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NEWSLETTER



of the
**Coal Research
Forum**

EDITOR'S COMMENTS:

I guess the most eagerly awaited item this summer, apart from who was in the England World Cup squad, was the release of the Government Energy Review. I think in some cases the feelings about both of these were the same! Firstly, it confirmed the worst kept secret about the fate of nuclear in the future energy mix. There are those, however, who feel it did not go far enough to ensure that this technology will be implemented in the future. A number of organisations felt it was a missed opportunity. The Oxford Institute for Energy Studies felt it 'contains few proposals, more a series of wish-lists'. Furthermore it does not resolve the problem of how to achieve energy policy objectives in a liberalised market. Coal UK, never one to mince its words, maintains that the review 'remains a work in progress' and 'has almost no substance to it at all' although conceding that 'coal is assumed to play a much larger role in the nations energy future than was the case in the 2003 review'. Keith Allott, WWF-UK's Head of Climate Change, said: "The Energy Review is a damp squib. We need to take action to make renewables and energy efficiency work 'with a vengeance'. Friends of the Earth has cautiously welcomed the review but feels that it is not the great leap forward that would be needed to create a low carbon economy. So, who liked it then? The nuclear and renewables industries, clearly did, and the power industry, probably. At least Kevin Anderson of the Tyndall Centre for Climate Change Research believes so. He thinks that it is an electricity review rather than an energy review since it concentrates purely on the electricity supply industry. The consensus seems to be "OK as far as it went, but it could have been better".

The other important event was the 6th European Conference on Coal Research & Its Applications held at the University of Kent, (see article in this newsletter).

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6th European Conference on Coal Research & Its Applications 5th – 7th September 2006

The sixth of our biennial conferences kicked off on a bright sunny morning in the pleasant surroundings of the University of Kent's Canterbury campus. The conference had once again attracted more than 100 attendees although the figure was just shy of our record attendance in Edinburgh in 2004. Some of our attendees had travelled considerable distances to be with us in that we had visitors from Australia, USA, India, Korea, China, Japan, Serbia, Spain, Russia, France, Sweden and Finland- as well, of course, as those from the provinces, Wales, Scotland and Northern Ireland.

This was the first occasion when we had felt it necessary to run with two parallel sessions so that we could shoehorn as many papers as we could into two and a half days without depriving the attendees of their mandatory caffeine intake.

I think it is fair to say that, apart from a few minor technicalities, the event went well and most, I hope, enjoyed the experience. The poster session on Tuesday evening, (5th September), was followed by an excellent buffet and the conference dinner on Wednesday was generally well-received. The slightly premature starting of the meal can be blamed on those football fans anxious to see the Macedonia vs England match which was on that evening.

Details of the technical programme and short summaries of the papers will appear in the next issue of the newsletter.

UK energy review answers some EU Green Paper questions

A new generation of nuclear power plants, promoting the use of renewable energy and a stronger energy saving policy are the main elements of the Labour government's energy review presented on 11 July.

Tony Blair's government announced his country's energy review in November 2005. Although a White Paper on Energy had been published in 2003, the Labour government felt that high oil prices combined with the fast depletion of Britain's North Sea gas reserves mandated a new look at the country's energy policies.

It became clear from the beginning that the review would be quite controversial, as the Prime Minister had expressed early on his intention to put nuclear back on the policy agenda. The urgency of Britain's energy concerns also fed into a renewed European debate on a Common EU Energy Policy. During the UK's EU presidency in the second half of 2005, Mr. Blair convinced his colleagues, heads of state and governments to re-open the discussion on a new European energy strategy.

The UK's new energy review can be seen as the UK's answer to the European Commission's latest "Green Paper on Sustainable, Competitive and Secure Energy" (March 2006).

Issues:

The main elements of the new UK energy review, presented on 11 July 2006, are:

- **Saving energy** through better information campaigns, "smart metering", incentives for energy suppliers to promote "energy efficiency" instead of just selling more energy;
- **Cleaner energy**: with a focus on distributed energy generation and the use of low-carbon alternatives;
- **Renewable electricity**: 20% of electricity to come from renewables by 2020; increase in the level of financial support for some renewables (esp. offshore wind and tidal plants);
- **New nuclear power stations**, but the private sector will have to fund, build and operate the plants and cover decommissioning and waste management costs; the government will overhaul the planning rules for new nuclear plants; the review does not state how many new plants can be constructed;
- **Cleaner fossil fuels**: government to look into commercial and regulatory barriers for the development of carbon capture and storage (CCS);
- **Alternative fuels for transport**: proposal for a Transport Innovation Strategy to bring forward cleaner technologies and fuels;
- **Emissions trading**: a mandatory emissions trading scheme (Energy Performance Commitment) might be introduced for businesses and public services not currently covered by the European emissions trading system.

Positions:

Although the **nuclear power industry** welcomed the review's revival of nuclear power, some of their industry leaders raised questions about the government's decision to leave the financial risk to the investors and demanded more incentives.

The voice of **British Industry, CBI**, called the review a "promising start" but warned against "drawn-out consultation". The government should make the final decisions before the end of the year, according to CBI.

The UK's **Trade Union Centre (TUC)** stated that the government has the "energy balance right", but questioned whether the UK still has the "skills and research infrastructure to deliver the new technologies on which the strategies rely."

UK MPs warned the government not to take any hasty decisions on the UK's energy strategy. In a [new report](#) for the UK **House of Commons Committee on Trade and Industry**, the British MPs criticised the lack of "proper assessment of the projected future capacity" and underlined the need for cross-party and public support for the new nuclear strategy.

Greenpeace UK called the review "a farce from the beginning", as it was "a rubber-stamping exercise for a decision the Prime Minister took some time ago". Stephen Tindale, Greenpeace executive director said: "The reality is that nuclear sucks up all the money. There is an enormous radioactive cloud hanging over this energy review which threatens to drown any positive moves on decentralised energy, renewables and energy efficiency".

The UK's **Tyndall Centre for Climate Change Research** also criticised the review, saying it is more "an electricity review" than an energy review, neglecting 82% of UK energy use in heat and transport. The think tank also sees energy

saving commitments as seriously flawed. "Energy saving is once again the Cinderella issue. Last but not least, Tyndall thinks that nuclear's small contribution to UK energy (only 3.6%) is "irrelevant to UK carbon targets".

