

REPTES
(07/2023– 06/2025)



LEAP-RE

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

Pillar-1 project



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

Consortium

8 partners involved:

- ✓ University of Cagliari
- ✓ Smart city instruments
- ✓ University of Liege
- ✓ Green Energy Park
- ✓ Ecole nationale supérieure d'arts et métiers de Rabat
- ✓ Ecole nationale supérieure des mines de Rabat
- ✓ Federal University of Petroleum Resources Effurun
- ✓ Bucharest University of Economic Studies

Aim of the project

Develop a **proof of concept** of innovative **RES-based multigeneration/storage systems** for covering both heat/cool and electricity demands of isolated and rural communities in Africa and for producing other **green commodities** for agriculture such as ammonia, desalinated water, and refrigeration energy for food conservation. The core of the system is the coupling between RES-based generators and **pumped thermal electricity storage (PTES)** system.

Relevance vs MARs

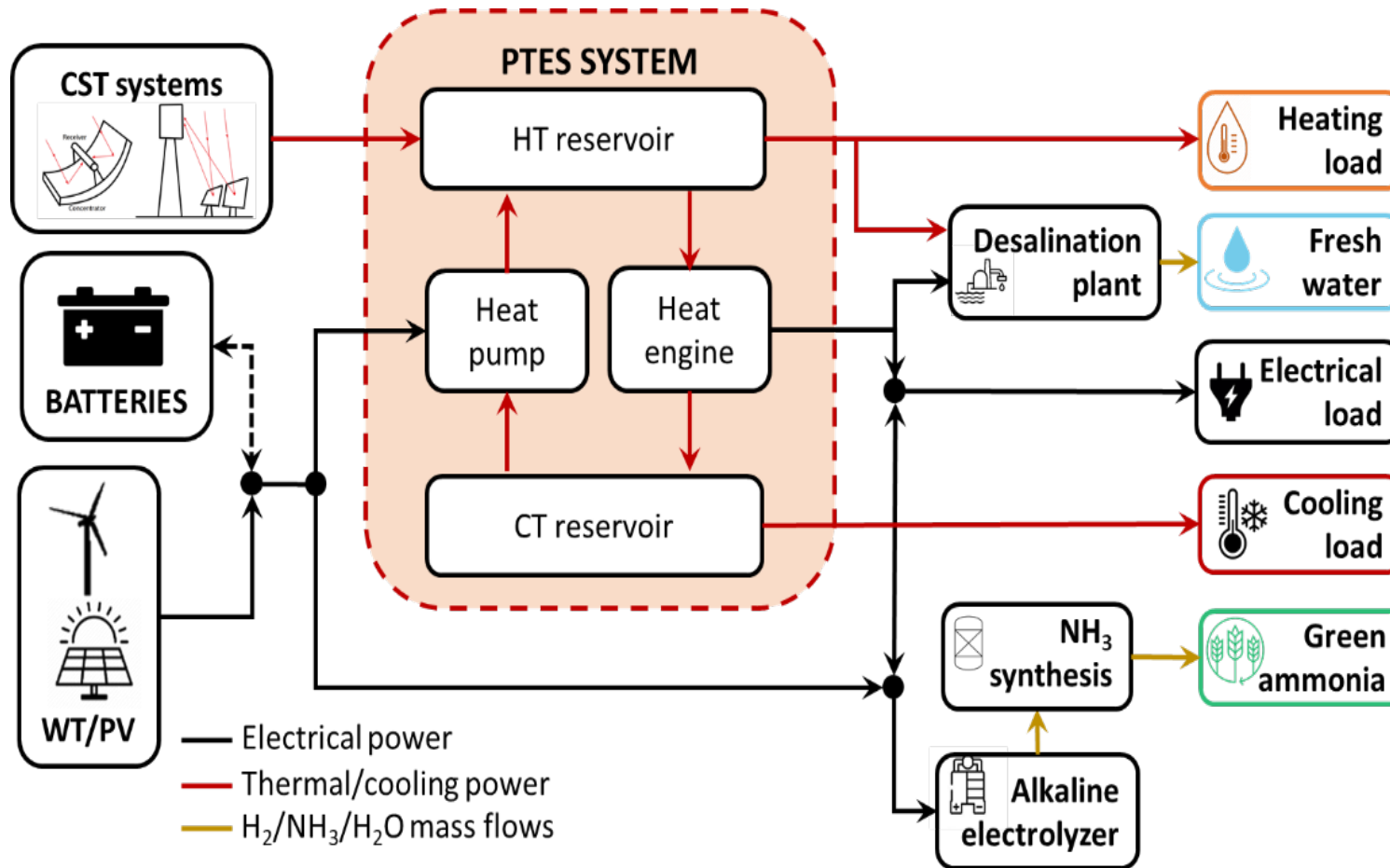
The proposed concept could give a response to the challenge of the MAR3 since it is completely based on RES and conceptualized for off-grid applications. This scheme is flexible both in terms of the energy generation systems as well as the produced outputs, in a manner that, the system's configuration is tailored to fit the environmental conditions of the concerned community

