

Advanced Concept for Participation of Large Wind Farms in Ancillary Services

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Abstract. The use of renewable energies is steadily growing. Wind energy is the main installed type of renewable energy in Germany. Wind power plants are concentrated in large wind farms. These wind farms are connected to high voltage grids. Despite the high level of installed wind power, wind farms have not contributed to voltage and frequency control (primary, secondary and tertiary control) until now. Wind farm owners receive a fixed payment from the transmission system operator for the energy they generate. This payment is much higher than the average variable costs of conventional power plants. This study shows that modern wind power plants and farms can also support voltage and frequency control. Wind farm owners receive more income through participating in frequency control than from the fixed payment for energy generated. This extra income can help to reduce the fixed payment for energy generated by wind farms.