

LEAP-RE STAKEHOLDER FORUM
THEMATIC SESSIONS

***GEOHERMAL ENERGY
COMMUNITIES AND
SUSTAINABLE BUSINESS
MODEL.
PRELIMINARY EVIDENCES
FROM WP9 AND WP11
ACTIVITIES***

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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.

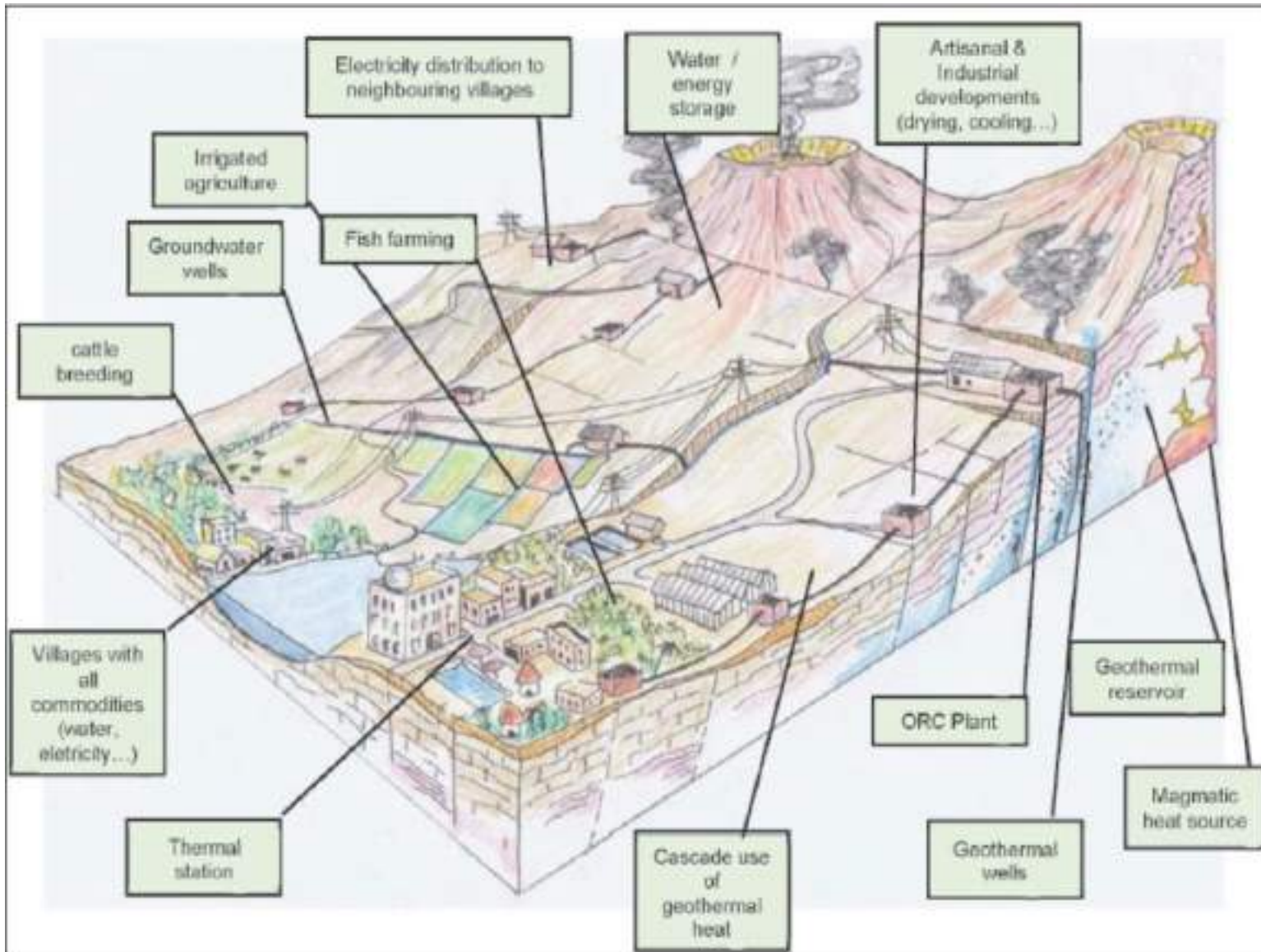
Ambole et al. (2021) conducted a **review of 19 documents** on energy communities across 46 SSA countries.

