



SOLAR HOME SYSTEMS

Product Catalogue - 2014

Prepared by MicroEnergy International GmbH
with the collaboration of Davide Forcella (CERMi-ULB)



EUROPEAN
MICROFINANCE
PLATFORM

NETWORKING WITH THE SOUTH

e-MFP ACTION GROUP
ON MICROFINANCE
AND ENVIRONMENT

Description and Working Principle

A Solar Home System (SHS) is a small-scale, autonomous electricity supply for households that are off-grid or have unreliable access to energy. It generates electricity from sunshine and stores the electricity in a battery for consumption during the night or cloudy days. SHSs generate direct current (DC) that can be used for a range of electrical appliances, from lighting and mobile phone charging to small televisions, radios, fans or other appliances. By replacing fossil energy sources such as kerosene, candles and dry batteries, SHSs have the potential to reduce indoor air pollution and substitute energy expenditures.

Technical Characteristics

Target group	Private households, small and micro enterprises (SMEs)
Components	Solar panel, charge controller, battery, wiring and mounting structure
System sizes	20 W, 30 W, 50 W, 100 W up to kW range
Battery capacity	10 Ah – 130 Ah depending on size
Typical output	12 V DC most common 100 – 240 V AC possible with inverter
DC appliances	LED lighting, mobile phone charging, small ICTs (radio, TV, DVD player, etc.), fan, fridges (in bigger systems only)
Operating time	3 – 5 hours daily with full load
Sunshine required	4 – 5 hours of full sunshine hours
Warranty	Battery: 3 – 5 years Panel: 20 years
System cost	e.g. USD \$150 – \$800 / (20 W – 120 W)
Substitution potential	Kerosene, candles, dry cell batteries

Ease of Distribution, Installation and Maintenance

The initial sizing of the technology packages on offer should be carefully considered and calculated by engineers. Hands-on training provided by local technical or government institutions can enable low skilled people to properly install the SHS. Solar panels must be installed on poles or rooftops with a particular angle towards the sun and away from shade caused by trees or other objects. Batteries should be connected close by in a secure, cool, dry and ventilated location, and electrical cabling must be safely installed. Properly designed and installed SHSs operate without supervision and require only minor routine maintenance by end-users. End-user training on use and load management is essential and should be repeated multiple times during a loan period. SHSs present some distribution challenges, as they require multiple components in separate packages and tools for installation. Batteries are heavy (10 kg or more depending on size), and cushioned packaging must be used to prevent damage to solar cells in transit.

Technology Options

System capacity	Example appliances	Price range (USD)
30 W	3 × 3 W LED lights, a 16" LCD/LED TV, mobile phone charging	USD \$250 (price varies with local equipment cost, tax, etc.)
50 W	5 × 3 W LED lights, a 16" LCD/LED TV, mobile phone charging	USD \$410 (price varies with local equipment cost, tax, etc.)

Price Range

Each SHS requires a solar panel, battery, charge controller, cabling, switches, and appliances. A complete setup of 20 W panel capacity starts at around USD \$150.

Type of target group	Price range (USD)
Households	Between USD \$150 – \$800
Community-scale projects	More than USD \$800

Type of Financing

SHSs are suitable for microfinancing and financial as well as operational microleasing. For community-scale projects microleasing can be more suitable. Depending on the down payment and size of the SHS, the loan or lease period can vary from two to three years. Higher down payment allows shorter repayment period and more attractive conditions for end-users. During this time MFIs also can offer after-sales service, including installation, maintenance and training.

Economic and Social Impact for End-users

SHSs can reduce the health impacts of indoor air pollution and fire hazards caused by kerosene and candles, whilst reducing expenditures needed for these fuels and improving the quality of lighting. Time spent purchasing fuels can also be reduced, and increased lighting availability may enhance the productivity of shops and studying opportunities for school children.

Break-even example: A kerosene lamp producing 37 lumens for 4 hours a day will consume about three liters of kerosene per month. If a 30 W SHS substitutes the use of 3 kerosene lamps with brighter LED lighting, it has the potential to save nine liters of kerosene a month – or USD \$7.83 a month¹. If the SHS system costs USD \$250, a simple calculation shows that the system can break-even in about 32 months.

