ERANETMED is funded by the
European Commission's
7th Framework Programme

ERANETMED

Descrption of projects supported through ERANETMED Funding agencies 2015

Joint call 1

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DURATION

OCTOBER 2013 – SEPTEMBER 2017

Grant Agreement N°

609475

www.eranetmed.eu

https://www.facebook.com/eranetmed?ref=hl

PREFACE

Funded by the European Union under the 7th Framework Programme, ERANETMED (Euro-Mediterranean Cooperation Through ERANET Joint Activities and Beyond) was launched in late 2013 and will run until the end of 2017. It represents a tangible achievement of one of the most ambitious policy objectives for the enhancement of Euro-Mediterranean cooperation on research and innovation -establishing a North-South co-ownership through joint calls, addressing the key challenges of the region – which also falls into the CIHEAM Strategic Agenda..

Gathering 23 research funding agencies in 15 countries, ERANETMED is a strategic milestone in the process of building a sustainable research and innovation partnership between the EU and its Mediterranean neighbours for competitive development, long-term cooperation and stability of the region. Such process has been advocated for more than a decade, and stated for the first time on the occasion of the 1st Euro-Mediterranean Conference on Research and Innovation held in Egypt in 2007.

Therefore, I am honoured to introduce the projects supported through the efforts of ERANETMED funding agencies in the first joint call, closed in early 2015, focused on "water, energy and their nexus". Twenty-one excellent Euro-Mediterranean research projects involving76 research teams from 20 countries were funded within the first joint call for a total amount of 11M Euros, with a balanced North-South financial contribution.

A deep thank goes to all ERANETMED members and funding agencies as well as to all researchers (more than 1100 research teams) who have applied to the first ERANETMED call. Their ideas and proposals show how dynamic and fertile the Euro-Mediterranean research community's. They all have contributed to the success of this regional joint programming action. ERANETMED has just closed the evaluation of the second call on "environmental challenges and solutions for vulnerable communities". We look forward to issuing a second collection of excellent, innovative and forward-thinking projects.

The Director of CIHEAM Bari
ERANETMED Lead Partner

Cosimo Lacirignola

SHORT DESCRIPTION OF ERANETMED

ERANETMED (Euro-Mediterranean Cooperation through Joint Activities and Beyond) is a project funded by the European Commission 7th Framework Programme, started in October 2013 and running until September 2017.
The aim of ERANETMED is to enhance Euro-Mediterranean co-ownership through innovation and competitive research in the societal challenges of the region. The project aims also at reducing fragmentation of programming in the Mediterranean region by increasing coordination among national research programmes of European Members States, Associated Countries and Mediterranean Partner Countries.
In the last three years, ERANETMED has achieved important milestones that make it a best practice in Euro-Mediterranean cooperation on Research and Innovation. It has established a framework for communication and coordination of programme owners and managers on the joint identification of common specific challenges to be addressed by collaborative and innovative research. In this process, ERANETMED has involved more than 100 local and regional stakeholders to maximise the range of the dialogue on research priorities and actions to be put in place. Building on this, ERANETMED has launched two joint calls – with a virtual common pot of around 25M Euros – which had a great visibility in the region and an impressive number of applicants. The two calls, addressing key challenges linked to water, food, energy and environment encouraged the applicants to include in their proposals also cross-cutting issues which should not, in ERANETMED view, ignored by research: governance, gender and socio-economic issues.
The consortium implementing ERANETMED is coordinated by CIHEAM Bari, and pulls together the following Funding Agencies of 15 countries: DGRS-DT (Algeria), RPF (Cyprus), ASRT (Egypt), MHESR (Egypt), ANR (France), CNRS-F (France), BMBF (Germany), GSRT (Greece), MIUR (Italy), HCST (Jordan), CNRS-L (Lebanon), MCST (Malta), MENESFCRS (Morocco), FCT (Portugal), MINECO (Spain), MHESRT (Tunisia), TUBITAK (Turkey). Other partners, not funding directly the joint calls, are engaged in ERANETMED to carry out key activities such as: networking with stakeholders, analysis of R&I cooperation scenario, definition of a strategic research agenda, capacity building. These partners are: DLR (Germany), NHRF (Greece), CNR (Italy), RegPuglia (Italy), AGUAR (Spain), CSIC (Spain).
Our intention is to make our best to spread excellence through developing joint response to common problems and challenges, hoping that this exercise might contribute to the establishment of a stable and long term Euro-Mediterranean cooperation on Research and Innovation.

ERANETMED Coordinator
Claudio Bogliotti

3DMicroGrid

DESIGN, DEVELOPMENT AND DEMONSTRATION OF A SMART MICRO GRID

Project ID: ERANETMED_ENERG-11-286

TITLE: Design, Development and Demonstration of a future-proof active smart Micro-grid system 3D-Mgrid

PERIOD: 3 years and start date is 1 September 2016

Total budget: 910,521.88 Euro

Project Summary

The project will facilitate the design, development and demonstration of a future-proof active smart micro-grid system to integrate and optimise multiple small to medium sized energy sources and loads. The overarching objective is to capitalise on the availability of local and large renewable energy resources and adapting them for solutions to sustainability in terms of electric power demand and supply. A demo smart micro-grid system will be built integrating all energy components, in an effort to (i) maximise renewable energy utilisation, (ii) reduce the carbon footprint by minimising consumption, (iii) improve the power quality while ensuring economic feasibility, and (iv) replicate similar setups to institutions and commercial and rural sites. 3D-Mgrid shall undertake a detailed campus assessment of existing energy scenarios, including: energy consumption; diesel consumption and generation efficiency; loads and their classification; consumption patterns such as human presence and behaviour; power quality with respect to grid power, switching between various distributed power sources, and techno-commercial assessment. 3D-Mgrid will also assess other studies related to the establishment and justification of a smart micro-grid while utilising various equipment, sensors, meters, hardware, and software for measuring, monitoring and analysing the required data to undertake the study.

Different power saving strategies will be envisaged, including load/demand forecasting; renewable energy generation forecasting, integration with weather sensors; utility grid's power outage pattern identification; prioritizing loads and exercising the option of demand response; identifying the appropriate distributed generator to turn-on; and exercising the option of storage technology utilization of appropriate size. It is expected that the 3D-Mgrid side management.

