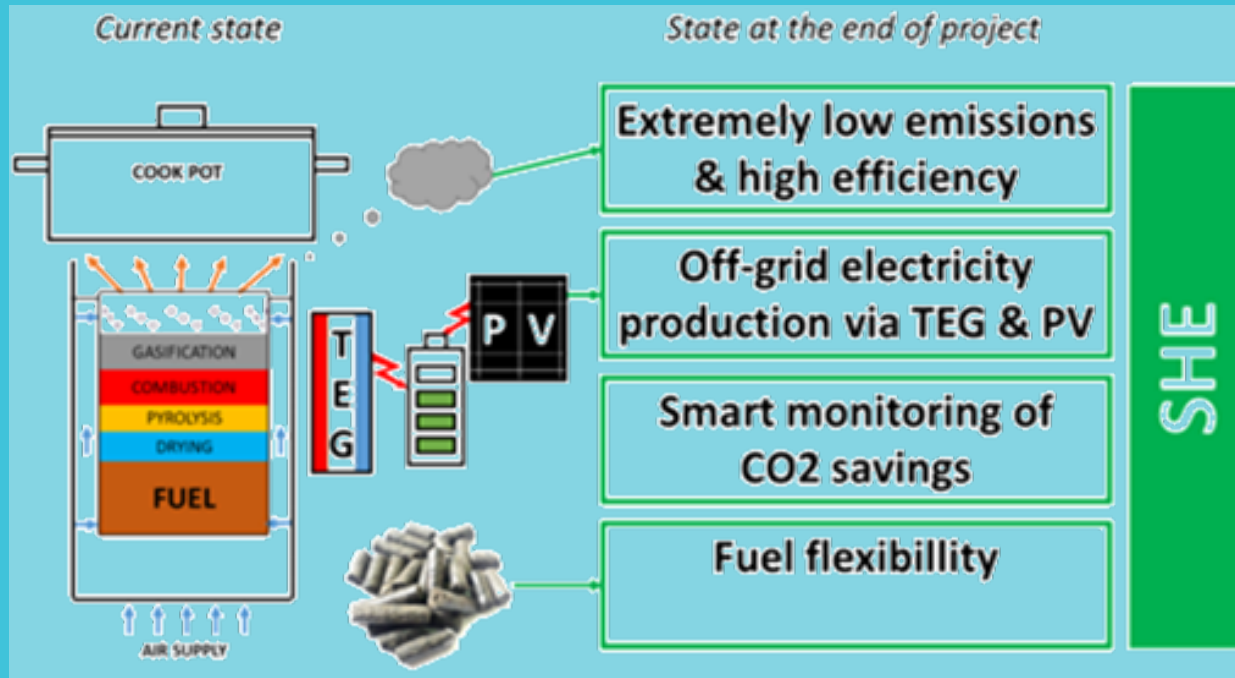


# SHE

## SMART HOME ENERGY

JULY 2023 – JUNE 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.



# ***SHE: Smart Home Energy for Africa***

## **Consortium**

*The consortium is a multi-disciplinary and multi-country alliance of partners with expertise in biomass combustion and locally cooking customs and project delivery.*

*The European partners will investigate the science of biomass micro-gasification with multiple fuels using both empirical and CFD models.*

*The African partners will establish the needs of users in different rural and urban environments and test the stoves in the communities both from a practical application point of view as well as proposing business models for rollout.*

## **Aim of the project**

*To develop a unique Smart Home Energy (SHE) technology and demonstrate its effectiveness and impact on users in four rural communities in two countries (South Africa and Uganda) taking into account locally available biomass fuels other than wood from trees.*

## **Relevance as a Smart Stand-Alone System**

*Biomass cooking fuels produced from locally sourced feedstocks are vital to the sustainability of the cooking value chain.*

*These fuels need to always be accessible, affordable and available. The need for a modern cooking device that is suited to available fuel its efficiency and ease of operation is important.*



# ***SHE: Smart Home Energy for Africa***

## **THE SITUATION**

1. **7 out of 10 people** in Africa still use/burn solid biomass and traditional combustion for domestic cooking and heating
2. This practice is marked by **low thermal efficiency, high per capita fuel use and excessive harmful emissions**
3. The use of biomass from natural wood resources now **outstrips nature's ability to supply enough fuel and is causing widespread deforestation**

## **OUR CHALLENGE**

1. **Lower daily household fuel needs** by increasing combustion efficiency and decreasing harmful combustion emissions
2. Find **alternative sources of sustainable biomass for home combustion** that do not rely on harvesting natural forest trees.
3. Use **thermal energy to generate backup battery power** when solar power is not possible.

## **OUR SOLUTION**

1. Use **advanced biomass gasification to boost thermal efficiency > 50%**, and ensure that indoor home emissions from cooking meet and exceed WHO standards.
2. Adapt the gasifier stove to effectively burn **solid biomass fuels from multiple renewable and sustainable sources**.
3. Build an **affordable Stove TEG** (Thermal Electric Generator) that can recharge solar batteries.



# ***SHE: Smart Home Energy for Africa***

## ***Key challenges addressed:***

- 1. Lack of sustainable biomass fuels in the local communities***
- 2. High per capita biomass fuel use because of low combustion efficiency***
- 3. High harmful emissions causing health issues in women and children***
- 4. Lack of backup power when solar is non-functional because of weather***
- 5. Lack of effective carbon reduction monitoring when using clean cooking technology***

## ***Expected results :***

- ***Mid-term expected results (mid 2024)***
  - *Baseline study of traditional practices for energy and cooking*
  - *Characterisation of locally available non-wood biomass resources*
  - *CFD and Laboratory tests of biomass fuels used in gasification with focus on low medium and high ash content*
  - *Theoretical and laboratory testing of suitable TEG technologies*
- ***End of project expected results (2025)***
  - *Revised stove design/s including TEG capability*
  - *User opinions from clean cooking workshops on SHE device*
  - *Business models for localised biomass fuel production that does not rely on harvested forest wood or fossil fuels*



# ***SHE: Smart Home Energy for Africa***

## ***Expected outcomes***

*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. Manufacturing at scale in Africa of efficient biomass gasifier stoves***
- 2. Manufacturing at scale of biomass pellets from agro-waste streams and climate friendly energy crops***
- 3. Reduction in per capita use of biomass fuels, reducing GHG emissions***
- 4. Improvement in living standards for poor households in both urban and rural environments***

## ***Which main risks could you face during the project implementation ?***

*Describe the main risks identified for project implementation*

- 1. Access to capital***
  - 1. For establishing energy crops***
  - 2. For manufacturing pellets***
- 2. Access to land for biomass crops***
  - 1. Tribal ownership***
  - 2. Competition with food production***



# ***SHE: Smart Home Energy for Africa***

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

- *Home-grown energy production of cooking fuel can reduce imports, create jobs and build the local capital base.*
- *Biomass cooking fuels have a lower carbon footprint than LPG or ethanol when doing a LCA (Life Cycle Analysis)*

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

*Other bio-mass based energy projects*

# THANK YOU

CONTACT US FOR MORE INFORMATION



[www.leap-re.eu](http://www.leap-re.eu)



[contact@leap-re.eu](mailto:contact@leap-re.eu)



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

