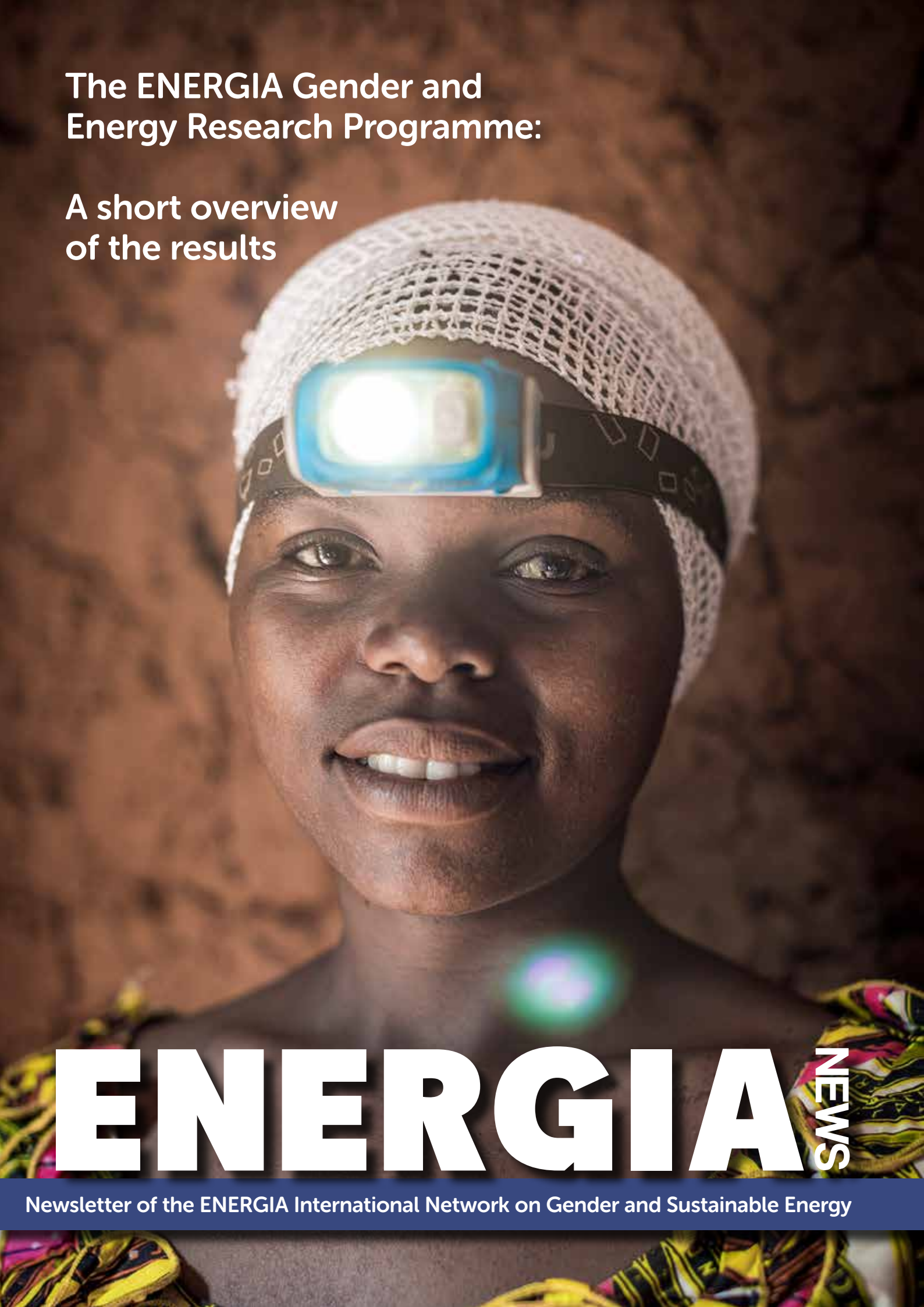
The ENERGIA Gender and Energy Research Programme:

A short overview of the results



ENERGIA NEWS

Newsletter of the ENERGIA International Network on Gender and Sustainable Energy

Colophon

This magazine is published by the ENERGIA International Secretariat, based at Hivos, People Unlimited. 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.

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Cover photo: In Umubuga Village, in Eastern Rwanda, Francine Nyirangirene is part of a group running a charging station. A blue charging box is connected to a solar panel and once the battery is full, it can charge up to five headlights at the same time. In the morning community members drop their lights at Francine's house, where she does the charging for a little fee. In the afternoon people pass by to pick up the lights again.

Photo: Sven Torfinn/ENERGIA

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Editorial

ENERGIA News: A special edition on the Gender and Energy Research Programme

In this ENERGIA News you will find evidence and highlights from the Gender and Energy Research programme, in which ENERGIA has worked, since 2014, with nine teams of researchers in 12 countries. This research programme has built an evidence base to support informed policy making to decrease gender inequalities in energy access and benefits of energy access. It has contributed to the development of an evidence base for improving energy investment effectiveness by understanding and better addressing women's specific needs for modern energy services. The objective of the Programme has been to generate and analyse empirical evidence on the links between gender, energy and poverty, and to inform policy and practice. The research themes were developed based on identification of priority gaps in evidence in the following areas: impacts of electrification; productive uses of energy; political economy of gender in energy sector; energy sector reform; the role of the private sector in scaling up energy access; women's energy entrepreneurship.

The research was carried out by nine research teams from 26 universities and research institutions, 19 of which were from the Global South, conducted research in 12 countries. These nine projects are presented in Box 1 .

The research programme has placed an emphasis on the combination of scientific research methods with dissemination of findings for policy makers and practitioners.

To provide rigour and insights into context, numbers and stories, the research teams used a mixed-methods approach, combining qualitative and quantitative methods, where the methods were developed according to the research questions for each project. This resulted in quantitative data from surveys covering in total more than 11 thousand interviewees. The qualitative data gathering included 547 semi-structured interviews, 188 key informant interviews, 293 participatory focus group discussions, and many stakeholder meetings ranging from workshops to discussions with experts, and literature studies.

Highlights of findings

The implications for policy from the studies from research programme studies are presented in the synthesis report of the research programme ***(ENERGIA 2019)*** in six main messages:

1. Universal energy access targets are unlikely to be met unless energy policies are aligned to women's as well as men's energy needs, their assets, skills, limitations and capabilities, and existing gender norms
2. Involvement of women in energy system supply chains is good for women and their families, and it is good for business
3. Modern energy services for women's productive uses contribute to women's empowerment
4. End-use appliances that deliver modern energy services to reduce drudgery and save time can transform gender roles and relations
5. Improving the affordability, reliability, capacity and convenience of modern energy services can help achieve gender-equitable outcomes, and will be critical for universal energy access
6. Engaging with political processes can help women access modern energy services and change gender norms.

A more elaborate article on these implications can be found on page 10. The main findings per research area are also laid out in separate articles within this issue.

Box 1

ENERGIA/DFID Gender and Energy Research Programme: Nine research areas (RAs)

1. **RA 1: Exploring factors that enhance and restrict women's empowerment through electrification**
   Lead partner: University of Oslo (UiO), Centre for Development and the Environment (SUM)
   With: The Energy & Resources Institute (TERI), Seacrester Consulting, Dunamai Energy
   Collaborating partner: Alternative Energy Promotion Centre (AEPC)

2. **RA 2: Productive uses of energy in the street food sector**
   Lead partner: University of Twente
   With: University of Cape Town, MARGE, ENDA

3. **RA 3: The gender factor in political economy of energy sector dynamics**
   Lead partner: M.S. Swaminathan Research Foundation
   With: Centre for Rural Technology - Nepal

4. **RA 4: Gender and fossil fuel subsidy reform**
   Lead partner: Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD)
   With: Bangladesh Institute of Development Studies (BIDS), Integrated Research and Action for Development (IRADe), Spaces for Change, The SMERU Research Institute, Universitas Gadjah Mada

5. **RA 5: Female microenterprise creation and business models for private sector distribution of low-cost off-grid LED lighting**
   Lead partner: Environmental Economics Policy Research Unit (EPRU)
   With: Nuru East Africa Ltd, Innovations for Poverty Action (IPA)

6. **RA 6: Unlocking the benefits of productive uses of energy.**
   Lead partner: Institute of Development Studies
   With: GIZ, Institute of Statistical, Social and Economic Research

7. **RA 7: Building the evidence base for women's empowerment and entrepreneurship to improve energy interventions' effectiveness: A literature review**
   Lead partner: Johns Hopkins Bloomberg's School of Public Health
   With: Babson College, International Center for Research on Women (ICRW)

8. **Commissioned research on lessons learned on gender approaches**
   Lead partner: University of Twenty
   With: Centre for Rural Technology – Nepal, ENDA Tiers Monde, Practical Action East Africa

9. **Levers of change: How global trends impact gender equality and social inclusion in access to sustainable energy**
   Lead partner: Sustainable Energy for All (SEforALL), United Nations Foundation

In such an extensive research programme, there have been many exciting findings and due to limited space we can only mention a few. Here we focus on some cross cutting points.

A finding is that a gender responsive approach to policy formulation and implementation takes into account the gender division of labour since this influences the opportunities that different forms of energy supply bring to women and men. A second key aspect of a truly gender responsive approach is the recognition of gender differences in access to, as well as control over, resources. The nature of differences vary with context per country, policy setting, economic status and depth of gender inequity. Nevertheless, they follow common patterns from deeply embedded norms and traditions, as patriarchy is implicit in the formal and societal institutions, influencing the choices men and women make and their roles in society. However, the research also shows that energy interventions can offer opportunities for change and contribute to changing roles.

Participation in the energy sector as suppliers or in sales of services is seen to empower women, increasing agency to make choices about their livelihoods including about energy services. Women's tasks differ from those of men especially as they relate to social norms about care for the family and household and in providing family income. Access to modern energy sources such as electricity and LPG can increase women's income from employment, participation in Self-Help Groups (SHG)/cooperatives and running their own enterprises. Such income, assuming that they have control over its use, can increase women's choice to access the energy services that they require.

Differences in energy needs and freedom to access energy services that meet priorities are gendered. This is not only evident in the appliances that are purchased and available for household tasks and activities, but also for activities related to income generation. Men and women tend to be represented in different types of income generation, in agriculture and in non-farm enterprise. This leads to differences in energy demands, which are typically missed by an energy policy focus on activities in the formal, higher electricity intensive enterprises in which men have a higher representation.

Policies and strategies for energy interventions are failing to take such gender differences into account and therefore risk missing development goals. While there has been considerable progress at the global level on recognising the links between gender and energy, it has been slower to take off at the national level. A review of the Audit Methodology of energy policies developed by ENERGIA has been shown to be successful in creating awareness at the national level of the links between gender and energy *(Clancy et al., 2016).*

Having the right data is the basis of policy making. An important finding from the research teams is the need to go beyond sex disaggregating the data. Firstly, women are not a homogeneous group and power relations also exist between women. There are a range of characteristics which influence energy access and energy demands. Geography matters – influencing the availability of infrastructure, including energy supply, and economic activity. Rural areas are less well served with modern energy supplies and appliances than urban areas. There are also variations between rural areas in the same country. People with higher incomes have more options to compensate for the lack of adequate energy supply through investing in independent or back-up technologies. This is a strong argument for analysing data using a range of socio-economic characteristics such as age, ethnicity, marital status and income group.

Achieving gender equality in policy outcomes requires a transformation of processes and of the organisations responsible for those processes, where men tend to dominate particularly in technical and policy making positions. There are signs in the countries where the research programme was active, that Ministries and Energy Agencies are now taking steps to become more gender aware in their organisations, for example, by establishing gender desks and with more inclusive employment policies which encourage women to taking up opportunities to work in the sector.

More detailed highlights of findings are provided in this ENERGIA News for each of the research teams.

- **RA 1: Exploring factors that enhance and restrict women's empowerment through electrification - page 16**
- **RA 2: Productive uses of energy in the street food sector - page 19**
- **RA 3: The gender factor in political economy of energy sector dynamics - page 23**
- **RA 4: Gender and fossil fuel subsidy reform - page 27**
- **RA 5: Female microenterprise creation and business models for private sector distribution of low-cost off-grid LED lighting - page 31**
- **RA 6: Unlocking the benefits of productive uses of energy - page 35**
- **RA 7: Building the evidence base for women's empowerment and entrepreneurship to improve energy interventions' effectiveness: A literature review - page 39**

Case studies illustrating some of the findings can be found on pages 22, 26 and 34.

Innovation through the research programme

The research programme used innovative approaches through the set up and design which was based on a foundation of collaboration and exchange between many different perspectives. Researchers came from different scientific backgrounds and different countries.

The setup of the programme included a scoping phase in which the study approaches were detailed and revised according to findings from the literature, consultation with policy, and a review by experts from both policy and research perspectives. In the second phase of the programme, the teams used a range of quantitative and qualitative research methods to collect and analyse their data. Further, collaboration between research teams took place both in small joint projects, and through discussions at annual meetings. On page 30 Shruti Sharma shares the experience of such cross-research team collaboration.

One of the reasons that gender and energy had received relatively little attention from research is the complexity of the gender and energy nexus. In order to provide a holistic answer to questions, research needs to draw on a range of disciplines including the political, social and technical, medical and behavioural sciences. With the effort and significant investments of the community of researchers in the Gender and Energy Research Programme to exchange, build capacity, and develop interdisciplinary approaches, important steps in developing insights and methods that address the complexity of doing research for practice have been made.

Also, research methods and approaches have been applied to the gender and energy nexus for the first time. For example the application of Randomized Controlled Trial (RCT) methodology for women energy entrepreneurs and the influence on livelihoods. An RCT is an experiment that aims to reduce certain sources of bias when testing the effectiveness of an intervention by comparing two groups – one of which is the focus of the intervention and the other group has no intervention. A second innovation in the research approaches is the combination of gender and feminist discourse in a political economy approach. While political economy analysis is a long established technique which aims to understand how change happens, identify how best to influence change and make more politically informed decisions, including gender analysis as part of the tool kit is a relatively new area.

The interaction with policy stakeholders at different levels has provided different focus and pathways for the research, and has created awareness of gender issues in a diverse range of actors. For example, the research on productive uses of energy in the informal sector refocussed on the street food sector to fit with policy frameworks, and engagement took place not only with policy makers in energy and business development, but also with municipal planners, a policy field that is rarely represented in energy policy development. Further, the interaction with policy development at global level, with the SDG development process and through NGO's and CSO's, has attracted much attention and interest in evidence on gender and energy, and has led to revisions in the policy briefs to the SDG development process. Interviews with Minoru Takada from UN DESA

and Sheila Oparaocha from ENERGIA on page 14 and page 43 detail more on the influence of the research programme on global policy making.

Next directions for Gender and Energy research and following up with uptake of findings

The community of researchers working in the Gender and Energy research programme have now presented the main research findings from the research programme, in research reports, but also in policy briefs and workshops and other forms of engagement with stakeholders. Following up on the work done will be in two directions. The first is supporting the uptake of research findings by policy and practice. Different members of the research programme are disseminating the work through their policy work. In 2019-2020, the ENERGIA International Secretariat is increasing uptake of findings by collaboration with selected stakeholders for whom the research findings and evidence fulfil a need in the development of gender responsive policy and policy development frameworks. In this ENERGIA News, Ana Pueyo tells us about ECREEE development of gender National Action Plans in the 15 ECOWAS countries which also make use of the findings of the ENERGIA research programme (page 38). ENERGIA is also collaborating with DFID's Sustainable Energy Access and Gender (SEAG) programme partners GOGLA and Practical Action in our outreach activities.

The second direction of follow up is to build on the evidence base that has been developed, to extend the scope of findings to different contexts, to expand on research questions that were uncovered during the process of research, and to respond to the developments in the field of policy and practice. In ENERGIA, our focus will be to expand the evidence with research that feeds directly into the needs of our stakeholder networks in international policy and advocacy, in Women's Economic Empowerment through the support of women energy entrepreneurs, and in innovations that will potentially have a great impact on women as energy users.

ENERGIA (2019). *Gender in the transition to sustainable energy for all: From evidence to inclusive policies.* The Hague: ENERGIA International Secretariat.

Clancy, J., Mohlakoana N. and Diagne Gueye, Y. (2016). *Mainstreaming Gender in Energy Sector Practice and Policy: Lessons From the ENERGIA International Network.* The Hague: ENERGIA International Secretariat.

Editors

Joy Clancy

Prof. Joy Clancy is a founder member of ENERGIA and was the Principal Investigator for the Gender and Energy Research Programme. In that capacity she ensured feedback and assessment of the research projects and was the principle author of the synthesis report. In 2016, Joy was appointed as a full professor Energy and Gender at the University of Twente, where she has worked since 1989 and is currently a member of the Department of Governance and Technology for Sustainability (CSTM). Joy's research has focused, for more than 30 years, on small scale energy systems for developing countries, including the technology transfer process and the role that energy plays as an input for small businesses and the potential it offers entrepreneurs, particularly women. From 2009 to 2013 Joy was a technical advisor on gender and energy to the World Bank AFREA Programme. Recently she has been working on social inclusion and exclusion in biofuel value chains and the impacts on poverty as well as producing two reports on gender and energy poverty within the European Union for the Women's Committee of the European Parliament.

Annemarije Kooijman-van Dijk

Dr. Annemarije Kooijman – van Dijk joined the ENERGIA International Secretariat in the summer of 2014 as Programme Coordinator for the Gender and Energy Research Programme. As Programme Coordinator, Annemarije ensured feedback and assessment of the research projects, to strengthen the individual research reports and the overall synthesis report. Currently Annemarije focuses on the uptake and promotion of the overall findings of the research programme. Before joining ENERGIA, Annemarije worked at the University of Twente for over 10 years, and at the Energy Research Centre of Netherlands (ECN) for 5 years. Annemarije has a Master's degree in Mechanical Engineering, and a PhD in Energy and Development, on which she has published a book: "The Power to Produce: the role of energy in poverty reduction through small scale enterprise in the Indian Himalayas". Her research work has been on energy and productive uses, renewable energy policy and diffusion of technology in small enterprises.