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These projets are funded by ERANETMED

Biosol

Project ID: ERANETMED_ENERG-11-075

TITLE: Development and demonstration of a hybrid CSP-biomass gasification boiler system BIOSOL

PERIOD: 3 years from 1st October 2016

Total budget: 1 million Euro

Website: www.dbfz.de/biosol

Project Summary

Electricity demand in the MENA region increases at a rate of 6-8% per year. It is expected to double by 2020 and triple by 2030. The use of renewable energy for electricity generation ensures climate protection, energy security, and development (employment, technology transfer, etc.). The aim of the project is to develop and demonstrate a new hybridization (solar/biomass) solution for an existing prototype of the REELCOOP project. A biomass gasification boiler will be developed and integrated in the CSP prototype 3 of the REELCOOP project, instead of the biogas boiler, allowing a direct comparison between the merits and disadvantages of the two biomass technologies in hybridization operation mode. Prototype 3 of REELCOOP is a hybrid renewable electricity production mini-power plant, composed of a CSP and a biogas boiler. The developed biomass gasification boiler operates with olive oil residues. It is characterized by high efficiency and low emissions. The developed system presents major improvements/innovations as no similar system is currently available in the market. The proposed system will be developed in the framework of a collaborative project including EU and MPC partners. A concept of CSP-Biomass hybrid systems for two different countries in the MENA region (Algeria and Jordan) will be also developed, taking into account the inherent context specificities. In addition, environmental and economic sustainability assessments for the hybrid system will be performed, together with a plan for commercial exploitation for the hybrid technology. This project will allow to extend the knowledge on CSP hybridization with biomass technologies, sharing the REELCOOP (prototype 3) project experience with new partners, and enhancing research cooperation between EU and Mediterranean researchers, fostering the participation of MPC partners. It will, also, strengthen knowledge and technology transfer between EU and MPC partners and R&D capacity of MPC partners.

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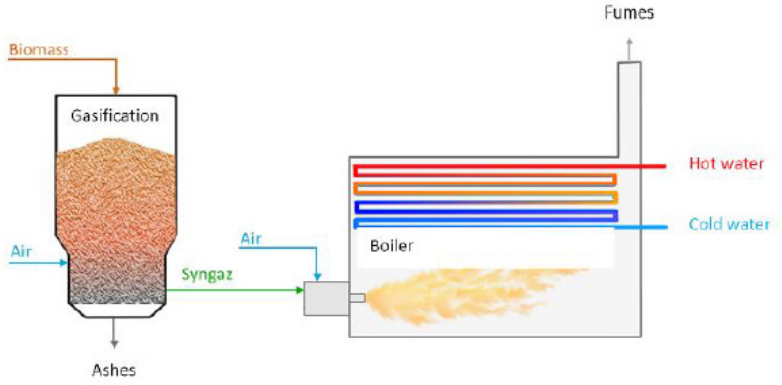

These projets are funded by ERANETMED

Project ID: ERANETMED_ENERG-11-281

TITLE: COMMunication systems with renewable Energy micro-griD COM-MED

PERIOD: June 2016-May 2019

Total budget: 382,342 Euros

Website: commed.ucy.ac.cy/

Project Summary

A smart micro-grid is a small-scale power-grid system consisting of a number of distributed energy sources, loads and storage units which is responsible to ensure power sufficiency in a small area. The effectiveness of a smart micro-grid depends on the proper implementation of a communication and networking system which monitors, controls and manages the grid's operations. Due to the ever growing worldwide energy consumption, the need of an efficient framework for managing the way power is distributed and utilized has increased. The main objective of this project is to study the fundamental interplay between communication and power networks in the context of smart micro-grids and renewable energy sources. On the one hand, we study advanced signal processing techniques and communication methods that optimize the operation of smart micro-grid systems. On the other hand, we focus on mobile communication networks with base stations based on renewable energy sources and we investigate communication and networking techniques that take into account both data traffic and energy profiles to support high quality-of-service (QoS). The objectives of each technical work package (WP) have been assigned in such a way as to ensure that the project's target is realised during the project's time period. The theoretical results derived from WPs 3,4 and 5 will be tested using the telecommunication network of MTN in Cyprus but also the state-of-the-art equipment of the CITI/INRIA research lab in France. The outcome of this project will provide a theoretical framework and a practical demonstration for the optimal cooperation between communication networks and power networks in the context of smart micro-grids and renewable energy sources which is in line with the objectives of the call's theme "Renewable Energy". The consortium has the expertise and the infrastructure to implement the objectives set and bring the project to a successful end.

Consortium

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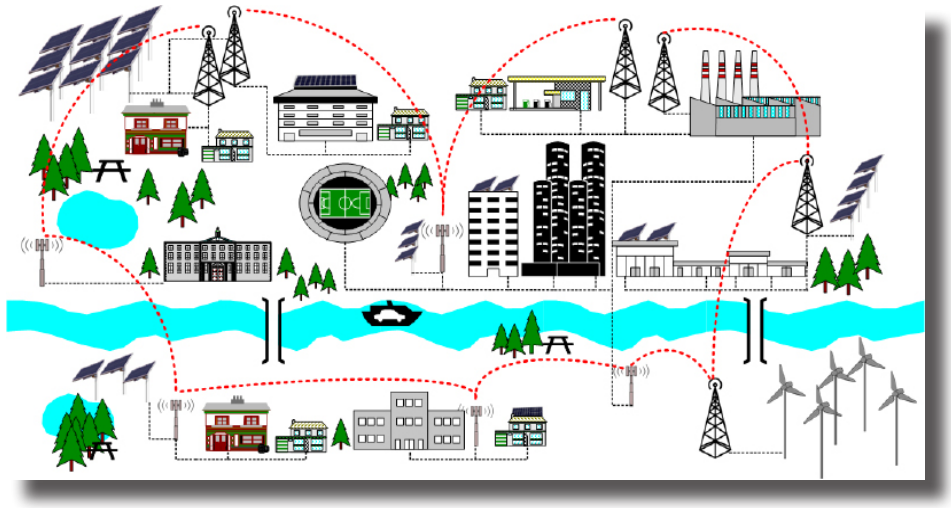

These projets are funded by ERANETMED

CrITERIA

Project ID: ERANETMED_WATER-13-051

TITLE: Cr(VI) Impacted water bodies in the Mediterranean: Transposing management options for Efficient water Resources use through an Interdisciplinary Approach CrITERIA

