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CHAPTER 8

Women in Energy: Perspectives on Engaging Women Across the Energy Value Chain: The Case of wPOWER

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8.1 Introduction

Globally, 1.2 billion people lack access to electricity (IEA 2016). Over 2.7 billion people, representing approximately 38% of the global population, rely on traditional biomass for cooking, mainly by burning wood, charcoal, crop waste and animal dung in open fires and on inefficient cookstoves (IEA 2016). This population remains concentrated in sub-Saharan Africa (SSA) and India, with estimates showing that the two regions account for over 850 million of those without access to electricity. Research has since confirmed that indoor air pollution, as a result of inefficient use of solid fuels, accounts for the premature deaths of 4.3 million people annually (Lim and Vos 2012). Most of these victims are women and children (Lim and Vos 2012), with current statistics indicating that approximately 800,000 children under the age of five die each year due to household air pollution (WHO 2016). Culturally, and more so in rural areas, women are the primary users of these inefficient cooking methods that increase their exposure and the risk of multiple detrimental health impacts. On the other hand, degradation of natural resources due to unsustainable harvesting and inefficient energy use means that women spend more hours (at least five hours a day) collecting fuel for cooking (GACC n.d.). Most women and girls have limited access to education and opportunities for empowerment due to time-consuming chores such as foraging for firewood, cooking and taking care of the household (Coltrane 2000).

8.1.1 Background information

Women's labor within this energy dependence on open fires and inefficient cookstoves is often invisible. Evidence shows that women are predominantly concentrated in certain energy subsectors, particularly those that are less capital intensive at the initial phase and consequently less profitable. This promotes a sense of 'survival entrepreneurship', i.e. being engaged in bottom-of-the-ladder, survival activities (Deshpande and Sharma 2013). They are also known to employ business models that are 'closer' to the final

customer such as charcoal retailing (Delahunty-Pike 2012). Generally, there is a lack of recognition of the economic value of women's work despite the fact that their participation benefits consumers and communities directly and is heavily oriented towards end of energy chain activities (Shankar 2015). At the decision-making level, in contrast, men dominate the sector (EIGE 2015).

Given the realities discussed above, i.e. (1) increased global carbon emissions; (2) inefficient cooking methods; (3) devastating health, environmental and economic outcomes; and 4) the vulnerability of women in the entire equation, there was a consensus that sustaining low-carbon emissions requires putting in place a set of conditions needed to create an 'enabling environment' (UN/DESA 2013) and increase women's participation across the energy access value chain. Consequently, women's knowledge, empowerment and collective action are now considered central to building more environmentally sustainable pathways for environmental management; adaptation to climate change; and securing access to sustainable energy (UN Women, UNDP and UNEP 2015). In addition, adoption of clean energy technologies with the active participation of women as entrepreneurs and consumers is critical in reducing the numbers of premature deaths of women and children, decreasing unsustainable biomass energy use and alleviation of limited life opportunities for women in rural and urban households (ACCESS 2014; WHO 2016).

8.1.2 Partnership on Women's Entrepreneurship in Renewables (wPOWER)

The genesis of the Partnership on Women's Entrepreneurship in Renewables (wPOWER) and its efforts was underpinned by needs to unite support for women's participation and promote the pivotal role they can play in clean energy entrepreneurship. To respond to this need, wPOWER was launched by the Department of State (United States) at the Annual United Nations Framework Convention on Climate Change Conference of the Parties (COP 19) at Warsaw, Poland in January 2013. The partnership, housed in Nairobi, Kenya, has grown into what is now a coalition of over 30 partners across the energy supply chain, including representatives from technology, implementation, research, advocacy and donor agencies (Figure 8.1).

FIGURE 8.1. wPOWER PARTNERS.

8.1.3 wPOWER organizational structure

In line with its mandate, the senior leadership of wPOWER constitutes women, with most of the team members comprising women as well, which reflects the values and mission of the organization. Figure 8.2 shows wPOWER's organizational structure.

8.1.4 wPOWER's vision

wPOWER's goal is to support over 8,000 women entrepreneurs and leaders by 2018 to enhance access to renewable energy and the adoption of energy-efficient technologies at the household level in local communities. wPOWER has already achieved more than half of this goal, empowering over 5,500 clean energy entrepreneurs working in underserved rural areas in Africa and India who are now catalysts for both urban and rural development. Table 8.1 summarizes the number of clean energy entrepreneurs trained by wPOWER and its partners.

