

Proceedings of

POWER-GEN Europe, June 4-6, 2013, Vienna, Austria

Power balancing in the grid – a dynamic approach with a pumped storage unit

Johann Hell, Markus Egretzberger, Alois Lechner, Yves Vaillant

Abstract

Balancing of electrical power production and consumption is necessary for stable grid operation. Especially renewable sources with volatile energy production are in need of a corresponding compensation, the higher the penetration with volatile sources, the more compensating sources are required. This can be done by installation of either additional generating units or energy storages systems. Depending on costs of energy, the strategy differs from case to case. US and Russia have natural gas resources, which lead to gas turbine power compensations. In Central Europe Pumped Storage applications are preferred to balance consumption and production of electrical energy.

Progress in Power Electronics Technology is leading to new solutions allowing short response times and additional features for grid stabilization, with the focus on high flexibility and on high efficiency. Thereby this presented Pumped Storage concept provides excellent ancillary services capability.

The presented paper is dealing with a pumped storage application using power electronic conversion between a generating unit and the grid. The impact to the hydraulic system and to the grid during transients and transitions is shown.