ETRERA 2020

E-handbook

A COMPREHENSIVE **GUIDE** FOR TURNING **IDEAS**
INTO SUCCESSFUL **RENEWABLE ENERGY** PROJECTS
IN THE **MENA** REGION

Project **ETRERA_2020**
Empowering Trans-Mediterranean Renewable Energy Research Alliance for Europe 2020 challenges
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Task 4.2- ETRERA_2020 e-Handbook

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Author: Vinicius VALENTE (EUREC)
Contributors: Paola MAZZUCCHELLI (EUREC), Alberto SORACI, (Innova B.I.C.)

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ABSTRACT

The present document details the steps to be undertaken to ensure that research ideas can be successfully turned into innovative projects in the middle eastern and nothern africa (MENA) region. The publication includes specificities of Mediterranean Partner Countries (MPCs) as well as the specificities of the concerned renewable energy technology. The objective is to provide the partners with a general overview of the process to transform an R&D project in a successful, and commercially viable, innovation project.

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INTRODUCTION

ETRERA_2020

"Empowering Trans-Mediterranean Renewable Energy Research Alliance for Europa 2020 challenges" (ETRERA_2020) is a project co-funded by the European Union's Seventh Programme for research, technological development and demonstration (FP7) aimed at tackling the future energy needs by creating a Euro-Mediterranean research alliance for the development of a RDI network on Renewable Energy Sources – RES technologies and for improving Research-Industry cooperation.

ETRERA_2020 targets the following technologies:

- Wind
- Photovoltaic
- Solar Thermal
- Hydrogen and Fuel Cells
- Smart Grid

Specific goals:

- Improving human resources & know how of Mediterranean Partner Countries RTD organisations
- Increasing the networking opportunity among the main actors of the RES value chain
- Increasing of public – private partnerships
- Increasing the accessibility to research facilities
- Increasing the project/partners visibility in order to attract potential research/industry partners.

Main activities:

- Developing:
  - the catalogue of competences of partner research centres: research capacity, equipment, testing facilities, etc.;
  - a common R&DI strategy/roadmap and the related financial plan;
  - policy recommendations;
  - some tutorial/publication on market and risk assessment, finance opportunities, etc.;
- Setting-up and facilitating:
  - a Meta-cluster;
  - Public-Private Partnerships in RES technologies;
- Providing:
  - exchange of best practices and mobility from Research to Enterprise;
  - technological/R&DI services and business advisory;
- Organising:
  - two international brokerage events;
  - an international scientific conference;
  - a trans-regional Network on innovation in the field of RES technologies at Euro-Mediterranean level.

The consortium

ETRERA_2020 is conducted by a team of twelve organisations from nine different countries in Europe, Africa and Middle East.

The ETRERA_2020 idea is to improve S&T and entrepreneurial relationship between European Member States and the neighbouring Mediterranean countries in the strategic field of renewable energy production, distribution and storage by a range of activities targeted to bridging the existing gap between research and innovation.

ETRERA_2020 consists of a comprehensive partnership of stakeholder groups: Research centers, Technology transfers, Business centers.

Partners:

- INNOVA BIC- BUSINESS INNOVATION CENTRE SRL – INNOVA BIC (IT)
- THE ASSOCIATION OF EUROPEAN RENEWABLE ENERGY RESEARCH CENTRES – EUREC (EU)
- ISTITUTO TECNOLOGIE AVANZATE PER L'ENERGIA – CNR – ITAE (IT)
- KENTRO ANANEOSIMON PIGON KE EXIKONOMISIS ENERGEIAS – CRES (GR)
- AN-NAJAH NATIONAL UNIVERSITY – ANNU (PS)
- EUROPEAN BUSINESS AND INNOVATION CENTRE NETWORK – EBN (EU)
- CENTRE DE RECHERCHE ET DE TECHNOLOGIE DE L'ENERGIE – CRTEn (TN)
- UNIVERSITE DE NANTES – Politech Nantes (FR)
- YILDIZ TECHNICAL UNIVERSITY – Yildiz (TR)
- TURKIYE BILIMSEL VE TEKNOLOJIK ARASTIRMA KURUMU – TUBITAK (TR)
- UNIVERSITE CADI AYYAD – UCA (MA)
- ASOCIACION MADRID NETWORK – MADRID NETWORK (ES)

ETRERA_2020 E-handbook

The ETRERA_2020 Work Package (WP) 4 was dedicated to "Capacity Building" and focused on developing actions to ensure that renewable energy operators in the participating Mediterranean Partner Countries (MPCs) are qualified to manage, transfer and use knowledge resulting from research. WP4 focused on actions to promote exchange of best practices amongst relevant organisations (including national and regional innovation agencies); to foster training activities; to exchange staff and to promote mobility schemes notably between research and industry; to support young innovative companies in setting up technological partnerships.

The ETRERA_2020 E-handbook was developed under the scope of WP4. The publication is a training guide tailor-made to the needs of the MPCs involved in the project.

The present document details the steps to be undertaken to ensure that research ideas can be successfully turned into innovative projects. The publication includes specificities of MPCs as well as the specificities of the concerned renewable energy technology. The objective is to provide the partners with a general overview of the process to transform an R&D project in a successful, and commercially viable, innovation project.

TECHNOLOGY READINESS LEVELS

In the renewable energy sector, the TRL scale is extremely important to understand the RD&D efforts and funds needed for innovation in order to improve efficiency reduce costs and, as a consequence, successfully bring new technologies to the market.

Technology Readiness Level (TRL) is defined as an index used for understanding the maturity and current usage of a technology under improvement. TRLs are gradually used for managing risks, benchmarking, and funding decisions all over the globe. It's an important tool for decision-makers to be able to understand whether and when to develop or integrate a technology into larger systems.

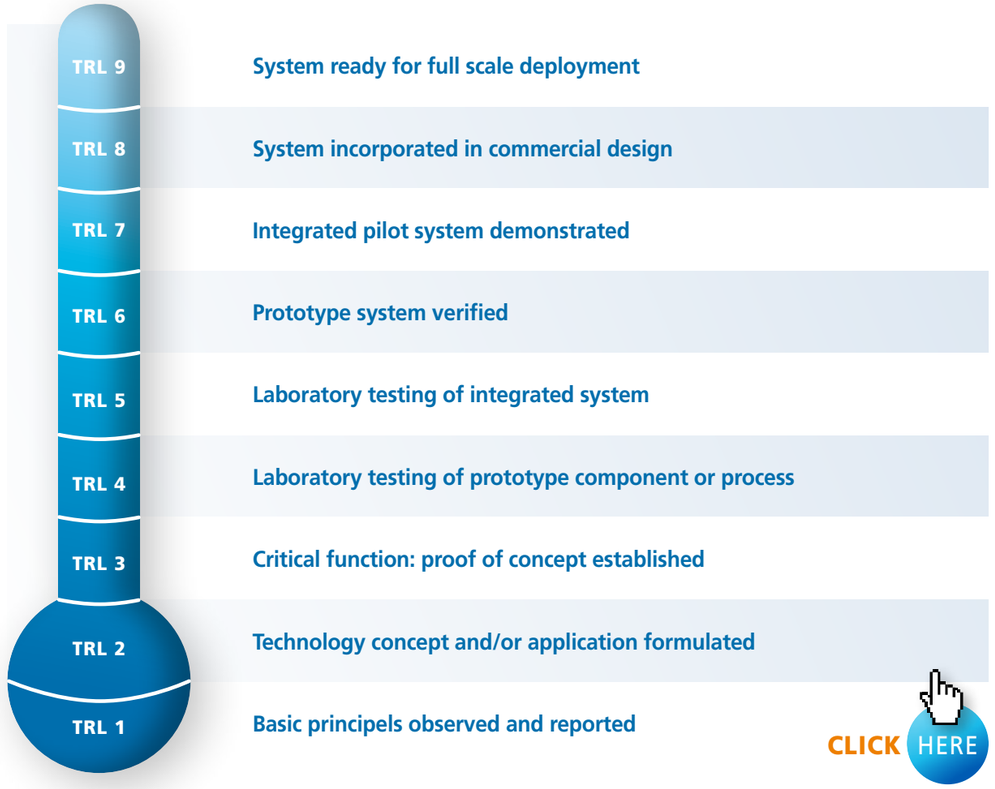
Stan Sadin, a NASA researcher, created the first TRL scale with 7 levels in 1974. NASA formalized the measurement in 1989 and later developed its current 9-level form, which is still used widely.

