

The Midlands: powering the UK's clean energy revolution



HyPER Project



CASE STUDY

The HyPER Project is a novel hydrogen production technology which achieves substantial greenhouse gas reduction from a fossil fuel feedstock.

An international collaboration between Cranfield University, GTI, Helical Energy and Doosan Babcock, HyPER is a state-of-the-art 1.5MWth pilot plant built at Cranfield University to test and evaluate GTI's compact hydrogen generator technology.

GTI's technology uses the sorption-enhanced steam methane reforming process where natural gas and steam are converted into hydrogen and carbon dioxide. CO₂ is then captured and removed from the gas stream, leaving a stream of hydrogen that is almost pure. Meanwhile, the captured CO₂ is transported to a different reactor where the sorbent is heated, leading to a near-pure stream of CO₂ that can either be transported and stored or converted into a different product that is useful.

This differs to existing commercial hydrogen production processes which emit CO₂ throughout, as CO₂ capture is an integral part of the process and increases hydrogen production.

GTI's compact hydrogen generator technology is capable of achieving economic benefits, such as a 25% lower hydrogen cost, a 50% reduction in capital expenditures and similar reductions in operational expenditures. It can also deliver 97% CO₂ capture rates with equivalent levels of hydrogen purity, a 40% lower carbon footprint through improved efficiency, and a smaller physical footprint because of the integrated nature of the process. There is also scope to scale the technology up into the hundreds of megawatts.