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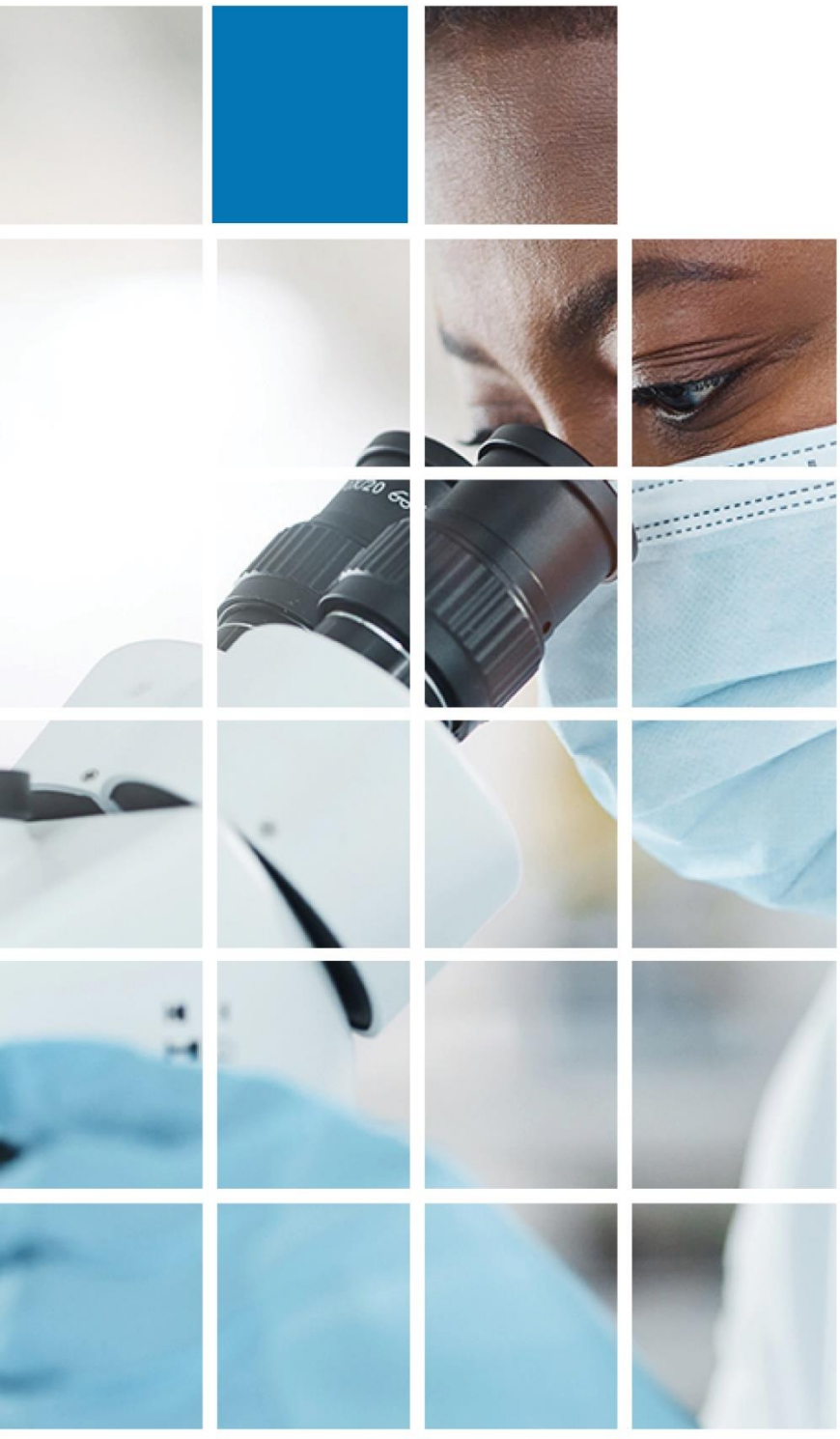
Powering and Connecting Health in Africa



2024

Toolkit for Equitable Health Facility Electrification

Health Electrification and Telecommunications Alliance

USAID
FROM THE AMERICAN PEOPLE

POWER AFRICA
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About this document: This document was made possible through the support of the American people through the United States Agency for International Development (USAID). It was produced by Abt Global for the Power Africa Health Electrification and Telecommunications Alliance (HETA) under USAID Cooperative Agreement 72067422CA00003.

Recommended citation: Bomasang, Ellen, and Martin, Shelley (2024). *Toolkit for Equitable Health Facility Electrification*. Power Africa Health Electrification and Telecommunications Alliance (HETA). Rockville, MD: Abt Global.

Date submitted: March 29, 2024

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About HETA: The Health Electrification and Telecommunications Alliance (HETA) is a USAID Global Development Alliance and Power Africa's flagship initiative for health facility electrification and digital connectivity in sub-Saharan Africa. Our mission is to catalyze public-private partnerships and sustainable business models that increase access to reliable, renewable energy and digital connections for 10,000 health facilities—vital improvements to support equitable access to life-saving care across the region. Together with diverse partners from the public, private, and social sectors, HETA is making it easier and less costly to invest in the systems that power healthcare and productive uses of energy.

HETA's partners: The alliance is led by Abt Global and launched in 2022 with three other founding members—RESOLVE, bechtel.org (Bechtel's social enterprise), and Orange.

Beyond these founding partners, HETA is an open platform with space for investors, implementation partners, and innovators working on energy and digital solutions for health in sub-Saharan Africa.

Contents

ACRONYMS AND ABBREVIATIONS

CAPEX	Capital expenditure
HFE	Health facility electrification
E&S	Environmental and social
LGBTQI+	Lesbian, gay, bisexual, transgender, queer, intersex and other gender and sexual identities
O&M	Operations and maintenance
PAYGO	Pay as you go
PUE	Productive uses of energy
RFP	Request for proposals
SME	Small/medium-sized enterprise
STEM	Science, technology, engineering, and mathematics
USAID	United States Agency for International Development
WASH	Water, sanitation, and hygiene
WHO	World Health Organization

INTRODUCTION

Reliable electricity and digital connectivity are essential infrastructure for effective health service provision. Populations seeking care and treatment are placed at tremendous risk when facilities do not have reliable lighting for emergency procedures at night, power to refrigerate life-saving vaccines, or the ability to share and access data in today's digital world.

According to a 2023 report from the World Health Organization (WHO), World Bank, International Renewable Energy Agency, and Sustainable Energy for All, nearly 1 billion people in low- and lower-middle-income countries are served by health facilities with unreliable electricity—or no electricity access at all. The numbers are most dire in sub-Saharan Africa and South Asia, where 12 to 15 percent of health facilities lack access. Only 40 percent of hospitals in low- and lower-middle-income countries in sub-Saharan Africa have reliable access to electricity, and at least 25,000 health facilities completely lack electricity access, underscoring the vulnerability of populations served by these facilities (WHO et al. 2023).

