***PRE-LEAP-RE***

*Coordination and Support Action (CSA)*

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# Synthesis report with a complete H& ICB Agenda

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PRE-LEAP-RE

PREparing for a Long-Term EU-AU Research and Innovation Partnership on Renewable Energy

# Synthesis report with a complete Human and Institutional Capacity Building Agenda

## *Deliverable D2.2*

**Lead Beneficiary: EIT InnoEnergy**

**May 2019**

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## ABOUT PRE-LEAP-RE

PRE-LEAP-RE – Preparing for a long-term EU-AU research and innovation partnership on renewable energy – is promoting an effective pathway for empowering local research. This pathway could be achieved by fostering EU-AU joint cooperation while creating the condition to transform research into effective innovation, tailored to the specific needs, the capacity and the aspiration of the African people and society which may be different from region to region.

Led by CEA, it gathers 17 partners across Africa and Europe jointly committed to strengthening the overall framework for cooperation in the field of science, technology and innovation (STI). During 14 months, the participants will identify and formulate a strategic Joint Research and Innovation (R&I) Programme for renewable energy technology and establish the organizational principles for its implementation within a forthcoming Joint Programme by bringing together national funding agencies of EU member states, African states and other key EU-AU actors involved in energy research.

*For more information visit: www.leap-re.eu*

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# Table of Contents

# 1 Introduction

## 1.1 Background

The design of a Human and Institutional Capacity Building Agenda in PRE-LEAP-RE responds to the need of complementing the activities of the LEAP-RE Research and Innovation ecosystem with the right set of competences to further improve the impact of research results. Indeed, the aim is to create a concise framework to fill potential gaps related to competences and capacities identified in the African renewable energy research and innovation ecosystem by setting up the right activities to build the right set of skills. Such skills should, on the one hand, further enable the conditions for the penetration of renewable energies in African regions; and therefore, on the other hand, contribute to their long-term, sustainable and local socioeconomic development.

As the Research and Innovation Agenda, this multidisciplinary framework for a Human and Institutional Capacity Building Agenda derives from PRE-LEAP-RE's WP1 *Ecosystem Analysis* (D1.1). This has two main outcomes. On the one hand, the rationale for the development of the Capacity Building Agenda has drastically shifted from the one the consortium described in the proposal for PRE-LEAP-RE. This entails that most of the activities suggested to be developed in the original approach have been replaced for what is laid down now in this deliverable; we consider these much more connected with the reality on the ground, as suggested by the *Analysis*. On the other hand, and most importantly, the rationale deriving now from the Ecosystem Analysis gives us the first structuring element for LEAP-RE's Capacity Building Agenda: it is conceived, like for the research activities, across the three main axes identified in the aforementioned *Analysis*: Technological Development, Methodological Approach, and Energy Scenarios and Policy Analysis. This allows for the capacity building activities to be naturally aligned with the research activities, and thus contribute to the suggested Outputs, Outcomes and Impacts of each Multi-Annual Roadmap.

This, in turn, places capacity building activities in the long-term perspective of the Theory of Change and Impact Pathway of LEAP-RE.

Furthermore, and as the second structuring element for the definition of the LEAP-RE's Capacity Building Agenda, since capacity building is a complex notion that involves individual and organisational learning, which builds social capital and trust, develops knowledge, skills and attitudes, and creates an organisational culture, the methodological approach to capacity building suggested here is based on three different levels: Individual, Institutional and System level. This holistic vision comprehensive of the three axes and of the three levels is integrated within the Multi-Annual Roadmaps (MARs). Thus, the MARs are always comprehensive of both research activities and capacity building activities.

Finally, together with, and complimentary to, the capacity building activities linked to the MARs, we plan capacity building activities to be performed by the future LEAP-RE consortium itself. These aim at creating long-term, multi-stakeholder collaboration and engagement.

## 1.2 Structure

This Deliverable will explain first in its *Concept* section the rationale for the definition of the conceptual framework for the LEAP-RE Capacity Building Agenda, consisting of two main anchoring points: the conclusions of WP1's *Ecosystem Analysis* and the Multi-level approach in capacity building. The second section, *Capacity Building in the Multi-Annual-Roadmaps*, will provide an individual detailed approach for each of the Multi-Annual-Roadmaps (see fig. 1 below) in which capacity building is required, including the identification of the main capacities and competences needed, as well as proposed activities to deliver them. Finally, section 4 briefly suggests some capacity building activities that could be designed and be performed by the future LEAP-RE consortium.

