



LEAP-RE

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

Detailed Work Plan WP13 SETADiSMA Deliverable D13.1

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Acronym

DoA	Description of Action
GA	Grant Agreement
MS	Milestone
M&E	Monitoring & Evaluation
O&F	Organisational & Funding
tbd	to be determined
WP	Work Package

1.1 Description of WP13 - SETADISMA

Start date: M7; End date: M42

Work Package Leader- co-Leader: Riccardo Mereu (POLIMI) & Erick Tambo (PAUWES)

The proposal aims to tackle the African mini-grid sector as a whole, thus addressing the challenging topics of technological, energy planning, digitalization research and development and related capacity building, focusing on communities to be electrified for the first time (green-field projects), as well as brown-field cases where old mini-grids are repowered including renewable sources, such as Algerian, Kenyan and Rwandan national case-study. The objective is studying brown and green-field mini-grid together with the inclusion of digital technologies and fully integrated socio-economic models:

- Technological Research: Generation technologies considering energy mix scenario
- Energy Planning Research: Context and energy demand assessment
- Digitalisation: Assessment and application of digital technologies at technical system
- Capacity Building: Development of educational training and capacity building programmes

1.1.1 Task 13.1.: System design and planning from social needs to technical design

This task aims to investigate the methodologies to properly design and plan a microgrid investment and to propose a first guideline to optimally size microgrid projects given the socio-economic information of the site, and perform validation on real case studies.

Start date: M7 End date: M42

Task Leaders: Riccardo Mereu, Irene Bengo (POLIMI) & Anne Wacera, Ignatius Maranga (SU)

Contributors: Teresa Simões, António Couto, Carlos Rodrigues, João Cardoso, Ana Estanqueiro and Paula Costa (LNEG), Antti Pinomaa (LUT), Philipp Blechinger (RLI), Davide Poli and Davide Fioriti (UNIFI), Kokouvi Edem N'Tsoukpoe (2ie), Chikhi Madjid (CDER), Kibibi Ndope (AESG), David Tsuanyo (CNDT MINRESI)

Action 1: Data collection

Procedures for the data collection related to the electricity demand and renewable energy resources in African regions will be agreed by partners in order to state a general procedure replicable in several different contexts and applied to case studies. Both electrical consumption data, on brownfield projects, and socio-economic information will be collected and analysed.

Sub-action 1: Data collection and analysis of electricity demand to microgrids in reference contexts (Algeria, Kenya, Rwanda)

Responsible partner & PMs: SU (3 PMs)

Contributing partners & PMs: POLIMI (0.5 PM), AESG (2 PMs), CDER (4 PMs), LNEG (2 PM), UNIFI (1 PM), CNDT MINRESI (1 PMs)

Description of steps and contributors:

- *Define a common methodology for data collection in the different countries and prepare a common questionnaire (POLIMI, SU, LNEG, UNIFI CDER, AESG, CNDT MINRESI)*
- *Contact the National Agencies / Utilities managing microgrids in Algeria, Kenya and Rwanda (SU, CDER, AESG)*
- *Collect the data of electricity demand to microgrids in reference contexts (Algeria, Kenya, Rwanda) (SU, CDER, AESG)*

- *Analyze collected data of electricity demand to microgrids and categorize them ((POLIMI, SU, LNEG, UNIFI CDER, AESG, CNDT MINRESI)*

Sub-action 2: *Data collection and analysis of RE resources in reference contexts (Algeria, Kenya, Rwanda)*

Responsible partner & PMs: CDER (2 PMs)

Contributing partners & PMs: POLIMI (0.5 PM), AESG (1 PMs), LNEG (2 PM), UNIFI (0.5 PM), SU (1 PMs), CNDT MINRESI (1 PMs)

Description of steps and contributors:

- *Define a common methodology for data collection in the different countries and prepare a common questionnaire (POLIMI, SU, LNEG, UNIFI CDER, AESG, CNDT MINRESI)*
- *Collect the data of RE resources available in reference contexts (Algeria, Kenya, Rwanda) (SU, CDER, AESG)*
- *Analyze collected data of available RE resources in reference contexts (Algeria, Kenya, Rwanda) (POLIMI, LNEG, LUT, UNIFI, SU, CDER, AESG, CNDT MINRESI)*

Sub-action 3: *Data collection and analysis of socio-economic conditions in reference contexts (Algeria, Kenya, Rwanda)*

Responsible partner & PMs: AESG (1 PM)

Contributing partners & PMs: POLIMI (1 PM), SU (1 PM), CDER (2 PMs), LNEG (1.5 PMs), UNIFI (0.5 PM), CNDT MINRESI (1 PM)

Description of steps and contributors:

- *Define a common methodology for data collection in the different countries and prepare a common questionnaire (POLIMI, SU, LNEG, UNIFI CDER, AESG, CNDT MINRESI)*
- *Collect the data of socio-economic conditions in reference contexts (Algeria, Kenya, Rwanda) (SU, CDER, AESG)*
- *Analyze collected data of socio-economic conditions in reference contexts (Algeria, Kenya, Rwanda) (POLIMI, SU, LNEG, LUT, UNIFI, SU, CDER, AESG, CNDT MINRESI)*

Action 2: Demand and Resource assessment and existing models' validation

The methodology for estimating the demand and renewable energy production in rural microgrids is applied to the raw data obtained in Action 1 with the purposes of (1) estimating the demand for the selected case studies, be them brownfield or greenfield projects, (2) evaluating correlations between socio-economic data and the electrical consumption of brownfield sites with adequate historical records, and (3) possibly validating existing models.

