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SCALING SUSTAINABLE ACCESS PATHWAYS FOR THE MOST VULNERABLE AND HARDEST TO REACH PEOPLE

PEOPLE-CENTERED ACCELERATOR WORKING PAPER

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EXECUTIVE SUMMARY

In 2014, over 1 billion people lacked access to electricity and over 3 billion lacked access to clean fuels and technologies for cooking (IEA and World Bank, 2017). Under current policies, 645 million people are projected to be without access to electricity in 2030. Of these, 600 million will live in rural parts of Sub-Saharan Africa. A further 2.3 billion people in Asia and Africa are projected to remain without access to clean fuels and technologies for cooking in 2030 (IEA, 2017). Progress is not moving fast enough to meet Sustainable Development Goal 7 (SDG 7)—to ensure universal access to affordable, reliable, sustainable and modern energy for all by 2030.

Business-as-usual solutions are not working for women, nor the most vulnerable and hardest-to-reach people. Eighty percent of those living without electricity live on less than \$3 a day but together spend \$37 billion a year on basic energy (World Economic Forum, 2013). Rural households across Africa spend about 10 percent of their income for 4 hours of light at night using kerosene, torches or candles (Overseas Development Institute, 2016). In seeking to achieve the interlinked objectives of SDG 7 and the Paris Agreement, while ensuring that the transformative benefits of sustainable energy access new and innovative approaches to energy service delivery are needed that specifically target people who are currently being left behind.

Sustainable Energy for All (SEforALL) and over 40 partners engaged in a People-Centered Accelerator are working jointly to advance gender equality, social inclusion and women's empowerment in sustainable energy.¹ One of the four goals of the Accelerator are to: *“enhance and extend the provision of sustainable modern energy to the very poorest people in society who will not be reached by business-as-usual approaches. This will include: identifying and promoting scalable models of private and public energy provision that address access and affordability challenges, including through social welfare and social protection; and, behavior change focused interventions to ensure adoption and sustained use of modern energy solutions.”*

This working paper discusses the issue of how to extend energy access to the most vulnerable and marginalized communities through two approaches: bundling energy and social services, and scaling access through women's enterprises. It explores the innovative models and strategies that can help accelerate access for the most vulnerable and those in hard to reach areas. These are not the only approaches but rather represent a first step in shaping the work of the People-Centered Accelerator.

SOCIAL PROTECTION SYSTEMS | BUNDLING SERVICES TO INCREASE ENERGY ACCESS

Social protection systems can enable economic advancement of the most vulnerable citizens by protecting them from deprivation (Mary Robinson Foundation – Climate Justice, 2016). But there is an acute gap in social protection coverage in Sub-Saharan Africa and South Asia. Safety net transfers tend to be relatively small; in low-income countries cash benefits are equivalent to 10 percent of the consumption expenditure of poor households. There is potential to adapt and expand the coverage of social protection systems to support access to sustainable energy services for poor households. In India, for example, the Pradhan Mantri Ujjwala Yojana scheme targets women by providing connections to liquefied petroleum gas (LPG) for cooking in low-income households.

Rapid technological development of energy systems and digitalization of services could also open opportunities to more precisely target energy subsidies and bundle them with other social services for vulnerable groups—with benefits of on-time payments, greater transparency and efficiency, savings for

¹ To learn more and to become a partner, visit <http://seforall.org/allequal>



government (Radcliffe, D., 2015), and financial inclusion and new opportunities for women (UNCDF, 2016). In Kenya, the Kenyan mobile money system M-PESA increased per capita energy consumption lifting 194,000 households (two percent of the population) out of poverty. Impacts were more pronounced for female-headed households, due to changes in financial behavior and labor market outcomes (Suri and Jack, 2016).

However, evidence is limited on the availability and effectiveness of social assistance measures for access to modern energy services (Scott and Pickard, 2016), and how to bundle energy and social services through the digitalization of social protection systems. Available evidence largely focuses on the transition countries of the former Soviet Union rather than low income countries across Asia and Africa where several barriers exist which may prevent social protection systems from fully realizing their potential to support access to modern energy services.

SCALING ENTERPRISES | EMPOWERING WOMEN THROUGH ACCESS TO AND PARTICIPATION IN THE ENERGY VALUE CHAIN

Over the past decade, engaging women in the promotion, sales, servicing and financing of household energy services has proven to be a bridging answer to the twin challenges of providing energy services to unreached populations and advancing gender equality, social inclusion and women's empowerment (IFC Lighting Africa, 2011).

Today, there are a growing number of organizations rolling out initiatives to support women entrepreneurs and a women-centric sales force, recognizing that women are especially effective in rural, hard to reach areas and can be partners and agents of change that can influence the distribution of products and services and change household behaviour at the grassroots level. They are part of different social networks from men and tend to have access to hard-to-reach households interested in purchasing household energy devices (GACC, 2014). However, more needs to be done to scale these approaches and achieve universal access by 2030.

By engaging women in the energy value chain, there is greater potential for growth of the energy sector. Women are better able to reach other women in their community to explain the benefits of clean energy, they are central to purchase and spending decisions in their households and by empowering them economically, women can become leaders for change in their communities.

Greater evidence is needed on the business case for increased investment in women as entrepreneurs and in their inclusion across the clean energy value chain as service users, entrepreneurs, engineers, designers, businesswomen. Governments could assist in scaling these approaches by adopting formal and informal financing frameworks to better reach women and ensuring that effective tracking of gender data is part of day-to-day operations, including market surveys, consumer outreach, and program monitoring and evaluation.

A PROPOSED WAY FORWARD

There is an urgent need to focus more attention on communities that are currently outside the ambit of modern energy services. Using non-traditional and more holistic approaches that broaden the scope of energy access to include social development and poverty reduction can contribute to the achievement of several Sustainable Development Goals, including SDG 7.

Going forward, the People-Centered Accelerator aims to²:

² This work program will be subject to raising the necessary resources to enable partners to undertake the work.



- Interrogate the World Bank’s Multi-Tier Framework (MTF) energy access surveys in 15 countries in Africa and Asia with large access gaps to better understand what the data says about the gender and social dimensions of last mile access to electricity and clean cooking.³
- Work with CAFOD and ODI to expand the evidence base around the effectiveness and challenges of using social assistance measures to enable energy access and thus inform policies and programs to support SDG 7.
- Engage the World Bank and the ACCESS network to explore how to develop the framework of gender-responsive and socially inclusive indicators to inform SDG 7, such as through the enhancement of the Regulatory Indicators for Sustainable Energy (RISE) dataset.

Drawing on this expanded evidence base, partners of the Accelerator would aim to work with experts and governments structuring policy, planning and regulations so that “social safety net packages” are integrated in the design of energy services; explore and share the experience in bundling social protection and energy services; examine how to best support household, community, and productive uses for income generation; and facilitate opportunities for women’s participation in the clean energy and/or cooking sectors—at scale—as service users, entrepreneurs, engineers, designers and business women.

³ These surveys will be released in 2018.



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ABBREVIATIONS

| | |
|-----------|----------------------------------------------------------------------|
| ANCAR | National Agency for Rural Agriculture |
| CAFOD | Catholic Agency for Overseas Development |
| CREEs | Community Rural Electrification Entities |
| CSOs | Civil Society Organizations |
| EDM | Energy Delivery Model |
| EOWS | Energy Opportunities for Women Senegal |
| GTNfW | Global Trading Network for Women |
| IBTs | Increasing Block-Tariffs |
| IIED | Institute for International and Environment Development |
| LPG | Liquefied Petroleum Gas |
| MTF | Multi-Tier Framework |
| ODI | Overseas Development Institute |
| PAPIL | Small Local Irrigation Programme |
| PMUY | Pradhan Mantri Ujjwala Yojana |
| SCODE | Sustainable Community Development Services |
| SDGs | Sustainable Development Goals |
| SEforALL | Sustainable Energy for All |
| SMEs | Small and Medium Enterprises |
| VDTs | Volume-Differentiated Tariffs |
| VSLA | Village Savings and Loan Associations |
| WDAN | Women Development Associations Network |
| WE | Women's Empowerment |
| WEDF | Women's Entrepreneurship Development Fund |
| WEEK | Women Energy Entrepreneurs in Kenya |
| WEE-Nepal | Women-led Enterprises for Energy Access and Local Production Project |

1 INTRODUCTION

As of 2014, over 1 billion people lacked access to electricity and around 3 billion to clean fuels and technologies for cooking (IEA and World Bank, 2017). At current rates of progress, only 91 percent of the global population will have access to electricity by 2030 and only 72 percent to clean fuels and technologies for cooking. This falls well short of the Sustainable Development Goal 7 (SDG 7) to achieve universal access to affordable, reliable, sustainable and modern energy for all by 2030. In fact, the 2017 World Energy Outlook Special Report on Energy Access estimates that on a business as usual basis, 674 million people will still be without access by 2030, of which 89 percent will be in Africa.

