Energising Development (EnDev) Ethiopia

Market development for Small Photovoltaic Systems

Period	**Since 2011 EnDev phase II**
Areas	Amhara, Oromia, SNNPR, Tigray, some activities in: Addis Ababa, Dire Dawa, Harari
Partners	Ministry of Water, Irrigation and Energy, Ethiopian Energy Authority, Ministry of Agriculture, Ministry of Health, Ministry of Environment and Forest, non-governmental organisations and others
Systems in place	52,481 solar lanterns 2,565 solar home systems (SHS)
Beneficiaries	Nearly 90,000 people gained sustainable access to modern energy services. 100 retailers were trained for installations, service and maintenance of small photovoltaic (PV) systems.

Objective

Low-income households in off-grid areas gain sustainable access to modern energy technologies and services. Solar powered systems enable education, communication, information, refrigeration, entertainment and/or productive use.

Challenges: low electrification rates

Only 5% of rural households in Ethiopia are connected to the national grid. Most rural households rely on kerosene lamps for lighting and dry cell batteries for electrical appliances. As a result they proportionally spend more of their income on power than on-grid households. Modern off-grid lighting systems, like small PV systems are often inaccessible or only available in low quality. Although cheaper products have lower investment costs,

they often result in higher maintenance costs and shorter life.

Unfortunately market access to high-quality products in Ethiopia is still restricted. In addition, since credit for energy systems is limited in rural areas, some potential customers are unable to afford PV systems, while retailers lack sufficient working capital.

Approach: market development

EnDev Ethiopia, operating under the name GIZ Energy Coordination Office (GIZ ECO), is focusing on market development and capacity building of private and public stakeholders and target groups in order to improve their access to modern energy technologies. A large number of retailers within an emerging small-PV-system market is desirable in order to increase dissemination. EnDev Ethiopia thus undertakes the following activities:

- Training for solar retailers to improve their technical, business and marketing skills
- Public demonstration of solar products in market places as well as exhibitions
- Establishment of training centres and an inter-linked solar communities
- Creation of linkage between suppliers and retailers to improve the supply chain
- Promotion of high quality, *Lighting Africa* certified products

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Ministry of Water, Irrigation and Energy · german cooperation DEUTSCHE ZUSAMMENARBEIT · Implemented by: giz

Advantages of the technology

Situated near the equator and located at high altitude, Ethiopia enjoys abundant solar exposure. The national annual average irradiance is estimated at 5.2 kWh/m^2/day. Once obtainable, small PV systems, offer a large potential to contribute to rural electrification.

- Small PV systems have little running costs
- Small PV systems provide bright pollution-free lighting, without the disposability hazards associated with dry-cells batteries
- Pico PV systems are portable
- Small PV systems are easy to install
- SHS can be individually designed to suit each user's need

Technology: small solar powered systems

EnDev Ethiopia promotes two types of small stand-alone solar systems for households.

Pico PV systems have a capacity of up to 10 Wattpeak (Wp) and supply lighting, energy for mobile phone charging and in some cases a radio. The system usually consists of a solar panel, a battery and one or more lamps.

Solar Home systems (SHS) are PV systems that offer a cost-effective mode of supplying power for lighting and appliances to off-grid households. With a capacity of up to 130 Wp, SHS are fixed systems that permit the operation of several energy saving lamps, mobile phone charging and a radio. In addition, modular expansion can allow a fridge or TV to be connected.

SHS usually comprise four components:

- a PV module for power generation
- a battery for electricity storage
- a charge controller for battery protection
- direct current (DC) appliances

Impacts: secured lighting in rural homes

More than 50,000 solar lanterns and 2,500 SHS are currently in use. Over 100 retailers were trained in installation, servicing and maintenance of small PV systems.

Close to 100,000 people are benefiting from sustainable access to secure lighting and can run basic electrical appliances from small PV systems. The intervention also yields the following:

- Small PV systems as a viable renewable energy source for rural electrification
- Improved education thanks to better lighting in homes
- Access to diversified information, communication and entertainment
- Reduced fuel expenditure
- Productive uses can be established
- Enhanced business capacity for retailers, and thus job creation

By replacing kerosene lamps and dry cell batteries, with solar powered lighting, harmful smoke inside the house and disposal of hazardous waste can be minimised. Furthermore, small PV systems reduce CO_2 emissions and protect local environmental resources.

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