



Coal mining releases large amounts of stored methane and other gases. These can now be captured and used to power operations. Bill Kopitz

Cooperation on capturing China's mine methane emissions

A new technology called VAMCAT (Ventilation Air Methane Catalytic Turbine) is poised to take a sizable bite out of global methane emissions by collecting and using waste gas from coal mines in China. It will result in a greenhouse reduction effect equivalent to more than 237 million tonnes of carbon dioxide annually.

Every year, the world's underground coal mines release greenhouse-potent methane to the atmosphere through their exhaust ventilation air. Over a 100-year timeframe, methane is 23 times more potent than carbon dioxide as a greenhouse gas. Approximately 70 per cent of all coal-mining related greenhouse gas emissions can be attributed to methane and 45 per cent of this originates from China.

This is not only bad for the environment, but also a waste of an important energy source. The new VAMCAT technology has the potential to significantly reduce these emissions while also providing a valuable source of clean, green energy.

A team from CSIRO and the Australian Greenhouse Office, together with China's Shanghai Jiaotong University and Huainan

Coal Mining Group is constructing the first pilot-scale demonstration unit at a coal mine in China.

The low-heating value gas turbine will be powered by about one per cent methane in ventilation air and will generate green power while also consuming the mine's fugitive methane.

The project is being conducted under the Australian Government's Bilateral Climate Change Partnerships Program along with support from an Australia-China special fund grant under the Australian Government International Science Linkage Program. The initial investigation of catalytic combustion performance was supported by a grant from the Australian Coal Association Research Program (ACARP).

The project is being led by Dr Shi Su from CSIRO Exploration and Mining.

Although gas drainage efficiency in China has increased from 15 per cent in 1998 to 26 per cent in 2004, much of the captured gas is poor in quality. It is estimated that more than 70 to 80 per cent of the drainage gas has a methane concentration of less than 30 per cent, which cannot

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be used by conventional technologies. So while China is the largest source of mine methane emissions, it is also the largest potential market for technologies mitigating those emissions,' Dr Su said.

'Once this novel gas turbine technology is demonstrated at a coal mine, it will also have application in the mitigation and utilisation of methane from landfill, livestock and the combustibles in industrial offgas.'

A prototype demonstration unit with a power output of 10 to 30 kilowatts will first be demonstrated in the Chinese mine. Operational performance data and experience gained from this small unit will then be used for the design of a second-generation turbine of at least one megawatt output.

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