



THE STATE OF THE ART OF THE PROJECT

Summary

Activities of the "Testing" phase (WP4) continued within the 2nd Transnational BEL held in Malta on 12th - 13th November 2018 aiming at sharing experiences regarding the regional BELs by project Partners and transferring knowledge through the engagement of stakeholders. All Partners have implemented their local BELs involving stakeholders of the Quadruple Helix (Government, University/research, Business/industry, Civil Society) in participative design processes. In particular, almost all the Pilot Projects have been identified at the time of writing this issue of the newsletter. Each Partner looks to follow a specific approach, apparently different from each other, and this diversity is functional and compliant with the objectives of the Project. Actions of knowledge transfer ("Transfer-ring" phase - WP5), have been also developed by interacting with the extended Blue Growth community through dedicated meetings and events and also through unscheduled but successful activities such as the educational initiatives explaining the BE potentials organized with high school students in Italy and Spain.



On 26th February 2019 the *Ecodynamics Group of the University of Siena - UNISI* (Lead Partner of

MAESTRALE) organized the 2nd BEL at Giglio Island, in the Tuscany archipelago (Province of Grosseto). In particular, given that the Giglio Islands lends itself to being a model of sustainable development for BE and that in 2015 the Giglio Municipality signed a Memorandum Of Understanding on renewable energies with the Tuscany Region, the participants carried out a site survey (port and desalter plant) to assess which areas could be most suitable for hosting BE technologies.



To this aim, an inspection to Giglio harbour and to the desalination plant of the island was done in order to evaluate:

- the possibility of installing a wave energy converter for the refurbishment of the already existing harbour or,
- the feasibility of producing energy through the osmotic gradient in the desalination plant.

During the inspection all the fundamental stakeholders such as the Major of Giglio Island, the Vice-President of the *National Park of the Tuscan Archipelago*, and the representatives of public services *Acquedotto del Fiora* (Single Manager of the Integrated Water Service in several municipalities of



Tuscany), *SIE s.r.l.* (electricity systems company), *Terna Plus* (Energy Venture - Terna Group TSO), were involved in the activities. Together with the fundamental stakeholders, citizens of Giglio Island took part actively in the event expressing their interest in BE and raising questions regarding possible positive or negative impacts. Besides the participation of citizens and main stakeholders, also some students of the University of Florence - UNIFI (Department of Architecture and Landscape) attended the 2nd BEL. Their presence was the result of a new collaboration between UNISI and the Department started on December 2018, which aims at transferring knowledge and competences. From this collaboration, master students of UNIFI will produce a landscape planning of Pilot Projects that will be developed by UNISI. A new meeting of the 3rd BEL is foreseen in the next month and it will be held in Punta Ala (Grosseto). Due to the preparatory phase of the event, closed meetings have been arranged with the *Regional Port Authority* (Ports of Viareggio, Marina di Campo, Porto Santo Stefano and Giglio Porto). In particular, a preparatory meeting with the heads

of *Marina Punta Ala* has been carried out in order to touch base their willingness on including BE technology for the next harbour enlargement. An agreement has been reached regarding the possibility to carry out with their collaboration the next BEL in May. During this meeting possible solutions for deploying BE for the new port will be proposed and presented to the administration of *Marina di Punta Ala*.

In the field of the "Transferring" activities, the collaboration with the *Higher Technical Institute Tito Sarrocchi* (Siena) was carried on achieving important results. During the event called *Gocce di Futuro 4.0* in Chianciano Terme (Siena), organized by the Italian



