

Spatial impacts of technological innovations on the levelized cost of energy for offshore wind power plants in the United States

Recent studies predict significant decreases in the future [levelized cost of energy](#) (LCOE) of [offshore wind energy](#), much of which is attributed to anticipated cost reductions from technological innovation. This study evaluates the spatial variability of LCOE caused by technology-induced decreases in a range of capital, operational, and financial cost categories. A spatial cost model of fixed-bottom and floating offshore wind plants is used to model the impact across thousands of potential United States sites. A specified change in an individual turbine subsystem cost produces a range of LCOE outcomes due to the varying geospatial characteristics of the considered sites and the nonlinear, interactive dependency on these input parameters; for example, a 10.8% improvement in net capacity factor can reduce LCOE by between 6% and 20% at different sites. This work expands upon the existing offshore wind literature, which typically evaluates cost sensitivities at a single site and does not consider the spatial variance in LCOE. The results suggest that the impact of technological innovations can be considerable and should be considered on a spatial as well as temporal basis when prioritizing technology innovation research or funding decisions to advance offshore wind technologies in the United States.

