

## ENVIRONMENT

### Case study



## LNG-fuelled power generation at Sunrise Dam

AngloGold Ashanti Australia's Sunrise Dam gold mine is located in an extremely remote and arid area, on the eastern shore of Lake Carey, 770 kilometres north-east of Perth and 200 kilometres from Kalgoorlie. Obtaining energy that is both cost-effective and environmentally-friendly has been an important challenge for the company and an area in which it has made significant strides in 2006.

Sunrise Dam has, since 1994 relied on an on-site standalone diesel fuel operated powerhouse, which generates electricity supply for the underground mine, the processing plant, other surface infrastructure and the camp facility. The powerhouse is run and maintained by Energy Generation (Pty) Limited, a 100% subsidiary of Wesfarmers Group, one of Australia's largest public companies. The plant comprises 22 Cummins generators each with a capacity of 1MW; and two 1.5MW Deutz generators. Maximum demand of the powerhouse is 18.1MW. Daily power production averages 14 to 14.5MW.

During 2006 an alternative fuel source for the powerhouse was investigated and reviewed as the rising price of diesel had increased the costs of operating the powerhouse. A sensible solution to Sunrise Dam's power requirements was identified when Wesfarmers announced the development of a 175 tons per day liquefied natural gas (LNG) plant in Perth. This resulted, in 2006, in Sunrise Dam signing a LNG Power Purchase Agreement with Energy Generation (Pty) Ltd and thereby becoming a foundation customer for the LNG plant

LNG will be trucked to Sunrise Dam where the power station diesel engines will be replaced with engines which operate on natural gas.

The application of LNG to provide natural gas for power generation at a remote mine site is unique and provides a platform for Sunrise Dam to reduce its greenhouse gas emissions, while at the same time reducing the costs associated with gas pipelines and diesel fuel.



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Liquefied natural gas is created by chilling natural gas to minus 160°C, which converts the gas to a liquid. At this temperature, the gas is reduced to 1:600th of its original volume, making it cost efficient to transport over a long distance where natural gas pipelines do not exist. LNG is transported by specially designed cryogenic (having extremely low temperatures) road tankers and stored in double walled steel with an extremely efficient insulation between the walls. Pressure in the tanks is very low and usually less than 35kpa.

LNG is odourless, colourless, non-corrosive and non-toxic – all properties which render it a safer, cleaner alternative to diesel-fueled power. When vapourised, LNG only burns in concentrations of 5% to 15% when mixed with air. Neither LNG nor its vapour can explode in an unconfined environment.

At current prices LNG is substantially less expensive than diesel fuel. An added advantage is that it is an indigenously-sourced fuel, which is not subject to fluctuations in the oil price and currency exchange rates.

On an energy equivalent basis, LNG has a substantial environmental benefit, as it is the cleanest burning fossil fuel available. Results from the study undertaken by AngloGold Ashanti Australia indicate that the conversion of the powerhouse to LNG will result in greenhouse gas emissions reducing by 18% to 20%. Further environmental benefits flowing from the use of LNG are:

- a reduction in the particulates emitted (dust);
- zero effect on groundwater supplies; and
- a 50% reduction in noise levels of engines driven by LNG.

During 2007 the storage facility on site, which consists of four containers known as bullets, will be constructed and installed. In addition, 12 diesel sets will be replaced. It is planned that a minimum of 85% of Sunrise Dam's power requirements will be produced with LNG. The powerhouse is scheduled for conversion to LNG by the first quarter of 2008.

