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

Report on capacity building actions performed

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LEAP-RE - Contract Number: 963530

Project officer: Maria-Laura TRIFILETTI

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Summary

Under the LEAP-RE WP11 ? Geothermal Village project, significant progress was made in strengthening capacity building and facilitating knowledge transfer across Africa. The central aim was to broaden understanding and practical knowledge of geothermal energy?both shallow and deep?through targeted training initiatives. These efforts were directed at a diverse range of stakeholders including academic institutions, research organizations, industry professionals, operators, investors, local communities, policymakers, and the general public. Capacity building is a cross-cutting theme within the broader LEAP-RE initiative, and several activities in WP11 were developed in synergy with other Pillar 2 projects, and later aligned with Pillar 1 efforts. Additionally, WP11 contributed to ongoing clustering activities (reported under WP4), notably within the dedicated Geothermal Energy and Capacity Building clusters.

Approval

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2025-10-16 13:49:29	Yves GERAUD (Univ Lorraine)
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LEAP-RE

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

Research & Innovation Action

09/2025

Research Mobility and Capacity Building

Capacity Building Actions Performed

Version N°2

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Abbreviations and Acronyms

Acronym	Description
WP	Work Package
GV	Geothermal Village
CB	Capacity Building

Summary

Under the LEAP-RE WP11 – Geothermal Village project, significant progress was made in strengthening capacity building and facilitating knowledge transfer across Africa. The central aim was to broaden understanding and practical knowledge of geothermal energy—both shallow and deep—through targeted training initiatives. These efforts were directed at a diverse range of stakeholders including academic institutions, research organizations, industry professionals, operators, investors, local communities, policymakers, and the general public.

Capacity building is a cross-cutting theme within the broader LEAP-RE initiative, and several activities in WP11 were developed in synergy with other Pillar 2 projects, and later aligned with Pillar 1 efforts. Additionally, WP11 contributed to ongoing clustering activities (reported under WP4), notably within the dedicated Geothermal Energy and Capacity Building clusters.

Key Achievements

1. Research Mobility and Networking

WP11 facilitated research exchange and mobility programs for African and European students and researchers, fostering stronger institutional partnerships. These exchanges enabled the creation of collaborative networks between geothermal stakeholders on both continents, promoting long-term scientific cooperation and mutual learning.

2. Capacity Building

A series of specialized geothermal training programs were designed and delivered, targeting scientists, local stakeholders, and community members. These trainings covered geoscientific, technical, economic, and social aspects of geothermal energy.

Furthermore, capacity-building activities were embedded directly within fieldwork and feasibility studies conducted at geothermal village pilot sites. These included hands-on training related to both energy applications (e.g., electricity generation, heating/cooling) and non-energy uses (e.g., geothermal water for agriculture or domestic purposes).

Keywords

Capacity building, transfer knowledge, international conferences, scientific publications, research mobility, training, young researchers, renewable energy, geothermal.

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1. Schools and Training

A series of high-impact training events were conducted, targeting both early career researchers and students, with a focus on geothermal energy systems.

1. RESchool – Renewable Energy Schools for PhD students to early career researchers and innovators were held during the thress LEAP-RE Stakeholder Forum in Pretoria (South Africa, 2022), in Kigali (Rwanda, 2023) and in Milan (Italy, 2024).
The aim of the schools was to support the development of early career researchers and innovators or entrepreneurs who are part of the LEAP-RE community. Format: hybrid (in presence and online). WP11 – GV partners were actively involved for the preparation and for lectures/training of the RESchools.
3rd RESchool held in Milan, Lecture title: Design and Management of DREs with local communities involvement - Business Models guidelines.

2. Training and Capacity building, Homa Hills, Kenya. 13-16 November 2023. Workshops on Geothermal Energy, Application and Sustainability Management and field walks for community members and Geothermal committee.

3. Training on Introduction to Geothermal Science, Technology and Social Sciences to Homa Hills Geothermal Community-Based Organisation and relevant government officials (15th and 16th November, 2023).

4. Workshop for business models for decentralized renewable energy, Kigali (Rwanda), 2nd LEAP-RE Stakeholder Forum, 11th October 2023.