The European Commission embraced the TRL scale, which was initiated by the efforts of the High Level Expert Group on Key Enabling Technologies (HLG-KET). A report on KETs[1] from 2011 recommended that the TRL scale to be used as "tool for assessing the results and expectation of the projects". The idea was embraced by the first HLG-KET and proposed for the use of the TRL scale to align its RDI activities and balance technological research, product development and demonstration activities within their RDI priorities[2]. This was adopted by the European Commission and included in their 2012 'Communication on KETs'[3].

In the 'Communication on KETs' explains that varied definitions and criteria are applied to RDI funding, what demonstrates that different policy instruments use different approaches. The European Investment Bank, for instance, uses a consolidated classification, different from the European Regional Development Fund (ERDF), whose scale distinguishes between basic research, technical & applied research, pilot lines/early product validation actions/advanced manufacturing capabilities, and first production. Several RDI instruments use different approaches to distinguish between the different phases in technology development.

In the renewable energy sector, the TRL scale is extremely important to understand the RD&D efforts and funds needed for innovation in order to improve efficiency reduce costs and, as a consequence, successfully bring new technologies to the market. The European Commission uses TRL scheme as a guidance to support further development of technologies.

1- PB Larsen, E Van de Velde; E Durinck, HN Piester, L Jakobsen & H Shapiro (2011), Cross-sectoral Analysis of the Impact of International Industrial Policy on Key Enabling Technologies, DTI & Idea Consult, Copenhagen.
2- HLG-KET (2011), Final report, Brussels.
3- European Commission (2012), A European strategy for Key Enabling Technologies – A bridge to growth and jobs, Brussels.



Level 1 - Basic Research: basic principles are observed and reported

Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include fundamental investigations and paper studies.

Level 2 - Applied Research: technology concept and/or application formulated

Once basic principles are observed, practical applications can be formulated. Examples are limited to analytic studies and experimentation.

Level 3 - Critical function, proof of concept established

Active research and development is initiated. Laboratory studies aim to validate analytical predictions of separate components of the technology. Examples include components that are not yet integrated or representative.

Level 4 - Laboratory testing of prototype component or process

Design, development and lab testing of technological components are performed. Here, basic technological components are integrated to establish that they will work together. This is a relatively "low fidelity" prototype in comparison with the eventual system.

Level 5 - Laboratory testing of integrated system

The basic technological components are integrated together with realistic supporting elements to be tested in a simulated environment. This is a "high fidelity" prototype compared to the eventual system.

Level 6 – Prototype system verified

The prototype, which is well beyond that of level 5, is tested in a relevant environment. The system or process demonstration is carried out in an operational environment.

Level 7 – Integrated pilot system demonstrated

Prototype is near, or at, planned operational system level. The final design is virtually complete. The goal of this stage is to remove engineering and manufacturing risk.

Level 8 – System incorporated in commercial design

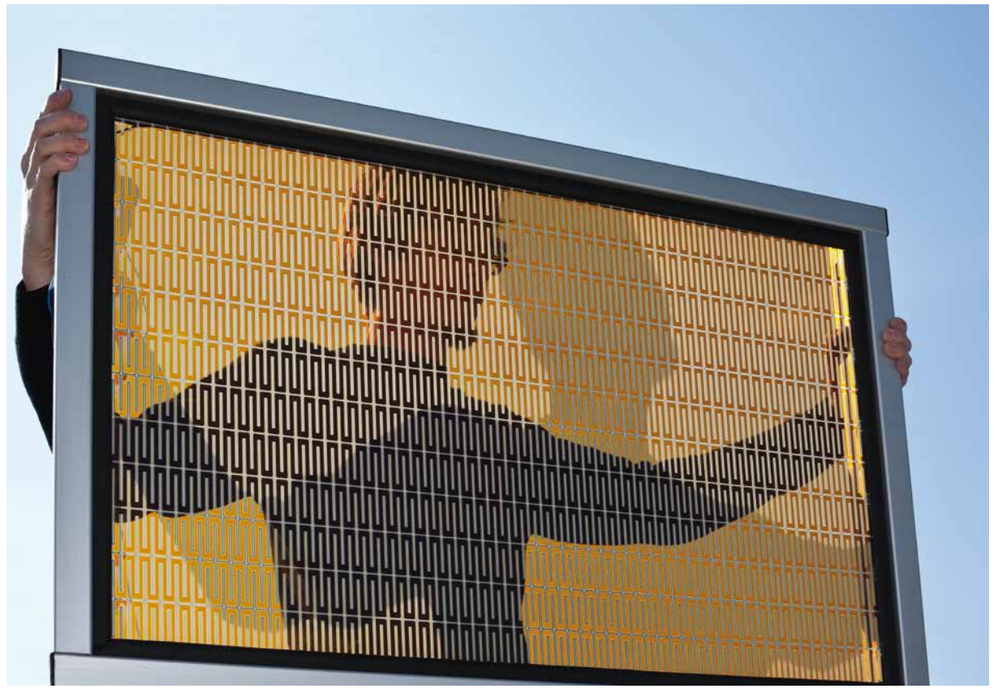
Technology has been proven to work in its final form under the expected conditions. In most of the cases, this level represents the end of true system development.

Level 9 – System ready for full scale deployment

Here, the technology in its final form is ready for commercial deployment.

Level beyond 9 - Market introduction

The product, process or service is launched commercially, marketed to and adopted by a group of customers (including public authorities).



How to use TRL

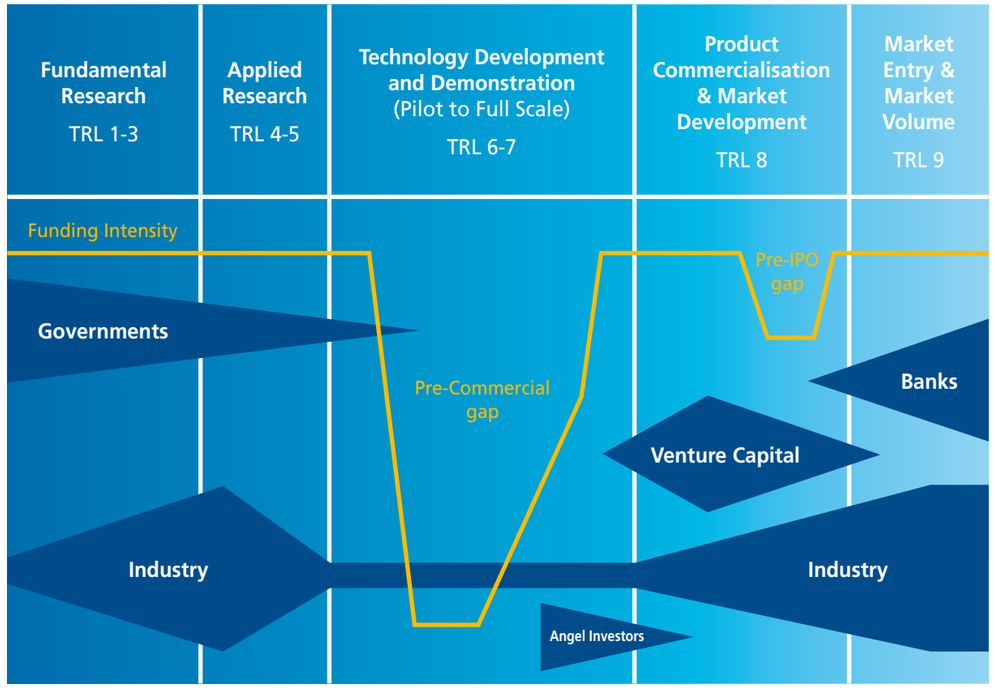
When a technology is at TRL 1, scientific research is beginning and those results are being translated into future research and development. TRL 2 occurs once the basic principles have been studied and practical applications can be applied to those initial findings. TRL 2 technology is very speculative, as there is little to no experimental proof of concept for the technology.

When active research and design begin, a technology is elevated to TRL 3. Generally both analytical and laboratory studies are required at this level to see if a technology is viable and ready to proceed further through the development process. Often during TRL 3, a proof-of-concept model is constructed.

Once the proof-of-concept technology is ready, the technology advances to TRL 4. During TRL 4, multiple component pieces are tested with one another. TRL 5 is a continuation of TRL 4, however, a technology that is at 5 is identified as a breadboard technology and must undergo more rigorous testing than technology that is only at TRL 4. Simulations should be run in environments that are as close to realistic as possible. Once the testing of TRL 5 is complete, a technology may advance to TRL 6. A TRL 6 technology has a fully functional prototype or representational model.

