



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

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## Otway CO<sub>2</sub> injection test underway



A major new phase of Australia's first geosequestration project began in late February with the drilling of CO<sub>2</sub>CRC's research well in south-western Victoria.

CO<sub>2</sub>CRC Chief Executive Dr Peter Cook said the new well will enable geologists to confirm their computer modelling of the underground



*The drilling of the new well is taking place in Nirranda South, near Warrnambool, in the Otway Basin in south-western Victoria. It is expected that the well will take 22 days to drill. Photos: CO<sub>2</sub>CRC.*

storage site before injection of up to 100,000 tonnes of carbon dioxide commences.

"During this initial research phase, geologists will conduct a detailed analysis of the rock samples taken from the new well to confirm the existence of suitable rock sequences for geosequestration," he said. "The sequence we expect to find, porous sandstone overlain by impermeable mudstone, will ensure that carbon dioxide can be safely and securely stored at this site," Dr Cook said.

Known as CRC-1, the 2300-metre well will also confirm for CO<sub>2</sub>CRC geologists the exact depth and location of the proposed underground CO<sub>2</sub>-storage reservoir.

"One of the most important elements of the project is to demonstrate to the community, government regulators and industry that geosequestration works and that carbon dioxide can be stored safely and monitored in rocks deep in the subsurface," Dr Cook said.

"Monitoring activities are already in place in readiness for the injection of carbon dioxide in

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Chris Baker  
Chairman, Coal Association

## Coal and climate change in Australia

*By Chris Baker, Chairman, Coal Association of New Zealand Inc.*

*The debate around coal and climate change is reaching new heights in Australia, and I think it's fair to say that whatever goes down in Australia will 'flow on' to us, so we are watching with interest. At present, the coal industry is being very well served by COAL21 and the Australian Coal Association (ACA), in particular the Executive Director of ACA, Mark O'Neill. The ACA has achieved some good balanced media coverage in the last few months – in the face of some orchestrated misinformation.*

*A few weeks ago Mark made a guest appearance on Australia's ABC Radio National programme "Perspectives" and the transcript of his appearance makes for good reading. The points Mark raises regarding Australia's coal export industry are as valid for New Zealand as they are for Australia. New Zealand exported some 2.3 Mt of coal in 2005, mainly to Pacific Rim countries, India, South Africa and the United Kingdom, generating export earnings exceeding NZ\$200M, with exports of thermal coal becoming increasingly important.*

### Mark's ABC transcript

Imagine the consequences if all energy-rich nations decided they would no longer share their resources.

This is exactly the path Australia is being urged to go down by those calling for an end to coal exports.

Anyone following the debate could be forgiven for thinking that coal is almost solely responsible for global warming; that Australia is literally flooding the world with the stuff, and if we just stopped doing so we'd be well on the way to solving the problem.

The reality is somewhat different. More than three quarters of the world's annual global greenhouse gas emissions are not caused by the use of coal. Coal is an important contributor, certainly, but oil, gas, waste, agriculture and deforestation all play major roles.

So what proportion of global emissions can be sheeted home to the use of Australia's coal exports? Most people will be surprised to learn that the answer is just 1.3 percent, and universally agreed protocols say that these emissions are quite properly counted against the emission ledgers of countries that actually use the coal.

Much is made of the fact that Australia is the world's leading coal exporter, but just four percent of the world's coal production actually passes through Australian ports. This is because only a small proportion of the world's total coal production is actually traded.

Importing countries buy our coal because they either don't have any domestic reserves or they need the high quality steel-making coal that Australia produces. More than half of our coal exports are used in steel mills, not power stations.

Japan, Korea and Taiwan are our biggest

customers. China is the world's largest coal producer with annual production six times greater than ours. Just three percent of Australia's coal exports last year went to China, and its use in power stations generated less than half of one percent of greenhouse gas emissions from China's power sector.