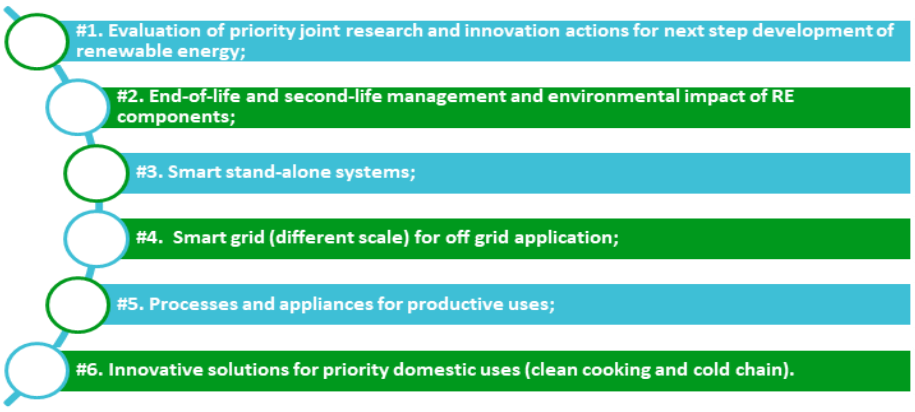


**Fig. 1: LEAP-RE's Multi-Annual Roadmaps for Research & Innovation and Capacity Building Activities**

# 2 Concept

## 2.1 Capacity building in LEAP-RE: a holistic approach addressing identified gaps in the EU-Africa RE innovation ecosystem through generation of competence and capacity in a multilevel system.

As the PRE-LEAP-RE *Ecosystem Analysis* shows, capacity building activities should be linked to research performing actions across the three main axes identified: technological development, methodological approach, and energy scenarios and policy analysis. Hence the design of the capacity building activities in the Multi-Annual-Roadmaps should be developed across three axes:

- Concerning **technological development** for any kind of RE technology, competence building in researchers and local empowerment activities need to contribute to generate the enabling environment that allows technology to be impactful to unlock long-term local innovation.

- In the area of **methodological approach**, capacity building shall put an emphasis on fostering a shared culture among stakeholders of the Comprehensive Energy Solution Planning[1] approach (technology but also how it is designed, built, operated, financed and maintained) to increase the chances of impactful innovation and societal change. Indeed, the ecosystem analysis showed that still 20% of technology research does not include at all an analysis of the societal needs, the technological solution's market potential, the design of a business model for its long-term sustainability, or the formulation of its expected impact.

- Finally, **concerning energy scenarios and policy analysis**, capacity is required in order to build robust energy scenarios and modelling tools as well as policy analysis mechanisms for understanding the potential implications of energy solutions against local economic, environmental, cultural and other boundary conditions.

Therefore, to improve the chances for renewable energy innovative solutions to be impactful and sustainable, as well as to generate development within local, national and regional African communities, LEAP-RE will work towards:

1. Empowering local understanding, engagement and ownership of technologies in all stakeholders;

[1] Comprehensive Energy Solutions Planning considers and analyses economic, social and environmental conditions of RE technologies uptake and impact for project preparation. Its main steps are: needs identification; baseline load demand & resource forecast; assessment & strategy selection; technology optimisation; business model identification; expected impact forecast and, increasingly, potential for engagement of local expertise and communities. Source: Ecorys and European Commission, *Study on Renewable Energy and Research and Innovation Capacity of Sub-Saharan Africa*, 2015, Brussels, European Commission – DG Research and Innovation.

2. Support a skilful and knowledgeable community that understands technology but also knows how to operate it and maintain it on the long term; and

3. Fostering the capacity to understand and manage a variety of short, middle and long-term energy scenarios as well as to formulate adequate policy.

This is why PRE-LEAP-RE proposes (also in line with the academic literature on the subject) to work in a threefold systemic approach in which capacity building activities address three levels: the Individual level (the researchers), the Institutional level (the research institutions), and the System level (including public sector and civil society actors at the local, national and regional actors).

