

Powering Jobs Census 2022: Focus on Ethiopia











Contents

About	3
1. Introduction	4
1.1 Report Objectives	4
1.2 DRE Sector Landscape in Ethiopia	4
2. Labor Market Features	5
2.1 Employment Estimates	5
2.2 Employment Types	6
2.3 Size of Firms	8
3. Workforce Profile	8
3.1 Women's Participation	8
3.2 Workers' Skill Levels and Training	9
3.3 Levels of Compensation	11
4. Conclusions	11
References	13

The Powering Jobs Census 2022 Series

- » The Energy Access Workforce
- » Focus on Ethiopia
- » Focus on India
- » Focus on Kenya
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About

About This Report

Coordinated and led by Power for All, the #PoweringJobs campaign and the Powering Jobs Census 2022 are made possible through the generous support and encouragement of The Rockefeller Foundation, Good Energies Foundation, GET.invest, and a coalition of research and implementation partners.

About Power for All

Power for All is a stakeholder coalition campaigning to rapidly scale the deployment of decentralized renewable energy to achieve universal electricity access before 2030. Decentralized renewables, specifically solar appliances and systems designed for households, businesses, and productive use, offer the fastest, most affordable, and cleanest path to electricity access for all. Power for All brings together more than 300 business, finance, research, and civil society organizations to achieve that goal.

Acknowledgments

Powering Jobs partners contributed to data collection and analysis, interpretation of results, and feedback on the report. Global and national steering committees and peer reviewers provided expert guidance.

Research Partners

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1. Introduction

1.1 Report Objectives

Economies and labor markets globally are currently facing many challenges. Existing vulnerabilities, such as high youth unemployment and widespread energy poverty, combined with severe pandemic lockdowns have worsened livelihoods and deepened socio-economic crises in sub-Saharan Africa and South Asia. In comparison to the standard grid extension strategy, decentralized renewable energy (DRE) can now provide underserved populations with faster, cleaner, and more affordable energy while also generating sustainable jobs that boost local economies. *Powering Jobs Census 2019: The Energy Access Workforce* was the first study of the prevailing employment landscape of the DRE sector and demonstrated the sector's great capacity to contribute to the creation of quality jobs [1].

This study is part of Power for All's Powering Jobs Census 2022 series, which examines the labor market for DRE in Ethiopia, India, Kenya, Nigeria, and Uganda. The DRE industry, which includes pico-solar appliances, solar home systems (SHS), commercial and industrial (C&I) standalone systems, and mini-grids, has an important role to play in the current global context. The technologies that comprise the DRE sector are essential to achieving Sustainable Development Goal 7 (universal energy access), but the sector also contributes to achieving Sustainable Development Goal 8 through job creation.

Powering Jobs Census 2022: The Energy Access Workforce is a bottom-up count of employment in the DRE sector [2]. Through direct surveys of over 350 DRE companies, the study consolidates employment data for the period spanning 2019 to 2021 and also includes employment and sales projections for 2022 and 2023. Primary data from the surveys, along with existing literature on the DRE sector, was used to estimate total DRE employment at a national level. The data collection and analysis were complemented by five focus group discussions (FGDs), one in each focus country, that helped validate the main results of the census and obtain additional qualitative information and context. For details regarding methods, sample characteristics, definitions, and scope of analysis refer to the global report [2].

This report breaks down the research results for Ethiopia, focusing on the country's DRE employment landscape, labor market features, and workforce profile. The latter includes the participation of women, skill levels and training in the sector, and compensation. The findings of this study can be used to raise awareness of the DRE sector's potential for job creation and to spark conversation about how to train the workforce for energy access. As Ethiopia's DRE market grows, so do the possibilities for employment generation within the sector.

1.2 DRE Sector Landscape in Ethiopia

Current Status of Electrification

Despite great progress in electrification over the past 20 years, energy poverty remains a challenge in Ethiopia with almost half of the population (49%) lacking access [3]. This puts Ethiopia in the top three countries with the largest energy deficits in the world (population-wise), following Nigeria and the Democratic Republic of Congo [4]. The geography of the country, mountainous with sparsely populated rural areas, makes the usual provision of energy through grid extension difficult and expensive [5]. National average access rates, however, mask the stark contrast that exists between rural and urban realities: while over 93% of the population in urban areas has energy access, less than 40% in rural areas has access to electricity [3], [6].

