World Academy of Science, Engineering and Technology
International Journal of Electrical and Computer Engineering
Vol:11, No:06, 2017

Techno-Economic Analysis of Motor-Generator Pair System and Virtual Synchronous Generator for Providing Inertia of Power System

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Abstract : With the increasing of the penetration of renewable energy in power system, the whole inertia of the power system is declining, which will endanger the frequency stability of the power system. In order to enhance the inertia, virtual synchronous generator (VSG) has been proposed. In addition, the motor-generator pair (MGP) system is proposed to enhance grid inertia. Both of them need additional equipment to provide instantaneous energy, so the economic problem should be considered. In this paper, the basic working principle of MGP system and VSG are introduced firstly. Then, the technical characteristics and economic investment of MGP/VSG are compared by calculation and simulation. The results show that the MGP system can provide same inertia with less cost than VSG.

Keywords : high renewable energy penetration, inertia of power system, motor-generator pair (MGP) system, virtual synchronous generator (VSG), techno-economic analysis
Conference Title : ICEMS 2017 : International Conference on Electrical Machines and Systems
Conference Location : San Francisco, United States
Conference Dates : June 07-08, 2017