5. Training staff in Kenya for modern MT data acquisition, formation on data modeling and short course on MT for hired GDC surveyors in Kenya, 2022.
Specialized training provided ODDEG, focusing on the integration of the social dimension in the implementation of activities. Following this training, an awareness workshop was organized in Djibouti, bringing together several national stakeholders.
Main objective:
To take into account the needs of the local population by learning about their way of life, the division of daily tasks, and their community organization;
To strengthen communication around the project by informing local communities about the objectives pursued, the nature of the fieldwork to be undertaken, and the expected results.
Beyond information and consultation, this exchange made it possible to identify the priority needs that the project could address (such as the supply of water and electricity to villages, direct uses of geothermal fluids, etc.) and to highlight new prospects for socio-economic development, such as greenhouse farming, thermal tourism, or other innovative applications.

6. Training and short course on MT for EDCL scientists, Rwanda, 2022.

7. Onsite training and field work on Geophysics, Geology and Geochemistry.

- GEOPHYSICS

Training ODDEG staff in magnetotelluric (MT) field work and courses on MT theory during field work in Lac Abhé (Djibouti republic), 2021.
The geophysics training, provided by the teams from Brest and Lorraine in partnership with ODDEG's geophysicists, focused on the application of electrical prospecting methods in the field. This approach enabled participants to strengthen their practical skills in acquiring electrical data (ERT and MT), thus contributing to a better evaluation of the subsurface and its geothermal potential.

- GEOLOGY

The geological training took place directly in the field and allowed ODDEG staff to become familiar with structural analysis, the identification and mapping of different faults, as well

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as the study of local geological formations. Thanks to the use of modern technologies, particularly drone surveys, participants were also able to inventory and accurately locate all the hot springs present in the study area.

- GEOCHEMISTRY

The geochemical training offered ODDEG's geochemical laboratory teams the opportunity to practice sampling directly in the field in order to analyze the physico-chemical characteristics of fluids an essential step in understanding the resource energy potential.

2. Research/Career

1. Internship 1st year Master of Geosciences at UBO on Bugarama data, Rwanda, 2023

2. UBO MSc Geosciences, one ODDEG student, 2022

3. Dissemination and Communication

3.1 Conferences, Workshops, Seminars

1. A participatory community approach for the design and management of geothermal energy communities in East Africa. Lessons learnt from the LEAP-RE Geothermal Village project, Fabio Iannone, Department of Economy of Management "Lunch Seminars series", University of Pisa, 25 March 2025.

2. 26th World Energy Congress, the LEAP-RE Project with focus on geothermal energy potential and applications, 22 – 25 April 2024, Rotterdam, NL.

3. Wheeler, W. et al., (2024). The LEAP-RE Geothermal Village project: Geoscience perspective on 4 sites in the EARS. Meeting, abstract with presentation. European Geothermal Workshop 2024, University of Stavanger, Stavanger, Norway 13-14/11/2024.

4. BAM Conference 2024, 4-6 September 2024, University of Notthingham, UK

5. SIMA 2024 Management Conference, 13-14 June 2024, University of Parma, Italy

6. Wheeler, W., and Bastesen, E., (2023). Fractured reservoirs, volcanoes and scale: challenges in GEMex and the Geothermal Village projects. Meeting; abstract with presentation. Geological Association of Norway, "Matchmaking: Industry meets academia – building consortia for relevant R&D projects". Oslo, 26/01/2023.

7. Piolat, L. (2023): Electrical conductivity and normalized chargeability tomograms, news tools to prospect geothermal resources. Abstract with presentation. LEAP-RE 2nd General Assembly, Kigali 11/10/2023.

8. Varet, J., et al. (2023) Geothermal play types in Africa: identification and development approach. Abstract with presentation. LEAP-RE 2nd General Assembly, Kigali 11/10/2023

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9. Varet, J., Geraud, Y., et al. (2023) Ethiopian Geothermal Village. Abstract with presentation. LEAP-RE 2nd General Assembly, Kigali 12/10/2023.

10. Varet, J., et al. (2023) Selecting a site for a demonstration of the "Geothermal Village" concept. LEAP-RE 2nd General Assembly, Kigali 12/10/2023.

11. Geothermal energy for local communities in East Africa: the case of Geothermal Village, Fabio Iannone, SSD, Helsinki, 25 May 2023.