TRL 7 technology requires that the working model or prototype be demonstrated in a real-life environment. TRL 8 technology has been tested and performed successfully, being ready for implementation into an already existing technology or technology system. Once a technology system is fully operational and designed for commercial purposes, it can be called TRL 9.

The TRL scale plays an important role in assessing the eligibility of innovation projects based on their maturity. The TRL model has an added value for planning the development of the technology steps for a product from initial ideas all the way to commercialisation. Currently Europe is making efforts to speed-up processes for transferring excellent research and development results into innovative solutions for the markets, avoiding that an innovative technology falls in the "Valley of Death".



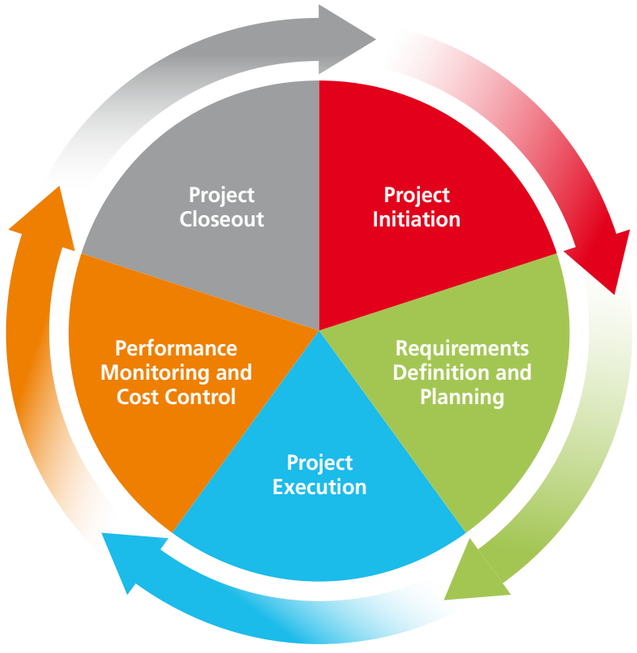
PROJECT PHASES

There are generally five crucial stages in a project.

Understanding the different stages of a project is crucial for achieving its goals. There are different schools of thought when considering a phased approach to project management. Some may claim there are three phases to a project while others say it's five. The most suitable approach to be adopted depends on the particularities of the related sector and on the project scope.

In summary, the management of a project is based on the simple idea that a project should go through a number of steps characterized by set of varied tasks and activities that bring the project from concept to concrete outcomes[4].

Projects may be of different sizes and limited by timing and costs. Frequently complex, they require structured and defined approaches for a successful overall management through the entire lifecycle.



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4- Project Management Institute (2013), A Guide to the Project Management Body of Knowledge

1 Project Initiation – The initiation phase marks the official beginning of a renewable energy project. The project is named and the concept is defined at a general level. Here, the concept needs to be well-understood in terms of its relevance, feasibility and innovative aspect of the idea, if applicable. The person behind it use his/her capacity to discuss the concept with other stakeholders and take decision on undertaking or not a project, or even to make the choice of undertaking one project over another. Feasibility analyses and other initial studies are usually conducted at this stage.

2 Project Planning – In order to professionally plan a project, the draft of an overall management plan needs to be conducted. This plan is usually prepared during the planning phase and includes comprehensive details on the costs, scope, timeline, quality, communication as well as risk and resources associated to the project. This phase is generally marked by activities such as the development of the project schedule, identification of milestones, GANTT charts, estimating and dividing the available resources among the partners, planning specific deliverables, tasks, deadlines as well as meetings and other types of communication with the involved parties. Risks of the development or installation of technologies should also be identified and measures to manage them should be foreseen.

3 Project Execution – The execution stage is the period in which all the tasks, deliverables and activities planned in the previous phase are developed and completed. The project execution and project monitoring and control usually occur simultaneously. Many project management tasks during this phase include project metrics through tasks such as development updates, status meetings and reports as well as human resources and performance reports.

4 Project Control and Monitoring – Control and Monitoring are related to measuring the project performance and progression with respect to the management plan. It's important to verify here the scope and control in order to monitor possible deviations or changes to the initial plan and, more importantly, to manage these changes to fulfil the initial requirements. Managers should calculate key performance indicators for cost and time are to measure the degree of variation, if any, and also in which case corrective measures are needed and suggested to keep project on track.

5 Project Closure – The final stage represent the formal closure of a renewable energy project. This phase includes a series of tasks such as delivering the expected outcomes, using the available resources and recognising the hard work of technical and non-technical team members. Also, the stage may include the formal termination of contractors in case they were employed on the project.

INNOVATION INVESTOR PUZZLE

Financing innovative renewable energy technology (RET) projects requires assembling an "Investor Puzzle" (see figure below), which is based on five main pillars:

Technology issues	Business models	Funding issues	Market issues	Management
Energy Technology documented	Business model	Capital requirement correctly estimated	Market size estimated	Management capabilities documented
Technology verified		ROI meeting investor requirement	Market access demonstrated	IPR document & secured
Prototype tested		Investor preferences met	Competitors described and evaluated	
			Price regulation & Feed-in tarifs	
			Regulatory compliance	

In order to close an investment deal, first, the building blocks are shaped, and then they are progressively assembled.

For the energy sector, the following building blocks are considered critical:

- business model
- regulatory compliance
- Price regulations

The puzzle was used in the ProRETT EU co-funded project, which promoted renewable energy technology transfer. While technology transfer is a wide notion used differently by different people, ProRETT acted on the very sensitive and complex part of the technology/knowledge transfer and innovation process, which follows after the technology development and precedes the market replication of a given technology: it focused on the first market introduction of a new technology or knowledge intensive service in the form of a spin-off creation or a licensing deal.

SPECIFICITIES OF
RENEWABLE ENERGY PROJECTS

In the energy sector, the maturation of an idea may often take long, between 5 and 10 years before the market uptake.

Technology issues

Energy innovation is not limited to the process of creating new technologies and doing research and development in government or university labs. Innovation is a broader set of interrelated practices. The process start by researching a basic idea or scientific principle that may one day lead to a useful technology, and is done mostly by researchers in universities. This "basic science" has the goal to enlarge or improve the scientific knowledge available. Technologies at this stage in life are not fully formed, and could never graduate to the next stage of development due to technical or cost-related issues. In order to ensure the successful improvement of a technology, it's crucial to consider the following three actions:

- Energy technology documented
- Technology verified
- Prototype tested

Technology barriers are linked to a low performance of prototypes with respect to existing technical solutions. These barriers are usually connected to:

- Lack of partners to bring the technical solution from "prototype" to a standardised product
- Underestimation of both time and requirements to make a product or a service

Business models

Investors usually evaluate the corresponding business models and eventually decide to invest into the start-up phase of these businesses or the knowledge acquisition by existing firms based on several potential sources of financing. As in any other business process, the technology exchange has to lead to commercially viable outcomes, such as the creation of sustainable profits based on the transferred technological knowledge, with a return on investment. Also, technology exchange via spin-off creation has higher interest when new business models are needed in order to achieve market application. It's important, however, to overcome some barriers:

- Customer benefits are not fully realised: the reduced environmental impact never fully translates into reduced private cost for the consumer, because the environmental externalities of conventional technologies (such as the damages caused by CO_2 emissions) are not fully internalized in market prices.
- The high capital costs of new installations.
- Reluctance to change – due to economic interests to fully exploit previously installed infrastructure.

Business model innovation is what distinguishes superior companies. The change of the innovation paradigm in the energy and environmental markets will create many new opportunities to develop such innovative business models.

Management

Renewable energy is a key sector for achieving GHG targets. In the transition to a system 100% powered by renewable energy, new craft areas will be created while some others will stop existing or transformed to adapt to the dynamic energy environment. Screening areas where skills need to be updated or acquired is crucial to support the reduction of skill gaps and shortage in the renewable energy sectors.

Barriers on management are related to a lack of experience from the innovation players with the development of business models, marketing strategies and financial plans, together with an underestimation of size/number of financing rounds needed to create a cash flow positive company. Especially the required number of financing adds the "dilution risk" into the financial plans – a risk normally completely overlooked by inexperienced management teams. In short, bright minds are reluctant to be part of a team able to address all the above issues without a sufficient background to make the right decision even when things go wrong.

The Renewable Energy Jobs barometer developed by the Knowledge Centre for Renewable Energy Jobs (KnowRES) project provides an overview of jobs trends per sector and highlights the critical skills and competencies the renewable energy sectors need for a successful deployment.