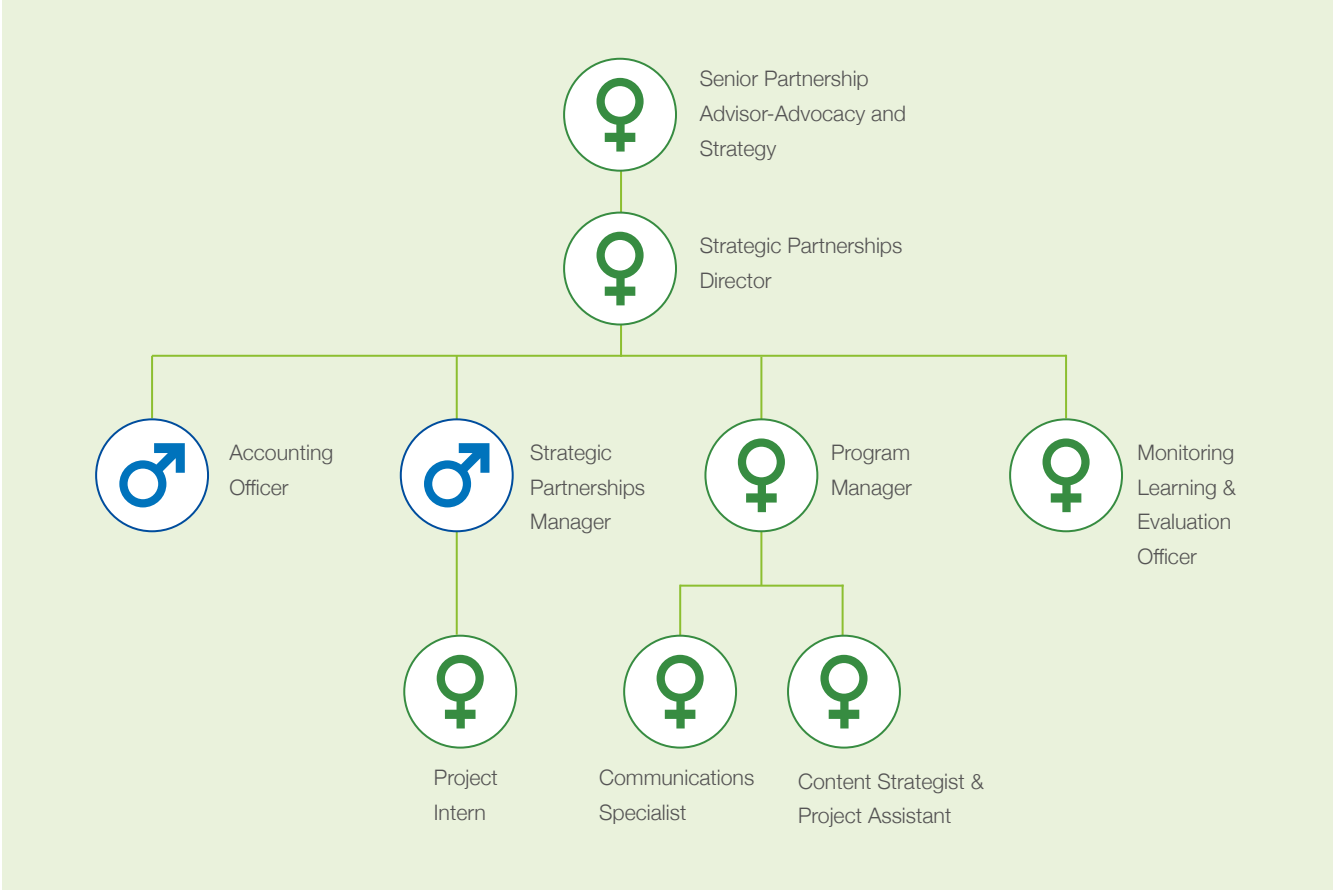
8.1.5 wPOWER strategies to integrate women in the renewable energy value chain

The burden of energy poverty is often disproportionately onerous for women and yet they are rarely involved and often marginalized in the energy value chain (WHO 2016). When they are included, they tend to be concentrated at the low-value end of the chain. Delahunty-Pike (2012) who studied gender roles played across the charcoal value chain confirmed that small-scale selling/retailing of charcoal is done almost entirely by women. The goal of the partnership is to catalyze the rate of energy adoption at the household level by integrating the primary users of energy across the entire value chain and by focusing on women in clean energy entrepreneurship.

