

Vision: Coal is accepted as a secure, competitive and environmentally sustainable energy resource contributing to New Zealand's prosperity

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This Newsletter is published for the Coal Association by CRL Energy Ltd. We value your feedback on issues discussed in the Coal Newsletter. For comments or enquiries please contact:

The Editor
CRL Energy Ltd
PO Box 31 244
Lower Hutt
Tel 04 570 3715
Fax 04 570 3701

Sahara inhospitable host for CO₂ research

At a CO₂ capture and storage seminar in Wellington on 6 December, attendees heard from a man with first hand experience of CO₂ research projects in some of the most remote places on the globe. Dr Tony Espie, Senior Reservoir Engineer with BP Exploration, gave details of BP's research projects in CO₂ capture and storage including the 'In Salah Gas Project' in the middle of Algeria, and the 'Decarbonised Fuel Project' in Scotland. In addition, Dr Peter Cook, Chief Executive of the Australian Cooperative Research Centre for Greenhouse Gas Technologies, gave a presentation on the International CO₂CRC Programme, as well as a look at the Otway Basin BP Project in Victoria, Australia.

The In Salah Gas Project in particular captured the imagination of the audience. The venture is currently the largest natural gas development project in Algeria, and entails the development of gas reserves of roughly 200 billion cubic metres of dry gas in south central Algeria. In Salah Gas is a joint venture between BP and Sonatrach, the Algerian state oil and gas company and Statoil. The project includes: compression; CO₂ separation and re-injection; and condensate stabilisation capabilities at four sites within the 23,000 sq km gas fields in the Sahara desert. From Krechba, the Northern most part of the In Salah gas fields where CO₂ is stored, the gas is transported along a 455km pipeline to Hassi R'Mel and then is exported via Italy to European markets.

The In Salah Gas project is estimated to have cost over US\$2.5 billion and is the world's first CO₂ storage operation in an actively producing gas reservoir. Dr Espie joked that when you are talking about that level of research funding the scientists "circle like sharks around fresh meat", but that "a few days working in the Sahara with ground surface temperatures reaching to mid 60s degrees Celsius and air temperatures in the high 50s degrees Celsius, with the nearest settlement with infrastructure being some 500kms away, soon sorted the serious players." Although he added that in reality most of the work was done in the cooler dawn and dusk hours.

The project is divided into three parts:

- > a 25 million m³/day hydrocarbon gas development costing \$2.4 billion
- > a 1.1 million tonne/year CO₂ storage project costing \$100 million; and
- > a CO₂ Storage monitoring project costing \$30 million.

The hydrocarbon gas development comprises a phased development of eight gas

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The In Salah Gas project is estimated to have cost over US\$2.5 billion and is possibly the largest exercise in CO₂ sequestration ever undertaken and certainly the world's first CO₂ storage operation in an actively producing gas reservoir.

Euphoria after Montreal decisions seen as premature

After several days of hectic negotiations and a late night concession from the United States delegation, the UN COP11 meeting in Montreal made a series of agreements on a process to extend the Kyoto Protocol beyond 2012. The Bush Administration agreed to join an exploratory global "dialogue" with other countries on ways to limit climate change. The agreement calls for developing nations such as China and India (not bound by Kyoto targets) to adopt voluntary emission reductions. Parallel negotiations at the conference produced agreement by the 157 Protocol nations (excluding the US and Australia) to begin talks

on mandatory reductions in greenhouse gases for the second Kyoto period (2013 to 2017). The aim is to provide a seamless transition that will reassure the emissions trading markets.

The mood of the meeting after the last minute agreements were made was said to be euphoric. However, many commentators consider that mood might be premature. A Christchurch Press editorial notes that the Kyoto Protocol countries have hardly been diligent in keeping up to their commitments so far. The US is still a long way from signing up to the assumptions and requirements of the Protocol and there is a lack of substance in what these countries have agreed to.

Coal seam gas

Solid Energy is investigating the extraction of methane trapped in deep coal seams of the North Huntly and Rotowaro coalfields. It believes there could be as much as 300 petajoules of gas in the seams. Solid Energy said 5 pilot wells will be sunk next year and a commercial decision could be made by early 2007.