<http://www.euractiv.com/en/energy/uk-energy-review-answers-eu-green-paper-questions/article-156690>

Aid must continue for biomass-coal power, say producers

By Daniel Fineren

LONDON (Reuters) - The UK government must take care when redeploying the support it now gives to power producers who cut carbon emissions by burning organic matter at coal-fired power plants, generators said. Co-firing biomass, which can be wood chips, sewage sludge or specially-produced grains and plants, is one of the most cost effective ways of cutting carbon emissions from coal-fired power plants, which are among the biggest emitters of greenhouse gases. "I do hope the Department of Trade and Industry (DTI) doesn't kill that potential," Roy Westwood of E.ON UK's renewables division said at the Bionergy 2006 conference in Weston-Super-Mare, western England, last week. He added that co-firing could vanish as quickly as it has grown if the conditions created by the government are not right. Co-firing in British coal-fired power plants has been nurtured through its infancy by the government through its Renewables Obligation, a policy which requires power suppliers to source a percentage of electricity from such sources. That is starting to change as the government looks to leave co-firing to stand on its own two feet while it brings up other low carbon technologies, such as wave and tidal power. In a follow up to an energy review published earlier this year, the DTI is looking at reducing incentives to use some forms of biomass by introducing a banding system for different energy sources.

It says that too much support for the technology could stifle growth of other nascent forms of renewable energy and gobble up more than its fair share of biomass, leaving nothing for the wood panel industry or dedicated biomass power plants. "We are concerned about the impact on other biomass users," Kristian Armstrong, who is responsible for the Renewables Obligation at the DTI, told the conference. In the longer term, the government may introduce a banding system whereby some types of biomass, such as energy crops, would get more long-term support than others, to encourage the growing of such crops in Britain while freeing up wood chips for other users.

The government already plans to boost incentives to burn energy crops in coal-fired power stations from April next year. The long term investment environment for biomass co-firing will remain unclear until the DTI completes its review of renewables funding next year. Westwood, of German-owned E.ON, said uncertainty over the long term future of co-firing was discouraging big investment in the technology and his counterpart at rival German-owned generator RWE npower agreed. "Long-term planning is what we need in this business," npower's Mike Evans said.

KEY CARBON WEAPON

Although it thinks co-firing could become viable without government support within the next decade, the DTI's Armstrong said it was still a key weapon in Britain's struggle to reduce carbon emissions from coal plants. He noted that technology to capture carbon dioxide from coal and bury it was still being developed. "There's a lot of talk about carbon sequestration, but that's a long way off and it also looks like its going to be expensive," said Armstrong. In the

meantime, the importance of co-firing should not be forgotten, generators said. RWE npower's Mike Evans said that co-firing at UK coal-fired power plants had probably cut 2.5 million tonnes of carbon dioxide in the last 12 months. Jeremy Woods of Imperial College London said his research showed that biomass produced at least 900 grammes less CO₂ than coal does for every kilowatt hour of electricity generated.

<http://news.scotsman.com/latest.cfm?id=1343652006>

Pumping Coal - Coming Soon To The U.S.: Cleaner Diesel From Dirty Coal

May 15, 2006, Gunjan Sinha

The U.S. is plump with coal. The country has one quarter of the world's reserves, and coal accounts for about 50 percent of the nation's electricity. To cut the reliance on oil imports, why not also use it to power cars and trucks or to heat homes, too?

That may happen soon. This year Waste Management and Processors, Inc. (WMPI) will break ground for the first U.S. coal-to-diesel production facility, in Gilberton, Pa. The plant will process 1.4 million tons of waste coal a year to generate approximately 5,000 barrels a day of diesel fuel. Other states, such as Illinois, Virginia, Kentucky, Wyoming and West Virginia, are also considering coal-to-liquid facilities.

Interest in the technology is certainly welcome news to WMPI president John Rich, who has been trying to finance such a facility for more than a decade. "Coal to liquids hadn't taken off, because the price of crude was at \$30 to \$40 a barrel," Rich says. Oil at about \$60 makes coal more attractive.

To create the fuel, coal is first mixed with oxygen and steam at high temperature and pressure to produce carbon monoxide and hydrogen. The second step, referred to as Fischer-Tropsch synthesis, uses a catalyst to transform the gas into a liquid synthetic crude, which is further refined. Along the way, mercury, sulphur, ammonia and other compounds are extracted for sale on the commodities market.

The type of technology required to gasify the coal depends on the starting material. Pennsylvania alone has an estimated 260 million tons of waste coal--coal discarded because of its low energy content. "For every two tons of coal mined, up to half ends up in the reject pile," Rich says. Existing nearby facilities are not equipped to burn it. WMPI will rely on approaches innovated by South African energy giant Sasol; those methods are optimized to work with energy-poor coal, which include lignite and bitumen.

The resultant fuel is cleaner than conventional, sulphur-free diesel. In comparison tests, Daimler-Chrysler showed that the coal-derived fuel spews 10 percent of the carbon monoxide and hydrocarbons and 70 percent of the particulates. The firm had plans to unveil a demonstration vehicle with a tweaked V-6 engine in April that cuts nitrogen oxides and other emissions even further, says Stefan Keppeler, senior manager of fuels research at the company.

Though relatively clean at the tailpipe, the fuel is dirty at its source. A similar coal-based power plant discharges about four million tons of carbon dioxide a year. In some facilities, the greenhouse gas can be repurposed--it can be pumped into oil fields or, in the case of WMPI's plant, sold to the beverage industry.

Unless scientists develop methods to sequester CO₂ and find other uses for the gas, the technology might languish, warns Rudi Heydenrich, business unit manager at Sasol. The gasification step is also expensive, accounting for two thirds of the cost of a facility. "You need a structure where there is government support to ensure sustainable economics in the long run," Heydenrich remarks. Under the Bush administration's Clean Coal Power Initiative, a \$100-million federal loan guarantee jump-started the new WMPI facility. The state of Pennsylvania also chipped in with tax credits and a plan to buy up to half the plant's output to power its vehicles. Investors may contribute the additional \$500 million necessary to build the plant. The initial cost of the fuel is expected to be about \$54 a barrel.

Coal is not the only source of synthetic diesel; the fuel can be derived from natural gas and more cheaply, too. In fact, Qatar and Nigeria are building gas-to-liquid plants, and Sasol estimates that by 2014, gas-to-liquid fuel may account for at least 5 percent of the global market. But the U.S. does not have nearly as much natural gas as coal. And considering the vast coal reserves in China, which is also considering the technology, coal-derived diesel seems likely to play a bigger role in helping to liberate some countries from dependence on oil imports.

<http://www.sciam.com/article.cfm?chanID=sa004&articleID=000DFF5E-9E57-1446-9A6283414B7F0000>

Power Industry Seeks High-Tech Solutions To Mercury Puzzle

August 5, 2006, AP, John Flesher, Marquette, Mich.

