



Contribution ID: 599

Type: **Poster Presentation of 1h45m**

Design and comparative analysis of MgB₂ and YBCO wire-based superconducting wind power generators

Thursday, 31 August 2017 13:45 (1h 45m)

Recently, MgB₂ wire and YBCO wire have been widely used in superconducting generators. However, they have differences in terms of material characteristics, product performance, price, and the relevant cryogenic cooling system, which have a great influence on the design of superconducting generators. Therefore, it is necessary to compare which wire is better for superconducting wind turbine design. This paper deals with design and comparative analysis of direct-driven type superconducting wind power generators according to MgB₂ and YBCO wires. The specifications of MgB₂ and YBCO wires are investigated, and the 3MW superconductor generators using MgB₂ and YBCO wires are designed based on the rated rotational speed of 14 rpm. The magnetic field distributions of the generator are analysed using a 3D finite element method program. The generator designs using MgB₂ and YBCO wire are compared focused on the size, weight, magnetic flux density, operation current value, and required length of the wire. As a result, the weight and volume of the generator using YBCO wire are lighter and smaller than the generator using MgB₂ wire, however, the required length of MgB₂ is shorter than the YBCO wire. When the weight, the volume and the length are considered together, the generator design using the MgB₂ wire is more attractive than the YBCO. This result will be useful for designing a superconducting wind turbine and selecting an appropriate wire.

Submitters Country

Republic of Korea

Primary authors: NAM, Gi-Dong (Changwon National University); GO, Byeong-Soo (Changwon National University); Ms SUNG, Hae-Jin (Changwon National University); PARK, Minwon (Changwon National University); Prof. YU, In-Keun (Changwon National University)

Co-author: Prof. SHIN, Hyun-Kyung (University of Ulsan)

Presenter: NAM, Gi-Dong (Changwon National University)

Session Classification: Thu-Af-Po4.06

Track Classification: E3 - Wind, Wave, and Tidal Generators