Business-as-usual solutions are not working fast enough to meet SDG 7 targets. Moreover, providing access to women, the most vulnerable, and the hardest to reach people –including those living in urban slums and rural parts of sub-Saharan Africa and Asia Pacific –is proving particularly challenging (ODI, 2015). In seeking to achieve the interlinked objectives of SDG 7 and the Paris Agreement, while ensuring that the transformative benefits of sustainable energy access reach the poorest and most marginalized people, new and innovative approaches to energy service delivery are needed that target those who are being left behind.

This working paper discusses how to extend energy access to the most vulnerable and marginalized communities and focuses on two approaches: bundling energy and social services, and scaling access through women’s enterprises. It highlights innovative models and strategies that could help accelerate access for the most vulnerable and those in hard to reach areas. These are not the only approaches to scale access but are rather a first step to help shape the work of the People-Centered Accelerator.

1.1 PROBLEM STATEMENT

Adopting a *leave no one behind* approach must recognize that people living in poverty are a heterogeneous group facing an array of multidimensional challenges based on context and social status. Women and girls represent 50 percent of people living in poor households in developing countries (The World’s Women, 2015). In most developing countries, women suffer more than men from the implications of energy deficits and energy poverty, and are under-represented in consultations about the design and delivery of energy services.

This heterogeneity calls for a combination of approaches. People in the most vulnerable situations typically live beyond the reach of conventional markets: the poorest among these typically need to be supported through social safety nets, solutions which might not be market-based or financially sustainable in the short term, requiring government assistance as a first step. Including women in enterprise development, and drawing on their networks in sales and servicing of energy products is another approach that is gaining traction and is discussed in this paper.

To develop new ways of delivering energy access requires evidence on how access deficits affect women and men, differently, and how to bring inclusive and equitable energy access to all. It requires demonstrating the potential development gains that can accrue by providing women with access to energy, enabling their participation in all aspects of decision-making across the energy value chain, and by supporting stakeholders to scale up successes. Benefits could include, for example, delivering access to ‘last mile’ customers, and providing income-generating and development opportunities such as education, improved health and security, changes in women’s position in society and role in decision-making. Marginalized communities, and particularly women, should be enabled to take part in the design, implementation and monitoring of electricity and clean cooking solutions to ensure that projects benefit from local and traditional knowledge.



To realize these benefits, partners in the People-Centered Accelerator aim to *“enhance and extend the provision of sustainable modern energy to the very poorest people in society who will not be reached by business-as-usual approaches.”* This paper draws on existing research and case studies to explore what is known about the innovative approaches that could reach the most vulnerable and hardest to reach people and what more needs to be done to scale sustainable pathways for energy access.

2 THE BENEFITS OF ENERGY ACCESS⁴

Modern energy services open development opportunities for individuals, communities and the economy. Household lighting improves education, allowing more time for studying at home due to increased light and the reduced time burden from collecting firewood. This leads to increased school enrollment and grade completion (Banerjee et al, 2011). In the Philippines, children with access to electricity at home attended school for two years longer than those from homes without access (UNDESA, 2014). In India, school enrolment increases by 6 percent for boys and 7.4 percent for girls from homes with access to electricity (UNDESA, 2014).

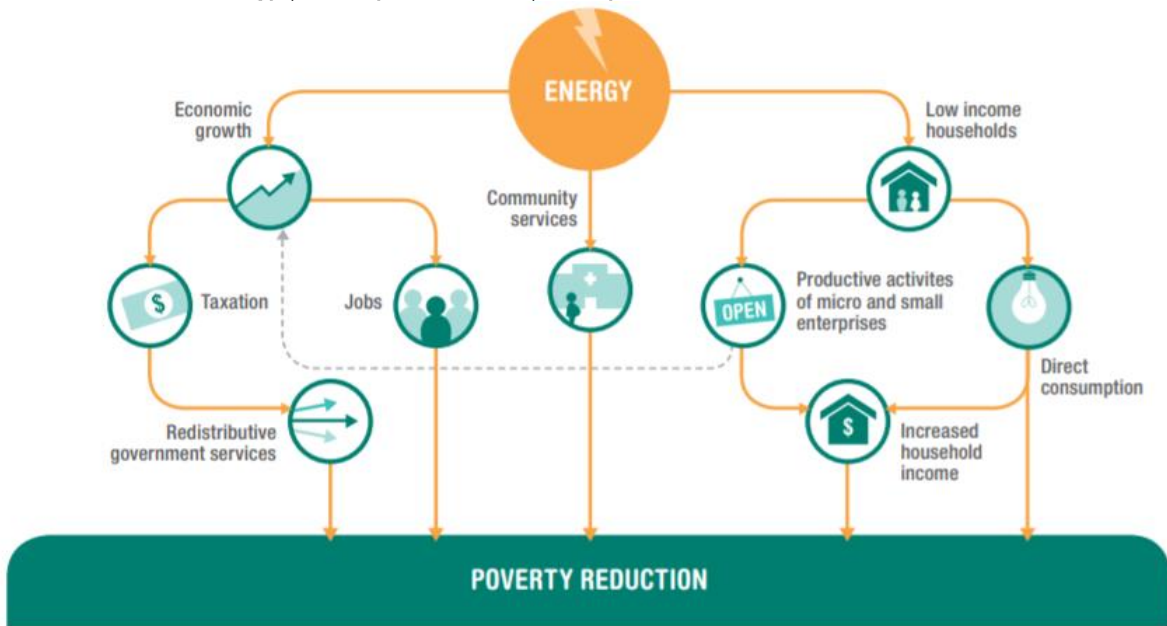
Access to electricity can enable a family to become economically empowered. An impact evaluation study analyzing the benefits of solar home systems concluded that household expenditure rises due to savings from lower energy costs and increased time for income-generating activities (Samad, et al, 2013). In Nicaragua, access to reliable electricity increases the likelihood of rural women working outside the home by approximately 23 percent (Grogan and Sadanand, 2013). With electricity people can charge mobile phones, increase connectivity and employment opportunities, and access available services like mobile banking (GSMA, 2015). Increasing access to mobile banking provides a unique opportunity to use PAYGO models to extend the benefits of electrification.

Over 4 million people die prematurely from illnesses attributable to the household air pollution (HAP) linked to cooking with solid fuels (WHO, 2016). Women and children are at a particularly high risk of diseases from exposure to HAP and account for most premature deaths that are attributed HAP. This is due to women's role as household energy managers and cooks, and the longer exposure to particulates in smoky kitchens. The drudgery associated with fuel collection also impacts women's health. Health benefits occur when electric lighting replaces kerosene lamps. This reduces the likelihood of respiratory illnesses (Samad, et al, 2013), provides efficient cookstoves and allows for time for productive activities. Women using more efficient cookstoves spend 70 hours less per year collecting fuel and can save over an hour a day in cooking time (GACC, 2015).

Modern energy services can improve poor people's welfare directly by enhancing their productivity, education and health, and indirectly by changing the economy around them and providing opportunities to reduce poverty (Figure 2.1).

