

# NEWSLETTER



*of  
the  
Coal Research Forum*

## **EDITOR'S MUSINGS:**

Welcome to what is the last newsletter of 2013. As we all know time accelerates the older you get and before any of us realise it the next ECCRIA conference, number 10, will be upon us. The organisation of the event is now well under way and key dates including the deadline for the submission of abstracts can be found in the link in the article in this newsletter.

The CRF is always looking to showcase the activities of our members through the newsletter and we have been able to do this for a number of organisations. However, more recent attempts to elicit articles have proved to be unsuccessful. Don't be shy, guys! Tell us all about what you do! I understand that many of you may be too busy to put such an article high on your list of priorities but maybe it is something one of your 'new starters' could do?

This edition of the newsletter contains a review of an event organised jointly by the CRF, the Mineral Engineering Society and the South Midlands Mining and Minerals Institute. It is an annual event but in the past has had few attendees from the CRF. I would urge anyone who has the time to attend the next one and get a view on minerals other than coal. It is usually very interesting and I for one always learn new things!

Finally, and I don't want to rename this section 'Editors whinging', but the fracking protesters have really got my goat. Their knowledge, gleaned no doubt from the tabloid press, is, I suspect, restricted to the idea that fracking causes earthquakes and makes fire come from your water taps. Is there any attempt to really find out what is involved in fracking or to suggest a viable additional source of energy for the UK? No! It's just those bad people again in white lab coats who just want to destroy the world! Rant over – sorry!

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## **Student Bursaries for 2013-2014**

Up to six travel and subsistence bursaries for up to £300 are on offer to bona-fide full-time students wishing to attend appropriate National and International 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  
School of Chemical & Environmental Engineering  
The University of Nottingham  
University Park  
Nottingham NG7 2RD

The requirements for eligibility for award of a bursary are that the recipient will submit a short report about his or her impressions of the conference to the Newsletter Editor for inclusion in the next edition. In addition, the report will provide some brief details of the beneficiary, their topic of study and the reasons for wishing to attend the conference.

### **10<sup>th</sup> European Conference on Coal Research and its Applications University of Hull**

The Executive Committee of the Coal Research Forum are pleased to announce that the venue for the above conference, known simply as ECCRIA 10, has been confirmed and it will be held at the University of Hull from Monday 15<sup>th</sup> September to Wednesday 17<sup>th</sup> September 2014.

The organising committee has been formed and has held its first meeting. Full details regarding the timing of submissions of abstracts and topics can be found at the following link:-  
<http://coalresearchforum.org/conference.html>

### **The 4<sup>th</sup> Annual Minerals Engineering Society Symposium "Minerals Engineering 2013"**

**Co-sponsored by the Coal Research Forum and the  
South Midlands Mining and Minerals Institute**

**Yew Lodge Hotel, Kegworth,  
Thursday 9<sup>th</sup> May 2013**

The one-day symposium entitled "Minerals Engineering 2013" was this year held at the Yew Lodge Hotel in Kegworth. MES National Secretary/Treasurer Andrew Howells introduced the MES National President Ian Flanagan to officially welcome everyone. Ian thanked the 52 delegates for attending and said he was looking forward to what he was sure was going to be a very interesting day of papers and discussions. He explained how this symposium had become the MES's main event of the year and this was the fourth in a series that started in Nottingham in 2010. He hoped the event would continue for as long as the MES was able to put together a programme that would attract the quality of speakers present and therefore the delegates. Ian thanked the sister organisations - the Coal Research Forum and the South Midlands Mining and Minerals Institute (SMMMMI) - for support in promoting the symposium and for providing the chairmen for the day. Ian then invited Dr Mike Richards, current president of the SMMMMI, to chair the morning session.

Session 1 opened with a paper by Tony Riley of SGS UK and was entitled "Coal Preparation Pilot Plant Testing for Coking Coal". Tony began by briefly describing the set-up of SGS world wide and indicated the wide areas of expertise that is available in many, if not all, parts of the world.