Why a gender and energy research programme?

People need energy in their everyday lives for essential services such as cooking and heating, lighting, food production and storage, education and health, industrial production, and transportation. Yet a lack of access to modern energy sources -such as electricity and gas- is still pervasive. One in five people in Africa and South Asia do not have access to electricity and close to 3 billion people (40 percent of the global population) use traditional fuels for daily cooking and heating (not all of whom live in The South). They burn solid fuels such as wood, charcoal, animal waste or crop residues in open fires or inefficient stoves. ***(UN, 2018)***. As a consequence, a significant portion of the global population is not able to adequately meet their daily needs, many of whom live in poverty with limited capacity to improve their condition.

It is in this context that DFID developed the Sustainable Energy Access and Gender (SEAG) programme for the development of data and evidence. Within the SEAG, the ENERGIA Gender and Energy Research Programme was set up to expand the evidence base related to the topic of gender and energy.

Informed policy is needed to increase gender equality of energy supply

There are gender issues linked to the access to energy supplies and in the outcomes of energy services. Women and men often use, are affected by, or benefit from energy services differently with unequal social or economic outcomes. The experiences of women and men with energy services should not be considered in isolation, because the activities of the one may affect the opportunities of the other ***(Clancy et al., 2012).***

However, interventions to improve access to energy services, whether from public or private sector organizations, or from civil society, are usually gender blind. Frameworks in which these interventions take place neglect gender differences, with little attention to the specific interests of women to meet their practical needs and aspirations. Women have limited influence over these frameworks and play a limited role in delivering energy interventions.

Policy makers need to be aware of these differences in access to energy and in benefits of energy services between women and men, so they can take them into account in energy policies. However, the evidence on the gender and energy nexus for such informed policy making has, until recently, been limited.

Need to expand the evidence base on gender and energy

The attention for the topic gender and energy in policy and research emerged in the 1980's and has gradually evolved since then. In the early 1980s, awareness started to grow about issues related to women and energy (rather than gender, which looks at the impacts on both women and men and the correlation between these impacts), with a narrow focus on cooking as synonymous with household energy. A landmark paper by Cecelski (1987) extended the analysis by pointing out the unique relation between women, traditional fuel use and productive activities. At the Beijing Conference on Women in 1995 there was little attention to energy specifically, but it did move the discourse from 'women' to 'gender'. At the same time, energy interventions also began to evolve from a technical focus on stoves, time-saving, wood-lots and biomass fuels, and appropriate technology to one that encompassed a broader range of issues including pricing, transport and modern energy forms, such as electricity and LPG (Cecelski, 1995). Another shift included increasing the range of stakeholders involved at all stages of an energy intervention – from policy and technology design to implementation. The end users of technology began to be gradually more involved in promoting energy access. At this stage we began to see an acknowledgement of the role of women as active agents in formulating energy policy and its implementation, including the effect of women's participation in economic and political activities on their empowerment.

The role of energy as a means for redressing historic gender inequities is now appreciated in international development discourses. An indicator of this recognition can be seen in the United Nation's Sustainable Development Goals (SDGs), which aim to end poverty and promote human well-being while safeguarding ecological systems of the planet by 2030. There are 17 goals in total, each with a set of targets. In the context of gender and energy the two goals that are especially relevant are SDG 5 (Gender Equality) and SDG 7 (Affordable and Clean Energy) (see Figure 1). All goals are intended to be mutually reinforcing, an example of which could be women's active participation in formulating energy policy (Goal 5.5) to deliver universal access to affordable, reliable and modern energy services (Goal 7.1).

An assessment of the gender and energy literature concluded that there is a need to generate new knowledge and close gaps. Prior to the start of the research programme in 2014, there was very little high quality rigorous, independent, quantitative assessment of causal impacts of energy from a gender

Figure 1

perspective in the peer-review literature. This was the conclusion of the small number of studies which have reviewed the evidence of the gender-energy-poverty nexus and the contributions improving energy access makes to women's lives both at the practical level and strategically ***(Clancy and Stockbridge, 2017; Cooke et al., 2008; Köhlin et al., 2011).*** The studies that do exist have presented useful findings, although they typically have a specific focus, such as the impacts of an energy system (e.g. multifunctional platforms) ***(UNDP, 2004)*** or energy service targeting energy use by women (e.g cookstoves). Further, there have been evaluations of energy interventions, which have mainly focused on outcomes at the household level, often neglecting an assessment of policies, processes and organizations. Other criticisms of these evaluations include a tendency to use gender neutral terms such as 'people' or 'consumers', making it difficult to assess any gender differentiation in outcomes. Household energy evaluations also tend to be single country studies, based on very small sample sizes, which makes it difficult to generalize.

All in all, the body of independent empirical evidence about the impacts of energy interventions on socio-economic outcomes was small, and even more so in terms of gender differentiated outcomes. The need for such evidence has increased since donors are basing their investments on empirical evidence. The following pages give an overview of the findings of each research project as well as the overall synthesis report.

UN (2018). *Accelerating SDG7 Achievement. Report prepared for the United Nations High-Level Political Forum 2018.* New York: United Nations (UN).

Clancy, J., Winther, T., Matinga, M. and Oparaocha, S. (2012). *Gender equity in access to and benefits from modern energy and improved energy technologies. World Development Report 2012 Background Paper.* Washington, DC: Social Development Unit, World Bank.

Cecelski, E. (1987). *Energy and rural women's work: crisis, response and policy alternatives. International Labour Review* 126(1): 41-64.

Cecelski, E. (1995). *From Rio to Beijing: engendering the energy debate.* Energy Policy, Vol. 23, No. 6, pp. 561-575.

Clancy, J. and Stockbridge, M. (2017). *Energy access and gender equality: what we know so far and knowledge gaps.* Policy brief. The Hague: ENERGIA Gender and Energy Research Programme.

Cooke, P., Köhlin, G. and Hyde, W.F. (2008). Fuelwood, *Forests and Community Management – Evidence from Household Studies.* Environment and Development Economics 13: 103-135.

Köhlin, G., Pattanayak, S.K., Sills, E.O. and Wilfong, C. (2011). *Energy, Gender and Development: What are the Linkages? Where is the Evidence?* Policy Research Working Paper 5800 Background Paper to the 2012 World Development Report. Washington, DC: Social Development Unit, World Bank.

UNDP (2004). *Reducing Rural Poverty through Increased Access to Energy Services: A Review of the Multifunctional Platform Project in Mali.* New York: United Nations Development Programme.

From evidence to inclusive policies for sustainable energy for all

A Summary of Insights from ENERGIA's Research Programme

If properly engaged in energy-system supply chains, women can challenge gender norms in households and communities. Photo: Solar Sister/ENERGIA

Since 2015, Sustainable Development Goal 7 has provided an ambitious mandate to ensure access to modern energy for all, to double the share of renewable energy in the global energy mix, and double the global rate of improvement in energy efficiency. The overwhelming reality is that it will not be possible to meet targets for affordable, reliable, sustainable, and modern energy access for all by 2030 unless the energy needs of women are met.

The objective of ENERGIA's research programme has been to generate and analyze empirical evidence on the links between gender, energy and poverty, and to translate this evidence into findings to inform energy policy and practice. By drawing decision makers and implementing agencies attention to the gaps in reaching universal energy access, they will be prompted into action. However, how to close these gaps? ENERGIA believes that a gender approach in energy interventions can help close the gaps. The research programme provided the opportunity, in the context of energy access sought to gain insights into how a more gendered approach can: i) lead to greater equity between women and men in the impact of modern energy services; and ii) transform traditional female/male roles and relations by empowering women

when they have improved access to, or participate in the delivery of modern energy services. The findings from the programme inform policy makers on gender approaches in the context of energy access.

Key findings based on crosscutting issues and recommendations from the ENERGIA-supported research reports are encapsulated in the synthesis report entitled, 'Gender in the transition to sustainable energy for all: from evidence to inclusive policies: Synthesis report of the evidence generated by the ENERGIA Gender and Energy Research Programme'[1].

The synthesis report is based on the empirical evidence developed by 9 research teams from 26 universities and research institutions, 19 of which were from the Global South, conducted research in 12 countries. The studies examined gender, energy and poverty linkages in the following thematic areas: (a) impacts of electrification, (b) productive uses of energy, (c) energy sector reform, (d) role of the private sector in scaling up energy access, (e) the political economy of energy sector policies, and (f) women's energy entrepreneurship. In this article, we summarize the key points of the synthesis report. All teams used a mixed-methods approach, combining quantitative and qualitative approaches to ensure rigour. Quantitative data was drawn from surveys, and qualitative data from semi-structured interviews (SSIs), key informant interviews (KIIs), and participatory focus group discussions (FGDs).

The six key research messages in a nutshell

 # 1 Universal energy access targets are unlikely to be met unless energy policies are aligned to women's, as well as men's energy needs, their assets, skills, limitations and capabilities, and existing gender norms. The research found that energy policies that do not explicitly target women often result in inequitable access to energy services between men and women. The reasons for this are related to differences between men and women in their energy needs, which is a function of societal norms and resulting differences in responsibilities of men and women, as well as their capacities to access energy services.

 # 2 Involvement of women in energy-system supply chains is good for women and their families, and it is good for business. The involvement of women in energy-system supply chains as entrepreneurs and employees – particularly in non-traditional roles – is a win-win situation. The energy supply chain offers the opportunity for women to earn an income, which can enhance their own and their family's welfare. Further, it can build their self-confidence and agency, challenging gender norms in households and communities. The research programme found evidence of increased spending on food and time of children spent studying when women earn an income. For energy businesses, women can bring a unique value proposition as entrepreneurs. The research also showed that there is a positive relationship between the use of modern energy and the economic performance of a business. In the case of women's businesses, this was also seen to contribute to their economic empowerment.

 # 3 Modern energy services for women's productive uses contribute to women's empowerment
Women and men engage in different types of productive activities, at different locations, and have different access to enablers such as assets, finance, markets, infrastructure and skills. Therefore, the benefits they derive from using modern energy in their productive activities differ. Men, for example, are typically involved in larger enterprises that use electricity, while women are more reliant on fuels such as firewood, charcoal and LPG for running their businesses. There is however, a positive relationship between the use of modern energy and the economic performance of a business. In the case of women's businesses, it also contributes, but is not the only ingredient to economic empowerment. A number of complementary factors, such as access to finance, training and assets as well as favourable social and cultural norms reduce barriers and support empowerment impacts. Currently, opportunities to advance progress toward the SDGs through support of productive use of energy for women are being missed, due to incomplete understanding about the nature of women's businesses.

 # 4 End-use appliances that deliver modern energy services to reduce drudgery and save time can transform gender roles and relations. The research showed that besides end-use appliances used by all household members such as televisions and fans, women prioritized electric appliances that help them perform their daily chores better, such as electric kettles in Kenya and rice cookers in Nepal. On the other hand, men prioritized television sets, radios, refrigerators and sound systems. The choice of appliances, how readily available and affordable they are, and how reliable the energy supply is, largely determines the impact of increased energy access. Some appliances meet women's practical needs and reduce drudgery in their current roles – both in unpaid care work and in their income-earning activities. These appliances

[1] This five-year research programme on gender and energy (2014- 2019), coordinated by ENERGIA, was supported by the UK's Department for International Development (DFID) as part of its Sustainable Energy, Access and Gender (SEAG) programme.
[2] Note: All content in this article is extracted from the original article with all due recognition for the authors of the said report.

A better understanding of modern energy services for women's productive uses is needed to support women's empowerment. Photo: Sven Torfinn/ENERGIA

also contribute to building women's human and social capitals[3] .

 # 5 Improving the affordability, reliability, capacity and convenience of modern energy services can help achieve gender-equitable outcomes, and will be critical for universal energy access. Among the various characteristics of energy supply, affordability of modern energy is well-recognized as a significant barrier for low-income households and the enterprises they run. Subsidies have been the common policy instrument aimed at helping low-income households gain access to modern energy sources. While the problems of subsidies not reaching target groups are well known, the key to success appears to be specific targeting- where for instance targeting poor women increases uptake of LPG. At the same time, offering other flexible payment options and introducing smaller appliances or refills could allow energy services to be more affordable. Quality of energy supply is also seen to directly affect the quality of community services, such as schools and health clinics, which in turn feeds into the quality of outcomes of those services. Convenience of supply through proximity and ease of use is not a luxury, but increases access for women where mobility and power relations form a barrier to access to energy services.

 # 6 Engaging with political processes can help women access modern energy services and change gender norms. The research shows that gender norms differ between communities in the way they influence access and control over energy services – so 'context matters'. A significant contribution of this research has been to combine a gender analysis with political and economic processes to understand the strategic energy needs of rural women (and men), who have experienced discrimination, marginalization and exclusion in the development of energy infrastructure. Use of modern energy services can contribute to changing gender norms and increased gender equality. Hence, organizations delivering energy services can be more effective if they are gender aware. Women's capacity to contribute to a gender-aware energy policy has been limited by their involvement in policy influencing. However, there are signs, for example in India and Nepal, that this is beginning to change with women

[3] Human capital: The knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being.
Social capital: networks together with shared norms, values and understandings that facilitate co-operation within or among groups.
OECD (2001) The Well-being of Nations: The Role of Human and Social Capital. Paris: Organisation for Economic Co-operation and Development (OECD).

being increasingly recognised by policy makers as a key stakeholder group and introducing policies advocated by, or thought to benefit, those groups.

What can policymakers do?

Based on the findings, the synthesis report formulates policy recommendations, a number of which can be seen to cut across all our research areas.

- Engage both women and men in the design, implementation, and monitoring and evaluation (M&E) of energy policies and programmes to enable gender equitable outcomes
- Support women's involvement in energy-system value chains and employment, both by overcoming gender barriers and through equal opportunity strategies.
- Multiply social and economic impacts of energy access by targeting women's productive uses.
- Increase poor women's ability to afford energy services, through innovative financial mechanisms, and improving the enabling environment for women.
- Improve reliability, convenience, and quality of energy supply to increase women's and men's access to and use of energy services.
- Support women's role in energy decision-making at household, organisational and policy levels.

The time to act is now

In 2017, for the first time, the number of people without access to electricity dipped below 1 billion, nevertheless energy access trends continue to fall short of global goals (IEA, 2018). More than 700 million people, predominantly in rural settlements in sub-Saharan Africa, are projected to remain without electricity in 2040. Currently, three billion people lack access to clean-cooking solutions and are exposed to dangerous levels of indoor air pollution, with women and children most at risk. The urgency of these issues requires a radical rethink of how women can both benefit from and contribute to the energy transition. The SDGs give a framework for action to which the global community has committed.

At the international and national levels, key actors including governments, donors, multilateral organizations and civil society organizations are striving to address these needs through policy and programmes. A lack of understanding of gender dynamics in the energy sector, limited evidence on linkages between energy interventions and gender outcomes, and the absence of sex-disaggregated data, are obstacles to these efforts. Therefore, in addition to the seven empirical research reports published by ENERGIA, there is a need for 'dissemination-influence-change' programmes, coupled with capacity development of target stakeholders/influencers including international and national agencies, public and private organisations and NGOs, to facilitate the uptake and utilization of the research conclusions and recommendations.

For the full synthesis report, visit: https://www.energia.org/synthesisreport

Public infrastructure and services such as schools and health clinics are affected by reliability, convenience, and quality of energy to deliver their services. Photo: Solar Sister/Show the Good

An interview with... Minoru Takada

Team Leader Sustainable Energy, UN DESA

Dr. Takada is the Team Leader Sustainable Energy at United Nations Development of Economic and Social Affairs (UN DESA), Division for Sustainable Development Goals. In this capacity he spearheads Technical Advisory Group equipped with the task to take stock on progress on SDG 7 and interlinkages with other SDGs. Prior to holding this position he was the Representative of the New York office of the Sustainable Energy for All initiative and Head of the Sustainable Energy Programme at United Nations Development Programme (UNDP).

What concrete progress in energy access for women and girls in developing countries do you expect by the end of 2030?

Empowering women and girls requires ensuring universal access to electricity and clean cooking solutions by 2030, and that is entirely achievable.

Sustainable Development Goal 7 includes five targets and a number of indicators. In developing countries, the most critical challenge is to ensure access to modern energy services. This includes ensuring electricity access and clean cooking solutions for all by 2030.

From women's perspective, both aspects are critically needed to enable opportunities. Electricity is fundamental for modern life, as it is directly linked to technologies, information, knowledge sharing and business opportunities. Unfortunately, many areas in developing countries are still not reached by grid or off-grid electrification, affecting women the most.

Similarly, special attention is needed to ensure access to modern cooking solutions. Roughly 3 billion people still rely on dirty biomass fuels and animal waste for cooking and are exposed to hazardous levels of air pollution, which results in millions of deaths each year, particularly among women and young girls responsible for most of the household chores. Among the SDG 7 targets, ensuring clean cooking solutions is the one lacking behind most. We must bring clean cooking solutions to the top of the national and international agenda.

These two factors, electricity and clean cooking solutions, will greatly boost women's empowerment in developing countries. And I hope we will be able to move forward to address the existing challenges and achieve modern energy solutions for all.

What role does evidence-based research play in reaching the SDGs? For example, earlier this year, ENERGIA's research programme provided inputs into Policy Brief number 4 on Energy and SDG10, which is one of a number of Policy Briefs on SDG7 interlinkages in support of the High Level Political Forum 2019. Are there other ways researchers can convey their findings to support the Global Community in achieving the SDGs?

