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LEAP-RE

Long-Term Joint EU-AU Research
and Innovation Partnership on Renewable Energy

The LEAP-RE project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 963530.

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Consortium

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Project coordinator:
- Irina G. Mocanu, Centrul IT pentru Stiinta si Tehnologie, **Romania**

Project partners:

- Centrul IT pentru Stiinta si Tehnologie (**Romania**)

-Tampere University (**Finland**)

- Laboratory of Applied Hydrology and Environment, University of Lomé, (**Togo**)

- Unité de Développement des Equipements Solaires / EPST Centre de Développement des Energies Renouvelables (UDES / EPST-CDER) (**Algeria**)

- Institut für Sozialforschung und Sozialwirtschaft e. V. - ISO (**Germany**)

Aim of the project

LEDSOL is aiming to foster long-term collaboration between Africa and European organizations on sustainable and affordable technologies by providing off the grid clean water through the use of a smart portable unit based on UV/LED disinfection augmented with classical decontamination and powered by renewable energy sources.

Relevance vs MARs

- LEDSOL will support remote areas and communities: (1) suburban areas in Algeria and nomads of Sahara; (2) Togo's rural areas where clean water is a huge challenge (MARS 3).
- The system is powered by renewable energies and adapted to the needs of the end-users (MARS 3).
- Testing in real life environments (MARS 3).
- Assessment of needs and potential resources at country or regional levels (MARS 1).
- Progress of EU-AU R&I cooperation on RES (MARS 1).

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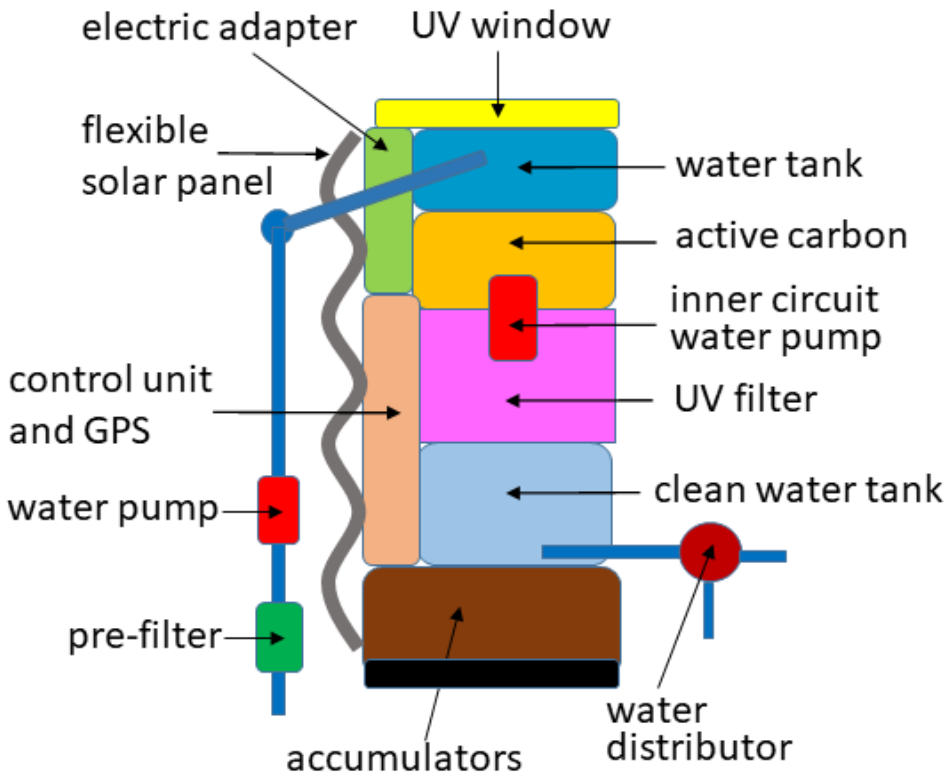

- Two reservoirs of 20 l (e.g., 32x25x25 cm³) each; one works as intermediate water storage and gets filled directly from the water source;
- Pipe with a rough filter and pump for filling the intermediate reservoir with a flow rate of at least 5 l/min;
- Pump to transfer the water from the intermediate reservoir to the final one through the filter and disinfection subsystem with a flow rate up to 2 l/min;
- Classical water filters;
- UV-filter for disinfection with a processing capacity of 2 l/min; approx. size: 35x15x3 cm³
- Solar panel as energy source
- Battery for energy storage
- Digital and power electronics to ensure tasks like: energy supply for pumps and UV-filter, localization, supervision, communication, etc.
- Backpack

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Key challenges addressed by the project

1. Development and optimization of the UV irradiation module
2. Development and testing of the solar energy module
3. Data processing and control software
4. Enhanced wireless positioning and tracking algorithms in order to keep track of the water sources and workforce/people
5. Pilots in realistic environments – Lome region, Algeria in (Tipaza and Blida) and Baragan region (Romania)
6. We aim for an affordable system which will be designed by keeping in mind the end-users' needs and local opportunities
7. A business plan for the future exploitation of the LEDSOL results.

Expected results :

- ***Mid-term expected results (end 2023)***
  - ✓ LEDSOL System fully designed
  - ✓ UV irradiation module developed and lab tested
  - ✓ Solar energy module developed and lab tested
  - ✓ Data processing and control module – beta version
  - ✓ Positioning algorithms and solutions – beta version
  - ✓ Report on users' needs

- ***End of project expected results (2025)***
  - ✓ Integrated and validated (real life conditions) LEDSOL system
  - ✓ Pilot results
  - ✓ Business plan for future commercial exploitation
  - ✓ Wide scale and scientific dissemination
  - ✓ Strategy for sustainable cooperation between the partners and with third parties from outside the consortium

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Expected outcomes in case of success of the project (2030)

What could be the impact of the project at 2030 on the economy and/or society in case of scaling up the results of the project ?

1. Certified solution for clean water production that can be easily and widely deployed in remote areas
2. Access to clean water for a large number of beneficiaries (at least 100 LEDSOL units in use)
3. LEDSOL advertised as product by CITST
4. Commercial exploitation contracts with local vendors in Africa and in Romania
5. Long-term and close scientific cooperation between Europe and Africa in terms of 2-3 common grant applications submitted

Which main risks of failure during project implementation ?

Describe the main risks identified for project implementation

1. Availability of components due to electronic component shortage
2. Lower disinfection performance for the UV/LED module than the targeted 99.999% pathogen inactivation
3. Partners quitting the project or underperforming (funds are already cut for Togo)
4. The system does not meet users' expectations and requirements
5. Local policies are impacting the project and in particular funding, visa, pilots, etc

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Contribution of the project to AU – EU R&D cooperation

In term of reinforcement of scientific or innovation cooperation, capacity building…

- The LEDSOL project supports cooperation between Europe and Africa during the project and beyond by seeking resources for product development and commercialization:
  - ✓ Task 1.3 will identify key stakeholders for future commercialization through EU-AU cooperation; Task3.3 will assess needs and user satisfaction
  - ✓ Common work will be published as joint publications or applied for IPR protection via common patent applications
- Additional grant applications will be prepared for a sustainable cooperation
- The cooperation network will be extended

Interest of Consortium members in participating in LEAP-RE clustering activities

Which thematic (MARs technologies…) or methodology (modelling, on site experimentation…) members would be interested to share with other LEAP-RE projects?

- End-user input on needs and satisfaction from both pre- and post-piloting inputs
- Algorithms for localization relying on multi-system multi-frequency GNSS and possibly LEO signals (LEO-based validation to be done only through simulations, while GNSS validation is with measurement data)
- LEDSOL system performance