



Saltend Power Station Case Study

Triton Power turned to Novotek Solutions to upgrade their monitoring and control systems at the Saltend Power Station with minimal downtime.

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Background

Supplying power to the UK grid and the nearby Saltend Chemicals Park, Saltend power station is crucial to local and national infrastructure. Commissioned in 2000, the Combined Cycle Gas Turbine (CCGT) power station outputs 1200 MW of electricity and 240 tonnes of steam per hour. A critical failure would cause a cascading set of adverse outcomes, including lost revenue and unscheduled engineering.

Since the station's commissioning, Triton Power and on-site contractor Mitsubishi Hitachi Power Systems Europe (MHPSE) had not implemented significant upgrades to their control or monitoring systems. The obsolete GE FIX32 SCADA software and proprietary communications drivers in use presented several red flags for cyber-security, usability, and the longevity of their systems. As the software vendor

no longer supported these products, and the hardware they were running was also obsolete, the owners identified a high risk of critical system failure.

An upgrade solution was required to minimise downtime and address the concerns.

In 2015, Triton Power approached Novotek Solutions due to their depth of knowledge, experience, and previous success in providing modern, future-proof platforms.

A preliminary feasibility study identified and defined the optimal system architecture, conducted between Novotek, Triton Power, and MHPSE.

Due to the complexity and criticality of the power station, this study carefully assessed the viability of an upgrade, outlining any issues, gaps, or challenges to address in the future commissioning process.

In addition, collaboration with Triton Power was also essential as the solution had to meet their stringent IT compliance rules. Novotek collaborated closely with the power company to provide hardware and servers built to the required standards.

As a result of the feasibility study, Novotek decided that consolidating the plant's disparate Distributed Control System (DCS) and Turbine Control System (TCS) into a central virtualised environment would offer increased redundancy and failover capability for maximum uptime. Coupled with modern system architecture and the latest operating systems, the solution defined by Novotek would exceed the expected outcome of an upgrade and provide increased security against cyber-security threats such as viruses via a patch management partnership.

A simple transition was unworkable due to the age of the legacy system. The new system was required to be compatible with regular software updates to maintain security and optimal performance.

Novotek defined a solid roadmap for the future, one inclusive of both available patches and structured security updates.

Implementation

Saltend power station conducts regular maintenance outages of their three turbines, each on an offset 18-month schedule. The Novotek team took advantage of these rolling shutdown periods to commission the new system. Before this, however, was an extensive testing period to ensure continuity and minimal downtime during commissioning.

This testing consisted of running

both the modern and legacy systems side by side to confirm parity of functionality. With 20,000 data points tracked and over 700 monitoring and control screens, this was a critical undertaking and key to the successful migration.

In this undertaking, Novotek merged the two individual components of two systems into one, combining the Distributed Control System (DCS) and Turbine Control System (TCS) at the application level. In support of this new structure, the required server instances leveraged virtualisation through Hyper-V, which offered greater control and a considerable hardware cost-saving alongside supporting the hot failover capability.

Novotek carefully crafted the performance of this consolidated system to not only guarantee satisfactory functionality but to exceed operator expectations.

Effective Solutions

In bringing together two communications drivers, a proprietary Mitsubishi driver was replaced with a standard Modbus protocol, allowing for communication with the updated network gateways installed in collaboration with Novotek. In addition, off-the-shelf drivers provided by Matrikon replaced the outdated APACS solution. These changes removed the need for implementing variations to the existing TCS and DCS interfaces, allowing for a seamless transition for operating staff.

Through commissioning the system in this way, Novotek reduced Triton Power's annual software license costs and maintenance liabilities with simplified system architecture.