Tony is employed in an energy minerals development role which supports the company's minerals managers around the world on coal quality and processing related opportunities. Tony's presentation described how SGS was approached in early 2011 by one of the major coking coal suppliers in Canada to establish if they had a pilot plant to generate batches of clean coal for downstream carbonisation testing in small-scale coke ovens. Tony had worked with SGS Canada in Lakefield, Ontario to convert a gemstone processing plant that previously had used ferrosilicon into one for processing coal using magnetite. The gemstone plant had been fed at 4 tonnes per hour and it was planned to put 2 to 2.5 tonnes per hour of raw coal through the unit with full treatment of the fines, as opposed to the original scheme which had discarded the -0.6mm material. Based on past experience it was decided to use a top size of 13mm in the feed to the plant, rather than the 6mm used in the gemstone operations. The raw coal supplied by the client was sized initially to -50mm and then screened, crushed to -13mm and then wet screened into three size fractions. The 13mm to 0.6mm fraction was fed to a 200mm cyclone, the -0.6mm to a spiral concentrator and -0.15mm to froth flotation cells. The client had set a parameter of 10 weeks in total from sampling the raw product to carbonisation tests because of potential oxidisation problems with the coal.

Following the success of the initial trials it was decided to improve the plant and Tony worked with SGS Lakefield to configure a new pilot plant, based on the original but with the addition of a fine coal classification screen which would allow the direct feeding of the -0.15mm size fraction to a bank of 6 x 28 litre sub aeration flotation cells. In 2012 Tony located a small HM drum (made originally by Wests of Manchester) that could enhance the capability of the plant by treating feed up to 35mm and speeding up the operation, which was critically important to the client. Following the future addition of this HM drum the plant will be further improved by changing the spiral separator to a Multotec MX7 spiral and adding a Lamella thickener for treating the effluent. The intention is that the revamped plant will be based in Western Canada, which is closer to the coal fields in British Columbia and Alberta, and will be dedicated to the testing of coal. With the larger top particle size that can be treated and size flexibility for each processing unit it is expected to be an important addition to the services offered by SGS.

The second paper was presented by Mr Thomas Baumann, who is a senior process design engineer and vice sales manager of AKW Apparate + Verfahren GmbH. His paper was entitled "Higher kaolin recovery with a water injection hydrocyclone". Thomas began by describing the hydrocyclone; its advantages and its disadvantages. Tackling one of its main disadvantages, the loss of fines into the underflow during the beneficiation of kaolin, was the subject in the paper. An R & D programme was described involving the use of water injection into the hydrocyclone. This project significantly improved the performance of the hydrocyclone. Optimisation of the process can result in either an increase in the recovery of kaolin or the elimination of a downstream washing stage. A control system to regulate the amount of water injection to ensure optimum performance was also described. The improvement is obtained using a low cost, low water consumption system which can be easily and inexpensively retrofitted into hydrocyclones.

The third paper was presented by Mr Balaji Vasudevan who is a plant metallurgist at Cleveland Potash Ltd. His paper was entitled "Dryer optimisation and stack particulate monitoring". Balaji began by outlining details of his employer, its products and its location, (in a National Park); the latter point serving to emphasise the need for minimised particulate emissions. He then went on to outline the scope of particulate monitoring and the influence of process parameters. The difficulties faced in dust measurement were also identified and discussed together with proposed process modifications and finally a way forward.

Unfortunately, the presenters of the fourth paper were not present so a paper from the afternoon session was brought forward. This was a joint presentation by Dr Rod Stace of the University of Nottingham and Mr Bill Penn of Ferrousity Ltd. and was entitled "Conveyor belt wear – A forensic investigation (Iron ore operations in Brazil)".

Bill began the talk by explaining that he had been working for a client in Brazil who was a large exporter of iron ore which is transported by seagoing vessels. The large, new conveyor system, (capacity 30mt per annum of iron ore and around 6 kilometres in length), had shown signs of serious premature wear. Bill and Rod Stace were invited to carry out an investigation into the likely causes. A number of slides were shown which showed the wear to the conveyor cover material and also the rollers. The wear was not evenly spread over the belt width and seemed to be mainly in the centre of the belt. It was also explained that the belts were not highly loaded during the commissioning period. Not only was the belt wearing prematurely but the idlers wore out very rapidly.

The authors gave details of their investigations, especially in relation to chute design and material impact at transfer points. This was well illustrated by modelling videos showing movement of material in chutes and the impact angles as the iron ore hit the moving conveyor which was travelling at 4.4m/s. Other tests to examine belt sag were made to assess sag versus wear profile. Changes in chute design were made and recommendations on conveyor belt specification were discussed. The presentation provided members with plenty of questions, which were ably dealt with by the authors.

After an excellent lunch the seminar re-convened with your newsletter editor as chairman for a slightly shorter session 2. Following a discussion with the seminar organisers it was decided that with the help of the presenters a programme which occupied the whole afternoon would be attempted.