PERIOD: Start date: 1 October 2016

Total budget: 538660 Euro

Project Summary

The project will deliver an optimization tool including documentation and a database to assist water resource management organizations and water users on decision making when coping with water scarcity, climate change and polluted water. Pollution by Cr(VI) will be used as an example of additional water pressure problem that has to be tackled through integrated water resource management. The methodological approach will be based on comparative, collaborative research using real situation data from case study areas in each of the participating countries. Such areas have already been identified in Greece and Italy where data on Cr(VI) in water exist. These will be further monitored, evaluated and compared to potentially affected water bodies in Cyprus, Turkey, Jordan and Oman within the same time frame. CrITERIA will address capacity building and mobility, through training of water users to enable participation in the water monitoring process and scholarships for young researchers. We aspire to develop a user- friendly process providing access to a set of problem-response options that will support stakeholders on management decisions, in line with their priorities of water use (civil, industrial, agricultural) taking into account the EU water framework directive and the prescribed water quality regulations on Cr(VI). The project will give a specific focus on water quantities, direct costs for water treatment and indirect costs accounting for impact of Cr(VI) contamination. Different scenarios will be explored in relevance to climate change taking into account ground truth data from the extremely arid environment of Oman, where similar geologic conditions prevail, as a future analogue of Mediterranean water basins. For each case study, the tool will provide high-spatial resolution information on vulnerability and impact indicators related to water budget and extreme events for the present and the projected future climate.

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These projets are funded by ERANETMED

Project ID: ERANETMED_NEXUS-14-049

TITLE: DESign of DESalination systems based on optimal usage of multiple Renewable Energy Sources DESiRES

PERIOD: 24 months, start: 1 June 2016

Total budget: 559.471,91 €

Website: desires.tuc.gr/

Project Summary

This project aims to develop an Internet-based, multi-parametric electronic platform for optimum design of desalination plants, supplied by Renewable Energy Sources (RES). The platform will rely upon 1) a solar, wind and wave energy potential database, 2) existing statistical algorithms for processing energy-related data, 3) information regarding the inter-annual water needs, 3) a database with the technical characteristics of desalination plant units and the RES components, and 4) existing algorithms for cost effective design, optimal sizing and location selection of desalination plants.

The utilization of RES as power supply for desalination systems combines water and energy issues and addresses the critical need for improving the efficiency of the water-production systems. Moreover, DES2iRES's cost analysis will permit the establishment of desalination plants even in marginal and isolated areas because it will take into account the area's specific economic, geographical and climate conditions. In addition, policy and societal particularities of the focus area will also be addressed through appropriate weighting of each RES technology, whereas potential energy surplus will be distributed for conventional energy purposes leading to the reduction of fossil fuels consumption. The project addresses joint regional societal challenges and is expected to contribute to the socio-economic development of the Mediterranean region by capitalizing on existing research results and innovations. DES2iRES comprises a unique tool, at both the industrial and scientific levels, which is not currently available on a worldwide scale.

Collaborative research will integrate existing -and possibly propose new- knowledge in the field of RES potential estimation using multi-disciplinary data. The innovation is ensured by demonstrating the proposed platform for a study area whereas capacity building will be accomplished through mobility and training of young MPC researchers in Europe.

Consortium

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These projets are funded by ERANETMED

Project ID: ERANETMED_NEXUS-14-044

TITLE: Energy and Water Systems Integration and Management

EdGeWIsE

PERIOD: 01/06/2016 (36 months)

Total budget: 883 thousands euros

Website: www.edgewise.ubi.pt

Project Summary

In the near future, both urban and rural environments will manage water and energy as an integrated system. The first situation directly leads us to the smart cities' concepts, were the city is ruled as an integrated environment where all systems inside it should cooperate to achieve an optimal point of operation. In the second, the intensive use of hydric resources comes with an increasing modernization of the agriculture by introducing electrical machinery and sensing networks wish demand a growing energetic availability. Despite the differences found in these two environments, they share issues that can be solved by the same scientific foundations. Water and wastewater processes lack low energy technologies, whereas the application of renewable energy is hindered by low efficiency. In addition, these processes demand a constant supply of energy, while most renewable energy sources can't provide energy in continues time base.

The project EdGeWIsE will contribute to integrate the water and energy systems in a single and efficient system. To achieve this vision the following general approaches and objectives will be pursued:

1. Improve and promote efficiency based on data collected by low power wireless sensor networks.
2. Identify renewable energy sources inside urban and rural areas.
3. Research new methods for water and energy caption/storage.
4. Stimulate the intelligent use of the available water and energetic resources.
5. Explore the impact of Micro-Hydro technology on river systems.

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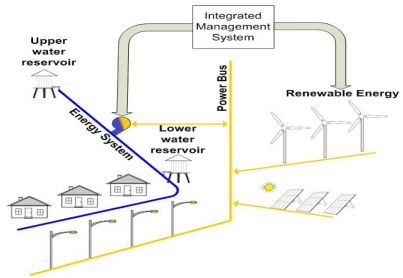

These projets are funded by
ERANETMED

Project ID: ERANETMED_ENERG-11-192

TITLE: In Vivo Solar Technologies OM : EXperimenTal Design in Harsh climate and acceptance contexts INVIVO NEXTH

PERIOD: 1st July2016 (3 years)

Total budget: 1003 k€

Project Summary

Europe is a leadership on the Solar R&D technologies market's with therefore a diversity of mature components related: sensor, storage, sealing, connectors design, grid connection,...

The Sahara represents an exceptional solar energy potential for MENA countries as well as European countries for production/exportation. Some solar technologies are already experimented in situ but their interaction with the environment leads to variable performances that Operations and Maintenance (O&M) procedures are most of time, unable to completely smooth.

The innovative contribution of InVivo nEXTh project is the design of "In vivo" O&M experiments 1/ on a large sample of Mediterranean PV plants of 12 sites in Mediterranean (~1MWc) 2/ taking into account the climate diversity and social requirements in order to provide Mediterranean O&M best practices.

To reach this goal, the InVivo nEXTh activities involve major Mediterranean stakeholders and 4 main tools/studies from 3 different disciplines are necessary: Solar Energy Efficiency, Statistic, and Information System.

