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Interactive comment on "Grid-forming control strategies for blackstart by offshore wind farms" *by* Anubhav Jain et al.

Anonymous Referee #1

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This paper compares grid-forming strategies when used for blackstart by offshore wind turbines. The presentation of each control strategy is clear and the benchmark model to compare is suitable for the comparison. My main concern is about how dependant are the comparison results with the control parameters chosen by the authors. Also, the presentation of the general grid -forming scheme should be improved since this presentation is mixed with specific details of control strategies that are later explained again.

My specific comments are as follows: 1) In Section 3.1 the authors should clarify when PLL is used in the control scheme presented in Figure 1. At this moment, I understand that PLL is used during the grid-connected operation mode, but from the current explanation is not completely clear. 2) At the end of Section 3.1 (from sentence starting

in line 200) is it not clear if these alternative control structure would replace the secondary droops and power controllers shown in Figure 1 or just the secondary droops. 3) Some control schemes like power synchronization or emulation of swing equation are explained twice in Sections 3.1 and 3.2. Even in Section 3.2 they are presented as a general review and later with all details. To improve clarity of presentation I would present Figure 1 with general details about the function of each block. Then later, in Section 3.2 for each subsection I would introduce the fours control systems with both their general operation and the details of the control blocks. 4) How did the authors choose the control parameters to ensure that all control structures are compared under the same conditions? Could DPC and PSC tunning be changed to improve performance? 5) It is clear that frequency shows much clear differences among the control strategies. However, the general differences in terms of all magnitudes (P, Q, f and V) must be explained at the beginning and later explain more in detail the differences in terms of frequencies.

My comments about format are as follows: 6) The authors extensively use words in italic format. I would not use italic format in the paper unless there is an important reason. 7) Section 2.3 does not have title. 8) In Figure 2: - In some control schemes it is not completely clear how dq components are merged or split. - In VSG, it is not clear if the virtual impedance Zv is applied to d, q or both components. - d and q are very small in all subfigures. 9) Please indicate T1 and T2 in Figure 3.

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