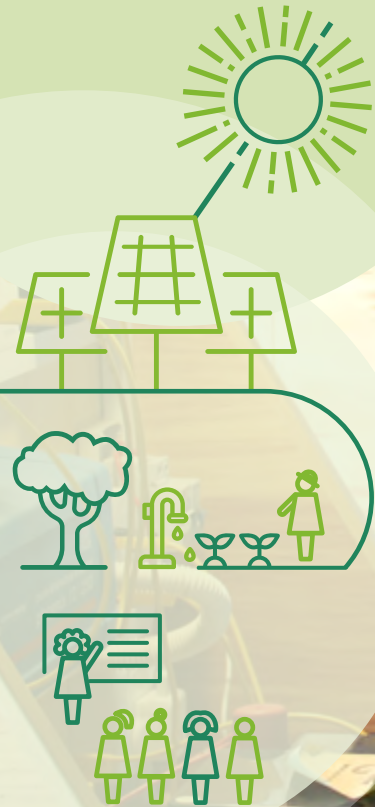


GRÜNE BÜRGERENERGIE
(GREEN PEOPLE'S ENERGY)
THEMATIC KNOWLEDGE PRODUCT



Empowering Women in the Decentralised Renewable Energy Sector

Learnings from the Green People's Energy programme



Purpose of the thematic knowledge product

About 600 million people in Sub-Saharan Africa (SSA) lack access to electricity. Electrification is particularly low in rural areas, where less than 20% of the population has access to electricity (IEA, IRENA, UNSD, World Bank, WHO, 2023). For people living far from the national grid in rural areas with low population density, access to electricity through grid extension is rarely economically viable. Although access to electricity and productive technologies can promote economic development of local enterprises and improve livelihoods, stand-alone off-grid electricity systems based on renewable energies remain unaffordable to many. As a result, households, social institutions, and micro, small and medium-sized enterprises (MSMEs) often use energy-inefficient and outdated technologies, such as diesel generators, which have high running costs and are harmful to the environment and human health.

Against this background, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) programme “Green People’s Energy” (Grüne Bürgerenergie, GBE) aims to improve access to electricity using decentralised renewable

energy (DRE) in rural SSA. GBE promotes DRE systems in rural areas in nine African countries: Benin, Côte d’Ivoire, Ethiopia, Ghana, Mozambique, Namibia, Senegal, Uganda and Zambia. It involves key local stakeholders, like authorities, agricultural cooperatives, financial institutions and solar companies. A particular focus is on supporting a productive use of energy (PUE).

GBE intends to generate learnings and give impulses for German and international development cooperation. Four thematic knowledge products look into the intermediate impacts and lessons learned from selected GBE interventions. They identify key success factors for why and how which support measures worked. The aim is to contribute to the sector discussion and give recommendations for future project designs.

This knowledge product focuses on **empowering women in the energy sector**. After an overview of challenges and intervention approaches from literature, four case studies from the GBE programme are showcased and key findings presented.

Women empowerment in the energy sector

Women are generally underrepresented in the energy sector. They are underrepresented as politicians, as managers, as entrepreneurs in the supply chain, as technicians and as direct users of energy appliances.

In the DRE supply chain, professional roles are typically considered a male domain be it in sales, installation, or maintenance of PV-systems. Families tend not to encourage or support girls and women to acquire technical knowledge and skills. Women themselves often do not have the confidence or agency to change this. They carry the bulk of household tasks but do not have equal control over resources. One cause are deep-rooted norms and traditional understandings of gender roles in society.

In addition, political reforms that strengthen the legal status and participation of women in education and public affairs, that reduce gender-specific violence and improve

women’s land ownership rights and, consequently, their access to resources and credits are in many countries still in the making.

At community level, energy projects are often planned and designed without taking women’s views or needs into account. The same is true for ministries and social institutions. At the same time, men are more likely to benefit from development projects focussing on skills development and access to PUE technologies in the DRE sector. This is enhanced by the fact that there are more male teachers and professionals in the market who already own land and tend to have larger businesses.

To reach more women and ensure they benefit, special efforts need to be made. Therefore, development cooperation projects in the energy sector are currently expanding their focus on strengthening the role of women.

Literature review: Key approaches to promoting gender equality in energy projects

The International Food Policy Research Institute developed the so-called ‘**Reach-Benefit-Empower Matrix**’ to help classify gender projects in terms of their impact (see Figure 1). A key statement this matrix makes is that **reaching** women, i.e., achieving a high female participation in projects (e.g., taking part in trainings) does not guarantee that they will also **benefit** (e.g., be able to follow and reach the learning

objectives, or apply the knowledge afterwards). And, even if women benefit, it is not automatically assured that they will be **empowered** (e.g., in control over gained income, that they potentially have to hand over to a male household member). This matrix is used when describing the interventions below.