Gaps in energy access and digital connectivity for health facilities have a disproportionate impact on women and girls, especially in rural areas, due to gender roles and responsibilities. Women and girls are often saddled with multiple care responsibilities and household chores that can affect their well-being. Insufficient energy access and unreliable or nonexistent digital connectivity at health facilities has a direct impact on the provision, use, and quality of services critical to their health, such as reproductive healthcare, prenatal care, and childhood vaccinations.

THE CASE FOR EQUITABLE APPROACHES TO HEALTH FACILITY ELECTRIFICATION

In Sierra Leone, Kadiatu K. Kamara, MCH Aide, assists Mr. Bangura in holding his baby. (Photo Credit: Tolu Jethro Bade, Envizage Concepts via Power Africa)

Equity-unaware investments **widen gaps** in local economies. Energy investments that integrate *equity approaches* can close gaps while delivering **social, economic, and financial returns.**

The most obvious case for integrating equity in health facility electrification (HFE) involves better service-level outcomes. Closing gaps in HFE and digital connectivity will result in some automatic benefits to health service client groups such as women, girls, and other marginalized and excluded populations.[1]

- **Improved health service delivery.** When health facilities are equipped with sufficient and reliable electricity, they have the power they need to ensure safer childbirth at night and during emergencies, continuously operate medical equipment (including for maternal and child health services), and safely store life-saving vaccines and medicines. When health facilities are equipped with digital infrastructure, vulnerable and marginalized populations have better access to public health education, information, and telemedicine services that can increase their resiliency and agency.
- **Greater climate resilience.** It is widely accepted that women, girls, persons with disabilities, and other vulnerable populations are disproportionately affected by climate change. Improving health facilities' access to electricity reduces medical equipment downtime and other vital functions (such as lighting and cooling) during disasters and emergencies. This prevents health complications, such as those from heat stress when there is no cooling equipment.

Beyond providing increased access to energy and digital connectivity that enables improved health service delivery and greater climate resilience, equitable HFE can support progress toward other social and economic goals:

- **Economic empowerment.** If implemented in an inclusive and equitable way, HFE can result in employment opportunities for women, youth, and other excluded populations in the health and energy sectors. It can open opportunities for direct entrepreneurship through the energy supply chain and indirect entrepreneurship in local economies. If linked to productive-use projects and digital connectivity, HFE can provide increased access to information and education and further improve opportunities for these populations to engage in productive activities. Local and under-represented firms' participation in the supply chain is advantageous—and possible—when projects first strengthen those firms' capacity to compete with more established firms.
- **Expanded STEM talent pool.** Intentionally upskilling women and young people with the science, technology, engineering, and mathematics (STEM) skills they need to operate and maintain HFE equipment unlocks a broader and more diverse local talent pool to address technical labor constraints. Creating opportunities for young women's education, apprenticeship, and employment in STEM industries has a role-model effect that can help dismantle stereotypes and other social barriers women face when seeking to participate in roles dominated by men.
- **Increased recruitment and retention.** An equity lens in solar energy system installation and operations and maintenance (O&M) can entail recruiting and upskilling women and youth as workers and benefiting from their skill retention and continuation in rural communities as many men migrate to urban centers. Additionally, a large proportion of health facility workers are women, from administration and clinical officers to nurses, cleaners and cooks. When health facilities have better access to electricity, they can become a preferred employer for women and boost their staff retention due to enhanced safety and hygiene, greater comfort in providing care, improved staff accommodations, and consistently functioning equipment.
- **Health and safety.** Well-lit facilities and improved access to after-hours care can help health facility staff and clients—especially women and girls, who are generally at higher risk of gender-

[1] USAID Inclusive Development Analysis considers marginalization of underrepresented groups such as poor and ultra-poor households, persons with disabilities, LGBTQI+ people, displaced persons, migrants, Indigenous Peoples and communities, older people, religious minorities, ethnic and racial groups, persons with unmet mental health needs, children in adversity and their families, and people with diverse economic classes and political opinions. For more information see: Inclusive Development: Additional Help for ADS 201 (usaid.gov)

based violence and harassment—gain an increased sense of security and safety. HFE can further increase public safety when it is linked to powering other public facilities or services, such as streetlights. If excess power from HFE is extended to households that have relied primarily on biofuels, women may gain access to cleaner cooking technologies, with immediate health benefits from avoiding dangerous indoor air pollution.

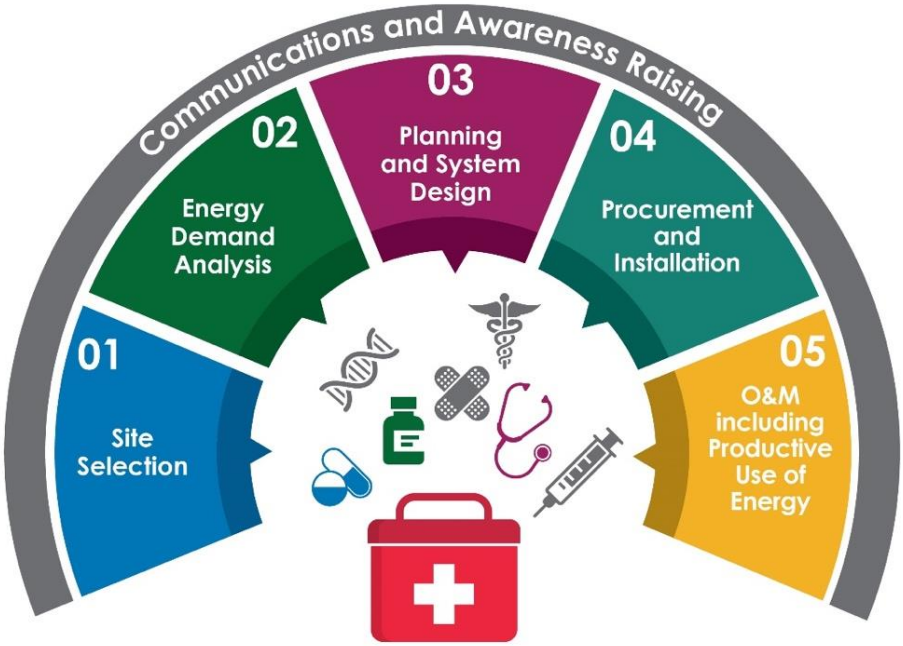
- **Women's and girls' increased agency.** Women gain greater autonomy and agency if HFE is linked to household electrification and productive-use projects. For instance, a local business offering mobile phone charging stations can expand women's digital connectivity, facilitating greater access to support, information, and markets. Sale of excess power to households and schools (when energy systems are sufficiently sized to enable offtake) can improve education access and quality and enable students to study in the evening.
- **Brand enhancement and social license to operate.** Community engagement, gender-responsive needs and risk assessments, and a diversified procurement approach are crucial for localization and equity. The safety and inclusion of diverse community members generates goodwill that enables a project's social license to operate. Supplier diversification can also drive inclusive economic growth, creating a more equitable industry ecosystem.