TABLE 8.1. TOTAL NUMBER OF PEOPLE TRAINED AS CLEAN ENERGY ENTREPRENEURS BY wPOWER AND ITS PARTNERS.

wPOWER and its partners conducting the training	Total number of people trained (as of September 2017)
wPOWER Hub	380
Solar Sister	2,174
Care International	1,055
Swayam Shikshan Prayog (SSP)	1,087
Greenbelt Movement Kenya	164
Energy 4 Impact	434
Global Alliance for Clean Cookstoves (GACC)	755
Total	**6,049**

FIGURE 8.2. wPOWER ORGANIZATIONAL STRUCTURE.



"To achieve human dignity and shared prosperity, we must address how a majority of the world's poor, particularly women, cook." Wanjira Mathai, Senior Partnership Advisor, Advocacy and Strategy, at wPOWER

Although wPOWER is not directly involved in the decision on which products partners should stock, the hub lobbies for solar technologies, improved (charcoal and firewood) production and use, ethanol cookstoves and fuel briquettes among other household clean energy solutions. wPOWER carries out its work by employing three pillars in a multifaceted approach to enhance women's integration in the renewable energy value chain. These pillars are: (1) building evidence, (2) sharing best practices and (3) advocacy. In addition to these pillars the organization uses community training as a strategy to build women's networks. Descriptions of the goals and expected outcomes of each of the strategies used by wPOWER are provided below.

8.1.5.1 Building evidence

To achieve its vision, wPOWER initially engages in evidence building. This involves gathering of information and data that support the important role that women must play in advancing the adoption of clean energy technologies. All recommendations and/or actions plans by wPOWER stem from evidence-based data. By using such data and implementing researched best practices, the organization is able to diagnose the most effective options to reduce greenhouse gas emissions, improve livelihoods, while simultaneously empowering women to be entrepreneurs.

Evidence building is carried out through reviews of existing literature, evaluation reports, case studies, compiling baseline surveys to assess needs, gaps and best practices in clean energy technologies. wPOWER's online site contains an exhaustive repository of resources collated from partners, practitioners, researchers and academic institutions. In addition, wPOWER also develops its own resources based on primary data from outcome surveys to be able to add new knowledge and seal off information gaps that exist in the quest to support the role of women in clean energy.

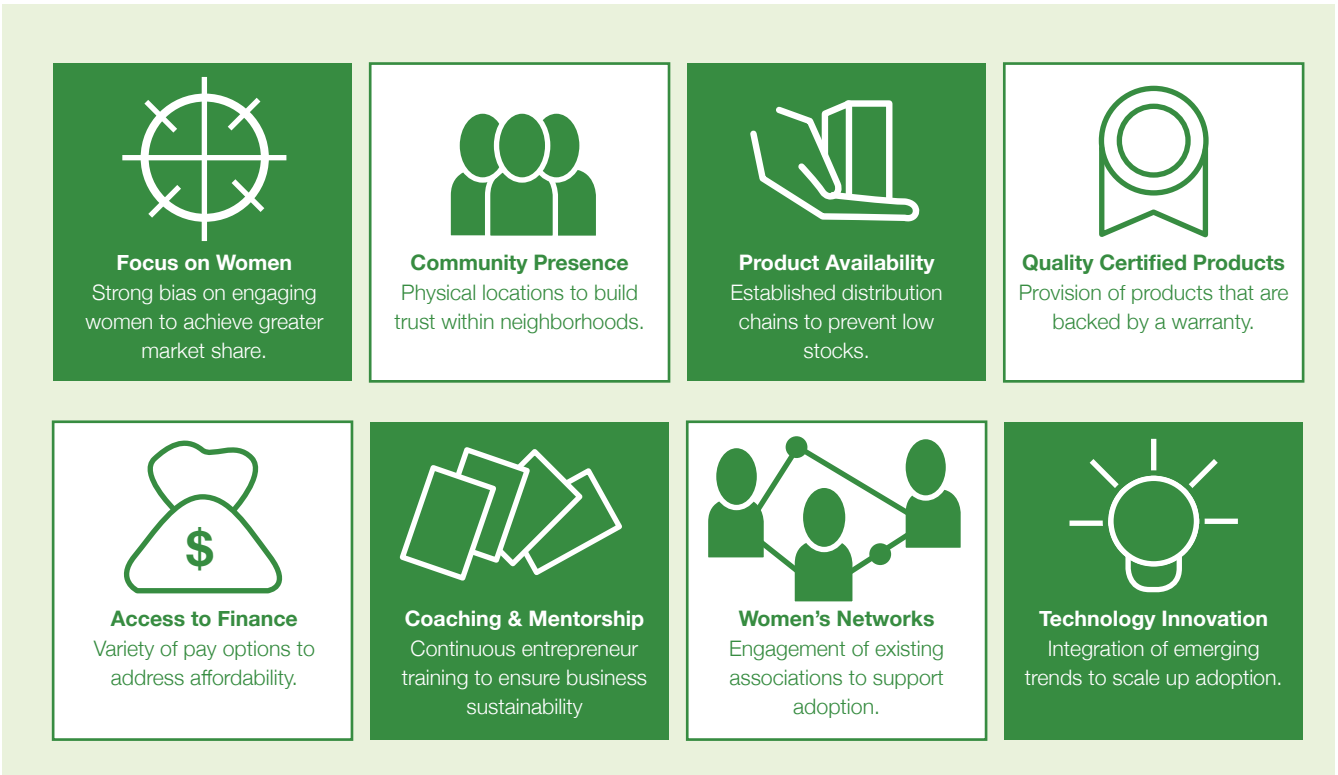
"Prioritizing women's leadership in clean energy entrepreneurship is investing in our future." Wanjira Mathai