The Reach-Benefit-Empower Matrix			
	Gender-sensitive	Gender-responsive	Gender-transformative
APPROACH	Include women in program activities, i. e. trainings	Designing trainings that consider gendered needs, preferences & constraints to ensure that women benefit from program activities	Strengthen abilities of women/girls/boys and men to make strategic life choices and to put those choices into action
	Inviting women as participants	Women make use of the learned techniques, skills, knowhow, etc.	Enhancing women’s decision making power in households/communities/politics; changing gender norms; men as change agents, addressing key areas of discrimination
INDICATORS	Number and proportion of female participants attending trainings	Sex-disaggregated data for positive/negative outcome indicators i.e. increase of yields/income etc.	Women’s & men’s decision making power e.g. in income use, agricultural production, food consumption; reduction in time burden, gender based violence, etc.
	Reach	Benefit	Empower

Figure 1: Reach-Benefit-Empower Matrix¹

A literature review shows that the following approaches are most frequently included in energy projects to overcome barriers to achieving more gender equality. Several

recommendations for their implementation are provided by literature.

¹ Adaptation of the RBE framework by the International Food Policy Research Institute (IFPRI) and the CGIAR Research Program on Fish Agri-Food Systems (accessed 14 July 2023, <https://gender.cgiar.org/tools-methods-manuals/reach-benefit-empower-transform-rbet-framework>)

Women's representation, voice and leadership in community consultations and energy committees

One of the low-hanging fruits of gender mainstreaming is actively ensuring women's participation and engagement in community consultations (e.g., in mini-grid projects). This **gender-sensitive approach** helps to capture the energy needs of both men and women for effective program design and implementation. Efforts are also made to ensure equal representation of women in energy managing committees. During community consultation, special attention should be paid to a) the date, time, and location of the consultation to involve men and women from different socio-economic strata and to ensure that it does not coincide with other important tasks, b) the language of the meetings (special attention to local/regional dialect and academic level), c) the sitting arrangement (reflective of local traditions

but no special preference given to either gender). A critical factor during participatory approaches is to avoid viewing any group as a homogenous category and to incorporate (women's) voices from different backgrounds (married vs unmarried, different caste/tribal groups, or old vs young). It should also account for the power relations as well as inequalities that exist between women in the community.² Ideally, women should not only be reached to participate in consultations, but it should also be facilitated (e.g., by sensitizing men) that their voices are heard, so that they may benefit from their engagement. Enhancing the decision-making power of women in such consultation settings (e.g., by tackling gender norms), leads to a **gender-transformative approach**.

Scholarships and quotas for women representation in the energy sector

A common **gender-sensitive approach** to reach and engage more women in the energy field is to offer scholarships as well as quotas for women to increase enrolment and representation of women, e.g., in technical trainings, universities, public institutions, or energy projects. However, for women's participation in the energy sector, pre-existing biases about women's capabilities (conscious and unconscious biases) and lack of acknowledgment of the different needs of female employees pose a hindrance. For example, this may result in women not choosing field work although it might advance their career or choosing support services that have a more feminine association. This leads to a chicken-and-egg situation, with companies complaining about the lack of qualified female employees and women complaining about the unsupportive environ-

ment.³ Hence, along with scholarships and quotas, it is necessary to tackle pre-existing organizational biases as well as culture/business practices in the host organizations that favour one gender over the other. This is less often included in project designs. Additional support is recommended, like networks and mentorships, workplace amenities (e.g., a breastfeeding room, a nursery, flexible working hours, maternity leave, female bathrooms on project sites), and gender sensitization among all employees for career advancement. Also, efforts should be made to have equal representations of women in leadership roles. Ultimately, women should not be token representatives but rather have a genuine choice to participate and an equal voice in the institutional environment.⁴

Training women for technical professions in the RE-ecosystem

One of the common gender-responsive approaches to encouraging women's participation in technical fields is training women as solar technicians (or other relevant jobs, e.g., engineers). For long-term sustainability, training female technicians should be accompanied with job opportunities in the local economy, so they may benefit from their capacity building. For this to be effective, programs need to tackle societal biases that hinder women's participation in the local economy and address potential conflicts that can occur in the family, especially if the male members are unemployed and only women

are trained. Such schemes should also be holistic so that after the training, women can repair e.g., solar kits from different manufacturers.⁵ The opportunities should further be advertised using a variety of channels to include women from different backgrounds. The trainings need to be customized to the local settings and often need accompanying trainings on business development and agency building. Agency building trainings (which focus on physical-social empowerment such as self-confidence, self-regulation, self-awareness, etc.) often also have a higher impact than pure business development trainings.⁶

2 Global Initiative for Economic, Social and Cultural Rights, "Women's Participation in the Renewable Energy Transition: A Human Rights Perspective" 2021

3 IEA and CEEW, "Women Working in the Rooftop Solar Sector" 2019, p.39

4 Soler, Jäger and Lecoque, "Women Entrepreneurs as Key Drivers in the Decentralised Renewable Energy Sector" 2020

5 Schultz and Riedmann, "Development Aid", 2016

6 Shankar, Onyura, and Alderman, "Agency-Based Empowerment Training Enhances Sales Capacity of Female Energy Entrepreneurs in Kenya" 2015, p. 67-75

Targeted support for women and women-led MSMEs using RE or working in RE supply chains

Women entrepreneurs as well as women-led MSMEs usually have less access to resources such as finance, networks, trainings, education etc. The businesses are also mostly informal and have limited access to business development services.⁷ To address this uneven playing field, programs can offer support and subsidies for promoting women-led entrepreneurship. The business development services should be reflective of women's needs and the date/time should be flexible to be **gender-responsive**.⁸ The training opportunities should also benefit women from all socio-economic strata equally and to be gender-transformative ensure that the benefits are retained by the women.