PURPOSE AND INTENDED USES OF THIS TOOLKIT

This toolkit seeks to guide HFE stakeholders in applying an equity lens as they design and deliver HFE projects. Given the critical role of HFE in improving health service provision, projects must intentionally ensure that the benefits and opportunities are realized for all populations. Although this toolkit describes the steps involved in HFE, it is not a detailed, step-by-step technical manual on implementing electrification. Its main utility is to provide ideas and leading-practice approaches that can be integrated into HFE projects to enhance equitable outcomes.

This toolkit focuses integrating equity considerations across five stages of HFE: (1) **site selection**, (2) **energy demand analysis**, (3) **planning and system design**, (4) **procurement and installation**, and (5) **operations and maintenance**, including **productive uses of energy**. It also offers cross-cutting guidance on **communications and awareness raising** (Section 6).

Exhibit 1. Five Stages of HFE



SECTION 1:
SITE SELECTION

Nyamirama Health Clinic in Rwanda. (Photo credit: OffGridBox.)

Even before project-level considerations, there are important decisions to make that can position an HFE project toward equitable outcomes. An HFE program can apply an equity lens early in the project cycle—as soon as the project begins to review the geographic focus, health facility level, and criteria for site selection.

Health facilities can be:

- **Small health posts or clinics** that do not have a permanent doctor or staff and provide only treatment for minor injuries and illnesses and basic immunization services. They might have community health workers or outreach workers who deliver interventions related to safe motherhood, nutrition, and simple preventions and treatments.
- **Health centers at the first or primary level**, staffed by trained healthcare professionals who offer maternity care, address childhood diseases, and prevent and treat major infectious diseases. These facilities typically also provide outpatient services and observation rooms. They might also include a labor room and outpatient surgery units.
- **District, regional, or provincial hospitals**, catering to sizable populations, with sophisticated infrastructure and medical equipment and providing specialized services, such as outpatient and inpatient departments, emergency services, and surgical areas (WHO et al. 2023).

EQUITY CONSIDERATIONS IN HFE SITE SELECTION

Purpose of an equity lens:

- Identify which populations are likely to benefit and how.
- Strategically invest to close gaps in public health and economic landscape
- Ensure site due diligence is gender responsive

Approaches:

- Prioritize public health equity goals
- Prioritize women's economic participation and inclusive service delivery

Site selection criteria vary based on demand, donor and Ministry of Health priorities, and social factors. An equity lens in HFE starts with positioning the program to answer *who will participate* and *how they might benefit.* With funding and implementing partners, management should consider the profiles of clients/patients and employees who stand to benefit from electrification and expanded service delivery if a region and facility are selected, and look for opportunities to strategically invest to close gaps in the public health and economic landscape:

- Consider opportunities to contribute to the country's **public health equity goals**; for example, leaving no one behind when controlling infectious diseases or expanding water, sanitation, and hygiene (WASH) and other primary healthcare initiatives. Facilities that commit to strategically leveraging electrification can provide convenient, lower-cost access to medical devices (such as respirators and imaging equipment) and temperature-controlled prophylaxes and treatments (such as insulin, COVID-19 vaccines, and medications for tuberculosis and HIV).
- Consider the investment's **potential to reach underserved communities**. This could include focusing on refugee settlements, ethnic minority communities, climate disaster zones, mountainous geographies, or remote areas that might not otherwise have reliable or convenient access to vital health services, particularly for pregnant people, persons with disabilities, older people, and youth. Equity in site selection can also mean prioritizing facilities that meet (or could target) gaps in service delivery for critical patient groups with prevalent or salient conditions, such as key populations at risk of HIV/AIDS or survivors of war, conflict-related gender-based violence and harassment, or occupational hazards such as mining injuries.
- Consider selecting facilities based on the **gender composition and equity practices of the health workforce**. In addition to supporting women's fuller economic participation, investing in facilities owned or operated by women or facilities that commit to hiring and promoting women into clinical and managerial roles could, by extension, offer better service delivery to women clients/patients and other underserved population segments. This is particularly true in conservative cultures, where women may not receive clinical treatments from men.

Health facilities may be selected because they already meet these objectives or be elevated to address them, such as when sites commit to serving key segments more equitably after the installation of electricity.

To ensure gender-responsive site due diligence, programs may also integrate basic gender and social requirements into any preliminary checklist for sustainability.

Site Sustainability Checklist

Facility commitment to gender-responsive HFE management:

- ✓ Environmental impact policies and gender-responsive practices in place to address them, including mitigation of risks such as relocation, livelihood loss, violence and harassment
- ✓ Potential for continuous and increased use of the health facility by the community at affordable price points
- ✓ Safe access to healthcare services
- ✓ Gender-specific recordkeeping at health facility
- ✓ Gender balance in health facility decision-making and energy system management
- ✓ Gender-responsive language, messaging, and images when communicating about facility use and available services
- ✓ Equitable opportunities for productive uses of energy powered by the system
- ✓ Commitment to fostering community security, participation, and sense of ownership
- ✓ Public support for gender equality, women's empowerment, and improving socioeconomic activities of the community
- ✓ Community inclusion in capacity strengthening, including direct engagement of and feedback opportunities for women and youth
- ✓ Availability of vocational education in the community, such as solar technician training and entrepreneurship support for women and youth

Adapted from Power Africa Nigeria Power Sector Program's Site Sustainability Checklist for HFE (USAID 2022).

SECTION 2: ENERGY DEMAND ANALYSIS

Clementina Clemency Mwamboneke, pharmacist and owner of a drug shop in Nkwabi (Dar es Salaam, Tanzania) uses a tablet and other digital tools, powered by solar energy, to serve customers and check inventory. (Photo credit: HETA via Kino Media/Stefano Bianco.)

Once a site is selected, understanding the health facility's basic energy needs is the first step in the electrification process. This involves determining the facility's daily load, or amount of power required to operate equipment in normal working conditions. This is calculated by conducting an inventory of the types of equipment used in the facility and the power required to operate each device.

ENERGY LOAD CATEGORIZATIONS

For **off-grid health facilities**, loads are categorized as critical and non-critical (Exhibit 2). This categorization determines the appropriate energy supply source for each end use and is essential for estimating backup power system needs.

The next step is to determine the **end use of a load** (the general purpose or equipment type with which it is associated). The goal of this exercise is to organize the load inventory and better understand which activities at the health facility are most energy intensive. Defining appropriate end-use categories depends on the size of the facility, the diversity of loads at the facility, the range of healthcare activities that take place there, and the objectives of the load analysis.

End-use categories can be broad or specific, depending on the needs and interests of the energy management plan a facility uses to monitor and control its energy use. Lighting, air conditioning, and office equipment are a few typical end-use categories, each with sub-categories (for example, lighting can be sub-categorized as indoor or outdoor, or by technology). Load calculation and system optimization tools are available, such as the HOMER Powering Health Tool. There are also energy audit guides to help develop an inventory of equipment in a health facility and specify an off-grid energy electric system (USAID n.d.).