Exporting just four percent of the world's annual coal production generated \$24 billion in export income for Australia last year. To put that in perspective, our coal exports were worth more than our wool, wheat, wine, copper, dairy, beef and gold exports combined. The industry directly and indirectly employs 130,000 people and their spending supports entire communities. Taxes and royalties amount to billions of dollars which is returned to the wider community in the form of government services.

We could choose to forego these benefits, but it would not reduce either global coal consumption or greenhouse gas emissions. Our customers would simply shop elsewhere. Indonesia, South Africa or Russia, to name a few, would be only too happy to take up the slack - and reap the economic benefits. By any measure, this would be spectacularly self-defeating.

No-one is arguing that Australia should simply wash its hands of all responsibility for emissions generated outside its borders by its products. As a wealthy nation we are well placed to invest "above our weight" in the technologies the rest of the world will need to deploy to address the problem. In terms of global impact, Australian investment in energy Research and Development will almost certainly prove to be our most important contribution.

In the case of coal, the key technology is carbon capture and storage. Like the

## Otway underway

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the second half of this year, subject to final planning and environmental approvals.

“We are establishing one of the world’s leading monitoring and verification programs for geosequestration. Baseline levels already being recorded of CO<sub>2</sub> in the soil, air and groundwater will be regularly compared with levels monitored throughout the project,” Dr Cook said.

“If any changes occur to the CO<sub>2</sub> levels in the soil, groundwater and air, CO2CRC will investigate the causes. Changes could be due to a number of biological and environmental reasons,” Dr Cook says.

Geosequestration of CO<sub>2</sub> will be necessary to help achieve the deep cuts required in greenhouse gas emissions from the combustion of fossil fuels.

CO2CRC collaborates with leading international and national carbon capture and storage experts to conduct world-class research into CO<sub>2</sub> geosequestration. Research organisations supporting and participating in the CO2CRC geosequestration research project in Victoria include CSIRO, Geoscience Australia and the Universities of Adelaide, Curtin, Melbourne, Monash and NSW; the Alberta Research Council in Canada and the US Lawrence Berkeley National Laboratory. CO2CRC industry and state core partners are ACARP, Anglo American, BHP Billiton, BP, Chevron, ConocoPhillips, NSW Department of Primary Industries, NZ Resource Consortium, Rio Tinto, Schlumberger, Shell, Foundation for Research Science and Technology (NZ), Solid Energy, Stanwell, the Victorian Department of Primary Industries, Woodside and Xstrata. CO2CRC is supported through the Australian Government’s CRC Programme.

New Zealand coal producer, Solid Energy is a founding shareholder in the CO2CRC-related company formed for the Otway project. With a commitment of more than A\$2 million in CO2CRC, Solid Energy says their investment is part of a 20-year, NZ\$100 million investment it is making in clean coal technology and new energy developments.



*Photos: CO2CRC*

## Coal and climate change in Australia

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IPCC, which has delivered the most comprehensive report on the technology to date, we are confident that it can be an important part of the solution. If we didn’t think so, industry would not be committing billions of dollars towards the global effort to bring the technology into commercial use. We already have a national plan of action to make this happen, and it is being implemented. The plan complements rather than competes with renewable energy and energy efficiency.

The image of the coal mining industry being actively promoted by some - of an evil empire counting its money while the planet melts - is a mere cardboard cutout. It does not reflect attitudes towards climate change of the people in the industry, or

their sense of responsibility for finding solutions.

But the vilification is now causing distress to thousands of working families. It is already dividing communities and leading to a distorted public perception of the causes of climate change and its possible solutions.

History is littered with morally vain political movements that have used selective vilification as a political tool, invariably with tragic consequences. History also tells us that it is dangerous for resource rich countries to withhold resources from those that are resource poor.

The scapegoating of a single industry over climate change, and calls for Australia to unilaterally withdraw its coal exports, reminds us that history is always in danger of repeating itself.

## Plan to recommission Marsden B scrapped

On 7 March Mighty River Power announced that it had abandoned plans to recommission the Marsden B coal fired power station near Whangarei, following a review of the company's potential generation developments and future market conditions.