Especially when promoting subsidies for productive use, it is important to watch out for the new technology not being hijacked by men, resulting in a loss of income for women.⁹ Promoting women-led businesses with RE solutions should also ensure that a market linkage is established to sell the finished products.¹⁰

Oftentimes, training participation and income-generating activities coincide with household responsibilities of women, and thus, gender sensitization among the male members is key for women's participation. Having buy-in from other family members can also ease the burden on women.¹¹

Employing saleswomen to reach last-mile consumers

Off-grid companies increasingly apply this gender-responsive approach of employing women as sales agents to reach last-mile consumers. Women sales agents are considered to be better listeners, reliable and consistent in their work, connect better with the energy needs of their female consumers, and have a large network to tap into. Women are also generally considered more trustworthy, and this is a key quality as rural consumers place a high value on familiarity and trustworthiness of the sales agents during purchase.¹² Involving women in the value chain also has a ripple effect as women reinvest up to 90% of their income in their families as compared to only 30–40% by men.¹³ Of course, this can only be observed if women have control

over their income. However, due to their household roles as well as prevalent cultural norms, the mobility of women is often restricted. Thus, for hiring and retaining women sales agents, there needs to be an emphasis on flexibility to balance household roles with work demands; safety while traveling to remote locations, and more mobility options.¹⁴ Solar companies can, for example, offer company-owned motorbikes with drivers for women sales agents to reach rural areas.¹⁵ Attention should also be paid that including only women as sales agents does not alienate them from other employees. This also has to align with the local, cultural, and religious contexts.

7 IRENA, "Renewable Energy: A Gender Perspective" 2019

8 Energia, "Supporting Last-Mile Women Energy Entrepreneurs: What Works and What Does Not" 2019

9 Global Initiative for Economic, Social and Cultural Rights, "Women's Participation in the Renewable Energy Transition: A Human Rights Perspective" 2021

10 Soler, Jæger and Lecoque, "Women Entrepreneurs as Key Drivers in the Decentralised Renewable Energy Sector" 2020

11 Energia, "Supporting Last-Mile Women Energy Entrepreneurs: What Works and What Does Not" 2019

12 Roy, "Shedding Light on Women in Solar: How – And Why – Off-Grid Solar Companies Should Hire More Female Sales Agents - NextBillion" 2019

13 UNEP, "Powering Equality: Women's Entrepreneurship Transforming Asia's Energy Sector" 2020

14 Roy, "Shedding Light on Women in Solar: How – And Why – Off-Grid Solar Companies Should Hire More Female Sales Agents - NextBillion" 2019

15 Global Distributors Collective. "Gender in Business: Lessons Learnt for Last Mile Distributors" 2022

GBE approaches to promote gender equality

For all training measures and business development support for PUE, GBE pursued a minimum target of 30% female participants. The programme has taken various measures to go beyond just reaching women, to promoting gender empowerment. The approaches applied vary from project to project. Most consist of combinations or adaptations of the women empowerment approaches described in literature above and/or further elements. In each case the empowerment strategies are interlinked with well-established technical assistance activities such as training measures, access to finance, and provision of internships.

Four case studies were selected to conduct a comparative analysis of the different GBE interventions on women empowerment.

Benin: Strengthening Young Female Engineers Working in Renewable Energy – Role Models for the Public Energy Sector

1. **Uganda:** Strengthening Solar PV Vocational Training and Promoting Energy Skills Development for Women in Uganda
2. **Uganda:** Productive Use Promotion for Rural Entrepreneurs and Smallholder Farmers in 25 Newly Electrified Villages, Lamwo District
3. **Senegal:** Access to Solar Applications in the Agricultural Value Chain in the Villages of Nguidjilone

Table 1 below shows in how far the GBE projects have combined approaches described in the literature review.

Apart from case study specific data, a quantitative survey across 14 GBE projects in fields such as PUE and innovative financing approaches was conducted and analysed. Most of these projects do not primarily focus on gender empowerment but the gender-disaggregated data from these projects can still provide interesting insights into the topic.

Overview:

GBE case studies and approaches to promote gender equality and women empowerment.