Benefits for the MFI

MFIs have the chance to expand their product portfolio with this technology and once implemented, the technology quickly gains interest from new potential clients such as neighbors, friends and family who see the benefits of clean, efficient and high quality products. SHSs offer an attractive opportunity to MFI clients wishing to gain access to basic electricity services. Substituted costs for conventional fuels and low operational costs help to ensure an ability to repay, however a focus on supporting productive use activities provides even more assurance. Due to their green characteristics, the inclusion of SHSs into an MFI's portfolio will promote the MFI to rank better in the Microfinance Environmental Performance Indicator.

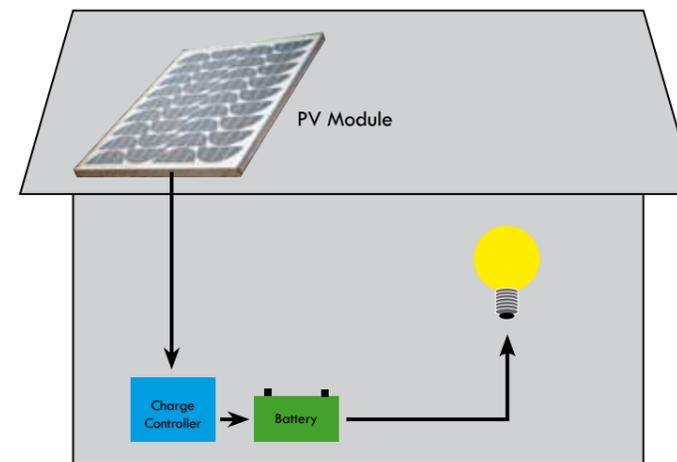
Environmental Benefits

Environment: it reduces particulate emissions and pressure on natural resources used to produce electricity. It reuses wasteland and it reduces waste coming from dry batteries and leakages from kerosene or diesel.

Climate change mitigation: it reduces greenhouse gas emission.

Climate change adaptation: it reduces the vulnerability to electricity and fuel price volatility, and it reduces the vulnerability to volatility in energy provision.

Potential positive synergies with: efficient air conditioner, energy efficient refrigerator.²



Source: MicroEnergy International

¹ Based on Bangladesh kerosene price of 0.88 US\$/liter in September 2014

² For further information on potential synergies check the other product catalogues for EE and RE technologies.

European Microfinance Platform

The European Microfinance Platform [e-MFP] was founded formally in 2006. e-MFP is a growing network of over 120 organisations and individuals active in the area of microfinance. Its principal objective is to promote co-operation amongst European microfinance bodies working in developing countries, by facilitating communication and the exchange of information. It is a multi-stakeholder organisation representative of the European microfinance community. e-MFP members include banks, financial institutions, government agencies, NGOs, consultancy firms, researchers and universities.

e-MFP's vision is to become the microfinance focal point in Europe linking with the South through its members.

e-MFP Microfinance and Environment Action Group

e-MFP Action Groups facilitate synergies among e-MFP members and encourage them to implement activities together, thus contributing to the advancement of the microfinance sector.

The aim of the e-MFP Microfinance and Environment Action Group is to bring together microfinance practitioners to discuss and exchange experiences in dealing with environmental issues and to create new practical tools to advance environmental microfinance. The Action Group is also intended to act as a think tank that disseminates its results among e-MFP members and the microfinance sector at large with a view to increasing the awareness of and commitment to act on these issues. It is meant both as an internal knowledge-sharing and external awareness-raising platform that serves as a reference in the microfinance sector.

Head of the Action Group: MicroEnergy International GmbH, www.microenergy-international.com

European Microfinance Platform

39 rue Glesener
L-1631 Luxembourg
Tel: +352 26271382
contact@e-mfp.eu
www.e-mfp.eu

With the support of



THE GOVERNMENT
OF THE GRAND DUCHY OF LUXEMBOURG
Ministry of Foreign and European Affairs



THE GOVERNMENT
OF THE GRAND-DUCHY OF LUXEMBOURG
Ministry of Finance

Directorate for Development Cooperation
and Humanitarian Affairs