Reliable evidence informs the development and implementation of sustainable and long-term policies. The Intergovernmental Panel on Climate Change (IPCC) reports are a good example of how science and research can interface and inform macro-policy discussions on how to address climate change. Another example is the SDG7 Policy Briefs developed by the multi-stakeholder SDG 7 Technical Advisory Group (SDG7-TAG), convened by the UN Department of Economic and Social Affairs (UN DESA), to inform intergovernmental discussions on SDG 7 at the UN High Level Political Forum (HLPF).

The work of SDG7-TAG has produced a tremendous impact to-date. First, the Policy Briefs informed the orientation of the HLPF Ministerial Declaration on the first review of the SDG 7 in 2018 and the deliberations of the HLPF in 2019. Second, the summary for policy-makers, presented in the Policy Briefs, became the basis for the global plan of action for the UN Decade of Sustainable Energy for All 2014-2024, endorsed by the UN General Assembly. ENERGIA played a crucial role both in terms of providing multi-stakeholder leadership (Ms. Sheila Oparaocha of ENERGIA serves as a co-facilitator) and harnessing its analytical capacities to develop policy briefs on the interlinkages between SDG7, SDG5 and SDG10. ENERGIA's contribution to the Policy Briefs on the linkages between energy and gender shaped the global debate, and shone a light on the importance of considering a gender-perspective in the energy sector. Bringing evidence to high-level discussions is an effective strategy, as national and

international governments are aligning their policies to what actually works. It's my hope that ENERGIA will continue to contribute to the global discussion through its evidence-based research reports.

Do you have any suggestions for where ENERGIA's research programme and the research partners can contribute to reaching the SDGs (particularly the mutuality of 5 and 7)?

Better data and analysis is a foundation for sound policies and investment decisions to unlock the potential of women.

Firstly, most of the SDGs are gender-sensitive, yet we often do not have sufficient data and analysis to show the degree of such sensitivity. For example, the lack of sex-disaggregated data results in an incomplete understanding about how the current state of energy access is affecting men and women differently. Without gender-disaggregated data, it is not possible to inform policy makers on the actions needed, and this hinders a gender-balanced energy transition. It is my hope that ENERGIA, by mobilising a network of research organisations, can take action for more and better gender data to inform and shape the policy measures at global and national level.

Secondly, we need a better understanding of how on-going clean energy transitions affect the status of women, their lives and their employment opportunities. Over the last decade, an enormous diffusion of clean and renewable energy technologies has happened and progress will continue over the coming decades. This development is clearly driving the expansion of modern energy access including for women in developing countries. But, beyond the increased energy access, what does this mean in terms of job opportunities for women and for their empowerment. Building evidence on the job opportunities in those countries where clean energy transition is already happening is of particular interest. By leveraging its network of allies and partners, ENERGIA's analysis should shed light on the barriers and impacts of the energy transition on women's life, providing a solid base for use by governments and policy makers to advance gender equality in the energy sector.

Access to clean energy affects women's lives, status and employment opportunities. Photo: Sven Torfinn/ENERGIA

Solar lanterns are flexible and can therefore be used in different rooms, according to the needs. Photo: Sven Torfinn/ENERGIA

Why the energy system needs to change

RA 1

Insights into how the energy supply chain disproportionately favors men over women and what can be done

If energy interventions do not take gender into account, or are 'gender-blind', often women will be left out of the energy supply chain and their empowerment hindered. This, and much more, is revealed in a recent research paper, written by: Dr. Tanja Winther, Dr. Kirsten Ulsrud, Dr. Margaret N. Matinga, Ms. Anjali Saini, Dr. Mini Govindan, Ms. Bigsna Gill, Mr. Debajit Palit, Mr. Deborshi Brahmachari, Ms. Rashmi Murali, Ms. Kristen Wanyama and Mr. Henry Gichungi. Their paper is entitled: *'Women's empowerment and electricity access: How do grid and off-grid systems enhance or restrict gender equality?'*[1]

The research paper presents the results of a four-year independent research project, supported by ENERGIA in its Research Area 1 (RA1). The research team examined women's empowerment through electricity access, with attention to the effects of electricity provided by the grid and various off-grid systems.

Transforming gender ideology and norms

In their study, Winther and team explored women's electricity access in selected areas in rural Nepal, Kenya and India. A central feature of the research was to investigate how different characteristics of the socio-cultural and material contexts conditioned electricity's gendered outcomes in each of the three contexts. The research team found that the socio-cultural context often hindered women in making decisions about electricity to the same extent as men and that gender

[1] *Note: All content in this article is extracted from the original report with all rights reserved for the authors of the said report.*

blind interventions resulted in more men than women becoming involved in energy supply. However, the level of inclusion varied between countries. In fact, the team noted that involving women in the supply is "the most directly observable pathway for transforming gender ideology and discriminating norms."

In the two interventions where women were put into leadership roles in the supply, this directly affected gender norms. The study found that initially there had been some resistance, particularly from village men, to women doing technical work: "customers perceived women to be more capable after seeing a woman working in the energy supply chain. 98% of respondents in Nepal and 77% Kenya said their views changed (about women's capabilities)."

Customers' perception of women's capabilities after seeing a woman working in the energy supply chain

Affordability, reliability and empowerment

The research team compared various systems of supply spanning from grids to portable lanterns, and examined how different systems empower women. Interestingly, they found that that the reliability and affordability (access and consumption) of energy are much more important factors in usage than the choice of system. At the same time, it appears that once governments do enable electricity supply to households, the focus on how the supply functions over time diminishes. This lack of attention to maintaining the quality thereby reduces the ability of the electricity to bring "empowerment, social and economic effects."

Reliability and affordability of energy - for access and consumption - are more important than the scale of the system, grid or decentralised.

With respect to the differences between systems of supply (socio-technical system design: fixed connections or mobile supply), the research team found that for those systems with fixed electricity connections, when combined with prevailing socio-cultural norms and customs, a woman had limited decision making power to obtain and use electricity and appliances. Yet, when the design of the electricity provision allowed for flexible services (such as with a solar lantern), women's agency appeared to be higher. This is because the access fee was lower than for fixed connections, the subscription to these services was not conditional upon existing land / house ownership status of women, and because lanterns could be used in a flexible way (i.e. in different rooms according to the needs). However, lanterns do not provide power to run appliances. Among the households that kept appliances (run by grid, mini-grid and/or solar home systems), these had more often been decided on by men than by women. Women's access to using appliances of their liking, such as rice cookers (common in the Nepali context), blenders and mobile phones are important to easing women's labour efforts.

Another effective mechanism for enhancing women's resources and thereby empowerment is potentially through "ensuring the enduring provision of reliable electricity to public services (water supply, health clinics, boarding schools)". Doing so would help to reduce women's hard labour, or drudgery, and has other impacts such as increasing safety and advancing children's learning. In the studied cases, this potential unfortunately remains largely untapped.

Leveraging the untapped potential through policy and practice

The researchers point out that, "while guidelines about understanding gender inequities in the energy sector exist, there is a need to update them by paying particular attention to addressing women's social conditions beyond education and financing." Socio-cultural barriers include, for example, marriages, work uniforms that are inconsistent with traditional values, and so on. The team suggests that the energy space should be modified to accommodate these and other socio-cultural needs of women.

Policy and implementation also needs to provide for reliable access to - and equipment for - public services. This can mean, for example, making a more comfortable working environment such as in India, where fans have been installed in schools, or, in Kenya, lighting for studying and for security, as well as power for laptops. "Policymakers and planners need frameworks and tools that define what kind of access, electricity services, associated equipment, and maintenance packages are required in different settings."

The private sector also plays an important role here, given their increasing engagement as implementers of government policy in providing energy supply to people. As noted in the research, the private sector "plays a

Getting women involved in the technical areas of supply can start to change attitudes about women's capabilities. Photo: Sven Torfinn/ENERGIA

role in structuring gender benefits and their influence will likely increase over the next few years." Therefore, public financing and regulations can and should be put in place to stimulate a gender transformative approach to service provision. The research team outlines some of their specific policy recommendations in line with this.

'Double transformation' opportunities and more

A key recommendation by the team includes that when wiring a household, priority should be given to the kitchen area. While this can mean women gain greater access to light, appliances and machines powered by electricity the outcome is limited to making women's household tasks easier. However, gender relations remain largely untouched. So to contribute to more gender equitable outcomes in the gender supply the team adds a second recommendation to "spot possibilities for 'double transformation' (electricity access and transformed gender relations) when setting up localised systems of electricity supply."

As was mentioned earlier, getting women involved in the technical areas of supply can start to change attitudes about women's capabilities. To ensure a more reliable energy supply, decentralised renewable and affordable energy options have been shown to be a means in providing energy services to the poor. Further, to help free up women's time, and to target benefits of electricity supply at services that would be relevant to women, the researchers suggest electricity, water and health sectors work together to ensure that village infrastructure is improved in key public services.

Overall, this ENERGIA-supported study helps us to understand how the organisation of the grid and off-grid energy supplies shape energy access as a gendered phenomenon, and what impacts effective policy can have if women are able to actively participate in supply. It is also not a question of the kind of energy technology being used, but more about an integrated approach which takes into account "the policies, practices, supply organization, end-user needs, social positions and aspirations."

For the full report: https://www.energia.org/RA1

Modern energy for women in the street food sector in Rwanda, Senegal and South Africa

Targeting energy interventions that further empower women

Street food is enjoyed by many people in different countries around the world, both rich and poor. At the same time, selling street food is also an important source of income for the hawkers, vendors, traders and enterprises behind the food stands. Because street food business has low barriers to starting an enterprise for the poor, it is relevant to study the role of energy and the opportunities this brings. This is also true for the women vendors in Rwanda, Senegal and South Africa, as found by N. Mohlakoana, A. Knox, A. Ranzanici, M. Diouf, H. Bressers, J. de Groot, W. Pailman, and V. Sanfelice (2019) in their research into men and women's productive uses of energy and their energy choices within the street food sector.

ENERGIA supported this research under its Research Area 2 (RA2) with as title of the research report *"Productive Uses of Energy and Gender in the Street Food Sector in Rwanda, Senegal and South Africa."*[1]

Making energy choices

The key to understanding energy choices in the street food sector is identifying the type of food product, and the availability and affordability of energy sources. The status of an enterprise, whether it is formal or informal, also plays a role in energy choices since it can determine which energy sources an enterprise can access. The choices for men and women working in the sector are not very different within a given context, but the choices do vary from country to country. The researchers explain:

[1] *Note: All content in this article is extracted from the original report with all rights reserved for the authors of the said report.*

The street food sector needs gender-sensitive policies able to support women in their business activities. Photo: Sven Torfinn/ENERGIA

In the street food sector, most of the informal businesses still rely on traditional fuels. Modern energy sources could help women's advancement in the sector. Photo: Sven Torfinn/ENERGIA

"The three countries present diverse patterns regarding energy use in the street food sector, and these are affected by different degrees of business formalization, and in the case of South Africa, by gender. This is also the country where as much as 70% of interviewees use electricity and/or gas for daily tasks, while in Rwanda we found a persisting heavy reliance on charcoal; Senegal is increasing its use of gas, but this very much related to the level of formalization of the business, with informal ones still relying on charcoal and, in a small extent, wood among men." In addition, the team's findings show that choices are slightly gendered, where men tend to diversify their energy mix more than women.
Indeed, most respondents reported that the main advantages of modern energy sources (gas and electricity) are that they are easier, quicker, faster and cleaner than traditional sources, such as charcoal and wood. The higher price of gas and electricity, however, remains a major barrier to the larger uptake of modern energy, especially among informal businesses. The speed of cooking is also correlated to higher productivity, rather than the final quality of the products itself: This is true especially for South Africa and Rwanda, with some exception for Senegal, electricity is considered important for the powering of ancillary services, such as TVs and radios, rather than for food-related activities.

Whereas access to modern energy services were considered by respondents to be instrumental in increasing productivity, modern appliances were considered to increase the attractiveness of the business, resulting in more customers: This is true for more than three-fourths of respondents, regardless the gender, the level of formality, or the country. This answer shows a strong commitment and willingness to grow by most respondents.

Overall, street food enterprises use multiple sources of energy. Both men and women recognize the added value of gas and electricity, from its time savings to having cleaner and healthier work environments.

Women dominate the street food sector

In the countries studied, more women than men work in the street food sector. As the street food sector is one of the easiest for women to enter, this makes it relevant for targeting energy interventions that can help empower women. The ability to locate one's business close to home in order to take care of household domestic chores and child-minding is attractive for women in Rwanda and Senegal. As the study points out, it is easier for women to operate enterprises or be employed in close proximity to their home, as the majority of them

are married and carry the burden of childcare and domestic chores.

"It is easier for women to operate enterprises or be employed in close proximity to their home, as the majority of them are married and carry the burden of childcare and domestic chores."

Reflections and recommendations

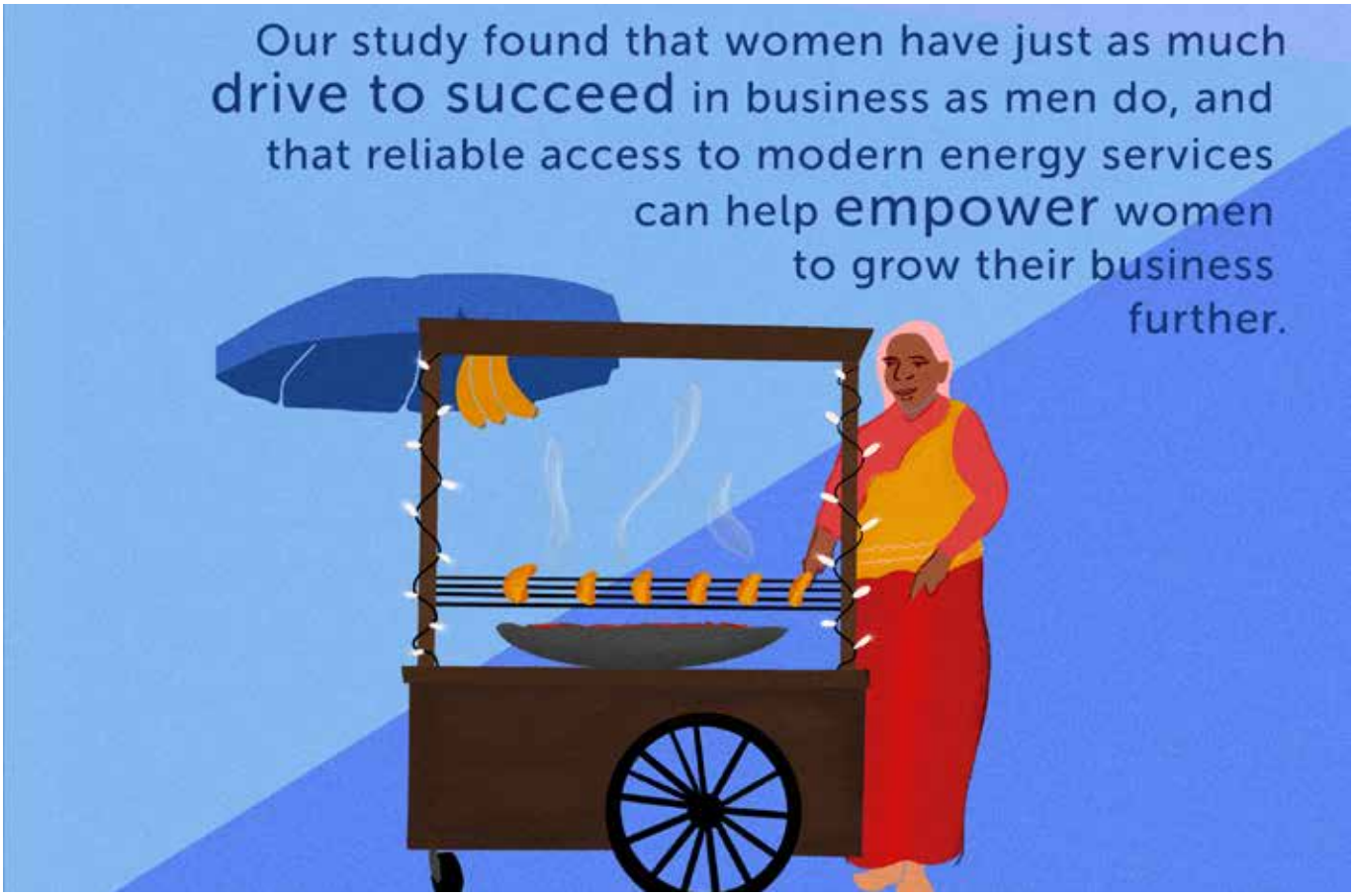
While across the three countries, women are prevalent in the street food sector, this could be at jeopardy if countries go about formalizing the sector without gendered policies. Ideologies about formalized growth-oriented enterprises favour men, who dominate these types of enterprises and sectors. Men tend to have higher levels of assets than women, making it easier for them to access bank loans at a level needed to enable enterprise growth. As highlighted in the report, "it is therefore important to have cautious and active gender-aware policies and interventions that support gender specific needs such as for business growth and energy use to ensure equal access to business opportunities."

The researchers' recommendations on the following points could help ensure that women can equitably grow and develop their businesses alongside men. Gendered recommendations include: i) Re-evaluating the regulatory paradigm; ii) creating integrated and innovative urban design and spatial planning for street food hubs; iii) piloting clean energy projects; iv) creating platforms for information and dissemination; v) quantifying energy costs, sources and uses; vi) offering energy subsidies and incentives; vii) leveraging health and safety food practices; viii) setting up appropriate financing mechanisms; ix) promoting bottom-up initiatives and x) providing training and education.