It somewhat resembles a honeycomb: row upon row of sturdy fabric bags, each 26 feet long and stretched over a steel frame that preserves its conical shape. For high-tech gadgetry, it's short on bells and whistles. Yet this mechanism inside a cavernous building at the Presque Isle Power Plant may help achieve one of the nation's top environmental goals: slashing mercury emissions from incineration of coal to generate electricity. It's part of a new system called Toxecon. Designed by industry researchers, it prevents gaseous mercury from escaping into the atmosphere by mixing it with carbon, creating ash that is collected in the fabric bags and trucked to landfills. Power companies are rushing to develop such technology as pressure mounts from government regulators and environmental activists to reduce emissions of mercury and other harmful pollutants. Presque Isle was chosen in 2003 to host the first demonstration of Toxecon under real-world operating conditions. After initial testing this year, project *manager Steven Derenne says there's reason for optimism that Toxecon can filter out 90% of the mercury from low-sulphur, sub bituminous coal burned at many U.S. electric plants. The state Department of Environmental Quality will impose that standard by 2015 for Michigan, while the Bush administration is requiring a more gradual 70 percent nationwide reduction.*

"I'm confident that we can make this work," says Derenne, an engineer with We Energies, the Milwaukee-based company that owns Presque Isle. The 625-mewagatt plant on the Lake Superior shore produces half the electricity generated in the Upper Peninsula -- and is the region's leading generator of atmospheric mercury pollution. But problems remain, Derenne said, from operational glitches to major hurdles such as figuring out how to calibrate instruments so they can measure the tiny bits of mercury captured in the gas.

The Toxecon experiment comes amid debate over whether power companies have the ability -- and the money -- to hit the 90% mercury reduction target set by Gov. Jennifer Granholm in April. A number of other states, including Illinois,

Pennsylvania and Minnesota, are adopting the same requirement. Vince Hellwig, chief of the state DEQ's air quality division, says technology is available that can enable companies to meet the 2015 deadline. If they implement a strategy in good faith and it flops, they'll get more time, he says. Industry leaders say the job is harder than it sounds.

Mercury is a trace element in coal and forms roughly 1 part per billion of the gas created by incineration. Capturing 90 percent of it is like dumping 30 billion white ping pong balls and 30 black ones into a football stadium, then tracking down 27 of the black balls, says Lou Pocalujka, senior environmental planner for Consumers Energy.

"It really relies on the technology being able to deliver," he says. Companies also say a mandatory 90 percent reduction will make them pour money into research and equipment yielding relatively little benefit. "It's really not going to gain very much in terms of public health," says Leonard Levin, principal technical manager with the Electric Power Research Institute (EPRI) in Palo Alto, Calif., the industry's research arm.

Most of the mercury that can become methyl mercury, the form that accumulates in fish and can cause neurological damage in humans, would be captured under the Environmental Protection Agency's plan for a 70 percent rollback, Levin says. That could be achieved mostly with existing technology, such as smokestack scrubbers, used for reducing other pollutants, he says.

Detroit Edison is spending more than \$1 billion on such equipment for its Monroe Power Plant, the biggest mercury emissions source in Michigan, says Skiles Boyd, vice president for environmental management.

The remaining 30 percent of mercury would be mostly a different variety that doesn't settle in nearby waters, but tends to circulate globally in the atmosphere with mercury generated elsewhere, Levin says. Costly new technologies such as carbon injection are needed to capture it.

But Derenne says it's not certain that existing technology can achieve the 70 percent reduction. It depends on the type of coal used and other factors, he says. Either way, EPRI is pushing ahead with technology aimed at reaching the 90 percent goal -- including Toxecon, which the institute patented.

The U.S. Department of Energy considered its prospects solid enough to pay half the \$53 million cost of installing and testing the system on three of the Presque Isle plant's nine generating units.

Toxecon injects activated, powdery carbon into the superheated gas from coal incineration. The carbon absorbs the mercury and flows into a newly constructed building called a "bag house," where it's trapped inside the network of fabric bags.

As a bonus, designers hope the process also will remove up to 70% of the sulphur dioxide and 30% of the nitrogen oxide from the gas, along with the 1 percent of fly ash from coal combustion that isn't captured earlier.

The system has reached the 90% threshold for mercury removal during testing this year, although not continuously. Once perfected, it should be able to average 90% if the correct amount of carbon is injected, Derenne says. That would prevent an estimated 82 pounds of mercury a year from slipping into the air from the three Presque Isle units.

But nagging problems have surfaced, such as overheated gas burning the bags and water collecting in ash hoppers for no apparent reason. Those issues were resolved, but the latest struggle involves how to make the captured mercury less dusty so it doesn't blow away.

"We're plowing new ground and there are always these setbacks," Derenne says while conducting a tour of the baghouse. But the industry can benefit from them, he adds. "They're going to build on the lessons learned at Presque Isle -- probably not just in the U.S., but the world.

Regardless of how the experiment turns out, Toxecon is not "a uniform magic potion" for all mercury emissions, Levin says. Power plants have varying configurations and use different types of coal, so a mechanism that succeeds one place might not somewhere else.

"It's going to take a lot of hard work and study for us to understand how to deal with mercury," says Kristine Krause, environmental vice president for We Energies.

Submitted by Technology News... on Sun, 2006-09-17 18:07.

GE Energy will establish a European Cleaner Coal "centre of excellence" in Warsaw, Poland.

According to John Krenicki, GE Energy President and CEO, the new centre will provide GE with a base for expanding the use of its state-of-the-art cleaner coal, or IGCC (integrated gasification combined-cycle), technology across Europe. The facility also will provide engineering support for GE Energy's environmental services and optimization and controls businesses, to supply the region with a broad range of offerings for the coal industry. Poland is among the world's leading producers and consumers of coal, with recoverable reserves of hard coal (bituminous and sub-bituminous) estimated at 41 billion tons. GE's IGCC technology converts coal into a cleaner burning fuel, which is used in a gas turbine combined-cycle system to generate electricity. "Cleaner coal" IGCC is a product of ecomagination, a GE corporate-wide initiative to address challenges such as the need for cleaner, more efficient sources of energy, reduced emissions and abundant sources of clean water. GE Energy will look to build on the success and the experience of GE's aviation engineering design centre in Warsaw and plans to co-locate its cleaner coal engineers in the same facility. The cleaner coal centre is expected to begin operations in the next 60 to 90 days.

<http://www.technologynewsdaily.com/node/4491>

Group wants to save giant coal shovel

Associated Press, **Cadiz, Ohio**

The giant shovel that rattled eastern Ohio's hills as it scraped the surface for coal for more than 40 years died in April. Now, what happens to it? The Silver Spade, taller than a 12-story building and capable of eating 155 tons in one bite, will either be sold for scrap or turned into a museum. The Harrison County Community Improvement Association believes the machine can have a second life. The association wants to turn the Silver Spade and the land around it into a museum dedicated to the area's mining industry. But Pittsburgh-based CONSOL

Energy, which owns the giant shovel, says it's worth at least \$600,000 as scrap and it doesn't want to give the Silver Spade away.