8.1.5.2 Sharing best practices and experiences

To ensure partners and other players in the sector can replicate and scale up for more effective approaches to clean energy entrepreneurship. wPOWER aim to spur effective implementation through providing access to practical tools to wPOWER partners. This in turn helps to accelerate the participation of women in the value chain.

In this light, wPOWER has created eight main principles for best practices for effective approaches to clean energy entrepreneurship (Figure 8.3). These are: focus on women, community presence, product availability, quality-certified products, access to finance, coaching and mentorship, women's networks and technology innovations. These success principles are key for organizations in the business of accelerating energy access to ensure success in the sector.

FIGURE 8.3. wPOWER BEST PRACTICE PRINCIPLES THAT UNDERSCORE SUCCESS IN THE CLEAN ENERGY ENTREPRENEURSHIP.



8.1.5.3 Advocacy

wPOWER, through its partnership programmes, plays a collaborative role in bringing policy-makers, manufacturers, distributers, suppliers and the end-user to forums that are focused on empowering and developing capacity for women to be clean energy entrepreneurs (Table 8.1). The organization, in collaboration with its partners, advocates for women's leadership in clean energy entrepreneurship and across the energy value chain. To be precise, a key qualification for partnership is a demonstration of common interest in the overall goals of developing women entrepreneurs in clean energy to address energy poverty and climate change. There is also a need to demonstrate evidence of the organization's effort in engaging women across their energy value chains. To ensure sustainability, the advocacy is based on multiple factors (Box 8.1) on both the supply side (policy and legislative environment, availability of raw materials, access to storage and distribution networks) to the demand side (access to fuel, availability of technology to use the fuel, traditional practices and price).

BOX 8.1. SPECIFIC ELEMENTS OF THE ADVOCACY STRATEGY.

wPOWER considers the building blocks to successful implementation of the initiative to be:

1. Awareness
Women entrepreneurs must be aware of the opportunities across the value chain. End-users must be aware that there are alternatives to their current solutions.

2. Accessibility
Entrepreneurship opportunities must be accessible with few barriers to entry. Products must be easily accessible within the communities where the women live.

3. Affordability
Entrepreneurs must have access to affordable financing to access the opportunities. Products must be affordable at a price end-users can bear.

4. Advocacy
Strong advocacy around the issue is warranted. Robust policies are needed to promote engagement across the value chain.

5. Association
Influence and potential in women's networks and community groups must be tapped effectively across the value chain.

6. Acceptability
Cultural barriers must be taken into consideration when approaching women in entrepreneurship and adoption of clean energy technologies.