On the demand side, electricity consumption in Ethiopia is one of the lowest rates in the world and most of it takes place in a few large cities (like Addis Ababa, Hawassa, Mekele, and Bahir Dar). In addition, service cuts are frequent in the country, and most grid-connected customers experience between 4 and 14 hours of power outages per week [6]. In this context, DRE technologies are starting to play a significant role in overcoming the overall lack of access and grid reliability issues. Ethiopia is currently diversifying its hydro-dominated energy mix to include additional solar, wind, and geothermal technologies to achieve a more resilient power system. Currently, about 11% of the country's population has electricity access through DRE solutions [7].

In 2019, the government of Ethiopia launched the National Electrification Program 2.0 (NEP 2.0), an ambitious plan to reach universal access to electricity by 2025—combining on- and off-grid electrification—with the target of supplying 35% of the population with offgrid solutions [8].

Current State of the DRE Sector

The pico-solar sector in Ethiopia has grown significantly during the past few years, with systems between 0–1.5 watt-peak (Wp) experiencing the greatest growth [6]. Most of the solar companies that provide a diverse set of products operate in four regions only (Amhara; Oromia; Southern Nations, Nationalities, and Peoples Region; and Tigray) [6].

Several barriers hinder the development of the off-grid sector in Ethiopia. For instance, despite the recent push towards liberalizing the economy, the strict capital controls that limit access to foreign exchange (forex) have severely impacted imports and thus DRE sales. Furthermore, Ethiopia follows a closed trade system that prevents foreign companies from engaging in the distribution of solar systems [6]. While this allows local companies to thrive in the DRE market, it will also limit sales growth. Another barrier in Ethiopia is the lack of financial services and access to banking, particularly in rural areas. Less than 3% of Ethiopians have a mobile money account, and only 11% borrow money from a formal financial institution [3]. This limits uptake as only customers who can pay upfront in cash can purchase DRE products and services. This leaves out millions in rural areas who don't have sufficient disposable income to spend on those solutions. DRE companies have also indicated that the conflicts in different parts of Ethiopia including Tigray have hindered them from reaching customers in the affected areas.

Within the mini-grid space, only two companies were operating in Ethiopia as of 2019, with a total of two systems active and four additional ones under construction. There are a few initiatives in place to support the mini-grid sector, including an off-grid directive to accelerate and shorten the cumbersome licensing processes [6], [9]. Moreover, the launch of the Distributed Renewable Energy Agriculture Modalities (DREAM) project aims, among other things, to provide mini-grid-powered irrigation to smallholder farmers [10]. The Ethiopian Electric Utility (EEU) has established a mini-grid department to scale up mini-grid electrification in remote communities and aims to apply standardized design and equipment to mini-grids in rural areas, ensuring their integration with the main grid [6].

Policy Landscape

Ethiopia aims to increase the installed generation capacity to 25,000 MW by 2030 (mostly through hydropower). Ethiopia's National Energy Policy promotes small-scale renewable energies, including solar photovoltaic applications. It also includes demand-side policy objectives and instruments for the industrial and agricultural sectors [6]. Through NEP 2.0, the Ethiopian government aims to achieve 100% electrification by 2025 (65% grid and 35% off-grid) and reach 96% of grid connections by 2030. In addition, the plan incorporates an assessment of electricity needs to inform the design of mini-grid sites for pilot projects [7].

The NEP 2.0 also outlines specific measures to promote opportunities for women's employment in the off-grid sector (including training as solar technicians and electrical engineers and capacity building for women entrepreneurs). Since current financial and business models have demonstrated a limited uptake of off-grid technologies by women, the program explicitly incorporates demand creation, marketing, and affordability considerations for women. The program also uses a communication and education campaign to engage women as customers for household and productive uses of energy [6].

Future Prospects for the Sector

DRE technologies have an increasing potential in the short and medium term to bring electricity to the almost 58 million Ethiopians currently without access. Over the long run, DRE technologies have the possibility of integrating with the main grid to improve its reliability. By 2025, the government aims to generate 6 million beneficiaries of off-grid technologies [11]. Achieving Ethiopia's ambitious NEP 2.0 off-grid program goals will require an estimated US\$2.5 billion for its implementation [12].

