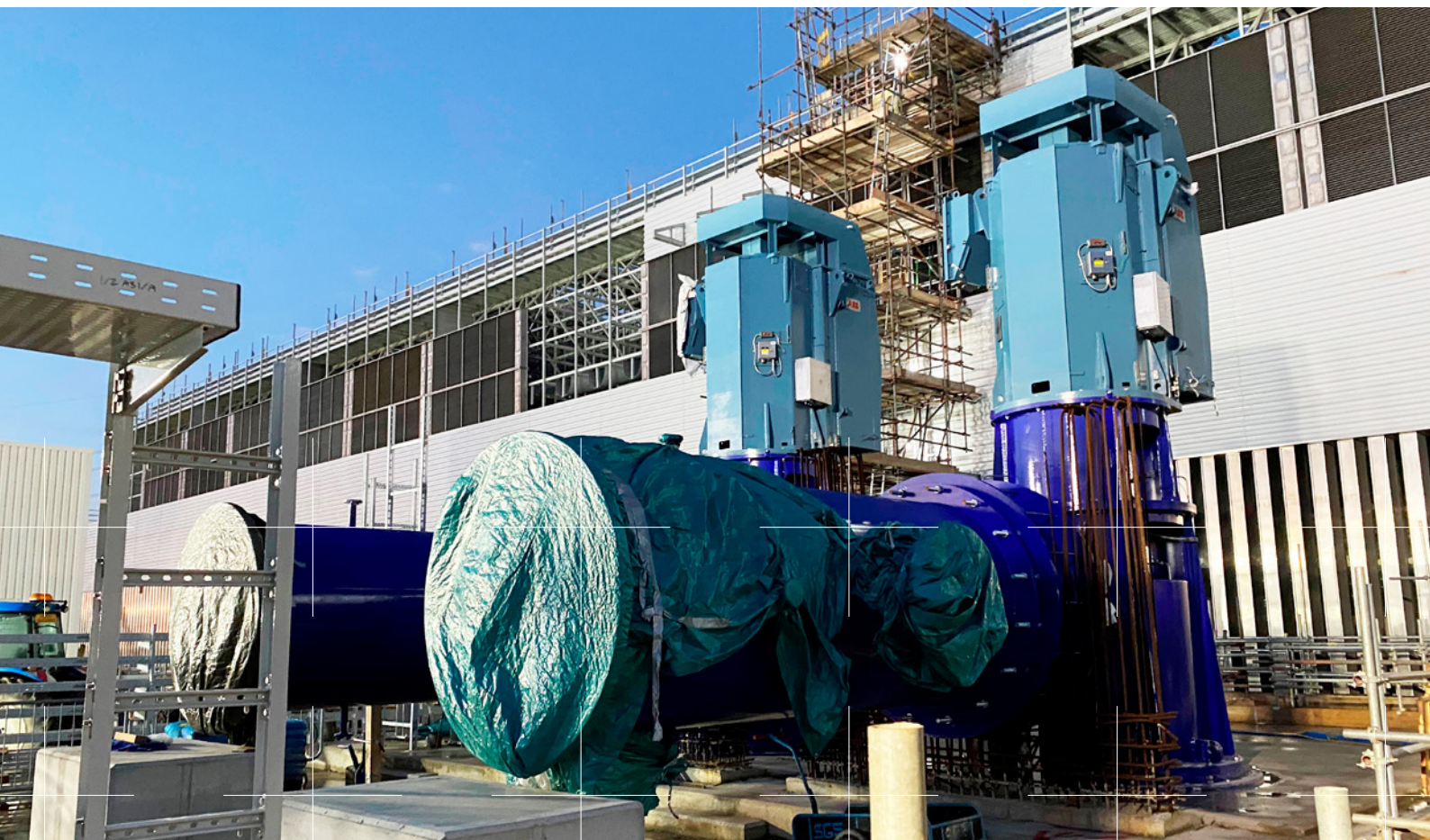


## The perfect combination

Sulzer supplies first-in-class pump technology to Keadby 2 combined cycle gas turbine power plant. Built by SSE in collaboration with Siemens, the 840 MW Keadby 2 power station in Lincolnshire, UK, is one of the most advanced gas-fired power plants in the world. Scheduled to commence operation in 2022, the facility will be the first commercial deployment of the 50 Hz version of Siemens' SGT-9000HL gas turbine. In a fast-changing energy market, the new plant has been designed to offer class-leading efficiency, flexibility, and reliability with Sulzer's innovative pump technology playing a key role.