In short, as the research team highlights, "the use of multiple energy carriers in the street food sector - regardless the country, gender, or level of formalization, is evident, and it is probably here to stay." Diversification is a risk mitigation strategy for poor people, and it is usually driven by a mix of technical, economic and social factors, such as affordability, convenience, and availability of resources. "Energy use in the street food sector is no exception, also given its strong correlations with cultural and social norms that affect final preferences for energy carriers for specific food transformation processes."

Opportunities to earn an income in the street food sector is important for many women globally. Policy to support these women should realise that the diverse range of fuel use from wood to modern is essential to customers and to business operation.

To read the full report, visit:
https://www.energia.org/RA2



Story of change: **Self Help Groups enable rural women to go for clean cooking energy**

Tulasichoura is a village in Odisha state in Eastern India. The people in the 259 households of the village are small and marginal farmers, weavers, casual labourers and daily wage earners. Tulasichoura has an active Self Help Group (SHG) called Maa Santoshi. This group has been instrumental in facilitating women's access to and use of LPG in their kitchens.

This village is typical of similar small remote villages in the gender distribution of work, where the women do all the household work, from cooking and agricultural work to taking care of the children, ailing and elders. For economic aspects of their livelihoods women are dependent on their husbands. This dependence ranges from food and clothes to medical treatment, educational expenses for the children and even their own smaller day-to-day needs.

The village has been traditionally using firewood as a source of their fuel to cook food. However, the local women recognised several issues with this tradition. Besides wood producing smoke in the kitchen, compromising health, cooking with fuelwood requires extensive time and effort needed to cook with firewood which often goes unacknowledged. Family members seldom understand the situation and blame the women for not preparing food on time. While the women are the ones who prepare the food, the men have been the primary collectors of firewood. They do so on their own time, not necessarily responding to the women's needs. The problem that women face with the firewood is its scarcity and it being wet, which makes it difficult for them to cook with it and exacerbates the air pollution.

The two potential alternatives for cooking that were available in Tulasichoura were kerosene and electric stoves. However, neither of these were satisfactory. For kerosene, availability is a constraint due to its limited supply and because the kerosene shop is not located in the village. Kerosene also poses a hazard to health, with its toxic fumes. For cooking with kerosene and even more so with electricity, the affordability is a further issue.

In this situation of dependency and dissatisfaction with available energy options, the women in Tulasichoura organised themselves to make a change. In 2000, Kausalya Mohanta, a housewife, organised 14 women from the village and formed the "Maa Santoshi SHG'. The members decided to earn money, so that they would not depend on men any longer. They started making ropes and selling them in the local market, saving small amounts of money along the way. To start their business, they received a loan from a revolving fund from Community Development Programme. They gradually repaid the loan amount while saving at the same time and in 2003, the SHG members were able to set up a small Public Distribution Shop and to sell kerosene to the nearby village. In 2006 the SHG mobilised 100 gas connections and since then, the number of connections increased. The main challenge in cooking with LPG now is that the supply of cylinders does not always meet the demand.

As of 2011, the SHG started production of roasted cereals (chatua) under a Supplementary Nutrition programme and supplied packaged chatua to 143 child care centres. Although the women faced opposition from their husbands forming the SHG and setting up the shop, which included scolding and beating, the SHG increasingly also helped reduce incidences of violence as women opposed this behaviour as a group.

The SHG received an award from the district in both 2008 and 2013. The SHG members reported with pride: "Before the SHG, we were dependent on our husbands for money and now our husbands are asking for money from us." They are now able to provide good clothing and education to their children.

"Before the SHG, we were dependent on our husbands for money and now our husbands are asking for money from us."

Further, the LPG connection has reduced working time in the kitchen and the cleaning of utensils. This extra time has enabled them to spend more time on the SHG-related activities and other opportunities to earn an income outside of the home.

Kausalya with her machine for Chatua grinding, Mayurbhanj, Odisha. Photo: MSSRF

Women's meeting at the Swaminathan Research Foundation to improve their entrepreneurial skills. Photo: Elavarasan Devarajan/ENERGIA

Gender dynamics in accessing and use of modern energy services

What happens when women's time is valued

RA 3

How can rural women be empowered to gain access to and use modern energy services in both household and production activities in the rural economies – in Nepal and India? That's the main research question the research team sought to answer in an ENERGIA-supported research study entitled, "*The Gender Factor in Political Economy of Energy Sector Dynamics.*"[1] The research was conducted by ENERGIA research partners M.S. Swaminathan Research Foundation in Chennai, India and the Centre for Rural Technology, Kathmandu, Nepal under ENERGIA's Research Area 3 (RA3). RA3 focuses on the gender factor in political economy of energy sector dynamics.

[1] *Note: All content in this article is extracted from the original report with all rights reserved for the authors of the said report.*

Modern energy usage and income generation

It is argued that when women make an income, their time is deemed more valuable and modern energy sources help save time. This study explores the notion that modern energy usage correlates to a woman's involvement in income-generating activities. For instance, in India, the study found that 57% of women who were the breadwinners of the home, used LPG as their primary cooking fuel, compared to 29% of women who didn't earn an income. Those using LPG also tended to have a higher level of education and participated in a local women's Self Help Groups (SHGs), Community Based Organisations (CBOs). The study's qualitative research shows that participation in CBOs strengthens a woman's decision-making and to choose for LPG.

Women are usually not valued for their work nor their capacities to operate machinery. Our study shows a positive correlation between agency and energy use. Photo: Elavarasan Devarajan/ENERGIA

Next to income-generating activities, another opportunity the researchers identified in their study was around promoting the switch to cleaner fuels. They note that the government should help "spread the notion of clean fuel as the primary cooking fuel, to make it the 'new normal'." Such promotion, for example through national campaigns, could help reduce women's work drudgery and encourage healthier living in the home, from less polluting cooking fumes.

"57% of women who were the breadwinners of the home, used LPG as their primary cooking fuel, compared to 29% of women who didn't earn an income."

Pronounced gender differences in agricultural production

The study also examined the access and use of modern energy in agricultural production. In India and Nepal, women's and men's tasks are quite distinct in agriculture. "Land preparation, ploughing, transporting of produce and marketing are some of the main tasks of men, while transplanting, weeding, harvesting and post-harvest processing are some of the women's tasks." The research team observed some interesting tendencies: 1) agricultural work in the studied areas in Nepal, more so than those studied in India, is becoming more 'feminised', due to the higher level of rural male migration in Nepal to urban jobs; 2) "only a small proportion of women (about 12% in India and 19% in Nepal) own any land jointly with men or independently." It also turns out that women's tasks are much less mechanised (use of machinery) than men's.

The difference in mechanisation, according to the study, is because women's labour is not greatly valued and there is a stereotype that women can't acquire the skills to operate more complex machinery. These reasons and a number of others have resulted in a bias against women using modern energy based machines and equipment.

Changing the status quo in agriculture

The governments of Nepal and India, as well as NGOs, have recognised these issues women face in accessing and using machinery. For instance, "in India, several government schemes provide a higher subsidy for women than men in the purchase of machinery. This however, in order to be identified as being farmers, still requires women to own some land. In turn, there are men who have taken to registering some land, even very small bits of land, in the name of women." In Nepal, women who have a national identity card are able to buy land.

In India, an example of women's empowerment comes through their collective agency, where women are leveraging their groups to gain access to machinery, and NGOs "such as SEWA and the Kudumbashree's Green Army groups [which] have taught women to operate these machines, including land tillers." In addition, the development of smaller-sized equipment has also encouraged women's use. For instance, "solar pump sets, promoted by SEWA, have been installed in place of the earlier large diesel pump sets. Similarly, there is high demand in Nepal for small solar pump sets that can be used for irrigating small patches of land for vegetable cultivation." What is reassuring is that a household survey by the team showed that "membership in CBOs and education, in both [study areas in] India and Nepal, were positively associated with women's ownership of motorised machines."

"Women's membership in CBOs and education, in both India and Nepal, were positively associated with women's ownership of motorised machines."

In sum, "the roles of NGOs, women farmers' and women's movements in general have been important, as governments have responded to these agencies/ movements with supporting policies. International agencies have also been active in promoting women-specific agricultural technologies."

There is promise for women's empowerment in the future if these practices continue to grow and take hold in both countries.

Two-way relationship between energy and agency

What the study demonstrates is that there is a two-way linkage between energy and agency: "If women's agency enables them to turn access to clean energy into use, their use of modern energy in production, in turn, also increases women's agency or empowers them."

What the researchers recommend to further enable women's access to modern energy sources and machinery is to develop agricultural machine service centres in rural areas of developing countries. Another recommendation to promote women's empowerment is to promote policies that support women's ownership of land and other assets, and their roles as independent income earners.

The researchers also propose supporting women's groups or CBOs as a way to enhance women's agency to secure and use modern energy sources, both for use in economic production and domestic work. Moreover, the research team highlights that providing training on new fuel-based technologies, domestic and farm machinery, can empower women with the knowledge and skills they need to take advantage of the opportunities these technologies offer. When women's time is valued, the opportunities they can access multiply.

For the full research report, visit: https://www.energia.org/RA3

Story of change: **Women three-wheeler 'tempo' drivers in Nepal**

Mrs. Sarita Dagaura Chaudhary on her tempo. Photo: MSSRF

In Nepal, an overwhelming majority of women are engaged in household work. However, with changing times, modernization and an increase in socioeconomic development, Nepali women have started thinking about their careers beyond domestic work. One sector that women are turning to is the transport sector, a male-dominated sector in Nepal. Now, it is not so uncommon to find a woman driving a three-wheeled tempo, a battery-powered vehicle used as a taxi.

One of these female tempo-drivers is Sarita Dagaura Chaudhary, a 42-year old mother of three children and grandmother of three grandchildren. Dressed appropriately in a salwar suit, she is waiting to drive customers to their destination. She has been driving the vehicle for 18 months and has learnt to accelerate, brake and back the tempo on the highways of Ghodhaghodi Municipality in Western Nepal. "My work is my savior, and no work is wrong as long as it is done with honesty," Sarita says. She has successfully stepped into this male-dominated sector—transport—in one of the least-developed regions of Nepal. At the time of writing, Sarita is the only female electric tempo driver of the 29 total drivers that are operating along the roads of Ghodhaghodi Municipality.

Driving the tempo has become Sarita's principal source of income. She has managed to collect some money for paying back a loan, maintaining the tempo, household expenses and making some savings as well.

To save time from household chores, Sarita switched her cooking fuel from traditional fuelwood to improved cookstoves, and just recently she has begun using LPG. She says: "I understand the benefits of reducing the use of fuelwood and the impact of clean fuel on health and the environment. For me, this change in the cooking fuel comes from the need to be on the road before the other drivers."

Sarita believes the driving profession has made her more confident and capable of managing her family even better. "I do not accept that men are born stronger and women are weak and not able to do these challenging jobs."

Making fossil fuel subsidy reforms work for women and girls

Assessing subsidy impacts for low-income households in Bangladesh, India and Nigeria

Fossil fuel subsidies often don't reach the poorest families, especially women and girls. Why not? The reasons for this policy implementation failure and recommendations on how to address this in Bangladesh, India and Nigeria are explored in the research, *"Gender and fossil fuel subsidy reform: Findings from and recommendations for Bangladesh, India and Nigeria"*[1]. The research was carried out by a team of people from the Global Subsidies Initiative-IISD, BIDS, IRADe and Spaces for Change. ENERGIA supported this research under Research Area 4 (RA 4): Energy sector reforms and regulation.

The subtleties of subsidies

In their paper, the research team provides evidence to show that, in general, fossil fuel subsidies are often poorly targeted at providing benefits to the poor, and energy access outcomes, such as clean cooking. A lack of affordable alternatives to switch away from kerosene, for both lighting (Bangladesh), and for lighting and cooking (Nigeria) is an issue. Subsidised kerosene continues to lock families into use, where there are also health and safety implications. Yet, an increase in kerosene prices from reforms may have a greater impact on women in Nigeria and appears to affect men and women equally in Bangladesh.

In many countries, LPG is promoted as replacement for cooking with biomass. Such replacement could have positive health implications especially for women, as mostly women are found to be the cooks in households, also in the three country surveys in this study. However, the common practice is that multiple fuels are used in cooking (fuel stacking).

The team's research looked in detail into subsidies for LPG consumption and connection in India. The subsidy on LPG consumption, PAHAL, did not enable an expansion of access and was and still is a subsidy that is captured by wealthier segments of society although it is 'universally' available, to those that have access to LPG. The Pradhan Mantri Ujjwala Yojana (PMUY) scheme is a connection subsidy that reduces the upfront cost of the LPG stove and first cylinder which has taken a gender approach. The research found that "efforts to better target and expand the LPG subsidy to poorer women via the PMUY scheme are bearing fruit, with poor women receiving the LPG connection subsidy via their bank account." By specifically targeting women, the policy appears to have enabled an increase in decision-making power by women, at least on cooking fuels. This might be because decisions on cooking fuels have traditionally been with women where biomass was 'free'.

[1] *Note: All content in this article is extracted from the original report with all rights reserved for the authors of the said report.*

However, even this innovative gender responsive policy for LPG connections has been insufficient to lead to a full transition to LPG use. Initial evidence on the volume of use of LPG after the initial connection indicates that the use of other fuels next to LPG is very common.

While the above reflects subsidies not reaching the full target group, it is important to note that some subsidies do not even deliver lower subsidised prices in the market place. In Bangladesh the study found that the consumption subsidies did not actually result in lower prices to consumers for kerosene.

Energy switching

The study also looked into expected impacts on switching of fuels from hypothetical price increases, such as could follow from subsidy reforms. It found in India, that most households (including those within the PMUY scheme) would not revert away from LPG, and could potentially be able to absorb price increases. Yet, some households reported a likely increase in the use of biomass for cooking if prices for LPG (India) or kerosene (Nigeria) were to increase, for instance because of a reduction in subsidy levels.

Switching fuels is not only influenced by fuel affordability but also by other factors such as the level of education of women (Nigeria), a focus on upfront costs (India), and who has the decision to make energy choices (mostly men in Bangladesh, mostly women for cooking in India and Nigeria). The team's findings suggest that policymakers could do more to target subsidies away from fuels and towards outcomes. This would likely imply shifting to cash transfers based on gender empowerment outcomes. In terms of energy, this could mean switching support from kerosene and towards solar or grid electricity, or small photovoltaic (PV) lamps where kerosene is used for lighting. In terms of LPG it could imply targeting cooking or LPG subsidies to households and women who need it most, for upfront costs, via cash, based on purchase, as India is implementing.

In their paper, the research team also explains that education and safety information about fuels may be key to encouraging switching. Doing so would enable people to better understand how fuels can be used safely and how switching could improve their health. Therefore, awareness raising campaigns might need to target both men and women, given the broad range of household members involved in making decisions within families around energy use.

Purchasing and using fuels – the gender differences

Since the gender balance of who purchases (and uses) fuel can vary from community to community, the researchers suggest a need to understand the gender differences surrounding the use of different fuel types and taking this into consideration at the local level before undergoing reforms, and for policy makers to consider how to better direct subsidies towards energy access and gender outcomes.

For instance, according to the survey conducted in Bangladesh, "men are responsible for buying kerosene for more than 94% of households and reported purchasing kerosene on average about once a week. Therefore, any government policies to encourage the shift away from kerosene for lighting or towards non-solid fuels for cooking in Bangladesh will need to significantly involve men." Meanwhile, in Lagos and Imo, Nigeria, the survey found that "women pay mostly for kerosene and firewood, while men pay mostly for petrol, LPG and electricity. Therefore, higher prices for kerosene might therefore impact women's budgets and incomes more [than on men's]."

In India, on the other hand, the researchers found that "women are responsible for the collection and preparation of fuels like dung cake and fuelwood, as well as predominantly responsible for LPG collection. In rural areas, fuel management responsibility was seen to transition from women to men with LPG adoption, although this is likely due to lack of doorstep delivery. Clearly, each country and context (rural vs. urban) has its own fuel purchasing dynamics that must be considered in a subsidy scheme. Taking a gender-responsive approach to designing energy sector policies would help ensure that the contextual factors influencing outcomes of households and their individual members are taken into account.

Next to gendered differences in purchasing fuel, the fact that the responsibility of cooking within the household is so dominated by women across all three countries underscores the importance of getting cooking fuel subsidies and policies right, from a gender perspective. Yet, aligning policies such as PMUY so closely with both a specific cooking fuel (LPG) and a specific gender (females) risks reinforcing existing gender roles within the household, particularly around cooking. At the same time, the team also identified that with the introduction of LPG more men were found to be involved with cooking than households without LPG. Seventy percent of households having an LPG connection said a male member cooked at least one meal in the last 30 days, against the 58 percent households who did not have LPG connection.

Opportunities for policymakers are now

Improving energy access and implementing targeted energy policies in India, Nigeria and Bangladesh can have a high-impact on a very large number of people's lives. These are the three countries with the largest number of people globally without access to electricity (India: 270 million, Nigeria: 76 million and Bangladesh 39 million in 2016) (World Bank, 2018). They are also among the four with the largest number of people without access to clean cooking (India: 781 million, China: 572 million, Nigeria: 177 million, and Bangladesh: 134 million). With the right policies on cooking in these

three countries, it touches the lives of around one in eight people in the world.

Many countries - including the three in the study - are "reviewing energy subsidies, undergoing reforms, increasing prices but also have goals to increase energy access and women's empowerment." Given this review, the opportunity now is for those policymakers to "deliver and target policies—such as targeted LPG subsidies in India— that cluster gender and energy access benefits towards poor, often rural, women, in order to leave no-one behind."