Westech New Zealand, a wholly owned subsidiary of Energy Corporation of America (ECA) says it will begin a coal seam gas drilling campaign near Auckland early next year. The company will be drilling six new wells on petroleum exploration sites south of Hamilton, and between Hamilton and Auckland. ECA has also been exploring on the West Coast, in Hawke's Bay and Taranaki. ECA operates 5000 gas and oil wells in the United States – primarily in the Appalachian Basin and Gulf Coast regions - and three in New Zealand.

Coal seam gas first attracted attention in the early 1990s in Otago and Southland, and reservoirs were found there in 1999 - strategically located close to urban and industrial sites. The coal seam gas varies with different coal types, but is typically 90 percent methane with some carbon dioxide, hydrogen and heavier hydrocarbons.

Policy review may recommend C tax scrapped

The officials' review of climate change policy has reached the level of the Cabinet Business Committee and there are indications a decision on replacing the carbon tax is likely by the end of the year. If the tax were to go ahead, then legislation must be drafted very soon to meet the 2007 deadline for the tax to take effect and to provide certainty for companies in the NGA process. The Prime Minister has been quoted as saying everyone is challenged by the rise in carbon emissions and other governments have found the enthusiasm of their climate change officials has not been matched by the accuracy of their emissions forecasts.

During the post-election coalition

formation, a highly placed official said off the record that the carbon tax is as good as gone but raised the question of what there is to replace it. Commentators have observed that the Government has the narrowest of majorities for the tax with 61 votes if the Maori Party can be persuaded to support it and they are on record as supporters: "Our key position is that we support a carbon tax as long as those responsible for polluting, i.e. industry, are directly contributing to it." While the leaders of coalition parties NZ First and United Future have publicly opposed the tax, their coalition agreements simply say that they agree to a review of the tax. As Revenue Minister, the United

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Pike River coking coal mine set to go

In late September, New Zealand Oil and Gas (NZOG) announced that it is joining forces with Indian coking coal company, Saurashtra Fuels Private Limited (SFL), to fund development of the Pike River coking coal mine.

SFL and NZOG will contribute \$40 million in equity funding and the Board of Pike River Coal

Company Limited (PRCC) has now made a formal decision to proceed with the mine development.

These arrangements will ensure NZOG retains a majority stake in PRCC during the time the mine is being developed.

The key elements are:-

- SFL will acquire a 10.6 percent stake in PRCC and invest \$17 million, with NZOG and existing minority shareholders in PRCC committing the remaining \$23 million.
- Of this NZOG will immediately invest \$6.9 million.
- Remaining mine development costs are intended to be funded by debt and up to \$30 million equity from an IPO.
- NZOG's shareholding in PRCC will be approximately 65 percent after the \$40 million funding is concluded.

"These arrangements for funding of the Pike River mine represent the optimal approach for NZOG and the other shareholders in PRCC," says Mr Tony Radford who chairs both companies.

"After evaluating a number of alternatives, it has become clear to NZOG directors that it is in the best interests of NZOG shareholders that we maintain a strong stake in Pike and have control over the company, at least through the development phase."

SFL are India's largest privately owned coke manufacturer. PRCC General Manager, Gordon Ward said, "As a substantial trade investor SFL are a good strategic fit with PRCC. SFL will purchase at least 150,000 tonnes per annum of high quality Pike coking coal for the entire mine life at market price." SFL will appoint a director to the Board of PRCC, and will assist in marketing Pike coal in India.

PRCC is now working on listing as a separate public company on the New Zealand Stock Exchange with a target date for an Initial Public Offering (IPO) by March 2006 and possibly earlier. At this stage a significant portion of any shares offered to the public will be reserved for NZOG shareholders. NZOG announced on 2 December that it had made a private share placement of 13.3 million NZOG shares at \$0.90 each, bringing in some \$12 million to help with the company's projects.

The Pike River coal mine is one of three cornerstone projects of NZOG. The others are the Kupe project off Taranaki, which will produce gas, light oil and LPG; and the Tui oil field offshore in north Taranaki, from which first oil could be produced by March 2007.

