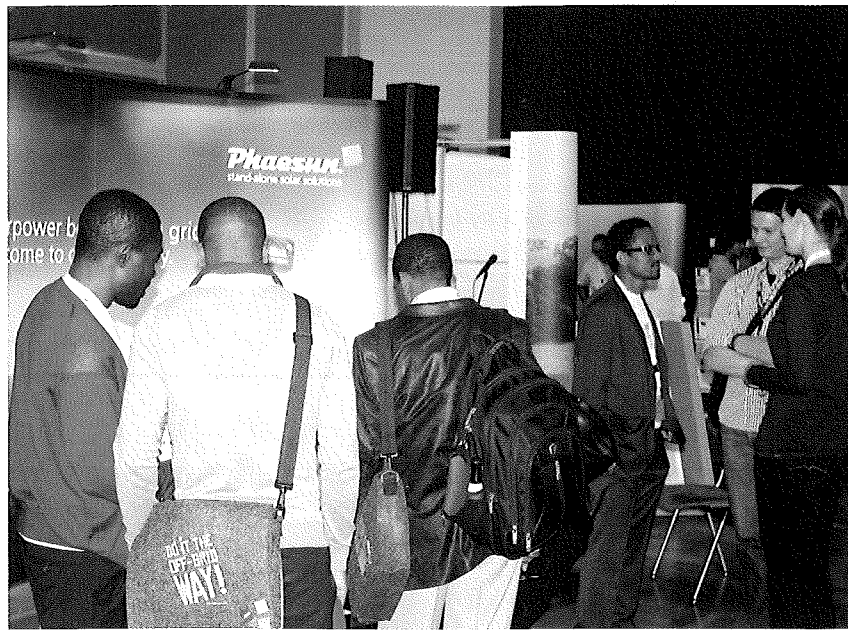
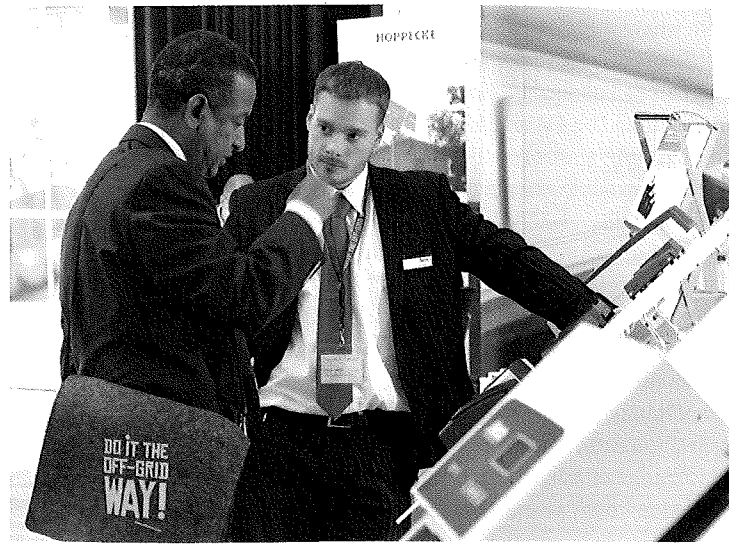


A meeting of experts at Phaesun



The Phaesun workshop offered an intensive exchange (above), presentations (below left: Dirk Gutzeit) and a trade exhibition (below right)

Photos: C. Dany (above), Phaesun (below)



Off-grid is different – that much was clear at the expert workshop in the southern German city of Memmingen. Autonomous power supply systems are complex but promising. Much of the information provided by the experts revolved around batteries, which were seen as a key component. In addition to photovoltaics, wind and hydro power can be used as an off-grid power supply.

Solar modules used to be the most expensive components of off-grid systems, said Dirk Gutzeit of Phaesun GmbH, “today it is the battery.” For the third time, the Memmingen company has invited guests to its “Off-Grid Experts” workshop in the Allgäu region of Germany. Some 300 visitors from four continents attended two days of presentations and a parallel exhibition. The increasing need for electrification in countries with low grid coverage justifies cautious optimism about the prospects of the off-grid sector. Off-grid can be further broken down into the sub-categories of rural electrification, solar water supply and treatment, irrigation in agriculture and horticulture, industrial applications such as telecommunications and traffic control, as well as the leisure segment including camping, caravans and boats.

Several speakers emphasized that batteries are not only expensive, but also represent the key system component. According to Gutzeit, 80 % of off-grid

systems use lead-acid batteries for purely economic reasons, despite their sensitivity, lower efficiency and shorter service life as compared with lithium-ion batteries. Nickel-based batteries are somewhere between lead and lithium on the price-performance curve, he said. Christoph Kocsis of the event’s co-organiser, charging electronics manufacturer Steca Elektronik GmbH, explained that batteries were the component with the shortest service life in solar off-grid systems – lasting two to eight years – but represented 50 to 60 % of the system cost. The charge controller accounted for only 2 to 4 % of the cost, he said, but had a significant influence on the battery. “Don’t damage your system with a cheap charge controller,” said Kocsis. This control element regulates charging voltage and protects the battery, particularly from deep discharge, he added.

