

<b>Setting</b>	
Country	Australia
Location	New South Wales
Project start date	
Project end date	14 September 2007
Technology keywords	Coal mining technology, Gas cleaning, Heat recovery & storage
Host sector	VAM Power Plant

<b>Technical summary of the project</b>	
Objective of the project	In an innovative way provide a combination of proven solutions to reduce major GHG (Green House Gas) emissions released into the air. Destruct methane to water and carbon dioxide and at the same time generate energy for heat and electricity.

**Project description**

**Power Plant That Uses Coal Mine Ventilation Air As Fuel**



MEGTEC Systems AB (MEGTEC), a company based in Swedish Gothenburg, announces the first power plant in the world to use MEGTEC's innovative technology to generate electrical power by using extremely dilute coal mine Ventilation Air Methane (VAM) as primary fuel. The power plant is since April 2007 in full operation in Australia at the West Cliff Colliery of BHP Billiton (NYSE:BHP), the world's largest diversified mining and resources company.

The system is based on a patented combination of emission control and steam-cycle technologies. The solution is developed by MEGTEC, supplier of air emission abatement equipment and energy systems worldwide. The world's first VAM Power Plant was partly funded by the Australian Greenhouse Office.

When coal is formed so is methane, which at excavation of the coal is released to atmosphere. This causes a safety issue since methane in air is explosive in concentrations between 5% and 15%. For this reason, coal mines around the world drill into the coal seam and extract as much methane as possible prior to mining. This drained methane is of high, but varying concentrations. At concentrations down to 25-30%, the gas can be used directly in special gas engines generating electricity. Below this and down to around 20%, it can be flared, but further down it requires supplementary fuel to be oxidized and is therefore simply released to atmosphere. Most of the coal mine methane is, however, released at excavation of the coal. It is then diluted by ventilation air to levels safely below the 5% lower explosion limit. Typically, a large coal mine ventilation shaft by the hour emits 1 million m<sup>3</sup> of air with a VAM concentration below 1%. Based on a 100 year comparison with CO<sub>2</sub> for effect on global warming the emission impact of this single source is similar to the emissions of half a million cars.

By using the compact and flameless VOCSIDIZER® regenerative thermal oxidizer as special furnace in a traditional steam cycle, MEGTEC has made it possible to generate high grade, super-heated steam from a fuel with only 0.9% methane content. The steam has the same quality as used at traditional power plants. It is used to drive a conventional steam turbine, which generates electricity that can be delivered to the state grid or directly to the mine.

Each hour, the installation is treating 0.9% of methane content in 150,000 scfm (250,000 m<sup>3</sup>) of ventilation air. The energy produced from the methane is utilized to generate steam suitable for running a conventional 6 Megawatt turbine, resulting in this first power plant of its kind. The volume of ventilation air treated amounts to only 20% of the total volume of ventilation air available from the ventilation shaft.

Methane is a greenhouse gas over 20 times more potent than CO<sub>2</sub>. BHP Billiton can now convert the emission reduction to carbon credits corresponding to 250,000 tons of CO<sub>2</sub>e (CO<sub>2</sub>-equivalents). A VAM Power Plant treating the full volume of ventilation air can generate approximately one million carbon credits. In comparison, methane emissions of a cow amounts annually to between 1 and 2 tons of CO<sub>2</sub>e while a car annually generates emissions corresponding to a typical 2 to 4 tons of CO<sub>2</sub>e.

By 2009, the WestVAMP installation had generated over 500,000 carbon credits (for trading on the local New South Wales Trading Scheme) and over 80,000 Megawatt hours of electricity. It is still the only large scale VAM processing plant in the World.

In the global coal mining industry and related environmental organizations, there is a large interest in this MEGTEC technology, capable of achieving major GHG emission reductions. The key to the emission reduction projects is revenue of carbon credits - even if power generation is involved, since the payback time is otherwise prohibitive. For GHG emission reduction purposes, the technology is cost efficient, attracting interest from many potential investors - all of whom, however, are hesitating because of the lack of international political agreement on rules or even existence of carbon credits after the Kyoto Compliance Period ending in December 2012.

### *Environmental and social benefits*

<b>(Estimate of) Greenhouse Gases abated</b> (in metric tons of CO <sub>2</sub> -equivalent)	Annual: 250 000 t CO <sub>2</sub> -equivalent Up to and including 2012: 1 250 000 tCO <sub>2</sub> -equivalent Up to a period of 10 years: 2 500 000 tCO <sub>2</sub> -equivalent Up to a period of 15 years: 3 750 000 tCO <sub>2</sub> -equivalent
<b>Number of reduction units</b> (EAU, CER, ERU, AAU)	So far 500 000 NAGC which is local emission credits. A smaller MEGTEC installation abating VAM and using the energy released to produce hot water for local use (in miner showers and heating of buildings) the technology is formally approved by UNFCCC to generate CER. So far, only VAM projects based on the MEGTEC technology have been obtained this approval.
<b>Socio-economic aspects</b>	Contributing to reducing effects on Global Warming, and generating energy for local production.
<b>Methodology used</b>	ACM0008

### *Project developer*

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### *Host organisation*

<b>Name of Host organisation</b>	West Cliff Colliery of BHP Billiton (NYSE:BHP),
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