

## High Speed PM Machines for Renewable Energy and Smart Grid Applications

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**Abstract:** In this lecture, applications of high-speed electrical machines in the area of smart grid will be briefly introduced. Common topologies of such high-speed machines will be reviewed. Design considerations, especially those for permanent magnet (PM) ac machines, will be presented, including the reduction of electromagnetic losses, thermal analysis and design, rotor stress, and rotor dynamics. This tutorial aims to describe the fundamental technical problems in high speed PM ac machines, and help the attendees better understand the analysis and design of the high speed PM machines.