ESEF
ECOWAS SUSTAINABLE ENERGY FORUM
CÔTE D'IVOIRE 2024

ECOWAS CEDEAO

ECREEE Towards Sustainable Energy

FORUM SUR L'ÉNERGIE DURABLE DE LA CEDEAO ESEF 2024

Vers Une Transition Energétique Juste en Afrique de l'Ouest

Empowering healthcare with sustainable energy: insights from the SophiA project in Léo

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www.ecreee.org

Healthcare access and energy challenges in remote African regions: context for the SophiA

Healthcare access

- Limited access to healthcare in remote areas
- Need for affordable cooling systems to support healthcare delivery

Electric infrastructure

Unstable and inadequate electrical infrastructure

- Dependence on non-renewable energy sources

Water supply

- Limited access to clean drinking water
- Need for cold, warm, and hot water for various medical applications

Medication and vaccine storage

- Insufficient cold chain for storing medications, vaccines, and blood products.
- Reliance on accessible and reliable refrigeration technologies.

Environment and pollution

- Chemical pollution from the use of traditional refrigerants.
- Importance of environmental protection and sustainable solutions.

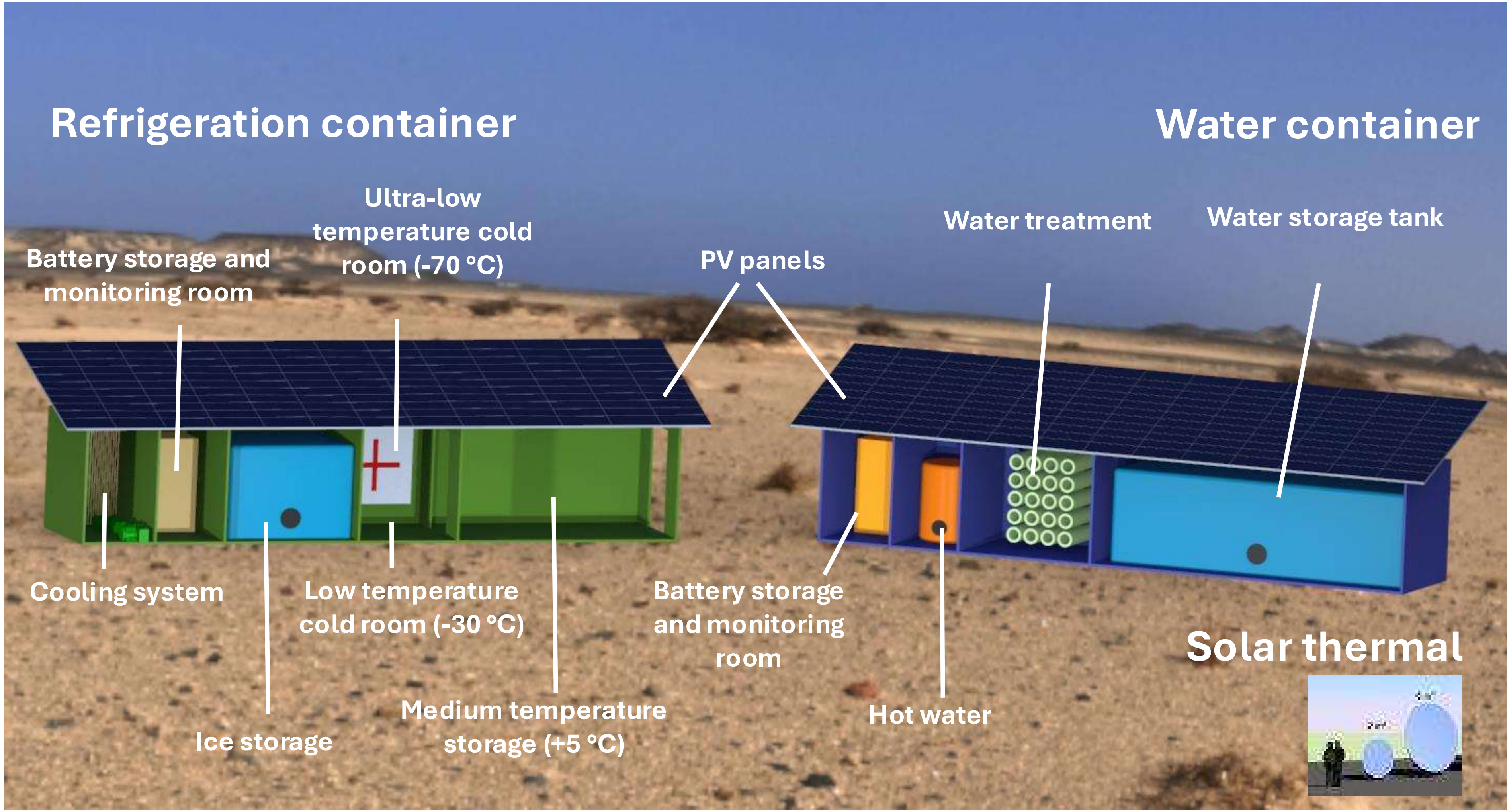
COVID-19 RESPONSE

SophiA: sustainable off-grid solutions for pharmacies and hospitals in Africa

Provide sustainable off-grid energy supplies and clean drinking water for rural and remote health facilities in Africa, thereby accelerating the sustainable development, growth and economic transformation, and ensuring improved access to energy and health services for all.

- Safe and clean **drinking water**
- **De-ionized water, hot water & steam**
- **Refrigeration** of medicines at **+5 °C**
- Low temperature storage at **-30 °C**
- Ultra-low temperature storage at **-70 °C**
- **Electricity** supply (PV-Med-Port)

SophiA technologies



SophiA consortium

13 partners (5 in Africa)

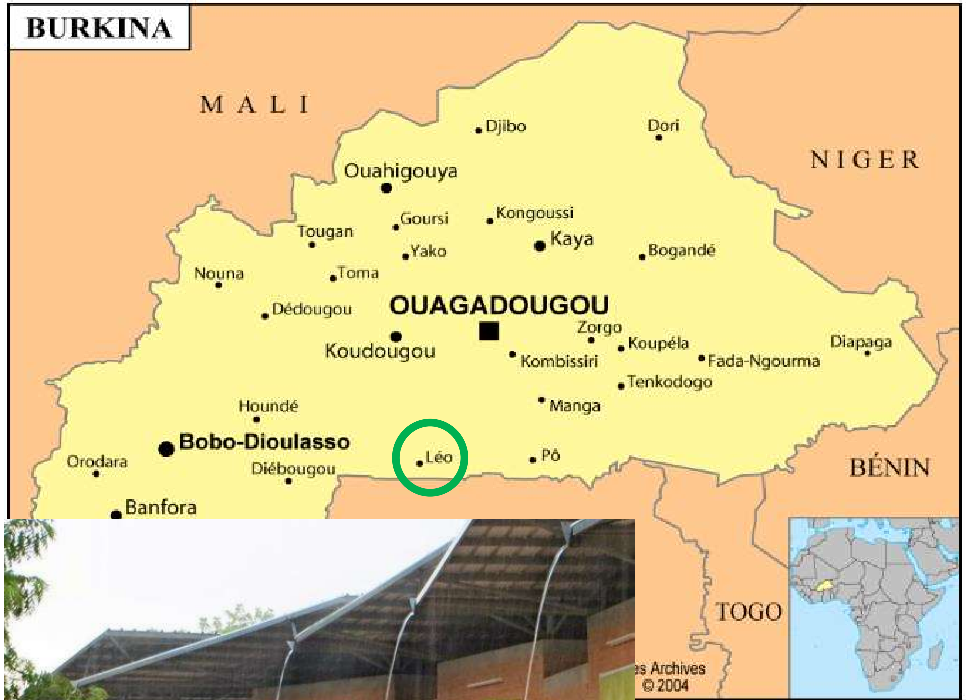
8 countries (5 in Africa)

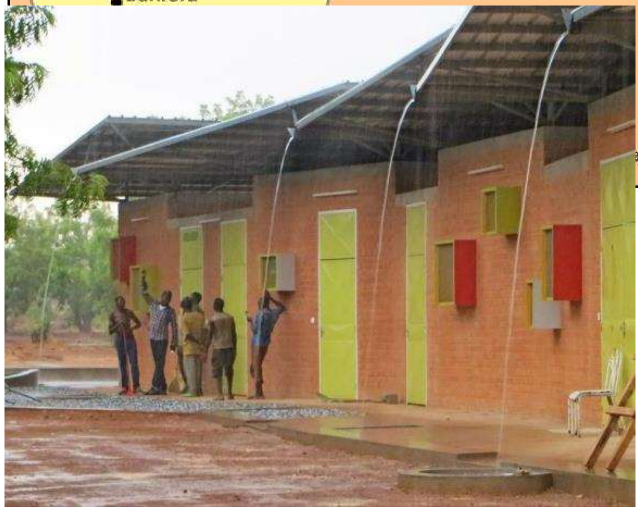
4 years (Oct 2021– Sep 2025)