⁴ Mary Robinson Foundation Climate Justice (2016) The Role of Social Protection in Ending Energy Poverty Making Zero Carbon, Zero Poverty the Climate Justice Way a Reality – Policy Brief. Available at: <https://www.mrfcj.org/wp-content/uploads/2016/09/The-Role-of-Social-Protection-in-Ending-Energy-Poverty.pdf>

Figure 2.1 Possible energy pathways to reduce poverty



Source: Overseas Development Institute and Oxfam (2015)⁵

⁵https://policy-practice.oxfamamerica.org/static/media/files/Speaking_truth_to_power_Exec_Sum_FINAL_2_2.pdf

3 SOCIAL PROTECTION SYSTEMS | BUNDLING SERVICES TO INCREASE ENERGY ACCESS

Vulnerable and hard-to-reach households generally don't have the disposable income to access improved energy services and thus use dirty fuels for lighting and cooking that are often labor intensive. It is estimated that rural families across Africa are spending on average 10 percent of household income for 4 hours of light at night using kerosene, torches or candles (Harrison, K., Scott, A., and Hogarth, R. 2016). Providing modern energy services to these communities requires targeted approaches that address issues of affordability and are often beyond the reach of markets.

Devising targeted strategies to assist poor households access energy without assuming unmanageable financial risk will deliver associated development benefits. Social protection systems that can bundle the provision of services such as health and energy, is one targeted approach that will be explored here (Figure 3.1).⁶ Technology advances such as pay-as-you-go solar home systems and the digitalization of financial payments provide an opportunity to expand access to energy and social services and improve financial inclusion. Adopting such approaches as a complement to existing market-based energy access strategies could enable governments to roll-out energy services at scale and ensure no one is left behind.

3.1 WHAT IS KNOWN ABOUT SOCIAL PROTECTION SYSTEMS?

Social protection systems aim to enable the economic advancement of a country's most vulnerable citizens by protecting them from deprivation (Mary Robinson Foundation – Climate Justice, 2016). They provide basic social and economic security and have the ability to facilitate structural change in economies by increasing stability, advancing social justice and cohesion, and promoting economic growth through increased opportunities for income generation and empowerment (Mary Robinson Foundation – Climate Justice, 2016). Social protection systems can take a variety of forms - some have a universal approach, benefiting the whole population (such as child welfare payments or pensions), while others enable the poorest in society to access essential services such as health care, education and nutrition through cash transfers, education subsidies and food and nutrition supplements.

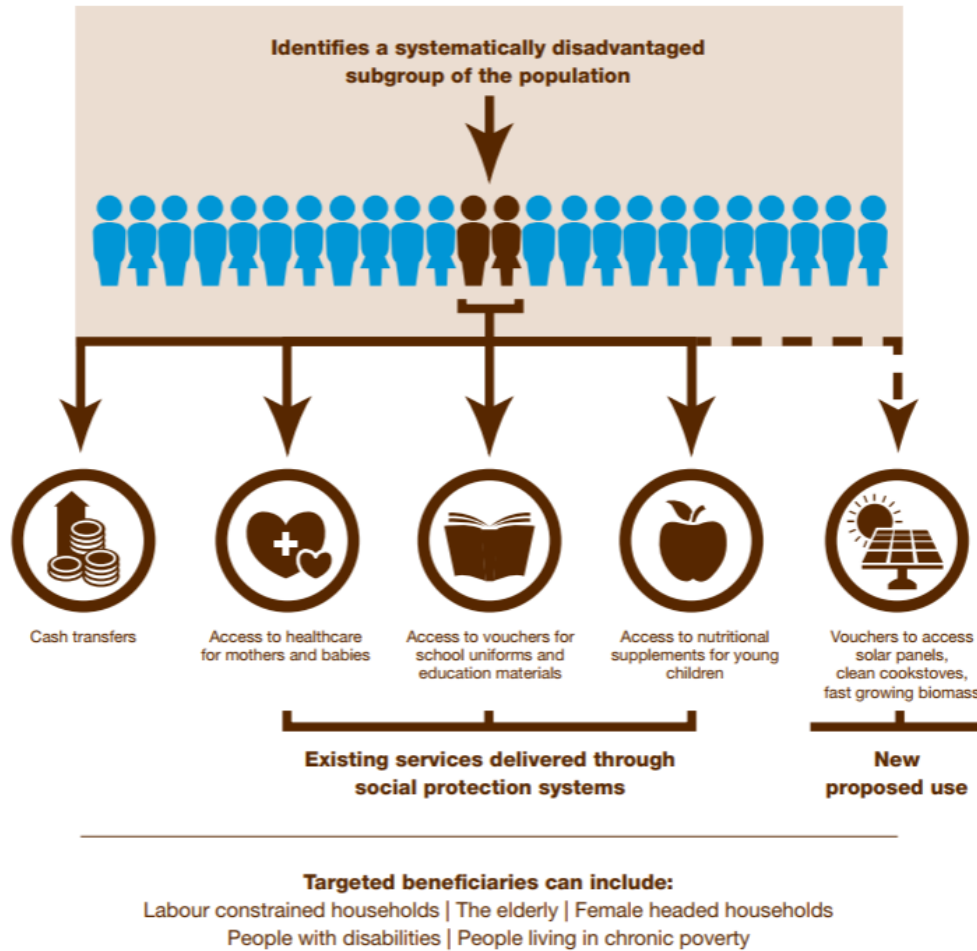
Social assistance programs can be found in 149 countries (World Bank, 2017). As of 2016, 27 percent of the world's population have access to comprehensive social protection systems. Although the number of social safety net programs has increased over the past decade, they do not reach most of the poor, with only 20 percent of the world's poor covered by social safety nets (World Bank, 2017). A review by the Overseas Development Institute (ODI) and the Catholic Agency for Overseas Development (CAFOD) found that the gap in coverage is particularly acute in Sub-Saharan Africa and South Asia and that the size of safety net transfers is relatively small. In low-income countries, the average value of cash benefits is equivalent to only 10 percent of the consumption expenditure of poor households, 21 percent in lower-middle-income countries and 37 percent in upper-middle-income countries (World Bank, 2015).

Recognizing the urgent need for all African member states and social partners to start implementing a social protection floor, 47 African member states signed the Yaounde Tripartite Declaration on the implementation of the Social Protection Floor in 2010 (ILO, 2010) and the Addis Ababa Declaration on Social Protection for Inclusive Development in April 2015.⁷ Social protection systems have increased in Africa over the past decade, however, they generally don't address energy access (World Bank, 2017).

⁶ For example, PEG Ghana Ltd is adding hospital insurance to solar home system sales in Ghana to ensure that 'your lights don't go off because you are ill'.

⁷ <http://includeplatform.net/wp-content/uploads/2016/02/Social-protection-thematic-review.pdf>

Figure 3.1 A possible approach to providing access to energy services through social protection systems



Source: Mary Robinson Foundation – Climate Justice:
<https://www.mrfcj.org/wp-content/uploads/2016/09/The-Role-of-Social-Protection-in-Ending-Energy-Poverty.pdf>

3.2 EXPANDING SOCIAL PROTECTION SYSTEMS TO ENABLE ENERGY ACCESS

There is the potential to adapt and expand social protection systems to support access to sustainable energy for poor households, and indeed this has been done in varying forms across the world (Box 3.1). Energy-related or energy-specific social safety nets can be delivered in several ways to provide energy services to those who lack access to affordable, reliable, sustainable and modern energy services. While subsidies are an option, general subsidies for energy often have serious shortcomings: they encourage the use of fossil fuels; act as a disincentive for energy efficiency; use up scarce public funds; can affect the financial viability of energy service providers; and are regressive – they do not always benefit poor and vulnerable groups (Box 3.2).⁸

Box 3.1 Free LPG Connections Targeting Women from Low-Income Households in India

Pradhan Mantri Ujjwala Yojana (PMUY) is a scheme that aims to provide 50 million free LPG connections to women from low-income households by 2019 and safeguard the health of women and children. Launched on May 1, 2016, the scheme has a budget of Rs 8 billion (about \$1.1 billion) for three years. Within a year, the government had distributed more than 22 million LPG connections, exceeding the target of 15 million.⁹ The scheme is currently operational in 487 districts in 17 states (Gol, 25 July 2016).

