CAGE AQUACULTURE INTEGRATION WITH OFFSHORE WIND FARM: A CHALLENGE FOR EFFICIENT USE OF MARINE SITES

M Yigit[1*], Y Buyukates[2], and S Ergün[3]

[1*]Department of Fisheries Industry Engineering, Marine Science and Technology Faculty, Çanakkale Onsekiz Mart University, 17020 - Canakkale, Türkiye
[2]Department of Marine Sciences, Marine Science and Technology Faculty, Çanakkale Onsekiz Mart University, 17020 - Canakkale, Türkiye
[3]Department of Aquaculture, Marine Science and Technology Faculty, Çanakkale Onsekiz Mart University, 17020-Canakkale, Türkiye

[*]Corresponding author: muratyigit@comu.edu.tr

Abstract. The development of marine technologies has triggered the growth of cage aquaculture industry in offshore conditions. Due to strong winds on sea surface, especially in offshore locations, intensive studies on marine turbines are under way over the past decade with modest test production in several sites. Open sea cage farms and offshore wind power plants have the potential to perform production activities in similar marine conditions. The relative high installation costs might be reduced by the integration of cage aquaculture systems with offshore wind turbines. Also, the co-production of energy and food with innovative system designs may advantage in both investment costs as well as operational expenses. Further, the poles of wind turbines and the entire construction system remaining underwater may serve as a "fish aggregating device (FAD)", serving as a shelter for wild populations, that has also been evidenced earlier for offshore fish farm systems, providing a nutrient zone for wild species schooling around the cage nettings. Concerns regarding noise pollution generated by underwater drilling and piling sounds during the construction of wind turbines, as well as the vibration driven by the rotational motion of the turbine is still an open area for research and needs clarification. This study aims to evaluate synergetic advantages of integrating cage aquaculture with wind farm systems in offshore marine conditions, a challenge for efficient utilization of marine sites in turns of economic and environmental management.

Keywords: Co-production of energy and food; offshore marine management; offshore wind farm; open sea fish farm, renewable marine energy