



The Voice of the **Off-Grid Solar Energy** Industry

LEVERAGING ENERGY ACCESS AND OFF-GRID TECHNOLOGIES TO REALIZE NATIONAL SOCIAL AND ECONOMIC DEVELOPMENT PRIORITIES

Powering Agriculture, Enterprise, and Public Services

POLICY BRIEF



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ABOUT THIS POLICY BRIEF

Access to a reliable and quality energy supply is vital to the economic development of any country. By unlocking access to electricity and electricity services, off-grid solar technologies are a critical enabler of several development impacts, particularly for rural and often poor off-grid communities including those linked to agriculture, enterprise, health, education, and climate.

This policy brief aims to highlight the ways that off-grid technologies can support the attainment of social and economic opportunity goals, for example by increasing crop yields and income, generating green jobs, and improving climate adaptation and resilience.¹

The brief intends to inform actors in the energy sector officials about the potential benefits of collaborating with their peers in other government agencies and institutions

to enhance the utilization of increased energy access, particularly from off-grid solar solutions to achieve a broader spectrum of development goals.

The off-grid technologies mentioned in this policy brief include:

- Solar lighting and home systems and appliances
- Solar generators, usually including an AC-DC inverter,
- Solar irrigation pumps and systems
- Solar refrigeration and cold storage solutions
- Solar mills and solar dryers

This policy brief was developed by GOGLA, with the support of The IKEA Foundation, World Bank/Energy Sector Management Assistance Program (ESMAP), Beyond the Grid Fund for Africa (BGFA), Efficiency for Access/Energy Saving Trust (EST), International Renewable Energy Agency (IRENA), SNV, World Resource Institute (WRI). Further briefs to elaborate the opportunities and recommended actions for specific sectors including in agriculture, enterprise, health, education, and climate resilience will be developed.

¹ GOGLA (2023) Powering Live and Livelihoods: Scaling Productive Use of Renewable Energy (PURE).

INTRODUCTION

Currently, over 675 million people² live without access to electricity. This limits economic opportunities and acts as a hindrance to growth, job creation and enterprise, while undermining the social welfare and status of families and communities. According to UNCTAD, the UN’s Trade and Development body, “Access to a reliable and quality energy supply is vital to the economic development of any country. It drives industrialization, boosts productivity and economic growth, spurs human development, and is crucial to achieve almost all of the United Nations Sustainable Development Goals (SDGs).”³

Access to electricity and energy services is a critical enabler of national economic and social development goals. Across many low energy access countries today, governments are proactively seeking to realize the SDG 7 target of universal access to clean modern energy through integrated electrification approaches that leverage off-grid solar solutions. In countries with high electricity

access deficits, off-grid technologies are complementing the existing grid infrastructure. They provide electricity services to those who have limited or no access to the grid. This enhanced energy access can rapidly increase the resilience of the poorest and most vulnerable communities and unlock green growth and job opportunities.

Today, Distributed Renewable Energy Solutions (DREs), particularly off-grid solar technologies are already used by almost 500 million people, support more than 10 million businesses, and power hundreds of thousands of smallholder farmers.⁴ They play a significant role in addressing national challenges, including improving food production and access to markets, enabling business growth, and electrifying public infrastructure. Figure 1 provides a snapshot overview of the ways that off-grid technologies are supporting agriculture and fisheries, commerce and industry, and social services.

However, there is a lack of knowledge on the ability of off-grid solar to drive a wide range of development outcomes. As a result, there is lack of deliberate planning and action to leverage energy access to drive economic and social development, particularly for rural off-grid communities.

FIGURE 1: EXAMPLES OF OFF-GRID SOLAR SOLUTIONS USE CASES

AGRICULTURE & FISHING	COMMERCIAL & INDUSTRIAL	SOCIAL SERVICES	
		HEALTH	EDUCATION
<ul style="list-style-type: none"> • Irrigation • Cooling • Poultry • Agro-Processing • Heating 	<ul style="list-style-type: none"> • Agro- processing • Entertainment • Cooling • Tailoring • Carpentry • Barbershops • Cooking 	<ul style="list-style-type: none"> • Refrigerators • Vaccine Storage • Medical Appliances • Water supply • Heating 	<ul style="list-style-type: none"> • Lighting • ICT • Cooling • Heating