- **Capacity building at individual level**: the overall aim in this level is to provide researchers with the knowledge and skills to lead the design, delivery, and dissemination of high-quality research. In LEAP-RE, capacity building initiatives for researchers shall include the provision of the required technical competences related to technology research and development, as well as the cross-cutting skills required to foster local knowledge among, and engagement from, the local environment, including community empowerment. Also, it should aim at equipping researchers to engage continuous dialogue with public sector stakeholders to understand needs and provide modelling tools for decision-making. Likewise, researchers shall be engaged in capacity building activities related to the application of the Comprehensive Energy Solution Planning methodological approach, thus ensuring the inclusion of a Social Sciences and Humanities (SSH) approach. Finally, researchers shall receive specific training on entrepreneurship and innovation to create the adequate mindset to develop more targeted and impactful innovative solutions.

- **Capacity building at institutional level**: the main goal is improving organisational structures, processes, resources, management and governance issues of research organisations. In the context of LEAP-RE, we aim at planning capacity building activities for research organisations, so they increase their ability to develop a long-term vision deeply rooted in society in order to facilitate technology acceptance and therefore impact. By doing so, research organisations increase their role as contributors to local, national and regional cohesion and development, a factor that also reinforces their chances to persist in the long term. Likewise, related to the methodological approach, capacity building at the institutional level should be also oriented at increasing the capacity of the research organisation's own staff for designing, building, operating, using, supporting and managing research infrastructure, as well as the technologies entering the market. Finally, capacity building activities for research organisations shall aim at increase and improve their dialogue with

    - 1) Policymakers, to coordinate and support their, as well as the institution's own, long-term ambitions; and
    - 2) The industrial sector, to foster innovation and an innovation ecosystem, as well as to improve the research organisations own innovation culture and drive.

  Finally, research organisations should increase their ability to attract new researchers, including international, new funding opportunities, and to participate in international networks so they gradually become centres of excellence.

- **Capacity building at system level**: it is designed to improve national and regional innovation environments. The emphasis here is to provide knowledge and tools for developing coherent policies, strategies and effective coordination across sectors and among governmental, non-governmental and international actors, as well as at local, national, regional and international level. It shall include strategic planning and priority setting through the energy scenario and modelling tools provided by the research activities. Additionally, the private sector should be addressed and included structurally in capacity building activities with the aim of enhancing innovation ecosystems in essential activities such the valorisation of research results. Moreover, the private sector can contribute to the fostering of a culture of market savviness, entrepreneurship and innovation drive. Likewise, civil society must also be addressed because interest representation, societal engagement and behavioural change are essential to technological acceptance and the unlocking of societal development.

Fig. 2 below shows a schematic summary of the approach for each level.

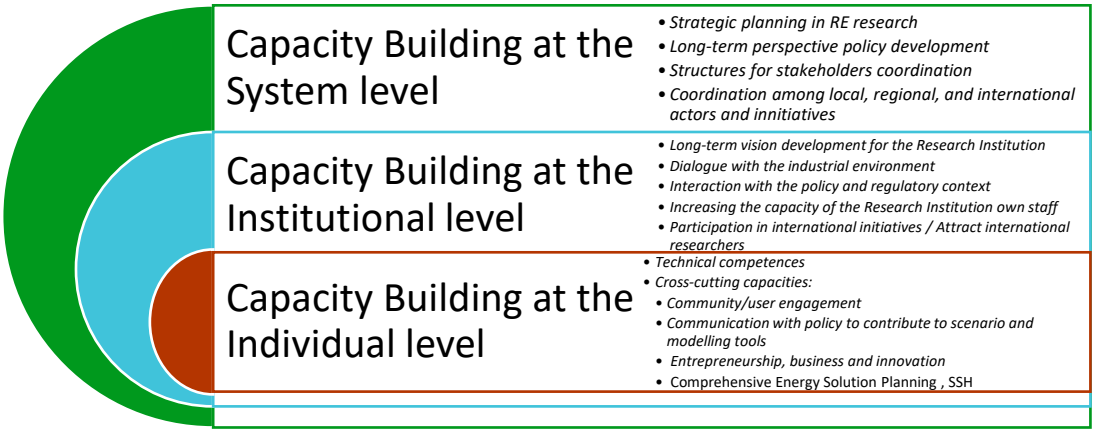


**Fig. 2: Holistic framework for multi-level capacity building agenda implementation in LEAP RE.**

## 2.2 LEAP RE prioritisation and potential for capitalisation with other initiatives

As explained in the previous section, the scenario requires acting on each of the three levels described in Fig. 2. Yet, after consultations with stakeholders, and given the time and budget constrains in the upcoming LEAP-RE RIA, the consortium undertook a reflection around what capacity building shall be prioritised in LEAP-RE. A further consultation with the European Commission advised to keep the focus on the capacity to perform research.