The research team summarises their five overarching findings as follows.

"First, overall fuel subsidies are not working well for poor women." This is partly due to the fact that a large share of subsidies ends up with the wealthier segments of the population given their higher consumption and access to energy. Many low-income households in Bangladesh were not even aware that the subsidies exist. In addition, subsidies do not guarantee lower fuel prices and may even create price premiums, and subsidies can increase fuel scarcity. Fuel scarcity leads to long line waiting, a burden that often falls on women, as in Nigeria.

A second overall finding is that "better targeting of support for energy access is needed and possible." "A focus on connection over consumption subsidies can encourage gender empowerment around decisions to purchase new cooking equipment for LPG and overcome upfront connection costs." Such connection subsidies, however, also require good targeting.

The third finding is that "subsidy reform needs to be undertaken with care, and mitigation measures are needed to protect poor women." This is because women that use fuels which are subsidised are still sensitive to price increases. For instance, they may switch "back to biomass for cooking when prices increase, with time and health implications for women."

Fourth, other factors could be significant for fuel switching and better access to cleaner fuels for women. For example, according to the findings, "improving the fuel distribution system or electricity system, especially to rural areas and to the poor, in order to have alternatives to switch to" has a big impact on driving energy access, as has been seen in rural India. Awareness and education on the energy types go hand in hand with this switch as well.

The final overall finding and recommendation is with regard to "investing in subsidy alternatives that could empower women more directly." This could entail investments in "solar or grid electrification (to replace kerosene subsidies), and investments in social safety nets, healthcare, education or business loans for women."

All in all, from across the three countries reviewed, the PMUY LPG scheme in India provides an example of how the government has expanded LPG access to poor women, but there are many areas where governments can step up and improve their policies for both women and men. The most critical point is that when considering fuel pricing reforms, governments must pay close attention to the specific gender dynamics surrounding energy access and use at the local level e.g. who purchases and uses fuel between men, women and children, and also between rural and urban locations where a range of factors come into play. Ultimately, governments can then use the opportunity that reform may present to explore the mix of energy policy interventions needed to deliver actively targeted outcomes, towards both gender empowerment and energy access goals.

An interview with... Shruti Sharma

Associate and Energy Specialist in IISD's Energy programme and the India Project Coordinator

Shruti Sharma is a policy advisor and energy specialist, based in India for the IISD's Global Subsidies Initiative (GSI). Shruti's role includes managing research projects focused on understanding household energy transitions with a focus on electricity, LPG and renewable energy. These projects range from analysing fuel pricing policies, their reform and impact, with the aim of providing recommendations to national and state governments.

You have been involved in Gender and Energy Research Programme from 2015. What has been your role in this programme?

In the gender and energy programme, I am a member of the RA4 group that examined gender impacts of fossil fuel subsidies and their reform. Within this group, I was a researcher with GSI and was engaged in the research for three countries – Bangladesh, India and Nigeria.

As a member of the programme, what was your experience?

It was an exciting opportunity to be at the core of research that can inform policy design. Our research on gender-disaggregated impact of fuel subsidies was a new and under-researched topic. Yet it is very relevant for governments that are currently designing and implementing substantial energy sector reforms policies. As GSI is already present in key countries and engaged with governments, this programme allowed GSI to expand the canvas of engagement with governments by reeling in the topic of gender and energy in its own country operations. Regular programme meetings were a fantastic occasion to engage with researchers, particularly those from academia, based in different countries that experience similar energy access issues.

Part of the research programme was a small collaboration project between the RA1 team and the RA4 team. What was this project about, and what were some key findings?

The collaboration project explored interlinkages between household take-up of electricity and LPG for cooking and what this means for women's empowerment. The collaboration took advantage of the findings from two different research groups which focused on different energy (electricity and LPG) and was motivated by the fact that few studies showed interactions between them. The project found households' access to electricity, mobile phones, TV and a bank account are positively correlated with LPG ownership. But that LPG ownership does not necessarily translate into the consumption of LPG, leaving room for the government to further discourage the use of biomass for cooking. We also found that in the majority of the households, the decisions regarding switching to modern forms of energy largely remains with men, like the choice of cooking fuel and lighting sources. But the responsibility of collection of a fuel, like firewood or cow dung was predominantly with women. The project also observed an imbalance - a joint decision making is practised when it comes to spending women's income but not for men's income. This has implications on the kind of appliances purchased by households, some of which could help women save time on activities.

Could you highlight what you are most proud of having achieved as part of the ENERGIA Gender and Energy Research Programme, as a member of the RA4 team, and personally?

Through the scope of the research, RA4 got an opportunity to directly contribute to a dynamic policy landscape. RA4's members were actively engaged in countries where governments are currently designing and implementing substantial energy sector reforms. It was exciting to use this research and help governments make informed choices regarding energy sector reform policy implementation. We could also play a role in cross-country learning by sharing lessons from India, where the LPG energy subsidy is being targeted towards poor women, with other countries.

Personally, I found it enriching to become part of a network of researchers that pushed the boundaries of evidence-based policymaking. The limited research on gender and energy subsidy was motivation to engage with new research techniques from different geographies. I also developed my skills as I had the opportunity to present the research at international platforms further expanding the dialogue among development practitioners.

Thanks to rechargeable lights, school-age children are able to study after sunset. This is seen to benefit their productivity and educational outcomes. Photo: Sven Torfinn/ENERGIA

Increasing access to low-cost lighting while eliminating gender barriers in Rwanda

In Rwanda, expansion of grid electricity to rural areas is a challenge due to the hilly terrain and sparse settlement of households, together with the prevalence of low incomes in these areas and related issues with affordability. This has presented an opportunity for off-grid solutions. Indeed, off-grid solutions, such as home solar systems, have rapidly gained ground in recent years. However, the upfront cost of purchasing them poses a challenge for rural communities seeking access to reliable lighting sources.

The RA5 project looked into issues of affordability and benefits of low cost solar, as presented in the report entitled: "*Female Microenterprise Creation and Business Models for Private Sector Distribution of Low-Cost, Off-Grid, LED Lighting: Multiple Randomized Experiments.*"[1]

[1] *Note: All content in this article is extracted from the original report with all rights reserved for the authors of the said report.*

Specifically, Martine Visser and her colleagues studied the effects of including women as entrepreneurs in village level enterprises (VLEs) that recharge LED lights to rural poor households that are not on the national electricity grid. The research took place in 272 villages across two districts in Rwanda - Ruhango and Rulindo. ENERGIA supported this study under its Research Area 5 (RA5), in which randomised controlled trials were used to provide quantitative findings.

Modern energy benefits for everyone

Overall, the study found that providing opportunities for VLEs to sell modern energy technology was beneficial for the entrepreneur, their family and their village – with heightened benefits for female entrepreneurs and their families. The study also found that female and male entrepreneurs perform similarly in comparable circumstances, indicating that gender quotas in the public and private sector for entrepreneurs in this

situation work well. Using gender quotas is worth considering in other similar situations where going beyond recharging and village level (group enterprises) are goals. The results have important policy implications for addressing gender inequalities in the rural workforce in Rwanda.

'Providing opportunities for village-level enterprises (VLEs) to sell modern energy technology was beneficial for the entrepreneur, their family and their village – with heightened benefits for female entrepreneurs and their families.'

A second important finding was that in households of all-female VLEs, there are noticeable educational effects among school-age children, including increased time spent reading or studying at home by almost an hour per week compared to households, where the head – male or female – were not VLE members. The researchers also found that female VLEs are more likely, than male VLEs, to report expecting that their children will be studying in 3 years' time. In addition, children from female VLE households are more likely to expect to find a job that they enjoy.

Third, the research team found broad welfare impacts, tested through comparisons with control groups. Evidence shows that the overall microenterprise programme raised household consumption and expenditure levels, which is considered to be one of the best measures of poverty, and thus increased general welfare significantly. The evidence showed a clear and statistically significant effect of women being member of the Village Level Enterprise on expenditure on food. Moreover, the low-cost lighting programme saved households money on lighting, as well as reduced their use of dirty, smoky lighting, and increased the probability that children study with a clean, high-quality, luminous light source.

Increasing the use of low-cost LED lighting

The researchers furthermore provided evidence on the sensitivity to price of the demand for LED lighting sources. In order to ensure high take-up, very low prices, or even no fee, are required. While the effectiveness of subsidies is debated, this team's findings provides a motivation for subsidies, particularly for the most vulnerable, i.e. female-headed households in the rural areas.

Doing so would increase the usage of LED lights and further promote the use of similar low-cost energy solutions. If these lighting sources cannot be fully subsidised, the researchers recommend initially giving away lights for free and then, to recoup costs over the longer term, introducing pay-as-you-go (PAYG) micropayments.

The research team concluded there is an important role for innovation, such as door-to-door services and flexible payment options to increase access to low-cost lighting options. They highlight the need for policymakers to fund further research into innovative support mechanisms for the take-up and use of lighting that does not focus merely on pricing as a policy tool.

Concrete policy steps

Simple gender quotas, for instance, may be an effective means of levelling the playing field in the renewable sector, ensuring women's access to work, which in turn provides positive spillovers for their households. This is particularly important in a country like Rwanda where significant differences in opportunities still exist between men and women.

Following from this study, policymakers in Rwanda can take concrete steps to support women and men-led VLEs and increase their access to low-cost lighting solutions. Doing so has enabled females to work after dark and males to spend time on finding food for livestock and provided the opportunity for families to have a supplementary income (i.e. increased food purchases amongst female VLEs and increased leisure expenditures and savings amongst male VLEs). Meanwhile, children benefit from getting additional time to study. Women and their families can elevate their status in the community - a significant step in women's empowerment.

For the full research report, visit: https://www.energia.org/RA5

Vivian Mutuyimare and two of her friends run a charging station. A solar panel provides the electricity needed to run the business.
Photo: Sven Torfinn/ENERGIA

Story of change: **Village-Level Entrepreneur Group operations in rural Rwanda**

Once the headlights are connected to the charger, the host is flexible to do chores around the house. Photo: Sven Torfinn/ENERGIA

A typical Village-Level Entrepreneur group has four members. They operate a central recharge station, and one of them is usually selected by group members to keep the central charging system known as the 'Octopus'. The designated person's house becomes the central recharge station for customers in the village.

The choice of where the Octopus is stationed depends on which of the VLEs lives closest to the village centre. This proximity makes it very easy for customers to access recharge stations. The VLE in whose house the Octopus is stationed automatically becomes responsible for recharging customer's lights. Other roles, such as the VLE group leader, the treasurer, and a person to follow up complaints of broken lights, are agreed upon by members of the group. Even though one person is designated to operate the Octopus and charge lights for customers, other VLE group members visit the recharge centre frequently to assist.

On a typical day, VLEs charge from four to six lights on average and between 20 to 60 lights per week, depending on the demand by customers. VLEs usually leave home early in the morning to go either to their farms or their place of work, and frequently return by 1 p.m. This is the usual routine of most people living in rural Rwanda. Thus, VLEs return from their place of work at the same time people start visiting the village centre for either recreation or to buy food. Most customers visit the recharge stations to charge their lights during this period.

Normally, since customers prefer to leave the lights at the recharge station and return for them hours later, VLEs do other domestic activities once the lights are plugged into the Octopus. VLE groups usually meet either once a week or twice in a month to take stock, buy units and discuss other challenges facing their enterprise.

Up to five headlights can be charged at once with the 'Octopus' Photo: Sven Torfinn/ENERGIA

Two men selling motor oils and other lubricants. Men tend to benefit more from electricity supply than women, because they are engaged in profitable energy-intensive businesses using heavy machinery such as welding, car repairs and saw mills. Photo: Ana Pueyo/Institute of Development Studies

Leveling the playing field between men and women in the productive use of energy in Ghana, Tanzania and Myanmar

Access to energy is a critical factor in economic growth and social development. It facilitates new types of job-creating enterprises and has the potential to reduce the drudgery of heavy work. Enabling entrepreneurs to have access to electricity can help unleash the income-generation and poverty-reduction potential of energy access interventions.

Harnessing the income-generation potential of energy in an equitable way for men and women is not straightforward, though. For one thing, men and women are not represented evenly over types of enterprises that are large electricity users. Also men and women owned enterprises tend to have different demands on electricity, heat or mechanical energy. Therefore the promotion of productive use of energy (PUE) with a focus on electricity delivers different benefits for women and men.

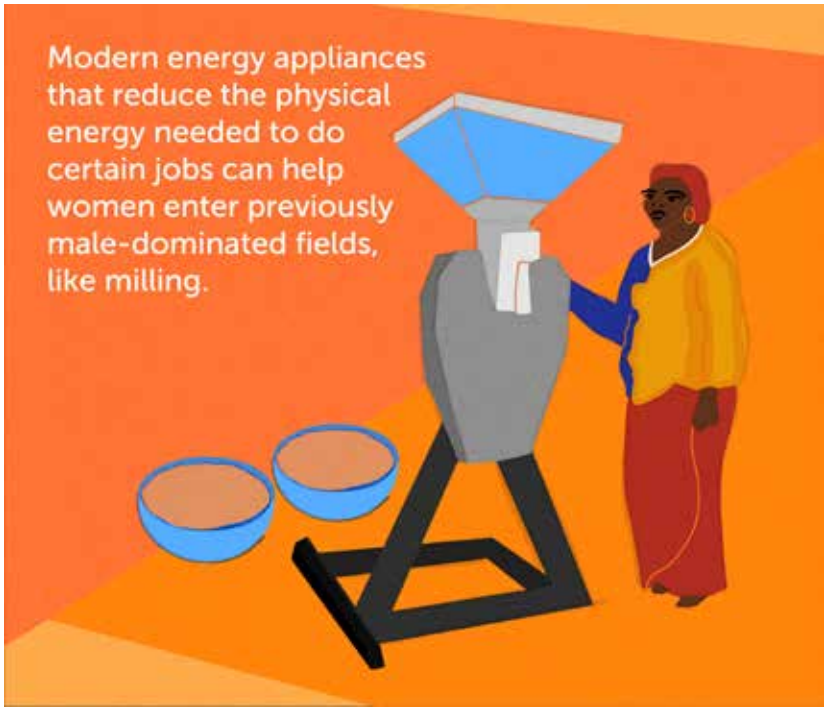
In their research report *"Unlocking the Benefits of Productive Uses of Energy for Women in Ghana, Tanzania and Myanmar"*[1] , Ana Pueyo, Mar Maestre, Marco Carreras, Simon Bawakyillenuo and Gisela Ngoo look into the challenges, and the opportunities, of harnessing the income-generation potential of electricity for gender equitable outcomes in the three aforementioned countries. ENERGIA supported this research under its Research Area 6 (RA 6): Unlocking the Benefits of Productive Uses of Energy.

Contextual considerations

In their research, the team focused on the gender similarities and differences primarily related to electricity use, and selected study areas with electricity access interventions. The team also examined other energy types used for productive purposes - including cooking fuels and diesel.

The focus of the study in Ghana was in light industrial zones in urban areas, where small enterprises had been provided an improved electricity supply. In Tanzania, the research team looked at fishing villages on three islands. One of the islands had access to electricity from mini-grids and had benefited from a programme to promote productive use of energy among women; the other two had not been exposed to gender mainstreaming programmes for energy. Among the islands without the mini-grid, one had electricity from the main grid, and

[1] *Note: All content in this article is extracted from the original report with all rights reserved for the authors of the said report.*



the other only from individual solar home systems. In Myanmar, the team looked at rural areas, some of which had only recently gained access to electricity from mini-grids, while others remained without access.

What does the evidence say?

The research finds that male entrepreneurs have more economic benefits than women from electricity supply as they usually work in the more mechanised sectors, hence more likely to be upgraded with the arrival of electricity. Second, compared to women, men are larger consumers of electricity, because their enterprises are larger and own more electrical equipment.

Women's productive use of energy is also widespread, but in smaller quantities. On the other hand, women dominate the use of cooking fuels, whether LPG, charcoal or firewood (of which charcoal is the most common). LPG was unavailable on the Tanzanian islands visited but was used by almost a quarter of female entrepreneurs in Ghana. Diesel, however, is more frequently used by men than women in their enterprises, for transport and back-up generators.

Poor electricity reliability remains a challenge for both male- and female-owned businesses. However, women in Ghana were more affected by unreliable supply, as the distribution network is weaker outside the industrial zones, where men predominately work. Results show that electricity use is consistently associated with better outcomes for businesses in all countries, while being female is associated with lower profits and lower electricity consumption.

In Tanzania, women's enterprises also display lower electricity consumption levels than men's, but a higher use of firewood and charcoal. In any case, using electricity is associated with better business performance for both male and female-owned enterprises, although the relationship is only statistically significant for men. Women's role as less-intensive consumers of electricity may make them less interesting for private sector suppliers. For example, one of the directors of the mini-grid supplier in Bwisya indicated that their two priority sectors are fishing and milling – both male-dominated.

Evidence from Myanmar showed that men benefit more from the productive use of energy. In all five villages examined, men had access to and control over the diesel generators, while women used firewood and charcoal.

In all three countries, in spite of the different ways in which women's productivity could benefit from existing energy policies, female-owned enterprises had lower performance than male-owned enterprises in terms of profits, salaries and electricity consumption. Several reasons account for this. Women typically specialize in sectors with low average electricity (as opposed to energy) consumption. These include hairdressing, tailoring, restaurants and bakeries. They are often less profitable and less power intensive than male-dominated activities. However, when men and women operate in the same type of enterprise, their performance is similar.

'Women's role as less-intensive consumers of electricity may make them less interesting for private sector suppliers.'