The outcomes of REPTES also respond to the challenges of MAR4 since the project will involve the assessment of the RES-PTES concept through four case studies representatives of small and medium-scale distributed generation.

REPTES



LEAP-RE



Schematic diagram of the proposed integrated system

Key challenges addressed by the project

1. Improving knowledge on the technical ability and limits of PTES system to operate as main energy storage systems in real off-grid applications
2. Assessment of the overall impact by using a multi-disciplinary approach (technical feasibility, economic prospects, relationship between the technological and social spheres and global environmental impact).
3. Analysis of new and innovative system configurations based on the coupling of PTES system with external heat sources and green commodities production plants.

Expected results :

➤ Mid-term expected results (mid 2024)

- *Definition of 4 case studies (2 from Nigeria and 2 from Morocco)*
- *Design of the main system components*
- *Development of tools for the simulation of the various components under operating conditions*

➤ End of project expected results (2025)

- *Technical feasibility analysis and performance evaluation of the RES+PTES system for the study cases considered*
- *Report on cost-benefit analysis, business opportunities and sustainable investment alternatives*
- *Guidelines for scalability and replicability of REPTES*

Expected outcomes

Through its innovative solutions, the REPTES system will have a great impact on the quality of life of those who will use it.

1. The proposed system could lower the cost of energy supply for communities
2. REPTES could have impact on sanitary security because it will enable local communities to procure fresh desalinated water.
3. REPTES will also enable improved home comfort by providing fresh and warm air as needed.
4. Green ammonia production will also enable useful fertilizer for agricultural production, 100% renewable and carbon-free.

Which main risks could you face during the project implementation ?

1. Delay in receiving funds from the funding agency
2. Difficulties in data collection
3. Difficulties in integrating the different subsystems models into a single model
4. Incorrect perception by the public opinion. Limited interest in the proposed technologies.

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

REPTES objectives are clearly in line with the R&I challenges to be addressed within the “pillar 2: Sustainable Energy” of the “Roadmap for a jointly funded AU-EU research & innovation partnership on climate change and sustainable energy (CCSE)”,

Since the proposed technology is characterized by low TRL, the development of reliable models and the set of results obtained can also be used as a starting point for further EU-AU projects

The project results could be the reference for the development of a suitable pilot plant to demonstrate the feasibility of the proposal.

The development of an effective research, with a significant scientific impact, is one of the primary objectives of the project. With this goal, during the project, 11 young scientists will be specifically trained on the topics addressed by REPTES and 7 of them will come from Africa.

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

Modelling approach used for energy consumption forecasting of stand-alone systems

System configuration proposed and modelling approach used for off-grid applications

Business model used for investigating economic prospects

Methods adopted for analyzing social acceptance

THANK YOU

CONTACT US FOR MORE INFORMATION



www.leap-re.eu



contact@leap-re.eu



[@leapRE_EU](https://twitter.com/leapRE_EU)

