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Floating photovoltaic systems a path to the energy-land-water sustainability in agriculture: the NRG ISLAND experience

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Abstract

Climate change is recognized as a great potential challenge to human society; the excessive use of fossil fuels is one of the main factor of environmental problems worldwide. All energy production and consumption has environmental impacts; the challenges of producing and using energy resources sustainably and protecting our natural environment represent an opportunity to pursue sustainable economic growth, and an effective path to climate change mitigation and adaptation.

Among sustainable renewable energy sources, photovoltaic systems assume an increasing relevance. In the last decade, many plants have been built, however, since they are mostly installed on the ground, the opportunity cost of land and environmental impacts are often high. To solve these problems floating photovoltaic (FPV) energy systems have been created. In the paper, overland and on water solar photovoltaic plants are briefly compared; applications of FPV systems in agriculture and aquaculture are addressed; finally, the NRG ISLAND patented system is illustrated.

The study confirms that FPV systems not only have higher efficiency in energy production, but also entail land conservation and water saving, due to a reduction of water evaporation, with positive impacts on the ecological system; such factors compensate higher investment cost.

In the next future, due to population growth and climate change in many regions, including the Mediterranean Basin, energy demand will increase, while land and water are expected to become scarce resources. The previous points highlight the great potential of the FPV technology to cope with sustainability issues and the agricultural sector could highly benefit from the adoption

Keywords: Renewable energy, Water Floating covers Agriculture, Climate change