Sectors	Three most wanted profiles	Short term recruitment forecast	Needed skills and competencies	Locations
Biomass	• Engineer (various disciplines) • Business developer/ technical sales • Research engineer	71% companies will be recruiting	• German language skills • Sales skills • Multitasking skills	Lithuania, Austria, Germany, UK
Geothermal	• Drilling engineer • Project manager • O&M plant manager	91% of companies will be recruiting	• Hydro-geologist • Reservoir engineer • Chemist	Turkey, France, Germany, Italy, Hungary
Ocean	• Project manager • Structural research engineer • R&D engineer	74% of companies will be recruiting	• Health and Safety • Technical skills, soft skills (multitasking and problem solving)	Scotland, UK, France
PV	• Technical researcher • O&M field technician • Engineer (project planning)	63% of companies will be recruiting	• Soft skills • Language skills • Legal expertise • Marketing, lobby skills	Algeria, Morocco, China
Small hydropower	• Technical sales • Field service technician (O&M) • Mechanical design engineer	60% of companies will be recruiting	• Project managers, business developer, Technical sales, legal, environmental managers	Market shift to Africa, North America and Asia
Solar Thermal	• Technology researcher • Chief, sales and marketing officer • O&M technician	80% of companies. Due to difficulties, forecast need to be reassessed	• Soft skills • O & M technicians	South Africa, USA, India

KnowRES industry survey main findings: jobs trends and forecasts per sector

Intellectual Property Rights (IPR) Strategy

In the energy sector, the maturation of an idea may often take long, between 5 and 10 years before the market uptake. For this reason, the Intellectual Property Rights (IPR) strategy (patenting, disclosure, licensing, and exclusivity) is crucial in order to ensure a successful cooperation. Each public research laboratory or university has its own rules and varied approaches are used over the countries:

- Disciplined efforts allow conducting simple checks to assess the commercial potential and funding needs of a new business idea. One of the three options will then be pursued: Licensing
- Business development through a dedicated spin-off
- Postponement until further development/results have been obtained

Licensing seems to be an easy way of commercialisation in comparison with the spin-off route. Yet, the diversity of circumstances makes licensing a complicated route with many unexpected obstacles. Technology Transfer Offices (TTOs) usually have the role of negotiating and signing licensing agreements with industrial organisations. They are considered well prepared for the legal writing up of the licensing agreements and the IPR management. However, TTOs feel also uncomfortable during the negotiation of license conditions with industry players in the energy sector, particularly those related with market issues: expected sales, competition risks or exclusivity clauses which will lead to set a pricing strategy for the license negotiation.

Furthermore, other difficulties come-up when the license is negotiated between the research organisation and the research teams who try to promote a spin-off company. The license conditions may collide with the fact that the R&D organisation wants to become a shareholder of the spin-off.

The amount of royalties to be paid by the spin-off company to the research organisation may reduce the future potential benefits of that new company. The spin-off teams may also have interests in licensing the technology developed to other industrial companies able to manufacture and commercialise the product, or to companies working in non-energy industrial sectors.

Therefore, TTOs and the researchers need expert external support to go through the licensing commercialisation route, preparing the contractual frameworks to be written by authorised lawyers.

Protecting IP

Taking steps to protect intellectual assets is not only necessary for proper management, but also for getting full benefit from such assets.

When considering protecting IP, it must be noted that IP assets can be protected by several types of IPR, and consequently the most appropriate protection strategy must be chosen pertinent to the marketing strategy.

For instance, inventions can be protected through patents and utility models, or by keeping them in secret. An IP professional should be consulted on the most adequate registration strategy according to the product, business plan and budget.

Enforce intellectual property rights IPR require constant monitoring, which is the responsibility of the owner. Hence, it is best practice to monitor the market and competitors to be sure of identifying any infringing actions.

According to the European IPR Helpdesk [5]:

Only inventions or designs not publicly disclosed can be protected as patents/utility models or designs. Moreover, trademarks and domain names are registered on a first-to-file basis in many countries. Therefore, it is essential to keep ideas secret in order to get the most benefit from the advantages of IP protection.

The following measures may help businesses to keep their IP secret within the organisation:

- Making sure that employees, researchers and collaborators have in place confidentiality obligations and reminding them from time to time of the importance of complying with these obligations,
- Reviewing public disclosures (such as technical publications or communications with potential partners) to guarantee that confidential information is not included therein,
- Signing confidentiality agreements with partners and testers, prior to performing concept and technical testing and with third parties, when negotiating partnerships.

Also, checking the IP databases is an important step to verify whether the idea is new and worth being pursued. Besides, it also helps companies to avoid re-inventing and re-developing as well as applying for IPR for an already existing technology, design or brand.

Furthermore, keeping records of inventions is of utmost importance, as these will help you to prove the date and ownership of the invention, when needed. Besides, such records are a valuable source of information when drafting patent applications.

5- www.iprhelpdesk.eu/sites/default/files/documents/EU_IPR_Guide_Commercialisation.pdf

Market issues

Barriers in the market arise from an inadequate examination of markets potential, cost and revenue estimates, or the effect of environmental externalities of existing technologies that are not internalised in market prices. Usually these barriers are related to the absence of conditions required for the use of a new technology, such as high prices of raw materials with no developed markets, limited capacity in certain production processes, lack of standards and technical regulations, inadequate service and maintenance facilities, lack of user-friendliness and so on.

Then, there are the financial barriers, which relate to a lack of understanding of investor's requirements and "information asymmetry" between the technology experts and potential investors. Most professional investors comprehend that a project may suffer from insufficient manufacturing capacity or competing technological or commercial solutions. Although they are experienced, many examples where even senior management teams have underestimated both time and requirements before a product becomes a standard industrial product.

Financial barriers are often also related to a lack of understanding of the accumulated financial needs before a product is ready to be launched into the market.

Commercialisation

Commercialisation is the process of developing a commercially viable value for products and services. When it comes to IP, commercialisation can be better defined as the process of bringing IP to the market in view of future profits and business growth.

However, managing IP commercialisation is not an easy task, as its success depends on several internal and external factors such as business objectives, type of IP as well as economic and intellectual resources. Also, as IP can be commercialised either directly by its owner, through an assignment or by building up business partnerships, the selection of the most appropriate tool is often challenging, especially for SMEs.

Funding issues

MENA countries have set ambitious RE targets of reaching 26.1 GW of additional RE capacity by 2020, which would reach the Mediterranean Solar Plan (MSP) objective of 20 GW by 2020. However at present, actual projects identified in the national pipelines represent a total capacity of 10.3 GW only for approximately 90 RE projects.

In order for the MENA to play a significant role in meeting the RE objective of the MSP, it is necessary to accelerate the implementation of their programmes, with particular emphasis on the development of the less mature projects identified in the study[6]. It's expected that the region will continue to play a very marginal role in the RE sector, if actions are not taken to develop the scenario.

This section provides comprehensive guide on available funding opportunities for innovation projects for MENA project partners at international level.