Chief Executive Doug Heffernan said the company had commissioned additional geothermal capacity and successfully consented and begun construction on other projects, including the largest geothermal power plant development in over 20 years at Kawerau.

"As a result of this work and other developments within the industry we no longer see scenarios where Marsden B will be cost effective in the next decade or so.

"By 2020 we expect global technology advances will mean that a converted Marsden B would no longer be economically viable, therefore there is no longer any benefit in securing consents for this project."

Suspension of such plans seems inevitable following an announcement by Energy and Climate Change Minister, the Hon. David Parker, that the Government's new energy strategy ([http://www.med.govt.nz/templates/ContentTopicSummary\\_19431.aspx](http://www.med.govt.nz/templates/ContentTopicSummary_19431.aspx)) would likely impose greenhouse gas charges on all new power stations. On releasing the draft strategy in December last year, Mr Parker said that he is determined that as much new electricity generation as possible should be renewable. He said the energy strategy aims to ensure New Zealand develops a sustainable and affordable energy system which minimises greenhouse gas emissions, and which will give New Zealand an enduring competitive advantage over other countries.

"There is a lot the government is already doing to encourage renewable generation, lower emissions, and improve energy efficiency, but the strategy and other studies make it clear that more needs to be done.

"We are now developing a series of long-term programmes which will make a significant difference to energy security and greenhouse gas emissions. Central to

this is the New Zealand Energy Strategy and the aim that new electricity generation should be renewable, except to the extent necessary to maintain security of supply." Mighty River had spent around \$4M on the consenting process.

Meanwhile, on 23 February, Contact Energy announced a new renewable generation programme totalling around \$2 billion in wind and geothermal, (See [http://www.contactenergy.co.nz/web/pdf/financial/2007\\_hy\\_media\\_release.pdf](http://www.contactenergy.co.nz/web/pdf/financial/2007_hy_media_release.pdf)), with up to 260 MW of new geothermal generation, including two new power stations planned for the Taupo region.

Wind generation developments are also on Contact's agenda, with the company pursuing four wind farm sites. The company is currently actively engaged on the development of two wind farm sites that indicate significant wind resources. These two sites may be able to contribute up to 400 MW of electricity.

Contact Energy Chief Executive David Baldwin said that "strong geothermal development is critical if we are to meet demand growth through renewables, particularly during peak periods. If the Government is committed to this path, then we believe it is possible to defer decisions on new thermal generation for up to 18 months.

"During this time, we would be looking to the Government to finalise a market-based pricing system for carbon emissions.

"Contact's proposed Otahuhu C combined-cycle gas turbine power station is clearly New Zealand's best thermal option."

Mr Baldwin said that while Contact Energy hold the consents to build Otahuhu C, construction of the plant would be deferred for up to 18 months. "This would enable a decision on Otahuhu C to be made in a stable policy environment."

Meanwhile, Genesis is commissioning its new e3p gas combined cycle station at Huntly Power Station.

## Solid Energy investigates SI CO<sub>2</sub> storage potential

In November last year, coal producer, Solid Energy announced its intention to survey potential land-based carbon dioxide storage sites in Otago and Southland, a project that is part of a 20-year, \$100 million investment the company is making in clean coal technology.

The first stage of the survey, currently underway and due for completion in mid-2007, involves detailed geological and data analysis. If and when potential sites are identified, the company expects to move to a detailed drilling programme to investigate potential structures in more depth under appropriate resource consents.

The initial project is being undertaken using expertise developed through the Australian-based Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC), in which Solid Energy is a participant. Future research will involve New Zealand scientists.

Solid Energy Chief Executive Officer, Dr Don Elder

said that internationally the coal industry is investing significantly in developing and introducing clean coal technologies that will improve the efficiency of burning coal and reduce emissions from coal-fired power stations and industry.

