Comparing offshore and onshore wind development considering acceptance costs - DTU Orbit (17/11/2018)

Comparing offshore and onshore wind development considering acceptance costs

Cost efficient deployment of wind energy is in focus for reaching ambitious targets for renewable energy and transforming the energy supply to one based on renewables. However, as more wind is being deployed the available sites onshore become less attractive in terms of wind conditions and capacity factor and more resistance from population groups affected in the deployment areas results in a reduction of areas that can be developed. We consider three different methods for estimating acceptance costs, one based on compensation and property purchase costs, one based on property value loss near wind turbines, and one based on willingness to pay calculated from a stated preference study. Utilising these methods, we provide an estimation of Levelised Cost of Energy (LCOE) for an expansion of 12GW onshore or offshore wind capacity in Denmark. We find that the three methods provide similar estimates for local acceptance, but that a high range of uncertainty exists in the upper bound of acceptance costs. Onshore does not have a clear-cut cost advantage over offshore when considering substantial amounts of wind capacity expansion and using high estimates for nation-wide acceptance costs. Moderate onshore wind expansion considering only local acceptance has a cost advantage.

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