Capturing this opportunity, wPOWER worked to promote a 'modern' wood energy value chain in Kenya in the first phase of its operation (October 2013 to September 2016). The importance of wood energy for communities in SSA and South Asia as a way to cook food, boil water and produce and sell charcoal as a source of income, is well documented (World Bank Group 2009; wPOWER 2017). In the present scenario, most of the households still continue to use woodfuel in the form of firewood and charcoal for cooking and space heating; charcoal is mainly used in urban areas in charcoal stoves and firewood in rural areas is mainly used for open fires.

While woodfuel use at the household level has been associated with deforestation and land degradation (primarily through illegal and unsustainable charcoal production), poor health and contribution to climate change, research shows that it will continue to be a significant energy source in the developing world, particularly in SSA, for the foreseeable future (World Coal Association 2012). Due to the slow adoption rate of modern sources of energy such as ethanol-based cookstoves, efforts are being directed to make woodfuel a sustainable source of energy in SSA. Promoting this modern wood energy value chain can alleviate health problems associated with traditional use of wood energy on inefficient and polluting cookstoves.

This points to a direct link on the role of women as effective catalysts for the adoption and use of clean energy technologies at household and community levels. With this in mind, wPOWER focused on training events to build women's capacity in entrepreneurship, financial and technical skills.

8.2 Methodology

8.2.1 Capacity-development trainings on renewable energy by wPOWER

wPOWER has spearheaded several activities including a Training of Trainers (ToT) course on Sustainable Clean Energy Entrepreneurship and community training at the local level. The ToT course included modules on empowering and developing transformative leaders, sustainable clean energy entrepreneurship, environmental stewardship and developing and delivering content. This level-one ToT course was held at the Wangari Maathai Institute for Peace and Environmental Studies (WMI), University of Nairobi in July 2014 with 27 participants (18 women and nine men) from wPOWER partner organizations (Green Belt Movement, Swayam Shiksha Prayog, CARE International, Solar Sister and Women for Women International) across Kenya, Rwanda, Uganda, Tanzania, Nigeria and India (see Figures 8.4A, B).

This course allowed trainees to launch themselves as entrepreneurs and trainers in clean energy technologies such as briquettes, solar lighting and clean cookstoves.

FIGURE 8.4A AND **4B** TRAINING SESSION IN ACTION AT THE WMI.

Source: wPOWER. **A**

Source: wPOWER. **B**

Upon completion of level-one TOT training, community training in different regions was carried out. In Kenya specifically, the first phase of local community training conducted by the graduates of the level-one ToT covered seven regions, namely: Othaya, Maragua, Kahuro, Kibera, Munyaka, Homa Bay and Machakos areas (Figure 8.5). A total of 353 trainers (320 women and 33 men) were trained at the local level in their respective regions. Development of baseline data and a monitoring and evaluation (M&E) exercise were undertaken, which resulted in easier tracking and mapping of the impacts and outcomes of the initiative.

8.2.2 Survey on outcomes of the trainings

As a way to evaluate impact and progress, a qualitative survey was conducted. The respondents of the survey were drawn from the total number of trainees in the level-two TOT's (353 participants) across the aforesaid seven regions in Kenya. Using an M&E questionnaire as a guide, the research assistants conducted face-to-face interviews with the respondents. The participants responded to queries on major themes to determine (1) if they had started a business after the training; (2) their opinion on how the training had impacted on the way they are conducting business/lives; (3) statistics on the number and type of clean energy products sold; (4) challenges they were facing as entrepreneurs; (5) gender variation of their customers; (6) approximation on amount of money saved after adopting clean energy products; (7) income generated from clean energy entrepreneurship, among others.