Harrison County Commissioner Dennis Watson said interest in saving the Silver Spade is so high that the county should have no problem raising money to save the shovel from going to scrap. A transfer from CONSOL to a museum developer would need federal and state regulatory approval. "It was part of the landscape around these parts for more than four decades," Watson said. "It's an engineering marvel we want to see saved." With a couple of passes, Silver Spade could carve a path as wide as an eight-lane highway. After the exposed coal was removed by smaller machines, the dirt was returned and the machine moved on. Until April The Silver Spade was only four or five shifts and a few hundred feet short of its planned retirement when the rollers that rotate the shovel broke.

"It had a stroke," CONSOL spokesman Joe Sorenzia said. "It cost \$6.9 million in 1965. The estimated cost to repair it today was \$30 million. After all those years, it outlived its usefulness." The Spade has had only 20 operators since it began working in coal-rich eastern Ohio. Tom Huntsman, 63, of Cadiz, was the last. "I ran the shovel for the last 15 years. It was my whole life," Huntsman said. "We knew that it was on its last legs, so we just ran it until it would not run anymore. The day it stopped was the day I was out of a job, so it was quite a shock." The Harrison County group wants to pattern a Silver Spade museum after one in Kansas. "Big Brutus is the same type of machine, and it's smaller than ours," said Chris Copeland, executive director of the Harrison County group. "It's set up with a museum in a remote area of Kansas and it still gets 40,000 visitors a year. ... We could get thousands of visitors here. We have 11 million people living within a 100-mile radius of Cadiz." Another Ohio shovel, Big Muskie, was scrapped in 1999 and its bucket was moved to a park in McConnelsville. Copeland is betting that the sons and daughters of miners will be interested in seeing how their fathers worked the coal fields. He believes that people will come from miles around to visit the Silver Spade and the mining museum that would be built at the site. "We can't move the Silver Spade," Copeland said. "But we can build the museum near it. It's the last of its kind. We'll probably never see one like it again. People want to see it, get close to it."

<http://www.timesleader.com/mld/timesleader/15543617.htm>

Korea to Develop Soft Coal in Bangladesh

Korean firms are looking into ways to exploit the vast deposits of soft coal in Bangladesh's north-western region of Dighipara, and to build a thermal power plant there as early as next year. Seoul's Commerce, Industry and Energy Ministry said Sunday a delegation met with Bangladeshi energy advisor Mahmudur Rahman and discussed ways of cooperation in energy resources development. POSCO and the Korea National Oil Corporation are also planning to set up a joint venture with Bangladesh's Petrobangla in explorations for natural gas in the Gulf of Bengal.

Arirang News

<http://english.chosun.com/w21data/html/news/200609/200609180017.html>

Huge French Coal Bed Methane Find

15-09-2006

Gas explorer Heritage Petroleum plc's first test drill in France has produced results at the 'top end of our expectations' Chief Executive Paul Ray said today (15.09.06). Mr Ray was commenting after significant gassy coal seams were

intersected at the company's Folschviller ST1 Well in Alsace Lorraine. Strong gas readings were recorded in the inter seam sediments over the entire 106 meter interval of the current depth of the well at 882 meters. Strong to very strong gas readings were recorded in coal deposits and gas has also been discovered within the inter and intra seam sediments. The ongoing analysis supports expectations that three more gassy coal packets, including two major coal seams, will be encountered in the remainder of the well. "Results to date are very promising indeed," said Mr Ray, whose company, quoted on Plus Markets, owns 25 per cent of the project in a joint venture with European Gas Ltd. "We are particularly encouraged by the preliminary data." The program is in preparation for the development of the large Gas in Place Resource which to date totals 28.1 billion cubic metres ("Bcm") (991.2 billion cubic feet ("Bcf")) within approximately 7% of Heritage's six permit and application areas in France and Italy.

http://sourcewire.com/releases/rel_display.php?relid=27135&hilite=

UK given only four years to combat climate change

Posted: 15 Sep 2006

The British Government has only four years to implement a major new programme of action to cut carbon emissions if the UK is to play its part in keeping global temperatures below danger levels an authoritative new report warns today.

The report, launched by The Co-operative Bank and Friends of the Earth, is based upon research commissioned from The Tyndall Centre for Climate Change Research at the University of Manchester. It is the UK's first comprehensive roadmap to a low carbon economy that would deliver on Government commitments to keep temperatures from rising beyond a critical point.

It suggests that a carbon budget of around 4.6 Giga tonnes between 2000 and 2050 would allow the UK to play its part in keeping temperatures from rising two degree centigrade above pre-industrial levels - the danger level. If emissions continue at the current rate the UK would emit close to double this amount by 2050.

Road map

The study also outlines what the Government could do - and by when -to keep within this carbon budget and maps out how homes, business and transport in the UK could change as a result. The report demonstrates that:

The UK can achieve the necessary carbon reductions if the Government implements a major programme of action within the next 4 years. Delaying action will require much more drastic and less manageable cuts.

The UK needs to achieve significant emission cuts - of around 70 per cent - within the next 30 years. Government targets of a 60 per cent cut in emissions by 2050 are insufficient as they do not provide for enough reductions within the necessary timescale.

UK carbon emissions have not fallen since 1990. Government calculations which show a decrease are misleading as they fail to take into account emissions from international shipping and aviation.

As a first step towards a low carbon economy Friends of the Earth's Big Ask Campaign and The Co-operative Bank - through its customer care scheme - are calling for a climate change bill to be introduced into Parliament this year which would commit the Government to reducing the UK's carbon dioxide emissions by at least 3 per cent year on year. A law would provide Government and business with the framework they need to turn the climate road map into a reality.

A Future starts here: the route to a low carbon economy outlines key milestones on the path to a low carbon economy including:

Year 2010

From now until 2010 the Government has used its spending and regulatory powers to control the growth in energy demand - for example by phasing out the most inefficient light bulbs and phasing in domestic aviation fuel tax. Industry and the service sector have been set more challenging targets to cut their emissions and there has been a big increase in investment in public transport.

Government policies take time to bear fruit however the Government has met its target for sourcing 10 per cent of the UK's electricity needs from renewables. While on the high street there has been a jump in sales of energy efficient appliances and smaller energy efficient cars.

Year 2030

Carbon dioxide emissions have decreased by 70 per cent. The Government of 2030 provides strong financial incentives for business to reduce emissions and to invest in research and development into new climate friendly technologies - for example by using the taxation system or an extension of the EU emissions trading scheme.