6- www.eib.org/attachments/country/study_msp_en.pdf

Financing Opportunities for Renewable Energy in the MENA Region

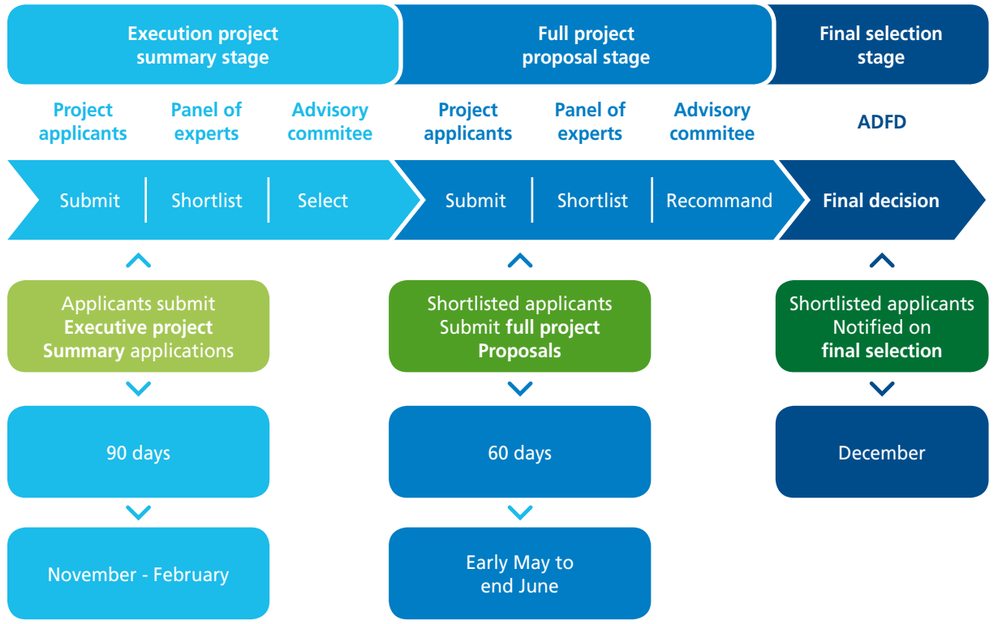
IRENA/ADFD PROJECT FACILITY

IRENA ADFD
Supporting Energy Transition

IRENA
International Renewable Energy Agency

- **What it is:** The International Renewable Energy Agency (IRENA) and the Abu Dhabi Fund for Development (ADFD) have collaborated to offer concessional loans worth **USD 350 million** over seven annual funding cycles to promising renewable energy projects in developing countries. These projects are recommended by IRENA to ADFD for final selection.
- **What it covers:** The ADFD loans cover up to **50% of the projects costs** and help leverage additional funding. Since 2012, USD 144 million of ADFD loans have already been allocated to 15 renewable energy projects recommended by IRENA. Over USD 189 million has been leveraged through other funding sources to cover the rest of the project costs.
- **Requirements:**
  - Projects should be submitted by Members of IRENA, Signatories of the IRENA Statute or States in Accession which are included as developing countries in the "DAC List of ODA Recipients" from the Organisation for Economic Co-operation and Development (OECD). Preference will be given to project proposals submitted by IRENA Members. For ease of reference, see list of eligible countries.
  - Projects should deploy renewable energy as defined in the Statute of IRENA: bioenergy, geothermal energy, hydropower, ocean energy, solar energy, and/or wind energy.
- **Timeline:** Each project selection cycle opens in November of each year. Selected projects are announced at the annual IRENA Assembly in January of each year.
- **How to apply:**
  - Organisations interested in applying for the project facility should register online HERE.
  - Applicants should carry out a Mandatory Eligibility Self-check before filling in the application.
  - Download the Form and fill in the Executive Project Summary (including project owner information) tab in the form and work offline and then upload to the interface.
  - A government guarantee letter needs to be submitted in addition to the Cycle Form. Please use the government or non-government letter template provided.
  - Co-funding institutions are listed on the funding page. Any questions on co-funding can be sent to adfd@irena.org
  - All applications must be submitted in English. If this presents a significant challenge, applicants should contact the Project Facility (adfd@irena.org) at least three weeks in advance of the deadline for applications for each cycle.

Timeline for Applicants



SUSTAINABLE ENERGY FUND FOR AFRICA

- **What it is:** The Sustainable Energy Fund for Africa (SEFA) is a multi-donor trust fund administered by the African Development Bank – anchored in a commitment of USD 60 million by the Governments of Denmark and the United States – to support small- and medium-scale Renewable Energy (RE) and Energy Efficiency (EE) projects in Africa. In many African countries, smaller clean/renewable energy projects are potentially viable from a commercial perspective, but the initial development costs often prevent these projects from accessing necessary financing. SEFA is founded on the premise that reliable, clean and affordable energy can contribute to strong African economies and can have a positive impact in creating employment opportunities across the continent. The development objective of SEFA is to support sustainable private-sector led economic growth in African countries through the efficient utilization of presently untapped clean energy resources. SEFA has been designed to operate under three financing windows: project preparation, equity investments and enabling environment support.
- **What it covers:** SEFA can provide grants of up to US$1 million to cover up-front development costs, from pre-feasibility studies and PPP preparation to assistance in achieving financial close. Support is only available for project preparation activities up to financial close. Proposed project's sponsor is a privately-owned or is a PPP.
- **Requirements** :
  - The total project size should be between US$30-200M.
  - The project must be implemented in an AfDB Regional Member Country.
  - Developers will be expected to provide at least 30% of the total pre-investment costs.
  - State-owned utilities are not eligible for direct support.
  - Projects should be sponsored by private sector or public sector agencies where the final project is to be an Independent Power Producer (IPP) or Public-Private Partnership (PPP).
  - Mobilizing resources and financing the development of renewable energy projects in Africa.
  - Projects should focus on the following technologies: **Small Hydro, Geothermal, Wind, Solar, Biomass**
- **Timeline:** All proposals received will be screened and pre-assessed against the basic eligibility criteria by the SEFA Secretariat, housed in the Energy, Environment and Climate Change Department (ONEC) of AfDB. The SEFA Secretariat will submit best proposals to the ONEC Management Team in the form a Project Evaluation Note (PEN) for a first assessment of the project and clearance for the pipeline. Following ONEC management clearance, the project sponsors and the Bank Task Manager will prepare a Grant Request that shall be peer reviewed and later presented to a Technical Committee (TC).
- Proposals up to US$ 1 million are recommended for approval at the Vice President level. Grants exceeding the equivalent of US$ 1 million are transmitted for approval to SEFA Oversight Committee and the AfDB Board of Directors. The turnaround period is estimated at three to six months but can vary depending on the proposals and the project proponent's ability to meet the information requests from AfDB throughout the process.
- **How to apply:** The application for grant request can be submitted via email: sefa@afdb.org

CLEAN TECHNOLOGY FUND

- **What it is:** The US$5.6 billion Clean Technology Fund (CTF), is a funding window of Climate Investment Funds (CIF). It is empowering transformation in middle income and developing countries by providing resources to scale up the demonstration, deployment, and transfer of low carbon technologies with a significant potential for long-term greenhouse gas emissions savings. The US$8.3 billion CIF is providing 72 developing and middle income countries with urgently needed resources to manage the challenges of climate change and reduce their greenhouse gas emissions. Since 2008, the CIF has been leading efforts to empower transformations in the energy, climate resilience, transport and forestry sectors.
- **What it covers:** A total of US$3.5 billion (over 60% of CTF funding) is approved and under implementation and expecting US$32 billion in co-financing. CIF concessional financing offers flexibility to test new business models and approaches, build track records in unproven markets, and boost investor confidence to unlock additional finance from other sources, particularly the private sector and the multilateral development banks that implement CIF funding. Total CIF pledges of US$8.3 billion are expected to attract an additional US$58 billion of co-financing for a portfolio of over 300 projects.
- **Requirements:** Every CTF country has tailored its CTF investment plan to align with national development goals and to serve as a framework to coordinate activities across institutions and stakeholder groups.

NATIONAL BANK OF ABU DHABI

- **What it is:** On the occasion of the World Future Energy Summit (WFES) 2016, NBAD has committed to lend, invest and facilitate a total of US$10 billion of financing within the next 10 years to projects focussed on environmentally sustainable activities. The commitment, which is a first for a GCC bank, supports the research from NBAD's 'Financing the Future of Energy Report', that identified a funding gap of US$48 trillion required in the next 20 years to meet global energy demand, with renewables playing a critical role in the energy mix of the future.
- Programme is still under development

HORIZON 2020

- **What it is:** Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.
- **What it covers:** Funding opportunities under Horizon 2020 are set out in multiannual work programmes, which cover the large majority of support available. The work programmes are prepared by the European Commission within the framework provided by the Horizon 2020 legislation and through a strategic programming process integrating EU policy objectives in the priority setting. If you participate in a research project, the EC reimburses 100% of your eligible direct costs. In an innovation project, you get 70% if you belong to a "for-profit" organisation (e.g. a company of any size), and 100% of your eligible direct costs if you belong to a "not-for-profit" organisation.
- **Requirements:** Legal entities established in the either EU Member States and territories or Associated Countries will be eligible to receive funding through Horizon 2020 grants. The current main Horizon 2020 work programme (2016-2017) comprises an introduction, 18 thematic sections and the general annexes describing general rules such as standard admissibility conditions and eligibility criteria, types of action, selection and award criteria, etc. Each thematic section is self-contained, and describes the overall objectives, the respective calls for proposals, and the topics within each call. To provide European citizens with the widest energy source choice, while respecting the right of Member States to decide on their own energy mix, several energy and ICT technologies need to be available. In parallel, we need to stay in line with the commitment to reduce greenhouse gas emissions by 20% by 2020 and the objective of a further reduction up to 80-95% by 2050. Therefore, the energy research is a very complex area including various technologies and covering the following fields: Non-nuclear energy (Concentrated Solar Power, Photovoltaics, Wind, Ocean, Hydro, Geothermal, Bioenergy, Fuel Cells and Hydrogen, Electricity Grids, Carbon Capture and Storage, Energy Storage, Energy Efficiency, Smart Cities) and the integration of ICT in all energy fields.
- **Timeline:** Once you have submitted a proposal, the Commission checks it is admissible (complete and properly put together) and eligible. The EC then asks independent experts to evaluate it. In the evaluation process, proposals are given scores for excellence, impact, and quality and efficiency of implementation – based on the Standard Evaluation Criteria. A panel then checks that the evaluation criteria have been consistently applied to all proposals for the same call. Coordinators and Participant Contacts are informed by the Evaluation Results Letter of how their proposal did in the evaluation. They will receive an e-mail notifying them that this letter is available in "My Area" of the Participant Portal. A positive result does not constitute a confirmed offer of a grant. Following the evaluation round, grant preparations are opened for the highest-scoring proposals.
- **How to apply:** Proposals must be submitted electronically using the electronic submission system of the Participant Portal. Access to the electronic submission system is available after selecting a topic and a type of action of a call. Proposals must be created and submitted by a representative/contact person of the coordinating organisation. Certain types of action differ from this standard: in fellowships and in proposals for the European Research Council's types of actions, the individual researcher (Fellow/Principal Investigator) takes the lead on the proposal. The electronic submission system is an online wizard that guides you step-by-step through the preparation of your proposal. The proposal itself consists of 2 main parts: administrative forms (structured information of the basic administrative data, declarations of partners, organisations and contact persons, etc.) and the technical annex, which is the detailed description of the planned research and innovation project outlining work packages, costs, etc. Further mandatory or optional annexes (e.g. supporting documents for ethics issues) can be required by the call and the given topic, as shown in the submission system.