The three major outcome of InVivo nEXTh project are the following:

- [InVivonEXTh – Database] large set of data on O&M PV systems events and monitoring resulting of surveys and experiments conducted in Mediterranean region. A subset of InVivo nEXTh database will be shared with the scientific community.
- [InVivonEXTh – Indicators] significant indicators/factors of performance and the efficiency assessment of PV systems in harsh Mediterranea
- [InVivonEXTh – Best Practices] Recommendations based on the previous indicators to provide O&M best Mediterranean practices. These recommendations will be disseminated by using Mediterranean network of the consortium.

Therefore, “In vivo” identification of Mediterranean best practices of PV systems O&M may be considered as a key booster of well-balanced Euro-Mediterranean scientific research. And Invivo nEXTh consortium will devote effort of 15 PMs during 36 months

Consortium

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These projets are funded by ERANETMED

Project ID: ERANETMED_WATER-13-069

TITLE: Assessing the chemical/microbiological contamination and productivity in the agricultural production chain of model fruit species grown under irrigation with different kinds of reclaimed wastewater IRRIGATIO

PERIOD: 1May 2016 (start date) - 30 April 2019 (end date)

Total budget: 1,297,777.00 Euro

Website: www.irrigatioproject.eu

Project Summary

The project deals with the reuse of treated wastewater (TW) for irrigation purposes of selected crops, chosen according to the "project idea" of investigating plant species characterized by different vulnerability to chemical and microbiological contamination. Different TWs from urban, mixed urban-agro industrial and mixed urban-textile origins will be tested, according to the specificity of the Countries involved in this project. Wastewater will be treated according to different treatment trains, using activated sludge (AS), clariflocculation, membrane biological reactors (MBR), constructed wetland (CW) and ozonation stages. The TWs will be used for the irrigation of model plants in field-scale and/or mesocosms and/or in pots, with cultivations irrigated with freshwater (FW) as controls. The plants (e.g. olive and strawberry) were chosen, considering their economic value in the Countries involved in the project and in order to share at least one common species between two partners, thus allowing for the comparison of the reuse impact of different TWs on the same species. Plants will be evaluated for their growth, development and crop production. Chemical and microbiological contamination indicators will be monitored along the whole agricultural production chain (i.e. TW, soil and food) in order to unequivocally assess the impact of the wastewater reuse practice under a wide spectrum of experimental conditions. Fruit quality parameters, including selected primary and secondary metabolites important for human nutrition and health protection will be also analysed. Socioeconomic research activities including social perception and farmer experience on TW reuse for irrigation, economic value of TW and health-related effects of waterborne diseases, are also provided by this project. Specific dissemination/exploitation strategies will be developed aiming at increasing social acceptance of the reuse practice

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These projets are funded by ERANETMED

Project ID: ERANETMED_WATER-13-166

TITLE: Groundwater Resilience to Climate Change and High Pressure within an IWRM Approach GRECPIMA

PERIOD: 1st april 2016 – 31st march 2019

Total budget: 232 327 €

Project Summary

In Mediterranean countries, groundwater has become over the past few decades, a fundamental resource for social, economic and environmental sustainability. There is also a need to integrate groundwater and surface water management.

This project aims to develop collaborations allowing (i) to tackle some of the most crucial groundwater issues in the Mediterranean area, i.e. tourism development, urbanization, changes in agricultural practices, seawater intrusion, through three representative sites; (ii) to bring together multiple skills in science and technology in a consistent and promising way regarding groundwater issues, in particular GIS and remote sensing, climate change impacts and flow and transport modeling; and (iii) to deal with social and economic fields by involving stakeholders in Turkey, Algeria and France. The study sites are the region of Mugla in Turkey, the plain of Mitidja in Algeria and the region of Poitou in France.

The project will associate three research teams with various domain expertise, which will allow to implement multiple scientific methods and technologies (hydrology, hydrogeology, climatology, data analysis, modeling, aerospace, IT), yet little used, especially by consulting firms. Mobilities will be provided between the partners to train project participants, including the youngest, to these scientific methods that are not yet included in the academic programs.

Remote sensing will be used out extensively at the satellite scale and a much larger scale (Unmanned Air vehicle of the Turkey team). Soft-computing modeling (e.g. Neural Networks), still very little used, will be applied to long-term forecasts. Mathematical modeling will be also widely used in the project to quantify the flow and recharge, analyze surface water-groundwater interactions and analyze pollution issues. In addition, every steps of the project will include socio-economic aspects, which will be addressed by involving very closely the stakeholders from 3 countries.

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These projets are funded by ERANETMED

Project ID: ERANETMED_ENERG-11-148

TITLE: HybridBioEnergies: Development of an innovative hybrid renewable energy plant based on a combination of biomass and solar energy and development of profound knowledge as precondition for application in Egypt, Jordan and Moroccob HYBE

PERIOD: 01.08.2016 – 31.07.2018

Total budget: 326,140 EUR

Website: www.auf-aw.uni-rostock.de/forschung/projekte/hybe/

Project Summary

The overall objective of the project is to set-up a sustainable basis for a joint research on hybrid bioenergy systems with focus on biomass and solar heat and their future application in form of a solar heated biogas plants in the Mediterranean Region. This will be achieved by collaboration of German, Egyptian, Jordanian and Moroccan researchers framed by close participation of public and private stakeholders (ministries, research program owners, financing sector, SMEs, farms and rural communities).

The addressed research issue is the development of a biogas plant using solar heat. This hybrid technology is unique, innovative and particularly suitable for the Mediterranean Region. As decentralized technology it will offer new chances in particular for rural areas.

Actions planned are workshops, trainings and internships, i.e. for young researchers as well as research, dissemination and sensitization activities. The main focus lies in the creation of preconditions for a longer lasting research on hybrid renewable energy systems, based on bioenergy from agricultural and industrial waste and waste water. To ensure a collaboration on eye-level and a high scientific level, the technical supplement of laboratories and the qualification of biogas and solar energy experts are necessary. Another target is to establish technology transfer mechanism in the partner countries as base for innovation. Dissemination and sensitization actions ensure to achieve acceptance for bioenergy and to build up a sustainable bioenergy network. Project actions culminate in the set-up of the new "EU-Mediterranean Hybrid Bioenergy Research Center" in Egypt. This Center will be future focal point for international research, vocational training, show-room for new technologies and information on bioenergy. It will be open for all types of bio energies and enhance the collaboration across borders, scientific disciplines, academics, gender, race and religious aspects.

