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Proposal of a methodology for the design of offshore wind farms

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In fact, the wind power installed in the sea is still very scarce, with only 1,500 megawatts in operation in the middle of 2009. Although the first offshore wind farm experiment took place in 1990, the facilities built up to now have been mainly pilot projects. These previous statements confirm the incipient state of offshore wind power, Anyway, in this moment this technology is being strongly pushed, especially by the governments of some countries - like the United Kingdom, Germany, etc. – which is due above all to the general commitments made to reduce the emission of greenhouses gases. All of these factors lead to predict a promising future for offshore wind power.

Nevertheless, it has not been still established a general methodology for the design and the management of this kind of installations. This paper includes some of the results of a research project, which consists on the elaboration of a methodology to enable the optimization of the global process of the operations leading to the implantation of offshore wind facilities. The proposed methodology allows the planning of offshore wind projects according to an integral management policy, enabling not only technical and financial feasibility of the offshore wind project to be achieved, but also respect for the environment. For that, it has been necessary to take into account multiple factors, including the territory, the terrain, the physical-chemical properties of the contact area between the atmosphere and the ocean, the dynamics resulting in both as a consequence of the Earth's behaviour as a heat machine, external geodynamics, internal geodynamics, planetary dynamics, biokenosis, the legislative and financial framework, human activities, wind turbines, met masts, electric substations and lines, foundations, logistics and the project's financial profitability. For its validation, this methodology has been applied to different offshore wind farms in operation.