MAGHRENOV

- **What it is:** The MAGHRENOV project, together with KIC InnoEnergy (EU) and IRESEN (Morocco) launches a joint call for Innovation projects on Renewable Energy, Energy Efficiency and Biomass, targeting Euro-Moroccan consortia. MAGHRENOV is a FP7 project addressing Mediterranean innovative markets in the field of Renewable Energies, Energy Efficiency (RE&EE) and Biomass, in order to foster innovation and to favour convergence between EU and MPCs initiatives for the development of sustainable energies adapted to regional specificities. The Joint Call for Innovation Projects is co-financed by two partners of the MAGHRENOV project – IRESEN and KIC InnoEnergy SE.
- **What it covers:** The call aims to provide support to Euro-Moroccan consortia who wish to develop innovative products or services in the field of Renewable Energy, Energy Efficiency and Biomass, as defined in the MAGHRENOV specific Roadmaps (Energy Efficiency or Renewable Energies priorities under the Mediterranean Area conditions).
- **Requirements:** Eligibility criteria towards projects, as defined by consortia partners, are the following:
  - Goal of innovation project is to develop products or services to be sold on the market
  - A least one company commercializing products or services must be involved since the beginning
  - At least one existing KIC InnoEnergy partner has to be part of consortium
  - At least one Moroccan partner has to be part of consortium
  - At least one company of the consortium must have more than 8 permanent employees
  - At least one partner of KIC InnoEnergy must have a significant role in the project
  - At least one partner from Morocco must have a significant role in the project
  - Number of partners of consortia should be between 3 and 7
  - The topic of project should fall within one of MAGHRENOV specific Roadmaps (Energy Efficiency, and Renewables + Biomass)
- **Timeline:** The 2016 call is closed
  - **January:** Opening of the Call
  - **April:** Closing of the Call, Eligibility check and Thematic Level Assessment Committees
  - **May:** KIC-IRESEN Level Assessment Committee and Decision about projects selected
- **How to Apply:** Applications should be done online here: http://maghrenov.eu/login

For more information, contact:

KIC INNOENERGY

Océane Elmajdoub
oceane.elmajdoub@kic-innoenergy.com

Emilien Simonot
emilien.simonot@kic-innoenergy.com

FACILITY FOR EURO-MEDITERRANEAN INVESTMENT AND PARTNERSHIP (FEMIP)

European Investment Bank

- **What it is:** The Facility for Euro-Mediterranean Investment and Partnership (FEMIP) brings together the whole range of services provided by the European Investment Bank in support of economic development in the MPCs. For the period 2014-2020, FEMIP has EUR 9.6bn available to support projects in the nine MPCs (Algeria, Egypt, Gaza-West Bank, Israel, Jordan, Lebanon, Morocco, Syria and Tunisia). Under the European Neighbourhood policy and in the framework of the Union for the Mediterranean, FEMIP encourages the modernisation and opening-up of the Mediterranean partner countries' economies. The facility focuses its activities on two main priorities: private sector support and the creation of an investment-friendly environment.
- **What it covers/requirements:** FEMIP offers financial and advisory services tailored to meet the needs of project promoters in the Mediterranean partner countries. Large-scale infrastructure investments, credit for SMEs, guarantees for riskier projects, technical advice to ensure optimum project design and partnerships for new entrepreneurs are all available:

Products		Objectives	Beneficiaries
Loans	Lines of credit	• To encourage the development of MSMEs, the EIB makes lines of credit available to partner commercial banks or development financing institutions, which then on-lend the funds to their own customers locally. This enables the EIB to respond efficiently to the needs of local communities in the MPCs.	• MSMEs
	Individual loans (generally over EUR 25 million)	• To develop the economic infrastructure of the MPCs and support larger corporate borrowers. When appraising such operations, the EIB pays particular attention to the expansion of the private sector and to the creation of a business-friendly environment (e.g. via projects to develop critical transport or energy infrastructure).	• Private and public sector promoters
Private equity and direct equity/ quasi-equity investments		• To promote the creation or strengthening of the capital base of productive businesses, particularly those established in partnership with EU-based companies.	• MSMEs • Intermediate-sized private enterprises • Investment funds • Microfinance institutions
Guarantees		• To stimulate local capital markets. • To mobilise additional resources, supplementing scarce public capital resources. • To support development of sub-sovereign counterparts. • To reduce foreign exchange risk and government risk exposure.	• MSMEs • Large corporates • Domestic banks • Public sector promoters • Sub-sovereigns
Advisory services		• To improve the quality of operations and their impact on development by financing studies and activities aimed at consolidating directly and indirectly the expansion of the private sector.	• All clients

- **How to apply:**

Loans: Investment less than EUR 20-25m

Applications for the financing of small-scale projects should be sent directly to the financial institutions or commercial banks receiving EIB intermediated loans. More details on partner institutions in MPCs and other information on lending can be found here:

Investment is more than EUR 20-25m

Direct loans and risk capital financing can be requested directly from the EIB. In general, a comprehensive feasibility study should be submitted. Where such a study has not been prepared, the promoter may use its own discretion in compiling as detailed a dossier as possible to permit the technical, environmental, economic, financial and legal appraisal of the project.

For more information, contact:

European Investment Bank (EIB)
Technical and Financial Advice (TFA)
Technical Assistance Unit (TAU)

98-100, Boulevard Konrad Adenauer
L-2950 Luxembourg
Email: info@eib.org

ERANETMED

ERANETMED

- **What it is:** ERANETMED is a EU FP7 initiative that aims at co-ordinating research activities of the different national research programmes from EU Members States, Associated Countries to the EU Research Framework Programmes and MPCs. In particular, the ERANETMED objective is to strengthen the collaboration and common capacity of research programme owners from above countries to address some of the major challenges that the Mediterranean is facing and strengthen Euro-Mediterranean research cooperation. The programme has already launched two calls co-funded several Euro-Mediterranean entities grouped together in the Executive Committee of Funding Agencies (ECFP). The ECFP is assisted by a Call Secretariat (CS) in charge of the Common Call Management (CCM) hosted at the German Aerospace Center (DLR). The Joint Calls are implemented through a coordinated funding action based on a Virtual Common Pot scheme where each Funding Party funds its own national research organization within a multilateral project selected through a peer review process. The total financial contribution to the Joint Call will be **EUR 11.450.000.**
- **What it covers:** The funding of an individual proposal will depend on the nature and duration of the proposed activities and must be justified in terms of the resources needed to achieve the objectives of the project. Researchers participating in projects selected for funding will receive the grant directly from their national funding agencies after meeting their national regulations. Funding will be managed according to the terms and conditions of the responsible national funding agency taking into account all other applicable national regulations and legal framework. Private organisations

may also bid for funding as members of consortia, but should first check the national rules for funding eligibility of SMEs or large industries. Eligible costs will be determined by the regulations and conditions of each national funding organisation/agencies. Sub-contracting will be allowed according to the regulations of the national funding organisation involved.