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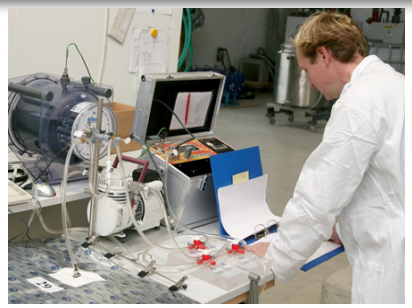
Hassan Latrache	University Sultan Moulay Sliman of Be-	Morocco
	ni-Mellal (FST)	
Mohammed Garoum	High School of Technology (EST) of the	Morocco
	Mohammed V University of Rabat	



These projets are funded by ERANETMED

Project ID: ERANETMED_ENERG-11-132

TITLE: Hydrogen production through photovoltaic energy HYDROSOL

PERIOD: 1/6/2016

Total budget: 319,815 Euro

Project Summary

The goal of this project is efficient, cheap, environmental safe production of H2 for small and medium-scale use in remote areas (e.g. small Islands or inaccessible villages) with the use of solar cells based on new perovskite dyes. The H2 is a clean fuel that can cover the majority of energy needs and the existed problems with its storage have been solved. On the other hand the solar cells can produce cheap electrical energy but it has to be consumed immediately because the storage in batteries it's expensive and unprofitable. For small communities that are not connected with the energy nets the storage of excess energy as H2 to be used later (for production of electricity or another energy needs) it will be the perfect solution.

By using the new types of perovskites we hope to eliminate their disadvantages that are their degradation over time and radiation, as well as their toxicity. To address these issues, we are planning to test perovskites based on metals other than Pb (e.g. Sn, Bi Sb, etc.) and use two-dimensional (2D) perovskite systems [e.g. (C9H19NH3)2SnBr4], nanoparticles of 3D systems, or quasi two-dimensional systems. The design of the perovskites will be based on our previous experience and on theoretical calculations. The prepared perovskites will be fully characterized and tested, in order to choose the most appropriate ones for the development of solar cells.

In addition, aspects such as materials used, fabrication and performance testing will be evaluated in order to achieve optimum characteristics and environmental friendliness for use by independent small units (houses, hotels etc).

The main goals of this project, except the fabrication of the specific system, are to build research and development activities between European and Mediterranean Research Institutions and to encourage a strong collaboration for renewable and clean energy fabrication.

Consortium

Coordinator

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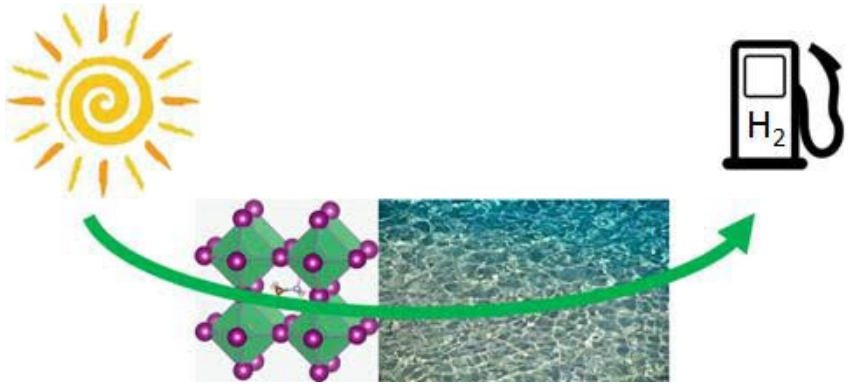

These projets are funded by ERANETMED

Project ID: ERANETMED_ENERG-11-103

TITLE: MENA Hybrid Solar System HYMENSO

PERIOD: 1st November 2016, 2 years duration

Total budget: 373000 €

Project Summary

Energy demand in all MENA countries is rising 5–10% pa. Most MENA countries satisfy their energy demand with fossil resources despite the fact that there is an excellent availability and quality of solar radiation. Yet the implementation of renewable energies in the MENA region is developing slowly. One reason for this is among others low confidence in the base load capacity of renewables. This project aims to support the implementation of solar energy systems in the MENA region by following a holistic approach covering aspects of cost, reliability and dispatchability. A combination of PV (Photovoltaics) and CSP (Concentrating Solar Power) systems is investigated, in order to harvest the advantages of both systems: easy installation and low LCOE (levelized cost of electricity) for PV, versatility and dispatchability of CSP. The main objectives of the project HyMenSo are:

- The continuation of the multilateral cooperation towards the innovative application of solar technologies adapted to the MENA region's market.
- Create a data base of relevant local conditions for CSP and PV plants, such as meteorological data, industry capacity, energy demand, current energy production, and grid capacity.
- Develop country specific solar energy roadmaps and concepts for combination of PV and CSP.
- Enhance local content.
- Address true demands and requirements of the MENA countries.
- Knowledge transfer and capacity building among the partner countries both on the academic and industrial level.
- Achieve successful demonstration in commercial applications with the optimal combination of available technologies.

The consortium with R&D institutions from Morocco, Tunisia, Algeria, Egypt, Greece , Germany, and Jordan is particularly eligible to conduct these activities because it is a well-established network from the enerMENA project. The enerMENA project (2009 – 2014) funded by the German ministry for foreign affairs, was initiated in order to pave the way for the DESERTEC.

Consortium

Coordinator

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Pr. Andreas Kazantzidis	University of Patras	Greece

These projets are funded by ERANETMED

Project ID: ERANETMED_WATER-13-104

TITLE: Monitoring the Water Hyacinth Using ASTER Imagery

MapInvPlnt

Project Summary

With the objective of taking a step forward in the control and management of aquatic weeds in the Nile River and surrounding coastal lakes, our goal is to develop an efficient method and software prototype to map and monitor the aquatic weeds. This software will allow us to identify aquatic weeds locations, change of dense and spreading rate. Availability of such information will have a great impact on identifying efficient methods to control, manage and eradicate aquatic weeds such as water hyacinth in the Nile River.

Invasions of aquatic weeds have caused significant problems in many lakes and river systems worldwide. Aquatic weeds usually grow naturally and abundantly into freshwater, and flood plain habitats. It seriously decreases biodiversity, threaten natural environment, alter nutrient cycles, and worsen water quality. In Egypt, more than 80% of the canals and the drains are heavily infested aquatic weeds [2]. Effective management of aquatic weeds requires appropriate control methods that include chemical, mechanical and biological techniques. Detection and mapping of the extent of rapidly spreading invasive populations are critical for identifying the weeds control priorities, including eradication efforts.