Exhibit 2. Types of Loads

Load type	Definition	Examples
Non-critical	Loads that, if not supplied with power, will not put patients at immediate risk or substantially disrupt health facility operations.	Air conditioners, electric fans, computer and accessories for admin functions (desktop, printer, photocopier, etc), air conditioning, sterilizer, fridge, autoclave, water bath
Critical	Typically defined as **equipment that is crucial to health facility operations** and further categorized by its need for high-quality, uninterrupted power.	• + Life support systems, ventilators and operating room equipment such as Oxygen machine, incubator, oscillators, patient monitor, Imaging machines and laboratory equipment such as microscope, centrifuge, X-ray/ultrasound machine, vaccine fridge, urine analyzer, hematology analyzer/full blood picture, indoor lighting, operation lamp
	Contact critical loads can endure minor fluctuations in voltage and brief losses of power.	Lighting, vaccination refrigeration
	No-contact critical loads are those for which any interruption in power will result in equipment damage or loss of data.	Sensitive laboratory instruments such as GeneXpert, medical equipment such as X-rays and data acquisition systems

Source: USAID (n.d.).

EQUITY CONSIDERATIONS IN ENERGY DEMAND ANALYSIS

Purpose of an equity lens:

- Engage diverse perspectives, on-site and in the community, to assess energy needs more accurately and inclusively, yielding more sustainable designs and results

Approaches:

- Use accessible, gender-sensitive methods
- Sample diverse respondents on site and in community

Although automated tools are available for many of the measurements involved in this stage of the HFE process, a human element remains:

- **Enumerators:** Individuals who facilitate focus groups and administer surveys to gather this data. For enumerators, it is important to prioritize local talent and promote **diversity**, including using women facilitators where doing so will support women respondents to participate.
- **Respondents:** Individuals and community institutions from whom some of the demand data is gathered. For respondents, it is essential to take steps that ensure **accessibility**, such as translating or interpreting instructions and questions in relevant local languages and dialects and phrasing information and questions in ways that are culturally appropriate, relevant, and easy to understand. To facilitate this approach, consult with local stakeholders to develop and pilot all surveys and data collection instruments.

Studies have shown that women and men use energy differently, have different perceptions of the benefits of energy access, and hold different opinions about what types of projects should be pursued (Tsagkari 2022). **In HFE, it is important to intentionally solicit all perspectives at the health facility.** For instance, women and men employed at a health facility may have different perspectives on energy priorities; a birth attendant might say the facility should first install an ultrasound machine, whereas a community health worker might prioritize refrigeration for biopharmaceuticals, and a doctor might suggest more lighting in the operating room.

It is also widely recognized that **inclusive community engagement in energy projects yields more sustainable results**. Larger infrastructure projects often fail to consider both the very real gender-related and social risks during the assessment stage and the impact opportunities that can come through inclusive stakeholder engagement. These have social, economic, and financial costs to communities, including trauma, displacement, lost earnings and livelihood interruptions, unwanted pregnancy, and HIV. For energy projects, this can lead to costly remediation, lost productivity, resource inefficiency and idle assets, delays, cost overruns, brand injury, and even project failure.

EXAMPLE: THE COST OF INSUFFICIENT COMMUNITY ENGAGEMENT

A Chevron geothermal project in the Philippines failed to address Indigenous women's concerns about the destruction of tiger grass, an important cash crop for women. Amid community frustration, Chevron installed a military presence to protect project assets, leading to fear of gender-based violence and harassment. The community ultimately blocked the site, causing the company to abandon the project. (*Source:* ESMAP 2019.)

Solar energy investments have an opportunity to approach community engagement differently. Consulting with local groups of women and underrepresented segments during energy demand analysis can provide valuable insights and generate a more accurate assessment of community needs, risks, and potential productive-use cases for the energy project. Women from the surrounding areas, as traditional managers of household economies and community affairs, are a valuable data source. They could foresee potential project pitfalls and identify valuable opportunities to leverage HFE for other social benefits. Considering the health, safety, and economic concerns of local actors in early stages is essential for long-term local buy-in and project success.

EXAMPLE: ENGAGING LOCAL ALLIES FOR HYDROPOWER IN LAO PDR

The Theun-Hinboun Expansion Project is operated by Theun-Hinboun Power Company with international financial backing. The expansion created an additional 230 megawatts of capacity and relocated 4,000 individuals. Driven mainly by its financial shareholders and corporate responsibility, the power company focused on gender equity throughout project planning, implementation, and follow-up. This included conducting a pre-resettlement health survey with gender-disaggregated results and setting indicators that tracked health during the resettlement process.

The consultative process included separate meetings with women to ensure Theun-Hinboun Power Company understood their concerns. The Lao Women's Union—a multi-level village to central government actor responsible for advancing gender equality, women's rights, and the Sustainable Development Goals—was considered an important ally in facilitating a gender-inclusive consultative process. (*Source:* NARUC 2018.)

SECTION 3: PLANNING AND SYSTEM DESIGN

Through the Elevate Women's Solar Installation Certification Course in Nigeria, women receive guidance through intensive hands-on training in Solar PV installation, maintenance, and troubleshooting. (Photo credit: Power Africa.)

Once daily load is calculated, it is possible to consider the range of electrification options. Numerous variables determine the best option; combining technologies could be the optimal approach. If a health facility is close to the national grid, connecting to the grid is often the most reliable and cost-effective option, compared with generating power on-site. In sub-Saharan Africa, however, where many utilities implement load shedding to conserve energy, supplementing grid power with off-grid solutions ensures a secure backup solution for health facilities. A mini-grid can be installed to run on traditional fuels and/or renewable technologies and may stand alone or be interconnected to the utility's grid.

This toolkit focuses on **off-grid solutions** for health facilities that do not have utility grid access. Importantly, decentralized energy that relies on solar photovoltaics and batteries for storage is faster to install than grid connections, more economically viable and environmentally friendly than fossil fuels, and can reduce labor for women and girls who are traditionally responsible for sourcing fuel such as firewood or charcoal.

CONSIDERATIONS FOR TECHNOLOGY SELECTION

The following are considerations for selecting technology (USAID n.d.):

- Reliability of the local grid (if applicable)
- Government policies and incentives
- System reliability requirements
- Local renewable energy resources (wind, solar, biomass)
- Local costs and availability of conventional energy resources (diesel, propane, gasoline)
- Local availability of systems, parts, service companies, and technicians
- Technical capacity and funds for system maintenance and replacement
- Special considerations or desired operational characteristics, such as noise or emissions

A thorough analysis of the health facility's **future load profile**, including intentions for any energy-intensive accompanying activities, is an important component of a solid energy needs assessment. This will enable scaling of the system as demand rises.

SYSTEM DESIGN

Based on the energy demand analysis and the identification of electrification options, the next step is to create a custom energy system for the health facility and determine an appropriate implementation model. An energy system designer must complete this process if the health facility owner cannot conduct the energy audit.