Contradictory claims on economic damage

By Wayne Hennessy, CRL Energy Ltd.

A UK economist has claimed the cost of trying to stop global warming will prove “politically unsustainable”, while two US economic studies claim mandatory greenhouse gas limits would not significantly affect average economic growth rates.

Charles Dumas, Director of UK based Lombard Street Research, is considered a leading economist who estimates the cost of preventing climate change globally would be a crippling US\$18 trillion. He claims this is “orders of magnitude greater than the cost of dealing with higher sea levels and freak weather.” His estimate is based on the assumption reducing global warming will require cuts in the world’s energy consumption that will reduce global growth by 0.5 percent a year for five years, giving a total cost of \$18 trillion. Dumas predicts that given the huge cost “nobody is going to do anything serious about global warming... In reality, nobody seriously proposes a cure for global warming, because adequate measures would cause economic catastrophe and probably world war.” Stopping climate change would either require Asian countries to reverse their rapid economic growth and “return to poverty” or developed countries will have to make savage cuts in their oil consumption.

The Energy Information Administration, an independent arm of the US Department of Energy, claims that mandatory limits on all US emissions of greenhouse gases would not significantly affect average economic growth rates across the country to 2025. This runs counter to President Bush’s repeated pronouncements that emission

caps would seriously harm the US economy. The proposal came from the National Commission on Energy Policy that stated it was an old argument that the economy could not withstand greenhouse gas reductions and the study had come up with “a reassuring set of conclusions”. EIA estimated that the cost to each US household would be US\$78 per year, from 2006 to 2025 reducing GDP in 2025 by about 0.1 percent. The commission also recommended a 36 percent increase in the average fuel economy for cars and light trucks between 2010 and 2015 and doubling to \$3 billion a year the budget for federal energy research and development. In addition, it called for new tax incentives for gasifying coal and building nuclear plants. EIA estimated that adding those measures to the greenhouse gas plan would reduce the nation’s GDP in 2025 by about 0.4 percent.

John Reilly of the Massachusetts Institute of Technology’s Joint Program on the Science and Policy of Global Change has examined the economic effects of several proposals. Implementing Kyoto is estimated to cost 0.6 percent of GDP. “We thought that was costly but that’s not wrecking the economy.” While the US can not fix the problem alone, he said it should lead the way with meaningful steps. Reilly admitted the ultimate price will be high although solutions can and should include economic safety valves. “Starting on a path isn’t committing to the entire path. If the cost becomes too great for the economy, we have to reconsider where we go. If the climate effects become more severe, or less severe, then we reconsider as we go.”

UK CO₂ emissions rise despite pledge

Energy statistics released by the United Kingdom Department of Trade and Industry show Britain’s CO₂ emissions are expected to rise significantly in 2005 for the third year running and will reach the highest level since 1992. Increasing oil and coal use meant that CO₂ emissions are expected to rise by more than 2 percent this year. Instead they should be falling by at least 1 percent a year to reach the 20 percent reduction target the Government set itself as an example to show the world that cuts could still be made in a growing economy. This will be an embarrassment to Tony Blair, who made tackling climate change his priority for the presidency of G8 and the EU this year, describing it as a greater global threat than terrorism.

The UK is still on target to reach its 12.5 percent cuts under its Kyoto commitment. In the early 1990s the Conservative government made major reductions in Britain’s CO₂ emissions, partly as a result of closing coal mines and the switch to gas-fired electricity generation.

House of Lords: IPCC ‘under political influence’

A report by the UK House of Lords has criticised the UN Intergovernmental Panel on Climate Change (IPCC) for being under political influence and states there are “significant doubts” about some of its emissions scenarios. It also notes: “There are some positive aspects to global warming and these appear to have been played down in the IPCC reports. The Government should press the IPCC to reflect in a more balanced way the costs and benefits of climate change.”