Internationally carbon capture and storage (CCS) is expected to play a key role in helping to meet the challenge of climate change, given that the world will continue to be dependent on fossil fuels for some time to come yet.

Technologies for CO<sub>2</sub> capture are well established and have been successfully used for many years as part of everyday industrial processes, for example in the production of ammonia, and to provide CO<sub>2</sub> for use in the food and beverage industry. The petroleum industry routinely separates excess CO<sub>2</sub> from raw natural gas before transporting it to market by pipeline. When coal or lignite is gasified to produce chemicals or fuels, CO<sub>2</sub> capture is an

## PM plans to make NZ 'carbon neutral'

In her statement to Parliament on 13 February, the Prime Minister, the Rt. Hon Helen Clark, voiced her aspirations for New Zealand to become "carbon neutral in our economy and way of life". She says the government intends to lead by example in moving the public service towards carbon neutrality.

People or organisations can claim to be carbon neutral when they measure and reduce the greenhouse gas emissions associated with their activities (which come about mostly when fossil fuels are burnt to generate electricity or as transport fuel), and then undertake 'offset' projects to remove an equivalent amount of carbon dioxide from the atmosphere or prevent it being released.

"This year the first group of six departments will commit to carbon neutrality plans. By early next year, the Ministries for the Environment, Health, and Economic Development, the Departments of Inland Revenue and Conservation, and Treasury will have reduced their carbon footprint significantly. Their objective will be to reduce their department's emissions, but at the point that it is not feasible to reduce further, they will offset them; for example, by supporting tree planting on Crown land."

The Prime Minister said that the process would be Government led as "The invisible hand of the market doesn't deliver a sustainable nation, as an earlier era of New Zealand politics showed only too well."

She stressed that New Zealand, more than any other developed nation, needs to go the extra mile to lower greenhouse gas emissions and increase sustainability. "This will strengthen our position against competitors who are all too ready to use against us the distance our goods must travel to market (food-miles), and the distance tourists must travel to us (carbon footprints)."

Ms Clarke said that the draft New Zealand Energy and

Energy Efficiency and Conservation Strategies champion renewable energy across power generation and transport, and energy efficiency at home and at work.

She also said that the time has come to implement a sales obligation for biofuels.

"Biofuels can replace diesel or petrol, and reduce our greenhouse gas emissions. With domestic production they can also be positive for the current account." The government has decided that a Biofuel Sales Obligation will be set at 3.4 per cent of the annual energy content of total annual petrol and diesel sales by 2012. This initial target is considered sufficient to encourage the uptake of biodiesel and the development of infrastructure for ethanol distribution. Details of the biofuel roll out were given by Climate Change Minister David Parker and can be viewed on the New Zealand Government's website at <http://www.beehive.govt.nz/ViewDocument.aspx?DocumentID=28359>

In response to the Prime Minister's statement to Parliament, National Party leader, the Hon. John Key, claimed that "a 'carbon neutral' public service is a gimmick. If the Government was serious it would include the big energy consumers like schools, hospitals, police and the air force."

"A minimum biofuels sales target is a bit late, and doesn't take effect until 2012, meaning it won't contribute anything to meeting Kyoto commitments. National has already outlined a biofuels proposal."

Business commentators such as BusinessNZ and others have raised concerns about instituting environmental policies without a proper cost-benefit analysis, pointing out New Zealand's unhappy experience with the Kyoto Protocol. However, business groups have welcomed the Prime Minister's support for carbon trading, rather than a carbon tax.

## Solid Energy investigates SI CO<sub>2</sub> storage potential

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integral part of the process. Likewise, the injection of CO<sub>2</sub> underground has been carried out safely for decades by the oil and gas industry as part of the process of enhanced oil recovery. The geological storage of CO<sub>2</sub> offers huge potential for the permanent storage of large volumes of CO<sub>2</sub> as an alternative to emitting it as a greenhouse gas.