Input from diverse stakeholders during energy demand analysis and planning should inform the system design. Energy audit guides (described in Section 2) are useful in collecting the information the system designer's needs. The energy system design process should use an optimization tool, such as the HOMER Powering Health Tool or an energy system modeling tool, to size the system components.

System design should always consider local meteorological conditions and loads. A one-size-fits-all design often results in an energy system that fails to meet the facility's load. Depending on the type

of system, several other rules of thumb apply in system design, such as incorporating anti-theft measures and using “maintenance-free” batteries (USAID n.d.).

HFE has several potential implementation models (Exhibit 3). Decisions common to all models include determining the following:

- Who will pay the capital expenditures (CAPEX) for equipment and system installation
- Who will own the installed systems
- How long-term O&M will be paid for
- Who will manage the funds to cover O&M

Exhibit 3. Off-grid HFE Implementation Models

Model and funding source	Implementation	Ownership	Challenges	Potential solutions or mitigation measures
Traditional procurement model Donors provide all funding necessary for CAPEX and O&M.	A project manager is hired to supervise implementation (contract with the energy company that will procure equipment, install the system, and provide O&M for a fee).	The facility owns the equipment (for public facilities, the owner is the Ministry of Health). *The health facility does not pay for the energy.*	• Ensuring the energy company or a third party has sufficient incentives to maintain the systems • Ensuring facility managers are empowered to request services • Maintaining systems after donor-funded service contracts end • Mobilizing enough resources to scale coverage	• Selling excess power for productive uses in the community to build an O&M fund • Raising community funds • Securing in-kind contributions from leverage partners • Facility/Government pays for the energy provided
Energy as a Service model Investors finance an energy company for CAPEX. The health facility pays the energy company only for electricity provided. This can be monitored remotely and verified by a third party before payment.	A project manager is hired to negotiate and supervise the partnerships and financial arrangements between the parties.	The energy company owns the equipment and is incentivized to provide O&M because payments depend on the system's continued operation. *The health facility pays for the energy.*	• Risk of non-payment by the facility, resulting in low interest from investors and energy companies	• Payment guarantees from a development partner and support for the Ministry of Health's health financing and operations • Cross-subsidization from the sale of excess energy or by embedding HFE in a mini-grid solution, which could provide revenue streams to attract energy companies
Lease-to-Own (LTO) LTO similar to Energy-as-a-Service but differs in that monthly payments cover system deployment costs over a set period. Once fully paid, ownership and long-term operations and maintenance (O&M) responsibilities transfer to the facility.	Both EAAS and LTO models are typically led by Energy Service Companies (ESCOs). These models are most effective when the ESCO identifies a project that aligns with USAID Implementing Partners' (IP) health facility electrification targets.	During the repayment period, the ESCO retains ownership of the system. Once the system is fully paid for, ownership and long-term O&M responsibilities are transferred to the health facility.	• Ensuring the health facility can make consistent payments over the repayment period. • Ensuring the facility has the capacity and resources to manage long-term O&M after the transfer. • Accurately estimating and incorporating CAPEX, OPEX, and major item replacement costs.	• Providing financial guarantees or insurance to cover the risk of non-payment. • Training facility staff in O&M to ensure they are prepared for long-term system management. • Establishing long-term technical support agreements to assist

Model and funding source	Implementation	Ownership	Challenges	Potential solutions or mitigation measures
				with major repairs and replacements. • Designing flexible payment plans that can accommodate the financial realities of health facilities. • Implementing robust monitoring and evaluation systems to track system performance and financial compliance. Encouraging facilities to develop budgeting or savings plans for future major items replacements and unexpected expenses.

Source: HETA Off-Grid Health Facility Electrification Models (available upon request from the HETA team).

EQUITY CONSIDERATIONS IN HFE PLANNING AND SYSTEM DESIGN

Purpose of an equity lens:

- Incorporate the local context and non-energy factors into planning to enable maximum impact on economic empowerment and community development
- Ensure equitable distribution of opportunities

Approaches:

- Facilitate inclusive stakeholder engagement
- Design inclusive implementation models

A nuanced understanding of the local context and non-energy factors (such as policies and capacity) must inform the technical aspects of planning. This step offers a prime opportunity to engage local stakeholders and **co-design for maximum impact on economic empowerment and community development**. Inclusive engagement entails identifying a range of local stakeholders, understanding their diverse interests and concerns, planning for equitable distribution of opportunities through the project, and proactively seeking input to mitigate the risk of unintended consequences. Adopting such an approach early in the HFE process provides a comprehensive picture and results in a more culturally responsive and gender-responsive project plan.

Projects should conduct multilevel, multistakeholder consultations and emphasize transparency and accountability by establishing clear communication channels. This could include conducting initial focus group discussions with women's groups, youth groups, and local organizations; planning for regular progress reporting and sharing at town halls and other public forums; and creating anonymous feedback mechanisms through which people can share ideas, log complaints, and request information about the project.

Energy system designs should incorporate diverse inputs from initial stakeholder engagement sessions during the demand analysis and planning stages. Whenever possible, requests for proposals (RFPs) must convey plans for inclusive energy access and economic opportunity. RFPs should also reflect any intention to sell excess electricity and stimulate opportunities for productive uses of energy (PUE) through the investment; applicants should specify technical plans and proposed partnerships for accomplishing these objectives in their proposals.

To factor local demand-side considerations into project design, developers can leverage consumer data from willingness-to-pay studies and household survey data. For example, Costa Rica's Public Services Regulatory Authority recognized that households headed by single women experience disproportionate impacts from changes in electricity tariff structures compared to other households; the Regulatory Authority then conducted studies on poverty and energy use to inform development of tariff subsidies for minorities, especially single women who are heads of household (NARUC 2018).

For off-grid energy to similarly benefit the whole community, designs can be oversized, include a method for tracking excess generation, and stipulate an energy management plan to determine a site's potential for subsidized sales to the public. Income-based incentives can enable resource-poor households to leverage PUE (Section 5). Poverty-reduction partnerships with aligned actors—such as Ministries of Gender and Youth and rural telecommunications and digital finance partners—can add value to the design through complementary service offerings. Facilitating women's access to finance and tailored enterprise development support are crucial for advancing inclusive growth.

SOLICITING INCLUSIVE STAKEHOLDER INPUT

FOCUS GROUPS

Solicit participation through snowball sampling (finding other respondents through local entities and organizations). Seek diverse input during planning, ensuring a representative cross-section of the community. To encourage participation, form groups thoughtfully, separating by gender, age range, ethnicity, language, and power dynamics (such as doctors and cleaners at a health facility). Schedule sessions in accessible locations at times that are convenient for women, students, and each participant group. Offset costs of transportation and provide a snack or drink. Pose questions generally, rather than using "you."

