

# HIGH SPEED 1



## BACKGROUND

UK Power Networks Services was commissioned to design, construct, finance, operate and maintain the critical electrical infrastructure of High Speed 1 (HS1), the UK's first major new railway to be constructed for over a century and its first high-speed railway.

The project was delivered on time and on budget, within a contract that extends for 50 years after the start of railway operation.



## SCOPE

The £150 million HS1 rail project is located in South East England, linking St Pancras International in London to the Channel Tunnel in Folkestone, Kent. UK Power Networks Services role was to provide traction power to the 108km of track. The three feeder stations were strategically located for optimal supply availability, maintainability and efficiency, providing a total supply capacity equal to 280MVA.

Under the contract, UK Power Networks Services is required to maintain and operate the three feeder stations for 50 years, representing a significant investment.

- 25kV overhead power supply – a first in the UK on a High Speed line
- Power fed directly from National Grid, to increase reliability
- 3 traction supply feeder stations
- 20 auto transformer stations
- Static Volt Ampere Reactive Compensators (SVCs) specified for better voltage regulation

## CHALLENGES

High Speed 1 is one of the UK's largest ever civil engineering projects, encompassing many new bridges and high speed tunnels.

In addition to the traction supplies, UK Power Networks Services provided HV and LV distribution systems including seven 11kV networks with 30 HV/LV substations and over 100km of 11kV cabling. These provide the electrical power to international stations, signalling and communication, trackside lighting, pump rooms, points heating, tunnel ventilation and the Eurostar maintenance depot at Temple Mills.

## ACHIEVEMENTS

The design had to deliver reliable, cost-effective and efficient systems. HS1's original specification was for four independent traction power feeder stations. By re-designing the system and using SVCs, we were able to reduce the number of feeder stations from four to three, and the number of National Grid supply points from six to four whilst maintaining the required performance.

Thanks to this innovative design, increased reliability was built-in. The re-design also helped the project to proceed by lowering overall costs including construction, maintenance, land-purchase, planning, staffing and insurance.

By reducing the total assets required, savings are realised throughout the whole of the contract life-cycle. The result has been a considerable cost saving, without loss of performance or safety, covering the complete running life of HS1's traction power supply system.

## KEY STATS

<p><b>£150</b> million project</p>	<p><b>50</b> year maintenance and operation contract</p>	<p><b>108km track, 36 non-traction substations</b></p>
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## CONTACT

DAVID MITCHELL  
HEAD OF PROJECTS

ENQUIRIES@UKPOWERNETWORKS.CO.UK