Under PMUY, the connections are issued in the name of women in the households. 50 million LPG connections will be given to low-income households, identified through Socio-Economic Caste Census Data over a period of three years. The cost of a new connection, including security deposit (cylinder and pressure regulator), the cost of Suraksha Hose pipe, DGCC book, installation and administrative charges on a one-time basis, are borne by the Government under PMUY. The stove must be purchased by the user, but a loan can be made available, which is adjusted against the gas

Energy safety nets can however take the form of targeted consumer subsidies for decentralized energy services which are directed to the poor and vulnerable, and can be distinguished from general energy subsidies which support energy consumption by the whole population, such as fossil fuel subsidies. By targeting those most in need with appropriate, off-grid energy solutions, affordability issues and energy distribution challenges have the potential to be overcome.

The World Bank's annual State of Social Safety Nets report identifies four categories of social safety net which could, in principle, apply to targeted support for energy access or energy consumption by the poorest social groups (World Bank, 2015). These are:

- **Conditional cash transfers:** periodic monetary benefits to poor households that require beneficiaries to comply with specific behavioral requirements to encourage investments in human capital (such as school attendance, immunizations, and health check-ups).
- **Unconditional cash transfers:** provide cash without particular co-responsibilities for beneficiaries; they may spend the cash as they wish.
- **Unconditional in-kind transfers:** allow the distribution of food or other in-kind transfers without any form of conditionality or co-responsibility

⁸ Globally, the IEA estimates that governments spent US\$493 billion on fossil fuel subsidies in 2014, against \$135 billion in renewable energy subsidies. A 2010 IMF study of 20 countries showed that the top 20 percent of households by income captured 43 percent of the subsidies, compared to 7 percent in the bottom quintile.

- **Fee waivers:** assist households in meeting the cost for a defined class of services, particularly related to education, health, and housing. Waivers can apply to either partial or discounted fees, as well as to other charges or expenditures.

Box 3.2 General Energy Subsidies

The ODI and CAFOD literature review identified a broad range of measures that could be described as energy safety nets. Energy safety net mechanisms take many forms. Komives et al. (2005) list 13 categories of electricity tariff subsidy for grid-connected customers, and a further six measures to support connections to the grid. Their analysis of 13 utilities identified 45 separate subsidies. Subsidy measures range from general price subsidies to highly targeted measures providing tailored assistance to specific populations. Between these two extremes are many types of support, differentiated by several factors including the type of transfer, the duration of use, and the way they target the poor. Several studies examining untargeted consumer subsidies for energy, that are often highly regressive and place a large burden on government budgets. They are therefore poor mechanisms for poverty reduction.

Energy safety nets transfer resources to target populations as cash or in-kind transfers. Transfers may be conditional or unconditional (e.g., on a specific change in behavior, such as the use of a technology). Most energy safety nets are monetary in nature, and involve either reducing the price of energy directly, or making it easier for recipients to afford the market price. For example, consumers in Ukraine can spread their utility payments for periods of high energy consumption over a longer period at zero interest (Kojima, M., 2016). In Peru, consumers may be offered a voucher for discounted Liquefied Petroleum Gas (LPG), while in India, the upfront cost of obtaining a connection is minimized through a subsidy paid into a woman's bank account, combined with a loan (if the user wants) to acquire the LPG gas stove, which is adjusted against the refills of the LPG cylinder.

Cash remains the predominant form of payment for energy services, exacerbating existing challenges for energy consumers in rural and low-income areas due to "last-mile" energy distribution issues, such as small and irregular incomes, limited access to formal finance, and low population densities. Rapid technological development of energy systems and the digitalization of services both provides an opportunity to consider digitalization of social protection systems to achieve more precise targeting around clean energy subsidies that benefit poor and vulnerable groups. It may also enable the bundling of services through biometric identification to unlock access to health and education, as well as mobile money payments enabling energy access.

Digitization of energy subsidies can enable more accurate targeting towards intended recipients and monitoring to ensure intended recipients receive their payments on time and in full. Enabling subsidies to be paid directly into citizens' accounts will provide greater efficiency and transparency. As each transaction is recorded in detail fraud and leakage are much easier to detect and harder to commit, and therefore deliver cost savings to governments (Radcliffe, D., 2016). Shifting LPG subsidies to bank accounts in India cut transfer leakages by 24 percent, while providing access to cleaner cooking fuel (Box 3.3) (The Indian Express, 2015).

Box 3.3 Reforming LPG Subsidies in India

India had a long-standing dual market in LPG canisters. Residential households were able to purchase a single canister at a subsidized price, while commercial entities were expected to pay in full. This created enormous incentives for fraud. In 2013 the Indian government decided to digitize the transfer and link it to the recipient's biometric identification, using the Aadhar National Identification System.

Within a year the government was able to shift millions of households receiving the subsidy on to digital payments. Transfer leakages fell 24 percent, mostly due to the elimination of ghost recipients, which could save the government as much as \$2 billion annually going forward. The LPG direct benefit transfers became the largest financial inclusion initiative in history: The program saw over 200 million accounts created in just under a year. Providing access to modern energy for cooking is expected to reduce final residential energy use by 2030 by between 31 and 46 per cent. This is because LPG stoves are approximately four times more efficient than biomass stoves, and therefore require less input energy.

Research also suggests that digital payments can drive financial inclusion and create new economic opportunities particularly for women by driving cost savings and efficiencies (UNCDF, 2017). Suri and Jack (2016) estimate that access to the Kenyan mobile money system M-PESA increased per capita consumption levels and lifted 194,000 households, or two percent of Kenyan households, out of poverty, with the impacts found to be more pronounced for female-headed households. This impact was driven by changes in financial behavior—in particular, increased financial resilience and saving—and labor market outcomes, especially for women, who moved out of agriculture and into business. They conclude that mobile money increased the efficiency of the allocation of consumption over time while allowing a more efficient allocation of labor, resulting in greater poverty reduction in Kenya. The pathway out of poverty therefore, may not necessarily be solely more capital, but rather financial inclusion for women and the most vulnerable at a more basic level, which enhances their ability to manage those financial resources that are already accessible (Suri and Jack, 2016).

3.3 WHAT IS NOT KNOWN ABOUT SOCIAL SAFETY MECHANISMS FOR ENERGY ACCESS

While social protection systems have been suggested to enable energy access, little research has been done to determine the effectiveness of social assistance to provide access to modern energy services (ODI and CAFOD), or the ability to bundle services through the digitalization of social protection systems. ODI and CAFOD found that discussion and analysis of social protection systems, or social safety nets, usually excludes or omits energy-related measures. Research on the effects of changes in energy subsidies, which might be accompanied by mitigating social assistance measures, has concentrated on ex-ante modelling around energy subsidy reform, with little empirical evidence about the actual effects of safety nets on poverty reduction, energy consumption or access to modern energy services. Much of the available evidence is found in transition countries of the former Soviet Union, whose experience may not be relevant to many developing countries. They find that while fossil fuel subsidies and electricity tariffs are analyzed

in the literature, measures that enable access to decentralized electricity and modern biomass cook stoves are not.

It is also important to understand the level and type of public and donor subsidies for energy compared to those that are specifically targeted at the poorest. For example, research by IIED shows that 40 percent (\$5.6 billion) of allocated international public climate finance was directed to energy projects between 2006 and 2015. Yet only 3.5 percent of the total amount (\$475 million) reached decentralized energy projects and 0.06 percent (\$8.4 million) reached clean cooking (Rai, N., et al, 2016). Moreover, recent SEforALL research finds that over 2013-14, the amount of public and private finance committed to decentralized solutions in 20 countries with the largest energy access gaps was one percent of total commitments (\$200 million) (SEforALL, 2017). Looking at in-country spending, the figures are also stark. IIED found in Tanzania that only 2 percent of total government spending on energy was allocated to decentralized projects between 2009-16 and 11 percent of total allocated donor energy spending for the period 2008-21 (Kaijage, E., 2017). This indicates the need to better track where and how public funds are allocated, so that social protection measures and other efforts targeted at the poorest do not end up being tokenistic when compared to public spending on energy through more generalized subsidies.