Sample questions about HFE and productive uses of energy:

- What types of services can people already access at the health facilities in this area? What types of services do people in this community travel outside to access?
- Do you know if there is a source of electricity in the main health facility you visit in this community? If so, is it used always, sometimes, or never?
- How would consistent electricity change one's experience as a client/patient or employee at this health facility?
- Are solar panels already installed anywhere in this community? If so, where? What do people think about them?
- Would other public sites benefit from electricity in this community? If so, where? Describe the main reasons it would be beneficial.
- Are there any concerns about installing and maintaining a mini-grid in this community? Please share any perceived risks for different groups and how projects can avoid them.
- How can new solar energy investments help those who need it most in this community? Please share any ideas or suggestions.
- In this community, do *[women/men/young people]* regularly use a mobile phone? *Yes, personal / Yes, share someone else's / No*
- If yes, do most people like you use their phones to access the internet or apps for information or communication?
- Which energy sources do most households use in this community? *Charcoal / LPG/ Firewood / Kerosene / Solar / Diesel Generator / On-grid PAYGO / On-grid post-pay / Other*
- What is the current level of electricity access in typical homes? *Never / Sometimes / Always*
- Who makes decisions about energy usage at home?
- What happens to people when household energy is interrupted or inaccessible?
- What might people do differently with greater access to reliable energy? Describe how new practices would benefit people and their households, studies, or businesses.
- Would access to energy improve people's ability to generate income in this community? If so, in what ways? Please share ideas for productive uses of energy that community members might be willing to pay for, such as pumped water, phone charging, refrigeration, cooking appliances or other devices.

SECTION 4: PROCUREMENT AND INSTALLATION

Solar installation in Nigeria. (Photo Credit: Power Africa Nigeria Power Sector Program/Tochukwu Mbachu.)

The next stage involves developing one or more RFPs and procuring suppliers or vendors to deliver the services required in the RFP.

Based on the system design and the selected implementation model, the health facility owner prepares a bid package and is prepared to ensure the entity procuring energy equipment and services and the suppliers are clear about what is needed and how it will be provided. The bid package includes a complete set of information on the system design and the expected system performance. It should cite established standards to ensure the quality of products and services, while allowing bidders to determine the best value they can offer (USAID n.d.).

After winning the contract outlined in the bid package, the engineering, procurement, and construction contractor must submit design revisions (if any), a project timeline, and a description of construction methods. The donor, project manager, or health facility owner/manager also typically collaborates with the construction company to develop a commissioning process (a period of testing to confirm the energy system performs according to bid document specifications). During installation and commissioning of the system, the health facility owner can retain the original system designer or hire a separate engineer to supervise construction. This ensures the construction consultant installs the system according to the agreed-upon design and critical standards (USAID n.d.).

EQUITY CONSIDERATIONS IN HFE PROCUREMENT AND INSTALLATION

Purpose of an equity lens:

- Mitigate unintended consequences during sourcing and installation, including upstream in supply chains, and social and operational risks at site-level
- Ensure equitable distribution of opportunities
- Enhance community relations, bolstering the project's social license to operate

Approaches:

- Technical assistance on Do No Harm and environmental and social responsibility
- Supplier diversification through modified procurement practices
- Supplier development and entrepreneurial support

Responsible Procurement

Procurement and installation comprise the HFE supply chain. All developers and contracting firms are required to **Do No Harm** in delivering their services, including respect for the community's health and safety and gender-responsive risk mitigation that prioritizes the concerns identified through consulting women and excluded groups during the demand analysis and planning stages.

Enabling contractors to comply with environmental and social (E&S) performance standards during installation can prevent harm to local populations, help teams guarantee community well-being and worker health and safety, and ensure environmental and gender-responsive risk management. As part of achieving E&S responsibility, HFE projects may require suppliers to implement key workplace policies such as *Anti-Sexual Harassment, Non-Discrimination,* and *Pay Equity*. If policies and procedures are not in place upon verification, programs can provide **technical assistance** to help firms meet social responsibility qualifications for doing business.

Responsible procurement also extends to E&S performance upstream in the supply chain. Mitigating risks at this level requires that partner firms source ethical products and select alternatives to supply chains with known stored risks, such as critical minerals and other raw materials that rely on child labor. Projects can safeguard human rights in the supply chain by operationalizing policies with vendors to train staff and protect *Whistleblowers* and prevent *Modern Slavery* and *Forced Labor* wherever traceable.

Supplier Diversification and Development

Encouraging **diversity in the energy supply chain** is also essential to keep gaps in economic opportunity from widening with new investment in underserved communities. Supporting and partnering with diverse suppliers can drive inclusive growth, lead to reinvestment in local businesses and households, and create a more equitable industry ecosystem. Sourcing from local firms can also generate goodwill as another form of community engagement, while supporting the HFE project's social license to operate.

The participation of local and underrepresented firms in the supply chain, with strengthened capacity to compete with more established vendors, is crucial for both localization and equity. Two strategies to help achieve supplier diversification are (1) modifying procurement processes and (2) offering entrepreneurial support.

Modifying the Procurement Process

The team can adjust procurement processes to be more inclusive of local suppliers and minority-owned businesses. For instance, HFE programs can:

- Promote gender equity internally, such as staffing women and minorities in procurement functions; this could improve gender-responsive procurement and increase the value of contracts with under-represented firms[2]
- Earmark a percentage of the budget for women-owned and women-led suppliers
- Unbundle RFPs and issue smaller value/volume contracts to encourage bids from small and medium-sized enterprises (SMEs)
- Advertise RFPs locally and extend support in the procurement process to companies without competitive experience
- Forecast opportunities in advance, provide sufficient proposal development time, offer opportunities to ask questions (e.g. in a pre-bidders conference held at convenient times for local and national firms), and respond with uniform information about the opportunity
- Add non-price factors in bid evaluations, such as firms' commitment to gender-inclusive hiring and staffing, and verified implementation of key policies including *Non-Discrimination, Pay Equity,* and *Anti-Sexual Harassment*
- Support supplier accreditation—confirming ownership status, directors, management, facilities, and existence of key E&S policies
- Create a dedicated list of diverse firms and preferentially award contracts to them if selecting between diverse and non-diverse leads of proposals of comparable quality and price

Offering Entrepreneurial Support

Entrepreneurial development programs often support SMEs to address business growth needs while providing training, counseling, and preparation for their introduction as potential suppliers. This can include mentorship and technical assistance related to business practices, from accounting and operations to network expansion and proposal writing. These skills can enhance SMEs' capacity to complete future HFE-related contracts. An engineering, procurement, and construction contractor can directly facilitate supplier development programs that equip SMEs to become supplier-ready or proactively link diverse firms to business accelerators that can increase local capacity to bid.

HFE projects with an explicit goal of supplier diversification can consider offering incentives to SMEs that participate in entrepreneurial development programs and bid successfully when procurement opportunities arise, such as favorable pricing, up-front payment terms, and phased retainer options.

[2] Diversity in procurement teams is likely to lead to more equitable procurement (UN Women 2020).

