Project Proposal of

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Topic: **Simulation and Reduction of Inrush Currents During Energization or Re-energization of Transformers using MATLAB**

The aim of this project would be to simulate a transformer using MATLAB. The transformer would connect two simulated grids. On the one side would be a PMSG offshore wind turbine (ideal voltage source), on the other a simulated grid load. Using simple switching events, we want to generate an inrush current into the grid. We would document and analyze the generated inrush current, based on the chosen transformer parameters. We would start by simulating a one phase transformer. If time and complexity permit it, we could upgrade it to a three-phase transformer.

When Time permits it, we would use the pre-fluxing method (https://ieeexplore.ieee.org/abstract/document/6104209) to reduce the inrush current in a single-phase transformer, or one or more of the below mentioned methods to reduce inrush currents, in the event we are simulating a three-phase transformer.

Methods for reducing inrush currents in three-phase transformers:

- Phase energization: https://ieeexplore.ieee.org/abstract/document/1413337
- Controlled Switching: https://www.sciencedirect.com/science/article/pii/S037877961630503X
- Per-Phase Method
- Cross-Blocking Method
- Percent Average Blocking Method
- Harmonic sharing Method https://ieeexplore.ieee.org/abstract/document/6494595

Project Timeline

08.01.2024-28.01.2024	Network building/Simulator Adjustment and testing
End of January	Preliminary Presentation
22.01.2024-04.02.2024	Network Simulation and results analysis
Mid February	Final Presentation
05.02.2024-25.02.2024	Writing of Final Report

Note: The timeline is a rough draft subject to future set deadlines and the actual time it takes to complete each task.