Sub-action 1: *Demand estimation*

Responsible partner & PMs: LNEG (2 PMs)

Contributing partners & PMs: POLIMI (3 PMs), CDER (1 PM), UNIFI (1 PM)

Description of steps and contributors:

- *Define and select existing models for demand estimation (POLIMI, CDER, LNEG, UNIFI)*
- *Estimate the demand from contexts of reference with selected models (POLIMI, CDER, LNEG, UNIFI)*
- *Compare the analyzed data and results from the models (POLIMI, CDER, LNEG, UNIFI)*

Sub-action 2: RE Resource estimation

Responsible partner & PMs: *LNEG (15 PMs)*

Contributing partners & PMs: *POLIMI (1 PM), CDER (1 PM), UNIFI (0.5 PM), 2ie (5 PMs), CNDT MINRESI (3 PMs)*

Description of steps and contributors:

- *Define and select existing models and databases for RE resource estimation (POLIMI, CDER, LNEG, UNIFI, 2ie, CNDT MINRESI)*
- *Estimate the available RE resources in the contexts of reference with existing models/databases (POLIMI, CDER, LNEG, UNIFI, 2ie, CNDT MINRESI)*
- *Compare the analyzed data and results from the models/databases (POLIMI, CDER, LNEG, UNIFI, 2ie, CNDT MINRESI)*

Sub-action 3: Socio-economic data evaluation

Responsible partner & PMs: *CNDT MINRESI (1 PM)*

Contributing partners & PMs: *POLIMI (1 PM), CDER (1 PM), UNIFI (0.5)*

Description of steps and contributors:

- *Define and select existing models for socio-economic evaluation (POLIMI, CDER, UNIFI, CNDT MINRESI)*
- *Compare the collected and analyzed data from contexts of reference with selected models for socio-economic evaluation (POLIMI, CDER, UNIFI, CNDT MINRESI)*

Action 3: Distribution system and dispatching methodology definition

The type of distribution system and dispatching methodology are evaluated to define the best suited for the different system configurations under test, also including the available technologies, which typically are photovoltaic modules, wind turbines, battery storage systems, converters and fuel-fired generators.

Sub-action 1: Distribution system

Responsible partner & PMs: *CDER (2.5 PMs)*

Contributing partners & PMs: *POLIMI (0.5), LUT (1 PM), UNIFI (1 PM), CNDT MINRESI (2 PMs)*

Description of steps and contributors:

- *Define and select existing models for distribution system (POLIMI, CDER, LUT, UNIFI, CNDT MINRESI)*
- *Reproduce the distribution system in the contexts of reference with selected models (POLIMI, CDER, LUT, UNIFI, CNDT MINRESI)*
- *Compare the analyzed data and identify the most suitable distribution systems for representative case studies (POLIMI, CDER, LUT, UNIFI, CNDT MINRESI)*

Sub-action 2: Dispatching methodology

Responsible partner & PMs: *UNIFI (3.5 PMs)*

Contributing partners & PMs: *POLIMI (0.5 PM), CDER (2.5 PMs), LUT (1 PM), CNDT MINRESI (2 PMs)*

Description of steps and contributors:

- *Define and select available dispatching methodologies and characteristics*
- *Compare the dispatching methodology of the contexts of reference with available dispatching methodologies*

Action 4: Optimal design and planning methodology for microgrids

Provided the methodology to estimate the demand and renewable sources from Action 2 and the dispatching strategy from Action 3, the Action 4 addresses the best characteristics of the design tools for microgrids, also accounting for the different applications and sources. Several design methodologies, including standard commercial software, prior tools developed by partners as well as ad-hoc approaches, if necessary, are tested and compared. Multi-year planning techniques are studied to account for demand growth.

Sub-action 1: Microgrids design tools and planning methodology

Responsible partner & PMs: *UNIFI (7 PMs)*

Contributing partners & PMs: *POLIMI (5 PMs), SU (3.5 PMs), AESG (1.45), CDER (3 PMs), LNEG (2 PMs), LUT (2 PMs), CNDT MINRESI (4.5 PMs)*

Description of steps and contributors:

- *Define and select existing models for microgrids design and planning methodology (POLIMI, SU, AESG, CDER, LNEG, UNIFI, LUT, 2ie, CNDT MINRESI)*
- *Reproduce the design of microgrids in the contexts of reference with selected models (POLIMI, SU, AESG, CDER, LNEG, UNIFI, LUT, 2ie, CNDT MINRESI)*
- *Compare the analyzed data and results from the models (POLIMI, SU, AESG, CDER, LNEG, UNIFI, LUT, 2ie, CNDT MINRESI)*
- *Design hybrid and RE microgrids for the contexts of reference with selected models (POLIMI, SU, AESG, CDER, LNEG, UNIFI, LUT, 2ie, CNDT MINRESI)*

Sub-action 2: Evaluation of innovative solar technologies for electricity generation