ODI and CAFOD note that while there are some commonalities between energy safety net experiences across different countries, the breadth of differences between countries' levels of economic and social development and energy systems means that there are often too many variables to make any concrete recommendations on the most appropriate design for an energy safety net in a specific context. There is a lack of rigorous impact analysis of how energy safety nets, or social assistance measures used to enable access to energy, have actually affected the poor. This also appears to be the case when considering the digitalization of government services.

3.4 BARRIERS TO PROVIDING ACCESS THROUGH SOCIAL PROTECTION SYSTEMS

While the evidence base is limited, Scott and Picker (2016) find in their draft literature review that the experience of energy safety nets points to a number of barriers that may prevent them from fully realizing universal access to affordable, reliable, sustainable and modern energy services. These include:

- **Exclusion of large portions of the poor can be inherent to the design of energy safety nets**, given that general energy price subsidies are regressive. Similarly, energy safety nets for grid-connected sources of energy do not improve the lives of those who remain unconnected to the grid.
- **The quantity of energy consumed is not necessarily correlated with income or vulnerability.** Energy safety nets which use consumption volume or quantity to target recipients (e.g., increasing block tariffs (IBTs), volume-differentiated tariffs (VDTs) and rationing programs) risk significant exclusion errors if the threshold is set too high, or significant inclusion errors if the threshold is set too low. In Honduras, for example, the introduction of a VDT subsidy failed to reach half of all poor households and had no noticeable impact on the poverty rate (Komives, K., 2005).
- **Categorical targeting only works well if the category is well correlated with poor households.** If categories are the sole targeting mechanism they are likely to suffer from either inclusion or exclusion errors, since there is no 'poor' category without means testing. Targeting of individuals also tends to suffer from high inclusion errors, though these may be reduced when recipients need to qualify for several categories or when categorical testing is combined with another targeting mechanism (Ruggeri Laderchi, C., et al, 2013).
- **Cash transfers are not a panacea.** Discussing cash transfers, Ruggeri Laderchi et al. (2013) conclude that non-earmarked transfers 'are often found to have inadequate coverage among the poorest groups', while earmarked transfers 'are generally accurate in directing benefits to the poor, but the coverage of the poor is highly uncertain and, in most countries, low'. Komives et al. (2005) noted that vulnerable households may choose to use unconditional cash transfers for other expenditure, especially when they are able to use a lower-cost or lower quality substitute for what the energy safety

net was intended to cover. In the Dominican Republic, for example, the reform of electricity tariffs in the electricity sector has been hampered by a large proportion of consumers consuming electricity from unregulated sources (Vagliasindi, M., 2013).

- **Means testing is usually more accurate, but more exclusive, and often not automatic.** Several studies have shown that transitioning from universal to categorical, proxy and fully means-tested targeting, increases the portion of the total subsidy going to poor households. However, the program often covers fewer poor households, as they can be excluded alongside non-poor ones. Moreover, even where households are eligible for energy safety nets, receipts of the support often depend on a successful application.⁹ This in turn requires that the applicants are aware of the energy safety net, can afford the cost of applying (e.g., travel to the application center), agree to any associated conditionality, and can overcome non-financial barriers to applying.
- **Relying on ineffective energy safety nets can shift the poor deeper into (energy) poverty.** Particularly where energy safety nets are implemented in an attempt to cushion the impact of energy price reforms, evidence suggests that the overall process can reduce access to energy for the poorest. The coping mechanisms households use when faced with inadequate compensation to deal with increases in fuel prices vary between substitution for lower quality fuels or restricting their total energy use. For instance, in Armenia an increase in electricity tariffs led to 60 percent of the poor choosing to increase their consumption of wood (Vagliasindi, M., 2013), as also occurred in Ghana when LPG prices were increased (Whitely and Van der Berg, 2015).
- **Social safety nets are time-consuming and costly to develop, and lacking in many countries.** The World Bank (2015) social safety net survey noted that while an average developing country has 20 social safety measures in place, of all the countries surveyed only 21 had fully operational beneficiary registries. Another 26 countries are building such registries, which could be used for energy safety nets, but experience shows that the construction of the targeting system consumes considerable government resources, and typically takes years to build, and many more years to refine.¹⁰ However, new schemes can learn from the experience of capacity building experience and implementing new technologies elsewhere.¹¹

3.5 WAY FORWARD | EXPANDING ACCESS TO ENERGY THROUGH SOCIAL SAFETY NETS

3.5.1 IMMEDIATE NEXT STEPS

Partners of the People-Centered Accelerator aim to¹²:

- Interrogate the World Bank’s Multi-Tier Framework energy access surveys in 15 countries in Africa and Asia with large access gaps to better understand what the data says about the gender and social dimensions of last mile access to electricity and clean cooking.¹³
 - SEforALL will work with the World Bank, CAFOD and ODI to detail the scope of work to explore the evidence base on the social dimensions of last mile energy access.
 - As needed, the People-Centered Accelerator will propose a way to strengthen this through additional research or other data collection efforts.

⁹ In Albania, the award of the benefit is at the discretion of local officials. The absence of transparency was considered to be a major factor preventing more people signing up (Ruggeri Laderchi et al., 2013).

¹⁰ The Georgian Housing and Water Assistance Program was modified annually for its first six years of implementation before being replaced by another targeting scheme in 2012 (Komives et al., 2005; Ruggeri Laderchi et al., 2013). Mexico’s Prospera program is the third version (with Oportunidades and Progresá before it), Chile’s Ficha CAS has been running, and improving, for over two decades, and Brasil’s Bolsa Família was formed from the consolidation of a number of other programs.

¹¹ An example of a currently developing scheme is the three-year plan to develop a social safety net in Mali as part of a joint government and World Bank project (De Broek and Kpodar, 2013).

¹² This work program will be subject to raising the necessary resources to enable partners to undertake the work.

¹³ These surveys will be released in 2018.

- Work with CAFOD and ODI to expand the evidence base around the effectiveness and challenges of using social assistance measures to enable energy access to inform policies and programs for SDG 7.
 - In the first instance, CAFOD and ODI plan to do up to two country case studies ahead of outreach at the SEforALL Forum on May 2-3, 2018.
 - There is the potential to expand this to six country case-studies to ensure a more representative sample upon which to make policy recommendations.

3.5.2 LONGER TERM

Following the development of the evidence base outlined above, the People-Centered Accelerator aims to draw on its findings to explore the experience with innovative and effective social safety net bundles that would enable access to energy, social protection services and a regular cash payment for the most vulnerable and hardest to reach people. It will explore the possibility of providing this as a “digital one-stop shop”, where the population had access to the appropriate technology. This research will consider existing social protection systems as well as inclusive energy planning approaches that could help identify and target services towards the needs and contexts of target beneficiaries and which could be augmented to include energy services. For example, CAFOD and IIED have developed the Energy Delivery Model (EDM) toolkit which is a participatory approach to planning energy services that focuses on maximizing impacts for the poor. It is based on a 6-step problem solving approach which builds local understanding across a combination of the technology, finance, management activities, policy support, legal arrangements and relationship types required to supply energy for user-defined development outcomes. There is a focus on understanding local socio-cultural aspects and the enabling environment to foster buy-in and improve chances of long-term sustainability (Garside, B., and Wykes, S., 2017).

The Accelerator also intends to explore the experience with digitization of direct benefit transfers as a way of achieving more precise targeting around clean energy subsidies and investigate other subsidized measures or end-user finance options to deliver sustainable energy services to last mile consumers. This could include for example, enabling family credits to be delivered electronically, with the option to be converted to subsidized devices and clean cooking solutions. Solutions may also include encouraging the deployment of micro-grids for community services and productive uses for slums and rural communities.

Linking social protection systems and energy access will require ministries working on social protection, energy, environment and development to collaborate with stakeholders across the public sector, private sector, civil society and local communities in the design and implementation of policies and program to ensure that social protection systems are designed specifically for individual country contexts. This includes the people living without access to energy, local and national governments, civil society, international organizations, bilateral donors, private investors, the corporate sector, microfinance institutions, research institutions and social entrepreneurs, including technology developers.

