Authors' additional response

The cost of the mooring designs was not included in the paper first version. However, allowing a larger displacement of the FOWT lead to a less stiff mooring designs. A less stiff catenary mooring design will have a smaller mass and hence the material costs of the mooring systems will decreases. This will lead to a decrease in levelized cost of energy (LCOE) of the floating wind farm. According to [1], the cost of the mooring lines can be split into two parts, the chain costs and the drag embedded anchor (DEA) costs as shown in equations 1, and 2 respectively. All mooring lines are assumed to have the same drag embedded anchor design. The minimum breaking load (MBL) is calculated using equation 5 from the paper, and L is the mooring line length. The cost in equations 1, and 2 is calculated in US dollars.

$$Chain_{cost} = (0.0591 \cdot MBL \cdot 10^{-3} - 87.6)L \quad (1)$$

$$DEA_{cost} = 10.198 \cdot MBL \cdot 10^{-3} \quad (2)$$

Using this equation the material cost of the baseline mooring system design is 38.5 million dollars for the entire wind farm, while the cost of the new customised mooring system designs is 30.7 million dollars. This means that the material costs of the new mooring system design is 20% less than the baseline mooring system design. The details of the customised and baseline mooring systems design parameters are shown in Table A1 and Table 2 in the paper respectively.

This shows that in addition to steering the wake and increasing the farm energy production, a more flexible mooring system design is cheaper and hence decreases the LCOE of the wind farm even further. If the editor and the reviewers would find this section relevant and informative, we will be happy to add it to the paper to emphasise the potential of considering a softer mooring system design to decrease the LCOE while designing the mooring system.

References

[1] Philipp Beiter, Walter Musial, Aaron Smith, Levi Kilcher, Rick Damiani, Michael Maness, Senu Sirnivas, Tyler Stehly, Vahan Gevorgian, Meghan Mooney, and George Scott. A Spatial-Economic Cost- Reduction Pathway Analysis for U.S. Offshore Wind Energy Development from 2015–2030. *National Renewable Energy Laboratory (NREL)*, (September):214, 2016.