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Utilization of the Renewable Energy Resource at Sea - the Wave Energy Converter Wave Dragon

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Natural resources for energy production have been utilized for quite some time, with a lot of consequences arising from this action, e.g. acid rain, contamination of streams etc. On the other hand, production and society demands energy to be readily utilizable. During the last twenty years or so, renewable resources have become more and more utilized, e.g. wind energy, solar energy, and ocean energy, just to name a few. During the last fifteen years, the Danish wind turbine industry have been benefiting from this development. At the same time plans for larger off-shore wave energy converting structures have been known, but as this technology has not yet been developed to a commercial level, it has not yet become an important player in the energy market. This must be seen in the light of the potential worldwide wave energy contribution to energy production which has been estimated to be approx. 10 to 50 % of the world's electrical energy consumption.

From theoretical and experimental research, and in close cooperation between universities and industry, a number of on- and off-shore devices have been developed, and one of the most promising ones is named Wave Dragon, representing a wave energy converter of the overtopping type. Deployment of such devices, with dimensions varying according to the expected wave-climate at the deployment site, is most suitable at areas with a water depth of min. 25 m, in order to be able to take advantage of high energy ocean waves. The deployment of a 4 MW power production unit is scheduled to take place in 2007, resulting in a power production equaling approx. 6 GWh/y. With respect to consumption of electrical energy in Denmark in 2002, being at the order of approx. 35 TWh, almost 800 units would have to be deployed in the North Sea to cover the amount of consumption of electrical energy being covered by other renewable energy resources in Denmark today. It is clear that such plans probably would run into opposition by different organizations and stresses the importance of further research

on the topic. This motivates a comparison between the area usage pr. produced kWh/y for different renewable energy sources placed at sea. Furthermore, it means that, if wave energy is to play a large role in the future supply of renewable energy, research into increasing the efficiency of wave energy converters is needed in order to meet the future demands of sustainable energy production.