- ✓ Energy communities offer an **opportunity to address energy access challenges in Sub-Saharan Africa (SSA)** through decentralised local energy systems, public participation in deliberative processes, multi-stakeholder involvement, and community ownership (Ambole et al., 2021).
- ✓ Some energy projects in SSA assume the **conventional characteristics of energy communities**, but overall, **communities** in SSA are **not sufficiently empowered** to institute and manage their own energy projects.
- ✓ Ownership of community energy projects is a challenge as most projects are **owned by the government solely or in partnership with elitist groups** (top-down approach).
- ✓ Integration of a **co-design approach** in SSA's energy communities to allow the incorporation of citizens in the planning, implementation, and management of energy communities
- ✓ The **sophisticate business models** used by energy communities in developed countries are **not replicable** for low-resourced, energy-poor communities in SSA.

Geothermal village: objective



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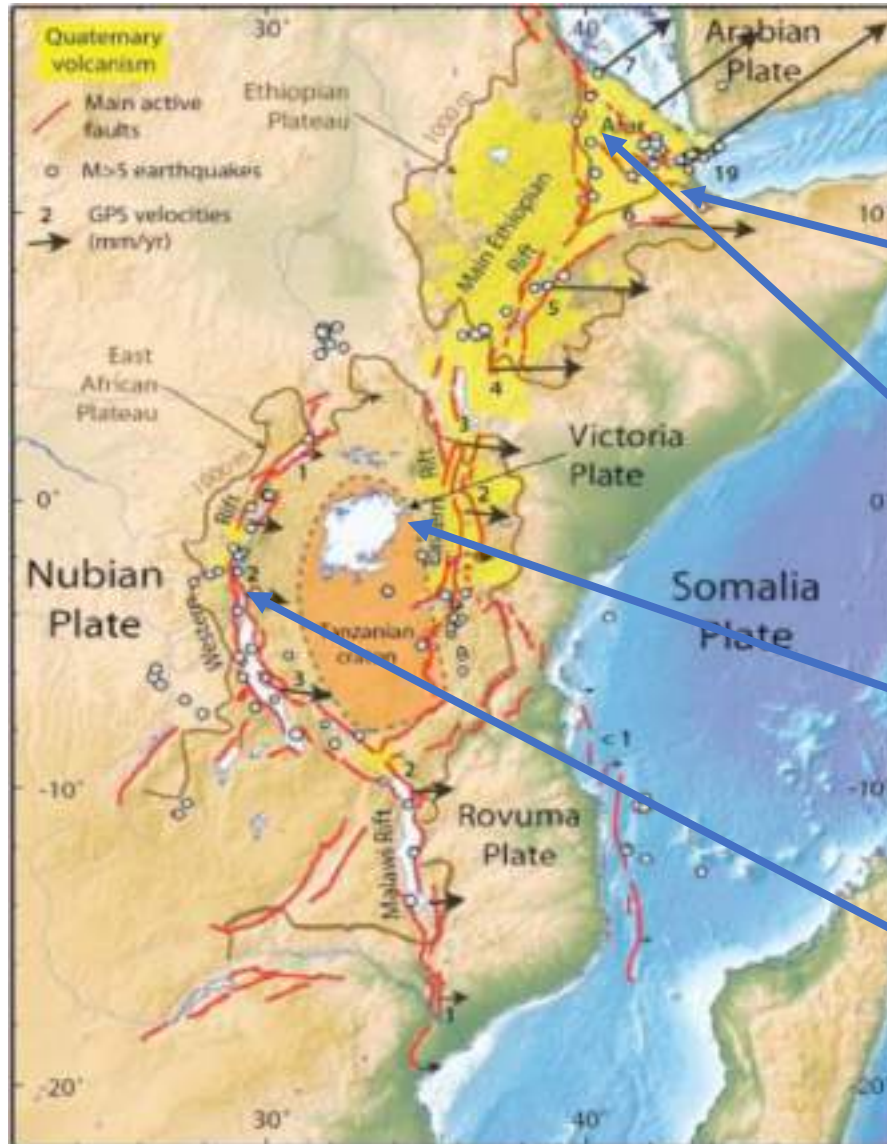
A project to build **geothermal-based stand-alone** electric and thermal energy systems to **off-grid African communities**.

A project that **brings together skills across the entire geothermal value chain**: resource exploration, resource exploitation, societal acceptance, local economic development.