Ministry of Education, University and Research - MIUR in November 2018, another small scale prototype of a vertical axis wind offshore turbine was realized and showed (in addition to the previous kite created for *BRIGHT 2018* - see Newsletter n. 5) their functioning to other students arriving from all the Province of Siena. In that occasion, under the supervision of UNISI, the students of the *Sarrocchi* transferred to younger students their knowledge and competences acquired within the MAESTRALE Project. The collaboration continued for a transnational event held on 18th of December 2018 in Málaga, co-organized by the Spanish MAESTRALE Partner, Cluster Marítimo-Marino de Andalucía - CMMA, and UNISI entitled *BLUE FUTURE GENERATIONS - exploring Blues Energy with students*. In that occasion, students from *Sarrocchi* transferred to their Spanish colleagues of *I.E.S. Casabermeja* of Málaga what they have learned from MAESTRALE project and they showed them the





wind offshore turbine prototype that they built. This was a good experience of citizens participation and of knowledge diffusion to the public. Thanks to the success of these events, the Joint Secretariat wrote an article dedicated to the *BLUE FUTURE GENERATIONS* meeting and to the transferring activities between MAESTRALE and the *Sarrocchi Institute* for the European Magazine *Panorama - Spring Edition*. In particular, the magazine of the EC dedicated to European Regional and Urban Policy valued MAESTRALE as a key-practice of transboundary cooperation. The opportunity came from the visit of the Korea Evaluation Institute of Industrial Technology (KEIT) to the Interreg Med programme (end of 2018). The delegation was interested in better understanding methodologies and objectives of the cross-border programmes and its possible application in the Asiatic area: MAESTRALE was presented as a real practical case of cooperation and knowledge transfer. You may find this amazing experience with the Korean delegation in the full *Panorama* magazine: read it here!

https://ec.europa.eu/regional_policy/sources/docgener/panorama/pdf/mag68/mag68_en.pdf

As regards the scientific communication of MAESTRALE, two papers derived from the "Studying" phase of the Project and written by the staff of UNISI and co-author, have already been published in *Frontiers in Energy Research - Energy Systems and Policy "Research Topic"* titled "Perspectives for Marine Energy in the Mediterranean Area". The 1st one "Disaggregating the SWOT Analysis of Marine Renewable Energies" was published in December 2018. It presents a detailed SWOT analysis of BE pointing out Strengths, Weaknesses, Opportunities and Threats deriving from the BE sector analysing the socio-economic, the legislative, the environmental and technological dimensions. The 2nd paper is "Lifecycle Environmental Impact Assessment of an Overtopping Wave Energy Converter Embedded in Breakwater Systems" published in April 2019. It shows the results of the environmental life-cycle assessment of OBREC, an overtopping breakwater technology able to exploit the wave energy, proving its potential in terms of emissions reduction



On last 15th March *Goriška Local Energy Agency - GOLEA* organized the 2nd Slovenian BEL in the municipality of Koper (the 1st one was held on 5th November 2018). The event was attended by 21 participants representing coastal municipalities, companies dealing with marine energy technologies (heat pumps) and ESCO companies, as well as representatives of education and decision-makers at local and national level. The main topic of the meeting was the selection of the two Pilot Projects on the basis of the answers/suggestions received from the "Public Call for Proposals for the Preparation of Documents for the Implementation of Pilot Projects" sent to the local stakeholders. During this public call GOLEA received two proposals



for the Pilot Projects implementation. Both proposals came from the Municipality of Izola and they predict use of BE as energy source for thermal use of sea water with sea water heat pumps. First selected Pilot Project will be the installation of sea water heat pump for heating and cooling in a building on the coast of Izola city, classified as cultural heritage, actually empty and for which radical restructuring works are planned. The 2nd

selected Pilot project will be the installation of sea water heat pump in the Health centre in Izola. Heat pump will replace part of old gas boilers and will be used for heating and cooling of the building. During the 2nd BEL, both proposals were discussed and all participants agreed the selection of Pilot Projects is appropriate. Research of selected Pilot projects will be done during project study with external experts. The 3rd Slovenian BEL is planned in June 2019.