Policy measures introduced from 2010 are having a big impact. One quarter of all energy demand is met by renewable power and biofuels, and fossil fuels are used much more efficiently including using waste heat for local domestic and industrial use. Capturing and storing carbon dioxide in old gas and oilfields is also used for removing emissions from fossil fuel power stations.

Energy demand from households and commercial sector has been reduced by a quarter. New and refurbished properties have a near zero demand for space heating and cooling thanks to improved building design. Travel in the UK and around Europe is by larger trains as air travel is largely reserved for long haul flights. There are 10 per cent less cars on the roads and city centres are largely car free.

Year 2050

Carbon dioxide emissions have decreased by 90 per cent. The Government of 2050 continues to deliver year on year cuts in emissions, however financial incentives become less important as public demand and research and development drives innovation.

The use of coal, oil and gas has declined by 70 per cent from 2004. Over a third of electricity needs are met locally through renewables such as building integrated wind turbine and solar panels. While hydrogen - produced from renewable energy sources or fossil fuels - accounts for about a quarter of total energy use. Hydrogen fuel cells in homes and multi-fuel filling stations that provide cars with hydrogen, electricity and - to a lesser extent - bio-fuels are commonplace.

Decisive action

Commenting on the report, the Director of Corporate Affairs at The Co-operative Bank, Simon Williams said: "This is more than yet another wake up call. Even if scientists take a gloomy view of the continually increasing human impact on our environment, this report illustrates that if we start acting now, the required carbon reductions are achievable, albeit with some potentially uncomfortable changes for our lifestyles. Decisive action from Government is demanded."

Research Director for the Tyndall Centre's Energy and Climate Change Programme, Dr Kevin Anderson said: "Our research demonstrates that the UK can move to a low carbon economy. However the journey will become much more demanding the longer the Government leaves it to act. To make a smooth transition to a low carbon future the Government, business and we as individuals need to immediately begin to implement a major programme of action to significantly reduce our carbon emissions."

The need for government action was stressed by Tony Juniper, Executive Director of Friends of the Earth. "To turn this road map into reality we need a law that commits this and future Governments to making annual cuts in the UK's carbon emissions - as called for by The Big Ask climate campaign. Without this law politicians will continue to place short term gains ahead of the long term decisions needed to get to grips with climate change."

<http://www.peopleandplanet.net/doc.php?id=2840>

Arrests as 600 march on coal power station

By Andrew Norfolk - The Times September 01, 2006

Police arrested 38 people during a climate-change demonstration yesterday when energy campaigners attempted to shut down Britain's biggest coal-fired power station.

Protesters marched on the Drax power station during a day of "creative mass action" to highlight the plant's status as the country's largest single emitter of carbon dioxide. Their attempts to disrupt the site's operation were foiled by a security operation involving several hundred officers from seven police forces across the country. Dozens of police vans were placed along routes leading to the power station. Ten Metropolitan Police vans alone were parked in one lay-by and at times a line of 25 police vehicles could be seen travelling in convoy.

Although some of the estimated 600 demonstrators gained temporary access to the giant North Yorkshire plant, most were forced to voice their protests outside the entrance gates. Arrests were made for offences including criminal damage, aggravated trespass and causing a public nuisance. Two people were held on suspicion of carrying offensive weapons.

The day of direct action came after a week during which a coalition of environmental groups set up the Camp for Climate Action near Drax, which supplies 7 per cent of Britain's electricity. Campaigners said that they wanted to take positive action against the root causes of climate change.

"The dream of consumption without end is becoming the nightmare of ecological collapse," a spokesman said. "This [the protest] is the only way to stop the actions of those vested interests that watch the planet burn while counting the money they make from the fire."

The power station had obtained an injunction barring demonstrators from its premises, and Melanie Wedgbury, the company's head of external affairs, said that despite the protest it had been "business as usual" for the plant.

She said: "Two people made their way on to the site in the early hours of the morning and climbed up a lighting tower some distance from the generators. They came down of their own accord and were arrested."

Dr Wedgbury said that Drax was the cleanest coal-fired power station in Britain, but accepted that climate change was a real threat and said the company was committed to making further reductions to its CO2 output.

Hundreds of demonstrators left their camp site yesterday morning for a two-mile march to the power station, led by a group of small children and parents pushing pushchairs. They were joined by campaigners dressed in white overalls and with their faces covered. There were minor scuffles as police blocked their route temporarily.

About 40 protesters attempted unsuccessfully to force entry to the plant. Others staged a colourful sit-down protest on the road outside the main entrance.

About 900 campaigners were involved in the week of activities leading up to yesterday's protest.

David Cairney, a spokesman for the group, said: "Drax is an enormous facility and getting it to stop production was nigh-on impossible, but we've managed to show the strength of feeling out there."

<http://www.timesonline.co.uk/article/0,,2-2337905,00.html>

Pits could re-open, says coal handling firm boss

THE boss of a Barnsley coal handling firm which has just been snapped up for £5.5 million claims the mining industry could be revived if the energy crisis continues.

Greg Kelley, MD of Norec said being bought up by industrial services group Hargreaves was "fantastic news" which would help them grow just as the use of coal was increasing.

The Dodworth firm, which handles coal at power stations and ports, employs almost 600 people. Norec last year turned over £23.4 million and made pre-tax profits of £1.02 million.

Mr Kelley, aged 56, said: "The use of coal is increasing. The Government has not made up its mind about nuclear and gas prices are horrific and unstable. "So what was potentially an industry in decline is not. Coal power is viable for the next 10 to 15 years while they try to come up with an alternative strategy. "Meanwhile clean coal technology is improving; it's no longer the dirty way of producing power. I would love to see the pits reopened. If it can be supported on the markets they will and if they don't come up with alternatives then coal could be the future. Most of our coal is imported but we are sat on it." Norec, formed in 1988, moved to Fall Bank industrial estate eight years ago. About 70 per cent of staff formerly worked for British Coal.

18 September 2006

<http://www.barnsleytoday.co.uk/ViewArticle2.aspx?sectionid=86&articleid=1773992>

Secret to cheap petrol is coal

Jason Dowling September 10, 2006

A \$5 BILLION (Australian) proposal to turn some of Victoria's abundant brown coal into diesel moved a step closer after the State Government revealed it was about to grant a mining licence to the company behind the project.

Energy Minister Theo Theophanous told *The Sunday Age* that the project aimed to produce about 60,000 barrels a day of high-quality diesel fuel at a much lower cost than present world prices. He said an announcement on a mining licence for Monash Energy was likely to be made before the November 25 state election. The mining licence approval would include details of the total investment and when the plant would be operational. The first stage, which will cost between \$300 million and \$400 million, would be a demonstration plant that could be up and running in six years. The entire project should be operational in 10 years.