The main objective of this project is to develop an efficient software prototype, using remote sensing techniques, to map and monitor the change of dense aquatic weeds in river and lake systems. More precisely, we will develop efficient analysis methods for low cost multispectral satellite images, such as ASTER images, for the detection of water hyacinth in the Nile River in Delta of Egypt, chosen as a case study.

The output of this project will revive the previous efforts that have been done by Mariout and Edku [8] to control water hyacinth growth in Nile River using biological methods. Further biological control researches will be enabled for ecologists, as time series hyperspectral images and recent maps will be available, with reasonable cost.

Consortium

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These projets are funded by ERANETMED

Project ID: ERANETMED_WATER-13-112

TITLE: Integrated Quantitative Assessment of Climate Change Impacts on Mediterranean Coastal Water Resources and Socio-Economic Vulnerability Mapping MEDAQCLIM

Project Summary

The Mediterranean region is more sensitive to climate change extremes. These coastal sites share common water management problems due to their overexploitation, fresh water pollution, sea level rise, seawater intrusion and land losses. Increased complexity of policy making in these sites presents an ongoing challenge to managers. The objective of this project is to identify the impacts of climate change on water resources in coastal zones, and how they imply, in turn, socio-economic vulnerability and sustainable development. An integrated quantitative assessment can achieve this goal by combining projections from climate change scenarios with advanced computational hydrological impact assessment models (numerical modeling and optimization workflows) to identify vulnerability hotspots. Particular emphasis will be devoted to optimal water resources management in six selected sites, including coastal aquifers to be protected from seawater intrusion and overexploitation. Climate change projections and outputs from many Global Climate Models (GCMs) will serve as a basis for generating outputs from Regional Climate Models (RCMs) at the basin scale, using statistical downscaling techniques. Based on the RCMs outputs, Regional Hydrological Models (RHMs) will draw upon global and regional databases with a view towards producing a series of regional hydrological impacts simulations for interacting surface and groundwater systems (including coastal aquifers) for different climate projections. A socio-economic vulnerability assessment will be carried out based on the outputs of these impacts by incorporating socio-economic and environmental issues. Integrated mapping of the outputs generated from the vulnerability assessment will facilitate understanding and analysis of the findings. The project will setup simulation scenarios addressing climate change uncertainty to enhance water resources management practices and to inform decision makers on the best adaptive measures.

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These projets are funded by ERANETMED

Project ID: ERANETMED_ENERG-11-196

TITLE: New Indium Free Flexible Electrode for Organic Photovoltaic Cells NInFFE

PERIOD: 22/04/2016 – 21/04/2019

Total budget: 180 000 Euro

Project Summary

Photovoltaic cells (OPVCs) attract high interest for solar energy. They are based on organic films sandwiched between two electrodes, one of them being transparent and conductive (TCE). ITO (indium tinoxide) is the TCE the most often used because it presents many advantages such as excellent optical properties and good conductivity. However, it has also some disadvantages such as indium scarcity, aggressive techniques of deposits for organic materials and brittleness.Therefore, an urgent need for alternatives to ITO by new ETC arises. This TCE must have the same electrical and optical performance as ITO. The elements constituting should be abundant and neutral environmental and integrate into the framework of sustainable development. The techniques used for its deposition should be as gentle as possible. The flexibility of the ETC and adhesion must be compatible with the use of a plastic substrate. Several solutions have been explored to replace ITO. Among the alternative to ITO, metal nanowires, as well as multilayer structures of dielectric / metal / oxide (DMO) are among the most promising. In the context of research on organic compounds, many works are devoted to wet deposition, because they appear inexpensive. However, dry process under vacuum allows stacking many layers without difficulty. These layers are pure and their properties are reproducible which reduces the cost of a large-scale production. Equivalent performances are obtained regardless of the technique used. Thus, in this project two types of original TCE are selected, one using a wet process the other a dry process. For the wet processes, we chose the deposition of metallic nanowires, whereas for the dry voice, the Dielectric/Metal/Oxyde structures seem best suited. At first, the TCE will be validated in classical OPVCs, then they will be optimized with new materials synthesized by the partners. Then, the TCE will be deposited on larger surface for OPVCs, which will tested for industrial purpose.

Consortium

Coordinator

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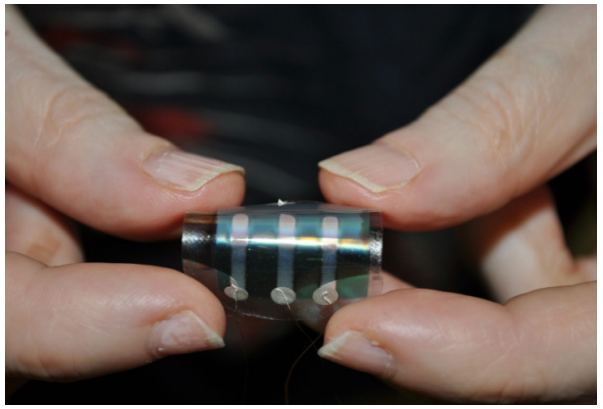

These projets are funded by ERANETMED

Project ID: ERANETMED_WATER-13-043

TITLE: Decontamination of textile industries' effluents in the Mediterranean region for reuse in agriculture. Coupling innovative sustainable treatment processes with existing industrial processes SETPROpER

PERIOD: April 15th 2016 ,3 years, until March 31rst 2019.

Total budget: 1 091 295 euros

Website: setproper.unistra.fr/

Project Summary

Water shortage is a short term crucial concern in the Mediterranean regions subject to arid climate andoveruse of water resources in agriculture and industries such as the textile dyeing activities. Improving their effluents' treatment is a major concern for the environment and human health because the wastewater even treated according to conventional processes, still contain pollutants and salt. Moreover, the textile dyeing effluents' composition is complex, and the use of a single process is not always sufficient to improve the waste water quality. The development of combined processes involving several physico-chemical methods is therefore necessary. Adsorption is a powerful treatment technique, but expensive and not fully efficient when, using conventional activated carbon. This can be overcome, using innovative materials and physico-chemical processes.

