



SOPHIA

Sustainable Off-grid solutions for Pharmacies and Hospitals In Africa

Aims to improve quality of life of populations through better treatment & working conditions in rural and remote health facilities in Africa

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By providing:

- 🚰 Safe, clean drinking water and deionized water for medical purposes
- 🔥 Hot water and steam production for hospital thermal requirements
- ⚡ Emergency electricity supply for surgical and intensive care units
- 🧊 Ultra-low temperature storage of sensitive medication at -70°C
- 🧊 Low temperature storage of blood plasma at -30°C
- ❄️ Cooling of medicines and food at $+5^{\circ}\text{C}$

SophiA M18 Meeting

The SophiA project started in October 2021. 18 months later, the consortium partners met in Cape Town, South Africa to discuss the progress of the project. The meeting was organised as a hybrid event, from March 15 to 17, 2023. All partners were represented in South Africa, benefiting from on-site discussions and visits at the factory where the SophiA systems are being built by the partner Everflo. A second meeting point was organised in Germany, at the premises of HKA University of Applied Sciences Karlsruhe - the project coordinator. Partners and members of the Advisory Board had the possibility to join online as well. During the meeting, the local partners Everflo and Kovco showcased the progress of the construction of both SophiA water and refrigeration containers, which are well underway.

First workshop on Capacity building

The partners responsible for Capacity building have prepared the first “train the trainer” materials on all SophiA technologies: refrigeration, water treatment, solar PV and solar thermal. These materials were used for an internal workshop held on the last day of the meeting. For this event, even the famous “Globi and energy” book travelled from Switzerland all the way to South Africa. While reading the book, SophiA participants joined Globi and his friends in a fascinating journey to learn together about conventional sources of energy like coal, oil, natural gas and nuclear energy, and about green or renewable energy sources like solar (solar thermal and photovoltaics), geothermal, water and wind. At the end of the journey described in the book, Globi and his friends visited a place from Switzerland where the energy transition from conventional energy sources to renewables has already taken place. Having captivating illustrations and simple language, this book in English is the perfect start to understand the complex topic of climate change and energy and it was offered to the SophiA partners as part of the tools that they can use during capacity building activities.

The workshop in South Africa was an important first step in the preparation of the content and materials for the on-site knowledge exchange, training, and education activities. The next workshop will be organised in Burkina Faso in summer 2023 by the SophiA partner 2iE



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Status of the SophiA systems

During the first year and a half, all technical partners have been involved in the design and testing phase of laboratory test prototypes, as well as the design of the first set of two containers to be installed in Burkina Faso. More about SophiA technologies and laboratory tests can be found in the first newsletter.

Going from the lab scale to a system prototype ready for demonstration in an operational environment, the first set of two SophiA containers are now being built at Everflo facilities in Cape Town, South Africa. Both will be equipped with solar technologies.

The refrigeration container includes a three-stage cold storage to provide $+5^{\circ}\text{C}$, -30°C and -70°C , and an innovative thermal energy storage using ice. The split systems design for each stage allows an improved power management, and all compressors are variable speed controlled to improve energy efficiency and manage power usage effectively. Two complete independent refrigeration systems for each temperature are provided, which makes SophiA refrigeration solution a robust and reliable solution to fulfil the hospitals cooling needs. A standby small diesel power set is also installed in case of extended low solar radiation. The second container will provide water for all services needed by the hospital: clean, cold drinking water, deionised water and hot water and steam. Using a specially designed, long term hot thermal storage, the container will be able to provide steam to hospital consumers even if the solar radiation is low for consecutive days.

Currently, the solar frames are being built, after which the PV arrays will be installed. A first test will be done before the containers are shipped to the first demonstration site. The water and refrigeration systems will use a SCADA system. This is an abbreviation for Supervisory Control and Data Acquisition. This system will offer the possibility to monitor and extract data online, and it will also be used for remote support. The PV-MedPort, a simple, solar powered standalone solution, that can be used for outreach campaigns, has also been designed and tested.

Data collection at SophiA demo site

Preparations for the SophiA containers at the 2nd SophiA test site on Buvuma Islands in Uganda are underway. Heike Hoedt, from the German partner Simply Solar, and Nicholas Kiggundu, from Makerere University in Uganda, performed on-site technical assessments at the Buvuma Health Center IV, where the SophiA containers will be located, and at several smaller health centres on the Islands in order to identify the most suitable location for the PVmedPort.

The purpose of these assessments was to collect data to ensure that the SophiA technologies are of maximum benefit to the targeted health centres.