The project has the backing of Shell and the big mining company Anglo American. A key aspect of the project, promoted as "clean energy", would be the minimising of greenhouse gas emissions by separating the carbon dioxide from the brown coal and storing it underground — a project known as geosequestration. About \$1.5 billion of the \$5 billion project would be spent on the geosequestration process, Mr Theophanous said. The project would be one of the world's biggest carbon dioxide capture and storage projects, with the gas stored deep underground in the offshore oil and gas fields in the Gippsland Basin.

Mr Theophanous told *The Sunday Age* that a trial geosequestration project near Warrnambool had received \$4 million in State Government money and would likely begin depositing carbon dioxide underground next year. "We have to find out — does it work and how safe is it?" he said. It would be selfish to not worry about global warming, leaving it to our children. Victoria is estimated to have about 500 years of brown coal reserves in the Latrobe Valley. Mr Theophanous said that if geosequestration was successful, Victoria could cut to "close to zero" the emissions from new brown coal power stations in the future. He said Victoria would need a new base-load power station in the next decade, but he did not expect the geosequestration technology to be ready until the power station after next. Mr Theophanous said it would also be unlikely the geosequestration technology would have much impact on emissions from Victoria's existing power stations. Peter Cook, chief executive of the company CO2CRC, which is behind the geosequestration trial at Nirranda, near Warrnambool, said its success was "absolutely crucial" to the future of the Monash Energy coal-to-diesel project. Dr Cook said there had been keen interest in the geosequestration trial from around the world. He said representatives from other countries and the International Energy Agency would be in Melbourne next month to examine the geosequestration trial. He said they would look at how the carbon could be monitored once it was stored underground. The project is expected to be the first geosequestration trial in Australia when up and running next year. Opposition Leader Ted Baillieu said he supported any project that tackled carbon dioxide emissions at their source. But a Greenpeace energy campaigner, Mark Wakeham, said geosequestration was untried and expensive.

"We don't know whether the CO₂ can be stored for the long term," he said.

<http://www.theage.com.au/news/national/secret-to-cheap-petrol-is-coal/2006/09/09/1157222384113.html>

VAMCAT on the prowl to slash methane emissions

15 August 2006

A new CSIRO technology called VAMCAT (Ventilation Air Methane Catalytic Turbine) is poised to take a sizable bite out of methane emissions with a Greenhouse effect equivalent to more than 237 million tonnes of carbon dioxide. These emissions are released to the atmosphere every year from the world's underground coal mines through exhaust ventilation air. CSIRO and the Australian Greenhouse Office together with China's Shanghai Jiaotong University and Huainan Coal Mining Group will construct the first pilot-scale demonstration unit at a coal mine in China. The low-heating value gas turbine will be powered by about 1% methane in ventilation air. It will generate green power while also consuming the mine's fugitive methane, which is 23 times more potent than carbon dioxide as a greenhouse gas over a 100 year time frame. The project is being conducted under the Australian Government's Bilateral Climate Change Partnerships Program along with support from an Australia-China special fund grant under the Australian Government International Science Linkage Program. The initial investigation of catalytic combustion performance was supported by a grant from the Australian Coal Association Research Program (ACARP).

The project is being led by Dr Shi Su from CSIRO Exploration and Mining. "China is responsible for about 45% of total ventilation air methane emissions," Dr Su said. "Although gas drainage efficiency in China has increased from 15% in 1998 to 26% in 2004, much of the captured gas is poor in quality. It is estimated that more than 70 to 80% of the drainage gas has a methane concentration of less than 30%, which cannot be used by conventional technologies.

So while China is the largest source of mine methane emissions, it is also the largest potential market for technologies mitigating those emissions. "Once this novel gas turbine technology is demonstrated at a coal mine, it will also have application in the mitigation and utilisation of methane from landfill, livestock and the combustibles in industrial off gas." A prototype demonstration unit with a power output of 10 to 30kW will first be demonstrated in the Chinese mine. Operational performance data and experience gained from this small unit will be used for the design of a second-generation turbine of at least 1MW output. Approximately 70% of all coal mining related greenhouse gas emissions can be attributed to methane exhausted to the atmosphere. This is not only bad for the environment, but also a waste of an important energy source. VAMCAT has the potential to reduce these emissions while also providing a valuable source of clean, green energy.

<http://www.ferret.com.au/articles/8b/0c043d8b.asp>

Strong, light building material invented

SYDNEY, July 31 (UPI) -- Australian university researchers have developed a strong, lightweight building material they believe might sell well in nations such as China and India. Coal-burning power plants in China and India generate millions of tons of fly ash each year, spending millions of dollars disposing of the fine powder that's loaded with toxic chemicals. Yet, Obada Kayali and Karl Shaw of the University of New South Wales note in the Middle East there are very few coal fired power stations and an acute shortage of durable building materials because of the lack of suitable clay, aggregate and sand. That, they said, creates a market for high-quality, light-weight building materials. The scientists have developed bricks and building aggregate that can be manufactured entirely from

waste fly ash and save on construction costs. The product is 28 percent lighter and 24 percent stronger than comparable clay bricks, resulting in lighter structures, shallower foundations, cheaper transportation, and less usage of cement and steel reinforcement. The technology been licensed in the British and U.S. markets. The researchers are now seeking interest from companies wanting to develop the technology for China, Japan, Southeast Asia, Europe and India.

<http://www.upi.com/NewsTrack/view.php?StoryID=20060731-024049-6210r>

Cleaning up a costly problem

June 08, 2006, Amanda Hodge

Plans are well advanced to invest up to \$20 billion to convert ageing power stations into clean coal energy producers. An ageing coal-fired power station in central Queensland is at the cutting edge of a multi-billion dollar international drive to produce greenhouse gas-free energy.

Run by the Queensland Government-owned electricity provider CS Energy, it is among the smaller players counting on \$50million in federal money to help finance what could be a technological breakthrough in the pursuit of emissions-free, coal-fired electricity.

In partnership with a Japanese boilermaker, power producer, government research body and coal-mining giant Xstrata, CS Energy plans to convert the Callide power station to become an almost greenhouse gas-free energy producer. The proposed \$160 million conversion will allow the plant to burn coal in almost pure oxygen - a process known as oxyfuel burning - which separates carbon dioxide into a concentrated stream, making it far more cost effective to capture and store underground.

CS Energy major projects manager Tony Anderson says the technology will be crucial to cutting global warming greenhouse gases because it can be retrofitted to ageing power plants across the world which collectively emit seven billion tonnes of carbon dioxide each year. Nuclear power may be on every politician's lips but to see where the Government's real energy interests lie follow the money trail to the country's coal and gas fields. Here the commonwealth will spend as much as \$500 million through its Low Emissions Technology Fund to help accelerate clean coal technology - the science of producing power from coal minus the greenhouse gases.