12. Géraud Y., et al 2022. Programme « Geothermal Village » : un concept d'exploitation géothermique haute température peu profonde reposant sur une appropriation locale, exemples en Afrique de l'Est. Journées de la Géothermie, Aix les bains. 9-10 juin.

3.2 Journal Articles/Books/Proceedings

1. Geraud, Y. , and Omenda, P. (2025). Enabling Geothermal Energy Communities in the European and African Union. In: Crowther, A, Foulds, C., Robison, R., and Gladkykh, G., editors, Strengthening European Energy Policy – Governance recommendations from innovative interdisciplinary collaborations. Palgrave Macmillan. Doi: https://doi.org/10.1007/978-3-031-66481-6

2. L. Piolat, A. Revil, P. Cosme, Y. Géraud, T. Dupaigne, W. Wheeler, J. Tveranger, B. Lønøy, E. Turinimana, E. Karangwa and A. Favier (2025). Induced polarization of volcanic rocks. 9. Anatomy of a rising thermal plume. Geophys. J. Int. v. 243, p. 1–19. doi: https://doi.org/10.1093/gji/ggaf307

3. Büscher, C., Wheeler, W., Onyango, S., Varet, J., Iannone, F., Annunziata, E., Geraud, Y. and Omenda, P., 2025. Create a Co-learning Environment for Geothermal Energy Communities Across the European and African Unions. In: A. Crowther et al (Editor), Strengthening European energy policy, pp. 43-54.

4. Walter, B., Y. Géraud, A. Favier, N. Chibati, M. Diraison (2025), Hydrothermal activity of the Lake Abhe geothermal field (Djibouti): Structural controls and paths for further exploration, Earth Sciences (accepted).

5. Geraud et al (2025)- Prefeasibility analysis of a geothermal field development in Homma Hills (Kenya), EGC2025, Zurich, CH.

6. Geraud et al (2025)- Prefeasibility analysis of a geothermal field development in Lake Abhé area (Djibouti Republic), EGC2025, Zurich, CH.

7. Geraud et al (2025)- Prefeasibility analysis of a geothermal field development on the Amashyuza area (Rwanda), EGC2025, Zurich, CH.

8. Varet et al (2025)- EraBoru, Afar, Ethiopia, a promising geothermal site, with in a first step the demonstration of the Geothermal Village concept using a shallow steam resource, EGC2025, Zurich, CH.

9. Create a Co-learning Environment for Geothermal Energy Communities Across the European and African Unions. Büscher, C., Wheeler, W., Onyango, S., Varet, J., Iannone, F., Annunziata, E., & Omenda, P. (2024). In Strengthening European Energy Policy: Governance Recommendations from Innovative Interdisciplinary Collaborations (pp. 45-57). Cham: Springer Nature Switzerland.

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10. Wheeler et al. The LEAP-RE Geothermal Village project: Geoscienceperspective on 4 sites in the EARS. European geothermal Workshop, Stavanger, 14-15 nov 2025.

11. Piolat et al (2024)- Quantifying geophysical electrical signatures in hydrothermal reservoirs, GET EAGE, Rotterdam, NL.

12. Antecedents of social exchange for a proactive engagement in the design of Renewable Energy Communities. Evidence from a participatory approach in Kenya. Iannone, F., Annunziata, E., Rizzi, F., & Frey, M. (2024). In BAM Conference 2024 Proceedings. British Academy of Management.

13. Social acceptance of Decentralized Renewable Energies in East African rural communities: preliminary evidence from a multiple case study. Iannone F., Annunziata E., Rizzi F., Frey M. In Sinergie-SIMA 2024 Management Conference.

14. Wheeler, W. (2023). Grid concepts for geothermal-based village energy systems. Abstract with presentation. LEAP-RE 2nd General Assembly, Kigali 12/10/2023.

15. Wheeler, W. (2023). Geothermal Village Project. Abstract with presentation. EGC 2023, TNO, Utrecht, Netherlands, 8-9/11/2023.

16. EAGE Piolat, L., Geraud Y., Revil A., Favier A., Diraison M. (2023). Induced polarization as a tool for the study of high clay content geothermal systems. EAGE-GET Paris, FR.