The report stresses global warming will continue, regardless of action taken by governments, due to long time lags in climate systems. It recommends that more attention be paid to ways the world can adapt to climate change, rather than focusing solely on how to reduce it. It concludes: “The Kyoto Protocol makes little difference to rates of warming, and has a naïve compliance mechanism which can only deter countries from signing up to subsequent tighter emissions targets. We urge the Government to take a lead in exploring alternative “architectures” for future protocols, based perhaps on agreements on technology and its diffusion.”

Taranaki potential for large scale CO₂ sequestration

By Wayne Hennessy, CRL Energy Ltd.

By 2050 coal may be generating 10 times more electricity than in 2004 and much of this new coal generation might be in Taranaki, as the depleted Maui gas field will have been developed into a carbon sequestration site. CO₂ emissions from the power stations would be fed to the former field along the old gas pipelines and then pumped underground.

This is one of the two scenarios in "Future Currents" a report produced by the Parliamentary Commissioner for the Environment (PCE) on how New Zealand might meet its electricity needs between now and 2050. This first scenario, "Fuelling the Future", is based on current ways of thinking, where building big power projects is seen as the key to a secure electricity supply. The second scenario, "Sparking New Designs", sees huge potential in getting 'more from less' by re-thinking how we use electricity and other forms of energy. Businesses, communities and individuals are given strong incentives to be innovative both in energy efficiency and in using

more localised energy sources. Future Currents uses fictional characters to illustrate its scenarios that are based on a broad range of research in an associated technical report (www.pce.govt.nz).

The PCE comments that New Zealand faces some difficult energy decisions in the years ahead. The electricity system is under stress through a lack of strategic planning over twenty years. However, it is claimed there are many opportunities if New Zealanders can think about the problems differently. "For too long we have concentrated on the 'supply side' - how to generate more electricity and distribute it around the country. We need to focus more on the 'demand side' - how to get more value out of the electricity we already produce. We need to draw more deeply on our resources of knowledge and expertise, and our ability to innovate. Many initiatives will take place at the individual household and business level, so each of us can be involved in the 'doing'. This will open up many opportunities for small and medium sized businesses."

Write-downs impact on bottom line

Pre-tax asset write-downs on Solid Energy's West Coast assets lost \$46 million off the company's bottom line in the June year. The state-owned coal miner's after-tax profit dropped to \$6.3 million in the year to June 30 from \$33.7 million the previous year. Record sales of \$400.8 million (2004: \$334 million) and record production of 4.46 million tonnes (2004: 4.21 Mt) initially produced an operating surplus of \$54.9 million (before write-downs and tax) for the year ended June 2005.

"While the company's financial position has been impacted detrimentally by large asset write-downs, it is stable. The company has managed a difficult year operationally and is now in a strong position to maximise continuing demand for coal, in New Zealand as a low cost energy option for industry, and internationally for our unique coking coals.

"We are confident that current international demand for coal, driven by Chinese and Asian market demand for steel and energy, is signalling a strong year for our export business. This should see the balance sheet strengthened in the current year, underpinned by continuing strong demand from our New Zealand industrial and commercial customers," says Solid Energy Chairman, Tim Saunders.

Sales to Genesis Energy for Huntly Power Station and New Zealand Steel for Glenbrook Mill dominated overall New Zealand sales volumes, although growth in the dairy sector also drove up sales in the South Island. Electricity generation is now the largest use of coal in New Zealand, accounting for 43 percent of sales in the

year. Total New Zealand sales were 2.28 Mt (2004: 2.07 Mt). Internationally 75 percent of Solid Energy sales are West Coast high value coking coals for steel manufacture, the major contributor to record export revenues in the year of US\$140 million. Exports for the year were 2.18 Mt (2004: 2.14 Mt).

"Our two largest opencast mines performed well; production at Stockton Opencast Mine in the Buller exceeded 2 Mt for the first time, up 16 percent on last year (2004: 1.74 Mt), while Rotowaro Opencast Mine in the Waikato produced a record 1.44 Mt (2004: 1.18 Mt)," says Solid Energy Chief Executive, Dr Don Elder.

The company's biomass business, trading as Nature's Flame, experienced a 50 percent increase in appliance sales as the company has expanded its sales presence into the Auckland and Wellington areas. Nature's Flame has recently begun production at a new pellet mill in Rotorua which will be fully operational by the end of the year (see page 5).