Besides unleashing the job creation potential associated with the DRE sector, the deployment of DRE technologies in Ethiopia represents an opportunity to transform the country's economy by harnessing natural resources and preventing the negative impacts of climate change [12]. However, the required investments and supporting activities for the implementation of off-grid programs (such as NEP 2.0) will need to address both demand and supply considerations of the DRE market [11].

2. Labor Market Features

2.1 Employment Estimates

The Powering Jobs Census 2022 estimates that over 14,000 workers were employed by Ethiopian DRE companies in 2021. The sector had employed close to 22,000 workers in 2019, equating to a loss of 35% of the workforce after the COVID-19 pandemic. A report by the International Labor Organization and the Ethiopian Job Creation Commission highlighted a sharp increase in unemployment during the first wave of the pandemic [13]. The report also indicated that income in the formal economy remained stable while income in the informal sector dropped by at least 30%. The ongoing conflict in different parts of the country including Tigray, which began in November 2020, has also affected the level of economic activity and employment in Ethiopia, including that of the DRE sector. Figure 1 shows the estimated employment in the DRE sector between 2019 and 2023 by different DRE technology types.





Source: Data from Power for All (2022); market size estimates from GOGLA (2022) and IRENA (2021)

As can be seen from Figure 1, there is a decline in overall DRE sector jobs in 2020 and 2021 with employment expected to gradually rise from 2022 onward. The majority of the decline in employment is coming from the SHS segment, the largest contributor to employment in DRE in Ethiopia. Sales of SHS lighting products in 2021 have fallen to almost half the number of sales in 2019 when the market size reached its maximum with more than 1 million products sold [14].

The decline in SHS sales, which had a knock-on effect on the sector's employment, is mainly attributed to three factors. First is the economic shock caused by COVID-19. Ethiopia registered a 6% GDP growth at the height of the pandemic in 2020, but this is relatively slow growth by Ethiopian standards when compared to the double-digit growth the country was recording in the 2010s[3]. In addition, the conflict in Tigray and other parts of the country also slowed the demand for SHS products. Participants in the FGD mentioned that the political instability in rural and remote locations, as well as demand hotspots for SHS products in Ethiopia, have hindered their ability to move people and SHS products. The third and most important factor is the lack of forex due to stringent capital controls imposed by the government. The World Bank and the Bank of Ethiopia created a credit facility called the Market Development Credit Line to bridge the finance gap in the DRE sector between 2012 and 2019 [4]. The facility granted concessional foreign currency loans to companies and microfinance institutions and is estimated to have contributed 90% of the investment in the DRE sector over that period [15]. The success of this facility indicates that demand for DRE products is high and that the shortage of forex acts as a binding constraint to the growth and development of the sector. But other factors affect sales too. FGD companies indicated they faced supply chain and logistical challenges. For instance, even after securing forex, restrictions on the shipment of containers have resulted in a long delay in the importation of products.

To address the decline in sales of DRE products, DRE companies have adopted varying coping strategies. According to FGD participants, larger companies with good financial standing were able to maintain their employees through the tough past couple of years. However, Small and Medium-sized enterprises (SMEs) in the downstream part of the value chain have likely dropped DRE products from their shelves or not survived at all. Some donor-supported programs were introduced to support DRE companies during COVID-19. For instance, GIZ opened a COVID-19 relief fund for DRE companies that were members of the Ethiopian Solar Energy Development Association. The program benefited 10 DRE companies by providing close to €25,000 per company.

In the next few years, the sector is expected to increase employment, albeit slowly. In 2023 DRE companies are expected to create close to 15,500 jobs, which would imply a 3% annual rate of growth. The above-mentioned factors, such as political stability and forex challenges, may persist in the near term and could dampen market growth, but the growth in the C&I segment is expected to compensate for the loss of employment in the SHS sector. Participants in the FGD were bullish about the prospects of C&I for three reasons. First, DRE companies indicated that the market size for productive use of energy, especially for irrigation, is large and is expected to take off soon with the launch of the DREAM project. The DREAM project will facilitate the implementation of the private sector operation of renewable energy mini-grids in irrigation systems across the country [9]. Moreover, a new credit facility is likely to be opened in the near future, offering some relief regarding the availability of foreign currency needed to import solar goods. Finally, demand for power backup systems is likely to increase due to the reliability issues of the national grid and the need to support it as the economy recovers from the pandemic.