€ 8,000,000

Horizon 2020
European Union Funding
for Research & Innovation

Demonstration site



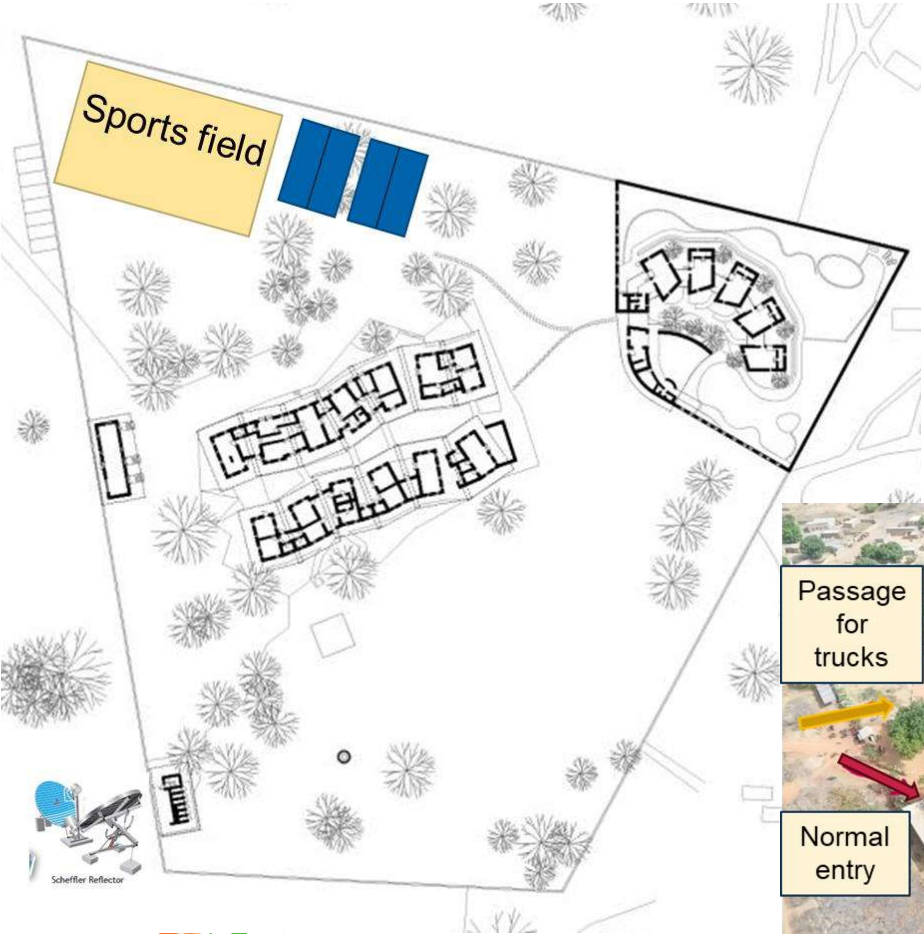


Dr. Sedogo Medical and Surgical Clinic, Léo (Burkina Faso)

A healthcare center focused on sustainability

Bioclimatic architecture (Francis Kere, Pritzker Architecture Prize)
Quasi-self-sufficient in
  Electricity (solar PV: 30 kW + 120 kWh): ~75% solar coverage
  Water: borehole + rainwater harvesting (underground reservoir) + wastewater treatment for irrigation

Initial challenges and adaptations



Initial challenges and adaptations

- Shipping
- Transit
- Customs
- Check-point
- Materials and gases local availability

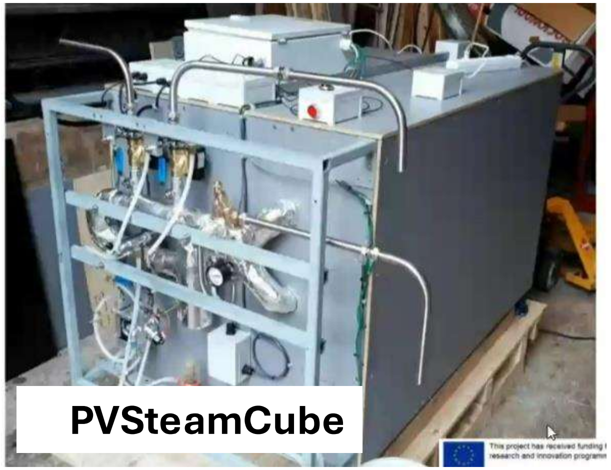
Component	Value
Propane cycle	16 kW cooling capacity
CO_2 cycle	2 kW cooling capacity
Ice storage charge	2,4 kW
Bridge time	36 h
Batteries capacity	25 kWh

Installed SophiA technologies


SophiA containers


Solar cooking
Scheffler reflector


PV-Med-Port


PVSteamCube


Solar cooking
PVSteamCube

Launch day: June 27, 2024

- **Key attendees**: Téwindé Isaac SIA (Haut-Commissaire of the Sissili province, representing the government), Ahmed Coulibaly (Special Adviser of the Minister of Energy), Prof. Harouna Karambiri (Director of Research at 2iE, representing the Head of 2iE), Administrative and customary authorities (traditional chiefs, deputy major, president of the Tribunal de grande instance (Regional Court), district attorney, etc.), etc.
- The invited embassies (DE, CH, EU) could not attend.