Add to that \$300 million from the Australian Coal Association, \$80 million from the Victorian Government and \$300 million from Queensland and the industry has a research purse that renewable energy industries could only dream about. Together with proposed private industry spending, investment in clean coal technology in Australia alone is expected to tip \$20 billion in the next decade.

The reason for this massive investment is that Australia has about 300 years' worth of coal still in the ground and fossil fuels comprise a quarter of all exports. Australia also has 24 large power stations that burn more than 250,000 tonnes of coal every day to supply what is among the cheapest electricity in the Western world. The downside is every station releases thousands of tonnes of carbon dioxide into the atmosphere. The federal Government has gone a long way to support the coal industry, risking international opprobrium by refusing to sign the Kyoto protocol - a treaty that seeks to reduce greenhouse gas emissions by putting a price on carbon dioxide. It was also instrumental in securing a six-nation Asia Pacific climate alliance Green groups have dubbed the Coal Pact for its focus on developing economic ways to capture carbon dioxide from fossil fuels and safely store it underground. These measures appear to be paying off.

If all goes to plan, Australia will have some of the world's largest carbon capture and storage demonstration projects by 2012, and commercially viable operations shortly after. By far the biggest will be the proposed \$11 billion Gorgon gas partnership, between Chevron Australia, Shell and ExxonMobil, which aims to inject 120 million tonnes of carbon dioxide from the WA gas fields into saline aquifers beneath Barrow Island to reduce greenhouse gas intensity.

In Victoria's La Trobe Valley, energy giants Anglo American Coal and Shell have joined forces in the \$5 billion Monash clean coal technology project to create high-value synthetic diesel. Within weeks the LETF will announce the recipients of its largesse as coal producers, power companies and large energy users line up for help to keep Australia's coal-dependent economy afloat.

For all its complexity, clean coal technology boils down to capturing carbon dioxide, either before the fuel has been burnt or post-combustion, compressing it and storing it underground. This method, called carbon sequestration, is not a new technology. It is already used commercially in the Sleipner North Sea project off Norway and in oil recovery at about 70 sites worldwide. The UK estimates it could store all its carbon emissions for more than 100 years in exhausted oil and gas fields in the North Sea. Victoria's Otway Basin is believed to provide one of the world's best opportunities for economic carbon storage because of the proximity of the power stations of the La Trobe Valley to Bass Strait's oil and gas fields.

A study by the CRC for Greenhouse Technology estimates the Otway Basin has the potential capacity to store anywhere from two billion to six billion tonnes of carbon dioxide emissions - decades worth of storage. "We've done major studies on this for La Trobe Valley and the costs look pretty reasonable," CRC chief Peter Cook says. He argues that it is far more economical to store carbon in the one place that has been emitted from a cluster of power stations. "It starts to make a lot of sense if you can bundle a lot of those operations together," he says. Anglo American Coal is counting on it. Its coal-to-liquids project will use an integrated gasification combined cycle process, the most hopeful of the carbon capture methods, to separate carbon from brown coal before it converts it to synthetic diesel. If all goes to plan the enterprise will not only successfully demonstrate the technologies needed for the next generation of coal-fired power stations but build vital infrastructure for piping the carbon from the valley to spent oil and gas seams offshore.

Cook believes the Monash project will be a crucial driver to further commercial deployment of clean coal technology in Australia. Similar plans are afoot overseas. The US, Canada, Japan and Europe have all invested heavily in finding ways of burning coal more efficiently and in capturing and storing the carbon dioxide emitted. The \$US1 billion (\$1.34 billion) FutureGen pilot in the US aims to have the world's first integrated carbon sequestration and hydrogen production power plant up and running by 2012. It will also use IGCC technology to separate hydrogen from carbon in coal, store the carbon in an underground aquifer or coal seam and produce emissions-free power from hydrogen. The public private partnership involves some of the world's largest coal companies including Rio Tinto and Australian mining giant BHP, the US Department of Energy, and the Indian Government. But renewable energy producers argue that the world can't wait for clean coal and they are ready to roll out their technologies now.

The nuclear industry makes a similar point and argues that clean coal is too expensive. However, a new report commissioned by the Australian Nuclear

Science and Technology Organisation found nuclear power in Australia would require heavy government subsidies for at least the first 12 years.

Reserve Bank director and energy economist Warwick McKibbin says the technology is unlikely to be economic until the federal Government is prepared to put a price on carbon emissions. "If you look at what it costs per unit of extracting it, capturing it and storing, it's still not economically viable given the inputs," he says. "At the moment there's no reward for extracting carbon from the atmosphere so a carbon price would make a big difference. It's the same argument for solar and other renewable energies." While clean coal cannot hope to compete with far cheaper conventional coal-fired power, which releases carbon dioxide into the atmosphere, the price is steadily reducing. A report commissioned by the Renewable Energy Generators Association found that the cost of clean coal technologies and a broad sweep of renewable energies were falling at similar rates and were competitive - at least with each other. By comparison the cost of nuclear energy declines only slightly and ends up more expensive. The report, by Melbourne-based consultants McLennan Magasanik Associates, is based on a collection of international data and considers capital costs, fuel costs, non-fuel operating costs and waste disposal.

A report released last year by an international panel of scientists, Intergovernmental Panel on Climate Change, found conventional coal-fired power plants in the northern hemisphere (where coal is more expensive) produced electricity for between \$US18 and \$US26 per megawatt hour. In Australia the price is \$25-\$35.

By comparison an IGCC plant, where the carbon was captured and stored underground, produced power for anywhere between \$US54 and \$US79 a megawatt hour.

A 2003 Massachusetts Institute of Technology study into the future of nuclear power estimated that the cost of building a new nuclear power station using the best existing technology in the US would equate to \$US67 per megawatt hour.

Australian Conservation Foundation president Ian Lowe believes that investing in cutting emissions from coal-fired power stations, particularly those existing ones that have a lifespan of as much as 40 years, is money well spent. But he fears the federal Government is putting all of its eggs in one basket. "Most of the Government's energy planning, to use that term loosely, is based on the assumption that we can continue to go on building coal-fired power stations and this technology will be made to work and be cost effective," he says.

"I would like to see technology that makes coal a lot cleaner but I'm a bit nervous about our energy policy being effectively based on the assumption that [clean coal] will work."

Amanda Hodge is The Australian's environment writer. Additional reporting: Joseph Kerr.

<http://www.theaustralian.news.com.au/story/0,20876,19398445-28737,00.html>

Tailings

Student Bursaries for 2006/2007

Up to 6 travel bursaries for up to £300 are on offer to bona-fide full-time students wishing to attend appropriate coal-related conferences. To apply, please send the abstract submitted to the conference with a brief supporting letter from your supervisor to:

Prof. J.W. Patrick
SChEME
The University of Nottingham
Nottingham
NG7 2RD

The bursaries come with no obligations to the recipient other than to supply a short essay about his or her impressions of the conference to the Newsletter for inclusion in the next edition.