With thousands of scientists working on this technology worldwide, the engineering has come a long way in just a few years and development will continue to accelerate. Scientists predict that CCS will be an operational part of CO<sub>2</sub> producing industries in the next five to eight years.

"New Zealand has vast opportunities for underground storage of CO<sub>2</sub>, including in depleted gas reservoirs and in deep coal seams. If we are to exploit our huge lignite reserves, we must work to address the challenge of CO<sub>2</sub>. We will be able to build on the considerable experience of the international oil industry, which has used CO<sub>2</sub> injection

into geological formations for many years to help recover oil and gas from hydrocarbon reservoirs. For example, about 1 billion tonnes of CO<sub>2</sub> is estimated to have been injected to date for enhanced oil recovery in the United States alone and this is equivalent to New Zealand's entire annual CO<sub>2</sub> emissions for 25-30 years," says Dr Elder.

Solid Energy is developing a number of research and development programmes to specifically address the viability of applying clean coal technologies in New Zealand and in the development of alternative fuels. This includes new coal-based energy sources, such as coal seam gas which it is currently being piloted in the Waikato, and the further development of biomass for industrial and commercial energy.

"We are committed to a range of research and practical projects to reduce the environmental impacts of coal use to allow it to continue to support the country's economic prosperity in a sustainable manner and while we transition to renewable energy forms."

## Coming Events

15-17 May 2007, 3rd international conference on clean coal technologies for our future, Cagliari, Sardinia, Italy, Consulcongress Srl, Via San Benedetto, 88-09129 Cagliari, Italy, Tel: +39 070 499242, Fax: +39 070 485402, E-mail: info@cct2007.it, Internet: www.cct2007.it

20-23 May 2007, 6th Asia-Pacific conference on combustion: ASPACC07, Nagoya, Japan, Prof. Akira Umemura, Department of Aerospace Engineering, Nagoya University, Furocho, Chikusa, Nagoya, 464-8603, Japan, Tel: +82 52 789 4404, Fax: +82 52 789 3280, E-mail: aspacc07@combustionsociety.jp, Internet: www.combustionsociety.jp/aspacc07/

21-25 May 2007, International coalbed methane symposium, Tuscaloosa, AL, USA, College of Continuing Studies, The University of Alabama, Box 870388, Tuscaloosa, AL 35487-0388, USA, Fax: +1 205 348 9276, Email: nhodo@ccs.ua.edu, Internet: www.coalbed.ua.edu

10-15 June 2007, 32nd international technical conference on coal utilization & fuel systems, Clearwater, FL, USA, Barbara A. Sakkestad, Coal Technology Association, 601 Suffield Drive, Gaithersburg, MD 20878, USA, Tel: +1 301 294 6080, Fax: +1 301 294 7480, Email: BarbaraSak@aol.com, Internet: www.coaltechnologies.com

## Surprising results from 10-year HEEP programme

If domestic solid fuel heaters (such as wood and coal burners) were removed from the energy equation tomorrow, New Zealand would need another power station at least half the size of Huntly and there would be a resulting major strain on existing electricity distribution networks. This is one of the remarkable findings from a BRANZ Ltd study examining energy use in New Zealand households, where it was found that a staggering 56% of space heating and 5% of water heating is provided by solid fuel burners.

The long-term study of 400 randomly selected households from Invercargill to Kaikohe, dubbed HEEP (Household Energy End-use Project), collected a wide variety of raw data which is helping BRANZ research partner CRL Energy Ltd., develop an energy model of the residential sector.

“The raw data collected by BRANZ was a massive undertaking,” according to Nigel Isaacs, BRANZ principal energy and environment scientist. “Whatever type of energy was used in a household, whether oil, solid fuel, LPG, gas, solar water heating, or electricity, HEEP monitored it.”