- **Requirements:** Interested project consortia composed of partners from the countries represented within the ECFP are invited to submit proposals for funding (Algeria, Cyprus, Egypt, France, Jordan, Greece, Germany, Italy, Lebanon, Malta, Morocco, Portugal, Tunisia, Turkey and Spain). All projects will have to include collaborative research. Collaborative research is compulsory and undertaken by a partnership of institutions designed to produce new knowledge through scientific research, whereby each team within the partnership actively pursues specific task objectives with a view to pooling the results to contribute to the achievement of a set of common, well-defined project objectives. Collaborative research should have high impact and contribute to demand and policy driven research. Applicants must be eligible for funding according to the regulations of their respective national Funding Agencies. They can represent research and higher education entities, companies, and other legal entities such as NGOs, once again subject to institutional restrictions set by individual Funding Agencies. The project consortium must comprise project partners from at least 3 different countries whose Funding Agencies contribute to the present call, of which at least one from an EU Member State/Associated Country to European Research Framework Programme and one from a Mediterranean Partner Country. The Project Consortium designates a Project Coordinator which must belong to an entity legally established in one of the countries funding the call. The duration of a project can range between 24 and 36 months. The projects are expected to start not later than three months after the conclusion of the Grant Agreement.
- **Timing:**
  - **Launching of the call:** March
  - **Deadline for submission of proposals:** May
  - **Informing applicants on call results:** November
- **How to apply:** Proposals will be submitted, evaluated and decided upon according to the procedures described in the Terms of Reference. Only submissions through the online submission system will be accepted. All members of ECFP will have access to reading proposals online. In order to submit a proposal the Project Coordinator has to gain access to the online submission system through the web site. When accessing the submission system for the first time, the Project Coordinator will be asked to enter her/his e-mail address. In return s/he will receive by e-mail a user ID and a password. Her/his account will be activated after receiving an email containing the password. The password grants all partners in the consortium access to the project proposal submission page, where it is possible to complete parts of the project proposal or to place or replace the proposal in part or in full.

Further information is available here:

www.eranetmed.eu/index.php/component/phocadownload/category/7-calls-announcement

EUROPEAN BANK FOR RECONSTRUCTION AND DEVELOPMENT (EBRD)

- **What it is:** The EBRD offers a wide range of financial instruments and takes a flexible approach in structuring its financial products. EBRD's vision for the energy sector is of a partnership between industry, governments and consumers that delivers the essential energy needs of societies and economies in a manner that is sustainable, reliable and at the lowest possible cost. In particular, the EBRD is responding to the challenges in this sector through:
  - Energy efficiency and demand side measures
  - Building deep and liquid energy markets
  - Rethinking energy systems
  - The low carbon transition
  - Cleaner energy production and supply
  - Setting standards and best practice. In a sector that has widespread impacts on society and the environment, the EBRD will promote the adoption of best international standards in environmental, health and safety and social practices as well as in transparency and corporate governance.
  - The wider role of the energy sector
- **What it covers:** EBRD investments in private sector projects can range from €**5 million - €250 million**. The average amount is €25 million. The E BRD's loans are structured with a high degree of flexibility to provide loan profiles that match client and project needs. This approach determines each loan currency and interest rate formula. The basis for a loan is the expected cash flow of the project and the ability of the client to repay the loan over the agreed period. The credit risk can be taken entirely by the Bank or may be partly syndicated to the market. A loan may be secured by a borrower's assets and/or it may be converted into shares or be equity-linked. Full details are negotiated with the applicant on a case-by-case basis.
- **Requirements:** The prospective project needs to be located in one of the EBRD's countries of operations [7] and should be in line with the challenges mentioned above.
- **Timing:** Applications are open and the timing may vary depending on the complexity of the project, which may affect the negotiations.
- **How to apply:** Organisation interested in obtaining EBRD finance, should complete an online form. Forms will only be accepted from commercial companies or by an intermediary authorised to act for them. The EBRD enforces a policy of strict confidentiality. Details submitted will not be disclosed to any other party without prior consent. The applicant will receive a response from an EBRD representative within 7 working days of submitting the form.

Further information is available here:

www.ebrd.com/what-we-do.html

7- www.ebrd.com/where-we-are.html

SPECIFICITIES OF MEDITERRANEAN PARTNER COUNTRIES (MPCs)

MENA is a diverse region whose development potential has yet to be fully exploited.

Technology issues

The MENA region has strong tradition of oil and gas consumption. However, MPCs are increasingly using the oil capital to increase the installed capacity of renewable energy technology. Higher energy consumption, lower oil prices and global warming are the main drivers of this shift.

The region climate is very favorable for generating solar power, which has already led to the installation of many solar power plants in Saudi Arabia, Qatar, UEA, Oman, Kuwait and Jordan. Due to a shortage of qualified engineers in the region, many opportunities for international renewable energy professionals are being created.

Achieving, however, substantial renewable power generation targets is a challenge for the region for many reasons. MPCs are in current need of international expertise, conceive supportive renewable energy policies and regulations as well as of improving the installed grid infrastructure.

Moreover, as solar and wind power still struggle to overcome the challenge of intermittency, natural gas is still required to cover pauses in power output. However, an important development in the region has been the understanding that storage has the potential to completely transform the traditional power market models. On this topic, there are currently three key points taking place globally that are also expected to reach MPCs[8]:

- The electric car/transport market is emerging with strong confidence that it will be the dominant transport technology.
- Storage cost curves are reducing rapidly with many accepting a cost curve similar to silicon.
- Software technology is allowing aggregation of storage and renewable energy generating solutions to operate on rapid demand response times so as to create virtual power plants.

These topics are also expected for MPCs as not only the region has some of the best renewable energy resource globally, but it has also a growing availability of regionally sourced capital both from banks and funds and from an expert community of developers, technical and other advisors. Governments are also understanding the opportunity and taking measures to ensure that their programmes work for all.

8 - https://www.pwc.com/m1/en/publications/documents/eversheds-pwc-developing-renewable-energy-projects.pdf

The EU project EUROSUNMED is currently developing a Roadmap, which will present some promising actions for building long-standing cooperation between EU and MPCs (specifically, Morocco and Egypt). The document will be a major action which is expected to create the necessary framework to support the establishment of a strong network between EU and MPCs in the area of solar energy.

The project is will organise two workshops with experts from the EU and the MENA region in order to gather input to the document. The first Roadmap workshop was organized on 14th April 2016, while the second event will be organised at the end of 2016.

The first workshop already presented some interesting ideas on current and possible future specificites of MPCs:

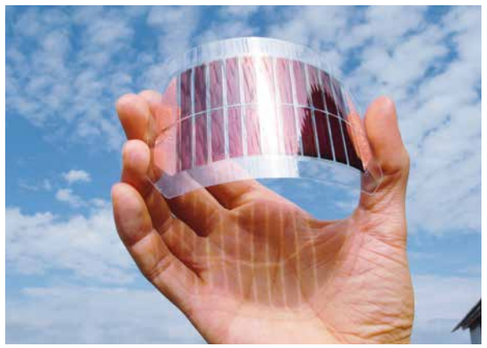
- Is 100% renewable energy in the EU-MENA a dream or a possibility? What would be the advantages for both sides?
  - **For MENA countries:**
    - Possibility to satisfy an electricity demand, which grows by 5-9% per year
    - Reduction of energy costs (in most MENA countries, fossil fuels are subsidized)
    - Development of a green economy with opportunities to create a local industry and job opportunities
    - Control and reduction of pollution
  - **For the EU:**
    - Reduction of oil and gas imports
    - Boosting the EU energy industry along the whole value chain
    - Reduction of electricity costs, by optimizing exchanges
    - Reduction of CO_2 emissions
- Different scenarios for the development of the electricity mix between EU and MENA countries were presented (e.g. Dii- 2050 Desert power)

Dii has already released the publication "Perspectives on a Sustainable Power System for EUMENA"[9] exploring the the future energy challenges of Europe as well as the MENA Region. The document shows how key aspects of the Desertec vision could work in practice while also moving beyond it. It demonstrates how, based on proven technologies, solar and wind resources can be combined with grids to securely supply North Africa, the Middle East and Europe with sustainable energy.

