

ENERGICA

Green transition and **energy** access in urban and rural **Africa**

LEAP-RE

Introduction at the LEAP-RE Stakeholder Forum

3-6 October 2022



Technische
Universität Berlin



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101037428. This output reflects only the author's view and the European Union cannot be held responsible for any use that may be made of the information contained therein.

Who we are...



28 partners



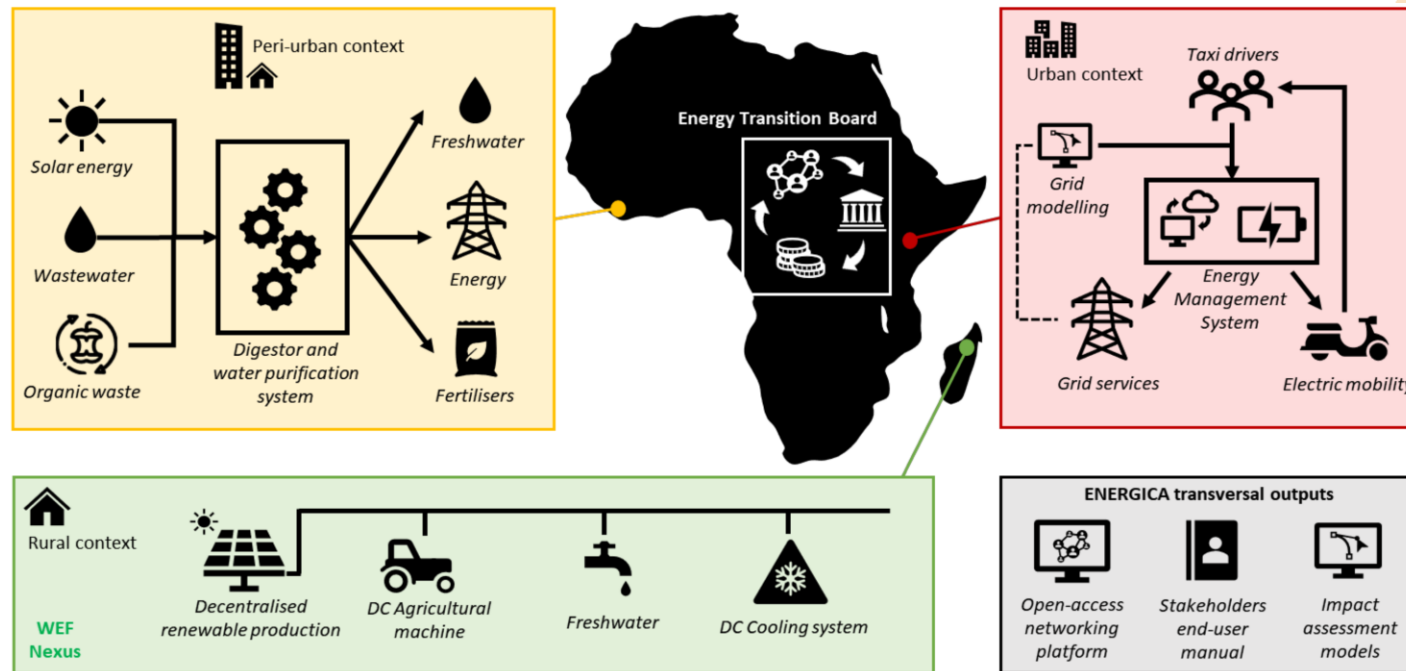
12 M.€ budget



Nov. 2021 – Nov. 2025

ENERGICA

Concept



The overall concept of ENERGICA is to develop appropriate and easily replicated **methodologies** for **energy access technologies'** uptake throughout both African and European continents. To ensure the proper uptake of the innovative technical solutions and sustainability in their different contexts, the ENERGICA activities are based on the building of locally based **Energy Transition Boards (ETB)**. ENERGICA will develop adapted demonstrations in **rural** contexts with the **Malagasy productive use nanogrids**, in **peri-urban** and **urban** contexts with the **Sierra Leonean biodigester** and **water purification systems** and in **urban** contexts with the **Kenyan smart e-mobility and battery storage management system**.

Specific objectives

- SO1** Demonstrate integrated productive use systems in innovative nano-grids addressing the WEF nexus
- SO2** Demonstrate water-purification and biogas low-tech cost-effective systems addressing the WEF nexus
- SO3** Demonstrate urban grid flexibility and decarbonisation through smart battery management for e-mobility
- SO4** Create dedicated local community-based structures for the uptake of renewable energy technologies
- SO5** Set up ambitious and tailored replicability strategies
- SO6** Develop capacity building and knowledge transfer programmes
- SO7** Develop tailored business models, circular economy models and local value chains
- SO8** Foster strong EU-AU collaborations

