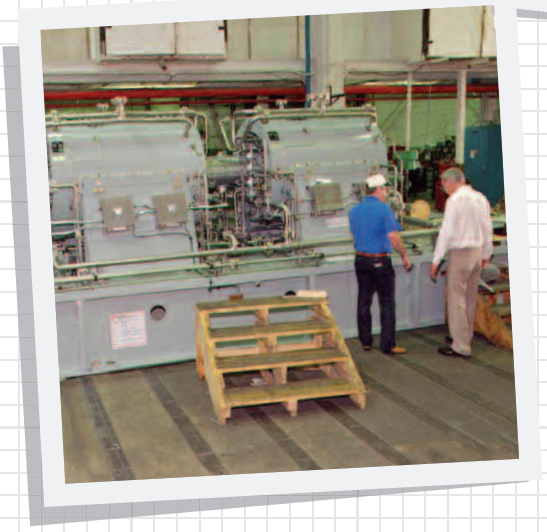
Technology Strategy Board
Driving Innovation

Innovation ideas

SPOTLIGHT ON A CURRENT PROJECT #007

Achieving cleaner energy by reducing CO_2 emissions



Capturing carbon dioxide (CO_2), which is released when power stations burn fossil fuels to make electricity, and storing it underground will help to reduce the scale of climate change. However, carbon capture and storage systems require power, which can be as much as 20% of a power station's output, which means even more CO_2 is produced. Therefore, to keep emissions as low as possible, all of the system's components, particularly the compressor, have to be as efficient as possible.

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The CO_2 Optimised Compression (COZOC) project is led by Rolls-Royce and aims to develop concept designs for low-power systems that will compress CO_2 to the required pressure for efficient pipeline transport and underground storage.

Project partner, E.ON Engineering, is providing technical expertise to ensure the advanced designs fulfil customer requirements and can be integrated successfully with existing and new power plants. The third partner, the University of Nottingham, is determining the properties of CO_2 and relevant mixtures. This world-first experimental work is crucial as, in certain conditions, CO_2 can act in a way that has significant implications on compressor and pipeline designs. The University is also conducting a comprehensive literature review of CO_2 compression technologies and the anticipated impact impurities will have on these, the corrosive properties of CO_2 mixtures and the potential material issues for the compressor.

Preliminary work has revealed that these innovative concepts could significantly reduce the power consumption of carbon capture and storage systems, saving power plant operators billions of pounds in avoided loss of revenue. Advanced compressor options would provide more choice, increase competition and potentially help to drive down capital costs.

In addition, the power-optimised compressors would reduce CO_2 emission by millions of tonnes, providing significant long-term environmental benefits.

The COZOC team is working to further develop its concepts, and undertaking cost modelling and market analysis studies for its promising advanced designs.

‘At a recent US Department of Energy workshop on CO_2 compression, it was clear that COZOC is leading the industry, tackling the right technical issues.’

Jonathan Bygrave, Chief Engineer, Industrial Compressors, Rolls-Royce

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Project number 100581

Duration 24 months – ends October 2010

Technology Strategy Board investment £255,000

EPSRC Investment £192,260

Total project cost £1m

Current project partners
E.ON Engineering
The University of Nottingham

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