Country	GBE Project	Approaches
BENIN	Strengthening Young Female Engineers Working in Renewable Energy – Role Models for the Public Energy Sector	<ul style="list-style-type: none"> › Internships for women in technical and managerial positions › Capacity building measures and mentoring during internships
UGANDA	Strengthening Solar PV Vocational Training and Promoting Energy Skills Development for Women in Uganda	<ul style="list-style-type: none"> › Lower entry barriers and quota for women to ensure representation and participation in trainings › Training women for technical professions: Solar trainings for lecturers and professionals
UGANDA	Productive Use Program for Rural Entrepreneurs and Smallholder Farmers in 25 Newly Electrified Villages, Lamwo District	<ul style="list-style-type: none"> › Business idea competition, including gender criteria to ensure representation of women-led MSMEs › Targeted support for women-led MSMEs: Entrepreneurial skills trainings; co-financing of PUE appliances
SENEGAL	Empowering women through productive use in the Agricultural Value Chain in the Villages of Nguidjilone	<ul style="list-style-type: none"> › Quotas for women-led microenterprises › Targeted support for women and women-led MSMEs: loans for solar refrigerators; capacity development and entrepreneurship trainings

Table 1: GBE Case Studies

Main case study results

BENIN:

“Strengthening Young Female Engineers Working in Renewable Energy – Role Models for the Public Energy Sector”

As an example of a **gender-transformative approach**, the intervention sought to increase the participation of young female engineers in the public energy sector. The objective was to increase the visibility of women in the field of energy at the national level and to make key institutions in the sector more inclusive. In the energy sector, technical positions are often unattainable for women. As of 2021 in Benin, only 1.7% of the technical personnel of governmental energy agencies were women. The intervention offered eight young female electrical engineers (selected through a competitive process) a 14-month traineeship at the Ministry of Energy (MoE) and its related public institutions to qualify them for a subsequent employment. Additionally, the female engineers were supported with mentoring and capacity building measures. Also aiming at increasing the overall visibility of opportunities for women in technical professions, the female engineers conducted various career awareness events at schools and universities and reached a total of 2,182 girls and young women with their message.

The most prominent intermediate impact of this intervention is that all eight female engineers now have been

employed, four of them with the Beninese Company of Electrical Energy (SBEE) and the other four with the Beninese Company of Electricity Production (SBPE). The combination of measures empowered the women to make the strategic life choices to pursue new job opportunities. The female engineers also reported that they were able to grow not only professionally, but also personally, for instance by speaking in front of large audiences. While leading the awareness events, the female engineers acted as multipliers and observed themselves that their example and information shared increased the acceptance of an engineering career within the families of the girls and women who participated in the awareness-raising events. As a representative of MoE mentioned, they moreover contributed to a “changed perception of technical women in the sector” and the political partner added “women have shown what they can do.” Hence, the intervention advanced the process to overcome deep-rooted prejudices both on the side of men but also among the women themselves to take on STEM¹⁶ jobs, rendering it a **gender transformative intervention** overall.

UGANDA:

“Strengthening Solar PV Vocational Training and Promoting Energy Skills Development for Women in Uganda”

The GBE project in Uganda represents a **gender-responsive measure with gender-transformative elements**. As a precondition for a more widespread usage of decentralised renewable energy (DRE) solutions, GBE Uganda supported the expansion and quality improvement of DRE capacity building opportunities through its technical training and skills development component in the Northern Region. Hands-on training programs on technologies relevant to the target group of teachers and professionals in the field of renewable energy (e.g., solar powered irrigation systems (SPIS)) to promote and develop the capacity of professionals in electricity and solar technology were developed and implemented. To this end, the project collaborated with two vocational training institutions (VTI) and one higher education institution. GBE additionally upgraded



Solar PV design, installation, operation and maintenance training at Daniel Comboni Vocation Institute (DCVI).

¹⁶ Acronym for Science, Technology, Engineering and Mathematics

the institutions' equipment (e. g., solar training stands or computer rooms) and ensured the installation of demonstration centres for SPIS and horticulture (so-called demo gardens) at each of them. The measures were closely interlinked with the implementation of multiple activities to attract and to enable women to equally participate in and benefit from the project's capacity building measures.

A total of 39 female teachers and 88 female professionals were trained. In line with the general underrepresentation of women in the renewable energy (RE) sector, the proportion of female teachers trained was 21% and of female professionals 28% of all people capacitated. Yet, the project reached considerably more women than originally planned due to a combination of different measures. For example, at a VTI in Northern Uganda a particular dormitory and washroom was built for female training participants, allowing women to stay overnight. This was an important improvement directly targeting women's needs, as in many other VTI there are only male dormitories which practically exclude women from participating. In addition, the trainings were advertised, awareness workshops conducted, the scope of potential female training participants widened, and the eligibility criteria for female farmers adapted to lower entry barriers.

Provisional kindergarten

The GBE intervention established a provisional kindergarten for participants' children at a VTI, enabling them to concentrate on the training content which was a major improvement for the women mostly in charge of childcare.

Complementing these gender-responsive measures, the project also implemented partially **transformative activities**. For example, female trainers were included to provide trainings, so that women could feel more com-

fortable to ask gender-related questions around fellow women. The project also established the "Solar Irrigation and Agronomy Club" (the club) at Gulu University. With a mandatory female representation of 70% among its 30 members, the club aims to advance the use of RE in crop production. As one interviewee remarked: "the club has many females in leading positions [...] and all are given a platform to talk and to speak out."

Gender-responsive appliance

Managed by the students, the club established a demonstration garden with a green house, and raised water tanks on a redesigned tank stand with extra handrails and non-steep staircases. The redesigned tank stand enabled women to easily access and fully manage the solar powered irrigation system. The tank stands are very considerate of the specific needs of women who had expressed reservations of climbing up the usually used ladders when wearing dresses.