Responsible partner & PMs: *2ie (18.75 PMs)*

Contributing partners & PMs: *LNEG (3 PMs)*

Description of steps and contributors:

- *Review of mature and innovative solar technologies for electricity generation (LNEG, 2ie)*
- *Design and demonstration of a micro-concentrating solar plant with high local content (CSP4Africa II) (LNEG, 2ie)*

1.1.2 Task 13.2.: Digitalisation, Open innovation and Entrepreneurship

This task aims to assess and analyse the current state, opportunities and challenges of digital technologies for mini grid at technical and operational system level, support the development ideas and solutions building on the innovative potential of youth across the continent and setup of ecosystem with the appropriate regulatory framework to support the further development of promising ideas, solution and business cases

Start date: M7 End date: M42

Task Leaders: Erick Tambo (PAUWES) & Marco Bovo (UNIBO)

Contributors: Chikhi Madjid (CDER), Marco Bovo, Patrizia Tassinari, Daniele Torreggiani (UNIBO), Antti Pinomaa (LUT), Anna Ekeledo (AfriLabs)

Action 1: Assessment and Analysis of Digital Technologies for Mini-grid

Assessment and analysis of current state, opportunities and challenges of digital technologies in context of mini grid at following levels including technical functionalities, system balancing, operational functionalities as well as and value chains.

Sub-action 1: Development of a methodology to assess technology readiness of digital technologies in African mini-grids

Responsible partner & PMs: PAUWES (5 PMs)

Contributing partners & PMs: CDER (1.5 PMs), UNIBO (2.5 PMs), LUT (1.5 PMs), AfriLabs (0.5 PMs)

Description of steps and contribution:

- *Desktop review of existing methodologies for the assessment of technology readiness in mini-grids (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Identification and definition of criteria to be used for digital technologies assessment in African mini-grids considering current state, opportunities, and challenges (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Identification of key stakeholders in the nexus digital technologies and Minigrid on the continent (CDER, UNIBO, LUT, PAUWES, AfriLabs)*

Sub-action 2: Assessment of current state of digital technologies in mini-grids in African context

Responsible partner & PMs: PAUWES (5 PMs)

Contributing partners & PMs: CDER (1.5 PMs), UNIBO (2.5 PMs), LUT (1.5 PMs), AfriLabs (0.5 PMs)

Description of steps and contribution:

- *Organization of stakeholder survey/workshop (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Compilation of data and analysis (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Report writing and mapping of digital technologies applications in African mini-grids (CDER, UNIBO, LUT, PAUWES, AfriLabs)*

Action 2: Open Innovation for Ideation and proposition of solutions

The open innovation for ideation and proposition of digital technologies-based solutions in the mini-grid in Africa is built on the innovative capacities of youth across the continent to implement concepts (youth innovator challenges, competitions and hackathons) for the generation of ideas, solutions and business cases using digital technologies in context of mini grid.

Responsible partners & PMs: AfriLabs (5.5 PMs)

Contributing partners & PMs: CDER (3 PMs), UNIBO (2 PMs), LUT (1 PM), PAUWES (4 PMs)

Description of steps and contributors:

- *Develop themes for the ideathons based on the needs of the key stakeholders in the renewable energy (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Organise and host meetups and ideathons to generate digital technologies solutions in context of mini-grids (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Create a database of ideas generates and share it with the ecosystem (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Link the ideas and solutions developed by the community to ecosystem stakeholders where possible (CDER, UNIBO, LUT, PAUWES, AfriLabs)*

Action 3: Innovation and Digital Entrepreneurship Ecosystem

This action aims at setting up an enabling environment consisting of all stakeholders of the entrepreneurial ecosystem (Tech Hub, incubator, accelerator, venture capital, equity funds, etc.) to support the further development of promising ideas, solutions and the development and deployment of business cases. Furthermore, it will allow the development of an appropriated framework incl. policy and regulatory measures with role and expectations of involved stakeholders and actors for a purposeful deployment of digital technologies and mini grid in rural Africa.

Sub-action 1: Mapping of entrepreneurship ecosystem actors and stakeholders in the field of mini-grid and digital technologies on the continent

Responsible partners & PMs: *AfriLabs (2 PMs)*

Contributing partners & PMs: *PAUWES (2 PMs), CDER (1 PM), UNIBO (1 PM), LUT (0.5 PM)*

Description of steps and contribution:

- *Assessment and identification of stakeholder and actors that can support youth innovation in the nexus digital technologies and mini-grid in Africa (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Organization and clustering of identified actors and stakeholders into specific groups to build a basis of a sustainable innovation framework (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Mapping of existing relationships among identified stakeholders in the sector based on specific value proposition to the establishment of the ecosystem (CDER, UNIBO, LUT, PAUWES, AfriLabs)*

Sub-action 2: Identification of specific actions for the establishment of the ecosystem

Responsible partners & PMs: *AfriLabs (4 PMs)*

Contributing partners & PMs: *PAUWES (2 PMs), CDER (1 PM), UNIBO (1 PM), LUT (0.5 PM),*

Description of steps and contribution:

- *Organization of a stakeholders' workshop/survey/interviews (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Identification of key elements to be considered to attract, engage and maintain relationships between different key stakeholders' groups to establish a conducive environment to strengthen youth innovation development building on existing experience at Pan African levels in the sector (CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Definition of prioritization of strategies to track progress and measure success of the implementation of the ecosystem (CDER, UNIBO, LUT, PAUWES, AfriLabs)*

1.1.3 Task 13.3.: Business Models and Socio-Economic Contexts

This task aims to propose appropriate business, delivery, and socio-economic models for local development evaluating and comparing available data for mini-grid systems in off-grid areas. The model includes as well the estimation of social-environmental effects on local communities and the assessment of risks related to potential negative externalities. The task takes also into account the scalability and long-term sustainability (in terms of O&M) of the evaluated models in terms of technical, organizational and economic sustainability dimensions. The goal of the task is to help

government planners (e.g. local Ministries and Agencies), driving them on selecting the most appropriate business and delivery models and financing method for specific contexts.