Some ideas to reach the Dii objectives that emerged from the EUROSUNMED Roadmap Workshp are:

- To install 50GW of renewable energy in the MENA region by 2050
- To finalise the MEDRing project
- To set a viable and credible business model for 1- 2 connections between EU and MENA
- Availability of appropriate lands with clear agreements in place
- Negotiation on feed-in tariffs, selling prices, priority dispatch…
- Attracting both government and private investors
- Increasing cooperation between industry, academia and research for mutual benefits in terms of education, employment and business creation

- A minimum target of 9% has been set in Egypt for electricity production from RES by 2022. A more ambitious scenario targets 20% (12% from wind; 2% from solar; 6% from hydro)
- Two strategic targets for the CSP industry at EU level:
  - In the short-term: to reach on overall reduction of more than 40% by 2020 (from 2013) translating into a supply price of <10c€ (provided that 30 GW STE plants are installed at that time at world level)
  - In the longer-term: Develop the next generation of STE technology by 2025 via technological research and demonstration projects/ initiatives in order to raise current concepts covering key aspects of the STE technology linked to the achievement of higher temperatures at the receiver from TRL 4/5 to 7/8.



9- www.desertenergy.org/wp-content/uploads/2015/09/dp2050_study_web.pdf

Business models

MENA is a diverse region whose development potential has yet to be fully exploited. The countries in the area benefit from a privileged geographic location situated at the crossroads of Europe, Africa and Asia; a young and increasingly educated population; and great potential in sectors including renewable energy and business development services.

The MENA-OECD Business Integrity Network Meeting[10] (April 2016) identified that the promotion of integrity as a vehicle for enhancing competitiveness and promoting stronger, cleaner and fairer growth in the MENA region. Present experts identified concrete actions to level the playing field for doing business in the region, including that between state-owned or controlled enterprises (SOEs) and other private firms. Another priority is to increase private sector engagement in the fight against bribery and corruption by defining joint projects and a common agenda.

Moreover, participants highlighted the need of the MENA-OECD Competitiveness Programme to contribution to the increase of public-private dialogue and foster "reform coalitions" in support of pro-integrity and anti-corruption efforts in countries.

Funding issues

Funding from public and concessional sources is usually scarce in the MENA region. Therefore, the screening of international funding opportunities (mentioned in the previous chapter) is needed in order to bring technologies from the lab to the market.

Also, the area is going through a complicated period. Syria, Libya and Yemen are in civil war, causing untold damage to human lives and physical infrastructure. Millions of families are fleeing the conflicts, giving rise to the biggest refugee crisis since World War II[11]. Countries undergoing political transitions, such as Egypt, Tunisia, Morocco and Jordan, are forced sometimes to prioritise security concerns over growth-promoting policies.[12]

Given the ongoing fragility and conflict in the region, international finance institutions have developed regional strategies for the area. The World Bank, for instance developed a new strategy, entitled - *"Economic and Social Inclusion for Peace and Stability in the Middle East and North Africa: A New Strategy for the World Bank Group"*[13], which puts the goal of promoting peace and social stability in the MENA region and has the promotion of sustainable energy among its pillars.

According to Frankfurt School-UNEP Centre's report *Global Trends in Renewable Energy Investment 2016*[14], Africa is one of the most promising markets for renewable energy over the next 10-20 years, with its growing population, urgent need for new generating capacity, lack of electricity access in remote areas, and its natural resources in sunshine, wind, biomass and geothermal. Morocco, for instance, appears among the developing countries investing more than $500 million in 2015.

10- http://www.oecd.org/mena/competitiveness/business-integrity-april-2016.htm
11- http://www.economist.com/blogs/graphicdetail/2016/01/daily-chart-8
12- http://www.worldbank.org/en/region/mena/overview
13- http://pubdocs.worldbank.org/pubdocs/publicdoc/2016/1/418471453478675951/MENA-Strategy-Final-Dec-2015.pdf
14- http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres_0.pdf

The EUROSUNMED workshop also identified important non-technological prerequisites are needed to achieve major cost reductions for CSP in MENA countries:

- Economies of scale due to market volume
- Solid risk finance (investor protection)
- Fostering international cooperation

In order to overcome the barriers for developing CSP in MENA, it's important the EUROSUNMED experts highlighted the need of:

- Getting political "investment drivers" to look at the difference between CSP costs and CSP value (including social benefits of CSP)
- Implementing focused CSP programs that:
  - Reveal its undisputable value according to various needs
  - Brings market volume and so CSP costs rapidly further down
  - Risk in investments on RE projects in MPCs is the main issue to the development of RES
- Agreeing on a common vision between EU and MPC-Towards a EU-MPC Energy Partnership Roadmap, based on:
  - Win-win basis
  - Technology effectiveness
  - Cost-reduction
  - Dispatchability
  - Sustainability

Market issues

Aiming to increase the overall access to energy, creating opportunities as well as reduce GHG emissions, many countries from the MENA region are targeting the development of renewable energy technologies to supply their energy needs. With regular abundant solar radiation and other resources such as wind and biomass, MENA countries have a natural potential to decarbonise their energy mixes.

Most MENA countries have only a modest share of renewable energy in their generation mixes. Egypt, Morocco, and Syria have some renewable generation, but the share is still very low and is composed mostly of hydropower. There is massive potential therefore for the development of other technologies such as wind, estimated by the firm Frost and Sullivan to have a potential to generate 630,000,000 MW (630 TW) of solar power and 75,000 MW of wind power[15]. Unlike fossil fuels, wind and solar energy are more evenly spread across the countries; this presents a unique opportunity for further regional integration as an instrument for enhancing economic growth and reducing poverty.

The Mediterranean Solar Plan (MSP)[16] is one of the priority projects of the Union for the Mediterranean[17] and aims at coping with the challenges posed by energy demand increases, security of supply and environmental sustainability in the Euro-Mediterranean region. It promotes the implementation of sustainable energy solutions concerning renewable energy and energy efficiency. Its objective is to develop an additional RE capacity in the region of 20 GW by 2020 along with the necessary electricity transmission capacity, including international interconnections.

15- http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/07/10/000442464_20140710112306/Rendered/PDF/ACS71240ESW0WH0l0and0II000Final0PDF.pdf
16- http://www.eib.org/attachments/country/femip_msp_ppi_en.pdf
17- http://ufmsecretariat.org/

Management

In order to develop the renewable energy market in MPCs, there's a current need of implementing the following tools:

- Establishment of consistent long term strategies and plans. Supporting policies for large-scale projects
- Reduction and progressive phase-out of subsidies to fossil fuels. Countries where meeting power demand relies on imported fuels have been the first-movers in creating a supportive enabling environment for renewables
- Contribute to the development of a local RE industry
- Ensuring stability of revenue stream, which is crucial for project bankability
- Need to develop a mature set of regulations, addressing the network as well as market rules.
- Integrating the issue of Research Infrastructures within the Euro-Mediterranean Research and Innovation Policy Dialogue and Instruments.
- Implementing networks of expertise and promoting the common commitment in industrial R&D as part of technological platforms.
- Promoting creation of spin-offs and innovative companies' in southern Mediterranean countries and valorizing the research results available in the Euro-Med region.
- Promoting large scale projects and encouraging the increase RE and EE market demand in the southern Mediterranean countries.
- Initiate a dialogue between the MPCs and the EU to boost or re-launch mega projects in the field of RE across the Euro-Med region.

The renewable energy sector needs highly qualified professionals to work in the different aspects of technology development. Energy systems cover multiple areas of scientific knowledge and require also management and communication skills, as well as the necessary in order to tackle the challenge of the energy system transition.

Using as basis employment factors from a new screening of studies on renewable energy job opportunities, the Energy research Centre of the Netherlands (ECN), analysed [18] the potential for renewable energy jobs in the MENA region. The results estimate the need of a local work force of about 155.000 direct and 115.000 indirect jobs, based on assumptions regarding which components of the respective wind and solar energy technologies can be manufactured in the region itself.

Other highlights are:

- Wind and solar power account for approximately 60% of total electricity supply in 2050.
- Manufacturing jobs are assumed to be partly local, while installation and O&M jobs are all domestic.

On the management issues for MPCs, the EUROSUNMED project also identified the need of:

- Supporting the creation of Public-Private Partnerships in MPCs:
  - To encourage the setting-up of partnership formulas
  - To stimulate investment opportunities
  - To promote innovative business models
  - To promote incentive mechanisms intended to enhance local industrial capacity and industrial culture

Also, it's crucial to promote training programmes focusing on the workforce to create jobs that meet local industrial needs.

18 - http://www.sciencedirect.com/science/article/pii/S0301421513003467

Design: www.acg-bxl.be

Contact us

Alberto Soraci
ETRERA_2020 Project Coordinator

Via La Farina, 17, is 278
98122 Messina
Italy

info@etrera2020.eu
Tel.: +39.090.716030
Mobile: +39.347.0611030
Fax: +39.090.669632

www.etrera2020.eu

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