In the rural economies observed by this research, men dominated the most profitable activities along the value chain of fishing and agriculture. Sectoral segregation and position along the value chain is largely due to gender norms that determine what are 'appropriate' income-generation activities for women. Women's limited access to capital and other resources also makes them more likely to specialize in lower-paid types of enterprises. In all three countries, men's paid roles tend to involve heavy machinery and activities requiring physical strength (such as carpentry), while women's paid roles use less appliances and electricity overall (such as cooking or hairdressing).

Productive use of energy intervention recommendations

The study contains a number of recommendations for how electricity can be better deployed, supported and used to help advance women's status in the three countries. The recommendations are divided into two sets:

i) Productive use of energy interventions that support the activities that men and women currently do, without discriminating against either sex; and ii) Productive use of energy interventions that transcend and thereby transform segregation within and across sectors, moving towards greater equity in the use of energy for income generation.

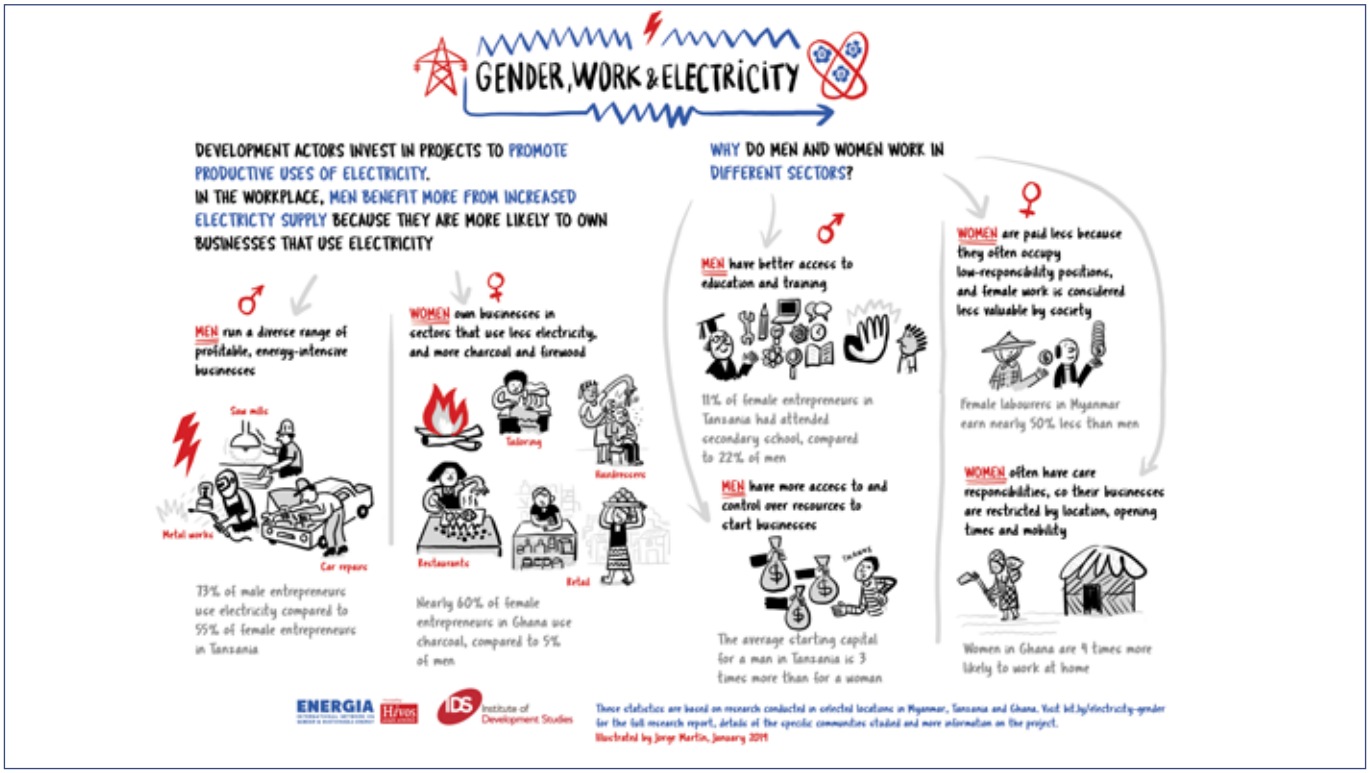
The researchers' recommendations for productive use of energy interventions that support the activities that men and women currently do, include improving access to finance and equipment and providing energy management training. They research team also recommends improving the reliability of supply and supporting traditionally female trades with high-quality, affordable energy, not just electricity. They suggest to support traditionally male trades with improved high-quality, affordable energy as well as new technologies, while also taking into account other business constraints.

With regard to productive use of energy interventions that transcend and transform segregation within and across sectors, these include the development of soft skills, exposure to role models who are overcoming occupational segregation, or quotas for women's internships or apprenticeships in non-traditional occupations. Finally, increasing women's access to transformational appliances could be their entry door to men dominated occupations.

The governments and public and private sectors in Ghana, Tanzania and Myanmar can undertake a number of initiatives outlined herein to support citizens to make better lives for themselves, while improving the economies as well. The appropriate policy choice depends on the particular circumstances of the target communities and areas.

Women are usually engaged in activities, which are often less profitable and less power intensive than male-dominated ones, such as bakeries. Photo: Ana Pueyo/Institute of Development Studies

For example, the first set of recommendations – targeting support to help male and female entrepreneurs in their current roles – is expected to achieve faster success, and particularly so in more traditional societies. The second set requires transformations at the community level but will lead to longer-lasting improvements. In the case of Bwisya, Tanzania, transformational interventions were already showing some initial successes. Women had started new electricity-consuming businesses after being exposed to training and awareness activities, as well as gaining access to loans. Some men, on the other hand, were starting to change attitudes towards accepting and promoting women's involvement in enterprises. In Ghana, there was also clear evidence that gender roles could change with time, education and exposure to different ways of doing things. In any case, much remains to be done in all settings to overcome deep-rooted preconceptions about what types of work are suitable for men and women.



An interview with... Ana Pueyo

Senior Research Fellow at the Institute of Development Studies

Ana Pueyo was a Renewable Energy Advisor for ECREEE from September 2018 until September 2019. One of her key roles was coordinating the preparation of National Action Plans in each of the 15 ECOWAS Member States for the implementation of the ECOWAS Policy on Gender Mainstreaming on Energy Access and the ECOWAS Directive on Gender Assessments of Energy Infrastructure. She is also a Senior Research Fellow at the Institute of Development Studies (IDS), where she leads research on Energy and Development, mainly in Sub-Saharan Africa. Her academic background is in Management and Economics (MSc) and Industrial Engineering (PhD).

What is ECREEE doing to support the uptake of gender in energy policy in the ECOWAS region?

ECREEE was behind the adoption of a "first of a kind" policy on Gender Mainstreaming in Energy Access in the ECOWAS region. The policy sets up the vision of an ECOWAS region where both men and women enjoy equally the benefits of improved energy access and do not suffer disproportionately from the negative impacts of energy infrastructure. The Policy sets up indicative goals and actions, but leaves flexibility to Member States for the selection of its goals and related actions. The Policy has been described as an example to follow by many other regions of the world. However, a regional policy cannot achieve much without national implementation, and many policy priorities compete for the attention of ECOWAS policymakers. For this reason, ECREEE is now supporting Member States to implement the policy through the preparation of National Action Plans, through which each Member State will define its priorities, actions, and key actors to achieve the final goal of the Policy, in a collaborative way. In addition to the ECOWAS Policy on Gender Mainstreaming for Energy Access, ECREEE has also promoted a legal document, the ECOWAS Directive on Gender Assessments of Energy Infrastructure, to achieve gender equality in the benefits and impacts of energy infrastructure projects.

What is your role in this?

My role was to coordinate the preparation of the National Action Plans (NAPs), by ensuring appropriate support for the Gender Focal Units of each Member States, organising a training workshop to kick-start the process and guarantee a homogenous approach across countries, and following up on the progress of preparation of NAPs. My role also consisted in ensuring that Gender Focal Units would have enough budget for dissemination once their NAP had been technically validated.

ENERGIA participated in the ECREEE inception meeting to bring in evidence from the Gender and Energy Research Programme. How can the participants use this evidence in their work in developing National Action Plans?

Evidence is essential for policymaking, as policymakers face competition from diverse areas requiring their attention. Without appropriate evidence of gender inequalities in energy access they are unlikely to act. ENERGIA provided evidence during the workshop regarding gender differences in a number of areas related to energy supply and consumption, such as men and women's involvement in energy value chains, productive uses of energy, their voice in political processes or power sector reform. The evidence contributed to the gender focal units working on the preparation of NAPs to understand the priority areas and the types of actions that can be undertaken to improve equality. ENERGIA also explained the different channels to obtain evidence, and the kinds of actors that should be involved in the provision of evidence and the preparation of gender mainstreaming policies for energy access.

ECREE countries

How women's lives can be transformed through energy entrepreneurship

Female entrepreneurs encounter both barriers and enabling factors every day, beginning with their own sense of agency at the individual level, to policies at the institutional level. To investigate the existing evidence around this and to identify gaps in understandings around gender and entrepreneurship in the energy sector, Dr. Anita Shankar, Dr. Amanda Elam and Allie McGonagle Glinski, undertook a systematic literature review. They prepared a paper, entitled *"Women's Energy Entrepreneurship: A Guiding Framework and Systematic Literature Review"*[1] to highlight their findings.

ENERGIA supported their research within its Research Area 7 (RA7): Building the Evidence Base for Women's Empowerment and Entrepreneurship to Improve Energy Interventions' Effectiveness. Three questions guided their review.

Q1: How does women's energy entrepreneurship advance energy access for all?

While the research team found the published literature on women's energy entrepreneurship to be at a very early stage of development, they found that reviewing women's energy programming provides important insights into the state of the sector. For instance, data from field programmes suggests that much of the discussion related to women's entrepreneurship in energy is, in fact, referring to a range of ways that women engage in the sector, including informal women's groups, micro and small businesses, high potential entrepreneurial ventures, as well as independent sales agents and cooperative employment models.

Engaging women in the energy sector

How and why women are and should be engaged throughout energy value chains differs by value chain segment and mode of engagement. The authors highlight that there are advantages of engaging women in particular roles throughout the energy value chain. Women's participation can be through membership of self-help groups and cooperatives, or as micro-entrepreneurs, owners of small to medium-sized enterprises (SMEs), or leaders of high potential firms. The nature of women's engagement affects impact, e.g., the enterprise's ability to reach new customers, the initiative's commercial viability, and the benefits experienced by the women and their families. In order for women to be successful in the energy sector, it is necessary to transform the gender system to support such advances. It is also likely that these shifts will need to be informed and, in large part, crafted by women.

Furthermore, due to women's conflicting household roles, it is important for any energy sector engagement to take into account women's schedules and mobility constraints. Household roles and responsibilities are negotiated within the household. Women may require targeted support, through behavioral training and coaching/mentoring focused on strengthening personal agency, voice and confidence in addition to education and training in business planning, accounting, and marketing skills that is oriented towards women's enterprises. Finally, programming is needed to prepare women financially for business ownership, with a specific focus on establishing a credit history and clear ownership of collateral to ensure access to affordable financing and credit facilities. Subsidies and investment programmes targeted towards women's businesses are essential to help support and grow these women-led businesses and must be designed with the preparation of women as equal and independent financial citizens in mind.

To make this happen, a change of mindset is required on the part of energy planners and practitioners. They need to promote the notion of women as managers and entrepreneurs of improved energy services, not just as beneficiaries. Unlike many other social status characteristics, gender operates within the household as well as across all levels of engagement and segments of the value chain. Therefore, shifting mindsets at all levels (especially within the household as change begins at

[1] *Note: All content in this article is extracted from the original report with all rights reserved for the authors of the said report.*

home) will be a critical force in changing gender norms to reflect greater equality.

'Shifting mindsets at all levels (especially within the household as change begins at home) will be a critical force in moving gender norms to greater equality.'

Considerable programmatic and policy interest and growth in women's energy entrepreneurship activities has emerged in recent decades as a mechanism of providing energy technologies and services. As a prime example, ENERGIA, has supported over 4,000 micro and small women's enterprises through its partners, Solar Sister in Nigeria, Tanzania and Uganda; Practical Action East Africa and Sustainable Community Development Services (SCODE) in Kenya; Kopernik in Indonesia; Energy4Impact and Social and Ecological Management Fund (SEM Fund) in Senegal and Centre for Research and Technology (CRT) in Nepal (SE4ALL, 2017b).

Q2: How does women's energy entrepreneurship benefit women and their families?

In their review, Shankar and team observe that, at the individual level, the most direct impact on female entrepreneurs engaged in energy value chains is increased income. In settings where women often have few opportunities for income-generation, clean energy production and distribution initiatives can create a host of opportunities.

Benefits for women and their households

Women engaged as clean energy entrepreneurs gain both business and technical skills. Women learn technical skills by being involved in various value chain segments. For instance, women involved in manufacturing and producing energy products learn technical, craftsmanship skills, while women involved in sales and distribution gain an understanding of how to operate the energy products/services, how to sell to women, and customer needs/preferences. Women engaged as technicians gain skills related to the repair and maintenance of energy technologies (World Bank 2004). Moreover, women engaged as energy entrepreneurs often gain access to public leadership roles and social networks (the significance of which is described below) either directly through the enterprise structure, or through forming their own groups to share knowledge and best practices.

When women gain income and are engaged in roles where they are physically moving throughout the community and interacting with diverse community members, it can cause a shift in power dynamics and relationships in the household and community. Having roles that break with cultural stereotypes and gender norms, can allow women, and their family members, to begin to question and challenge other gender norms. In particular, as women earn income and contribute to household earnings, household power dynamics can shift as they claim a larger role in household decision-making (e.g. how money earned is spent).

'As women earn income and contribute to household earnings, household power dynamics can shift as they claim a larger role in household decision-making.'

In addition to the benefits associated with having a female family member who is an energy entrepreneur, households benefit from the use of the energy products and services with which the entrepreneur works. Numerous studies in the developing world have found that access to electricity is associated with better school outcomes as students – girls and boys – are able to study later into the night (see also "Increasing access to low-cost lighting while eliminating gender barriers in Rwanda on page 31-32).

Increased visibility in the community and enhanced communications and self-confidence often enable women to rise to supervisory or management roles and also to serve in leadership roles in local community groups and committees. Also, as women participate in roles that give them exposure to the community and also engage in the management and distribution of an important resource, their sense of status in the community often improves. When women are engaged as sales and repair agents, their visibility and reputation spreads throughout their community. Social norms may also begin to shift as community members see women in roles for which they previously did not think they were suitable.

While there are many economic and social benefits of participation in energy entrepreneurship, as outlined above, it should be noted that entrepreneurship carries significant risks for women from the poorest tiers of society. While the clean energy sector presents new and innovative ideas, poorer women may be hesitant to take risks on products and services that have not already been proven in the market. These women may prefer opportunities in the energy sector where they can earn a steady income without becoming indebted and do not have to depend on convincing potential customers to purchase a new, unknown product or service.

It's also relevant to note that women's energy entrepreneurship is not, on its own, the solution to gender inequity – but an important piece of the puzzle, nevertheless.

Q3: What are the best practices to support women's entrepreneurship in the energy sector?

On best practices for women's energy entrepreneurship, Shankar and team identified four types of support that vastly enhance women's economic growth - at the individual level, i) business education and skill development and ii) training to foster personal agency and initiative; and, at the business level, iii) preparation for access to finance and capital and iv) access to experienced coaches, mentors and networks

Business education and skill development

Of course, basic business skills and financial literacy are necessary to build strong women's businesses. Although there may be considerable variation in business education content, these programmes tend to include accounting, financial planning, pricing and costing, marketing and inventory management (McKenzie & Woodruff 2013). Despite the clear necessity for business training, there have been a number of randomized experiments recently showing fairly strong evidence that business skills training alone is not sufficient for entrepreneurial success (McKenzie & Woodruff 2013; Buvinic et al. 2016).

Training to foster personal agency and initiative

Many university-based entrepreneurship training programmes now incorporate training on 'entrepreneurial mindsets' and 'growth mindsets'. However, few of these novel programmes have published evidence that these entrepreneurship training approaches actually enhance business performance. Two exceptions are found in two approaches to personal empowerment training in entrepreneurship that can be further strengthened: one is a targeted action-regulation training approach focused on enhancing personal initiative (Campos et al. 2017; Frese et al. 2016; Glaub et al. 2014; Koop et al. 2000); and the second is a personal agency approach that recognizes the integrated nature of various aspects of an entrepreneur's life and uses a cognitive-behavioral approach that addresses how an individual's thoughts and feelings can lead to meaningful action when examined within one's specific sociocultural and situational context (Shankar et al 2018; Shankar et al 2015a).

Access to finance and capital

With respect to business support, access to capital (as monetary services or goods) is one of the largest barriers faced by female entrepreneurs attempting to start and expand energy enterprises. The primary mechanisms for accessing finance include commercial banks, equity funds, micro-credit, angel investment, grant funding or venture capital. Importantly, women are often unqualified for business credit, especially when they do

Access to electricity has positive impacts on children' educational outcomes. They are able to study in the night with solar lamps. Photo: Judith Quax/ENERGIA

not hold financial assets in their own names and when family assets are not held jointly, including family bank accounts, property deeds, and credit instruments. This documentation and experience is necessary to establish a credit history and prepare women for access to business credit. The case for gender equality in business, including entrepreneurship is strong, yet is remarkably underutilized (IFC 2017). Investors in businesses with greater gender diversity have better returns and are able to adapt more effectively during times of economic volatility (IFC 2017).