All in all, the GBE measures positively impacted the targeted women. Among the trained female professionals an overwhelming majority of 90% record an improvement of their professional performance and 36% report an increase in income. Considering that the project was largely implemented during the Covid-19 pandemic with the world's longest school lockdown in Uganda, this is a clear success. Adding to this, an interviewee from the club reported that fellow female students regard the club members as role models. Similarly important, the trainings for women led to positive side effects, like participants installing solar PV systems at home for their own crop production and generating interest in solar PV systems in their communities. Thus, the project reached its target group, assured that a large majority benefitted from the activities, and contributed to the empowerment of women.

UGANDA:

"Productive Use Program for Rural Entrepreneurs and Smallholder Farmers in 25 Newly Electrified Villages, Lamwo District"

Prior to the GBE program 25 villages in the Lamwo district had been electrified with mini-grids. To make sustainable use of this newly available electricity, the project approach was to train and/or coach up to 150 new or existing rural entrepreneurs and smallholder farmers with a particular focus on women in entrepreneurial skills and assist them in business development through the productive use of energy. This **gender-responsive approach** was complemented by the establishment of a matching grant

scheme for the target group to co-finance the purchase of productive use appliances and equipment, and the creation of an enabling environment for improved access to such financial services. The project particularly sought to foster women's participation by placing emphasis on the selection of women entrepreneurs. To receive support, the smallholder farmers and rural entrepreneurs had to participate in a business idea competition with a criteria-based selection process. One criterion for the



Entrepreneurship and businesses skills training organized for businesses now having access to energy provided by a newly installed mini-grid in Lamwo.

selection of business ideas was the business' ability to offer equal opportunity to men and women. The GBE country team also ensured that the trainings were conducted by experienced local trainers of which 50% were women.

The project's main achievement is that more than 80 businesses in 25 villages in the Lamwo District use electricity for productive purposes. In line with the general underrepresentation of women in the RE sector, slightly less than 25% of the beneficiaries were female business owners.

SENEGAL:

“Empowering women through productive use in the Agricultural Value Chain in the Villages of Nguidjilone”

The **gender-responsive intervention** aimed to enable women and youth groups to finance income-generating activities in the agricultural sector in the villages of the Nguidjilone area. The target group was supported in investing in PUE appliances such as solar pumps, solar rice husking equipment, solar freezers, or solar mills. Access to finance was facilitated with the establishment of a fund. Training and group mentoring to set up and manage microenterprises in the agricultural sector was also provided for the target group. The project components aimed to support the target group to become financially self-sufficient for themselves and their families. Additionally, quotas for equipment that is more sought by women, like solar fridges, were also integrated in the approach to indirectly promote women.

The project enabled numerous end-users to invest in solar equipment and also in solar home systems. One of the

However, according to one interviewee, the project could have done more to “address the cultural hurdles that help to free women from domestic work and give them more room for entrepreneurial engagement.” Further sensitization measures, particularly among men, would have been conducive. The capacity building measures, in turn, observably impacted the beneficiaries with 98.6% of the businesses reached reporting that they increased their competencies and are applying skills, tools and methods acquired in the trainings. Additionally, 83% of the active businesses were able to increase their revenues through the productive use of the newly purchased electrical appliances and the corresponding increase in sales. Thus, the GBE project helped women start new businesses or expand their existing ones. For example, female entrepreneurs now offer their customers cold drinks from a new and more efficient freezer. As more clients can be served at the same time, turn-over and ultimately revenues increase. Moreover, the GBE project supported the process of social development in the communities. Women reported that they feel encouraged to be able to work late because the newly available lighting also means greater security for them. Their children can also study longer in the evening which helps to reduce the number of those dropping out of school. The project was therefore gender-responsive and partially gender-transformative, as it remains unclear in how far the women's decision-making power over the increased income was improved.

groups of women farmers reported that they had increased their profits by replacing the expensive diesel pump on their two-hectare farm with a solar pump. These profits are now not only being used to repay the loan, but the group is also using the profits to invest in a new sheep farm.

In the trainings and group mentoring sessions, the women and youth groups gained a basic understanding of PUE appliances, of how to manage their operations and finances, and of how to develop business plans.

Part of the project specifically aimed to change the way communities think about gender roles in economic activities, contributing to greater equality and economic independence for women. Awareness-raising workshops were conducted to sensitize communities, especially male members. For example, some mixed-gender meetings attempted to sensitize men about the need to be more

flexible in domestic tasks, i.e., to encourage men to take on more household chores in order to reduce women's domestic responsibilities and allow them to take on more economic activities. Approximately 1,750 people were sensitized regarding these issues. According to interviewees,

the role and the perception of women noticeably changed as a result of the project implementation. Thus, the project followed a gender-responsive approach and benefitted women. It also contained **gender-transformative efforts** to tackle gender norms in the sensitized communities.



President of the Nguen women's processing group in Senegal, accompanied by her colleague. Thanks to the solar dryer and equipment supported by GBE, the group was able to improve the operation of their unit, which was previously unprofitable.