Start date: M7 End date: M42

Task Leaders: Antti Pinomaa (LUT)

Contributors: Irene Bengo (POLIMI), Ignatius Maranga (SU), Kibibi Ndope (AESG), Chikhi Madjid (CDER), Marco Bovo, Patrizia Tassinari, Daniele Torreggiani (UNIBO), Davide Poli and Davide Fioriti (UNIFI), Erick Tambo (PAUWES), Anna Ekeledo (AfriLabs)

Action 1: Evaluation framework development to analyze the available business and delivery models

This Action develops the fundamental framework to analyze and evaluate the available business and delivery models defining a general matrix characterizing the models and related indicators. Through this framework the project maps the cases, identifies the strength and weakness of all cases and distills the best practices considering the four key dimensions that must be included into an efficient, scalable and sustainable business and delivery model: Technological (referring to data and parameter defined in Task 13.1), Organizational (stakeholder map and analysis), Economic ('base of the pyramid (BoP)' or inclusive business model application), Social (Social impact evaluation applying assessment methodologies as the Social Impact Assessment, Impact Weighted Account, the SDG Impact Standards).

Sub-action 1: Input data formalization for framework development via data gathering, filtering and categorization from Task 13.1 and Task 13.2 and related sub-actions

Responsible partner & PMs: *LUT (0.5 PM)*

Contributing partners & PMs: *POLIMI (1 PM), CDer (0.5 PM), UNIBO (1.4 PMs)*

Description of steps and contributors:

- *Close communication with T13.1 and T13.2 sub-action leaders to get access to data (POLIMI, CDER, UNIBO, LUT)*
- *Input data synthesis from the previous Tasks and Actions (T13.1.1, T13.2.1...) (POLIMI, CDER, UNIBO, LUT)*
- *Literature review of current and existing business, delivery and socio-economic models (POLIMI, CDER, UNIBO, LUT)*
- *Baseline formalisation for evaluation framework development based on the input data from the field (POLIMI, CDER, UNIBO, LUT)*

Sub-action 2: Definition of a general matrix characterizing the models and related indicators

Responsible partner & PMs: *LUT (1 PM)*

Contributing partners & PMs: *POLIMI (1 PM), CDER (0.5 PM), UNIBO (1 PM), UNIFI (0.5 PM)*

Description of steps and contributors:

- *Map the cases, identify the strength and weakness of all cases (POLIMI, CDER, UNIBO, LUT, UNIFI)*
- *Distil the best practices considering the four key dimensions (POLIMI, CDER, UNIBO, LUT, UNIFI)*
- *Define efficient, scalable and sustainable business and delivery model taking into account the four key dimensions (POLIMI, CDER, UNIBO, LUT, UNIFI)*

Action 2: Case studies evaluation, applying the evaluation framework through the combination of the four dimensions (synthetic evaluation)

The application of the framework to each case-study is performed and analysed. The framework is revised and reinforced during evaluation of the case studies through the combination of the four dimensions (synthetic evaluation). Moreover, a series of best practices are defined based on the available data from the African mini-grid studied in Task 13.1.

Sub-action 1: Implementation and Analysis of framework to each case study

Responsible partner & PMs: *LUT (0.5 PM)*

Contributing partners & PMs: *POLIMI (1 PM), SU (0.5 PM), AESG (0.5 PM), CDER (1 PM), UNIBO (0.5 PM), PAUWES (0.5 PM), AfriLabs (0.5 PM)*

Description of steps and contributors:

- *Run the framework prototype to each case study (LUT, POLIMI, SU, AESG, CDER, UNIBO, PAUWES, AfriLabs)*
- *Analyse the results from each run (LUT, POLIMI, SU, AESG, CDER, UNIBO, PAUWES, AfriLabs)*
- *Evaluate the results of analysis through synthesis (LUT, POLIMI, SU, AESG, CDER, UNIBO, PAUWES, AfriLabs)*

Sub-action 2: Revision and reinforcement of the framework utilizing synthetic evaluation to each cases

Responsible partner & PMs: *LUT (0.5 PM)*

Contributing partners & PMs: *POLIMI (0.5 PM), SU (0.5 PM), AESG (0.5 PM), CDER (1 PM), UNIBO (0.5 PM), PAUWES (0.5 PM), AfriLabs (0.5 PM)*

Description of steps and contributors:

- *Revise the framework via synthetic evaluation to each cases (LUT, POLIMI, SU, AESG, CDER, UNIBO, PAUWES, AfriLabs)*
- *Analyse the results (LUT, POLIMI, SU, AESG, CDER, UNIBO, PAUWES, AfriLabs)*
- *Reinforce the framework via synthetic evaluation and based on the revise analysis findings (LUT, POLIMI, SU, AESG, CDER, UNIBO, PAUWES, AfriLabs)*

Sub-action 3: Define and Select best practices based on data and results combined from the results of Task 13.1.

