



# ACCELERATING DEPLOYMENT OF DECENTRALIZED SOLAR PVS IN SOMALIA: ENHANCING ENERGY ACCESS AND CONTRIBUTING TO GLOBAL CLIMATE GOALS

## TECHNOLOGY DESCRIPTION

### TECHNICAL DESCRIPTION

Decentralized Solar Photovoltaic (PV) refer to solar power installations that are distributed across various locations, typically small scale and community owned power plants. These systems consist of solar panels, inverters, and, in some cases, battery storage, which capture and convert sunlight into electricity. Given Somalia's abundant solar energy potential, decentralized solar PV systems offer a sustainable and cost-effective alternative to the country's current reliance on diesel generators and biomass fuels for energy. The systems are particularly suitable for homes, small businesses and institutions such as health facilities and schools, providing reliable and clean energy to underserved populations. The target is to install additional 200MW of decentralized solar PV capacity by 2030 across Somalia to significantly enhance energy access and contribute to reductions in carbon emissions and Somalia's broader climate commitments under the Paris Agreement.

### CURRENT TECHNOLOGY READINESS LEVEL OR COMMERCIAL READINESS INDEX

The Technology Readiness Level (TRL) of decentralized solar PV systems in Somalia and in the horn of Africa region is relatively high, TRL 8, indicating that these technologies are fully developed and commercially available for deployment. Decentralised Solar PV systems are already in use in some regions of Somalia by private companies and international development projects particularly in urban areas, demonstrating their technological maturity and reliability in the field. However, despite the technical viability, there are still significant barriers such as high upfront costs, lack of financing options, weak policy and regulatory environment and limited technical capacity for installation and maintenance need to be addressed to promote large-scale commercial deployment.

### CLIMATE RATIONALE OF THE TECHNOLOGY

Decentralized Solar PV technology offers a critical solution to Somalia's dual challenge of energy poverty and climate vulnerability. Somalia is highly dependent on biomass (with over 80% of the population using charcoal and firewood) and diesel generators, which contribute significantly to deforestation and environmental degradation, carbon emissions, and indoor air pollution affecting especially women and children. Decentralized solar PV systems offer a transformative solution by providing reliable, renewable electricity, reducing dependence on fossil fuels, and lowering GHG emissions while contribute to achieving various Sustainable development goals(SDGs). The installation of 200MW of decentralized solar PV capacity is projected to reduce carbon emissions by 3.1 MtCO<sub>2</sub>eq by 2030, contributing to global climate mitigation efforts. Furthermore, solar PVs offer resilience to the impacts of climate change, as they provide a decentralized, renewable, and reliable energy source that is less vulnerable to extreme weather events such as droughts and floods.



## AMBITION OF THE TECHNOLOGY

### SCALE FOR IMPLEMENTATION AND TIME-LINE

By 2030, Somalia aims to deploy 200 MW of decentralized solar PV capacity, covering 40,000 Solar Home Systems (SHS) and institutional solar installations (e.g. for schools, health centers). The ambition is to bring clean electricity to both urban and rural areas, enhancing access to reliable, low-carbon energy and cutting carbon emissions by approximately 3.1 MtCO<sub>2</sub>eq annually by 2030.<sup>1</sup> This scale of deployment will help to close the energy access gap and support Somalia's efforts toward sustainable development.

### AMBITION FOR TECHNOLOGY READINESS LEVEL OR COMMERCIAL READINESS INDEX

By 2030, the goal is to significantly advance the Technology readiness levels to 9 and CRI to 5 or 6 from the current low levels. Somalia aims to create a fully functional solar energy market, characterized by accessible financing mechanisms, streamlined supply chains, and robust policy and regulatory enabling environment. This ambition includes enhancing the scalability of decentralized solar PV systems, improving installation and maintenance capacities, and ensuring market confidence through partnerships with the private sector. Achieving these targets will accelerate the deployment of 200MW of decentralized solar PVs and facilitate a sustainable, low-carbon energy transition in alignment with Somalia's climate and development goals.

## EXPECTED IMPACTS OF THE TECHNOLOGY

- **Environmental Impact:** Solar PV systems will displace diesel-based electricity generation and reduce Somalia's reliance on biomass fuels for energy, leading to a significant reduction in GHG emissions and deforestation. This shift could result in a 3.1 MtCO<sub>2</sub>eq annual reduction in GHG emissions by 2030.<sup>2</sup> Furthermore, the reduction in reliance on biomass fuels such as firewood and charcoal could lead to a 25% reduction in deforestation rates, aligning with Somalia's efforts to combat environmental degradation and improve air quality.<sup>3</sup>
- **Economic Impact:** Decentralized solar PV systems will lower household energy costs by up to 50% and reduce the need for imported diesel fuel, saving millions in foreign exchange. Furthermore, the deployment of solar PV systems is expected to create 30,000 new jobs in installation, maintenance, and manufacturing by 2030, particularly for youth and women, with the potential to increase employment opportunities in rural areas (Energy Sector Policy, 2018).
- **Health Impact:** The reduction in the use of diesel generators and kerosene lamps will lead to improved indoor air quality, reducing respiratory illnesses associated with air pollution, by up to 25% among households switching to Solar PVs. In addition, reliable electricity will support the operation of health clinics and medical facilities, improving healthcare outcomes. Improved healthcare infrastructure is expected to benefit over 2 million people in both urban and rural areas.<sup>4</sup>
- **Social Impact:** Access to electricity through solar PV will improve educational outcomes by enabling 24-hour lighting in schools and facilitating the use of technology in schools, potentially improving student performance and reducing dropout rates. Furthermore, solar PV will empower small businesses by providing power for refrigeration, charging stations, and other activities, helping