Overall quantitative results

The quantitative data is based on a survey conducted for micro, small and medium-sized enterprises (MSME), farmers and cooperatives using solar technology in 14 GBE interventions in seven African countries (Benin, Côte d'Ivoire, Ethiopia, Ghana, Namibia, Senegal, and Uganda). Of the 291 respondents 76% were men and 24% were women.

Overall, numerous positive effects were observed by the surveyed group of men and women that had been supported to acquire and use solar-powered appliances like irrigation pumps, refrigerators for cold storage, or dryers. For the farms, enterprises or cooperatives the solar-powered appliance in 51% of the cases replaced a mechanical appliance or fuel-powered system, decreased energy costs (66%), increased the productivity (76%), increased income

(75%), or improved the overall financial situation (79%). These results were the same for men and women. More detailed information on the overall effects of GBE measures can be found in the GBE knowledge products on PUE and innovative finance approaches.

Apart from these aggregated effects, several survey questions deliver disaggregated insights into the situation of women. Respondents say that **own money to buy solar technology, access to finance, capacity building, and awareness of solar technology are the most crucial elements for the integration of women in the solar energy sector** (see Figure 2). It is also interesting that a number of respondents considered the lack of physical skills to use solar technology a hindrance for women.

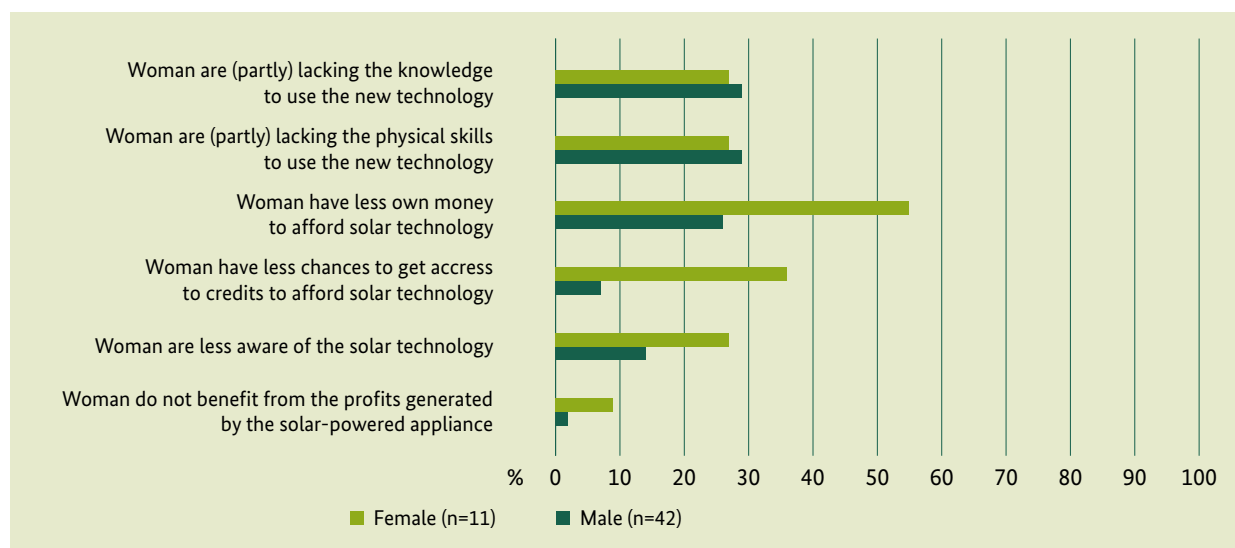


Figure 2: Reasons why women do not benefit from solar technology in the same way as men (multiple answers possible)

Of 111 respondents¹⁷ 39% reported that they hired additional labour because of the new solar-powered appliance they operate. 44% of the newly hired workers are women, which indicates that the projects had a positive employment effect

on women (see Figure 3). Although the project measures also led to efficiency gains and consequently the dismissal of no-longer needed workers, the net share of additionally hired workers, particularly women, is remarkably positive.

¹⁷ The further respondents were self-employed/one-person businesses for which the question does not apply.

