

HS2 trials Clean Air Gas Engine technology to dramatically cut carbon on construction sites

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In its bid to cut carbon and focus on improving local air quality, HS2 is trialing new ultra-clean generator technology developed by a collaboration of three UK technology companies. By replacing diesel with LPG, the innovation is set to cut carbon, lower emissions, reduce noise and deliver major cost savings.

OakTec Power Ltd has collaborated with generator manufacturer Sutton Power Engineering and site welfare specialist Advanté to develop the low emission, off-grid, electricity generation solution into a welfare cabin specifically designed for the needs of HS2 construction and its maintenance contractors. It is a hybrid energy system which utilises battery energy storage with solar panels to boost charging.

The OakTec Clean Air Gas Engine (CAGE) project is funded by Innovate UK, with the three project partners supported by the UK government as part of the Clean Air Programme. The trial has just started on HS2's construction site near Euston station run by HS2's enabling works contractor Costain Skanska joint venture.

The system uses clean gas and biogas fuels as a replacement for the diesel machines that dominate the construction sector, with the aim of delivering breakthrough reductions of exhaust gas emissions and over

time moving to full carbon neutral capability.

When available, Calor will deliver their new BioLPG product to the project. This non-fossil fuel renewable energy, which enables continuous running with no downtime needed for refueling, significantly reduces the total carbon footprint compared to diesel systems and is currently cost competitive with red diesel. This creates the lowest CO₂ impact combined with a game-changing reduction in the total exhaust gas emissions achievable on this type of installation.

During the trial, exhaust emissions will be monitored by specialists from Imperial College London, with results expected to show massive improvements in air quality and welfare conditions for construction site workers, leading to positive public health and wider environmental benefits. The welfare cabin operates silently on stored energy and uses Advanté's EcoLogic curfew technology to limit noise during unwanted hours, further reducing any negative impact on the user and local community.

HS2's Director of Infrastructure Chris Rayner said: "HS2 is ramping up the introduction of brand new technologies to dramatically cut carbon during construction, as we work towards supporting the Government's 2050 carbon zero target. We are delighted to be trialing this innovative off-grid solution, which aligns with HS2's aim to introduce new technologies to reduce our carbon and environmental impacts across the whole project.

"As a project that is supporting the country's economic recovery, with thousands of supply chain contracts and jobs on offer, we are also proud to back pioneering British businesses that are breaking new ground in green technology and developing innovations that will be game-changing for the whole construction sector and beyond."

OakTec CEO Paul Andrews said: "This trial with HS2 is a fantastic opportunity for OakTec to showcase our first CAGE technology as a viable alternative to diesel, and represents a major milestone in the drive to improve air quality in off-grid construction sites across the UK. It offers cost-effective power with significant air quality improvement and NOx emission reductions. This is a great example of a collaboration of small agile UK companies collectively innovating to find world class solutions.

"The CAGE hybrid Advanté welfare system we have deployed on HS2's construction site near Euston is our first step in a series of really exciting innovations that will take us to full carbon neutrality using clean engines powered by biogas fuels and hydrogen."

OakTec have been conducting intensive research into efficient combustion of gas and biogas fuels since 2013. Now, for the first time, a biofuel capable hybrid system delivers greatly reduced levels of harmful emissions, in a cost-effective generation solution. The breakthrough gas engine generator manufactured by Sutton Power Engineering is integrated into a welfare cabin from the market leader in green technology in this sector, Advanté.

This is the first of a series of gas engine innovations and emission reduction technologies OakTec are developing for this sector with the next step being the launch of a higher output multi-cylinder engine developed with support from a major OEM.

After the HS2 trials, the product will move forward to the production phase with further roll-out planned for the project and the wider industry.

Advanté's R&D Director, Stan Chapman said: "Delivering the first CAGE hybrid Oasis welfare unit to the HS2 trial is a huge milestone for our team at Advanté. The evolution of our Oasis welfare range is driven by the changing needs of the construction industry and we are extremely pleased to be taking another step forward in supporting net-zero carbon targets.

"The addition of OakTec's CAGE generator and our new complete solar PV roof, takes our hybrid EcoLogic Solar welfare units to the next level in low carbon welfare provision."

Photo credit: HS2 Ltd

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