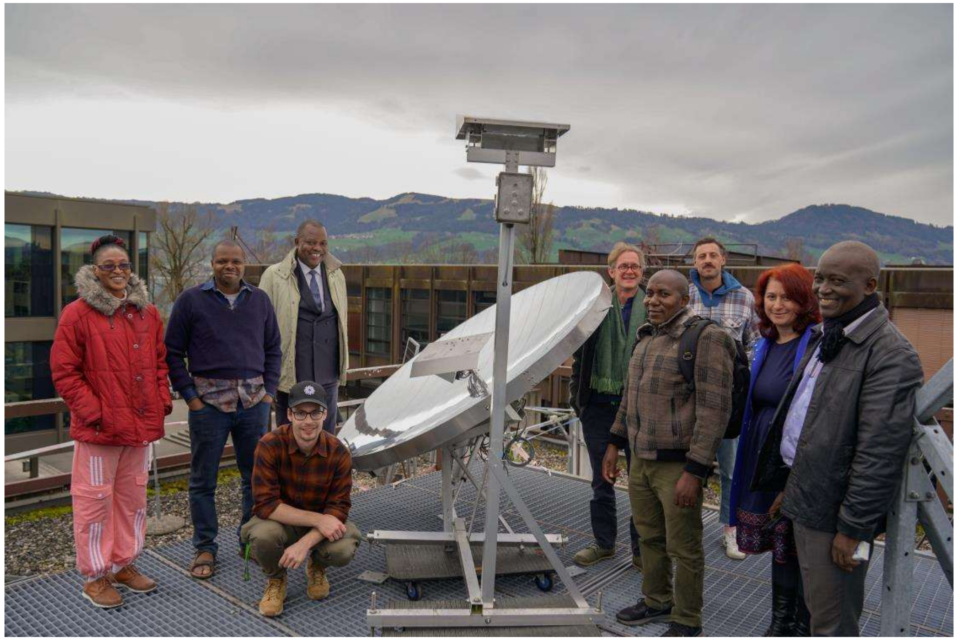
Cost savings and environmental benefits

- Clean water (safer) and de-ionized water now directly available at the hospital
- Possibility to store medicine down to -30 °C (including for neighboring hospitals)
- Hospital laundry powered by steam from solar energy
- Hospital kitchen entirely powered by steam from solar energy
- Domestic hot water to the guesthouses
- Ice for the village (social responsibility)

Training and capacity building

Train the trainers: empowering local core teams

Rapperswil (SPF, Switzerland) + Karlsruhe (HKA, Germany)
February/March 2024



Training and capacity building

Empowering local stakeholders for long-term sustainability

- **Objectives**:

Strengthening the capacities of local stakeholders in the knowledge, management, and operation of sustainable energy solutions and water treatment systems implemented as part of the SophiA project.

- **Training in 2 phases**

Theoretical (June 24th to 26th) and Practical (June 27th to 28th)

- **Module covered**

Water treatment, Refrigeration, Solar PV systems, Solar water heaters, SCADA, PVsteamCube

- **Participants**

Total participants: 28 (24 men, 4 women)
Refrigeration technicians, technical staff from hospital and national refrigeration associations, operators in the field of water and wastewater treatment, businesses interested in marketing the SophiA concept, students, startups, innovators, technology companies, and other industrial stakeholders, universities and training centers offering technical education.

Sustainability: post-project maintenance, scalability and marketing

- Local capacity building
- Online courses, internships and summer schools for students
- New services and products (de-ionized water, solar food) to cover part of maintenance costs?
- Partnerships to locally manufacture and sell SophiA systems.
- New markets (e.g. storage of fruits, vegetables and meat)

Lessons to inform future installations

- Successful design, development and implementation and demonstration of sustainable technology
- Anticipation, anticipation, anticipation
- Natural refrigerants (propane, ethane) local unavailability, especially ethane to power the -70 °C unit; international transport has an impact on the package and cost, due to fire hazards
- Long-term sustainability and technology commercial dissemination
- Culture de collaboration: first African-European project collaboration for some partners, different social realities (allowance for participation in workshop/training, etc.)
- Concept of technology transfer: interpretation may vary among partners!
- Monitoring on-going to evaluate the technical performance and economic/environmental benefits