

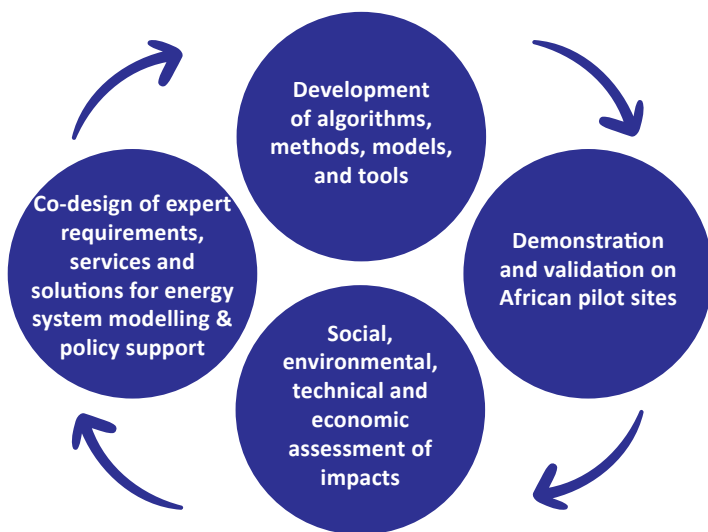
Energy System Modelling for Green Development of Africa

The main objective of the EMERGE project is to provide African policymakers, academics, investors, and citizens with the tools and knowledge required to increase the production of clean energy and the sustainable use of resources while bridging cultural and socioeconomic divides. This ambition is rooted in concrete actions and strategies aimed at supporting the transition of the African energy systems toward 100% renewable systems.

Project Ambition

To address energy transition challenges in Africa, EMERGE will introduce tailored solutions and establish knowledge communities by leveraging open innovation and practical problem-solving for stakeholder engagement, participatory design of the tools, and capacity-building initiatives.

Methodology



Stakeholder Benefits

- Scientific and technological innovations can enhance policy-making, leading to improvements in well-being, research expansion and collaboration opportunities for a successful energy transition.
- EMERGE's analysis of African energy systems supports policy-making by facilitating actionable strategies for the widespread adoption of clean energy technologies, generating multiple benefits.
- Synergies with similar initiatives offer the potential for additional value and impactful actions to accelerate the deployment of renewables and the improvement of energy efficiency.

EMERGE Toolbox

The EMERGE Toolbox consists of a set of methods, algorithms, tools, and platforms for the development and analysis of energy systems based on green technology at a large scale. With a wide variety of functionalities, the Toolbox will evolve based on user feedback and needs.

01

CEPIA (Artelys)

CEPIA is an Excel-based tool, allowing for **user-friendly assessment of energy and climate scenarios** through multiple economic and environmental indicators. The parameters used in the modelling can represent concrete actions or objectives of policymakers.

02

Hosting Capacity (CIRCE)

Hosting Capacity tool has an algorithm implemented that calculates the **total amount of power that can be installed in each node of the grid**. Due to its static nature, the tool is suitable for planning of industrial, rural and city areas.

03

Optimal Storage Placement (CIRCE)

The Optimal Storage Placement tool has an optimization algorithm implemented that calculates the **best locations in the grid to install storage systems**. The tool also performs a cost-benefit analysis based on the price of energy assets.

04

GREENADVISE (UNIZAG FSB)

GREENADVISE is an **investment advisor** based on a Python module and used for the optimization of small-scale energy systems. Its application can range from household or building level to small cities and is suitable for citizens without energy education.

05

PowSyBI (Artelys)

PowSyBI is an open-source framework written in Java, dedicated to **modelling and simulating European electricity networks**. It is used for transmission network investment planning, network security analysis following incidents and the merging of individual network models.