

# Direct reuse of rare earth permanent magnets — Wind turbine generator case study

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A novel recycling strategy, direct reuse, for rare earth permanent magnets were investigated in this article. Direct reuse uses small, unit-cell (segmented) magnets to replace the normal solid pole configuration, which is not directly reusable due its unique shape and size. The unit-cell magnets are directly reusable due to their standard shape and size, and direct reuse effectively bypasses a number of the expensive and energy intensive processes of normal recycling. Based on a model of a 3 MW direct drive wind turbine generator, the finite element studies concluded that normal values of average output torque, torque ripple, and cogging torque are achievable with this segmentation technique. The influence of the thickness of the adhesive layer was analyzed, and a pole-shaping technique was applied to improve the torque characteristics. The simulation models were verified experimentally.

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