<sup>1</sup> Federal Government of Somalia (2021) Somalia updated NDC 2021 and NDC mitigation analysis report

<sup>2</sup> Ibid

<sup>3</sup> Federal Government of Somalia (2022) Energy Sector Policy, 2018

<sup>4</sup> <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>



to boost local economies and create entrepreneurship opportunities. These changes are particularly important in rural areas, where access to electricity can transform communities and enhance livelihoods.

## POLICY ACTIONS FOR TECHNOLOGY IMPLEMENTATION

### EXISTING POLICIES IN RELATION TO THE TECHNOLOGY

- **National Development Plan (NDP) 2020-2024:** The NDP promotes investments in renewable energy, including solar PV, to address Somalia's low electrification rate and enhance energy security. It highlights the need for decentralized energy solutions in off-grid areas.
- **Somalia National Energy Policy (2018):** The goal of the policy is to provide all Somalians with adequate, affordable and sustainable access to efficient energy, with commitment to environmental stewardship, while also improving quality of life, promoting socio-economic growth, developing clear policies, regulations, building strong institutions, and unlocking the country's renewable energy potential. The policy recommends investment in renewable energy options such as solar and wind to advance the country's resilience and sustainable development.
- **Somalia Electricity Act (2023)** – The recently established Act establishes the National Electricity Authority and provides proper legal and regulatory frameworks for electricity development and access. The Act supports the deployment of decentralized solar PV systems by incentivizing private sector investment, enabling independent power producers, and streamlining licensing procedures for off-grid and mini-grid solar installations.
- **Somalia Power Master Plan (2019):** The Master Plan sets out a 20-year strategy to increase Somalia's electricity generation capacity, focusing on renewable energy, including solar PV, to meet the growing energy demands of the population.
- **Somalia updated Nationally Determined Contributions (NDC) 2021-** The country's NDC commitment in the context of the Paris Agreement is to to achieve low emissions and climate-resilient sustainable development. The NDC includes key measures to be implemented in the energy sector including investment in renewable energy, energy efficiency, energy efficient cookstoves among others

### PROPOSED POLICIES TO ENHANCE TECHNOLOGY IMPLEMENTATION

1. **Financial Incentives and Support:**
  - Introduce subsidies and grants for households and businesses to reduce the upfront cost of solar PV installations. Financial incentives are critical to making solar PV systems affordable, especially for rural and low-income populations.
  - Establish low-interest loan schemes and microfinance partnerships to support the purchase of solar PV systems. The Pay-As-You-Go (PAYG) financing model should be introduced to allow households to pay for solar systems in small, manageable installments over time, reducing the barrier of high upfront costs.
  - Facilitate access to international climate finance, including funds from the Green Climate Fund (GCF) and carbon markets, to support the widespread deployment of decentralized solar PV systems.
2. **Strengthen Policy and Institutional Frameworks:**



- Develop a comprehensive renewable energy policy that prioritizes decentralized solar PV systems and sets clear targets for renewable energy integration. This policy should also create a regulatory framework to support the private sector's involvement in the renewable energy market.
  - Establish a Renewable Energy Agency (REA) within the Ministry of Energy and Water Resources to oversee the implementation of renewable energy projects, enforce quality standards, and coordinate between stakeholders. The REA would also facilitate capacity building and technology transfer to ensure sustainable deployment.
- 3. Capacity Building and Local Production:**
- Invest in the training of technicians and engineers in the installation, maintenance, and repair of solar PV systems. These training programs should be developed in collaboration with technical schools, universities, and international organizations to ensure that local expertise is built.
  - Support the local manufacturing and assembly of solar PV components to reduce dependency on imports, lower costs, and create jobs in the renewable energy sector.
- 4. Public Awareness and Education:**
- Launch a national public awareness campaign to promote the benefits of decentralized solar PV systems, focusing on energy savings, environmental protection, and health improvements. The campaign should utilize radio, television, social media, and community workshops to reach both urban and rural audiences.
  - Engage community leaders and women's groups in promoting solar PV adoption, particularly in regions with low electricity access. This grassroots approach will help build trust and drive demand for solar energy solutions.

#### COSTS RELATED TO THE IMPLEMENTATION OF POLICIES

The total estimated budget for implementing decentralized solar PV systems is USD 63 million over the period 2025-2030, covering:

- Subsidies and grants for installations (USD 50 million)
- Capacity building for technicians and local manufacturers (USD 6.5 million)
- Public awareness campaigns (USD 2.5million)
- Policy development and regulatory frameworks (USD 4 million)

## USEFUL INFORMATION

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#### LINKS TO TNA REPORTS

<https://tech-action.unepccc.org/country/somalia/>