As a result, therefore, the capacity building program proposed by the PRE-LEAP-RE consortium has a focus on the two first levels: the capacity building for researchers (individual level) and for research organisations (institutional level). However, to achieve the ambitious goal of improving and adapting renewable energy technology solutions to the real needs of communities, capacity building for other actors at System level should be considered in the LEAP-RE approach from the start.

In this perspective, LEAP-RE should foster an operational framework in which all three levels (researchers, research institutions and the system) constantly interact. Thus, while keeping the focus on funding and implementing the individual and institutional levels (researchers and research organisations) LEAP-RE should create the stakeholder community and environment in which the actors of the System level are also interpellated. In this logic, it is expected that researchers and research organisations will interact with entrepreneurs, NGOs and local community representatives (belonging to the System level) with the purpose, for instance, of valorising research results. Such exchanges will necessarily build capacity within the System level. In the opposite direction, entrepreneurial capacities will be needed by researchers to translate the real needs of communities into innovative products; they can build capacity on those by interacting with industry and entrepreneurs in the System level. This interaction could be schematised in a 3-stage approach as represented in Fig. 3 below.

LEAP RE will also, where necessary, build on existing capacity-building actions already undertaken by the African Union and European Union partners that address directly the System level of renewable energies.

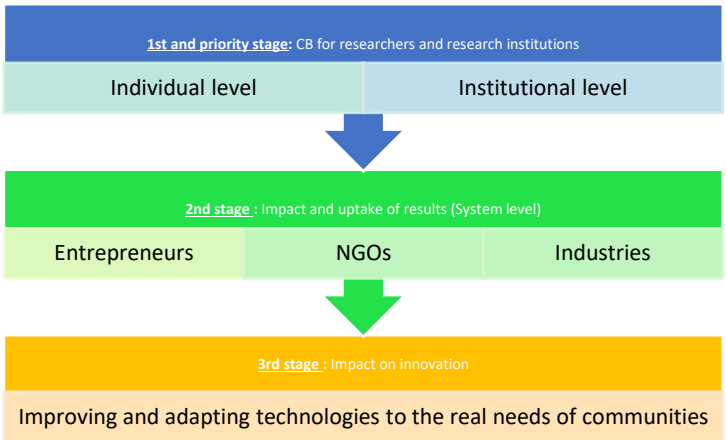


**Fig. 3: Stages of interaction between the 3 levels of the RE R&I Ecosystem.**

# 3 Capacity building in the Multi-Annual Roadmaps

The approach described in the previous chapter for the Capacity Building Agenda aims at ensuring mutidisciplinarity and a holistic approach that addresses a variety of stakeholders in the African renewable energy R+I ecosystem. This overarching conceptual framework for the Agenda does not exclude a hands-on, specific individual approach for each Multi-Annual Roadmap. Since the Roadmaps address specific thematic and technological field(s), the aim for addressing them independently is to provide a first identification of the right technical competences related to technology needed in each specific Roadmap. After this, we also identify the cross-cutting capacities needed for both researchers and research institutions. In this case, these capacities apply for all Roadmaps so we have grouped them together. Finally, we also provide a first suggestion of possible activities that could contribute to the delivery and building of these competences and capacities. Having an individualised approach per Roadmap for what concerns technical competences, together with a good description of cross-cutting capacities needed in all Roadmaps, shall ensure the capacity building activities put in place through LEAP-RE generate the right competences and capacities in each thematic field so that they contribute to the fulfilment of the Outputs, Outcomes and Impacts defined for each Roadmap.

For clarity, we understand ‘competences’ as those skills related to the technical aspects concerning technology. On the other hand, we understand ‘capacities’ as those skills that are cross-cutting because applicable and needed in any technology development project: firstly, those related to the Comprehensive Energy Solution Planning; secondly, capacities to engage local communities and technology users; knowledge of social, environmental and cultural boundary conditions; capacity to establish permanent dialogue with civil society organisations, policy-makers, and the industrial environment; entrepreneurial mindset and innovation drive, market and value chain knowledge, among others.

Please note that since the Multi-Annual Roadmap number 1 is a mapping exercise around joint research and innovation actions for next-step development of RES (as a coherent follow-up to the one undertaken in WP1 of PRE-LEAP-RE) capacity building activities are not relevant and hence this area is not addressed in this MAR.