Responsible partner & PMs: *LUT (0.5 PMs)*

Contributing partners & PMs: *POLIMI (0.5 PMs), AESG (0.5 PM), CDER (1 PM), UNIBO (1.4 PMs), UNIPI (0.5 PM), PAUWES (0.5 PM), AfriLabs (0.5 PM)*

Description of steps and contributors:

- *New data recreation from the framework evaluation and from Task 13.1 via Big Data tools (POLIMI, AESG, CDER, UNIBO, LUT, UNIPI, PAUWES, AfriLabs)*
- *Compose and evaluate new data (POLIMI, AESG, CDER, UNIBO, LUT, UNIPI, PAUWES, AfriLabs)*
- *Define and select best practices to develop the framework (POLIMI, AESG, CDER, UNIBO, LUT, UNIPI, PAUWES, AfriLabs)*

Action 3: Productive uses support through energy access and connectivity for new local businesses and the access to a global market, supporting the whole community and increasing its livelihood

The energy access and connectivity support the generation of new local businesses and the access to a global market, supporting the whole community and increasing its livelihood. The development of

new businesses related to the conversion of traditional mini-grid to RE smart-grid is evaluated and their impact to the local context and community are analyzed in order to identify the main parameters influencing the evolution of the socio-economic conditions.

Sub-action 1: Selection of mini-grids under evaluation regarding productive-use approach

Responsible partner & PMs: LUT (0.5 PMs)

Contributing partners & PMs: SU (0.5 PM), AESG (0.5 PM), CDER (1 PM), UNIBO (0.5 PMs), PAUWES (0.5 PM), AfriLabs (0.5 PM)

Description of steps and contributors:

- *Select set of traditional mini-grids to the evaluation of conversion to RE smart grids (SU, AESG, CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Define selection criteria for the different use cases (SU, AESG, CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Define measures for evaluation: RE, connectivity, services with value add (SU, AESG, CDER, UNIBO, LUT, PAUWES, AfriLabs)*

Sub-action 2: Evaluation of RE smart grid conversion approach and the impacts

Responsible partner & PMs: LUT (0.5 PMs)

Contributing partners & PMs: POLIMI (1 PM), SU (0.5 PMs), AESG (0.5 PMs), CDER (1 PM), UNIBO (0.5 PM), PAUWES (0.5 PM), AfriLabs (0.5 PM)

Description of steps and contributors:

- *Evaluate the impacts of conversion by applying the determined selection criteria (POLIMI, SU, AESG, CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Analyse the results and outcomes of the evaluation to the local context (POLIMI, SU, AESG, CDER, UNIBO, LUT, PAUWES, AfriLabs)*

Sub-action 3: Identification of the main parameters influencing the evolution of the socio-economic conditions

Responsible partner & PMs: LUT (0.5 PM)

Contributing partners & PMs: AESG (0.5 PM), CDER (0.5 PM), UNIBO (0.5 PM), AfriLabs (0.5 PM), UNIFI (0.5 PM)

Description of steps and contributors:

- *Identify the main parameters influencing the socio-economic conditions evolution (AESG, CDER, UNIBO, LUT, AfriLabs, UNIFI)*
- *Determine / Conceptualise baseline for the productive uses in different use cases. (AESG, CDER, UNIBO, LUT, AfriLabs, UNIFI)*

Action 4: Guidelines to summarize the framework, indicators and related best practices

The guidelines summarize the framework, indicators and related best practices, enabling organizations, investors and policy makers to implement and evaluate programs, investments and national and regional plans for rural off-grid development.

Sub-action 1: Summarization of the framework

Responsible partner & PMs: LUT (2 PMs)

Contributing partners & PMs: POLIMI (1.5 PM), CDER (0.5 PM), UNIBO (0.5 PM), PAUWES (0.5 PM), AfriLabs (0.5 PM)

Description of steps and contributors:

- *Formalize Indicators, measures and related best practices to different stakeholders (POLIMI, CDER, UNIBO, LUT, PAUWES, AfriLabs)*
- *Produce guidelines to summarize the framework indicators and related best practices (POLIMI, CDER, UNIBO, LUT, PAUWES, AfriLabs)*

1.1.4 Task 13.4.: Capacity Building and Training

This task aims to design and develop concepts and educational materials based on models and scientific results coming from Task 1 to 3 and to implement educational training and capacity building

Start date: M7 End date: M42

Task Leaders: Leslie Ashburner (UCT) & Riccardo Mereu (POLIMI)

Contributors: Irene Bengo (POLIMI), Ignatius Maranga (SU), Kibibi Ndope (AESG), Chikhi Madjid (CDER), Teresa Simões, Carlos Rodrigues, David Loureiro, and Jorge Facção (LNEG), Marco Bovo, Patrizia Tassinari, Daniele Torreggiani (UNIBO), Antti Pinomaa (LUT), Philipp Blechinger (RLI), Davide Poli and Davide Fioriti (UNIPI), Erick Tambo (PAUWES), Anna Ekeledo (AfriLabs), David Tsuanyo (CNDT MINRESI), Kokouvi Edem N'Tsoukpoe (2iE)