2.2 Employment Types

In Ethiopia, the SHS sub-sector is the biggest employer in DRE followed closely by the C&I segment. In 2021, the SHS sector accounted for 57% of the employment in DRE, while C&I accounted for 42%. Mini-grids accounted for less than 1% of the total direct employment in the sector. Figure 2 demonstrates the composition of employment in the DRE sector by type of technology and level of formality.

The dominance of the SHS sector in employment creation and market size is not surprising in Ethiopia, where the DRE sector is nascent compared to more mature markets such as India and Kenya. However, the high share of C&I employment in the DRE sector is an interesting case. Most countries in Ethiopia's stage of DRE market development tend to have a lower share of employment that comes from C&I.

Ethiopia's total installed C&I capacity in 2021 was estimated at 12 MW. Kenya and Nigeria meanwhile have higher installed capacity at 30 MW each, yet have fewer C&I technology workers in absolute

terms than Ethiopia. A closer look at the estimates reveals that Ethiopia has a highly labor-intensive C&I segment which resulted in more workers within that sub-sector. This means that DRE companies in Ethiopia hire more workers, per MW of installed C&I capacity, than their Nigerian and Kenyan counterparts.

The shift towards larger systems is expected to continue slowly over the next few years. For example, within the SHS segment, home systems have recorded a sharp increase in uptake compared to lanterns and PICO systems. The Development Bank of Ethiopia, a public sector entity that manages the World Bank forex facility, has specifically allocated 75% of funds towards home systems, which increased their uptake [15]. Similarly, FGD participants indicated that power demand for rural industries, such as grain mills and barber shops, is expected to become the major demand driver in the coming years.

According to the estimates from the survey, mini-grids currently create very few direct jobs in Ethiopia. Mini-grid employment contribution comes in terms of indirect and induced employment such as an increase in rural retail sector employment. A report by the



FIGURE 2. SHARE OF DRE WORKERS BY TYPE OF TECHNOLOGY AND LEVEL OF FORMALITY IN 2021

Source: Data from Power for All (2022); market size estimates from GOGLA (2022) and IRENA (2021)

Africa Minigrid Developers Association (AMDA) estimates that minigrid developers created 621 local village jobs and 402 central staff jobs from 2010 to 2019 in 288 sites across western, central, eastern, and southern Africa [16]. This is particularly relevant since Ethiopia is expected to commission many mini-grids over the coming years. The DREAM program will operationalize nine mini-grids and irrigation systems by October 2023 [9]. In 2019, the EEU identified 286 promising sites for mini-grid development, out of which a tender has been issued for 25 [17]. This mini-grid installation spree is expected to increase direct employment in the mini-grid sub-sector.

The Powering Jobs Census 2022 also looked at the level of formality in the Ethiopian DRE sector. As can be deduced from Figure 2, informal employment accounted for 15% of total direct DRE employment. Nearly one-sixth of the urban employment in Ethiopia is reportedly informal with the rate of informality in rural areas expected to be higher [18]. The actual figure for informal employment in the Ethiopian economy overall and the DRE sector, in particular, is also expected to be higher [18]. Ethiopia has high rural-urban migration, and most migrants tend to join the informal sector as they often lack the necessary gualifications or legal documents to work in the formal sector. In addition, COVID-19 may have pushed more workers into the informal sector as they struggled to find employment in the formal sector[13]. This is in contrast to India where there was increased formalization following the pandemic due to partial government interventions to encourage workers to join the formal sector [19].

2.3 Size of Firms

The Ethiopian DRE sector is composed of a diverse set of companies. In the Powering Jobs Census 2022, Ethiopian DRE companies are classified into three groups based on the number of their employees. The first category is large DRE companies, defined as those companies employing more than 100 full-time workers. The second category is medium-sized companies, which employ more than 25 but less than 100 workers. The last category is small companies, which employ less than 25 workers. Figure 3 illustrates the distribution of DRE employment by the size of companies.

