

Retrofit brings top efficiency for German CHP plant

By replacing aging steam pressure reducing valves and upgrading actuators to state-of-the-art models, N-ERGIE will realise efficiency improvements at its combined heat and power plant in Sandreuth, Germany.

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N-ERGIE, the operator of a combined heat and power (CHP) plant in Sandreuth, Nuremberg, Germany, is in the process of replacing aging steam pressure reducing valves that have become worn. The original valves were supplied by German valve manufacturer Welland & Tuxhorn (W&T) at the bypass station for pressure minimisation and flow control. The same vendor is now providing its latest generation RVG steam reduction valves as replacements. As well as replacing the valves, N-ERGIE is also updating their actuators to state-of-the-art models.

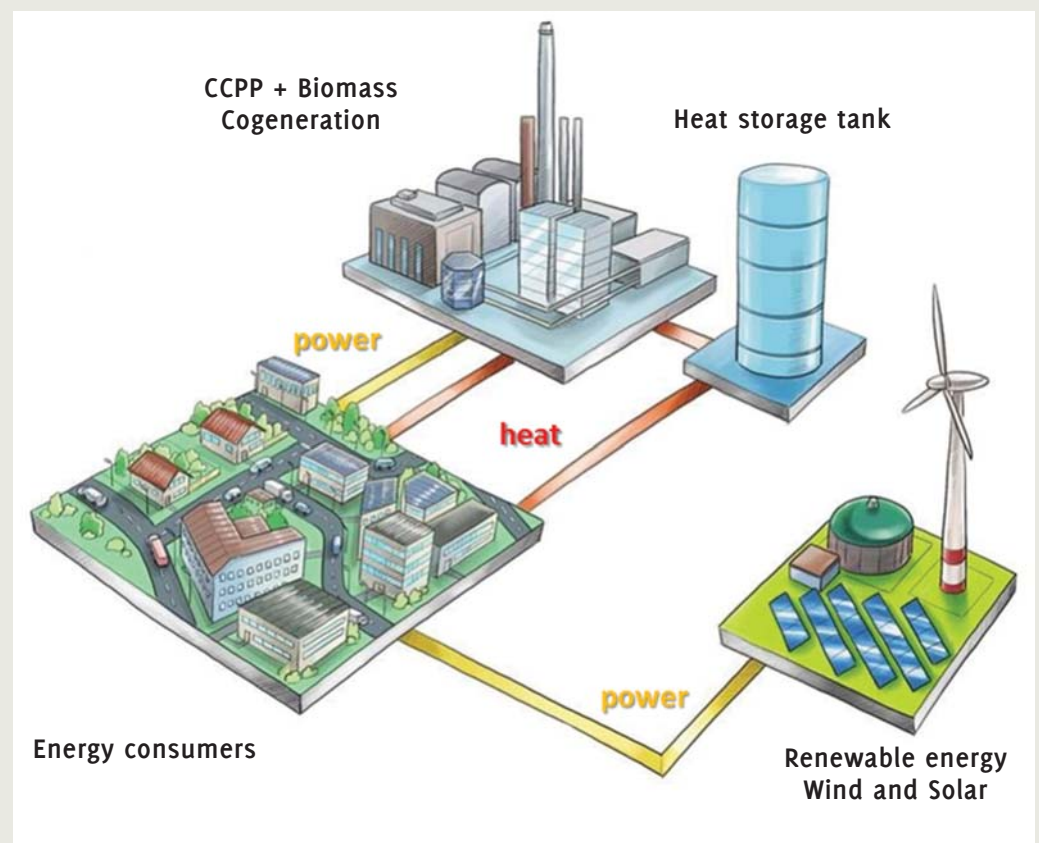
The Sandreuth site houses two plants: a modern natural gas fuelled combined-cycle power plant and a dedicated CHP plant burning biomass. Together, the two plants supply approximately 85 percent of Nuremberg's district heating requirement. A hot water tank on the site with a total volume of 33,000 cubic metres acts as a thermal buffer for the district heating network, allowing power and heat to be generated at different times. This considerably increases the flexibility of the CHP plant while making best

use of solar and wind-generated electricity on the grid.

When demand for electric power is high, such as on hazy days with little wind, the Sandreuth plants run at high capacity and the spare heat is stored in the hot water tank. On sunny or windy days when there is plenty of renewable electricity on the grid, power production is scaled down or halted altogether, and the hot water tank supplies the district heating system. Demands for more flexibility in the energy sector, and the need to compensate for rapid fluctuations in solar and wind generation, make it important to maximise the responsiveness of existing power plants. Modern combined-cycle gas turbine (CCGT) plants feature fast startup that is valuable in this respect.

Increased flexibility

Retrofitting valves and actuators can also contribute to quicker system startup and increased operating flexibility, while boosting the plant's thermal efficiency thanks to improved controlla-



Utmost flexibility and responsiveness are prime requirements for Nuremberg's CHP plant to compensate for rapid fluctuations in solar and wind generation (copyright: N-ERGIE).

POWER GENERATION

bility at both low and high loads. N-ERGIE expects the new steam valves to bring economic benefits that include:

- improved control characteristics across the complete valve travel
- more accurate control
- increased efficiency in the water and steam cycle
- reduced emissions in terms of noise, exhaust gas and heat loss
- lower operating costs
- increased availability.

Replacing the valves alone is not enough, however: to gain all the advantages listed above, it is also necessary to replace the actuators with modern designs that can meet the more stringent demands set by the need for rapid response. The actuators must also be chosen with a view to future upgrades to the plants' distributed control systems (DCSs) and other process automation technology

N-ERGIE awarded the order for the new actuators to SIPOS AKTORIK GmbH, a member of the AUMA Group. Thanks to their virtually backlash-free gear units and integral frequency converters controlled by intelligent software, the SIPOS SEVEN actuators



SIPOS SEVEN actuators ensure precise control of steam pressure reduction valves by Welland & Tuxhorn at the Sandreuth CHP plant.



SIPOS SEVEN actuators feature an easy-to-use drive controller, a high-resolution TFT colour display and an external USB interface.

satisfy N-ERGIE's stringent requirements for performance. They are sized for a large number of starts and premium precision with regard to control accuracy. To fulfil these demanding requirements, excellent matching between the components of the control valve and the actuator is an absolute must, as are effective communications between the actuators and the DCS. Operating as a seamless unit, the control system, actuators and valves together increase the performance of the power plant, improve efficiency and ensure safe operation.

SIPOS SEVEN actuators excel not only in their precision control accuracy but also in terms of ease of use. Featuring a drive controller and a high-resolution TFT colour display, SEVEN actuators offer a simple and intuitive interface for commissioning, parameterisation and diagnostics. The customer also benefits from an integral Bluetooth interface as standard, and an external USB port for straightforward communication and data exchange.

Besides the steam pressure reduction valves featured in this project, thermal power plants also rely on many more valves within the water-steam cycle that are of utmost importance for smooth and efficient plant operation. N-ERGIE is now considering further valve and actuator upgrades to further improve the plant's efficiency, economics and availability.