Geothermal village: targets



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4 proposed targets:

Lac Abhé (Djibouti)

Afar (Ethiopia)

Homa Hills (Kenya)

Bugarama (Rwanda)

Task 11.2 – Main objectives



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Partners involved: SSSA (leader), University of Nairobi (co-leader), UNITO, Géo2D, EDCL, ODDEG, (*HHGCBO, AGAP*)

Main Task objectives:

- **Determine the socio-economic needs** of the communities living on each selected geothermal site, covering a population large enough to justify the geothermal production system.
- **Understanding the living conditions, social organization, culture, values, gender dynamics** such as gender relations and social division of roles.
- **Provide the local communities' engagement strategies** through anthropological and sociological approaches.
- **Partner with local community-based organizations** when existing and analyse their needs in order to better strengthen their capacity to further master the projects on sites

- 1. Context analysis** - *UoN, UNITO, Géo2D, SSSA, ODDEG, EDCL*
- 2. Social aspects and dynamics** - *Géo2D, EDCL, UNITO, SSSA, UoN, ODDEG, HHGCBO, AGAP*
- 3. Stakeholders' analysis** - *UNITO, UoN, SSSA, Géo2D*
- 4. Best practices in renewable developments** - *SSSA, UoN, UNITO, EDCL, Géo2D, ODDEG*
- 5. Guidelines for Potential Business Models** - *SSSA, UoN, UNITO, EDCL, Géo2D*
- 6. Local organisations' capacity-building needs** – *in collaboration with task 11.5*

Main outputs:

- ⇒ Analysis of **Policy context** (environmental, administrative, etc) governing geothermal development.
- ⇒ **Strategies and models for effective communities' engagement.**
- ⇒ Guidelines for potential **business models** will be defined.



Photo: Interviews with people from the local community (Djibouti, 2021)

Our methodology:

- **Desk research** – systematic Literature Review (*shared with WP9*)
- **Qualitative analysis** – interviews and focus group (jointly with sociologists and anthropologists) to be done in the field – protocol build on LR results
- **Quantitative analysis** – survey to be launched in 2023/4 – build on LR and QLA results

Purpose: Represent the main features studied (challenges, benefits, drivers and barriers – eventual best practices) on renewable energy communities (following, RECs) existing in Africa, with a shape specifically addressed to management aspects.

RQ(s), both addressed to the African context, are the following:

1. How RECs are present in literature?
2. What are main challenges for a sustainable business model of RECs?

Following Bauwens et al. 2022 characterization, our analysis started with a characterization for factors:

1. the **meanings** attached to “community”
2. the energy-related **activities** pursued by communities
3. the **objectives** pursued by communities

Some considerations (following Bauwens et al. 2022)



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- ✓ **Meanings attached to «community»:** the analysis of REC (or related) projects or achievements showed a strong link to territorial proximity;
- ✓ **Participatory processes:** there is a need to support the development processes through intermediaries in the design and initial investment phases. Participatory processes must take into account the **needs of communities** severely affected by energy poverty (to avoid the vicious circle due to economic poverty);
- ✓ **Energy activities and technological homogeneity:** Solar energy is the most easily accessible for electricity, but other renewables can be evaluated, such as geothermal energy, capable of providing also other uses – thermal energy e.g., agriculture, thermal tourism, etc;
- ✓ **Predominance** of the **economic objectives** that in the African context cannot be separated from the social ones – environmental objective to date just ancillary due to RES wide availability;
- ✓ The **other objectives** (political, infrastructural innovation, etc.) appear to be less frequent – due to local and community contextual factors;
- ✓ Avoid to develop **business models** disconnected from communities.

Other variables of analysis: some management challenges



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Strenghts

- Energy access to rural areas
- Positive impact on local economy and wealth improvement
- Social conditions enhancement
- Alternative for fossil fuels and tackling climate change
- Bottom-up approach
- Tool for pursue SDGs in Africa

Weaknesses/Threats

- Initial investment may represent a barrier
- Lack of policies in creating a long-term foundation for engagement with companies
- Sustainability of the project (e.g., Operational phase costs, Willingness to pay, etc)
- Alternative among grid extension or decentralized solutions

Success/Failure factors

- Policy framework and political support
- Project/technological
- Social challenges
- Economic
- Local skills
- Environmental

Room for social and managerial Innovation

- Participatory/bottom-up approach
- Involvement of Community Based Organizations in the management and ownership
- Financial model (classic donor vs innovative: e.g., diaspora or micro-credit)
- Hybrid RES plant
- Capacity building

Qualitative analysis: Homa Hills (Kenya)



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Based on the results coming from the LR, qualitative data collection had started with the first site (Homa Hills, Kenya, 8-18 November 2022).