Update on current BCURA Projects

B66 THE UNIVERSITY OF GREENWICH,
"Direct On-Line Measurement of Wall Friction of Coal as an Indicator of Handleability"

Dr.M.Bradley and Dr.R.J.Farnish,
(01/10/02 to 30/09/06).

B69 THE UNIVERSITY OF GREENWICH,
"Handling Characteristics of Biomass/Coal Mixes for Co-Firing: Measurement Techniques and Establishing Benchmarks", Dr.M.S.A.Bradley,
(01/10/03 to 30/09/06).

B72 TES BRETBY,
"The Maintenance of the BCURA Coal Bank",
Mr.G.Bradley,
(01/04/04 to 31/03/07).

B73 IMPERIAL COLLEGE,
"The Selection of Low Cost Sorbents and Process Conditions for Mercury Capture from Flue Gases",
Prof.R.Kandiyoti and Prof.D.R.Dugwell,
(01/10/04 to 30/09/07).

B74 CRANFIELD UNIVERSITY,
"The Properties and Combustion Characteristics of Coal-Derived Fuels for Industrial Gas Turbine Applications",
Prof.J.B.Moss,
(01/10/04 to 30/09/07).

B77 THE UNIVERSITY OF NOTTINGHAM,
"The Effect of Additions of Biomass on PF Combustion Efficiency and Ash Properties during Coal/Biomass Co-Combustion",
Dr.E.Lester, Dr.A.W.Thompson and Dr.M.Cloke,
(01/10/04 to 31/03/07).

B78 IMPERIAL COLLEGE LONDON, (DEPT. OF MATERIALS),
"Coal-biomass Ash Deposition during Deeply-staged Combustion", Dr.F.Wigley,
(01/01/06 to 31/12/07).

B79 UNIVERSITY OF LEEDS,
"Co-firing Coal/Biomass and the Estimation of Burnout and NOx Formation",
Prof.A.Williams, Dr.J.M.Jones and Prof.M.Pourkashanian,
(01/01/06 to 31/12/07).

B80 IMPERIAL COLLEGE LONDON, (DEPT. OF MECHANICAL ENGINEERING),
"Characterising Biomass Particle Behaviour under Co-combustion Conditions",
Dr.J.R.Gibbins, (01/10/06 to 30/09/09).

B81 IMPERIAL COLLEGE LONDON, (DEPT. OF MATERIALS), "Coal Mineral Transformations under Oxy-fuel Combustion Conditions", Mr.F.Wigley, (01/01/07 to 31/12/08).

B82 IMPERIAL COLLEGE LONDON, (DEPT. OF CHEMICAL ENGINEERING), "Improvements in Amine Flue Gas Scrubbing Systems for Coal Fired Power Plants", Dr.C.S.Adjiman, Dr.A.Galindo, Prof.G.Jackson and Dr.J.R.Gibbins, (01/10/06 to 30/09/09).

B83 UNIVERSITY OF NOTTINGHAM, "Mercury Oxidation by Fly Ash Constituents and Flue Gases and its Optimisation for the Development of Mercury Control Technologies", Dr.M.Maroto-Valer and Prof.C.E.Snape, (01/10/06 to 30/09/09).

B84 UNIVERSITY OF GLAMORGAN, "Optimisation of Fluidised Bed Combustion of Mixtures of Coal and High Moisture Content Biomass", Dr.D.R.Garwood, Prof.J.Ward, Dr.S.J.Wilcox and Mr.M.Fisher, (01/10/06 to 30/09/09).

B85 UNIVERSITY OF LIVERPOOL, "On-line Condition and Safety Monitoring of Pulverised Coal Mills Using a Model Based Pattern Recognition Technique", Dr.J.Wang and Prof.H.Wu, (01/10/06 to 30/09/08).

CALENDAR OF COAL RESEARCH MEETINGS AND EVENTS

Date	Title	Location	Contact
10-11 October 2006	Coal Indaba 2006: 12th Southern African Conference On Coal Science & Technology	Johannesburg, South Africa,	Ms Heather Moon, Fossil Fuel Foundation of Africa, PO Box 61809, Marshalltown, Gauteng 2107, South Africa Tel: +27 83 278 5886 Fax: +27 11 880 1237 Email: heather@aquorange.co.za Internet: www.fossilfuel.co.za
6-8 November 2006	13 th International Conference On Ashes From Power Generation	Krakow, Poland,	Anna Gorka, Polska Unia Ubocznych Produktow Spalania, ul. Niedziałkowskiego 47a/4, 71-403 Szczecin, Poland Email: anna.gorka@unia-ups.pl Tel: +48 91 424 4580 - Tel: +48 91 424 4580
15 November 2006	Environment Divisional Meeting, "Recent Developments in CO ₂ Capture Research for the UK Power Market", joint Seminar with the Royal Society of Chemistry Energy Sector.	Didcot Power Station, Didcot, Oxfordshire	Dr M Whitehouse RWEpower Swindon Tel: 01793 894118 Email: michael.whitehouse@rwenpower.com
22 November 2006	BRITISH FLAME SEMINAR : COMBUSTION DIAGNOSTICS : The Route Map to Increased Efficiency, Lower Emissions and Improved Product Quality.	Corus Technology, Swinden Technology Centre, Rotherham, South Yorks.	Prof.A.J.Griffith, British Flame, Cardiff School of Engineering, Cardiff University, P.O.Box 925, CARDIFF, CRF24 0YF. Fax : 029 2087 4317

25-26 April 2007	"Low Carbon Economy" organised by the Environmental Protection Subject Group of the IChemE	Dunchurch Park Hotel, Dunchurch, Near Rugby, Warwickshire	Mr C Hadfield Tel: 01455 552999 Email: chadfield@tiscali.co.uk
7-11 May 2007	World Of Coal Ash 2007 Conference	Cincinnati, OH, USA	Michael MacDonald, American Coal Ash Association, 15200 East Girard Avenue, Suite 3050, Aurora, CO 80014, USA Tel: +1 720 870 7897 Fax: +1 720 870 7889 Email: wocainfo@acaa-usa.org Internet: www.worldofcoalash.org
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 Email: info@cct2007.it Internet: www.cct2007.it
May 2007 Date TBA	Coal Research Forum Annual Meeting and Coal Utilisation Subject Group Annual Meeting, title to be announced	Venue TBA	Dr David J A McCaffrey The Coal Research Forum P.O. Box 154 Cheltenham GL52 5YL Tel: 01242 236973 Fax: 01242 516672 E-mail: info@coalresearchforum.org