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IN RESEARCH AND INNOVATION TECHNOLOGY

COASTAL STABILIZATION BY INNOVATIVE WAVE ENERGY CONVERTER REEF

1 - Project Idea and benefits

It is proposed to amend the maintenance of coastal protection through barriers inshore indifferent buoyant turbines that produce energy and at the same time break marine currents coming toward the shorelines subject to erosion by protecting them, you will get the following benefits:

Conversion of periodic maintenance costs for nourishment and cliffs emerging in defense of the beaches in defensive investments related structural turbine for the production of renewable energy for at least 1 MWh per year and kilometer inshore in the Tyrrhenian Sea.

Efficiency and service life far greater than those wind turbines as proposed, being indifferent weight in water, are more sensitive to weak currents.

Elimination of CO₂ production and accumulation of sand on the shoreline to stem the rise in sea level in place and expected (IPCC) exceed one meter within the next few decades if we do not intervene decisively in the reduction of energy production from fossil fuels, especially charcoal.

Re-launching of prevention to protect the environment containing the high cost to repair the damage in global emergency, urgent being the containment of "Climate Change".

The turbines are located in the area inshore little affected by the storms as they fall after the end where the energy is transformed into stationary offshore currents on the shallow-water; in any case, the supporting rod is designed to withstand such events as an ear of corn or dolphins.

Rooting with the seagrass ecosystem restoration with the development of poseidonia and the restocking of fish along the coastal areas protected by artificial barriers proposals similar to coral reefs or breakwater "soft" rather than "hard" as the cliffs emerging desertification seabed especially during storms and trigger collateral damage.

Elimination of withdrawals of sand on the seabed off with pumping for artificial beach nourishment.

Elimination of the cliffs emerging and reloads with boulders (spring improvement after storms) allows the upgrading of the landscape especially in tourist areas by blocking the algae to eutrophication; boulders can be recycled to make the weights for the barriers with the turbines.

The turbines also work in emergency in case of an earthquake as they are equivalent to simple oscillatory earthquake-proof, are in fact a mass at the top and therefore nothing being indifferent buoyant a period away from its zero resonance in the spectrum of the marine environment.

Availability of energy is further along the coast and in ports as well as piers along through the barriers to recreational boating in transit, with the development of modern systems of energy storage.

Security: permanent lighting is a deterrent barriers, the barrier protects bathers and archeological underwater sites.

Development of new jobs in the fields of electrical engineering, marine works, maintenance.

The European innovation patented proposal concerns the research and innovation on the efficiency of the turbines and breakwater for coastal stabilization, in order to employ them to convert and integrate maintenance to existing coastal defense type of submerged reefs and mattresses geocontentitori, whose effectiveness erosion control is the most proven experimentally.

2 – Brief description of the innovation technology

It is proposed to implement the new patented marine turbines which have the dual function of producing electricity and breakwater to protect "soft" coasts, if ordered "comb" type reef, with promising substantial economic benefits compared to the traditional protections .

The project research and innovation is focused on the first phase, 1 milion €, to verify through monitoring the effectiveness of full-scale turbines in respect of the production of electricity.

The program is divided into 4 experimental prototype of a buoyant rotors with various sizes of impellers fixed, to be placed on the seabed in a band near the coast where the sea surface currents induced by the transformation of offshore waves, have the maximum kinetic energy and at a sensitive period annually.

This band is investigated through bathymetric satellite winter species for survey the movable bar on the seabed inshore and in detail by means of a aluminum reinforced fiberglass and currentmeters to get to the end of wave breaking of the waves, so as to locate the turbines in the intermediate position winter bar-wave breaking.

The turbines are made, as in the attached project, from a vertical axis with impeller blades on a flat die cast fiberglass indifferent buoyant shaped trotola, so as to make it in neutral equilibrium in the water and rotating in the two directions under the minimum sea current; the impeller imparts motion to a dynamo out of the sea level and driven by a shaft coaxial with a steel pile dolphin founded on a plinth.

The system is controlled with an appropriate monitoring divided into a wavemeter and current meters, telewattmeters, dolphin-accelerometers to verify the cyclic fatigue especially during storm surges, ground control data collection and processing, maximum species at each event, with average monthly basis for two years.

The impeller is easily removable for periodic maintenance that must be particularly accurate for monitoring, with stocks of spare sensors and training of specialized personnel.

3 · Concrete Objectives

In case of a valid efficiency, also found after the first year of testing, the project will eventual completion of the first phase of the prototypes to increase the efficiency of the impellers and the choice of the most durable materials, then follow the second experimental phase of dissipation "soft" marine energy through a stretched "comb" of innovation turbines also used as breakwaters for coastal protection in erosion.

It provides a sufficient source of income to balance the cost of electricity (energy parity) and the containment of the costs of maintenance of species nourishment artificial boulders and cliffs in emerging markets, with significant savings in public spending and the disputes (spending review) .

It would remove the cliffs emerging in fact, even turning in of submerged, with stablization of severe erosion in the lateral portions of the cliffs, and the excessive erosion of the sandy bottom and eutrophication.

Coastal protection would be transformed into inshore barriers reported by headphone / lighted buoys, with the possibility to realize moorings for pleasure craft, helping recharge the batteries to avoid clogging of the ports in the summer.

It also promotes the recovery of the coastal landscape, control of coastal lights at night, protecting bathers from the boats, the rooting of seagrass with the balance of the ecosystem for fish reproduction.

They develop new jobs also favoring for retraining of personnel in the fields of activity: electro, sort of nautical and maritime works and maintenance (*Consortium in training*).

The enterprise would turn into a real international company with a consequent increase in sales and the acquisition of new domestic and foreign markets.