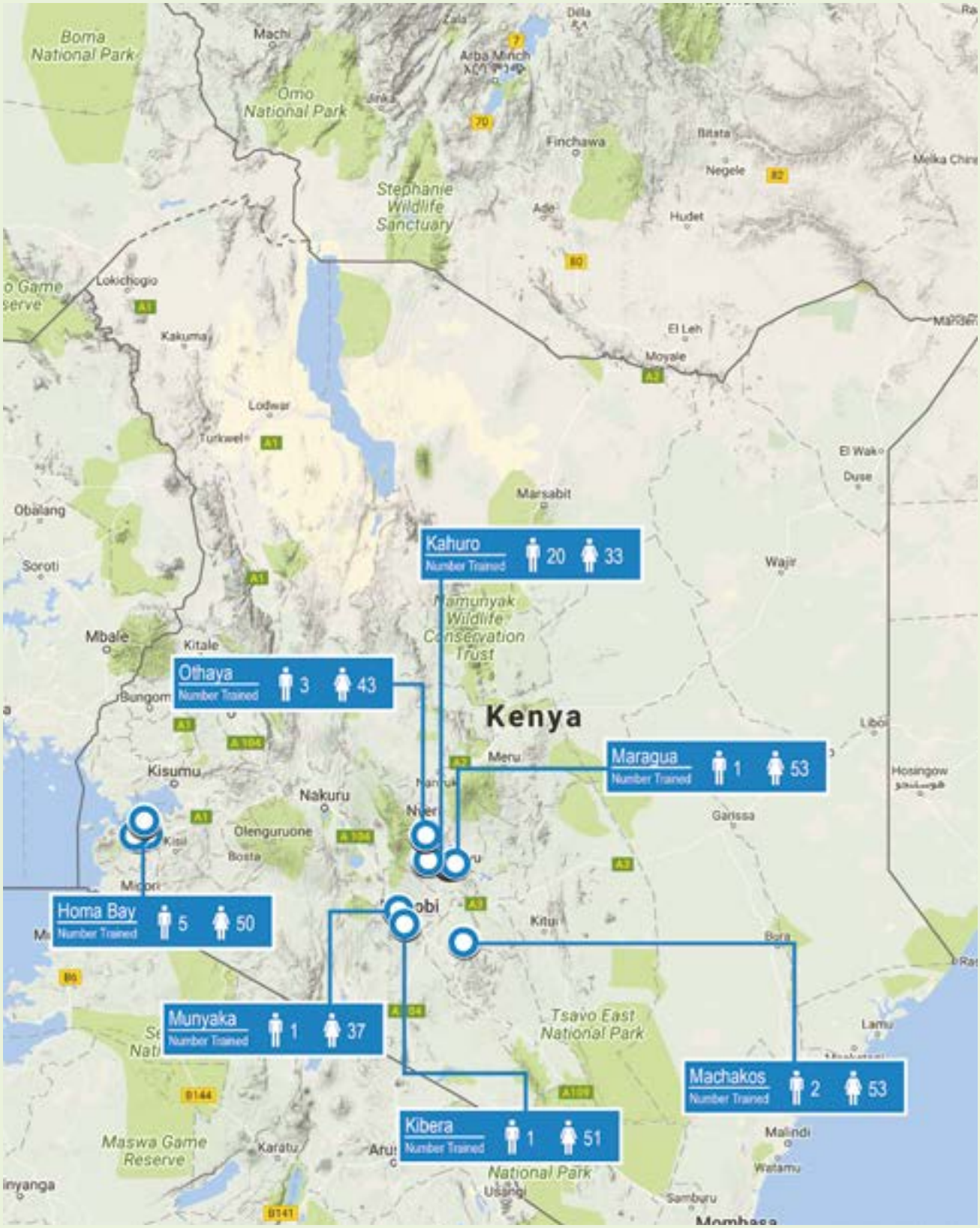
8.3 Impacts of the Trainings on Renewable Energy by wPOWER

A total of 306 participants responded to the survey, indicating an 88% response rate with 8% and 92% being men and women respondents respectively. Approximately 54% of the respondents had completed primary school and 34% had completed secondary school education. Comparisons between clean energy entrepreneurship and level of education showed that trainees who had higher educational levels were more likely to engage in entrepreneurship. After the training, a total of 23 respondents were engaged in clean energy entrepreneurship.

Results also indicated that a major impact was an increase in the average monthly income among the 23 entrepreneurs who started business after the community training. On average, each of the entrepreneurs generated an income of approximately USD 32.00 per month through the sale of clean cookstoves and solar lamps. The impact also included near elimination of monthly lighting expenses from kerosene and electricity bills for over 100 households, and a decline in cooking fuel-related expenses by almost half from an average of USD 17.20 to 8.80.

Looking specifically at the Kaewa area program location, Machakos County, the design of the local community training program was tailored to the region and took into consideration the challenges in the adoption of alternative energy there. These were documented (see Table 8.2). These challenges

FIGURE 8.5. DISTRIBUTION OF MEN AND WOMEN WHO PARTICIPATED IN THE COMMUNITY TRAINING CONDUCTED BY THE LEVEL-ONE TOT GRADUATES IN KENYA.



