Wind energy in the electric power system

The ongoing increase in renewable power generation causes a parallel overall decrease in conventional power generation from, in particular, fossil and nuclear power plants. Apart from providing market-based active power schedules, these power plants are crucial for offering ancillary services in order to guarantee a reliable stable power supply at any instant in time. Substituting these plants with renewable generation units requires the latter to be capable of providing these ancillary services. The state of the art is that grid codes are used to define the way wind turbines and wind farms have to behave when connected to the power system. In this way, they already incorporate basic ancillary services. However, frequency control is normally not provided as a regular reserve, because this would require reserving parts of the available wind capacity as stand-by capacity. Within R&D institutes, such control options were demonstrated and assessed for wind power plant clusters.