

## **0 Abstract**

Wind-power is characterised by output levels which are weather-dependent and not demand-dependent. In Northern Germany, wind-power production already satisfies the demand for electrical power because of the low demand and the large amount of wind. It is clear that the forecast increase in wind-power capacity in Germany from today's approx. 15,000 MW to provide an additional approx. 2,500 MW, and in the long term an additional approx. 25,000 MW based on offshore wind-power generation, cannot be realised on the basis of the existing grid and power plant infrastructure.

Compressed air energy storage (CAES) power plants can store excess power generated in times of high winds and low demand, ready for delayed power generation at times of higher demand – they are analogous here to pumped hydropower plants. CAES can also generate and store balance power to balance out deviations between forecast and actual wind energy production. In addition, CAES plants can also make reserve power available for a limited period of time on windless days. In both cases, a CAES has low fuel consumption and hence low CO<sub>2</sub> emissions, can improve the loading patterns on existing grids, and even cut the need for additional grid capacities.