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

Report about the outcome on scientific collaboration 13

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Summary

This report provides an in-depth analysis of the consortium through a SWOT analysis framework, identifying key strengths, weaknesses, opportunities, and threats that influence its performance and impact. The evaluation conducted by the Work Package (WP) leader will offer valuable insights into the consortium's structure, collaboration dynamics, and strategic positioning within the LEAP-RE initiative. The findings from this analysis will serve as a foundation for the valorization of the LEAP-RE experience, particularly within WP5 and WP6. By identifying internal and external factors that affect the consortium's effectiveness, this report aims to enhance future decision-making processes, optimize resource utilization, and improve the implementation of activities in the later work packages. The integration of these insights will contribute to the overall success of LEAP-RE, ensuring that lessons learned are leveraged to maximize impact and sustainability.

Approval

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2025-03-25 19:12:29	Dr. Riccardo MEREU (POLIMI)
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Contents

1. INTRODUCTION

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The findings from this analysis will serve as a foundation for the valorization of the LEAP-RE experience, particularly within WP5 and WP6. By identifying internal and external factors that affect the consortium's effectiveness, this report aims to enhance future decision-making processes, optimize resource utilization, and improve the implementation of activities in the later work packages. The integration of these insights will contribute to the overall success of LEAP-RE, ensuring that lessons learned are leveraged to maximize impact and sustainability.

2. SWOT ANALYSIS

STRENGTHS

The updates to the work plan, as reflected in Deliverable 13.1, demonstrated a proactive and adaptive management approach, ensuring that WP13 activities remained aligned with the project's evolving needs. The extension of the work package until September 2024 (M48) allowed for the integration of additional data collection efforts, such as the campaign in Kenya in March 2023, which enhanced the quality and completeness of the project's outputs. The adjustment of D13.2 ensured that the characterization of electricity needs and resource assessment benefited from a more comprehensive dataset. Similarly, the early delivery of D13.4 accelerated the utilization of digital technology mapping, creating synergies with other tasks. The postponement of D13.5 was strategically aligned with the scheduling of the Ideathon alongside key stakeholder events, maximizing outreach and engagement. These adjustments collectively reinforced the quality and applicability of WP13's deliverables.

WEAKNESSES

The revised timelines introduced challenges related to project coordination and resource management. The extension of WP13 by six months and the postponement of key deliverables such as D13.3, D13.7, D13.8, and D13.9 led to dependencies and scheduling conflicts within LEAP-RE. The delays in D13.2 and D13.5, which were essential for understanding energy needs and digital technology applications, slowed down subsequent analyses and business model development. Additionally, while the extended timeline improved data quality, it required sustained commitment from consortium partners, increasing the risk of personnel turnover or shifting institutional priorities.

OPPORTUNITIES

The additional time frame allowed for a more thorough analysis of mini-grid optimization, business models, and training materials, leading to more impactful and well-informed recommendations. The strategic alignment of the Ideathon with the AfriLabs Annual Gathering and LEAP-RE Stakeholder Forum enhanced networking opportunities and ensured that the deliverables reached a wider audience. The refined data collection approach, incorporating the Kenya campaign and compensating for missed Algerian data, improved the reliability of WP13 outputs. Furthermore, the early availability of the digital technology map (D13.4) fostered earlier integration of technological solutions, providing valuable insights for other LEAP-RE work packages.

THREATS

Despite the benefits of extending the work package, the risk of further delays remained due to external factors such as logistical challenges in data collection, policy changes in the target countries, or unforeseen disruptions in stakeholder engagement. The extension of multiple deliverables until M48 compressed the final reporting and implementation phases, increasing pressure on the team. Additionally, delays in mini-grid business model development (D13.7) and training material preparation (D13.8) affected knowledge dissemination and practical implementation, potentially reducing the overall effectiveness of WP13. Effective risk mitigation strategies were essential to ensure that the revised schedule remained feasible and that the project achieved its intended impact.

3. MAIN INTERNAL SCIENTIFIC COLLABORATIONS

The internal scientific collaboration within SETADISMA was characterized by a series of structured activities aimed at fostering knowledge exchange and joint research efforts. Visiting periods between partner institutions played a key role in strengthening technical cooperation, allowing researchers to engage in hands-on collaboration, share methodologies, and refine project deliverables. These exchanges facilitated the integration of diverse expertise, particularly in energy system modeling, mini-grid optimization, and socio-economic assessments.

Common publications emerged as a core outcome of this collaboration, with joint research efforts contributing to scientific articles, conference papers, and technical reports. These publications addressed critical aspects of mini-grid development, digitalization in energy systems, and innovative business models for sustainable electrification. The dissemination of findings through high-impact journals and international conferences ensured that SETADISMA's research reached a broad academic and professional audience, enhancing its contribution to the field.

Beyond publications, collaboration extended to joint participation in scientific events, workshops, and stakeholder forums, where partners collectively presented research progress, shared insights, and engaged with external experts. This dynamic and interdisciplinary approach reinforced SETADISMA’s role as a hub for advancing innovative solutions in decentralized energy systems.

The collaboration and complementary expertise of the project partners are also evident in the online training materials, which have been uploaded to an Open Access platform (EdApp) and the

LEAP-RE Knowledge Platform. The results of this activity are documented in D13.8, Development and Implementation of Training Programs. As part of this effort, five online training courses were provided, covering the following topics: Introduction to Off-Grid Solutions, Renewable Energy Technologies, Energy Storage Systems, Microgrid Design and Implementation, and Policy and Regulatory Frameworks.