Action 1: Involvement of Master and PhD students in the project: 3 PhD theses / 18 Master theses

Responsible partner & PMs: UCT (3 PMs)

Contributing partners & PMs: POLIMI (0.5 PM), SU (1 PM), LNEG (2.6 PMs), UNIBO (0.7 PMs)

LUT (0.5 PMs), UNIPI (1 PM), PAUWES (1 PM), AfriLabs (0.8 PM), 2ie (1 PM), CNDT MINRESI (3 PMs)

Steps and contributors:

- *Confirm available supervisors for theses (POLIMI, SU, LNEG, UCT, UNIBO, LUT, UNIPI, PAUWES)*
- *Organization of the selection of PhD and MSc students (POLIMI, SU, LNEG, UCT, UNIBO, LUT, UNIPI, PAUWES)*
- *Matchmake student to supervisor (POLIMI, SU, LNEG, UCT, UNIBO, LUT, UNIPI, PAUWES)*
- *Supervision of MSc and PhD students (POLIMI, SU, LNEG, UCT, UNIBO, LUT, UNIPI, PAUWES)*
- *Support network of students and researchers (POLIMI, SU, LNEG, UCT, UNIBO, LUT, UNIPI, PAUWES, AfriLabs, CNDT MINRESI)*

Action 2: Organize two Summer Schools/ Workshops

Responsible partner & PMs: UCT (3 PMs)

Contributing partners & PMs: POLIMI (0.5 PM), SU (1 PM), CDER (2.5 PMs), LNEG (1 PM), UNIBO (0.8 PM), LUT (0.4 PM), RLI (1 PM), UNIPI (0.5 PM), PAUWES (2 PMs), AfriLabs (0.5 PM), CNDT MINRESI (5 PMs)

Description of steps

- *Confirm dates/ venue / host platform (POLIMI, SU, CDER, LNEG, UCT, UNIBO, LUT, RLI, UNIPI, PAUWES, AfriLabs, CNDT MINRESI)*

- *Invite participants (POLIMI, SU, CDER, LNEG, UCT, UNIBO, LUT, RLI, UNIPI, PAUWES, AfriLabs, CNDT MINRESI)*
- *Confirm agenda (POLIMI, SU, CDER, LNEG, UCT, UNIBO, LUT, RLI, UNIPI, PAUWES, AfriLabs, CNDT MINRESI)*
- *Confirm contents and speakers / lecturers (POLIMI, SU, CDER, LNEG, UCT, UNIBO, LUT, RLI, UNIPI, PAUWES, AfriLabs, CNDT MINRESI)*
- *Coordinate logistics: venue & flight bookings, etc., as necessary (POLIMI, SU, CDER, LNEG, UCT, UNIBO, LUT, RLI, UNIPI, PAUWES, AfriLabs, CNDT MINRESI)*
- *Host the event (POLIMI, SU, CDER, LNEG, UCT, UNIBO, LUT, RLI, UNIPI, PAUWES, AfriLabs, CNDT MINRESI)*
- *Collate results (POLIMI, SU, CDER, LNEG, UCT, UNIBO, LUT, RLI, UNIPI, PAUWES, AfriLabs, CNDT MINRESI)*

Action 3: Development and Implementation of Training Programs

Responsible partner & PMs: UCT (2.5 PMs) & PAUWES (5 PMs)

Contributing partner & PMs: POLIMI (0.5 PM), SU (1 PM), CDER (3.5 PMs), LNEG (1 PM), UNIBO (0.5 PM), LUT (0.5 PM), UNIPI (0.5 PM), AfriLabs (1 PMs), CNDT MINRESI (2 PMs)

Description of steps

- *Collate initial research results submitted from Tasks 1, 2, 3 (UCT, PAUWES)*
- *draft materials (UCT, PAUWES)*
- *Review and refine materials (UCT, PAUWES)*
- *Confirm dates, agenda and invite participants (UCT, PAUWES)*
- *Deliver the training (POLIMI, SU, CDER, LNEG, UCT, UNIBO, LUT, UNIPI, PAUWES, CNDT MINRESI)*

1.1.5 Task 13.5.: Coordination, Dissemination and research uptake

This task aims to coordinate and supervise the project activities, to carry out the overall administrative and financial management of the project and the dissemination of the results obtained

Start date: M7 End date: M42

Task Leaders: Riccardo Mereu (POLIMI) & Erick Tambo (PAUWES)

Contributors: Ignatius Maranga (SU), Kibibi Ndope (AESG), Chikhi Madjid (CDER), Teresa Simões, António Couto and Carlos Rodrigues (LNEG), Leslie Ashburner (UCT), Marco Bovo, Patrizia Tassinari, Daniele Torreggiani (UNIBO), Antti Pinomaa (LUT), Philipp Blechinger (RLI), Davide Poli and Davide Fioriti (UNIPI), Kokouvi Edem N'Tsoukpoe (2ie), Anna Ekeledo (AfriLabs), David Tsuanyo (CNDT MINRESI)

Action 1: Coordination and financial management of all the activities with the LEAP-RE