Employment in the Ethiopian DRE sector is almost equally distributed between the different size categories of companies. FGD participants indicated that the number of small companies was probably higher pre-pandemic but some likely closed their operations due to a decline in SHS sales. As the sector matures into C&I and minigrid systems, increased consolidation in the sector is expected, which will lead to large and middle-sized companies dominating



FIGURE 3. SHARE OF EMPLOYMENT BY SIZE OF FIRMS



the market due to the financial and human resource competencies required to run C&I and mini-grid projects. Smaller companies will likely play a minor role usually in terms of subcontractors to large companies. The outputs of the survey were corroborated by FGD participants. Participants indicated that the average number of direct full-time employees in major DRE companies is between 30 and 40 persons. However, if the companies have big projects the total number of employees (including part-time, contract labor, and informal workers) may increase to more than 100 employees.

3. Workforce Profile

3.1 Women's Participation

The rate of women's participation in the DRE industry in Ethiopia is 37%, which is low compared to the 46% women's participation rate in the total economy [3]. It is worth noting that the ratio of women to the total labor force varies greatly depending on the technology and skill level (see Figure 4), with the highest rate of participation seen in semi-skilled SHS workers and the lowest in skilled C&I and mini-grid workers.

There is evidence of a migration of jobs from the SHS subsector to the C&I subsector in the DRE market in Ethiopia. Women's labor participation in these two technologies is quite similar on average, 39% and 37% respectively. However, the distribution of women's labor participation across skill levels is not homogeneous between



FIGURE 4. SHARE OF WOMEN WORKERS ACROSS DIFFERENT SKILL LEVELS AND DRE TECHNOLOGY

Source: Power for All (2022)

both technologies. Compared to SHS, women's labor participation in C&I is higher in unskilled jobs, while it is lower in skilled and semi-skilled jobs. With increasing levels of employment expected to come from the C&I segment in the coming years, investing in a skills development program targeted at women employees in the DRE sector is paramount to equip them with the necessary skills such as the installation and maintenance of standalone solar systems.

Participants in the FGD indicated that women are overrepresented in administration, finance, training, research, and sales roles, while there are few women engaged in technical fieldwork. The share of women in top management and skilled work is less than 30% across all technologies. Existing cultural bias was also discussed in the FGD as directly affecting female labor participation, such as by assuming that women would not travel to remote rural areas for fieldwork. Additionally, after marriage, their responsibilities at home (e.g. raising children) usually have an impact on their work.

There are ongoing initiatives to improve women's participation in the Ethiopian DRE sector. One such initiative is an EEU program to increase opportunities for women in the historically male-dominated electricity sector in Ethiopia, through internships and scholarships for women in STEM professions as well as new regulations against sexual harassment and gender-based violence [20]. Another initiative, implemented by the Ethiopian Women in Energy (EWiEn), provides networking and training support to aspiring women professionals [21]. EWiEn also launched the first of its kind women's energy-based incubator program in Ethiopia [22]. The program aims to encourage women to develop start-up ideas that can transform renewable energy access in Ethiopia. Also, the government applied some policies such as giving priority to women-led companies to access finance/forex from the Development Bank of Ethiopia for the importation of DRE products to support companies that hire females [23].

3.2 Worker's Skill Levels and Training

In 2021 an Ethiopian DRE worker had, on average, 26 hours of internal training and 25 hours of external training. The latter is defined as any kind of skill-development program supplied by the government, a non-profit, or other private sector players, whereas internal training is provided by the DRE firm itself. The total average training time is very low in Ethiopia when compared to other focus countries. In neighboring Kenya, DRE companies indicated that they provide 120 hours of internal and external training cumulatively, which is more than twice what Ethiopian DRE employees receive.

Figure 5 showcases the average training hours only for the subset of DRE companies that provide any training to their employees (55% of those surveyed, or about half). The majority of those businesses offer internal training programs, while less than 45% of the organizations offer external training for senior management and 40% for skilled staff. For semi-skilled workers, 29% of DRE businesses provide external training, but only 10% offer external training for unskilled workers.

40% 30% 20% 10% 0% Top management Skilled Semi-skilled Unskilled Internal training Exernal training

FIGURE 5. AVERAGE HOURS OF TRAINING FOR COMPANIES SURVEYED

Source: Power for All (2022)

Ethiopia has a higher proportion of unskilled workers compared to other countries, as shown in *Powering Jobs Census 2022: The Energy Access Workforce.* This is related to the maturity of the sector, as most of the labor is needed in SHS, the least technical and most sales-oriented technology class. However, the limited availability of training could be playing a role too. As the sector transitions to more advanced technologies, equipping the existing semi-skilled and unskilled workers with the necessary skills is paramount (e.g. training a sales agent to become an installation expert).

