The Plant
The Cogeneration plant Nossener Brücke is operated by DREWAG, the local utility company for the city of Dresden in Germany. With an output of 1,700 gigawatt hours per year, this combined heat and power plant provides up to 80% of the district heat supply to the city. The plant comprises three SGT-5-1000 (V64.3) Siemens gas turbines with downstream heat recovery steam generators. The plant is in operation year-round and regular plant outages are not scheduled.

In general, the heat requirements of the customers in the heat network essentially determine the operating mode of the plant. In addition, the capabilities of optimized operation that are offered by the use of a thermal storage module are also employed.

The Task
The objective is to equip the plant for the marketing of system services so that both primary and secondary frequency response could be marketed in future.

Additional restrictions result from the gas load management plan for the avoidance of gas purchase peaks. The stress on the gas turbines shall also be kept at a low level. In addition, a low-stress control concept for district heat balancing had to be elaborated and implemented.

The Solution
Adjusting the steam turbine inlet valve is a proven method in coal-fired power plants and has been applied in a combined-cycle power plant for the first time in this project. This concept involves using the main steam system as a steam storage module which the steam turbine can use to implement fast load changes. In this case, the gas turbines are only operated slowly and with low plant stressing as a consequence. Siemens implemented a coordinated unit control which matches the output of the gas turbines with the steam turbine. Up to now, gas turbines have controlled the output while the steam turbine operated either with the valves wide open or in inlet pressure mode.
The new coordinated unit control has proven successful in practice, permitting a dynamic operating mode which can be adjusted in line with the requirements but which is nevertheless stable and incurs low stresses. The implemented capabilities and the increase in flexibility have future-proofed the plant and enabled it to adapt better to changing market conditions.

Axel Pechstein, Power Plant Manager, DREWAG - Stadtwerke Dresden GmbH

The Results

- Increased plant efficiency
- Flexible adaptation to the regulations of the power market
- Increased flexibility for a future-proof plant