Sub-action 1: *Organization of periodic meetings*

Responsible partner & PMs: POLIMI (0.5 PMs)

Contributing partners & PMs: PAUWES (1.5 PMs), UCT (0.5 PMs)

Description of steps and contributors:

- *Draft agenda for periodic meetings (POLIMI, LUT, PAUWES, UCT)*
- *Organize the logistic for virtual meetings (POLIMI)*
- *Draft the minute of the periodic meetings (POLIMI)*
- *Share minute and material shown during the periodic meetings (POLIMI)*

Sub-action 2: Coordination with Pillar 2 Coordinators

Responsible partner & PMs: POLIMI (0.5 PM)

Contributing partners & PMs: PAUWES (1 PM)

Description of steps and contributors:

- *Participate to the periodic meetings of WP Leaders (POLIMI, PAUWES)*
- *Report information and communications to WP13 partners (POLIMI, PAUWES)*
- *Report communications and feedbacks to Pillar 2 coordinators (POLIMI, PAUWES)*

Sub-action 3: Financial management

Responsible partner & PMs: POLIMI (0.5 PM)

Contributing partners & PMs: SU (0.5 PM), AESG (0.5 PM), CDER (1 PM), LNEG (0.5 PM), UCT (2 PMs), UNIBO (0.38 PMs), LUT (0.5 PMs), RLI (0.5 PM), UNIPI (0.5 PM), PAUWES (1.5 PMs), 2ie (0.5 PM), AfriLabs (0.5 PM), CNDT MINRESI (3 PMs)

Description of steps and contributors:

- *Report information and communications from LEAP-RE Coordinators to WP13 members (POLIMI, PAUWES)*
- *Report communications and feedbacks to LEAP-RE Coordinators (POLIMI, PAUWES)*
- *Periodic update of financial situation (All WP13 partners)*

Action 2: Dissemination and Outreach

Sub-action 1: social media channel and online events

Responsible partner & PMs: PAUWES (0.5 PM)

Contributing partners & PMs: POLIMI (0.5 PM), AESG (0.5 PM), CDER (3 PMs), LNEG (0.5 PM), UCT (1 PM), UNIBO (0.5 PM), UNIPI (0.5 PM), PAUWES (1 PM), AfriLabs (1 PMs), 2ie (0.5 PM), CNDT MINRESI (4 PMs)

Description of steps and contributors:

- *Define the typology and format of material to be shared via social media channels /online events with LEAP-RE Coordinators (POLIMI, PAUWES)*
- *Design and development of Portal resp. homepage of the project (POLIMI, PAUWES)*
- *Provide material from WP13 activities to social media managers of LEAP-RE (All WP13 partners)*

Action 3: Transfer and research uptake

Sub-action 1: publication of scientific articles and participation to scientific conferences

Responsible partner & PMs: POLIMI (0.6 PM)

Contributing partners & PMs: PAUWES (1 PM), SU (0.5 PM), CDER (2 PMs), LNEG (0.5 PM), UCT (0.5 PM), UNIBO (0.5 PM), UNIPI (0.53 PM), PAUWES (1 PM), CNDT MINRESI (7 PMs)

Description of steps and contributors:

- *Coordinate partners for common scientific publications (Task Leaders, All WP13 partners)*
- *Coordinate partners for common participation to scientific conferences and research uptake from WP13 (POLIMI, PAUWES, All WP13 partners)*
- *Provide materials from WP13 activities to Pillar 2 Coordinators for special issues and other initiatives for scientific publications (All WP13 partners)*

1.2 Deliverables

Number	Title	Due Date	Responsible
D13.1	Presentation of a more detailed Plan of Activities for the whole WP13	M7	POLIMI
D13.2	Report of characterization of the electricity needs and resource assessment methodologies	M24 (19)	LNEG
D13.3	Guidelines & best practices for mini grid optimization in African context	M42	POLIMI
D13.4	Accurate map of digital technologies components and systems for mini grids at technical system and operational levels dedicated to African needs	M21 (42)	PAUWES
D13.5	Portfolio of ideas, solutions and business cases using digital technologies in context of mini grid and Community of Practice (Scientist, Innovator, Investor, policy maker) for innovative digital solutions in mini grid	M30 (18)	AfriLabs
D13.6	Evaluation methodology and selection of Best Practices for business and delivery models of mini grid methodologies	M30	LUT
D13.7	Guidelines of the methodology for defining business and delivery models of mini grid	M42	POLIMI
D13.8	Material of online training program	M42	UCT
D13.9	Report about the outcome on scientific collaboration WP13	M42	POLIMI

1.3 Milestones

Number	Title	Verification mean	Due Date	Responsible
MS6	Launch of the projects (Pillar 2)	Kick off meeting minutes	7	POLIMI

1.4 Interaction/synergies with other WPs

WP13 via the Project Leader, will participate in WP3 Activities as part of the Scientific Board of Pillar 2 and will work with the Pillar Coordinators to maximise synergies across the WPs in Pillar 2, either in terms of R&I and capacity building.