Over the lifetime of the study HEEP monitored 440 hot water cylinders, 65 wetbacks, 206 solid fuel burners, 7 solid fuel ranges, 42 open fires, 175 portable LPG heaters, as well as all the normal range of household appliances - stoves, fridges, fridge/freezers, televisions, stereos and so on. Data were recorded every ten minutes for all fuels and hot water systems used in the study houses. In all houses, temperatures in the bedroom and living room were also recorded every ten minutes – about 1,200 temperature files.

This was then matched to a detailed household energy audit, physical inspection and occupant survey. Every electric appliance in the house is documented, and if ‘plugged in’ its power use recorded. These datasets now hold details on energy use and location of over 10,000 appliances.

In conjunction with the Centre for



*Dr Pieter Rossouw, energy efficiency research scientist and senior modeller at CRL Energy Ltd.*

Research, Evaluation and Social Assessment Ltd (CRESA) and John Jowett (consultant statistician) powerful statistical tools were then used to explore these datasets, and to extract algorithms.

Dr Pieter Rossouw, energy efficiency research scientist and senior modeller at CRL Energy Ltd in Gracefield, Lower Hutt, has implemented algorithms based on the HEEP data to create the Household Energy End-use Resource Assessment (HEERA) model. An earlier version of the model has already been tested in national and regional analysis of energy efficiency and the electricity system.

The finished HEERA model can be used to not only understand the existing energy relationships in New Zealand dwellings, but also to model the impact of policy on this relationship, such as insulation regulations and implementing energy efficiency standards – with the resultant reduction in certain types of solid fuel burners.

Dr Rossouw explained that the HEERA model is now being put through its final paces, with preparation of scenario modelling software. As well as all the usual energy variables, some of the other variables include aspects of the house (climate, region, floor area) and the occupants (tenure, income, the number of and life stage).

“The model supports a wide range of ‘what-

if' type questions. Some of the interesting results being looked at include the impact of mandatory insulation in 1978, and what would happen if older houses are insulated. The model has shown that while insulation may have led to improvements in energy efficiency this did not necessarily translate into energy savings or reductions, as newer houses often have larger floor areas. In addition, insulation may have reduced space heating energy, but most of these energy reductions have come from non-electric fuels."

Principal scientist on the study, Mr Isaacs, says there were a number of other unexpected findings from the data gathering exercise. "As well as the surprising amount of space heating provided by solid fuels, HEEP monitoring found that houses heated by open fires, portable electric and LPG heaters are the coolest, while houses with central heating or enclosed solid-fuel burners are the warmest. The LPG heating was a surprise as LPG heaters can produce a lot of heat, but most are used sparingly.

"Bearing in mind that thermal insulation became mandatory in 1978, we found that newer homes are warmer. However, they are usually warmer all year round which could be a problem in hot summer temperatures. We are investigating the reasons for this."

HEEP has also undertaken the world's first nationwide study of baseload and standby electricity uses. Standby is the electricity used by an appliance when it is waiting to be used, while baseload is the electricity used by appliances that are on all the time. Baseload appliances are typically appliances

such as a fridge and/or freezer, heated towel rail, and electric clocks, and items on standby typically include anything with a light on such as TVs, VCR, DVDs, stereos, clothes dryers, dishwashers, microwaves, portable phones, instantaneous gas water heater and computers. The study found that on average a household used about the same electricity on baseload and standby as for electric space heating.

"Who would have thought all those little lights and background appliances were using about the same electricity as space heating?" said Mr Isaacs.

Another surprising result of the study was the high number of faulty refrigeration appliances in New Zealand homes.

"We found around 16% (1 in 6) refrigeration appliances were faulty. The owners were probably unaware there was even a problem, as the fridge still made a noise and food might have been kept cool. But insulation degrades or gets wet, coolant leaks, door seals fail, or the thermostat or controller fails, all causing the appliance compressor to run continuously or in a faulty manner with poor temperature control."

The Foundation for Research, Science and Technology (FRST) and Building Research provided major funding for the project, with additional support from EECA, Transpower, Ministry of Social Development and Fisher & Paykel Ltd.