On 1st March 2019 the *Oceanography Center* of the *University of Cyprus OC-UCY* organized the 3rd BEL in Nicosia. During this meeting, attended by 86 representatives (mainly from enterprises, national public authorities, universities/research centres and general public), several topics have been

addressed. The Cyprian 3rd BEL started with a presentation by OC-UCY on the major achievements of MAESTRALE Project and also the forthcoming activities. In particular, the event focused on techno-economic issues for BE technologies. At the BEL, the invited experts from *University College of Cork*, *Exxon Mobil* and *National Technological University of Athens* spoke about the status and challenges of wave energy, marine biofuel and offshore wind energy. Training activities were also carried on engaging the audience to find a suitable location and make a business plan about a BE project. To achieve that, it was given data about machine power output, regional energy potential, human activities, physical characteristics and ship routes. The participants had to find a suitable location and address if a BE is feasible at the selected location. The first Pilot Project is focused on wave energy using an innovating WEC (Wave Energy Converter) created by the SME *Sea Wave Energy Limited (SWEL)*, a R&D company based in Cyprus and in UK that has been focused on the design and development of its WEC "*Wave Line Magnet*", a device that has been evolved for more than 10 years achieving numerous patents.. The WEC is innovative because is cheaper than other well-known WECs and it performs very well in the wave climate of Cyprus. The focus area is the South-West coast of





Cyprus, though the environmental and socioeconomic factors will influence its precise location. The 2nd Pilot Project is on marine biofuel. This Pilot was selected to use the current technological capacity of *Agriculture Research Institute* and use the by-products of an electricity power stations. The idea is to use CO₂ produced by fossil fuel burning for feeding and regulating temperature of the algae population to extract bio-fuel from micro-algae cultivation.



The 1st BEL of the Valencia Region, organized by *European Center for Innovative Companies – CEEI* of Valencia and Valencia Port Foundation was held on 25th February 2019 at the headquarters of the Port Authority of Valencia with the participation of more than thirty entities, companies and people. During the meeting several

experts have analysed the possibilities of the Valencian coast for the implementation of BE infrastructures. Also the Maritime-Marine Cluster of Andalusia (CMMA), the 2nd Spanish member of MAESTRALE, presented the results of its two BELs carried out a few months ago and the Pilot Projects being developed in Andalusia. In the 1st round table



1st Valencian Community BEL (Valencia - 25/02/2019)

representatives of the Port Authority of Valencia and Castellón, of the two Horizon 2020 projects *HiSea - High Resolution Data of Sea Water Quality* and *ODYSSEA - Operating a network of integrated observatory systems in the Mediterranean Sea* and the Valencian company *I-Box Create SL* (consulting company for construction and RES sectors), have spoken of the increasing trends of sustainability in the ports and the potential of BE in these areas. During the 2nd part, a round table was held in which new trends in BE

generation were highlighted by *APPA Marina* (association of RES companies), and three companies that are working on its development, *TYPSA* (Spanish group of independent consulting engineering firms), *EnerOcean SL* of Malaga (marine energy engineering - stakeholder of CEEI for MAESTRALE) and *Rotary Wave* of Valencia (marine energy engineering). On 4th April 2019, in the framework of the *Sesame Summit*, event of international vision on issues or problems useful for the Valencian ecosystem, a session was organized with different presentations on clean energies in which CEEI participated in its 2nd BEL, focused on the use of this types of technologies and their impact. The event was attended by more than 30 entrepreneurs and startups who showed their interest in promoting the use of these technologies and participating in the training modules for Valencian entrepreneurs that CEEI Valencia will carry out in the MAESTRALE Project.