The Powering Jobs Census 2022 has identified ten key areas in which further training is required, as shown in Figure 6. A few of the skills needed are soft skills, including communication, interpersonal skills, and time management, but the majority of the skills needed are hard skills such as installation and commission, marketing, maintenance, and project management. Among businesses in the Ethiopian DRE sector, installation and commission were ranked as the most desired capability in their workers. This evidence is in line with the technology transition discussed earlier.

In addition, this evidence is in line with the findings from the FGD that the most demanded skills in the sector are technical, in particular, sales and marketing positions with technical knowledge related to DRE products. The need to create technical training courses in universities was also highlighted in the FGD.

There are existing programs, led by the government and other actors, that aim to improve the current skill levels in the DRE sector. One noteworthy program, which was mentioned in the FGD, is managed by the regional energy bureau in Oromia, the most populous region in Ethiopia. In Oromia, DRE companies are restricted from selling products directly to consumers themselves; they have to do so through SMEs, which are trained by the regional energy bureau and DRE companies. This is not only for solar lanterns and SHS but also for larger systems such as solar pumps.





Source: Power for All (2022)



FIGURE 7. AVERAGE ANNUAL WAGE FOR DIFFERENT ROLES IN THE DRE SECTOR IN 2021 (IN US\$)

Source: Power for All (2022)

3.3 Levels of Compensation

According to the Powering Jobs Census 2022, the average annual salary for the Ethiopian DRE sector ranges from US\$8,075 for top management in a mini-grid firm to just under US\$206 for an unskilled worker in a C&I company.

Average annual DRE salaries in Ethiopia, which hover around US\$1,800, are much higher than the estimated US\$1,296 average urban salary for all job categories [24]. However, workers in C&I typically make less than the average pay in cities. On the other hand, unskilled workers from the DRE sector earn more than the average annual rural wage at a national level [25].

Furthermore, there are significant disparities in pay among skill levels. As can be expected, a gain in skill level is accompanied by an increase in remuneration. The salaries of top managers in the C&I sub-sector appear to be an exception to this, but this could be due to imprecise estimates resulting from the low number of responses obtained in that part of the survey. Additionally, remuneration differences exist across different business technologies (SHS, minigrids, and standalone C&I systems). The disparity in compensation of top management and skilled workers explains the majority of the variance between SHS and independent C&I systems. Even though the former pays more than the latter at all skill levels, the average annual salaries of top management and skilled workers show the most obvious differentials. There is also a pay discrepancy between men and women. Women earn 87% of what men earn in the DRE sector, indicating a lower gap than Ethiopia's current average gender wage gap of 69% [26].

4. Conclusions

In 2021, the Ethiopian DRE sector employed more than 14,000 workers. The Ethiopian DRE workforce contracted by 35% in 2021 compared to its pre-pandemic level in 2019, when the sector employed close to 22,000 workers. A decline in sales of SHS products caused by the economic downturn resulting from the global COVID-19 pandemic, internal conflict in Tigray and other parts of Ethiopia, and lack of forex were the main factors contributing to the loss of employment. However, employment is expected to gradually increase and reach 15,500 in 2023.

In Ethiopia, the SHS sub-sector still employs the most workers, followed closely by the C&I segment. In 2021, the SHS sector accounted for 57% of the employment in DRE while C&I accounted for 42% of employment. However, the share of employment that comes from solar C&I is expected to grow in the coming years. Surveyed DRE companies indicated that they anticipate demand from rural businesses to be a major driver of growth in the near future. With the launch of the DREAM project, an initiative that aims to provide irrigation services to smallholder farmers through privately owned mini-grids, direct employment in C&I and mini-grids is expected to grow.

According to the Powering Jobs Census 2022, informal employment accounted for 15% of the total direct employment in the DRE sector. This is equivalent to the country's average urban informal employment [18]. However, DRE companies indicated the actual figure for informal employment in the sector may be higher.

Women accounted for 37% of the DRE workforce in 2021. This is lower than the country's overall participation rate of women which stands at 46% [3]. Participants in the FGD indicated that women tend to be overrepresented in administrative and finance roles while there are fewer women in skilled positions such as installation and maintenance.

