

## Thermal Assessment of Outer Rotor Direct Drive Gearless Small-Scale Wind Turbines

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**Abstract :** This paper investigates the thermal issue of permanent magnet synchronous generator which is frequently used in direct drive gearless small-scale wind turbine applications. Permanent magnet synchronous generator (PMSG) is designed with 2.5 kW continuous and 6 kW peak power. Then considering generator geometry, mechanical design of wind turbine is performed. Thermal analysis and optimization is carried out considering all wind turbine components to reach realistic results. These issue is extremely important in research and development(R&D) process for wind turbine applications.

**Keywords :** direct drive, gearless wind turbine, permanent magnet synchronous generator (PMSG), small-scale wind turbine, thermal management

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