

Requirements for peakers in volatile, renewable dominated grids

Dr. Thorsten Krol, Siemens AG

Abstract

The increasing share of renewable power generation dominated by wind and photovoltaics creates challenges for the grid operators to keep the power system stable and to ensure a high quality of power. If renewable power is not available in excess to the demand paired with sufficient storage capacity, the remaining fossil power equipment must take over more and more balancing task to keep frequency and voltage stable. Based on these requirements the power equipment must provide a high operational flexibility in combination with low emissions and over the entire power range.

Gas turbines paired with fossil generators achieve these requirements in a perfect manner. They do not just deliver the power whenever required with the load change rates necessary to stabilize the frequency but especially their generators are also capable to compensate the increasing demand of re-active power and short circuit power combined with mechanical inertia. Depending on the design of the equipment it is also possible to operate the gas turbine combined with the generators in case active power is required but also the generator separate to provide the grid services during times of full coverage of demand by renewables.

Especially considering the changed requirements from the European Commission, different solutions should be introduced and compared to other solutions considering all time scales of the ancillary services.