An Ethiopian DRE sector employee receives on average almost 25 hours of internal and external training for a combined 50 hours of training annually. This is low compared to other focus countries, such as Kenya where DRE companies indicated that they provide 120 hours of training cumulatively. Ethiopia has a higher proportion of unskilled workers compared to peer DRE markets. Quality and quantity of training in the DRE sector need to be enhanced to ensure DRE workers are equipped with the skills for tomorrow. The average annual salary for the Ethiopian DRE worker ranges from US\$8,075 for top management in a mini-grid firm to just under US\$206 for an unskilled worker in a C&I company. In terms of the gender pay gap, women in the DRE sector earn 88% of what men do. Compared to Ethiopia's current 69% national average for the gender wage gap, the DRE sector has a significantly lower gender wage gap [26].

Box 1: Insights from Ethiopian DRE workers on how COVID-19 affected their work

The economic downturn caused by COVID-19 and other internal problems harmed the DRE sector in Ethiopia. However, a recurring theme in the sector has been resilience. Workers in the DRE sector who were interviewed as part of the Powering Jobs Census 2022 spoke of the challenges and opportunities that arose from the pandemic.



"The fact that I work in a field that is personally rewarding and has a broad impact on so many people is one of the key reasons. I love my career in renewable energy. Another reason I love my profession is that I work on solar energy projects that will alter the way people live, especially as more people become aware of the impact of climate change. COVID-19 has taught me to use flexible working conditions to my advantage through virtual meetings and online platforms."



"Light brings a bright future. What I like about my job is seeing the satisfaction and happiness after I switch on the light for those who are living in off-grid areas. COVID-19 breaks so many things. We couldn't reach our people at this time. It was not possible to help them, especially the health institutions. Sad about that"

Samson Tsegaye Solar PV Trainer



"During the COVID-19 period, there was less work than usual. Withstanding this pressure, I continued my favorite profession with Black River Engineering and successfully completed major projects conducted by HEDERA Sustainable Solutions GmbH for EnDev GIZ in Ethiopia and the installation/testing of 5 solar water pumps in the Harar region by contracting with Sun Transfer Tech Plc."