Forecast demand within New Zealand and internationally is driving the planning and development of new mines. A significant amount of work has been carried out in the year quantifying the current level of the company's reserves and resources. While the company has more than 5 billion tonnes of coal and lignite in its licence and exploration areas, current reserves (proven viable and economic in existing mine plans) total only 36 Mt. Estimated production over the next 20 years will total about 100 Mt, requiring ongoing major investment to prove reserves, then develop or expand, new and existing mines.

Solid Energy launches new pellet mill

On 7 December, Solid Energy officially opened biomass producer Nature's Flame's first North Island pellet mill in Rotorua. Joining Nature's Flame's existing Rolleston mill near Christchurch, the new mill will add to Nature's Flame's growth and provide up to 15 new jobs in the Rotorua area, both at the plant and in sales and installation.

Solid Energy, New Zealand's largest coal producer purchased Nature's Flame in 2003 to offer home-owners a renewable, clean burning home heating alternative.

Nature's Flame wood pellets are produced from waste pine-wood and sawdust. At the mill the waste wood by-product is dried, compressed and formed into small pellets, which burn virtually emission free. Because of the strict pellet manufacturing process, the pellets are organic and contain no plastics or harmful additives.

The new mill will have an initial annual production capacity of 50,000 tonnes, enough low emissions energy to heat up to 36,000 homes.

"Together with the Nature's Flame pellet mill in Christchurch, the Rotorua mill will sustain the increased demand for pellet fuel

well into the future," says Nature's Flame Managing Director, Andy Matheson. "Our Christchurch mill has been operating for three years and has doubled its production each year to meet demand. The Rotorua factory gives Nature's Flame the capacity to increase production further with an expansion plan in place to produce 100,000 tonnes a year. Pellets are here to stay."

Widely used overseas, Solid Energy says that wood pellets have become a popular choice for New Zealand homeowners with gas and electricity price hikes.

"Following the demise of the giant Maui gas field there is greater pressure on New Zealand's natural gas supply which is leading to higher prices for gas buyers. In addition, electricity generation capacity is under pressure, especially in dry years, driving power prices to record levels," says Matheson. "With the opening of the new Rotorua mill Nature's Flame can promise its North and South Island customers security of supply which will help maintain Nature's Flame as a cost effective and economical home heating solution for many years to come."

Power and gas prices rise faster than inflation

Earlier this month Statistics New Zealand released quarterly energy statistics which show that electricity, gas and petrol prices are climbing faster than overall inflation. Electricity prices for households increased 1.1 percent in the September quarter and were 7.8 percent higher than 12 months earlier, flowing on from a four-year trend in rising household electricity prices.

Commercial electricity prices rose 1.3 percent in the September 2005 quarter and were 10.6 percent up on the September quarter last year. The consumer price index rose 3.4 percent for the year to September.

The price of liquid petroleum gas was 6.4 percent higher in the September 2005 quarter than in the June quarter and 10.2 percent higher than the September quarter last year. The price of natural gas for household users rose 9.4 percent between the September quarter last year and the September 2005 quarter. The retail price of petrol jumped 13.1 percent in the September quarter from the

June quarter and was 20.5 percent higher than in the September quarter 2004.

Meanwhile dry weather has seen the highest recorded use of coal and gas-fired power plants in the September quarter 2005. This underlines New Zealand's reliance on coal and gas-fired power plants when inflows into the hydro lakes are below average.

Hydro generation, the main renewable form of electricity generation, fell in the September quarter by more than 24 percent. Together, hydro and wind generation supplied 55 percent of electricity in the September quarter, compared to 71 percent in the September quarter last year.

Over ten years the mean contribution of hydro and wind generation to total production has been 63 percent in the September quarter.

Total electricity production in the September quarter 2005 was 2.3 percent lower than 12 months earlier, when the level of electricity produced was the highest ever for a quarter.

Glencoal awarded Central Otago coal prospecting permit

Glencoal Energy Ltd, a coalmining subsidiary of the large dairy cooperative Fonterra, has been granted a permit to prospect for lignite in Central Otago. The permit has been granted for an 18 month term and covers a 558 sq km area near the town of Ranfurly, in central Otago.