² World Bank (2022) The Energy Progress Report

³ UN Trade and Development: Special issue on access to energy in sub-Saharan Africa

⁴ GOGLA (2023) New paper highlights the critical role of off-grid solar technologies in powering climate adaptation and justice



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HIGHLIGHTING KEY OPPORTUNITIES

ENERGY IN AGRICULTURE, ANIMAL HUSBANDRY AND FISHERIES

There are 33 million smallholder farmers in Africa, who contribute as much as 70% of the continent's food supply.⁵ Agriculture plays a huge role in economic and social development, accounting for 25%-40% of GDP in countries including Kenya, Uganda, Tanzania, Rwanda, Burundi, and Republic of South Sudan. The sector is the leading employer for over 80% of the population.⁶ However, a staggering 60% of Africa's population still grapple with food insecurity, and 240 million Africans endure daily hunger.⁷

Off-grid solar (OGS) can help to modernise food production and value addition through the adoption of

solar water pumps (SWPs) in irrigation,⁸ Solar Refrigeration and Cold Storage Facilities for Cooling,^{9,10} Decentralized energy efficiency agricultural processing units include solar milling machines to grind grains or produce flour and solar dryers that help to dry agricultural products like fruits, or coffee amongst others.¹¹

ENERGY IN ENTERPRISE AND INDUSTRY

Micro, small, and medium-sized enterprises (MSMEs) are the building blocks of the economy, contributing to 50% of gross domestic product (GDP) globally.¹² MSMEs account for 90% of businesses worldwide and up to 70% of jobs, driving employment and economic growth.¹³ The absence

of reliable electricity access poses significant challenges for MSMEs. According to a paper by the New Climate Economy, in Africa, businesses lose approximately 4.9% of their annual sales resulting from power outages.¹⁴

Off-Grid Solar (OGS) is addressing some of these key constraints today by providing lighting to MSMEs faced with no or unreliable energy supply, Solar-powered communication devices such as mobile phones and internet routers also offer reliable connectivity. Refrigeration units provide needed cooling for retail outlets and restaurants.¹⁵ The sector is also creating green jobs across the value chain, directly more than 80,000 workers in India with opportunities in manufacturing, installation, maintenance, and repair, while in Kenya and Nigeria employing about 50,000 workers and 30,000 in Uganda and 14,000 in Ethiopia.¹⁶

5 [IFAD: Invest more in smallholder agriculture](#)

6 [East Africa Community: Agriculture and Food Security](#)

7 [AFDB \(2021\) Raising Africa Agricultural's Productivity](#)

8 [MNRE: Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyaan \(PM-KUSUM\)](#)

9 [UOMA \(2019\): Productive use of off-grid energy: The business case in Uganda's dairy value chain – UOMA](#)

10 [Ecozen \(2022\) Ecozen's EcoFrost helped this FPO reduce Losses by 30% | Ecozensolutions](#)

11 [Agsol](#)

12 [Coke-Hamilton \(2023\). Micro-, Small and Medium-Sized Enterprises are Key to an Inclusive and Sustainable Future](#)

13 [ibid](#)

14 [WRI \(2021\). Energy Access is Key to Sub-Saharan Africa's Economic Recovery](#)

15 [Efficiency for Access Coalition \(2023\). Keep it Cool: Harnessing Cold Storage to Reduce Food Loss and Support Sustainable Food Systems in Emerging Economies](#)

16 [Power for All \(2019\). Powering Jobs Census 2019: The Energy Access Workforce](#)



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ENERGY IN HEALTH AND SANITATION

Approximately 1 billion people in low- and lower-middle-income countries are served by healthcare facilities that lack reliable access to electricity or have no access to electricity at all.¹⁷ In Sub-Saharan Africa, 25,000 healthcare facilities completely lack access to electricity, with 70,000 experiencing unreliable electrical supply, while, in South Asia, 12% of healthcare facilities have no access to electricity.¹⁸

Off-grid solar solutions can play a critical role in electrification of healthcare systems and can provide vital inputs to the provision of care. This can be through the provision of basic lighting and access to energy to power medical equipment and appliances, support communication for healthcare providers and preserving critical medical supplies such as vaccines.¹⁹ Healthcare is also heavily reliant on diesel generators and Off-grid solar can help green the industry.²⁰

ENERGY IN EDUCATION

Access to electricity plays a crucial role in the education of students, this has been even more true in recent years. The COVID 19 pandemic caused a global upheaval, with over a billion school children impacted around the world.²¹ Millions of students in developing nations lack access to basic amenities like electricity, let alone the technology or internet access needed to gain the benefit of distance learning and connectivity.