Behailu Alemu Black River Engineering PLC

Amen Aniley Business Developer of Green Scene Energy Plc

References

- [1] Power for All, "Powering Jobs Census 2019: The Energy Access Workforce," Power for All, 2019. [Online]. Available: https://www. powerforall.org/application/files/8915/6310/7906/Powering-Jobs-Census-2019.pdf
- [2] Power for All, "Powering Jobs Census 2022: The Energy Access Workforce," Power for All, 2022.
- [3] "World Bank Open Data | Data." https://data.worldbank.org/ (accessed Jun. 20, 2022).
- [4] PowerforAll, Energise Africa, P4G, "Catalyzing Investment for Energy Access: Making the Case for Change," 2021. [Online]. Available: https://p4gpartnerships.org/sites/default/files/2021-12/catalyzing-investment-for-energy.pdf
- [5] Khan B, Singh P, "The Current and Future States of Ethiopia's Energy Sector and Potential for Green Energy: A Comprehensive Study," pp. 115–39, 2017.
- [6] Power Africa, "Off-Grid Solar Market Assessment," 2019. [Online]. Available: https://www.usaid.gov/sites/default/files/ documents/1860/PAOP-Ethiopia-MarketAssessment-Final_508.pdf
- [7] IEA, "Ethiopia Energy Outlook," 2019. https://www.iea.org/articles/ethiopia-energy-outlook
- [8] "Ethiopia's Transformational Approach to Universal Electrification," World Bank. https://www.worldbank.org/en/news/ feature/2018/03/08/ethiopias-transformational-approach-to-universal-electrification (accessed Aug. 22, 2022).
- [9] "Distributed Renewable Energy-Agriculture Modalities (DREAM) | SNV." https://snv.org/project/distributed-renewable-energyagriculture-modalities-dream (accessed Aug. 19, 2022).
- [10] "Ethiopian Regulator Approves Groundbreaking Mini-Grid Directive, Improves Licensing Process, Paving the Way for Increased Electrification," NARUC. https://www.naruc.org/international/news/ethiopian-regulator-approves-groundbreaking-mini-griddirective-improves-licensing-process-paving-the-way-for-increased-electrification/ (accessed Aug. 22, 2022).
- [11] United Nations, "SDG7 Energy Compact of Ethiopia." https://www.un.org/sites/un2.un.org/files/energy_compact_ethiopia_ eredpc_version_01.docx_1_0.pdf
- [12] Gebreslassie, M.G., Cuvilas, C., Zalengera, C. et al., "Delivering an off-grid transition to sustainable energy in Ethiopia and Mozambique," 2022, [Online]. Available: https://energsustainsoc.biomedcentral.com/articles/10.1186/s13705-022-00348-2#citeas
- [13] ILO, Job Creation Commission, "The jobs impact of COVID19: Rapid labour force survey (RLFS/E)," 2020. [Online]. Available: https://jobscommission.gov.et/wp-content/uploads/2020/12/ILO-JCC-Rapid-labour-force-survey-of-COVID19-impact-in-Ethiopia-Aug-2020.pdf
- [14] GOGLA, "Global Off-Grid Solar Market Report: July December 2021 Global Off-Grid Solar Market Report," GOGLA, 2022. https:// www.gogla.org/global-off-grid-solar-market-report (accessed Jun. 20, 2022).
- [15] Africa Clean Energy, Tetra Tech, Precise, "Stand-alone Solar Investment Map," 2021. [Online]. Available: https://www.ace-taf.org/ wp-content/uploads/2021/03/Stand-Alone-Solar-Investment-Map-Ethiopia.pdf
- [16] AMDA and Economic Consulting Associates, "Benchmarking Africa's mini-grids," Aug. 2020. Accessed: Jun. 20, 2022. [Online].
 Available: https://africamda.org/wp-content/uploads/2021/08/AMDA-Benchmarking-2020-.pdf
- [17] D. Slanger, "It Takes a Village: Ethiopia Builds on Global Minigrid Experience," RMI, Nov. 20, 2019. https://rmi.org/it-takes-a-villageethiopia-builds-on-global-minigrid-experience/ (accessed Aug. 19, 2022).
- [18] R. Tucker, "Addressing Policy Gaps in Informal Sector Growth in Ethiopia," Center for International Private Enterprise, May 18, 2021. https://www.cipe.org/blog/2021/05/18/addressing-policy-gaps-in-informal-sector-growth-in-ethiopia/ (accessed Aug. 19, 2022).
- State Bank of India, "Share of Informal Economy may have shrunk to no more than 20% from 52% in FY18," 2021. [Online]. Available: https://sbi.co.in/documents/13958/10990811/281021-Ecowrap_20211029.pdf/b0625dda-46bf-1f1e-2998-3c58c94dd156?t=1635409920832
- [20] "Ethiopia: Expanding Opportunities for Women in the Electricity Sector," Apr. 2021, Accessed: Aug. 19, 2022. [Online]. Available: https://www.wri.org/update/ethiopia-expanding-opportunities-women-electricity-sector
- [21] "Our Programs EWiEn." https://ewien.org/our-programs-2/ (accessed Aug. 10, 2022).
- [22] "EWiEn Incubator Program by Ethiopian Women in Energy (EWiEn)," VC4A. https://vc4a.com/ewien/incubator-program/ (accessed Aug. 23, 2022).

- [23] "DPSP III: Enabling Access to Off-Grid Energy to the People of Ethiopia Thematic Line of Credit to the Commercial Bank of Ethiopia," Climate Investment Funds, Apr. 08, 2020. https://www.climateinvestmentfunds.org/projects/dpsp-iii-enabling-accessgrid-energy-people-ethiopia-thematic-line-credit-commercial-bank (accessed Aug. 12, 2022).
- [24] "Living Wage for Ziway Region, Ethiopia," Global Living Wage Coalition. https://www.globallivingwage.org/living-wagebenchmarks/non-metropolitan-urban-ethiopia/ (accessed Aug. 10, 2022).
- [25] "Rural Livelihoods, Poverty, and the Millennium Development Goals," Resources for the Future. https://www.rff.org/publications/ working-papers/rural-livelihoods-poverty-and-the-millennium-development-goals/ (accessed Aug. 10, 2022).
- [26] World Economic Forum, "Global Gender Gap Report," 2021. [Online]. Available: https://www3.weforum.org/docs/WEF_ GGGR_2021.pdf