## 3.1 Roadmap #2: End-of-life and second-life management and environmental impact of RE components

| DESCRIPTION OF CAPACITY BUILDING REQUIREMENTS | | PRE-LEAP-RE |
|---|---|---|
| Multi-Annual Roadmap #2 | *End-of-life and second-life management and environmental impact of RE components* | |

**General CB objectives related to the Roadmap**

- Management schemes for waste from RE components should be adapted to the unique conditions of each country or region.
- R&D and skills development are needed to support additional value creation from RE end-of-life components.
- Metrics for environmental impact categories.
- Promote International Standards and Rigorous Testing Protocols.
- Sustainable end-of-life management policies for RE components can be achieved through an enabling regulatory framework.

**Technical competences required for Researchers**

- Designing efficient large scale of RE power generation systems.
- RE technology and policy frameworks.
- International Standards for RE systems/equipment.
- Mitigation of the effect of carbon-based heat and power generation systems.
- Measurement of ultrafine particulate emissions.

**Expected learning outcomes**

*Researchers should be able to:*

- Design the RE installations for the environment to address issues relating to design for toxic reduction, design for improved reusability/recyclability as well as other environmental priorities such as energy consumption and resource management.
- Produce the net environmental impacts of large-scale RE installations.
- Use a metric to track by life cycle analysis (LCA), and comprises the physical unit of measurement, the methods of data gathering, and the methods of data analysis.
- Rank end-of-life the strategies in accordance with their potential economic and environmental efficiency.
- Extent Testing Protocols for International Standards.

**Expected outputs, outcomes and impacts of the Multi-Annual Roadmap 2**

The research and capacity building activities within this multi-annual roadmap shall allow:

Output

- Map of the EoL/OoS component value chain, identification of key stakeholders & business models
- Creation of categories of components found in EoL/OoS components and proposed safe methods of handling
- Development of comprehensive models and standard operating procedures for EoL/OoS component management
- Proposal of methods for EoL/OoS component recycling which address local environmental impact through effective management;
- Identification of second life components with a benefit for African countries: lower cost; higher reliability, less environmental impact
- Dissemination of acquired knowledge, among the African and European community to extend support for sustainable EoL/OoS component management

Outcome

- Promotion of environmental and ecological sustainability of renewable energy systems;
- Increase in innovation around the use and reuse of EoL/OoS components before disposal
- Increased awareness among researchers on the importance of accounting for EoL/OoS components in RE research work.

Impact

- Creation of jobs through use and reuse of EoL/OoS components management e.g. creation of jobs through repair of systems and proper collection of EoL/OoS components
- Creation of policy incentives towards RE production, including handling and disposal at EoL/OoS component stage e.g. financial incentives to encourage manufacturing of easily repairable systems
- Reduced materials used for new products and thus cost and environmental impact reduction

## 3.2 Roadmap #3: Smart Stand-alone systems

| DESCRIPTION OF CAPACITY BUILDING REQUIREMENTS | | PRE-LEAP-RE |
|---|---|---|
| Multi-Annual Roadmap #3 | *Smart Stand-alone systems* | |

**General CB objectives related to the roadmap**

- Improving the technology of stand-alone components and usability of the whole system
- Knowledge transfer regarding the final purpose of different devices
- Standardisation competences for increasing the compatibility of systems and components
- Accreditation for laboratories to test stand-alone systems
- Collaboration with policymakers about the potential of the RE-SAS systems in specific social and geographic contexts

**Technical competences required for Researchers**

- Characteristics and properties of materials
- Systems modelling and control
- Electrical components

**Expected learning outcomes**

- *Know and use the fundamentals techniques dedicated specifically to RE Stand-alone systems*
- *Make optimal use of the technical research infrastructures dedicated to RE*
- *Transmit the results of their research in a simple way to different types of actors, especially those whose involvement are needed to obtain positive impacts of the project*

**Expected outputs, outcomes and impacts of the Multi-Annual Roadmap 3**

The research and capacity building activities within this multi-annual roadmap will allow:

Output

- To provide avenues for the development of RE-SAS demonstrator(s), considering the diversity of potential local RE sources and the local effective environment;
- To develop tools for RE-SAS design.