Regarding the identification of the Pilot Projects, CEEI Valencia has deepened the hypotheses already presented during the 1st TBEL of May 2018 in Nova Gorica, namely:

- *Bottom fixed offshore wind (BFOW)*: this technology needs to be installed in shallow waters (up to 40 m. water depth, even deeper with new technologies). Some suitable places can be found in the Atlantic coast of Andalusia and in the North coast of Valencia. The examples of this kind of technology are: *Elisa Technology* by the Spanish Company *Esteyco* and *GRAVI3* by *TYPSA*;
- *Floating offshore wind (FOW)*: a technology to be installed in medium to deep waters (i.e. more than 50 m water depth), and now is getting close to market. It has got great potential for serial manufacturing, easy installation and repair. It could be installed in all Andalusia and Valencia coast (better wind resource in the South) and it is important to know this is the only solution suitable for most of the Mediterranean area. One example is: *W2Power* by *EnerOcean* (see also newsletter n. 5);
- *Isolated wave and PV hybrid (IWPV)*: consists of a floating platform hosting WECs and PV panels. It is suitable for far to grid installations with low to medium power needs (i.e. aquaculture farms). Offering great savings for plant owner both in fuel and trips to the farm (allows automation). IWPV can be installed in medium to deep waters of Andalusia and Valencia coasts.



Malta Intelligent Energy Management Agency - MIEMA organized the 2nd Maltese BEL on 17th October 2018 in Lija. This meeting, attended by 11 representatives of public authorities, universities and enterprises, was focused on the results of the analysis of Malta's BE potential, the criteria for selection of Pilot Projects proposals and a brief presentations of possible Pilot Projects to be implemented in Malta. Pilot Projects will result from collective discussion during the regional BELs. At the moment, MIEMA has not yet identified the Pilot Projects, however, within the Maltese BE potential analysis carried

out by the MAESTRALE project, three marine energy sources with good potential for success for the characteristics of the Maltese sea have been selected:

- Offshore floating wind turbines, to be installed in the open sea, at appropriate distance from marine protected areas and birds' migration routes
- Marine geothermal plants, which could exploit seawater as heat exchanger to run the heating and cooling systems of large hotels, resorts or office buildings situated along the coast



- Wave energy conversion systems embedded in breakwaters - either existing or scheduled in current planning instruments (such as the REWEC3 plant in the Port of Civitavecchia, visited by the MAETRALE team in the 1st study visit - 4/6 April 2017).



Finally MIEMA identified two other opportunities (to be evaluated later) for the BE exploitation, namely: salinity gradient energy (this source need to be investigated, however in the Maltese islands there are wetlands and salt-works which can be used as testbeds); marine biomass from micro-algae for biofuel production.



On 3rd April 2019, *INFORMEST (Agency for Development and International Economic Cooperation)* organised the 3rd Friuli Venezia Giulia Region's BEL in Gorizia. In particular, from the experience of the *National Institute of Oceanography and Experimental Geophysics - OGS* of Trieste in the field of marine micro-algae for biofuel

production, the hypothesis of a Pilot Project was deepened. In fact, it was confirmed that thanks to the conformation of its territory, the FVG Region could benefit from the marine micro-algae as energy producers. OGS has its own culture collection of marine microorganisms called *CoSMi - Collection of Marine Microorganisms Cultures*. The *CoSMi*'s mission is to isolate, identify and cultivate marine microorganisms to make them available



to the scientific community and to the food, pharmaceutical, nutraceutical industries and the energy sectors. The collection already provides a cleaning and maintenance service for micro-seaweed cultures and the supply of 'starter' crops for a hatchery plant in the FVG region. The 2nd Pilot Project aims to promote a possible regional value chain regarding the WECs, analysing the various components/systems of these devices and the actual competences and know-how of local companies.

Considering the low energy potential of North Adriatic Sea, the objective is not using WECs technologies locally, but giving regional enterprises the possibility to expand their activities in areas with higher marine energy potential, providing services of design manufacturing/installation/maintenance to already existent or future companies. The number of companies interested in being part of this supply-chain increased from 19 to 46



units mainly concentrated in the design/site application and manufacturing and/or supplying activities (mostly in the mechanical components and less in the electrical components sub-sector).

