A Study on Visual Impacts of Wind Turbine Arrays in Offshore Wind Farms

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Abstract. Although offshore wind energy is one of the promising renewable energy sources, there are some opponent opinions due to some reasons, including "disturbance of landscape." Such opinions should not be ignored for public facilities. However, landscape is a value that cannot be quantified easily. Array patterns of wind turbines are determined due to terrains, wind conditions, avoidance of wake, etc., not because of the landscape. The authors apply a method called "induction field of vision" to wind turbine arrays to extract numerical features of the shape. Correlation of the numerical features and the observer's preferences were calculated. The preliminary results showed that the regular pattern has a weaker impression than the irregular pattern, and more preferred to. Although the tendency itself is natural, the important fact is that the reason of preference can be explained numerically. This paper investigates the observer's preferences more precisely by the photos combining practical landscapes with virtual wind turbine arrays using Virtual Reality. Through this effort, the study clarifies which array patterns can ease disturbance of landscape. Since there are many offshore wind farm projects following the approved three projects, the obtained information will be useful in considering the acceptable array designs of the next offshore wind farms, which have less impacts on landscape and are symbiotic with local communities.

Keywords. Offshore wind, wind turbine array, induction field, observer's preference, landscape disturbance

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