Outcome

- The development of reliable stand-alone system architecture that can be easily and widely deployed in off-grid African rural and remote areas;
- Sharing acquired knowledge to develop a sustainable RE-SAS systems deployment.
- Stakeholders and business model are identified
- To increase the share of renewables and reliability;
- To promote environmental sustainability of renewable energy systems;

Impact

- The creation of jobs in RE production and uses through RE-SAS systems installation, management and maintenance
- To give access to affordable energies to the largest number of beneficiaries and to maximise the socio-economic impact.
- To promote income generating activities

## 3.3 Roadmap #4: Smart grid (different scale) for off grid application

| DESCRIPTION OF CAPACITY BUILDING REQUIREMENTS | | PRE-LEAP-RE |
|---|---|---|
| Multi-Annual Roadmap #4 | *Smart grid (different scale) for off grid application* | |

**General CB objectives related to the roadmap**

- Researchers involved in improving smart grid components, connections and management
- Knowledge transfer and established standards for the smart grid system and components
- Established and accredited laboratories for testing smart grid systems
- Training of electrical technicians
- Behavioural changes to have energy access with reliable systems

**Technical competences required for Researchers**

- Electrical components
- RE power generation system modelling
- RE technology optimization

**Expected learning outcomes**

*Researchers should be able to:*

- *Know and understand about electrical components, RE power generation system modelling and technology optimization*
- *Apply knowledge and understanding electrical components*
- *Make judgements RE technology optimization*

**Expected outputs, outcomes and impacts of the Multi-Annual Roadmap 4**

The research and capacity building activities within this multi-annual roadmap will allow:

Output

- Development of new tools for optimizing capacity in planning and dispatching strategies based on people's needs;
- Reduction of energy dependence on fossil fuel and increase in the share of RES;
- New open-source code access for researchers worldwide.

Outcome

- Researcher capacity will be strengthened with holistic and multidisciplinary thinking and needed

technical competences through capacity building. Additionally, increased awareness of people's needs will support longer-term behaviour change;

- Research and related capacity building will be valorised as instrumental to the creation of native and local innovation and behavioural change;
- Technologies design will be increasingly people-driven, increasing efficiency;
- Local people and civil society will feel more engaged in the research-innovation process;
- Private players will benefit from a new instrument for supporting sustainable business.

Impact

- Increased energy access in rural areas and use of REs;
- Improved living conditions and social inclusive growth in the local context;
- Improved economic development and promoting job creation in the local context.
- Behavioural change as far as energy usages

## 3.4 Roadmap #5: Processes and appliance for productive uses (including cold chain for industrial uses)

| DESCRIPTION OF CAPACITY BUILDING REQUIREMENTS | | PRE-LEAP-RE |
|---|---|---|
| Multi-Annual Roadmap #5 | *Processes and appliance for productive uses (including cold chain for industrial uses)* | |

**General CB objectives related to the roadmap**

- Improving the adaptability of existing PRODUSE systems that match the identified needs
- Knowledge on productive systems that could use renewable energy sources.
- Installation and maintenance of PRODUSE equipment/systems
- NGOs appropriate the concrete results generated by research to bring positive advocacy to policy makers and donors;
- End users received simple and clear information to use efficiently sustainably PRODUSE systems

**Technical competences required for Researchers**

- Advanced modelling and testing of systems
- Process of technical products assembly
- Electrical and electronical components

**Expected learning outcomes**

- *Model, assemble and test new and innovative PRODUSE products/equipment that match the need of targeted community;*
- *Develop appropriate research methodologies on RE PRODUSE systems;*
- *Collect, collate, critically analyse, synthesise, summarise, report and disseminate information. This includes searching literature techniques, and writing effective literature reviews on RE PRODUSE systems;*
- *Use specialist software and research computing services appropriate to the RE PRODUSE*
- *systems;*
- *Know, understand and abide all relevant legislation and guidelines applicable to materials, equipment used in general in the targeted RE PRODUSE systems;*
- *Engage with researchers in other fields, if appropriate to the subject of RE PRODUSE systems;*

**Expected outputs, outcomes and impacts of the Multi-Annual Roadmap 5**

The research and capacity building activities within this multi-annual roadmap will allow:

Output

- Categories of IGAs performed by off grid communities, existing PRODUSE appliances supporting these IGAs and IGA categories and existing gaps that RE PRODUSE appliances can fill
- Existing PRODUSE appliances in small- and large-scale agriculture (livestock, fisheries and farming) and proposed RE appliances that can be improved or developed
- Cold chain and thermal PRODUSE appliances in different sectors such as healthcare and agriculture
- PRODUSE appliances used by industries, alternative appliances that can be used and energy efficiency measures that can be taken to improve the energy consumption of existing ones
- PRODUSE appliances available to on-grid consumers vs off grid consumers to assist with assessment of levels of service expected from RE PRODUSE appliances by off grid consumers
- Existing business models used to sell PRODUSE appliances and quality issues related to PRODUSE appliances in on grid and off grid markets