The first afternoon paper was a joint presentation from the University of Birmingham. Dr Neil Rowson gave the first part of a paper entitled "Adding value to minerals". This was followed by a specific example of how this can be achieved when Neil's PhD student Miss Zubera Iqbal described her work on the recovery of lithium-rich micas from mineral wastes.

Zubera explained that lithium is a strategically important metal for Europe due to the limited availability of primary deposits, of sufficient grade, for economic processing. Lithium is also a finite resource, thus if processes are not investigated to recover the metal from secondary sources, problems with its availability and price may soon limit the development of its' current applications. These include using lithium for technology driven devices such as: lithium ion batteries. In addition to batteries other uses include ceramics and glass, electronic devices and greases.

In one of Europe's industrial mineral processes, a lithium-bearing mica mineral, lepidolite, has been found in the waste product. Currently this waste product is stored on valuable land. Recycling plays a vital role in environmental sustainability and development. By processing this waste product to recover lithium, the rate at which these ores are currently being utilised is reduced and the environment is being sustained.

Zubera's current research is an investigation into the feasibility of recycling secondary sources of lithium to produce secure reserves. The recovery of lithium on a commercial scale will make it a sustainable source for future generations. To extract lithium, the team are following two separate phases of research. The first consists of separating lepidolite from the other impurities via froth flotation and magnetic separation and the second investigates the extraction of lithium from the lepidolite mineral, in an economical viable process.

The first phase investigated parameters such as: particle size, maintaining pH control during flotation and varying reagents (depressor and collector) on the concentration of lithium-rich micas via froth flotation processing. Using this technique they were able to recover sufficient lithium for downstream processing with a recovery rate of up to 96%, thus making the process potentially viable for some areas.

The samples were analysed initially using X-ray fluorescence (XRF) for quantitative chemical analysis, and then by inductively coupled plasma (ICP) for lithium content.

The second afternoon paper, entitled "Enhanced tailings disposal", was presented by Mr Stephen Adkins of BASF Performance Products plc. Stephen detailed the concept of Enhanced Tailings Disposal through the process of 'rigidification' using Rheomax ETD polymers. Many mines and processing plants find themselves with limited tailings disposal options for reasons of an environmental or legislative nature or restrictions in land use. Rheomax ETD is a novel process of tailings management that utilises a rigidifying polymer applied prior to the point of deposition.

This results in a steepening of the 'beach' in the impoundment area improving land utilisation and the immediate release of large quantities of water or liquor that is of suitable quality for reuse directly in the process circuit. For the uninitiated, (this includes the editor!) the 'beach slope' in the tailings industry refers to the surface slope of the tailings after being hydraulically or mechanically deposited from a point of discharge. This is the slope the tailings settle at after being discharged from the end of a pipe. In sub-aerial (above the water line) deposition, the exposed surface of the tailings between the point of discharge and the supernatant pond (where present) or towards the low point within the storage area is referred to as the beach.

Stephen showed the effects of under-dosing and overdosing of the polymer used in the technology with dramatic time lapse photography giving the audience seven months of operation in two minutes. Also shown was the polymer preparation and dosing system, with the whole Tailings deposition and Rheomax ETD operation being controlled by BASF in house process control technology linked back to the CHPP SCADA system. This system is also capable of being interrogated by both BASF and the client's process engineers either as a monitoring tool or as a troubleshooting facility.

Case studies using impressive video footage were presented from various mines in Europe and Asia from concept through to completion, detailing design, testing, construction and operation. We were shown evidence that Rheomax ETD is a viable alternative to existing tailings dams, paste thickeners, belt filter presses and pressure filters and is a very low CAPEX and a less expensive OPEX option than these other types of process equipment.

The final paper of the session was given by Mr Paul Taylor of Bretby Gammatech Ltd who gave us a talk entitled "Natural gamma for the ash measurement of coal – 25 years of success". Paul is the managing director of Bretby Gammatech Ltd., the company he and his colleagues formed in 1994 when British Coal started its privatisation process. The company provides and maintains on-line, portable and laboratory ash monitoring systems. From 1978 until 1994 Paul was employed by British Coal, initially as Head of In-Seam Seismic Acquisition and then as Head of Physics Services. It was in this latter role that Paul was responsible for the team that successfully transferred the fledgling natural-gamma on-line ash monitor from a research project into a commercial instrument with international appeal. In 1997 he conceived the idea of the Ash Probe and this instrument now accounts for most of Bretby Gammatech's worldwide sales. In November 2012 Bretby Gammatech Ltd. became a subsidiary of the President Engineering Group (PEGL).