Access to coaches, mentors and networks

In addition, a large body of literature supports the need for on-going support and mentoring to provide female entrepreneurs with the training and support they need to excel (IUCN 2014; Pailman 2016; Amatucci & Crawley 2010; O'Dell et al. 2014). Creating on-going touch points for mentoring and networking can help female entrepreneurs feel that they have a support network, to address business challenges as they arise and learn best practices from other entrepreneurs, and to expand their contacts and reach. In the case of energy entrepreneurs, two types of mentors with different skills are required, one to support women's business development and another to support the technological components of the energy product.

For organizations or programmes that are designed to work with women, Shankar and team suggest a number of best practices to support this process. First, identify the right people, as not all women will be effective entrepreneurs or mentors. Next, business networks, especially for women, have become an important source of new information, and means of obtaining social support with other entrepreneurs. Third, digital technology is likely the most important innovation for scaling small and medium sized entrepreneurs to emerge in recent decades (UNCTAD 2014). Fourth, there is growing evidence that engaging men in programmes targeted towards women can greatly improve women's participation with knock-on effects on the impacts of those programmes for women and the family.

A need to do more...

In general, the team's review suggests that energy entrepreneurship may provide a unique combination of inputs for transforming women's lives through the provision of an income-generation opportunity and also time-saving technologies that have the potential to both reduce women's unpaid care work and increase the value of women's labor.

What is clear is that experts, academics, policy makers and programme managers from multiple disciplines and fields should participate in working towards solutions. There are clear programme and policy messages as well as research recommendations to be drawn from this literature review.

'What is clear is that experts, academics, policy makers and programme managers from multiple disciplines and fields should participate in working towards solutions.'

Lastly, women's participation in energy entrepreneurship has the potential to address several of the Sustainable Development Goals (SDGs) through the direct empowerment of women, through women's investments in their families and communities, and through benefits associated with access to energy. Women's participation in income-generation, and as ambassadors of new energy technology products or services contributes to increasing decent work and economic growth (SDG8) by providing women with a sustainable income generation opportunity. Women's increased incomes help reduce poverty (SDG1) and contributes to reaching gender equality (SDG5). Women earning an income are able to not only financially contribute to the family, but are also able to communicate, negotiate, and participate in household and community decision making.

For the full research report, visit:
https://www.energia.org/RA7

An interview with... Sheila Oparaocha

International Coordinator and Programme Manager, ENERGIA

Sheila Oparaocha has over twenty of working experience in the gender and energy sector. She holds a Bachelor's of Science Degree in Veterinary Medicine and a Master's Degree in Gender and Development Planning. Sheila is the overall manager of ENERGIA's international programmes and also provides technical support to ENERGIA's activities on women's entrepreneurship development, gender mainstreaming in energy programmes, international policy advocacy, research and evidence development, network building and knowledge management. Sheila co-chairs the Sustainable Development Goal 7 Technical Advisory Group that has been convened by UNDESA to review progress on SDG 7 and it interlinkages with other SDGs for the High level Political Forum.

The 2014-2019 Gender and Energy Research Programme was not the first research programme that ENERGIA has managed, but the largest. How did this research programme come about and how was this programme different from earlier programmes?
Indeed, we had an earlier research programme "Gender as a Key Variable in Energy Interventions: Are We Asking the Right Questions?". We initiated the research programme as a result of our capacity building and advocacy work, during which we identified a number of gender and energy issues that required more in-depth analysis and thus decided to start our first research programme. This research programme which was based on case studies from different regions and programmes, provided us with some level of evidence on what was happening on the ground in terms of gender impacts of energy access, but it was not sufficient.

Later on, when we started doing gender audits of energy policies, we understood from speaking to key policy makers, that case studies were not sufficient. Empirical evidence to inform and influence public policy and help bring a systemic gender-responsive change in the energy sector is extremely important. Following this, we conducted a scoping study to assess the level of empirical evidence on gender and energy access and found that the majority of the so called evidence was self-reporting from own projects and that there was little to no evidence from independent robust research. This lack of evidence contributed to energy policies being gender blind.

Great steps forward were made in 2015, when there was political recognition of the interlinkages between Sustainable Development Goal (SDG) 5 on gender and SDGs 7 on energy. However, once gain while many assumptions were made about the linkages between SDG 5 and SDG 7, not many research studies provided convincing evidence for policy-making. Therefore, it was clear to us that we needed to make a very strong evidence-based case for why the international community would not be able to ensure reliable, affordable, modern and sustainable energy for all (SDG7) without addressing gender issues. This is how our current Gender and Energy Research programme was conceived.

Although we wanted to be very ambitious, we realized that we had to prioritise which research gaps we could work on and thus focused on the following six thematic areas that were on the international energy policy agenda: electrification, productive uses of energy, energy sector reform, the role of the private sector in scaling up energy access, the political economy of energy sector policies, and women's energy entrepreneurship, with the aim to provide robust evidence and analysis of the impacts of these interventions on gender equality and women's empowerment. We used this to make our case for support to the research programme from our donor, the UK government's Department for International Development (DFID), which was looking for "not business as usual" research.

What has been the added value of simultaneously having a research programme, an implementation programme and an advocacy programme at ENERGIA?
Over the years, ENERGIA has developed an ecosystems approach to energy and gender. This multi-pronged approach, which combines evidence building, lobby and advocacy, women's economic empowerment, gender mainstreaming, knowledge and information sharing, and network building, has become pivotal in our strategy.

In this regard, first and foremost, in collaboration with our partners, we support women's entrepreneurs to grow and run their own businesses in the energy sector, providing them with technical, business and leadership

skills. Secondly, we support electricity utilities, energy programmes and rural electrification agencies to mainstream gender approaches in their institutions and operations. While these implementation efforts focused us to deliver results, our research allows us to deep dive into needs and barriers, and to verify our assumptions of the impacts of our inventions and what constituted game changing results.

At the same time, the right policy framework is required to implement our programmes and to scale up our results. Indeed, the lack of a policy framework means that most projects are not sustainable for the long term. Evidence constitutes a valuable source for governments to prioritise the right policy strategies at national, regional and international levels. This does not happen automatically. Advocacy and lobby activities are therefore crucial to influence and inform policymakers on what is actually working on the ground. Out network building allows us to enhance synergy and learning among key stakeholders on gender and energy. In summary, our implementation programmes demonstrate the how, our research programme shines a light on the impact, our advocacy programme informs and influences policy change, while our networking fosters partnerships to scale up gender intervention in the energy sector. This is why for us it is important that all our programmes are interconnected. You cannot do one without the other.

Which of the findings have you already been able to use directly?

The research programme has reconfirmed that taking a gender approach in the energy sector benefits all. As mentioned earlier, this does not happen automatically and we need to strive to scale up gender-responsive actions in energy policies, markets and programmes.

Another key point is linked to our Women's Economic Empowerment Programme. The research programme confirmed that in order to realise women's potential and scale up their business, they need to be supported through a comprehensive package of support, which includes capacity building in technology, business skills and leadership; marketing, promotion and distribution; access to finance; and one-to-one mentoring. In this regard, digital technology plays a crucial role in scaling up successful business. Nowadays, the mentoring and feedback process is through face-to-face interactions. This method works when you are dealing with thousands of women. However, when scaling up to work with ten thousands of women is when digital technology comes in. For example, with digital technology, mentors would be able to respond more rapidly.

Lack of women's agency has been identified as a major barrier to their economic development. Women are hindered in pursuing income-generating opportunities because of social norms which do not allow them to build self-confidence and enter specific markets. Interventions that break these barriers, increase women's self-confidence, decision making and direct control over resources and as such have been identified as central for women's successful entrepreneurship in energy value chains.

The research programme has also shown that women and men typically run different types of productive activities. For this reason, they differ in their productive use of energy. Men are typically involved in electricity-based enterprises. On the other hand, women are more reliant on fuels such as firewood, charcoal and LPG for running their businesses, which are usually informal and closer to their home. A complete understanding of women's and men's energy needs and of the nature of women's businesses is an essential requirement for any energy intervention. Projects can be made more gender responsive and targeted by understanding what kind of energy is needed by which stakeholder group. On the basis of this evidence, ENERGIA supports local governments and authorities in Africa and Asia to address barriers to equal and equitable participation of women and men in the energy sector and to implement effective policy that increases equality through energy policy and energy programmes.

The research has also shown that end-use appliances can transform gender roles and relations. Whether the energy comes from solar, from the grid or traditional fuels, the choice of appliances can drive a change within the communities. Appliances could reduce women's drudgery and encourage their participation in income-generating activities. To give an example, using a rice cooker or an ordinary pot, a washing machine or washing by hand, makes a big difference in how women are engaged in their business. Again, these findings constitute a starting point in the development of energy interventions and say much on the gender impacts in the expansion of energy access. Involving women in the design and implementation of energy interventions can strengthen the project outcomes.

These findings have been critical for our advocacy in intergovernmental negotiations. For example, as co-facilitator of the SDG 7 Technical Advisory Group, we contributed to the policy briefs, "Accelerating SDG 7 Achievement: SDG 7 Policy Briefs in Support of the High-level Political Forum 2019", which focused on the links between SDG 7 and the SDGs under review at the High-level Political Forum on Sustainable Development in July. Both, our experience on the ground with our implementing partners and the findings from our Research Programme, have been brought to the Summit with the aim to stress the urgency of targeted policies that empower women and meet the needs of the poor.

News from the Secretariat

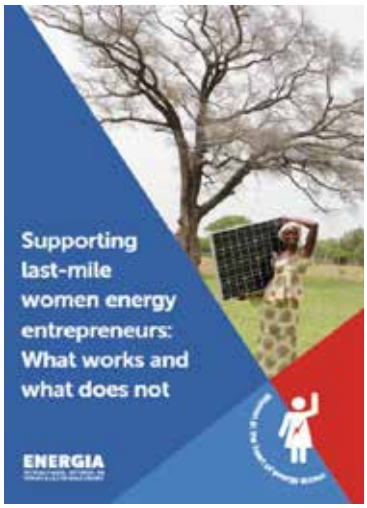
The last issue of ENERGIA News focused, like the current one, on our Gender and Energy Research Programme. Back then, the reports from the initial scoping phase had recently been published. In this new issue, we present the final reports of the research projects, which have generated and analysed empirical evidence for energy policy and practice. We are currently working on the uptake of the research reports to facilitate the use for policy-makers. However, a lot has happened beyond this programme. We closed our 2013 - 2018 Phase 5 programme and started the ENERGIA Phase 6 programme, which allows us to continue and deepen our work on women's economic empowerment, advocacy and gender mainstreaming. Prior to the recently started Phase 6 programme, Phase 5 was subjected to an external evaluation, whose conclusions and recommendations informed the current programme. Below we present highlights from our different programmes besides the research programme and our ambitions moving forward. We also dedicate some words to saying goodbye and welcoming colleagues who have left and joint ENERGIA in the past year.

Women's Economic Empowerment

In our ENERGIA Phase 5 Programme, named Women's Economic Empowerment (WEE) Programme (2013-2017), we supported 4,153 women entrepreneurs to build their energy businesses in seven countries (Indonesia, Kenya, Nepal, Nigeria, Senegal, Tanzania, Uganda). We did this in close collaboration with five leading partners (Centre for Rural Technology Nepal (CRT/N), Energy 4 Impact, Kopernik, Practical Action and Solar Sister) and with funding from the Swedish International Development Cooperation Agency (Sida), the Norwegian Agency for Development Cooperation (Norad) and the Finnish Ministry of Foreign Affairs. Support to the women entrepreneurs included business development and financial literacy training, hand held technical support, agency training and providing linkages with financial institutions and markets. Together, the women provided access to clean energy services to 2.9 million, and created employment for over 5,000 people, predominantly women, in their local communities.

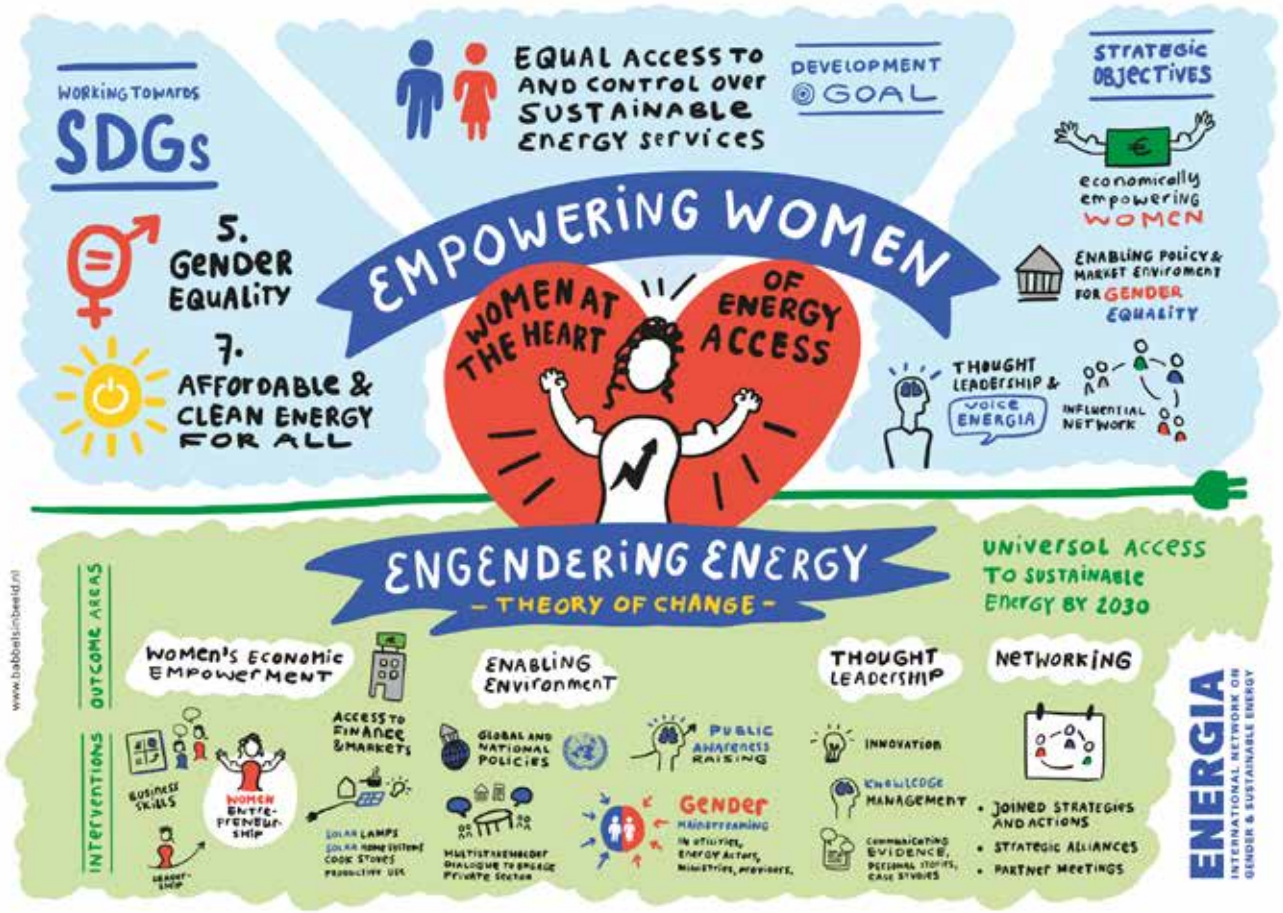
In 2017, six of these women entrepreneurs participated in the Sustainable Energy for All Forum in New York, sharing their experience as women energy entrepreneurs with high level international policy makers. Their participation inspired us even more. Their strength, ambition and determination in overcoming the barriers to women's leadership and the challenges they face in becoming entrepreneurs, strengthened our commitment to advancing gender inclusion in the energy sector.

We documented our experience of the four-year journey in which we learned, failed and succeeded, together with our partners, in the publication *Supporting last-mile women energy entrepreneurs: What works and what does not.* The document is a self-reflection on our experience alongside women entrepreneurs. It analyses and reports on new approaches and business models that worked or failed to create and upscale women-centric energy enterprises that deliver modern energy services to low-income consumers in underserved areas. Based on the growing belief that women and their networks can access and serve untapped markets, the programme was designed to empower women to become micro and small scale entrepreneurs through engaging them in the energy supply chain. While growing their self-confidence, actively increasing their income, ownership of businesses and contributing to the welfare of their families, these women have made clean energy technologies available in the last-mile and reduced the energy access gap in their communities. The document looks into every aspect of the WEE programme, from recruitment to women's training and mentoring. It delves into strategies for sales, marketing and promotion, supply chain development, management and distribution. It further draws a number of lessons learnt on how to engage in last-mile women's entrepreneurship in the energy sector and implement strategies to move forward.



In the energy access space, women's entrepreneurship is gaining momentum. Indeed, moving forward, ENERGIA plans to deliver calibrated strategies to accompany women in all stages of their business growth and to strengthen our collaboration with existing partners to support them in scaling up and deepening their impact on last-mile markets. Given the market opportunities and understanding the challenges women entrepreneurs face, ENERGIA will also work towards creating an enabling environment, aiming at unlocking business and finance opportunities for women energy entrepreneurs. We will engage government institutions, the private sector and financial institutions and inform them on the benefits of taking a gendered approach and investing in gender-responsive energy policies.

The WEE publication, the external evaluation of the Phase 5 programme and a thorough analysis of the current context informed our Phase 6 programme which kicked off in 2018.



ENERGIA phase 6 Strategy

A thorough context analysis, combined with our experience and an evaluation of Phase 5 confirms that our mission to increase women's and men's equal and equitable access to and control over sustainable energy services as an essential right to development remains relevant. To achieve this we have formulated three long-term strategic goals:

- Women are economically empowered in the sustainable energy value chain
- Policy and market environments are more enabling for enhanced gender equity
- Programme, project and strategic partners are well connected, share evidence base, co-create new solutions and have a shared influential voice in the energy sector.