This project aims at contributing to the objectives of the Mediterranean countries of water conservation through the reuse for irrigation of textile effluents' wastewater, gathering the different competencies of Euro-Mediterranean teams, and exploring new combined methods based on adsorption on low cost, effective materials tested on real effluents, and with the objective of sustainable industrial use, including the fate of the solid waste. Their environmental and technical performance will be assessed, and their applicability will be tested by the implementation of small scale pilots.

The expected results are scientific, by improving knowledge on the mechanisms of degradation of organic molecules depending on the physico-chemical or biological processes involved, on adsorption processes and salt retention, on modeling of porous media transfers, on solid waste inerting/valorization. From the technological aspect, it is expected to give clues to adapt the type of combined process, and physico-chemical conditions, to any type of textile effluent.

Consortium

Coordinator

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These projets are funded by ERANETMED

Project ID: ERANETMED_ENERG-11-065

TITLE: SOLAR ASSISTED CATALYTIC REFORMING: AN HYBRID PROCESS TO TRANSFORM MUNICIPAL WASTE INTO ENERGY SOL-Care

PERIOD: 1st April 2016

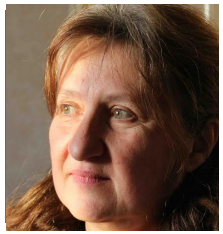
Total budget: 386 k€

Project Summary

Municipal solid waste (MSW) is posing enormous environmental problems, particularly in Mediterranean countries. A radical solution for their treatment has not been yet implemented. An attractive way for their valorisation is to convert their organic and carbon part into syngas (a gas mixture of H2 and CO), then into fuels (called bio-fuels since produced from renewable resources). Nevertheless, such process, which final aim is to produce energy, still suffers from low yield of products and from the presence of pollutants that can severely affect the catalyst used. In order to purify the feed and increase the yield of syngas from MSW, porous materials will be used in order to obtain higher activities than existing catalysts. In addition, solar energy will be applied with the wish to lower the high energy demand of the reforming reaction. Besides, modelling of the process will enable further optimization. Therefore, combined efforts will be employed in this project in order to purify the crude syngas obtained from MSW gasification, to carry out the reforming reaction in realistic (stringent) conditions of gas composition with the target to increase the syngas content, and solar energy will be implemented (process hybridization) to heat the reactor. The consortium will consist of seven members (including an industrial one) from Lebanon (Mediterranean country) and four European ones (France, Italy, Portugal, Spain).

Consortium

Coordinator



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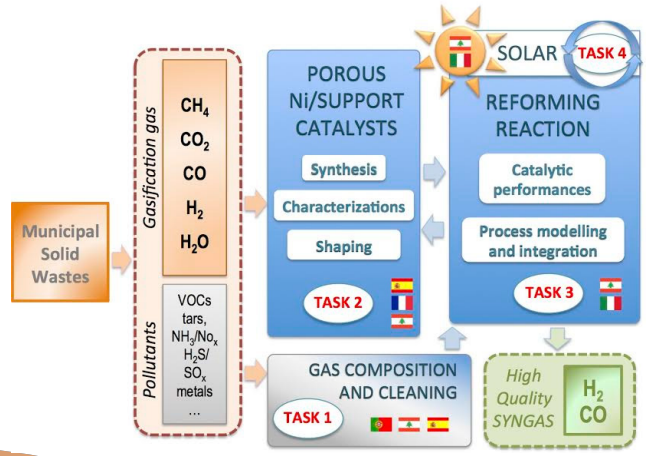

These projets are funded by ERANETMED

Project ID: ERANETMED_ENERG-11-138

TITLE: Sustainable Air conditioning Using Desiccant membrane System SOL-COOL-DRY

Project Summary

Hybrid sustainable air-conditioning displacement ventilation (DV) system is proposed and uses a novel liquid desiccant (LD) cycle with porous membrane material (DM) for indoor dehumidification using ceiling mounted layout and a tower bed for desiccant regeneration. It is intended to totally power the proposed air conditioning system by renewable energy. The cooling capacity of the system is constrained by its upper limit 100 W/m2. To increase the load capacity of the integrated system, the proposed system will be integrated with a ductless personalized ventilator (PV) to bring fresh cool air from the floor level to the breathing level of the occupant. The PV will also improve the breathing air quality and would reduce the required energy to operate the system especially in the absence of any natural heat sink.

Conventional liquid desiccant cycles dehumidify the air before supplying it to the indoor space, while the proposed cycle absorbs the humidity directly from indoor space using a ceiling permeable membranes acting as a dehumidifier cooled ceiling panel. In order to reduce the sensible load that might be added to the indoor space and to increase the potential of the desiccant to absorb moisture, the liquid desiccant is cooled using the available heat sink, before it enters the space to be dehumidified. An integrated mathematical model of the solar-regenerated-desiccant membrane with the DV space model and the personalized ductless ventilator (PV) will be developed to study the feasibility and efficiency of the proposed cycle. Experiments will be conducted to validate the models of the dehumidifier permeable membrane, tower-bed desiccant regenerator, personalized ventilator and the integrated models. The current system will be compared to the conventional technology to determine system energy performance and life cycle costs in the presence\absence of the ductless personalized ventilator

Consortium

Coordinator

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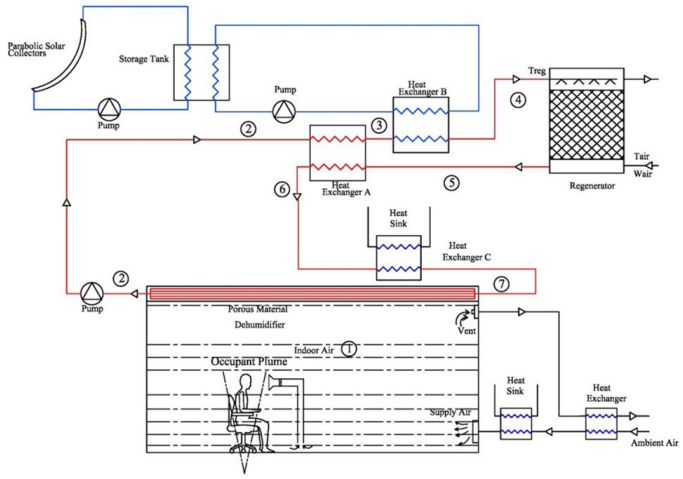

These projets are funded by ERANETMED

Project ID: ERANETMED_ENERG-11-151

TITLE: Sodium-ion batteries: An advanced solution for mobile and stationnary energy storage applications STORENERGY

Project Summary

The transition from 'fossil 'economy to a greener and sustainable economy cannot be achieved without efficient energy storage systems. The recovery of energy from renewable sources such as solar or wind power has enormous potential to meet current and future energy needs and to lead to a better preservation of nature and the environment. In the United States for example, the combustion of fossil fuel results in more than 90% of the greenhouse gas emissions, which is also the main cause of global warming.