Source: wPOWER.

TABLE 8.2. CHALLENGES FACED BY THE COMMUNITY MEMBERS IN THE ADOPTION OF ALTERNATIVE ENERGY OPTIONS

Biogas	%	Solar	%	Others	%
Lack of raw materials	4.9	Lack of knowledge and skills	5.7	Unavailability	4.1
Lack of knowledge and skills	23.8	High installation cost	54.9	Lack of knowledge and skills	13.1
High installation costs	18.0	No response	39.3	High installation cost	24.6
No response	53.3			No response	58.2

emphasized the need for training, and providing connections with suppliers, to name but a few. The training was attended by 55 participants (53 women and two men), drawn from various registered women's groups from Machakos County.

The wPOWER training led to increased awareness on the need to protect the environment with over 95% of the respondents claiming commitment to do this. It was indicated that the uptake and adoption of improved biomass cooking devices and solar lighting equipment may have increased as more of the entrepreneurs were able to convince customers on the importance of using clean energy not only as a cheaper option but also as protection against respiratory diseases associated with smoke inhalation. Some of the products commonly used were JikokoaR, Jiko Kenya, the Kenya Ceramic Jiko (KCJ) and the Safi™ ethanol-based cookstoves at the household level. The lighting devices used included dlight™ (A1, S2, s20), EnvirofitR duo torch and solar lanterns. Although lack of funds was considered as a major challenge contributing to the low percentage of trainees becoming entrepreneurs (8%), the adoption of clean energy sources and products for those who remained as end-users was encouraging. The adoption of these products resulted in the following impacts:

- ***Reduction in cost of cooking:*** The cost of cooking fuel compared before and after the use of new cooking devices showed a reduction of about 10%. This meant that the adoption of clean cooking and lighting devices also contributed to improved livelihoods through cost reduction.
- ***Light for studying:*** Children were able to study well with solar energy providing adequate light as cited by 7% of the participants and a reduced monthly energy cost amongst 3% of the participants.
- ***Briquette making:*** 38% of the participants practiced briquette making after the training for their household use. Those not continuing to do so attributed reasons to lack of time, lack of raw materials and appropriate market.
- ***Decreased charcoal use:*** 70% of the respondents disengaged from charcoal production after the training, with 63% engaging in briquette making for the first time and 73% continuing to engage in tree planting.
- ***Training and mentorship:*** While 20% of the people trained were already aware of climate change, 7% of those trained instilled this knowledge in other people, promoting environmental awareness and tree planting.

These results therefore confirmed that engaging women in clean energy entrepreneurship had a direct impact on community adoption of clean energy practices. Based on these impacts, wPOWER continues to make progress in improving livelihoods, creating efficient production and use of cleaner energy, promoting a sustainable environment and empowering the role of women in the clean energy chain.

8.4 Conclusions and Recommendations

The inclusion and mainstreaming of women in the energy sector is as much a decision-making choice, as it is a process of influencing the existing perceptions and fighting prejudices. The myopic developmental approach that focuses on investments primarily in the area of cooking stoves and lighting initiatives for women as opposed to recognizing the critical role that women play across the entire clean energy value chain, needs to change. Results from this study have shown that women are a critical force for the sustainable management of natural resources and increasing clean energy access. This means that the involvement of women in clean energy initiatives has the potential to not only improve livelihoods but to increase access to clean energy solutions. Financial constraints were indicated as a key reason for the low number of women engaging in entrepreneurship post-training. wPOWER acknowledged this gap and the results formed a basis for the strategic engagements in the next project phase to ensure access to affordable financial support to see more women become entrepreneurs. As for energy sector institutions, there needs to be a shift from a general call for better women's integration to a gender-inclusive strategy at the core part of every human resource strategy. This strategy, in turn must be complemented with targets and periodic monitoring. Broad systemic approaches are needed to change and challenge the status quo, which is why this enabling ecosystem created by the unique partnership network of organizations hosted by wPOWER is so critical. wPOWER is committed to working with like-minded partners to achieve our shared goal – one of a world free of energy poverty and where women's leadership and entrepreneurship are the norm.

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