Rural demo – Productive nanogrids

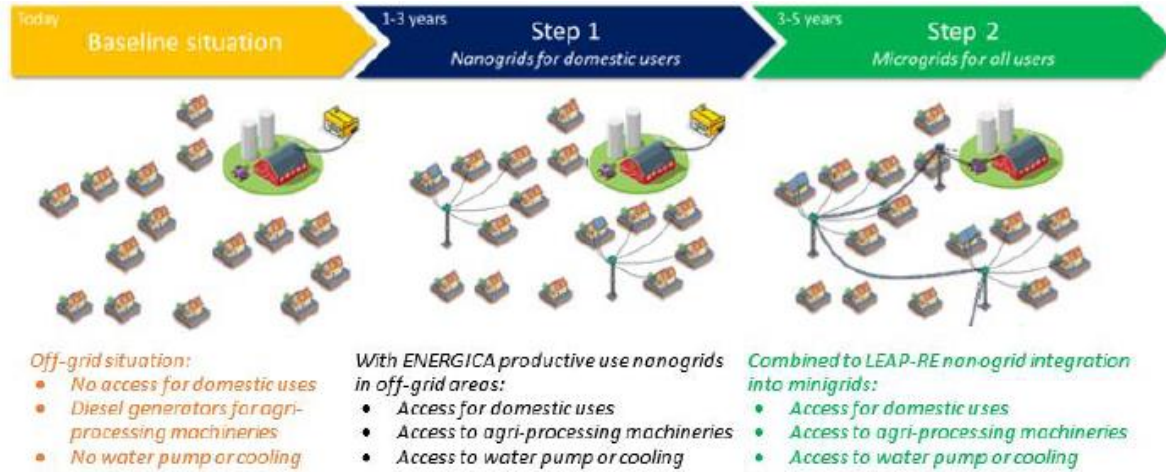


Figure 3: Malagasy demonstrator concept



Figure 2: Madagascar demonstration

Context	<ul style="list-style-type: none"> • 5% electrification rate in rural areas (17% overall) • low population density of 43.4 people/km2 → Grid extension not a feasible option • Low income, especially in rural areas
Solution	<p>Productive nanogrids development</p> <ul style="list-style-type: none"> • Solar powered DC nanogrids (powering 3 x ca. 100-200 households) with PAYGO solution • Agri-machinery (DC rice-hullers), cooling devices and water pumping connected • Water-Energy-Food nexus • "Anchor load" model to increase revenue for operator

Peri-urban demo – Biogas-water system



Figure 5: FWT-TWT's current AD plant



Figure 8: Water purification solar prototypes (reactors) located at CIEMAT-PSA



Figure 4: Sierra Leone demonstrators

Context

- Only 28 percent of health facilities have access to reliable electricity in sub-Saharan Africa
- Food security is intimately tied to access to fertiliser
- long-term sustainability of agricultural production relies on replenishment of soil organic content to maintain fertility

Solution

- Small-scale biogas digester to serve electricity and heat (to a local hospital)
- Sideproduct of 3000kg/day residue to be used as fertilizer
- Coupling to the **ARENYS** water purification system will lead to tackling WEF nexus issues on site

Urban demo – Electric motorcycles and swappable charging station

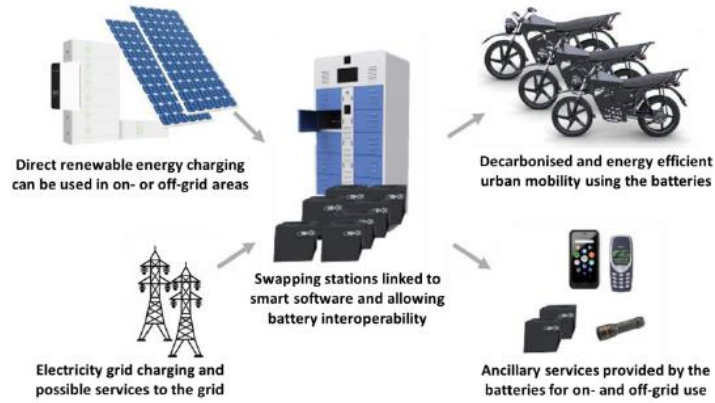


Figure 11: Eco-system for battery swapping



Figure 6: Kenyan demonstrators

Context

- Kenya has put itself on the forefront of the transition to a low-carbon economy through the Climate Change Act of 2016 and the Energy Act of 2019
- 85% of energy is produced from renewables and an excess production of about 800MW
- However, challenges with energy access, transport, pollution and congestion as a result of inefficient transport systems and old vehicle fleets → hazardous particle emissions affecting the environment and public health

Solution

- Service of swappable batteries and swapping stations for electric motorcycle fleet
- 15 main motorcycle hubs in urban and sub-urban areas of Nairobi
- demonstrator will be focused on how swapping stations optimally can be distributed including payment system and telemetry optimization

Happy to exchange on

- Methodological and technical approaches (Productive uses of energy, WEF nexus, Hydrogen, ...)
- Socio-economic challenges (Co-creation of energy solutions, Local energy communities, ...)
- Solution uptake, replicability and transfer (Capacity building, Market and Policy uptake, ...)
-



THANK YOU!