Number	Interaction description	Responsible
1	Project Management will be carried out in synergy with WP3 and the Pillar 2 Board Governance indications	POLIMI
2	Information on the current capacity building /training activities within each WP9-WP16 will be valorized to increase the “impact” of each capacity building activity back to WP9-WP16	UCT, POLIMI

3	Based on the sharing during the first months of LEAP-RE, a constant link on cross-cutting interests relative to Technological development, methodological approach , Modelling tools and other R&I related topics that will take place into WP9, WP10, WP11, WP12, WP13, WP14, WP15, WP16 is promoted in Task 3.1	POLIMI
4	Scientific Dissemination will be carried out in agreement with the Scientific Dissemination Strategy defined in WP3	PAUWES
5	Other dissemination activities will follow the guidelines provided by WP4 in the LEAP-RE Communication and Awareness Raising strategy	AfriLabs, PAUWES
6	Monitoring and Evaluation will be carried out receiving input from the M&E plan for Pillar 2 developed in WP3 and coordinated by WP5	PAUWES, POLIMI
7	Financial Reporting will be managed by WP1 and supported by the WP leader and WP3 Leaders	POLIMI

1.5 Risks

Number	Risk description	Risk mitigation	Proba	Impact
1	Lack of electricity consumption data availability	Strong synergy with Energy Utilities (P), Use of literature data (C)	3	4
2	Lack of local stakeholders' collaboration	Involvement of local and specialized partners (P) Activation of local collaborators (C)	2	2
3	Financial risks	Continuous communication and strong organization of the activities (P) Adjustment of the activities (C)	2	2

Annex 1: WP13 GANTT Chart

		WPT3: SETADISMA																																									
		2020			2021												2022												2023												2024		
Lead		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
						#####	April	May	June	July	Aug	Sept	Oct	Nov	Dec	#####	Feb	Marc	April	May	June	July	Aug	Sept	Oct	Nov	Dec	#####	Feb	Marc	April	May	June	July	Aug	Sept	Oct	Nov	Dec	#####	Feb	Feb	
Task 13.1.: System design and planning from social needs to technical design		POLIMI																																									
Data Collection																																											
13.1.1	Data collection of electricity demand to microgrids in reference contexts (Algeria, Kenya, Rwanda)																																										
	Data collection of RE resources in reference contexts (Algeria, Kenya, Rwanda)																																										
	Data collection of socio-economic conditions in reference contexts (Algeria, Kenya, Rwanda)																																										
Demand and Resource assessment and existing models' validation																																											
13.1.2	Demand estimation																																										
	RE Resource estimation																																										
	Socio-economic data evaluation																																										
Distribution system and dispatching methodology definition																																											
13.1.3	Distribution system modeling																																										
	Dispatching methodology																																										
Optimal design and planning methodology for microgrids																																											
13.1.4	Microgrids design tools and planning methodology																																										
	Evaluation of innovative solar technologies for electricity generation																																										
Task 13.2.: Digitalisation, Open innovation and Entrepreneurship		PAUWES																																									
Assessment and Analysis of Digital Technologies for Mini-grid																																											
13.2.1	Development of a methodology to assess technology readiness of digital technologies in African mini-grids																																										
	Assessment of current state of digital technologies in mini-grids in African context																																										
13.2.2	Open Innovation for Ideation and proposition of solutions																																										
	Open Innovation for Ideation and proposition of solutions																																										
	Innovation and Digital Entrepreneurship Ecosystem																																										
13.2.3	Mapping of entrepreneurship ecosystem actors and stakeholders in the field of mini-grid and digital technologies on the continent																																										
	Identification of specific actions for the establishment of the ecosystem																																										
Task 13.3.: Business Models and Socio-Econ. Contexts		LUT																																									
Evaluation framework development to analyze the available business and delivery models																																											
13.3.1	Input data formalization for framework development via data gathering, filtering and categorization from Task 13.1 and Task 13.2 and related sub-actions																																										
	Definition of a general matrix characterizing the models and related indicators																																										
Case studies evaluation, applying the evaluation framework through the combination of the four dimensions (synthetic evaluation)																																											
13.3.2	Implementation and Analysis of framework to each case study																																										
	Revision and reinforcement of the framework utilizing synthetic evaluation to each cases																																										
	Define and Select best practices based on data and results combined from the results of Task 13.1.																																										
Productive uses support through energy access and connectivity for new local businesses																																											
13.3.3	Selection of mini-grids under evaluation regarding productive-use approach																																										
	Evaluation of RE smart grid conversion approach and the impacts																																										
	Identification of the main parameters influencing the evolution of the socio-economic conditions																																										
13.3.4	Guidelines to summarize the framework, indicators and related best practices																																										
	Summarization of the framework																																										
Task 13.4.: Capacity Building and Training		UCT																																									
13.4.1	Involvement of Master and PhD students in the project: 3 PhD theses / 18 Master theses																																										
	Involvement of Master and PhD students in the project: 3 PhD theses / 18 Master theses																																										
13.4.2	Organize two Summer Schools/ Workshops																																										
	Organize two Summer Schools/ Workshops																																										
13.4.3	Development and Implementation of Training Programs: Organize 3 online trainings																																										
	Development and Implementation of Training Programs: Organize 3 online trainings																																										
Task 13.5.: Coordination, Dissemination and research uptake		IMI/PAUWES																																									
Coordination and financial management of all the activities with the LEAP-RE																																											
13.5.1	Organization of periodic meetings																																										
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