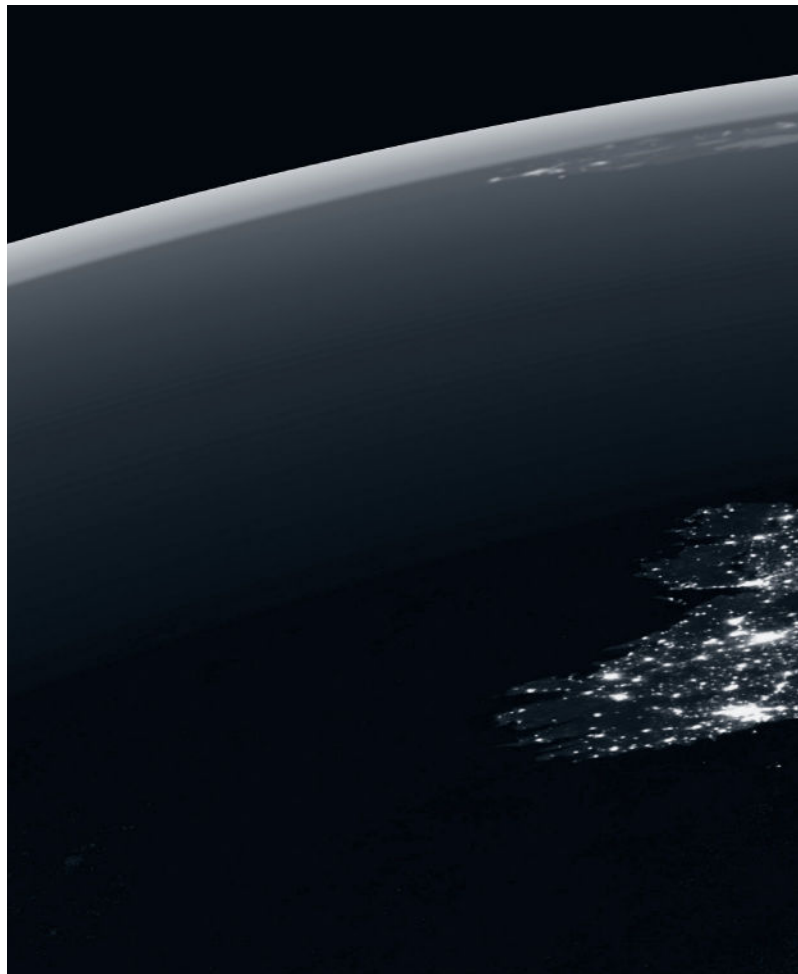


Collaboration with Novotek Solutions

With the shortfalls of the aging systems identified, Mitsubishi Hitachi Power Systems Europe was encouraged by Novotek's superior experience in completing legacy migrations. This collaboration was vital to the success of the system migration and was actively encouraged by Triton Power to secure the best outcome for the customer.

Many key hardware components had become obsolete in the two decades since the plant came online. Novotek worked with both MHPSE (and their parent company, MPS in Japan) to determine the required changes to support the integration of the migrated system with the proprietary control system network and associated network protocols following the migration.

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Outcome

With the new system fully commissioned, many improvements and efficiencies are now available to Triton Power. Patching is now part of a routine workflow with modern architecture, allowing continual improvement and SCADA development. This new firm footing means Triton power can perform ongoing maintenance of control systems in the same way as any of their other equipment - an effect amplified by the simplified, consolidated platform.

A new domain is now in place with unique user access to the control providing improved security and reporting. In addition, data acquisition and processing are streamlined, granting greater access for the trending and processing of vital information. Controls were further improved with alarm reporting, providing necessary details on when, why, and what led to a given issue. Previously, such data wasn't easily

retrievable or actionable by operators.

The route highlighted by Novotek allowed for the control system to be abstracted from the turbine hardware provided by Mitsubishi Power Systems, which presented a significant saving in time and cost against a replacement of the entire APACs.

Upon its conclusion, the project represented a framework for the potential modernisation of the entire Triton Power estate. Saltend power station is now in a strong position for the future, with modern control systems and a solid roadmap of continuous improvement strategies.





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