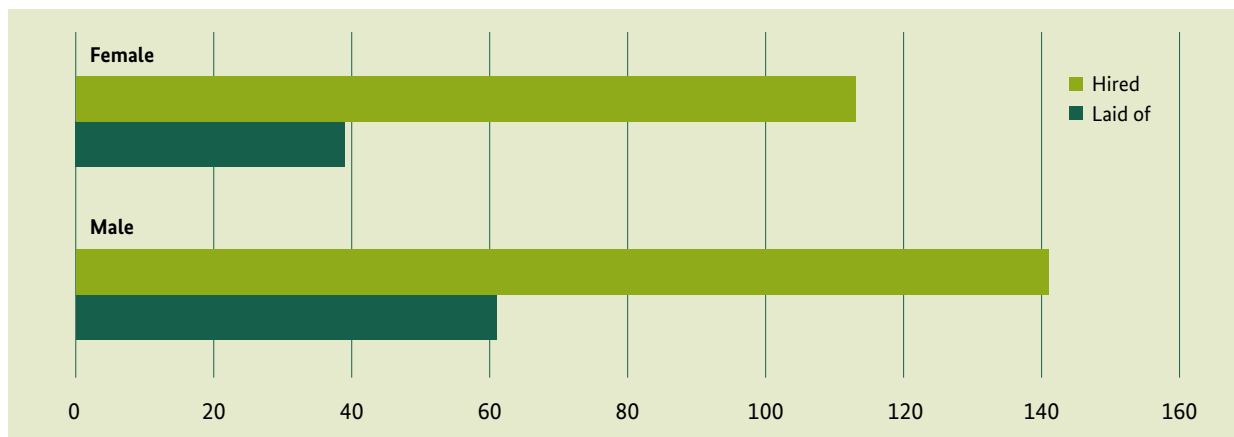


Figure 3: Additionally Hired/Laid off Workers Due to New Solar-Powered Appliance

Lastly, the involved women in the GBE measures experienced two other effects more strongly than their fellow male beneficiaries. First, **10% more women than men stated that they are now more respected in their communities as a result of the GBE measures supporting them.** Second, **15% more women than men also highlighted that they gained more self-esteem and confidence due to GBE support** (see Figure 4).

Women’s increased self-esteem can be seen as an important prerequisite for their increasing individual empowerment, whereas more respect for women in the communities is an indicator for a structural change towards greater equality in the communities.

These results **highlight the importance of focusing on gender equality when promoting productive use of energy among MSMEs.**

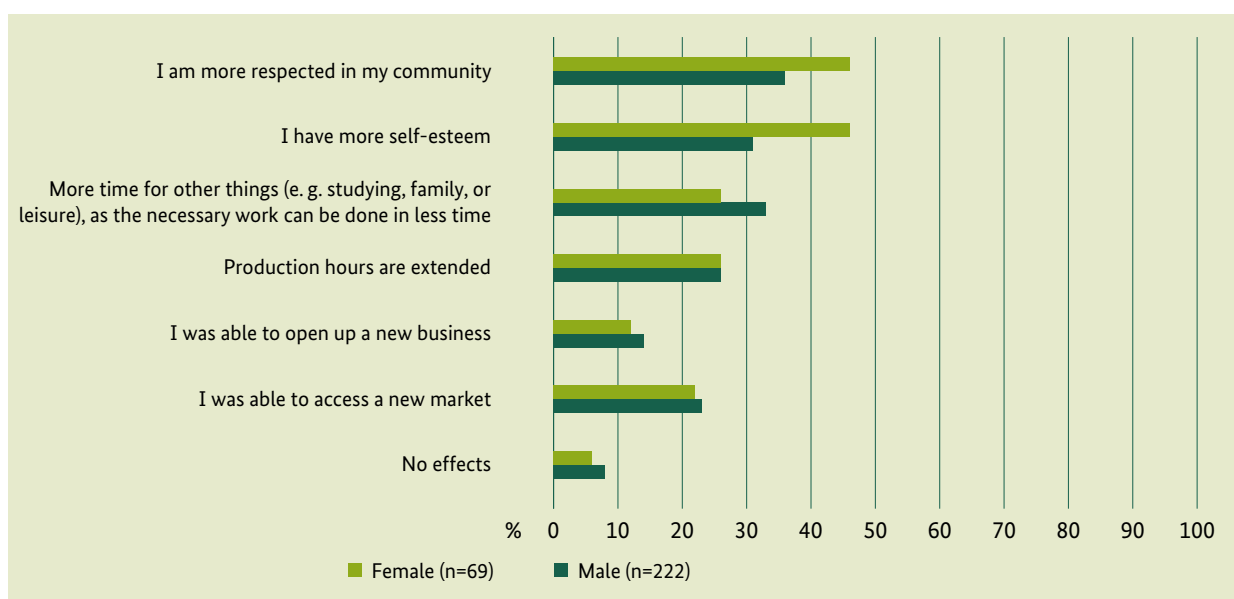


Figure 4: Other Effects the Solar-powered Appliance has on the Farm, Business, or Cooperative

Lessons learned and recommendations

By analyzing the case studies and complementing qualitative data the following key success factors regarding the empowerment of women through renewable energy

projects were identified. They add depth to the general approaches described in the literature review by considering further aspects.

Quotas and scholarships for women can contribute to transformative change. Even more so when accompanied by sensitization and awareness raising that challenges gender norms.

Promoting employment for women in management positions in top national energy service companies and government, through quotas or scholarships as the GBE internship programme in Benin did, has great potential to catalyse more systemic change. Scholarships or quotas for women were applied **at different institutional levels** by numerous GBE projects as in Benin, Uganda, Zambia, and Ethiopia. In all interventions women also acted as **multipliers sensitizing their peers and communities**. For example, the Ugandan club members sensitized their peers at university, in Zambia and Uganda, the VTIs used the

GBE trainings to raise general awareness to include more women in their programs, and in Benin the supported female interns ran a campaign of awareness raising events. By highlighting the accomplishments and contributions of women within the sector, awareness raising challenges traditional gender norms and counters the prevailing narrative of a male-dominated field. This not only serves to inspire and motivate aspiring women professionals but also dismantles ingrained gender stereotypes that have limited their participation in technical and leadership roles.