The Executive Summary and the full HEEP Year 10 Report are available for free download from the BRANZ website, or at a charge for the hard copy from the BRANZ Bookshop on the web site: <http://www.branz.co.nz>.

## Pathway to a hydrogen economy

CRL Energy has won a contract worth \$533,334 over 16 months from the Foundation for Research, Science and Technology to develop a pathway showing how New Zealand could make the transition to a hydrogen energy economy if hydrogen becomes part of this country's energy future.

CRL Energy's research manager, Dr Tony Clemens, says that it is important to have such contingency plans in place as the future energy mix of New Zealand is likely to come from a variety of sources as fossil fuel supplies such as oil and gas dwindle.

"Countries, such as Iceland, are already demonstrating that hydrogen can play a vital role in public transport. Almost every large car manufacturer in the world has a fuel cell programme."

Dr Clemens hopes to have a discussion paper ready by the end of the year, canvassing the potential to use hydrogen to run vehicles and generate electricity, including how surplus electricity could be used to split hydrogen out

of water and store it until needed.

The project would also look at ways to produce hydrogen, ranging from the concept of extracting it from coal to producing it from methane from digester systems making use of manure and other effluent from dairy farms.

A coal gasifier to produce hydrogen was built and operated by CRL Energy as part of an earlier \$6M FRST contract, shared with IRL, which has expertise in fuel cells.

The plant began turning coal into hydrogen in 2004 at Gracefield, Lower Hutt, to generate hydrogen gas for use in alkaline fuelcells.

Foundation Chief Executive, Murray Bain, said all projects receiving investment in the energy sector are consistent with the recently released National Energy Strategy.

"The outcomes of the research being funded will feed into the ongoing development of the National Energy Strategy, delivering improved knowledge to help achieve the Government's aim of ensuring New Zealand develops a sustainable and affordable energy system."

*28-31 August 2007, International conference on coal science and technology: ICCS&T, Nottingham, UK, Prof. Colin E. Snape, Nottingham Fuel & Energy Centre, University of Nottingham, Tel: +44 115 951 4166, Fax: +44 115 951 4115, E-mail: [Colin.snape@nottingham.ac.uk](mailto:Colin.snape@nottingham.ac.uk)*

*10-14 September 2007, 24th Annual International Pittsburgh Coal Conference, Johannesburg, South Africa. Johan van Dyk, PO Box 1, Sasolburg, South Africa, 1947, Tel: +27 16 960 4505, Fax: +27 11 219 2398, Email: [pitt2007@sasol.com](mailto:pitt2007@sasol.com), Internet: [www.sacoalprep.co.za/events.htm](http://www.sacoalprep.co.za/events.htm)*

*4-5 October 2007, 2nd international symposium on capture and geological storage of CO2, Paris, France, François Kalaydjian, IFP - Communication Division, 1 & 4, avenue de Bois-Préau, 92852 Rueil-Malmaison Cedex, France, Tel: +33 1 4752 6440, Fax: +33 1 4752 7049, Email: [francois.kalaydjian@ifp.fr](mailto:francois.kalaydjian@ifp.fr), Internet: [www.co2symposium.com](http://www.co2symposium.com)*

*9-15 November 2007, World energy congress, Rome, Italy. Mike Treacher, PennWell UK Office, UK Tel: +44 1992 656 636 Fax: +44 1992 656 700 E-mail: [miket@pennwell.com](mailto:miket@pennwell.com). Internet: [www.rome2007.it](http://www.rome2007.it)*

*16-20 November 2008, 9th international conference on greenhouse gas control technologies, Washington, DC, USA, John Gale, IEA, Orchard Business Centre, Stoke Orchard, Cheltenham GL52 7RZ, UK, Tel: +44 1242 680753, Fax: +44 1242 680758, Email: [johng@ieaghg.org](mailto:johng@ieaghg.org), Internet: [mit.edu/ghgt9](http://mit.edu/ghgt9)*

# Coal Association of New Zealand Inc.

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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 twice yearly, 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.



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