Off-grid solar solutions can address the energy gap, ensuring first time access or dependable power supply to schools located in rural areas. Off-Grid Solar (OGS) is enabling lighting, access to Information and Communication Technology (ICT), both at school and home for learners, enhancing performance, attendance, concentration, and motivation of students as a consequence.²²

17 WHO (2023) Energizing health: accelerating electricity access in health-care facilities (who.int)

18 SEforALL (2024) State of the Market Report for Healthcare Facility Electrification

19 Gavi (2024): The vaccine cold chain: A history

20 SELCO Foundation: Enabling Resilient Health Systems using Decentralized Sustainable Energy

21 Power for All (2020) Why Off-Grid technologies are key in bridging the digital divide amid COVID19

22 SolarAid

ENERGY AND CLIMATE CHANGE

The ravages brought by our changing climate are a reality for many today. The majority of energy poor communities are amongst some of those most vulnerable to climate change. They are also the least responsible for the extreme weather conditions they now face, having contributed the least to global emissions. Mozambique provides a compelling example. The country combats devastating floods and cyclones almost every year exacerbated by climate change, while 22 million of Mozambique's population lacks access to electricity.²³

One of the 30 key objectives outlined in the COP 27 Sharm El-Sheikh Adaptation Agenda is to achieve universal access to electricity via climate-smart and resilient energy systems.²⁴ There is a significant opportunity to leverage Off-grid solar to power **climate adaption** for these communities,²⁵ and enable **resilience** in the face of Climate Change.²⁶ As a renewable energy solution, Off-grid solar also offers an alternative to also **minimize carbon emissions** as communities meet their energy needs.²⁷



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23 [GOGLA \(2023\) Adaptation and Resilience in the Face of Climate Disasters in Mozambique: The Role of Off-Grid Solar and Energy Access](#)

24 [GOGLA \(2023\) Powering Adaptation and Climate Justice: The Critical Role of Off-Grid Solar Technologies](#)

25 [GOGLA \(2023\) Adaptation and Resilience in the Face of Climate Disasters in Mozambique: The Role of Off-Grid Solar and Energy Access](#)

26 [IFPRI \(2020\) Irrigation to Transform Agriculture and Food Systems in Africa South of the Sahara](#)

27 [GOGLA \(2023\) Adaptation and Resilience in the Face of Climate Disasters in Mozambique: The Role of Off-Grid Solar and Energy Access](#)

THE NEED FOR ACTION TO MAXIMIZE IMPACT

To enable countries and governments realize their full social and economic development objectives from the enhanced access realized from the national energy access efforts, it will be necessary to ensure that all the critical enablers are not only present but are fully leveraged. As already stated, the limited awareness of the potential that is being unlocked through enhanced energy access particularly in rural and off-grid communities presents a critical missed opportunity today. To maximize the impact of off-grid solar electrification on various development goals, a more strategic approach is needed. This requires deliberate recognition of off grid solar potential, followed by concrete planning and execution. These are the proposed three key levers necessary:

ENHANCE COORDINATION OF EFFORTS ACROSS THE PUBLIC SECTOR

Traditionally, national, and local government institutions and agencies focus delivering on their individual mandates while respecting mandates of other peers. However, this can lead to siloed decision making and planning which may lead to duplication of efforts and inefficient use of scarce government resources. As energy actors drive the delivery of enhanced energy access across their respective geographies, coordination and collaboration with other government ministries and agencies responsible for other sectors will play a crucial role in enabling the alignment of enhanced energy access to the utilization on target socio-economic pillars to drive realization of development goals.

In India, the Ministry of New and Renewable Energy (MNRE) collaborates with the Ministry of Agriculture to promote solar-powered irrigation systems.²⁸ This collaboration not only enhances energy access for farmers but also improves agricultural productivity and sustainability. By leveraging such synergies, governments can maximize the impact of off-grid solutions on economic development, social welfare, and environmental sustainability.