Including women in RE trainings is important. For this, trainings need to be made accessible and adapted to women's needs.

The case study results underscore the statement from the literature review that training women for technical professions is an essential approach for women empowerment in the energy sector. In interviews, key informants highlighted the importance of trainings for women. Only if more female professionals enter the market, will they be able to play a more prominent role in the sector. The quantitative data collected in the respective GBE interventions indicates the positive effect of the RE-trainings had on the participating women in categories such as 'relevance of trainings for your future career or job' or 'improved professional performance'.

Against this backdrop, the GBE experience shows that improving access to education for women is just as essential as providing the education itself. This requires targeted

efforts to overcome barriers. Options which proved to be successful in GBE measures are for example to offer mobile training units – like the mobile training truck of another GBE Uganda intervention – that can travel to different regions, bringing training opportunities directly to women in underserved areas, while mitigating the issues of long commute and often socially negatively perceived overnight stays away from home. These units can deliver hands-on training and demonstrations. Dormitories and washrooms specifically built for women are a pre-condition to providing access to education. In addition, childcare facilities at the training centres greatly facilitate women's possibilities to fully focus on the training programmes, as shown in the GBE Uganda project.

Access to finance is key (also and especially) for women-led MSMEs and should be an important part of business development programmes.

Targeted support in the form of business development or agency trainings is futile when women do not possess the financial means to buy, maintain, or repair solar-powered appliances necessary for their businesses. Women's improved access to finance, particularly through loans, is therefore crucial for their empowerment. Numerous GBE projects focused on access to finance (see [Knowledge Product on the Energypedia Financing Topic Page](#)) and included female target groups. Since this is so key, future projects should look into further promoting women's financial inclusion, e.g., by providing additional financial literacy trainings or creating gender-sensitive lending products.



President of an economic interest group of thirty women in Senegal. Thanks to solar equipment installed by GBE, the group has been able to improve the services they provide to the community with a cereal mill, and improve the quality of the soap they produce.

Soft skills trainings are especially relevant for women to enhance self-esteem and empowerment.

Generally, soft skills training is important for everyone, regardless of gender, as these skills play a crucial role in personal and professional success. However, soft skills training can be particularly important for women since women may face more barriers in the workplace.

A representative from the solar irrigation club at Gulu University in Uganda illustrated that learning to talk to customers, to lead, and to be responsible increased her confidence and ability to succeed in the sector. Moreover, soft skills like leadership, teamwork, and decision-making are essential for women who aspire to leadership positions within the energy sector. As one interviewee underscored

the point and elaborated: “We learned how to relate with others, we learned teamwork (every day in a different group) and we learned time management.” Developing these skills enables women to take on roles of influence (e.g., in an enterprise, farm, or cooperative) and to guide employees effectively. Soft skills training can also counteract gender stereotypes that might suggest women lack certain skills or traits. Demonstrating competence in communication, leadership, and other soft skills challenges such biases, as seen in the Benin or Uganda case studies. All in all, soft skills training complements technical knowledge and is a further building block to empower women in the RE sector.

Women's needs and views must be represented and considered from the start in the design of energy projects to ensure women actually use energy appliances and benefit.

Moving beyond the main approaches established in the literature, considering women's perspectives in the design of solar appliances can also facilitate their representation in the sector. It encompasses considerations that reflect women's needs, preferences, and roles within households and communities. Taking this perspective into account could ensure that solar appliances are user-friendly, effec-

tive, and responsive to the realities of women's lives. It also concerns women's safety and physical ability to operate appliances. This involves addressing concerns related to workplace safety, like the redesigned tank stand with extra handrails and slanting non-steep staircases to enable women to easily access and fully manage a solar powered irrigation system in Uganda.



Conclusions and outlook

GBE's objective was to enable women to equally benefit from all training and business development measures and achieve a gender target of 30%. The featured GBE case studies demonstrate diverse approaches that were implemented to reach this target, ranging from **gender-sensitive** to **gender-responsive** approaches, including a number of **gender-transformative** elements. The projects showcase through innovative examples how women in the energy sector (1) can benefit to a greater extent of project activities, (2) can use new technologies for their income generating activities or (3) are empowered to take up male dominated professions.

The GBE projects all addressed key barriers to women's participation. What only few projects did, is include **working with men on social norms and values** that counter women's benefits from project activities. Future programmes seeking to have an even higher **gender-transformative effect**, should include all genders and focus even more on promoting societal change (as shown in the GBE case study from Senegal). This would include strengthening equal rights, resources, and representation.

Working on gendered social norms is complex and long-term. But it is important to recognise that when engaging with men and boys change is possible, that norms can and do shift, and that everyone has the potential to change. For such activities, additional time and resources would need to be allocated.

In essence, the findings confirm that to achieve real gender equality in the renewable energy sector, a one-dimensional approach is not sufficient. A **holistic approach** is needed that addresses not only technical and educational aspects but also broader societal and systemic factors that limit women's participation. By combining these strategies, stakeholders can gradually foster an environment where women can thrive in the renewable energy field, contributing to sustainable and inclusive energy solutions for all.



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