Outcome

- Understanding of opportunities for PRODUSE appliances to address IGA related challenges by researchers
- Reduction of post-harvest losses especially in the agricultural sector
- Adoption of energy efficiency measures by industries
- Improved partnerships and joint research opportunities between European and African researchers

Impact

- Increase in productivity of the informal sector such rural industries
- Improved socio-economic development of off-grid communities due to support of their IGAs
- Creation of jobs and improved energy access through support of IGAs in off grid communities
- Reduced GHGs, local pollution and deforestation due to improvement in energy efficiency in industries

## 3.5 Roadmap #6: Innovative solutions for priority domestic uses (clean cooking, cold chain…)

| DESCRIPTION OF CAPACITY BUILDING REQUIREMENTS | | PRE-LEAP-RE |
|---|---|---|
| Multi-Annual Roadmap #6 | *Innovative solutions for priority domestic uses (clean cooking, cold chain…)* | |

**General CB objectives related to the roadmap**

- Researchers involved in improving solar photovoltaic systems, cookstove and cold chain components
- Knowledge transfer and established standards for the renewable energy components and supply chain
- Behavioural changes to have energy access with reliable systems
- Established and accredited laboratories for testing solar photovoltaics cook stoves and cold chain systems
- Training of specialised technicians

**Technical competences required for Researchers**

| Technical Competences |
|---|
| • How to set and apply standard protocol for lab and field testing<br>• Stove thermodynamic modelling<br>• Decision support system to select alternatives<br>• Chemistry of fuel<br>• Installed Solar PV systems performance in different climatic conditions |

**Expected learning outcomes**

Researchers should be able to:

- Know and understand about how to set and apply standard protocol for lab and field-testing electrical components, stove thermodynamic modelling and chemistry of fuel
- Apply knowledge and understanding about how to set and apply standard protocol for lab and field-testing electrical components
- Make judgements about decision support system to select alternatives

**Expected outputs, outcomes and impacts of the MAR 6:**

The research and capacity building activities within this multi-annual roadmap will allow:

Outputs

- Innovative cooking device design;
- New and appropriate modern cooking systems;
- Local and low-cost materials used for stove construction;
- Technical improvements in fuel processing or fuel production technologies, and the technical and managerial capacities related to these improved processes and production technologies;
- Improvements to existing technologies, and new technologies for cold chains, including refrigeration units based on solar or biomass resources, as well as long-term sustainability and management capacities.

Outcomes

- Researchers provided with capabilities for lab and field testing of cooking stoves;
- Use of modern fuels promoted and its required skills;
- Sustainable fuel supply chains promoted:
- Effective and low-cost food preservation promoted;
- Efficient air conditioning promoted;
- Greenhouse gas (GHG) emissions due to lower power consumption from the grid or diesel generators reduced.

Impacts

- GHGs, local pollution, land degradation and deforestation reduced;
- Medicines and vaccines in remote areas better preserved;
- Social conditions of local stakeholders as well as job creation improved;
- Drudgery for girls and women reduced and their social power and health conditions (female empowerment) improved;
- Food and nutrition security strengthened;
- Individual health, and public healthcare improved.

## 3.6 Cross-cutting capacities for Researchers

| CROSS-CUTTING CAPACITIES FOR RESEARCHERS | |
|---|---|
| | Multi-Annual Roadmaps 2 to 6 |

Together with technical competences related to technologies, researchers should acquire the following cross-cutting capacities through the Capacity Building activities funded and implemented through LEAP-RE:

**Community/user engagement and social aspects**: researchers shall be able to interact and dialogue on a permanent basis with local communities, civil society and their organisations, including interest representation entities. The aim is to create a collaborative culture that links the work of researchers with the real needs and interests of local communities. Long-term sustainability of innovation and the gender dimension shall be prioritised.

**Business/Market aspects**: in order to create market-fit and impactful products and services, capacity building activities in LEAP-RE shall ensure researchers develop an entrepreneurial and market-oriented mindset, including innovation methodologies, knowledge of the value chain and commercialisation, etc. The aim is achieving a "lab-to-market" approach to daily activities.