These goals translate into four intervention areas: Women's economic empowerment, Enabling environment and advocacy, Thought leadership and Networking. Big difference with the previous programme will be our work on stimulating an enabling environment for the women energy entrepreneurs to thrive. We envision creating round tables with all actors involved—entrepreneurs, (local) government, financial institutions, renewable energy companies and NGOs—to jointly discuss and tackle obstacles, the entrepreneurs encounter on their way.

Within the women's economic empowerment pillar, ENERGIA and partners' efforts will focus on increasing the number of entrepreneurs to 6,500, to scaling up and consolidate their business, reaching an additional 3 million customers. To achieve this goal, we will work towards facilitating access to finance, improving training support, and mentoring on the use of modern information and communication technologies for business development.

Enabling environment and advocacy

ENERGIA is committed to undertake lobby and advocacy activities to ensure that policies and programmes at the regional, national and global levels are gender-responsive and reflect the needs of women's entrepreneurs in the energy access space. Phase 6 sees an orientation of efforts towards the SDGs, particularly those on gender equality (SDG5) and energy access (SDG7) in line with the global commitment to 'leave no one behind'.

Recent studies confirm that the adoption of clean cooking solutions lags far behind the targets of the Sustainable Development Goals (SDGs). In alignment with these pressing concerns, ENERGIA has made clean cooking a top priority and has joined Hivos, Hon. Dr. Kandeh Yumkella, UNDESA, WHO, UNDP and ESMAP/ World Bank to bridge the gap, increase public support and raise awareness about the benefits of clean cooking by establishing a High-Level Coalition of Leaders for Clean Cooking. The coalition advocates for and encourages a shift to clean, efficient cooking in an effort to improve people's health, reduce toxic air pollution, increase productivity and protect the environment.

Together with our partners, our advocacy efforts have, among others, contributed to:

- Increased public awareness through campaigns that have reached 33 million people and will reach another 15 million
- Supported the participation of 120 gender experts and women from the South in 56 global and regional energy events
- Integration of Gender and Renewable Energy into primary school curricula in Nepal
- Inclusion of gender in county energy plans and the development of a national gender policy in the energy sector in Kenya
- Engagement of other actors such as media, schools and ministries of education as advocates for gender equality in the energy space
- Inclusion of gender in the SEforAll country action agenda's in Kenya, Nepal, Tanzania and Senegal, the Global, SEforAll's Strategic Framework, Business Plan, People Centered Accelerator and Forums
- Development of the unique ECOWAS Policy for Gender Mainstreaming in Energy Access
- Inclusion of cooking, energy and indoor air pollution in SDG indicators
- Gender inclusion in the SDG 7 Technical Advisory Group's Policy Briefs and in the Report of the Secretary-General on SDG7 to the 73rd session of the General Assembly
- Creation of a High Level Coalition of Leaders for Clean Cooking in Sub-Sahara Africa

Gender Mainstreaming

Gender mainstreaming (GM) is another core element of our work and is part of creating an enabling environment. In this area we currently operate projects in Benin, Ghana, Liberia and Nepal, funded by the Millenium Challenge Corporation (MCC) and the Asian Development Bank (ADB). ENERGIA Technical Advisors support, guide and assist government bodies and electricity utilities to mainstream gender in their organisations, projects and programmes. Mainstreaming gender encompasses a range of activities, including gender audits of these bodies, formulating guidelines and developing gender and social inclusion (GESI) indicators, capacity building and training of staff, support the development of GESI strategies, action plans, budgets and monitoring formats.

Thought leadership

In the intervention area Thought leadership, several aspects of this concept come together: Research to inform policy and decision making, innovation, communication and knowledge management and sharing.

Research

The current phase of the research programme focuses on facilitating the uptake of the findings of the research laid down in the reports and is closely intertwined with our advocacy endeavours. Through presentations, active participation in panels as well as one-on-one meetings, findings, results and outcomes of the research are shared with policy and decision makers in the energy sector, national and global, to feed their knowledge on gendered impacts of energy access. This phase runs into 2020 and we are currently looking into possibilities and opportunities to continue the research programme, because even though the research programme gathered evidence and data on a variety of topics, many research questions within the gender and energy realm that can inform policy still remain.

Innovation

Phase 6 is the first Phase within ENERGIA that specifically addresses this theme. We hope to work with Hivos and our other development partners to build an innovation hub to fund and evaluate innovative projects on gender and energy.

Knowledge management & sharing and communications

Through our knowledge management interventions we aim to deepen understanding of energy, gender and sustainable development linkages. To this end, we produced and disseminated over 248 communication and knowledge products to over 10,000 professionals and practitioners through a variety of channels (social media, print, radio and TV). The products included flagship publications such as *Supporting last-mile women energy entrepreneurs: What works and what does not* and *Gender in the transition to sustainable energy for all: From evidence to inclusive policies.* The dissemination of three issues of ENERGIA News focused on practice, with a conscious effort to interpret and learn from this practice. Through storytelling and news updates on our website we aim to inform on a continuous basis what is going on in the projects and highlight specific accomplishments and events. This year we re-launched the empowerment journeys, an online series in which we follow eight women entrepreneurs on their journey to becoming successful energy entrepreneurs. The empowerment journeys aim to highlight not only the successes, but also the challenges the entrepreneurs encounter and their ways to overcome these.

We strive to generate a complete as possible database of publications related to gender and energy and make it available to a wide audience through our website: https://www.energia.org/knowledge-centre/latest-publications/. This database holds not only ENERGIA's publications, but from throughout the sector. Other ENERGIA generated resources such as webinars and our ENERGIA News are also publicly available on our website: https://www.energia.org/knowledge-centre.

The ENERGIA Phase 6 is currently funded by:

- Swedish International Development and Cooperation Agency (SIDA)
- Department for International Development (DFID)
- Asian Development Bank (ADB)
- Dutch Ministry of Foreign Affairs, Directorate-General for International Cooperation (DGIS)
- Millennium Challenge Corporation (MCC)

We are constantly working to grow our funders base, which will allow us to expand and deepen our work.

Farewell and welcoming

Behind our activities, there is the commitment of a qualified team, continuously working hard to ensure that gender and energy are placed at the top of the international agenda. Respect, harmony and synergy drive our mission and shape our relations daily. This is why we were sad to say goodbye to Soma Dutta, who led the Women's Economic Empower Programme as Project Manager with passion and devotion. We thank her for her enormous contribution and are excited to continue collaboration with her as gender and energy programme and policy advisor for future projects.

In 2019, after three years working together, our Project Assistant Joke Keuning moved to another job within our host organisation Hivos. While we are happy for her to take on something new, we are sad to see her go. Joke has always been an indispensable support to our team, and a great person who helped us with competence and kindness.

In parallel, our team was very happy to welcome Lucia Lenci as Communications Officer, Remco van Stappershoef as Women's Economic Empowerment Manager and Zaki Al Qaraghuli as Project Assistant. We look forward to working together, sharing moments and building new valuable working relationships.

A new Advisory Group

All the work done by our staff would not be possible without the continuous support of our Advisory Group. For many years a steady group of experts and specialists dedicated time and knowledge to support and guide our work. Part of that group has now decided to step down. We thank each and every one of them for their dedication and commitment to engendering the energy sector. The departing Advisory Group members are:

- Ms. Priyanthi Fernando, Director, Centre for Poverty Analysis
- Ms. Rose Mensah Kutin, Director, Abantu for Development
- Mr. Sécou Sarr, Director, ENDA ENERGIE
- Mr. Thiyagarajan Velumail, Managing Director and Principal Consultant, EnergyPlus Sustainability Consulting
- Mr. Venkata Ramana Putti, Programme Manager Climate and Carbon Finance Unit, World Bank

As of November 1st, 2019 three new members joined the Advisory Group. We wish to extend a warm welcome to:

- Ms. Amanda Elam, Research Fellow International Diana Institute, Babson College and President of Galaxy Diagnostics, Inc.
- Mr. Paul Mbuti, Principal Renewable Energy Officer, Ministry of Energy & Petroleum, Kenya
- Ms. Shonali Pachauri,Senior Researcher and Deputy Programme Director, International Institute for Applied Systems Analysis (IIASA)

We look forward to working together, discussing relevant topics and analyze trends to advance and our impact.

Two highly valued members, Elizabeth Cecelski, Founder Member of ENERGIA and Carol Gribnau, Director Green Department at Hivos, will remain part of the Advisory Group. With them, historical knowledge about ENERGIA and continuity in our cooperation is safeguarded.

Going digital

In line with our commitment to reduce our impact on the planet and maximise resources, we have shifted from printed to digital dissemination of our publications. As this edition of ENERGIA News, all our publications are now equipped with a QR-code to facilitate easy download, disseminated through our online channels and available online on our website. The downloadable version of this issue of ENERGIA News is available on our website at www.energia.org/energianews2020 Please subscribe to our Newsletter to continue receiving ENERGIA News in the future: www.energia.org/subscribe.

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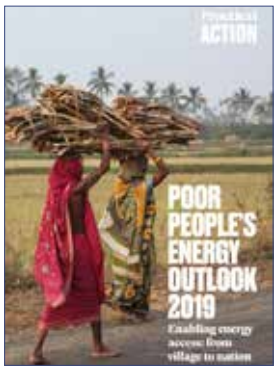
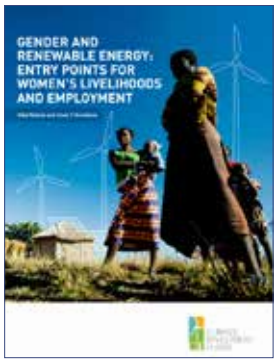
Resources



Poor People's Energy Outlook 2019 - Enabling Energy Access: from Village to Nation

PPEO 2019 is the culmination of five years' research, exploring what it takes to realise the kinds of energy services that enable people living in energy poverty to thrive. The report compiles and updates key messages and recommendations on energy access planning (PPEO 2016), financing (PPEO 2017) and delivering at scale, while also leaving no one behind (PPEO 2018).

https://practicalaction.org/poor-peoples-energy-outlook/#latest



Gender and Renewable Energy: Entry Points for Women's Livelihoods and Employment

This Note highlights key issues on women's livelihoods and employment in the renewable energy sector, and provides practical guidance, including checklists and indicators, on integrating gender into the renewable energy project cycle. [...] Further, it highlights the livelihoods and productive use impacts that can be fostered indirectly through renewable energy investments, such as strengthening of women-owned firms, business skills, and linkages to productive on- and off-farm applications.

https://www.climateinvestmentfunds.org/sites/cif_enc/files/gender_and_re_digital.pdf

Opportunities and Constraints for Women's Employment and Entrepreneurship in Renewable Energy

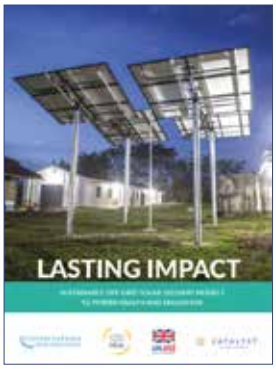
This paper identifies opportunities and constraints that low-income women face in accessing livelihoods in the renewable energy sector in India through research conducted in collaboration with The Energy Resources Institute (TERI) and the Self-Employed Women's Association (SEWA). Whereas previous research has focused on women mostly as end users of solar and biomass technologies, this research attempts to also understand women's potential as entrepreneurs, facilitators, designers and innovators. Findings reveal that although their access to technology and employment in the energy sector is limited by inadequate purchasing power and low social status, there is tremendous potential to create livelihoods for women at all levels of the energy supply chain.

http://grow.research.mcgill.ca/publications/working-papers/gwp-2017-10.pdf

Accelerating SDG 7 Achievement: SDG 7 Policy Briefs in Support of the High Level Political Forum 2019

The briefs in this compilation focus on the links between SDG 7 and the SDGs under review [...]: SDG 4 on quality education, SDG 8 on decent work and economic growth, SDG 10 on reduced inequalities, SDG 13 on climate action, SDG 16 on peace, justice and strong institutions, and SDG 17 on partnerships. This stock-taking report is being issued at the midpoint of the UN Decade of Sustainable Energy for All 2014-2024 [...]

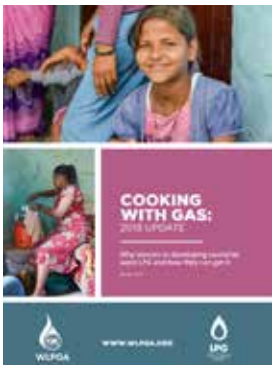
https://sustainabledevelopment.un.org/content/documents/22877UN_FINAL_ONLINE_20190523.pdf



Lasting Impact: Sustainable Off-Grid Solar Delivery Models to Power Health and Education.

This report uses case studies to shed light on what kind of off-grid solar delivery models contribute to—and, likewise, hinder—sustainability.
The purpose of the report is to help decisionmakers in the public and private sector design sound off-grid electrification projects for rural schools and health centers by helping them evaluate the most effective and appropriate delivery model for their specific country context.

http://poweringhc.org/wp-content/uploads/2019/04/Lasting-Impact_Sustainable-Off-Grid-Solar-Delivery-Models-to-Power-Health-and-Education.pdf



Cooking with gas: 2018 Update

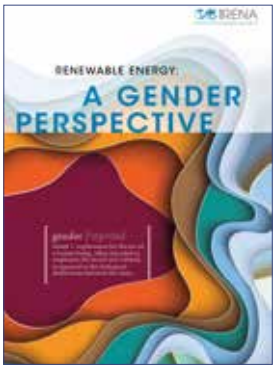
Increasing household use of LPG is one of several pathways to meet the objective of universal access to clean cooking and heating solutions by 2030, one of the three targets of SDG7 (along with doubling the global rate of improvement in energy efficiency and doubling the share of renewable energy in the global energy mix). For the first time, access to cooking and heating energy, the most important energy need for poor women, is treated as a global and national target on an equal footing with access to electricity.

https://www.wlpga.org/wp-content/uploads/2019/07/Cooking-with-Gas-Why-Women-in-Developing-Countries-Want-LPG-and-How-They-can-Get-It.pdf

What Drives the Switch to Modern Energy? Linkages and Gender Implications

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 programmes to ensure near universal access to these energy sources. [...]

https://www.energia.org/cm2/wp-content/uploads/2019/04/Cooperation-Brief-final-07032019.pdf



Renewable Energy: A gender perspective

IRENA's Renewable Energy: A Gender Perspective analyses the status of women's participation in the sector in two distinct deployment settings – the modern context (in which renewables displace or complement conventional energy) and the energy access context (which is characterised by efforts to expand access to modern energy services)
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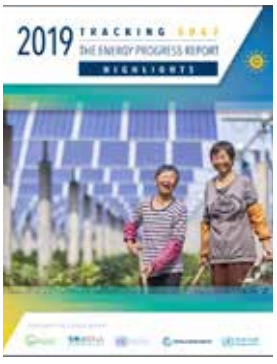
https://irena.org/-/media/Files/IRENA/Agency/Publication/2019/Jan/IRENA_Gender_perspective_2019.pdf



Tracking SDG7: The Global Energy Progress Report 2019

This report provides a global dashboard on progress towards Sustainable Development Goal 7 (SDG7), which sets 2030 targets for reaching universal access to electricity and clean fuels and technologies for cooking, substantially increasing the share of renewable energy in the global mix, and doubling the rate of improvement of energy efficiency.

https://trackingsdg7.esmap.org/downloads

In the light of what we cannot see: Exploring the interconnections between gender and electricity access

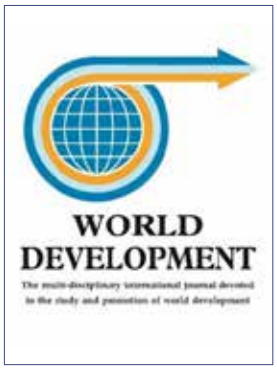
In this paper we quantifies gendered decision-making patterns regarding electricity access, light and appliances in selected rural contexts in Mahadevsthan (Nepal), Homa Bay (Kenya) and Chhattisgarh (India). [...] The findings show that women generally had less power than men to make decisions about electricity and appliances and that women's lack of rights in electricity was mirrored in their subordinated position in the socio-material contexts. Comparing groups of women, women in Mahadevsthan, including those who were living without a man in the household, were most likely to have electricity access and acquire appliances of their choosing. Widows in Homa Bay were the least likely to have electricity access.

https://www.sciencedirect.com/science/article/pii/S2214629619306000

Gender audits: An approach to engendering energy policy in Nepal, Kenya and Senegal

Gender audits are an approach for putting gender on the policy agenda and are an alternative to gender budgets being less dependant on experts in government finance. This paper explores the effectiveness of gender audits as an approach to mainstreaming [gender] in the energy sector. [...] The paper uses an analysis of qualitative data, reviews of audit reports and key informant interviews to answer two questions. As a result of gender audits, have gender issues or attending to women's particular interests been incorporated in energy policy? Did participation in an audit build the capacity of national actors to contribute to gender mainstreaming in the energy sector?

https://www.sciencedirect.com/science/article/pii/S2214629618310077



Exploring the linkages between energy, gender, and enterprise: Evidence from Tanzania

[...] Using a multi-methods approach, this study provides new evidence about how men and women use energy in rural micro-enterprises in Tanzania, and which benefits they obtain from it. [...] Typically, female activities are less profitable and less mechanised than men's. Consequently, in the absence of gender interventions, male entrepreneurs are more likely to benefit from the promotion of productive uses of electricity. The paper discusses several approaches to improve the gender equity of PUE interventions.

https://www.sciencedirect.com/science/article/abs/pii/S0305750X19304899

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