Glencoal predominantly operates coal permits in the Waikato area, where it mines sub-bituminous coal from its Kopako and Renown opencast mines. Most coal from these mines fuels dairy factories in the Waikato area. Among its South Island plants, Fonterra operates a large dairy processing plant at Clandeboye, and has a five year contract with Solid Energy to supply coal from the Ohai mine in Southland.

Eastern acquires Cascade coal mine

Queensland-based energy company Eastern Corporation Ltd has completed purchase of the Cascade open cast coal mine near Westport. Eastern said that although Cascade is a small resource of approximately 1.5M tonnes, it is a profitable operation.

Cascade provides thermal coal for the domestic industry market and metallurgical coal for export. The resource comprises approximately 770,000 tonnes of measured, 112,000 tonnes of indicated and 600,000 tonnes of inferred resource.

Marketing is targeted toward high value export sales combined with contracts to supply domestic markets. Most coal from the mine has been sold to the nearby Holcim cement works.

Coming Events

McCloskey's 15th Asian coal conference 2006

Kuala Lumpur, Malaysia, 21-22 Feb 2006 Georgina Lucey, The McCloskey Group, PO Box 15, Petersfield, Hampshire, GU32 3HX, UK Tel: +44 1730 265 095 Fax: +44 1730 260 044 Email: georgina.lucey@mccloskeycoal.com

The Clearwater Coal Conference

Coal Technology Association and The International Technical Conference on Coal Utilization and Fuel Systems 21-25 May 2006, Clearwater, Florida, US

For further information please contact: Barbara Sakkestad, Phone: 301/294-6080, Fax: 301/294-7480, E-mail: barbarasak@aol.com

15th international coal preparation congress & exhibition: designing for the environment

Beijing, China, 17-20 October 2006, Ms. Sun Jiaohua, China National Coal Association, 21 Hepingli Beijie, Beijing 100713, China, Email: sjiaohua@chinasafety.gov.cn

World energy congress

Rome, Italy, 9-15 Nov 2007 Mike Treacher, PennWell UK Office, PennWell House, Horseshoe Hill, Upshire Essex EN9 3SR, UK Tel: +44 1992 656 636 Fax: +44 1992 656 700 Email: miket@pennwell.com Internet: www.rome2007.it

CRL Energy opens new Chch office



Around 30 clients and staff gathered in CRL Energy's new Christchurch office on Friday 9 December to officially launch the new premises. Dr Rob Whitney, CRL Energy's Managing Director based in Wellington, acted as MC and attendees enjoyed drinks and a hearty BBQ.

The new office premises feature open plan office space for the 14 Christchurch staff as well as a workshop and laboratory. The Christchurch office provides a wide range of high quality geologically and environmentally based services, including:

- Geological services;
- Geotechnical engineering;
- Hydrogeological services;
- Environmental monitoring;
- Acid mine drainage;
- Air quality monitoring;

- Contaminated site investigations and remediation;
- Ambient dust monitoring; and
- Coal export sampling.

The team is gaining an international reputation for its research in acid mine drainage, and its collaborative research work is to be the subject of a feature article in the Feb/March issue of Australia's 'Position' magazine, published by South Pacific Science Press.

You can find out more information about the services that the Christchurch base provides on CRL Energy's website at www.crl.co.nz by clicking on 'Geology' on the top menu bar.

The new office contact details are:
123 Blenheim Road
Riccarton, Christchurch
Ph +64 3 341 2120

Policy review may recommend C tax scrapped

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Future leader, the Hon. Peter Dunne, is also conducting a separate review of the revenue implications of the tax removal, speculated to be completed by January. The Government is apparently very keen to reduce corporate tax rates, so it will only very reluctantly abandon the annual carbon tax revenue of ~\$300M, which has already been allocated to accelerated depreciation etc.