Finally, as part of the dissemination activity of MAESTRALE, on 13th February 2019 Informest, participated to the workshop "Next Maritime Technologies Day" dedicated to the future of the maritime sector in FVG region. This event, organized by the *Maritime Technological Cluster of Friuli Venezia Giulia MARE FVG* (technical partner of Informest for the establishment of the BELs and for the identification of the two Pilot Projects) and attended by SMEs, research institutions and educational centers, was a big opportunity for Informest to strengthen its relations and the network created during the Regional BELs. Finally in the issue "November-December 2018" of the Italian magazine *BioEcoGeo* was published the article "Energy from the sea" Starting from an overview on MAESTRALE aims and objectives the article describes FVG regional experience on BE, detailing actors participating in the regional BELs, the first results achieved and the two possible Pilot Projects identified.



On the occasion of the *European Maritime Day* held at the Port of Málaga on 24th May 2018 the *Marine Maritime Cluster of Andalusia - CMMA* presented the MAESTRALE Project to attendees representing several national and local public authorities, universities/research centres, SMEs and general public. CMMA illustrated the BE sources situation in the Mediterranean and the synergies of MAESTRALE with other projects. On 16th October 2018 CMMA presented MAESTRALE also in the *1º Encuentro Nacional de Clústeres del Sector Naval Español*, placed in Cádiz with the participation of

32 attendees. On 19th October 2018 CMMA organized in the Port of Málaga the 1st Regional BEL. During the meeting several papers and round tables were developed all with a focus on opportunities for the development of new marine energy technologies. At the time of writing this issue of the newsletter CMMA has not yet identified the 2 Pilot Projects, However, during the 1st TBEL of Nova Gorica the company *ENEROCEAN* of Málaga (Stakeholder of CMMA), specialized in marine energy engineering from feasibility studies to commercial exploitation (offshore wind, wave and tidal energy), presented its floating offshore wind *W2Power* device. In particular *W2Power*, developed since 2012, is a patented technology that uses proven platform technology and offshore wind turbines available today. It can be installed, maintained and repaired world-wide, at any sea depth. The plant is large but light-weight semi-submersible: up to 12 MW wind power on one foundation. A prototype will be demonstrated at sea in Canary Islands (Project *DEMOWIND WIPI0+*).



Next Steps

The MAESTRALE Project activity calendar foresees, first of all, the organization of the remaining BELs by individual Project Partners, above all for the Partners who have not yet identified the Pilot Projects. From this perspective, the next 3rd Transnational Blue Energy Lab "Blue Energy Perspectives in the Mediterranean" in Thessaloniki (5th - 7th June 2019) will be the best opportunity for an "updated" comparison between the Partners on the progress of the "Testing" phase of the Project. In particular, the 3rd TBEL of MAESTRALE foresees the presentation of the status of the Project, next activities and deadlines; the updates on Regional BELs; roundtable discussions for possible transnational synergies promoting BE: gaps, expectations and future steps. Finally, **between 1st and 5th July 2019 in Kotor (Montenegro), the Blue Growth Community organises the Summer School "Blue Growth: emerging technologies, trends ad opportunities"** addressed to young graduates students, researchers, professionals, public servants and practitioners in specialised fields related to the Blue Economy.

OUR COMMUNICATION ACTIVITIES

In order to disseminate the Project development and a more comprehensive understanding of BE on various aspects: actual potential, existing regulations, availability of innovative technologies and perspectives, a Facebook page and a Twitter account have been created. We are going to share all important updates of the Project, news and research articles on BE and the practices that have been successfully implemented in that field. Moreover, we aspire to create a virtual community where scientists, policy makers, entrepreneurs and citizens can contribute with their knowledge and ideas with regard to prompt effective actions and investments for Blue Growth.



<https://maestrале.interreg-med.eu>



@maestrале.project



@MAESTRALE_MED.



maestrале@unisi.it

Project partners



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REGIONE AUTONOMA
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