IMPORTANCE OF STAKEHOLDER ENGAGEMENT

While energy access and electrification in general has been in the sole purview of national utilities and government agencies, the energy sector has evolved. Today, it includes private sector companies developing, selling, and supporting off-grid solar solutions, investors and development partners providing needed financing and public sector institutions that not only set policy and regulatory oversight for the sector, but also facilitate market growth through incentives and provision of other public support.

By engaging with the private sector, and development partners, governments can further leverage the expertise and resources of various stakeholders, access funding, and gain technical assistance. For instance, Mali's Ministry of Health recognised the need to improve the vaccine cold chain across the country and selected SureChill, a pioneering platform cooling technology company, as their

partner to do so. Mali received assistance from UNICEF and funding from UNICEF partners to rebuild the cold chain from regional cold stores to health post refrigerators.²⁹

ADOPTION OF INTEGRATED AND WHOLISTIC PLANNING

As we look towards leveraging enhanced energy access to realize national economic or social service development objectives, integrated planning across sectors will be necessary to not only recognize the specific energy needs and uses in target sectors, but to also take cognizance of the potential enabled by these energy access solutions and mainstream them into the specific sector plans and strategies for each social service or economic development pillar.

Off-Grid Solar technologies should therefore be properly integrated not only into government electrification plans, but also the specific sector plans relating to climate, water, agriculture, education, health, industry, trade, and green growth. This should include the a) national sector strategies, policies, and plans, and b) the sector specific programmatic efforts of all ministries and agencies where these solutions can help meet targets. The Ministry of Health in Kenya for example has announced plans to spearhead climate-friendly initiatives, to adopt solar power for healthcare facilities across the country and investing in solarized facilities plans.³⁰

28 MNRE: Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyaan (PM-KUSUM)

29 SureChill

30 The Star (2023) MoH to adopt Solar Power for Hospitals to combat Climate Change

CALL TO ACTION

Off-grid solar technologies can play a significant role in achieving a range of development benefits that cut across various sectors. However, the knowledge of these solutions is often limited to Energy Ministries and those working in the electrification space. To address this challenge and extend awareness of the impact of off-grid solar solutions, this paper recommends three approaches on how energy actors can seek to partner with other government institutions and other stakeholders to leverage energy access to maximize its impact on social and economic development objectives.



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INTERGOVERNMENTAL COORDINATION:

- Establish a dedicated task force or working group within the Ministry of Energy to coordinate off-grid solution efforts with other relevant ministries, such as agriculture, health, enterprise, education, and environment.
- Develop an inter-ministerial action plan to integrate off-grid solutions into broader national socio-economic development strategies.
- Regularly convene high-level meetings or conferences with representatives from different ministries to discuss progress, challenges, and opportunities for collaboration in scaling up off-grid solutions.

MULTI-STAKEHOLDER ENGAGEMENT:

- Facilitate regular dialogues and partnerships between the government, private sector, civil society, and development partners to leverage their expertise, resources, and networks in scaling up off-grid solutions.
- Create platforms or forums for knowledge sharing, capacity building, and best practice exchange among stakeholders involved in off-grid solutions.
- Encourage private sector investment and participation through incentives, policy support, and regulatory frameworks that promote the growth of off-grid solutions.

INTEGRATED PLANNING:

- Conduct holistic sector assessments to identify areas with high potential for adoption of distributed energy renewable solutions. Analyse socio-economic factors, energy needs and existing solutions to ensure fit of applicable Distributed Renewable Energy (DRE) solutions.
- Properly integrate DRE solutions into the specific sector plans including into the a) sector policies, plans, and strategies and b) the sector specific programmatic efforts of all relevant ministries and agencies and institutions. These plans should specifically recognize the goals, actions necessary and measures to be undertaken.
- Design and implement initiatives and support programs specifically tailored to target user groups and beneficiaries to increase awareness, provide capacity building and training and but enhance access through access to finance and other measures. Foster partnerships with sector specific organizations such as agricultural, cooperatives, and educational institutions to strengthen awareness and ensure long-term capacity building.



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