The Accelerator could convene these stakeholders in the development of the research and subsequent exploration of nationally appropriate social safety net bundles that include energy services, and where appropriate, enable energy and broader social services to be linked through a digital identification, for example by bundling a LPG connection with access to health services through biometric identification.

Drawing on this expanded evidence base, partners of the Accelerator would aim to work with experts and governments structuring policy, planning and regulations so that “social safety net packages” are integrated in the design of energy services; explore and share the experience in bundling social protection and energy services; and examine how to best support household, community, and productive uses for income generation.

4 SCALING ENTERPRISES | EMPOWERING WOMEN THROUGH ACCESS TO AND PARTICIPATION IN THE ENERGY VALUE CHAIN

Over the past decade, engaging women in the promotion, sales, servicing and financing of household energy services has proven to be a bridging answer to the twin challenges of providing energy services to unreached populations and advancing gender equality, social inclusion and women's empowerment.¹⁴ There are a growing number of organizations rolling out initiatives to support women entrepreneurs and a women-centric sales force, recognizing that women are especially effective in rural, hard to reach areas and can be partners and agents of change to impact scale of distribution and household behaviour change at grassroot levels. They are part of different social networks than men and tend to have access to hard-to-reach households who may want to buy household energy devices (GACC, 2014). However, more needs to be done to scale these approaches and achieve universal access to modern energy services by 2030.

Nearly one-fifth of the global population is without access to any form of electricity, 84 percent of them in rural areas, and a larger proportion rely on solid fuels as a cooking fuel. Women's energy entrepreneurship thus represents a huge economic growth potential. Even though 80 percent of this population have incomes of less than \$3 per day, together they spend \$37 billion per year on meeting basic energy needs (World Economic Forum, 2013). Some recent initiatives to advance energy access, social inclusion and women's empowerment include:

- Energia, the international network on gender and sustainable energy, has been supporting 4000 micro and small women's energy entrepreneurs in seven countries. Energia works with partners including Solar Sister working with over 1800 women entrepreneurs who have brought solar lighting, mobile connectivity, and clean cooking solutions to 804,000 people across Nigeria, Tanzania and Uganda; Practical Action East Africa in partnership with Sustainable Community Development Services (SCODE) working with 811 women entrepreneurs and reached energy products 317,352 poor people in Kenya; Kopernik works with 400 women entrepreneurs and has reached more than 200,000 people in Indonesia, Energy4Impact is working with 145 women enterprises and has reached 31,500 people in Senegal; and, CRT Nepal, reached 137,805 people through 797 women entrepreneurs.
- Grameen Shakti project in Bangladesh, which has trained over 30,000 women to install and maintain over 1 million solar home systems (Power for All, 2017).
- The US State Department's wPOWER programme has trained 5,542 youth and women in clean energy technologies resulting in over 2 million people having improved access to clean energy.¹⁵
- The Women's Empowerment Fund of the Global Alliance for Clean Cookstoves, a grant facility, is designed to scale up effective business models and approaches for empowering women energy entrepreneurs in the clean cooking sector.
- Swayam Shikshan Prayog, supported under USAID's wPower project (from 2013-16)¹⁶ supports 1010 women entrepreneurs who propagate clean energy and green practices in sustainable agriculture.
- 'Solar Mamas,' illiterate mothers who have been trained as solar engineers by India's Barefoot College, have installed over 45,000 solar home systems in 1,083 villages in 63 countries (Power for All, 2017).

4.1 WHY FOCUS ON ENGAGING WOMEN IN THE ENERGY VALUE CHAIN?

Based on existing initiatives and business models that seek to empower women through access to energy enterprises, the following benefits and opportunities have been demonstrated (Box 4.1):

- **Women's existing businesses offer great potential for growth of the energy sector.** Women's businesses and enterprises, especially through the informal sector, are already contributing significantly to the economy (Schneider Electric, 2017). Small and Medium Enterprises (SMEs) with full

¹⁴ IFC Lighting Africa 2011, Kohlin et al, 2011; Smith and Dutta 2011; Dutta, 2005, cited in GACC 2015a.

¹⁵ <http://wpowerhub.org/who-we-are/#impact>.

¹⁶ <http://www.sspindia.org/wp-content/uploads/2017/09/SSP-Annual-Report-2016-17.pdf>.

or partial female ownership represent 31 to 38 percent (8 to 10 million) of formal SMEs in emerging markets (IFC, 2013). These provide a ready springboard for selling energy products and services.

- **Women are better able to reach other women in their community to explain the benefits of clean energy.** Evidence from the Global Alliance for Clean Cookstoves finds that women have unique societal and cultural understanding, can reach new consumer segments, have access to markets and networks beyond the reach of the market and can better communicate the benefits of cleaner cooking to other women. A survey in Kenya shows that women-led sales of improved cookstoves offers additional benefits for adoption and customer satisfaction (GACC, 2015): women outsold men by a margin of nearly 3:1, and when women sold to other women, consumers reported greater satisfaction with the cookstove, better knowledge of cookstove benefits, and more regular use.
- **Women are central to purchase and spending decisions in their households.** Women hold significant sway in household decisions related to the purchase of energy technologies, and more in cooking technologies (IFC Lighting Africa, 2011). They make or influence 80 percent of buying decisions and control \$20 trillion in global spending (ICRW, 2014). Recognizing their role as consumers is important to grow the market.
- **Women entrepreneurs as social leaders.** As women entrepreneurs grow, they are seen to take up leadership roles in their communities. Women as leaders for a change, can help transform social norms and culture while helping amplify the voice of the women in new and existing political spaces.

4.2 BARRIERS TO SCALING WOMEN ENERGY ENTERPRISES FOR THE LAST MILE

While women offer great potential as energy entrepreneurs, they face multiple barriers to growth including:

- Limited business skills and lower levels of education.
- Limited access to market data, actors and intermediaries.
- Difficult access to finance, often due to non-financial barriers, including the legal and regulatory environment; differentials in education among women; and constraints within financial institutions (little familiarity with and cultural barriers preventing interest in female clients).
- Discriminatory cultural and gender norms, restricted mobility and higher demands on their time that can inhibit them and limit opportunities to growth.

There are several initiatives that are working to address these barriers and increase women's empowerment through entrepreneurial opportunities, including Energia's Women's Economic Empowerment programme and Solar Sister. These approaches combine the best of an enterprise development model with a women's empowerment approach, offering tailor-made support to women entrepreneurs in market assessments, technology and business skills training, sustained career mentorship, and distribution network management, which help to overcome the above barriers.

Box 4.1 The Gains of Energy Entrepreneurship for Women

Entrepreneurial options in clean energy provide women much needed income. Women represent most of world's poor people, and stand to gain tremendously from new income opportunities. In Sub-Saharan Africa, the labour force participation of women is at least 10 percent lower than that of men, and women are concentrated in a few elementary occupations, including informal employment, with big pay differentials between women and men. Every year, sizable GDP per capita losses occur due to the underutilization of women. If women fulfilled the same economic potential as men, the global GDP would experience an increase of \$12 trillion by 2025.^a In Tanzania, 60 percent of women live in poverty, women's incomes are half that of men, and women are two times more likely to be uneducated, especially in rural areas.^b

When a woman earns an income, it multiplies. Studies show that women reinvest 90 percent of their income in their families and communities, while men reinvest only 30 to 40 percent; thus, the implications for economically empowering women can reach far beyond the individual.^c Women are more likely than men to invest a large proportion of their household income in the education of their children, including that of girls.^d According to the ILO, women's work, paid and unpaid, may be the single most important poverty-reducing factor in developing economies.

4.3 STRATEGIES TO ADDRESS BARRIERS AND ENABLE WOMEN TO ENGAGE IN THE ENERGY VALUE CHAIN

Based on a review of existing initiatives, several factors must be considered when designing business models to provide women with opportunities to engage in the energy value chain and access to energy.