Based on discussions with officials and politicians, consultants Frazer Lindstrom predict the Government will choose to revive plans for emissions trading rather

than risk a controversial carbon tax. Stuart Frazer notes Labour has always favoured emissions trading, whereas the carbon tax has been largely driven by the Greens. He considers Helen Clark will not want to go into a 2008 election with a carbon tax having been introduced less than 18 months prior. Emissions trading could be a compromise that requires action from the industry sector in a more cost effective manner than a carbon tax. He believes large firms should still pursue NGAs because they would be beneficial under an emissions trading regime, which would still have energy pricing impacts threatening international competitiveness.

Sahara inhospitable host for CO₂ research

from page 1 fields located in the Ahnet-Timimoun Basin. The initial development focused on the exploitation of the gas reserves within the three northern fields of Krechba, Teguentour and Reg to deliver the contracted sales gas stream of 9bcm/yr. These gas fields contain CO₂ concentrations ranging mostly between 5 to 10 percent, although sometimes as low as 1 percent. The remaining gas is almost exclusively pure methane. By the time CO₂ is removed, CO₂ concentrations in the gas stream are reduced to less than 0.3 percent. The unwanted CO₂ is compressed and re-injected back into Krechba at a rate of 70mmscf/d (or 1.1 million tonnes per year) into an aquifer beneath a 950m thick layer of carboniferous mudstones.

From the Sahara to Scotland

From the searing heat of the Sahara to the some what more chilly climes of Peterhead in north-east Scotland, Dr Espie outlined a new US\$600million industrial scale project to generate 'carbon-free' electricity from hydrogen.

The project, a partnership between BP, ConocoPhillips, Shell and Scottish and Southern Energy (SSE), is projected to be a win-win scenario, with clean energy provided to consumers, and recovered CO₂ used to enhance the recovery of known oil resources. The project – producing 'decarbonised' fuel and using it for power generation – would convert natural gas to hydrogen and CO₂, then use the hydrogen gas as fuel for a 350MW power station, and export the CO₂ to a North Sea oil reservoir for increased oil recovery and storage. The project would reduce the amount of CO₂ emitted to the atmosphere by the power generation by over 90 percent.

Initial engineering feasibility studies into the project have already been completed. Detailed front-end engineering design work is now underway to confirm the economic feasibility of the scheme, and should be completed in the second half of 2006. This will allow a final investment decision to be taken next year, subject to which the project would then be expected to commence operation in 2009. Dr Espie said that a key challenge for the project will be getting appropriate policy support from the Government and developing a regulatory framework and protocols with relevant parties to assure safe transportation, storage and monitoring of CO₂, as well as reaching agreements on long-term public stewardship of storage sites.

When fully operational, the project would be expected to capture and store around 1.3 to 2 million tonnes of carbon dioxide each year, the equivalent of removing 400,000 cars from the roads, and provide 'carbon-free' electricity to the equivalent of a quarter of a million UK homes. A newly built reformer plant would convert up to 70 million cubic feet of natural gas a day into carbon dioxide and hydrogen and the hydrogen would be used as fuel for a new 350MW combined cycle gas turbine power station.

The carbon dioxide generated by the reformer would be exported through existing pipelines to the mature BP-operated Miller oilfield, 240 kilometres offshore, where the platform would be adapted to allow for injection of the gas into the reservoir four kilometres below the seabed to increase oil recovery from the reservoir and for storage. The Miller field is currently due to cease production in 2006/7 but the injection of carbon dioxide into the reservoir could increase the amount of oil extracted from the field, potentially



Dr Tony Espie: "a few days working in the Sahara with ground surface temperatures reaching to mid 60s degrees Celsius and air temperatures in the high 50s degrees Celsius, with the nearest settlement with infrastructure being some 500kms away, soon sorted the serious players."

allowing the production of up to 40 million additional barrels of oil and extending the life of the field by 15 to 20 years.

Over to Aussie

Dr Peter Cook gave an overview of CO2CRC's A\$30 million Otway Basin Project. The basin itself spans from southern Victoria into the Southern Ocean of Australia. The project draws on many research groups to develop the sequestration scheme along with a suite of monitoring and verification programmes.