COLLABORATIVE WORKS SUBMITTED TO CONFERENCES

(LNEG, POLIMI) 2024 - António Couto, João P Cardoso, Teresa Simões, Ana Estanqueiro, N Stevanato, R Mereu - Descarbonizar micro/mini-redes através da complementaridade da produção solar fotovoltaica e eólica. In: CIES2024: XIX Congresso Ibérico e XV Congresso Iberoamericano de Energia Solar, Évora, Portugal: Universidade de Évora, 19 - 21 June, 2024

(UNIPI - SU) 2024 - Giulio Pisaneschi; Davide Fioriti; Sandra Banda; Anne Wacera Wambugu; Izael Da Silva; Davide Poli - Electricity Forecasting in Kenyan Off-grid Microgrid: Forecasting Accuracy Versus Multi-Year Load Growth - 2024 IEEE International Humanitarian Technologies Conference (IHTC) - DOI: 10.1109/IHTC61819.2024.10855058

(LUT - SU) 2023 - Leticia Tomas Fillol; Antti Pinomaa; Samuli Honkapuro; Sandra Banda; Anne Wacera; Neema Oribo - Understanding the Drivers of Appliance Adoption Over Time: Evidence from Rural Kenya - 2023 IEEE PES/IAS PowerAfrica - DOI: 10.1109/PowerAfrica57932.2023.10363282

(POLIMI - LUT - SU) 2023 - Nicolò Stevanato; Ivan Sangiorgio; Giulia Baldelli; Ahd Farah; Riccardo Mereu; Emanuela Colombo; Sandra Banda; Anne Wacera; Neema Oribo; Izael Da Silva; Leticia Tomas Fillol; Antti Pinomaa - Guidelines for Demand Data Collection for Rural Access to Electricity Projects - 2023 IEEE PES/IAS PowerAfrica - DOI: 10.1109/PowerAfrica57932.2023.10363265

COLLABORATIVE WORKS SUBMITTED TO JOURNAL PUBLICATIONS

(CNDT-MINRESI - UNIPI) Claude Boris Amougou, David Tsuanyo, Davide Fioriti, Joseph Kenfack, Abdoul Aziz, Patrice Elé Abiama - LCOE-Based Optimization for the Design of Small Run-of-River Hydropower Plant - Energies 2022, 15, 7507. https://doi.org/10.3390/en15207507

(PAUWES - CNDT-MINRESI) Mirana Njakatiana Andriarisoa, Erick G. Tambo, David Tsuanyo, Axel Nguedia Nguedoung - Peer-to-Peer Energy Trading Using Blockchain in Sub-Saharan Africa: Towards a Policy and Regulatory Framework - Energy Transition in the African Economy Post 2050, 2023, DOI: 10.4018/978-1-7998-8638-9.ch006

(UNIPI - POLIMI) Davide Fioriti; Nicoló Stevanato; Pietro Ducange; Francesco Marcelloni; Emanuela Colombo; Davide Poli - Data Platform Guidelines and Prototype for Microgrids and Energy Access: Matching Demand Profiles and Socio-Economic Data to Foster Project Development - IEEE Access (Volume: 11) 2023 - DOI: 10.1109/ACCESS.2023.3294841

(POLIMI - UNIPI) Nicolò Stevanato, Davide Fioriti, Tommaso Ferrucci, Luca Belloni, Lorenzo Rinaldi, Davide Poli, Emanuela Colombo - Data-driven analysis for the characterization of household appliance ownership and use in Sub-Saharan Africa - Renewable and Sustainable Energy Reviews 2025, https://doi.org/10.1016/j.rser.2025.115396

(LUT - POLIMI) Leticia Tomas-Fillol, Nicolò Stevanato, Antti Pinomaa, Riccardo Mereu, Samuli Honkapuro - What happens after electrification? Exploring the evolution of appliance adoption in rural Kenya - Energy Research and Social Science 2025, https://doi.org/10.1016/j.erss.2025.104015

(LUT - POLIMI) Leticia Tomas-Fillol, Nicolò Stevanato, Antti Pinomaa, Riccardo Mereu, Samuli Honkapuro - Dynamic Energy Demand Estimation in Rural Mini-grids: A Data-Driven Model Based on Appliance Diffusion Analysis - To be submitted soon to Applied Energy

VISITING RESEARCHERS

1. VISITING LUT - POLIMI

Andrea Pacenti, a Master Thesis student from Polimi visited LUT from September to December 2022. During this time, Andrea worked on developing part of the thesis with LUT University focusing on collecting data from literature for the business model of mini-grid and socio-economical conditions in rural areas in Rwanda and Kenya.

Leticia Tomas Fillol, a PhD student from LUT (Finland) and an active member of SETADISMA, spent two visiting periods at Polimi

- from March to May 2024. During this period, Leticia Tomas Fillo visit also included the drafting and finalizing step of the paper *Leticia Tomas-Fillol, Nicolò Stevanato, Antti Pinomaa, Riccardo Mereu, Samuli Honkapuro - What happens after electrification? Exploring the evolution of appliance adoption in rural Kenya - Energy Research and Social Science, accepted, in press*
- from November to December 2024. During this visit, she attended the Engineering and Cooperation for Development course. The course covered various topics related to engineering and development cooperation. Leticia Tomas Fillo visit also included the drafting and finalizing step of the paper *Leticia Tomas-Fillol, Nicolò Stevanato, Antti Pinomaa, Riccardo Mereu, Samuli Honkapuro - Dynamic Energy Demand Estimation in Rural Mini-grids: A Data-Driven Model Based on Appliance Diffusion Analysis - To be submitted soon*

2. VISITING CDER - POLIMI

TIFOURA Khaled, and BERKANE Smain, two PhD students of CDER visiting Polimi from September to October 2024 to develop the activities related to mini-grid modeling for energy transition planning in Algeria.