17. Bernard Marty, Delphine Contamine, Raphael Pik3, Alan M Seltzer, David V Bekaert, Marc Diraison1, Bastien Walter, Yves Geraud, Peter Omenda and Jacques Varet,(2023). Unraveling the composition of mantle noble gases from CO2-rich geothermal emanations, Homa Hills, Kenya. Goldschmidt conf, Lyon Abstract ID: 19470

18. Yves Géraud, Alexiane Favier, Bastien Walter, Marc Diraison, Nadjib Chibati, Loris Piolat. 2023.- Activité hydrothermale du champ géothermique du Lac Abhé (République de Djibouti) : contrôles structuraux, paramètres minéralogiques et pétrophysiques pour de nouvelles perspectives d'exploration de la ressource, RST Rennes 23, 487069.

19. Renewable energy communities in Africa: Evidence from a systematic literature review. Conference paper presented at the SIMA Conference 2023, 29-30 June 2023, Bari, Italy. Iannone F., Annunziata E., Rizzi F., Frey M. Proceedings: ISBN 978-88-94-7136-3-3.

20. Benoit Hazard, Christine Adongo, Yves Géraud. « Sources thermales » et « ressources géothermiques »: Quelles socio-techniques pour les sociétés pastorales du Rift kenyan? Le grand Rift Africain : à la confluence des temps, College de France; CNRS; GDR Rift, Nov 2023, Paris, France. pp.82-91

21. Book Chapter: Geothermal Power Generation, Isabella Nardini, The Palgrave Handbook of International Energy Economics Book, Springer International Publishing, 2022 Book, DOI: 10.1007/978-3-030-86884-0, ISBN: 9783030868833, Open Access, p. 183-194. The Palgrave Handbook of International Energy Economics | SpringerLink

22. Geraud et al 2022- Surface study of a shallow geothermal site for Abhé Geothermal Village Project (Djibouti). Proceedings 9th African Rift geothermal Conference Djibouti, Djibouti Republic, November 2022, 12p.

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23. Piolat et al 2022. Electrical geophysical exploration of Lac Abhé's geothermal system, Djibouti. EAGE

24. Piolat, L. et al 2022. Electrical geophysical exploration of Lac Habbé geothermal system. EGU 22-5775.

3.3 Webinars and Science Days

1. LEAP-RE Webinar 29th Jan 2025 - Bridging Data and Action on Climate Change and Services
2. The Role of Geothermal in Africa's Just Energy Transition 22 April 2025
3. Presentation at the Gender, Local Communities, and Capacity Building session, Milan Stakeholder Forum 2024.
4. Webinar on Gender-Energy Nexus, 3 June, 2024
5. Peer-2-Peer session for the Green Energy Transition in Africa, 7 May 2024
6. Sustainability Science Days 2023, University of Helsinki (Finland), 25 May 2023
7. ESEW2023 European Sustainable Energy Week. Stand representing EU-AU project (LEAP-RE), Bruxelles.

4. Other activities

1. Mapping on existing training programs and schools in AU countries in the RES sector with special attention to geothermal energy to identify gaps and needs.

2. Identification of training programs proposed by Kenya National Research Fund (NRF), and US embassy in Nairobi and others to empower women and youth through training.

3. Organization and dissemination/communication activities (i.e. webinars reported in WP4) of the Geothermal and Capacity Building Clusters within the LEAP RE Clustering activities.

4. Proposal of a round table organized by LEAP RE at COP28 in Dubai, 30/11-12/12-2023

5. Fieldwork for geological and energy-grid models (WP 3,4,1). Mashyuza site, Rwanda. 27/9 to 9/10/2023. W. Wheeler, J. Tverange and B. Lønøy (NORCE), with EDCL and Univ. Lorraine teams.

6. EU-AU joint organization and moderation at the Gender, Local Communities, and Capacity Building session, Milan Stakeholder Forum 2024.

7. AU-EU joint organization and moderation of the Teaming and Twinning Session, Milan Stakeholder Forum 2024.

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Conclusion

The LEAP-RE WP11 – Geothermal Village project has played a key role in advancing geothermal energy development across Africa through strong scientific collaboration between European and African partners. By integrating focused capacity-building programs, research mobility, and expert knowledge exchange, the project has enhanced both the academic and technical capabilities of African institutions as well as local communities. In addition, it has established a solid foundation for long-term partnerships, supporting sustainable energy transitions that align with the continent's development goals and local energy needs.

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