SECTION 5: O&M, INCLUDING PRODUCTIVE USES OF ENERGY

Health worker inputs data into a tablet. (Photo credits: Power Africa)

For any energy system to be sustainable, a proper O&M mechanism must be in place. This requires trained operators who understand current system performance and a budget to pay for consumables and replacement parts. These elements are essential for the energy system's ability to support the health facility infrastructure (USAID n.d.). O&M is included in all the implementation mechanisms listed in Section 3.

Electricity, heat, mechanical power, and other PUE are intended to enhance income-generating opportunities and productivity (MIT D-Lab n.d.). PUE has been promoted in decentralized renewable energy and rural electrification for decades, with applications in solar energy, cooking, hydropower, and biogas. Recent developments, such as the following, have led to wider interest in the promotion of PUE:

- Increases in the number of people with access to electricity and greater emphasis on translating that access into opportunities for income
- Emergence of pay-as-you-go (PAYGO) models and the growth of mobile money services, which has helped make energy products more affordable to low-income consumers
- Increased mini-grid deployment in rural areas
- Declining costs of solar panels, batteries and other technological innovations, increasing efficiency and output (Havinga and Teule 2020)

Section 3 discusses potential implementation models, including examples of oversized systems that are designed to capture and store more energy than a health facility needs. In such models, the surplus energy can be channeled into PUE projects, operated by nearby entrepreneurs. These local revenue streams can be channeled toward system O&M and investment in system expansion when the health facility's energy needs increase.

EQUITY CONSIDERATIONS IN HFE O&M, INCLUDING PUE

Purpose of an equity lens:

- Ensure equitable distribution of ongoing opportunities related to HFE investments, including energy sector skills, jobs, and enterprise support
- Shift norms in the energy sector

Approaches:

- Investment in the STEM pipeline and inclusive workforce development
- Equitable PUE opportunities and enterprise support

Inclusive Workforce Development

It is important to prioritize community members when training new technicians for energy system O&M, especially in rural areas. Apart from strengthening community buy-in, having local residents conduct regular O&M tasks eliminates the need for technicians based in urban areas to travel to rural areas, so there is an economic premium.

It is essential to ensure diversity when training O&M technicians. Because of societal norms and expectations, security concerns (real or imagined), and the many responsibilities women often hold that prevent them from traveling frequently, men still hold the majority of technician posts in most countries (Deloitte Consulting LLP 2020). Yet, there can be tremendous value in having women in these HFE roles, just as evidence has shown in the solar home system industry.

First, women are more likely to stay in their communities, where they often have deep relationships and responsibilities, whereas men frequently move elsewhere for better economic opportunities. These women represent great value to both the unpaid economy and the paid labor force. For example, women who have worked as field installers and technicians in the solar home system industry have proven to be highly skilled in construction, commissioning, and O&M, demonstrating that training and experience—not gender—are the most important success factors. In conservative or rural communities, where men professionals are not welcome in homes while men family members are not present, women installers and technicians can typically enter homes more easily.

Additionally, there is mounting global evidence that lower operational costs result from women's employment in the building and infrastructure sectors, since they tend to take better care of tools and machines. Studies have demonstrated that women employees are often more likely to follow safety protocols, treat equipment responsibly, and operate equipment safely (IFC 2013). Beyond solar home system installation and maintenance, training local women as solar technicians for social infrastructure, such as clinics and schools, represents an equally promising opportunity to diversify the energy workforce and leverage women in the sector—potentially reducing O&M costs through the local dispatching of technicians, fewer visits, and extended system value through prolonged equipment lifespans.

STEM Pipeline Development

In many countries, the pipeline of women and youth in STEM is not robust enough to meet demand. Intentionally training young women with the skills to operate and maintain off-grid energy equipment develops a broader and more diverse talent pool to address technical labor constraints in local communities. HFE programs can unlock this diversity dividend by creating opportunities for **young women's education, apprenticeship, and employment,** either directly (with core funding) or through their influence and partnership with other ecosystem actors.

When women and other under-represented groups participate in technical education and assume non-traditional roles in the energy industry, it creates a powerful role-model effect that can counteract longstanding gender stereotypes. For example, the Barefoot Women Solar Engineers Association in Sierra Leone equips women with limited formal education to lead in solar installation and maintenance. The Barefoot Women have expanded off-grid training to include related industries, such as solar-powered baking and tailoring, creating valuable vocational opportunities while dismantling some of the social barriers young women face in entering the energy workforce.

Gender Equity in PUE

Aspects of PUE have clear gender dimensions, arising from the reality that women suffer disproportionately from energy poverty. Unreliable energy or lack of energy access has direct impacts on women's health, time use, education, safety, well-being, and access to information. As workers and entrepreneurs, women and men carry out different types of productive activities in different locations. In agribusiness, for instance, women and men may play different roles during land preparation, cultivation, harvesting, and marketing that require different energy assets on small farms versus larger ones—from tractors and solar irrigation pumps to cold storage units and mobile phone connectivity. Their access to assets, finance, infrastructure, and training to make powered upgrades to their work also varies, with women at a systematic disadvantage.

However, investing in energy access for women **entrepreneurs** can have a multiplier effect that leads to reinvestment in their households and communities, and may create work opportunities for more women than investing exclusively in businesses owned by men. As **consumers**, women may also benefit more from electrification of certain businesses; for instance, clean water kiosks can reduce the time burden on women and girls, who are often responsible for collecting and purifying water.

An equity lens is essential to ensure inclusive PUE initiatives are feasibly factored into project design and implementation, such as facilitating partnerships that expand women's access to finance and tailored enterprise development support. Sections 2 and 3 describe ways women can be consulted and engaged as active participants during planning, including providing consumer data on demand for PUE and willingness to pay. Each facility should establish a sustainable O&M model with a clear governance structure during the design stage and can stipulate the role of a diverse advisory board to ensure local actors' input and continued support for public electricity sales.

Once the project and PUE avenues are designed, an equity lens in service delivery means providing women entrepreneurs with equitable access to training, mentoring, and support. Training should be delivered in accessible formats and languages that work for women, in safe and welcoming locations with accommodation for childcare and transport and at times that do not conflict with women's other responsibilities. As empirical evidence shows, PUE projects that close gendered access gaps and engage all community members not only empower women and other marginalized groups, but also result in more sustainable projects (ENERGIA 2018).

SECTION 6: COMMUNICATION AND AWARENESS RAISING

Pharmacist Fides Said Kimaro, owner of Rwaech Drug shop in Tandale (Dar es Salaam, Tanzania), assists a customer. (Photo credit: HETA via Kino Media/Stefano Bianco.)

Throughout the HFE project cycle, thoughtful communication can help teams increase engagement and effectiveness. Respectful, inclusive communication extends to all written, verbal, and non-verbal approaches for external outreach, client engagement, and awareness raising across HFE project stages.