Prior to announcing the Otway Basin project, CO2CRC (previously GEODISC) conducted an Australia-wide study of sedimentary basins conducted over the past five years which identified at least 100 sites that have the suitable geological conditions for the safe, long-term storage of CO₂. Dr Cook said that the sites typically had porous sandstone that is overlain by a seal of non-porous rocks, with no active faults to avoid movement and leakage. He said the storage possibilities should see Australia through at least 100 years of CO₂ storage needs.

The Otway Project is the first of its kind in the Southern Hemisphere, it involves extracting the naturally occurring CO₂ and methane from a natural gas well, separating the methane from the CO₂ and using the methane to drive a compressor. The compressor condenses the CO₂ to liquid so it can be transported via pipeline to the well-head of a depleted natural gas field. The compressed CO₂ is injected some 2080 metres underground into a depleted gas field where it should be stored for thousands of years. Stringent monitoring activities at all stages of the process will enable the researchers to track the migration of the CO₂ underground. Further information about the project can be seen on the CO2CRC website at www.co2crc.com.au, under 'research'.

The free lunchtime seminar was hosted by the Coal Association and organised by CRL Energy Ltd. For details of future seminars check under 'events' at either the CRL Energy Website at www.crl.co.nz or the Coal Association Website at www.cleanccoal.org.nz. Overheads from this seminar are available from either site.

Coal Association of New Zealand Inc.

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Doug Hood Contractors
Energy for Industry
(formerly Meridian Solutions)
Fonterra (Edendale)
G L Bowron Ltd
Genesis Energy
Golden Bay Cement
Heinz-Wattie Ltd
Holcim (New Zealand) Ltd
Huntly Retail Distribution Centre
Kenroll Industrial Coal Ltd
L & M Coal Limited
Lincoln University
Lion Breweries South
Lytelton Port Company Ltd
Mangapapa B2 Incorporation
McDonald's Lime Ltd
Meritec (Worley Consultants)
Metso Minerals (New Zealand) Ltd
Ministry of Economic Development
Montgomery Watson Ltd
National Institute of Water and
Atmospheric Research (NIWA)
Natural Gas WEL Energy
NZ Coal Processors Ltd
NZ Steel Ltd
Oderings Nurseries, Christchurch
Phillips Fox
Pike River Coal Ltd
Port of Greymouth
Sea-Tow Ltd
SGS NZ Ltd
Shipherd Nurseries
Sinclair Knight Merz
Skellerup Industries Ltd
Southport NZ Ltd
Southtile Ltd
TNL Group Ltd
University of Canterbury
Websters Hydrated Lime Co Ltd

Associate Membership

Did you know that you can join the Coal Association, even if you are not a coal producer, by becoming an Associate Member?

Why should you join?

The Coal Association needs the support of Associate Members more than ever, so that New Zealanders can retain access to the plentiful and economic fuel coal. Your support is vital, as the Association attempts to reduce the impact of economic measures, designed to help meet New Zealand's Kyoto Protocol obligations. As an Associate Member, you can keep up to date with happenings in the energy industry by reading the Coal Newsletter, which is sent out quarterly, and the Annual Review, which every Associate Member receives with an invitation to the Annual General Meeting.

Other benefits of Associate Membership are:

- opportunities to participate in Coal Association activities;
- opportunities to make your voice heard through Coal Assn initiatives;
- free access to information held by CRL Energy Ltd;
- free short consultations with CRL Energy staff; and
- free updates of recently published coal information.

What does it cost?

An annual fee of \$350 +GST.

How do I join?

Ring CRL Energy 04 570 3715 for the details.



LOWER HUTT

68 Gracefield Road
PO Box 31-244, Lower Hutt
Tel: +64 4 570 3700
Fax: +64 4 570 3701

HAMILTON

C/- Ruakura Research Centre
East Street
Private Bag 3123, Hamilton
Tel: +64 7 838 5261
Fax: +64 7 838 5252

CHRISTCHURCH

123 Blenheim Road
PO Box 29-415
Christchurch
Tel: +64 3 341 2120
Fax: +64 3 341 5500

GREYMOUTH

43 Arney Street
PO Box 290, Greymouth
Tel: +64 3 768 0586
Fax: +64 3 768 0587