Ensure a comprehensive and sustained support package for entrepreneurs

The entrepreneurship development process entails a careful identification of the barriers women face in starting a business and then, systematically addressing them (Box 4.2). Women entrepreneurs need to be trained in technical, managerial, leadership, and empowerment aspects of energy businesses. A critical element of women's entrepreneurship development is continued hand holding from mentors who need to support the entrepreneurs on a continuous basis to identify new market opportunities, develop marketing strategies, identify and transact with suppliers, interact with local government authorities, prepare business plans, approach and negotiate with financial institutions. The mentors take the support package right to the entrepreneur's place of work, work around their domestic chores, and demystify 'business'. An important emerging area is the use of information and communication technologies, including advice on using mobile phones as a business tool, to improve operational management, customer relationship management or resource planning.

Partner with the private sector

The private sector is not yet investing in the energy access market at scale in last-mile communities. Barriers include lack of information about market opportunity, fragmented and unattractive markets, small demands, lack of consumer debt finance, coupled with high up-front investment and prohibitive transaction costs, and high expectations for short-term returns (World Economic Forum, 2013). Working with women entrepreneurs, who operate through extremely local and often informal networks, can address many of these barriers, and help the private sector expand to previously untapped energy markets.

Box 4.2 The Wonder Women of Indonesia

In Indonesia, Kopernik Solutions^a, supported under Energia's WE programme, trains its Wonder Women in technology use and maintenance, sales and marketing, book-keeping, public speaking, and agency and empowerment. Training sessions equip them with the skills and confidence to succeed. They are kitted out with marketing materials and an inventory of technology, and are trained to conduct Tech Fairs and regular promotional events to demonstrate and raise awareness of the clean technologies to their potential customers. The women earn a margin on every technology item sold. Ongoing mentoring helps them to develop new skills and grow their businesses. Kopernik, through its Wonder Women program reached 235,799 people with new technologies, having recruited 403 female and 83 male energy entrepreneurs.

The 4 year (2014-17) "Low Smoke Project" being implemented by Practical Action in Darfur, Sudan, has been working with a 50,000 member strong Women Development Associations Networks (WDAN), in urban and rural North Darfur state, to reach LPG to through the Nile Petroleum Company (LPG distributors), and other government departments. Private sector companies provide loans to women groups for purchasing up to 500 cylinders; and through the women's networks' feedback loops, the companies can respond to specific needs of the customers through manufacturing suitable and affordable stoves and smaller LPG cylinders. The LPG and stoves are provided by the project as seed money and on a full cost recovery basis, contribute to a revolving fund. Repayments are collected in instalments during 9–12 months. This arrangement enables poor communities to circumvent the major constraint of high initial cost. The latest assessment showed that the total repayment rate of the beneficiary is about 85 percent (Practical Action, 2017).

The real value of the initiative is that through the complementary work between CSOs and one private sector company, it has successfully created a new and affordable LPG market, serving women and very poor people in Sudan. For the LPG private sector, engaging women and their unserved communities has helped scale its market and geographical expansion. For the women, it is a new, sustainable source of livelihood and for the 72,228 people of El Fashir town, where 87 percent of the town's population is displaced, the project makes available a clean energy service that reaches 32 percent of the poorest and displaced sections of the community. Additionally, the program has contributed to reduce local deforestation processes and tons of CO₂ emissions as each stove alone was accredited to reduce 4 tons of CO₂e per annum.

Form local partnerships

Local partners have specialized skills and local market and consumer knowledge. In Senegal, the Energy Opportunities for Women in Senegal (EOWS) project, implemented by Energy4Impact, works with women's energy businesses in the poor district of Tambacounda.

In its work with women's groups engaged in agriculture and agricultural processing Energy4Impact provides business skills training and one-to-one mentorship to women in developing business plans and advice on improving energy use practices. At the same time, two specialist government agencies, the Small Local Irrigation Programme (PAPIL) and the National Agency for Rural Agriculture (ANCAR), train women on farming techniques, irrigation and product transformation.

To enable the women to have access to credit so that they can purchase energy technologies for their businesses, Energy4Impact has brought together the French Financial Institute PAMIGA and a local Microfinance Institute, Caurie MF, to establish a credit programme. PAMIGA provides concessionary finance to Caurie MF, which in turn provides solar equipment (including solar fridges and solar pumps) on a leasehold basis to women at an interest rate of 15 percent, which they pay off within 24–30 months. This fund is guaranteed through a Loan Guarantee Fund that has been set up within the EOWS program.

The partnerships ensure that the multiple needs of the women entrepreneurs are met: credit on convenient terms is made available; ANCAR, PAPIL and Energy4Impact together ensure that the credit is well utilised, and that the productivity and profit margins of the businesses grow. Finally, through partnerships, the project ensures that the energy interventions help reduce poverty for the local community.

A further example is IFC's Lighting Asia partnered with solar distributors in India, such as Frontier Markets, to develop a network of women entrepreneurs known as Solar Sahelis. This network helped to overcome the cost and awareness challenges of selling in last-mile markets and as a result, the partnership was able to increase sales by 30 percent, opening up the market for solar lighting products. The network is made up of a group of self-employed women recruited from self-help groups. These women-run alliances provide access to funds and technical assistance to help women in local villages improve their lives and start their own businesses. Based on initial results, Frontier Markets plans to expand the Solar Sahelis network from 250 women to 20,000 between 2016 and 2020.

Aggregate services

One of the recurrent bottlenecks in working in remote areas, and especially when working with women entrepreneurs who typically have small sized transactions, is that their operations are too small and scattered, leading to high transaction costs. This is often an unviable proposition for private sector engagement. Aggregating projects is a possible solution. SEWA, the Self-Employed Women's Organisation in India is a member-based organization of poor self-employed women workers with a membership of 1.7 million women workers in 14 states of India, 1.1 million of whom live in villages (SEWA, undated). SEWA's Hariyali Initiative, or the Green livelihood campaign, provides clean, green and affordable energy access to its rural members to make their livelihoods sustainable. It is implemented through a not-for-profit company, specially set up for this purpose, the Grassroot Trading Network for Women (GTNfW).

The Hariyali initiative works on clean lighting, clean cooking, solar pump-sets and access to start-up capital, eventually leading to green livelihoods ultimately manifested as full employment and self-reliance for SEWA members. GTNfW acts as a single portal between the SEWA women members and external partners including the technology providers like SunEdison, D-Light and financial institutions that provide loans and/ or grants like ICICI Bank, Yes Bank, and various government agencies. GTNfW acts as a consolidator for SEWA, riding on the existing system, collecting user requirements, product feedback and suggestions from its member women and providing them to state federations at village, district and state levels. For external partners, GTNfW acts as an aggregator facilitating financial services, loans, and training from state federations to end users.

Ensure appropriate and affordable financing for women entrepreneurs

The single most important bottleneck for women-owned businesses is limited access to finance. In Kenya, 48 percent of business owners are women, yet they draw only seven percent of the formal credit. In Sub-Saharan Africa, only six percent of adult women borrow from formal financial institutions (Innovation Fund for Poverty, 2017). Compared to men, women are less likely than men to have a bank account or enough collateral, and significantly lag men in saving and borrowing through formal financial institutions. Underdeveloped domestic financial sectors, particularly the lack of rural bank branches, affect women due to their lower levels of mobility.