**Communication**: capacity to disseminate and communicate efficiently to different audiences, both locally and internationally, research activities and research results. Additionally, through capacitation activities, researchers should also be able to communicate the measurable impact of their work.

**Research proposals drafting** for public and/or private funding.

**Policy**: capacity to link research results to policy objectives. Researchers shall be trained so they are an essential part of efficient, high-quality oriented policy co-creation processes. And this at local, national and regional levels.

**Examples of suggested activities**

- Hands-on working groups with the different stakeholders in the ecosystem focusing on research orientation and link to needs.
- Challenge-based training (continuous digital + hackathons) in entrepreneurship and innovation. Focus on short programmes.
- Research programs developed in collaboration with industry and entrepreneurs.
- Continuous s
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- pecific training on the Comprehensive Energy Planning approach.
- Establishment of networks and hubs for researchers.
- Training for, and participation in policy-oriented co-creation processes with policymakers.
- Specific trainings in policy-oriented modelling tools production.
- Training on relevant legislation and guidelines.
- Communication papers in specialised publications.
- Workshops with local secondary schools and with universities.
- Mentorship programs: between researchers, researchers-industry, researchers-policymakers.
- Development of digital and/or blended training modules in any of the needed capacities.

## 3.7 Capacities for Research Institutions

| CAPACITIES FOR RESEARCH INSTITUTIONS | | PRE-LEAP-RE |
|---|---|---|
| | Multi-Annual Roadmaps 2 to 6 | |

Focused on strengthening the position of the Research Institutions (RIs) as such with a special focus in the following aspects:

**Capacity to develop a long-term vision for the RI**: deeply rooted in society to contribute to technology acceptance and impact. In doing so, they reinforce their role as contributors to local, national and regional cohesion and development, and hence they strengthen their chances to persist in the long term.

**Policy**: RIs shall position themselves at the core of policymaking processes to support their long-term ambitions and maximise the impact of research activities: it is about creating the right supportive environment for the successful contribution, the impact and the visibility of the RI.

**Industrial liaison**: strengthen ties with the industrial environment to foster innovation and an innovation ecosystem, as well as to improve the RI own innovation drive.

**Increasing the capacity** of the RIs' own staff for designing, building, operating, using, supporting and managing the Institution's infrastructure, as well as the results of their activities.

**Capacity to attract** (international) new researchers, new funding opportunities, and to participate in international networks.

**Examples of suggested activities**

- Workshops and conferences including industry, policymakers, and civil society representatives aimed at developing a long-term, fit-for-purpose strategy for the RI.
- Acquiring knowledge and understanding of new approaches, methodologies and applications of research and its outcomes to renewed RIs' strategies.
- Organisation and participation in hands-on policy co-creation processes including researchers, entrepreneurs, research funders and policymakers.
- Social, environmental, and policy advocacy training.
- Capacitation to become local innovation hubs linking researchers, entrepreneurs and civil society stakeholders.
- Develop, in collaboration with industry, own RI' guidelines to create an innovation and entrepreneurial research culture which is in contact with the local community.
- Setting specific research programmes as services to industrial sectors.
- Periodical exchanges of staff between Research Institutions, and between these and industrial organisations.
- Staff training in digital skills and use of databases.
- Development of clear RI's roadmaps including interesting opportunities for international researches and request for funding.
- Inclusion in RI's networks for eventual collaboration activities and funding.

# 4 Capacity Building activities performed by the LEAP-RE consortium partners

Complimentary to the capacity building activities performed by external partners of LEAP-RE in the Multi-Annual Roadmaps context, we foresee to develop a series of activities aimed at long-term sustainability of the African-European renewable energy ecosystem partnership that will be performed by the members of the LEAP-RE consortium.
Always keeping a long-term perspective of collaborative practices, and also of those who might entail an incremental amount of engagement and deepening of cooperation, we aim at developing:

Joint curricula, with the following options to be further explored and concretised:

- A Joint Master of Science programme between European and African education and research institutions covering a priority area of study.
- The setting-up of an MBA in Africa-Europe Energy Cooperation in collaboration with Industry. The role of the latter could be contributing real-world, challenge-based cases to the study programme; joint supervision of master thesis; and provision of scholarships and traineeships for students and researchers.

Finally, the creation of an African-European PhD school specialised on renewable energy innovation could also be envisaged.

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