Activities performed:

- **Focus Group Discussion** in 5 sites with locals (10-15 pp per site) and short questionnaires;
- **Interviews with local administrators** (Chiefs, County Government), electives (MCA), Community Based Organization Executive Committee (created for Geothermal development in 2018), Business Associations (Fishermans, Horticulture, Cotton farmers), NGO (ie. Table Banking), Water public company, etc.



Photo: Focus group discussion in Homa Hills (Kenya, 2022)

Qualitative analysis: Homa Hills (Kenya)



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The activities carried out so far outlined some **basic needs expressed by the communities** that can be answered (following their expectations) through GV project, as:

-Clean water; electricity; roads; poverty; lack of employment; health; education for youths; women opportunities.

Electricity can be used to*:

- domestic use: lights, cooking, etc
- agriculture: pumping water, both from the lake and wells
- fishing: drying/storing fish
- public services: lights in schools, conservation of medicals in dispensaries
- enlarge job opportunities: lights in local markets, processing cotton, etc.

*not-exhaustive list



Photo: Focus group discussion in Homa Hills (Kenya, 2022)

Qualitative analysis: Homa Hills (Kenya)



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Regarding the **management** of the GV, the communities met would like to be involved to ensure *security* (through acceptance and ownership) and *sustainability* (in the sense of long-term duration).

Local communities also stated that the area of HH is already affected since at least a decade by **climate change, deforestation** (mainly caused by poverty) and lake Victoria depletion, which are worsening environmental and, consequently, life-conditions.



Photo: Focus group discussion in Homa Hills (Kenya, 2022)

Qualitative analysis: Lac Abbé (Djibouti)



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From 12 to 19 February 2023, the joint team visited the territory of Djibouti Ville and Lac Abbé, in Djibouti.

The local communities we worked with belong to the **Afar ethnic group**. The Afar are semi-nomadic and mainly practice pastoralism as their means of livelihood. Traditionally, and due to the region's arid climate, they do not engage in agricultural production.

The Afar communities of Lake Abhé have no other water source than Lake Abhé, which is salty.

We met two local communities (FGDs) and various Public authorities.



Photo: Focus group discussion in Lac Abbé (Djibouti, 2023)

Access to good quality sources of water would allow an improvement in access to various basic services:

- potable water
- Basic food cooking conditions
- ability to use water for irrigation (even if not properly agriculture).

These are the main needs expressed by the communities in Lac. Abbè and As-Eyla.



Photo: Focus group discussion in As-Eyla (Djibouti, 2023)

Then, the electricity generated can enhance some public services, such as health (dispensary – there is a building but does not work) and education (lights in school and home working).

More indirectly, this development, in the view of the communities, **could increase the overall living conditions, including job opportunities, roads, etc.**



Photo: Focus group discussion in As-Eyla (Djibouti, 2023)

Qualitative analysis: Bugarama (Rwanda)



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During the **last week (3-9 October 2023)**, we visit the geothermal site (Mashyuza) in Rwanda, Rusizi District, Nyakabuye sector.

In the Bugarama Valley, we met various actors: local communities, **rice and coffee cooperatives**, rice factory, CIMERWA, public authorities, etc

The geothermal resource development – in the view of the stakeholders met – has to answer to the needs of the community, especially **job creation and work conditions improvement** (especially agriculture implication).



Photo: Focus group discussion Bugarama (Rwanda, 2023)

- From the LR we have a comprehensive picture of how RECs can contribute to energy access and other social challenges in Africa
- Management/business models are still understudied, or not represented in scientific literature
- Regarding field work, sites observed are promising
- Local communities seems to be willing to be involved in Kenya and in Rwanda, with a different degree in Djibouti (but this can be caused by other factors (i.e., cultural, political) not related to GV project)
- Basic needs are related to the water-food-energy nexus: geothermal resource exploitation can work on those issues
- Lack of competencies is a relevant issue: training and capacity building are needed, also for SMEs.

THANK YOU!

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