Several innovative strategies have been employed to address this issue, including:

- Direct credit through technology suppliers:** In Senegal, Energy4Impact has set up a financing mechanism that enables technology suppliers to sell energy technologies to women entrepreneurs on credit. Energy4Impact guarantees the value of those products through a Loan Guarantee Fund set up for this purpose. The suppliers make energy products available for women who must provide 25 percent of the cost of the product upfront and repay the remaining 75 percent over a period of 90 days. The EOWS Project is working with three suppliers: TOTAL, through its AWANGO solar products initiative, to deploy certified Lighting Africa products in Africa; and two ICS manufacturers selected through a partnership developed with PERACOD (a GIZ-managed program).
- Building on Village Savings and Loan Associations (VSLAs):** In Kenya, Practical Action East Africa together with SCODE, builds on existing, thriving Village Savings and Loans groups. A VSLA is a group of persons (12 to 30) that pools individual contributions and extends micro loans among themselves at affordable interest rates and with no collateral requirements. The groups are registered with the Government. The Women Energy Entrepreneurs in Kenya (WEEK) project works on this existing model, first building the capacity of lending by VSLAs, and then advancing VSLAs a loan to boost the pool of finances for onward lending to members for energy businesses. A locally accredited public accounting and audit firm contracted by the WEEK project provides financial management services, undertaking due diligence on the VSLAs' capacity to absorb the loan from WEEK. They periodically review the WEEK project loan performance and audit accounts and project reporting.
- Engaging community based organisations for financing:** In Nepal, the Women-led Enterprises for Energy Access and Local Production project (WEE-Nepal) works with Community Rural Electrification Entities (CREEs). CREEs are community-embedded organisations that purchase electricity in bulk from the grid and retail it to their users within their command area. Working through CREEs enables WEE-Nepal to extend clean cookstoves in remote districts through women entrepreneurs. The CREEs operate as local hubs for the WEE interventions and, in several cases, have set up a Women's Entrepreneurship Development Fund (WEDF). This is used as a guarantee fund to enable local financing institutions to extend concessional loans to CREE-supported women entrepreneurs. The WEDF is also used for building the capacity of women entrepreneurs. As enterprises grow, they demand more electricity, and hence it is a win-win situation entrepreneurs and the CREEs, who can sell more electricity, making higher profits.

4.4 ACHIEVEMENTS FROM PROGRAMS SUPPORTING WOMEN'S ENGAGEMENT

Women entrepreneurs can get modern energy services to last mile communities. Women entrepreneurs and their networks thrive in under-served rural communities and areas that traditional energy development approaches have failed to reach. By acting as sales agents for private sector suppliers, they complement existing distribution channels, and help them tap new, distant markets. Within three years of its operation, by the end of June 2017, Energia's WE programme managed to reach energy services to 2.3 million people, mostly poor and in rural areas.

Solar Sister, in its work in Uganda and Tanzania, works through a network of over 1800 solar sister entrepreneurs who live in rural communities which are largely at the base of the market pyramid. A recent study by the Global Social Benefit Institute at Santa Clara University found that 97.8 percent of Solar Sister's customers in Tanzania were using kerosene before buying a solar product from a Solar Sister entrepreneur. Further, 91.6 percent of the customers that did purchase solar lights from Solar Sister no longer used kerosene. Children overwhelmingly use lanterns for reading or studying, with 88.3 percent of families reporting this use. 90.6 percent of parents in off-grid areas reported that their children's academic performance had improved since their households starting using solar lighting. In addition, 31.3 percent of participants said they use savings from kerosene for education (school fees and materials), 8.8 percent said they use it for farming inputs, and 7 percent for business investments.

Solar Sister's focus on last-mile distribution meets the unique energy needs of families living below the poverty line who cannot afford large home systems or a grid connection. The impact of these lights extends to small-scale businesses in communities as well. In Tanzania, 62 percent of customers reported using solar products to either start a new business or support an existing one. Solar Sister's 2016 annual impact report found that 31 percent of entrepreneurs reported using solar or clean cooking products to run a business alongside their Solar Sister activities; many customers and entrepreneurs reported that, because of gaining access to solar lights, they could keep their shops open later into the night, increasing their income.

Similarly, the wonder women of Kopernik Solutions in Indonesia, live and work largely in rural, un-electrified areas where the customers are poor and access to clean energy technologies is negligible. Even in electrified areas, people are increasingly relying on solar lighting, as the supply from the grid is erratic. A survey conducted in August 2017 showed that the expenditure on fuel as cooking energy (stove users) was reduced on average by 24 percent per month, and fuel for lighting was reduced by 32 percent, from the baseline level. All in all, this project resulted in \$1,933,343 in fuel savings by all customers of all distributed technologies from 2015 to 2017.

As women are economically empowered, household and community development multiplies. Working as energy entrepreneurs opens a range of new possibilities. Starting with almost nothing, or a small energy business, many women go on to become social leaders in their communities. They are role models for other women and showcase how women can run successful businesses, and negotiate and advocate for their interests. Women also demonstrate significant improvement in decision-making and agency, starting with taking responsibilities for their energy business and getting more and more involved in household decisions.

As women grow more confident and increase sales, they often engage other women and men on a commission basis, which helps them to reach distant markets and create a second layer of women's economic empowerment (Box 4.3). Most women play multiple roles as a mother, wife, teacher, entrepreneur, and a micro-social entrepreneur of clean energy technologies. The wonder women also inspire others through what they achieve; earning money to support their families, gaining new business skills, and gaining confidence in their ability to succeed as micro-social-entrepreneurs.

Box 4.3 Case Study

Maria Bernadette Amsikam, commonly known as Ibu Detty, has been involved in Kopernik's Wonder Woman programme. Alongside raising four children with her husband and working as a teacher, Ibu Detty has been selling energy technologies to community members in Kefamenanu over the past year. She wants to expand her business and distribute clean energy technologies to the most remote parts of her area.

Ibu Detty today is a strong, confident and successful clean energy technology business person within her community. Ibu Detty regularly talks about this subject to the parents of her students and other teachers at the two schools where she works as a teacher. She has been raising awareness of the benefits of the technologies she sells and their positive impact on the environment. Among other things, she points out that solar lights give children a better chance to excel in school, since they can study after sunset. In addition, the water filters she sells decrease the likelihood that children miss school because of water-borne bacteria.



Photo credit: Kopernik

4.5 PROPOSED WAY FORWARD

The women's energy entrepreneurship model offers the twin advantages of effectively delivering energy services to last mile communities and driving women's empowerment and poverty reduction. To scale this model, there is a need to:

- Urgently focus attention on communities that are outside the ambit of modern energy services. Use proven, non-traditional and more holistic approaches to energy access that embrace social development, poverty reduction and complementarity work with different stakeholders.
- Elevate efforts within government to promote women-centric business models to expand energy access at the last mile while leveraging the work of women's networks, women entrepreneurs, and civil society organizations delivering energy services, poverty reduction and gender equality.
- Support formal and informal financing frameworks to better reach women and ensure that effective tracking of gender-disaggregated data is part of day-to-day operations. This could include market surveys, consumer outreach, and program monitoring and evaluation.
- Build the capacity of organizations delivering last mile business models—e.g., developing technical, business and leadership skills, and advocacy capability—and focus on elevating women as leaders at all levels.
- Engage manufacturers, suppliers and distributors to encourage their partnership with women's formal and informal networks as distributors/resellers.
- Include targeted strategies in the approaches of financial institutions to reach the women's market through targeted products and services, and possibly financial and management skills training.

4.5.1 IMMEDIATE NEXT STEPS

Partners of the People-Centered Accelerator aim to¹⁷:

- Work with the World Bank and the ACCESS network (CAFOD, ODI, WRI and Oxfam) to propose a framework of gender-responsive and socially inclusive indicators to inform the delivery of SDG 7.

4.5.2 LONGER TERM

The People-Centered Accelerator could facilitate the development and scaling of opportunities for women's participation in the clean energy and/ or cooking sectors as service users, entrepreneurs, engineers, designers, business women by:

- Advocating for strategies that enable the inclusion of women at every stage of the design, implementation, delivery and monitoring of energy services so those services respond to the needs of women.
- Advocate for governments to build women's entrepreneurship and business development needs into policies and regulations and facilitating women's access to best practice models and experience.
- Encourage the development of innovative business models and business value propositions that help low-income women play an active role in energy service delivery and maintenance across the value chain.
- Amplify the work of organizations with successful approaches to business development, training and networks to raise awareness and help their interventions go to scale.

¹⁷ Subject to raising the necessary resources to enable partners to undertake the work



- Engage financiers to highlight opportunities, and develop innovative and appropriate financing solutions, that can help open new opportunities, and accelerate and scale successful business models that support women entrepreneurs (e.g., through social safety net packages).

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