“Thanks to their advanced hydraulic and mechanical design, our pumps will operate at an efficiency of more than 81%, requiring a rated power of only 5.1 MW to achieve suction and discharge flows of 860 m<sup>3</sup>/hour and 730 m<sup>3</sup>/hour respectively at a head of 2'200 m.”

Patrick Welz, Head of Tendering EMEA for Sulzer

---



Site installation of Sulzer feedwater pump



Bareshaft pump of Sulzer SJT CWP pump

To achieve its overall efficiency target of 63%, Keadby 2 is using a 1-on-1 design, with a single gas turbine linked to a single steam turbine. The equipment and all critical ancillary components must be able to offer extremely high efficiency levels across a wide range of loads. When it came to the major pumping applications, the Keadby team turned to Sulzer for the most advanced technology available.

The plant will use two of Sulzer's state-of-the-art feedwater pumps, MD200-400, which have been upgraded in close collaboration with leading gas turbine manufacturers, including Siemens, specifically to meet the requirements of the new generation of H-class turbines. The pumps are set up in a 2x100% configuration, with one duty unit and the other on standby.

### Everything in balance

---

One key feature of the Sulzer pump is its hydraulic thrust balancing system, which includes a balance drum and thrust bearing that have been developed for a long life under extreme operating conditions. Combined with bearings and a lubrication system that have both been optimized for the application, this greatly improves the ability of the pump to manage overrun situations where it may be required to operate outside its normal performance envelope.

The balance drum and bearing arrangement also help the feedwater pumps to achieve class-leading reliability and availability, with a longer service life and less requirement for maintenance than alternative designs. That is an especially important attribute for the Keadby 2 project, which will feature the first HL-class turbine in Europe to be operated under a 15-year long-term service contract.



## Matching performance

In addition to the class-leading boiler feed pumps, Sulzer was also selected to deliver condensate extraction pumps and cooling water pumps as part of the same project. Sulzer's expertise in pump design and its ability to engineer every pump to exactly match the specific application within a short timeframe meant the new pumps could be manufactured and delivered quickly.

The condensate extraction pumps came from the SJD-CEP series of vertical pumps and offer low net positive suction head (NPSH) as well as high head per stage and excellent efficiency figures. Specifically designed for this application, the Sulzer pumps are designed for extended, maintenance-free operation and have been installed in many power generation plants.

The cooling water pumps were selected from Sulzer's SJT/SJM-CWP range, which as a fabricated pump offers much lower weight and higher efficiency compared to equivalent cast iron designs. These pumps can be quickly manufactured to meet the performance requirements of the cooling system and also deliver high efficiency figures and decades of reliable service.



## Thermal stability

CCGT power stations, such as Keadby 2, are used to respond to peaks in demand or fill supply gaps when output from renewable sources is reduced. That requirement leads to significant cycling and the resulting rapid changes in load and temperature present additional challenges for the equipment.

With this in mind, the Sulzer design team paid particular attention to the thermal stability of the MD200-400, with the mass distribution in the suction and discharge casings optimized for thermal behavior as well as castability. The pump's stage casing is investment cast for improved thermal performance, and the tensioners that hold the casing together use a Sulzer patented design that provides additional security under cyclic operating conditions.

Patrick Welz concludes: "In addition to the main feedwater pumps, Sulzer has also supplied several other large pumps to the Keadby 2 project. They include a pair of SJD-CEP pumps for condensate extraction and two SJT/SJM-CWP cooling water pumps, all of which use our state-of-the-art designs, offering high efficiency across their full operating range. Together, Sulzer has made a very significant contribution to the overall efficiency of the new power station."

[SJD-CEP pump  
ready to delivery  
from Sulzer  
workshop](#)

**For any inquiries please contact**

[power@sulzer.com](mailto:power@sulzer.com)

[sulzer.com](https://www.sulzer.com)

A10511 en 5.2022, Copyright © Sulzer Ltd 2022

This case study is a general product presentation. It does not provide a warranty or guarantee of any kind. Please contact us for a description of the warranties and guarantees offered with our products. Directions for use and safety will be given separately. All information herein is subject to change without notice.