

Maximum wind power generation in a power system imposed by system inertia and primary reserve requirements

F. Fernández-Bernal, I. Egido, E. Lobato

Abstract— Although the technology to simulate inertia or to provide primary control in wind power generators is mature, most of them are a source of power with neither inertia nor primary reserve provision mainly because it means wind spilling. Therefore, an increasing wind power penetration means a reduction in the inertia of the system and of the primary reserve due to the substitution of conventional generation. In this paper, the maximum wind power penetration focusing on system inertia and primary reserve value is assessed. The Spanish power system is used as an example for the calculation of these values. For this purpose, real Spanish scenario data are used. Results will show that high penetrations of wind power can be achieved without risking adequate values of primary reserve or inertia of the power system even if wind power does not contribute to these items.

Index Terms— wind power generation; wind power penetration; system inertia; primary reserve; ancillary services

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has an electronic subscription to Wind Energy, you can download the paper from the journal website:

[Access to the Journal website](#)

Citation:

Fernández-Bernal, F.; Egido, I.; Lobato, E.; "Maximum wind power generation in a power system imposed by system inertia and primary reserve requirements", Wind Energy, vol.18, no.8, pp.1501-1514. August, 2015.