

## view from the field

**Combating climate change with hydrogen energy****Laurel Green, Group Climate Change Executive, Rio Tinto**

*Climate change presents one of industry's greatest challenges, especially for mining companies like Rio Tinto, which both produce the fuel and use vast quantities of energy. For Rio Tinto, one of the world's largest coal producers, combating climate change means finding new and better ways of using and producing energy. The company's aim, writes Laurel Green--Rio Tinto's Group Climate Change Executive based in London--is that all of its products contribute to the solution to climate change.*

Power generation contributes about 40% of the world's total greenhouse gas emissions. There is rapid worldwide development of new power generating capacity as older power stations are replaced and new plants are built to meet growth in demand, particularly in the fast expanding economies of the developing world. Much of the growth will be in countries where coal is abundant and so coal is expected to be a significant part of the energy mix.

To enable fossil fuels like coal and gas to provide much needed power, but at the same time reduce greenhouse gas emissions, the carbon dioxide from power stations must be captured and stored rather than emitted into the atmosphere. New technologies can produce new cleaner forms of energy and capture and store CO<sub>2</sub> emissions.

Rio Tinto has joined with oil major BP to take an exciting step towards this new energy future. In May, Rio Tinto announced a new venture it has started with BP's alternative energy division called Hydrogen Energy. The joint venture will develop technologies and businesses that reduce carbon emissions and accelerate the deployment of hydrogen-fuelled electric power plants.

These 'decarbonised' energy projects are based on the conversion of fossil fuel feedstocks such as coal, petroleum coke (a refinery by-product) or natural gas, to hydrogen and carbon dioxide gases, with 90% of the carbon dioxide being captured and sent for permanent storage in geological formations deep beneath the earth's surface.

By using hydrogen as a fuel, virtually no greenhouse gas emissions are produced and the main by-product is water. Each of the component technologies is already proven but they need to be combined and integrated to a very large scale.

Rio Tinto chief executive Tom Albanese said: "Rio Tinto's entry into Hydrogen Energy is about charting a future for our coal business in a world that is likely to put a price on carbon. We would like to see Hydrogen Energy deliver a business model that captures competitive value from technology and provides future opportunities for our coal business."

The joint venture has a pilot project under way in Carson, California, to use petroleum coke to manufacture hydrogen. It recently announced the start of a study to develop a US\$1.5 billion coal fired power station at Kwinana in Western Australia that would be fully integrated with carbon capture and storage.

Subject to the successful outcome of detailed engineering and commercial studies, and providing government policy is in place to make the project commercially viable, a final investment decision for Kwinana could be made in 2011, with the project coming into operation after a three-year construction period. Government subsidies needed to make the first few projects commercially viable would be about the same as those for other low carbon energy sources.

Rio Tinto has long accepted that the climate is changing as the result of human activities. For some years, its approach to climate change

has been based on three major themes: engaging with governments and stakeholders, developing lower emission pathways for its products, and reducing greenhouse gas emissions at its operations. Together, these measures provide a practical, effective and efficient response to climate change.

Government climate change policy, and changes in climate systems, will have an impact on the growth potential, operability and cost structure of Rio Tinto's business. Business and industry are increasingly seen as essential to the development and implementation of solutions, while communities, shareholders and governments expect industry to be involved.

Rio Tinto is focusing on the seriousness of the issue from both an economic and environmental perspective. It is working on the cleaner use of coal and setting credible emission limits, supporting technology development, and using market mechanisms to establish a price on CO<sub>2</sub> emissions.

Throughout the Group there is an ongoing focus on energy management, improving efficiency and reducing emissions. Ninety per cent of emissions are energy related, so a few per cent efficiency gain can make significant savings. Diagnostic tools are in use to provide a health check of energy management, procurement and use, and this is being applied across all operations.

Rio Tinto is now in its second phase of targets to improve energy use and reduce emissions per tonne of product. The Group has set targets to improve energy efficiency by five per cent per tonne of product and decrease greenhouse gas emissions by four per cent per tonne of product over a five-year period. These targets are proving challenging, especially in an environment where mines become deeper over time and trucks need to haul materials over longer distances.

To address these challenges, advanced mining methods are being applied and improvements made in the efficiency of heavy mining equipment through, for example, the use of fuel additives, larger haul trucks, and alternative approaches like conveyor belts for moving material.

All forecasts point to rising energy demand worldwide and coal as an energy fuel has

positives that make its continued use essential for the foreseeable future. It is abundant and affordable, widespread, reliable, familiar, and secure. But, it remains a major environmental and climate change challenge.

Rio Tinto has accepted the challenge of using research and development to deploy hydrogen energy and clean coal technology as widely and as rapidly as it can.

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