This noticeable climate changes have urged major vehicles producers to develop zero-emission vehicles (electric or hybrid vehicles). To achieve the aim to develop a suitable energetic solutions for mobile and stationary applications, an efficient and low cost energy storage system is needed. The lithium-ion batteries with high energy density have long been effective solution to meet these demands, however, this technology faces two major challenges:

- The safety issue due to the thermal instability of oxides used in the commercial batteries,
- The problem of lithium resource available in politically unstable regions increasing the lithium carbonate cost.

In order to face these major challenges, both actions are being undertaken around the world:

- Replace electrode materials based on oxides by phosphates with higher chemical and thermal stability, in order to impede the generation of oxygen causing the combustion of flammable electrolyte (Safety issue);
- Reduce the price of these rechargeable batteries to make them more competitive especially in the stationary applications requiring large size batteries.

The abundance and low cost of Na in the earth is great an advantage when a large amount of alkali is demanded for large-scale applications (Renewable energy and EV/HEV). The aim of this project is to present full sodium-ion batteries made from phosphate by exploring new efficient electrode materials and proposing a prototype ready for use in the industry.

Consortium Coordinator

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These projets are funded by ERANETMED

Project ID: ERANETMED_WATER-13-109

TITLE: WAter Saving in Agriculture: technological developments for the sustainable management of limited water resources in the Mediterranean area WASA

Project Summary

This project aims at developing, testing and establishing a general protocol to reduce water consumption for irrigation of high value crops, with important socio-economic consequences for current and future scenarios of water scarcity in the Mediterranean region. The protocol shall be defined through a combination of scientific, technical and training activities conducted by nine partners from six countries. These activities will revolve around three main scientific pillars, i.e.: (a) the adoption of deficit irrigation criteria based on regulated deficit irrigation (RDI) and partial root-zone drying (PRD) integrated with advanced drip and sub-drip irrigation methods; (b) the use of advanced methods for monitoring the soil-plant-atmosphere fluxes (mass and energy); (c) an accurate definition of the extent of the crop root systems, active in the water uptake process, using minimally invasive (geophysical) techniques. The combination of these techniques is based on the key idea that the success of RDI and PRD depends heavily on a growing capability of understanding and measuring the water storage, state and fluxes in the soil-plant-atmosphere system. This will allow us to quantify the real water demand of typical crops, spread across the Mediterranean area, that greatly contribute to the economic development of the region. The added value of having a large and geographically diversified consortium is twofold. On one hand different crops in different socio-economic areas will provide a wide variety of realistic challenges, and the different partners, with their own expertise, will help adapt the general project framework to the local needs and solutions. On the other hand, the large consortium will help disseminate the gained knowledge about techniques and crop behaviour across the Mediterranean area by a well-balanced programme of professional training, through short study stays, workshops and interaction with local and global stakeholders.

Consortium Coordinator

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These projets are funded by ERANETMED

Project ID: ERANETMED_NEXUS-14-035

TITLE: Sustainable wastewater treatment coupled to energy recovery with microbial electrochemical technologies WE-MET

PERIOD: 3 years

Total budget: 962,812 €

Project Summary

In Mediterranean countries, over 1% of municipal electricity consumption is attributed to wastewater treatment (WWT) plants. Thereof, the main share is owed to the aeration of the activated sludge tanks. Recent studies have experimentally demonstrated that the energy content of influent municipal wastewaters is typically over 10 times greater than the energy required to run the plants. This clearly demonstrates that the energy content of raw wastewater is substantial and should accordingly be regarded as a valuable energy resource rather than a waste to simply dispose of. If the energy contained wastewater is harnessed (even only partially), it could help the water industries become self-sufficient in energy or even net-providers.

In this context, the WE-MET project will devise the use of Microbial Electrochemical Technologies (MET), possibly integrated with other technologies, as a groundbreaking approach to recover energy trapped in wastewater while simultaneously cleaning up the wastewater. Overall, using MET will therefore offer a net environmental benefit from wastewater treatment and an economic and environmental upside of using a waste stream for high value energy recovery.

To reach these ambitious objectives, the WE-MET Project brings together a multidisciplinary team of scientists from Universities and Research Institutions, as well as industrial partners (i.e., a SME with expertise in industrial engineering). The WE-MET's pathway to impact combines both fundamental science and upscaling activities, in order to facilitate the development of technologies which are technically effective and sustainable and also to reach out end-users and stakeholders. This will be possible also with the help and support of an influential Advisory Board composed of policy making institutions (e.g.,European water supply sanitation technology platform), professionals (e.g., Tunisian WWT company) as well as international representatives of scientific associations.

Consortium

Coordinator

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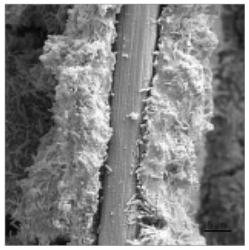
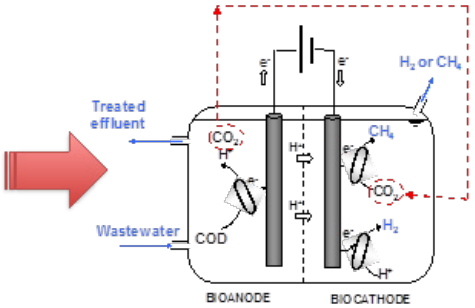
Pr. Gerasimos Lyberatos	National Technical University of Athens (NTUA)	Greece
Pr. Ameur Cherif	University of Manouba (UManou)	Tunisia

From Extracellular Electron Transfe to Groundbreaking Biotechnology for Water Treatment and Energy Recovery





These projets are funded by ERANETMED

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DURATION
OCTOBER 2013 – SEPTEMBER 2017

Grant Agreement N°
609475

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