Peter Adelmann of the id-eee-Institut for distributed electrification, which is based in Ulm, Germany, examined the costs of pico PV systems. “Considered over

a ten-year period, the priciest LiFePO batteries are the least expensive, because they need not be replaced.” Pico PV is a catch-all name for the smallest devices and systems up to 10 W. Often, the term refers to LED lamps with an integrated battery and sometimes even a mini solar module. The battery is a critical component in such applications because frequent charging cycles tend to reduce the life of such devices. In addition, heat endangers the battery lying in direct sunlight with the module. “Pico PV is competitive,” Adelmann said. Lamps pay for themselves in six to nine months compared to kerosene lamps and purchasing them is not excessively expensive in rural development areas. “The greatest need is in Africa, but the largest market in Asia,” he added, indicating that the primary markets are in India, Pakistan and Indonesia.

An African, Said Abib, recounted a witty success story. His company, Horn Renewable Energy, sells solar systems to kiosk owners without electricity in remote regions of Somalia. The kiosks can increase profits by offering cold drinks, longer hours of operation thanks to lighting, and particularly with charging stations for mobile phones. “75 % of the rural population in Somaliland have mobile phones,” said Abib, causing a stir. The demand for charging stations is huge. Solar home systems for lighting and media use in houses, as well as the rental of lights and freezers for fishermen on the coast were other promising business models, he said.

Small local power grids

Catherina Cader, of the Berlin-based Reiner Lemoine Institute, also identified South and East Africa as offering particularly good conditions for mini-grids. The political and financial conditions were satisfactory and the need for electrification high. “In areas with high diesel prices and abundant renewable resources, hybrid mini-grids are profitable,” Cader said. In small grids powered by diesel generators, the term hybrid often means feeding solar power into the grid to save as much of the expensive fuel as possible.

The question of whether small, distributed systems or mini-grid systems were better suited to rural electrification was the focus of a running discussion. The construction of mini-grids requires funding and support, which are not easy to secure, especially in Africa. However, small grids are likely to be less expensive over the long-term, as well as more variable. Matthieu Prigent of Phaesun presented a guide to the design of hybrid systems. The guide leads the user via ten questions through a tree diagram, which takes into account both investment and operating costs.

In addition to the battery and charge controller, the power generator and of course the devices which consume electricity are all part of the off-grid system. In the case of the latter, said Gutzeit, a critical issue was whether AC loads had to be supplied. This is often the case, especially with electrical machinery, which means that an inverter is needed as well. “Systems are getting more complex.” On the topic of generators,

the product manager gave an overview of small wind systems with axial turbines and vertical rotors.

Dereje Walegn of the Ethiopian solar company Lydetco PLC spoke about drinking water projects. Systems in remote villages were built to supply drinking water and irrigation using solar pumps. Johannes Puy, of the company Mörk, presented a seawater desalination project in Tanzania. The Leonberg company installed two Mörk Desalin systems on Tanzanian islands, each providing 100 l/h of drinking water, with the support of GIZ, the German foreign aid agency. According to Puy, these efficient systems require just 4 kWh of electricity provided by solar and wind energy per cubic meter of drinking water.

Christian Dany

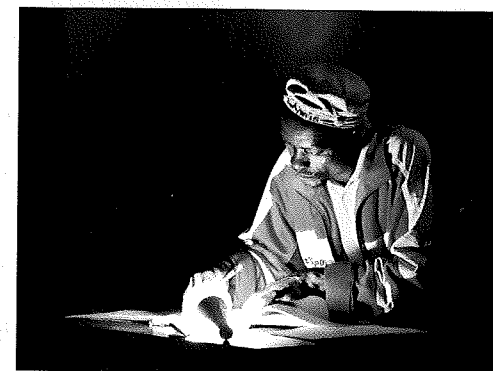
Award-winning off-grid experts



For the first time ever at the Memmingen workshop, Off-Grid Experts Awards were awarded. There were four categories: under the motto “Energy Autonomy” Phaesun GmbH announced a competition supported by the Alliance for Rural Electrification (ARE). ARE also provided the jury, comprised of its board, for the best product and the best project. The photo and short film categories were judged through public online voting.

The Bell mini solar lamp made by the startup company Bright Products from Norway was awarded most innovative product. The winners proudly presented their new product which can be used as a hanging, table and reading lamp. Mobisol GmbH from Berlin was awarded a prize for a project with an innovative combination of off-grid solar energy and micro financing. Rural households in Tanzania can obtain solar installations without having to pay for them. Instead, they pay for the electricity supplied by the system using a prepaid method via mobile phone.

Sven Walters won the photo contest with his “Solar Light for Enwen, Cameroon 2013.” The picture shows the secretary of a Cameroonian community administration office using a solar lamp. In the short film category, the image film of a joint project between Crossing Borders Stuttgart e.V. and the Stuttgart Media



University, both located in Stuttgart, Germany, received the most online votes. (cd)

The winners of the Awards (above) and the winning picture of the photo competition Photos (2): Phaesun