0 Summary

Climate change, declining reserves of fossil fuels, and rising energy prices, are giving rise in countries like Germany and the United Kingdom to a rapid increase in investment in renewable energies – especially wind and solar power, and biofuel.

Wind power will dominate future power production. With a predicted share of over 15% in total power production in Germany in a few years time, wind power will require the development of additional energy storages at a grid scale; the aim is to compensate for short-term deviations in production forecasts at a scale of minutes and hours. The first part of this paper therefore concentrates on a new development: *adiabatic* Compressed Air Energy Storage (CAES) plants, which also store the compression heat of the compressed air and, thus, allow for a much higher efficiency comparable to that of pumped hydro plants. In Germany, two CAES projects are currently under development.

Because of their low energy density however, CAES plants will only be capable of balancing out power discrepancies over periods of hours, up to a few days at most. The second part of this paper therefore looks at the principles and current state of the art for the storage of hydrogen in salt caverns – the only option capable of providing balance power for much longer periods of time.