A health facility is crucial for community well-being; thus, it is advisable to educate community members about an electrification initiative that improves service offerings or extends the hours health services are available. This will help foster appreciation of the project's value in contributing to more reliable healthcare, can increase community members' trust in the health system and willingness to seek care at a health facility, and could create opportunities for complementary programs that promote social and economic benefits (such as income-generating PUE projects). The awareness campaign can include information about the complementary activities that community members can pursue, as well as contract opportunities and requirements such as raw materials, access to credit, or markets.

A well-implemented awareness campaign can help the community appreciate a project's value and increase their willingness to pay for services. For example, if the needs assessment shows that community members value electricity for HFE and other potential uses, such as mobile phone charging, then developers conduct awareness campaigns about how electricity can improve water pumping and food milling, spur local business development, and help improve health and nutrition.

EQUITY CONSIDERATIONS IN HFE COMMUNICATIONS AND AWARENESS-RAISING

Purpose of an equity lens:

- Market HFE opportunities inclusively
- Boost local awareness and demand for energy solutions
- Ensure all stakeholders feel welcome and safe
- Shift norms in the sector

Approaches:

- Eliminate bias
- Conduct inclusive outreach
- Promote balanced imagery and messaging

Cross-cutting communication and awareness campaigns must reach all community members. HFE projects should consider accommodations such as translation and interpretation, holding sessions in the evenings or on weekends so those with multiple responsibilities can attend, and providing onsite childcare for all community meetings.

Communication should use **inclusive, gender-sensitive language**. During all outreach and in project materials, teams should avoid exclusionary terms (for example, using "they" universally rather than gendered pronouns). Teams can show further respect and inclusion by identifying their pronouns at the start (if staff are comfortable doing so and if the local context permits doing so safely). This can signal safety for transgender and nonbinary individuals and help colleagues avoid misgendering others (for instance, by assuming, based on appearance, that someone uses "she" when they do not identify as a woman). Project staff should take care to welcome all and demonstrate nuance for safeguarding colleagues in places where nonbinary and other LGBTQI+ identities are not accepted. It is also important to be mindful in using equal forms of address (never assuming marital status) and to respect how individuals prefer to be addressed, such as honoring that someone uses *Professor* or *Doctor* rather than *Ms., Mr., or Mx.* before their name.

Beyond personal pronouns and honorific titles, **gendered roles and terms** are likely to appear in many project languages. Take care not to assume, for instance, that nurses are always women. If using English, avoid terms that denote gender and try to use neutral language; for example, *homeland* instead of *motherland* or *fatherland* (Exhibit 4).

Exhibit 4. Examples of Gender-Biased and Gender-Responsive Language

Gender-Biased Language	Gender-Responsive Language
Kofi and Issa both have full-time jobs; *he* helps *her* with the housework.	Kofi and Issa both have full-time jobs; *they share* the housework.
Each clinic worker will perform better if *he* has access to reliable electricity.	All clinic workers will perform better if they have access to reliable electricity.
Miss, Mrs.	Ms. (unless the person states their preference for *Miss or Mrs.*
Mother tongue	First language
Manpower	Workforce

Adapted from UNDP (2018).

During **recruitment**, human resources and hiring managers should eliminate masculine defaults in role descriptions and interviews by choosing neutral alternatives. For example:

- *Chair* instead of *chairman*
- *Line worker* instead of *lineman*
- *Supervisor* instead of *foreman*

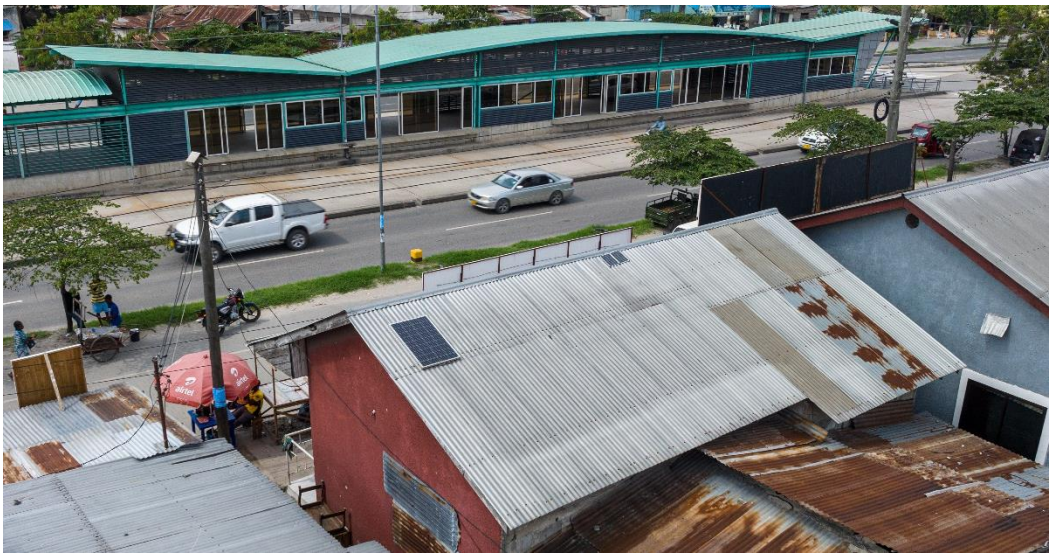
If neutral or nonbinary terms do not exist in the community's primary languages, balance whenever possible with representations that include a mix of feminine and masculine examples or concepts.

Imagery should promote gender equality by portraying diverse appearances in a range of roles, such as women performing technical activities like installing a solar power unit and men performing important forms of unpaid work like escorting a child to the clinic.

When seeking opinions on communication, consult a diverse group to ensure the effectiveness of final messaging and materials.

EXAMPLE: GENDER EQUITY SEAL

In Uruguay, as part of the Gender Equality Seal launched in 2009, the National Administration of Power Plants and Electrical Transmissions developed a resolution to use inclusive language and non-stereotypical images in its advertising and internal communications. The agency is also committed to showcasing women and men in its newsletters. (*Source:* Schomer and Hammond 2020.)



The image showcases Rwaech Drug Shop in Tandale, Dar es Salaam, Tanzania, with solar panels installed on its tin roof. (Photo credits: HETA (via Kino Media/Stefano Bianco.)

CONCLUSION

Sustainably solving energy poverty and achieving equitable health outcomes form the core of resilience. The central objectives of renewable energy development in the health sector—access to care and inclusive development—will not be possible without addressing social risks, engaging local actor voices to inform project planning, and closing gendered gaps in and through the investment.

Gender equity, disability, and social inclusion approaches across the HFE stages are imperative for a just transition to electrified health facilities. Equitable approaches can also improve business and economic outcomes by addressing operational risks and unlocking potential in frontline communities, ensuring that electrification initiatives do no harm and deliver benefits to all.

The Health Electrification and Telecommunications Alliance is taking steps to integrate equity internally and through approaches to site selection, procurement, partnerships, and data. Join us by contacting HETA@abtglobal.com.

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