Paul began by presenting a review of the development of the technology and how it is currently being utilised. He started by correcting a commonly held misconception that the device uses a radioactive source. This is not the case and the device measures the naturally-occurring radiation emitted by the coal and ash minerals themselves.

Paul explained that during the 1980's they successfully developed the Ram Feed Coal Quality Monitor (RFCQM) (now obsolete but still in everyday operation at two collieries) and the Natural Gamma Coal Quality Monitor (NGCQM), now improved and re-branded as the Ash Eye.

The Ash Eye is a non-contacting, fully on-line ash monitor providing second-by-second information on the ash content of conveyed coal which can easily be fitted to existing conveyor

belts or feeders. The dirt associated with coal contains a higher concentration of radioactive material than the coal itself. The signal from a natural gamma detector mounted under the conveyor belt contains ash information. When this signal is combined with the mass of the material from a belt weigher a measurement of the ash content can be obtained. In order to counter the effects of changes in background radiation, signals from a small background sensor are also included in the ash calculation. The accuracy of the Ash Eye will depend upon the site and the belt weigher. Accuracies of better than 0.5% ash on final product and 1-3% on run-of-mine have regularly been achieved. A precision of 0.5% ash can be achieved with final product systems as measured to ISO/DIS 15239, (Solid mineral fuels -- Evaluation of the measurement performance of on-line analysers).

The company has also developed several new and improved products using natural gamma technology. These include the Ash Probe, Lab Ash and Heat Eye.

The development of the Ash Probe was initially prompted by two of their customers who had a requirement for measuring the ash content of coal deliveries. The first was a power station buying truck loads of coal from small mines and the second was a blending plant buying various coals to blend to produce a consistent power station fuel.

The Ash Probe is a hand portable instrument for measuring the ash content of piles, wagons or trucks of coal. It provides the user with ash readings within seconds. The Ash Probe comprises two main parts: a probe and a display unit. To obtain an ash reading the probe is pushed into the pile or truck to be tested. After a few seconds an ash result is shown on the display unit. In order to obtain an accurate assessment of the ash content of the whole pile (or wagon load) the probe is inserted at several locations. This is repeated until the desired precision level has been reached.

In Pile Mode up to 99 probings per pile can be made and data from up to 99 piles can be stored. In Truck Mode up to 12 probings per truck can be made and data from up to 600 trucks can be stored. Calibration is readily achieved by the customer using the supplied calibration sample gathering equipment. The display unit can use up to nine separate calibrations for different coal types. Tests on a wide range of coals from over twenty countries on five continents have shown that the Ash Probe can measure the ash content to closer than 1% ash. In some cases better than 0.5% accuracy has been achieved with high grade anthracite.

The LabAsh is a laboratory instrument which provides a quick measurement of the ash content of a crushed sample of coal. It is easy to use and provides accurate results within a few minutes. Applications at several sites have shown that unbiased results with a precision of 0.65% ash can be achieved in less than 3 minutes.

The LabAsh comprises two parts: a sample measuring chamber and a display unit. The sample chamber is a substantial lead-walled cylinder containing a scintillation crystal and associated electronics. The crystal is positioned vertically in the centre of the chamber so that when a special beaker containing the coal sample is lowered into position the crystal is evenly surrounded by the sample. The mains powered display unit provides the user interface and is housed in a case suitable for desk or bench top operation. Its main features are that it is simple to use, it can store up to 300 sample measurements, it is easy to calibrate on site using normal production samples and can store up to nine different calibrations for multi-source applications. Data generated can then be downloaded to a computer. It can be used for any coal where a crushed sample is available, including final product, power station fuels, washed fines, and imported coal.

Benefits of the LabAsh are that it provides quick ash results from production samples (less than 3 minutes compared with at least 2 hours to obtain the in-house lab analysis or several days for an off-site laboratory). Being faster it provides more accurate control of quality. It reduces in-house sample analysis time leading to less effort by laboratory staff thereby achieving lower

costs. It also provides an independent check on both in-house and commercial sample analyses enabling precision of all measurement methods to be assessed under ISO 15239.

The Heat Eye is a fully on-line instrument providing second-by-second measurement of the ash, moisture and net calorific value (NCV) of conveyed coal. It comprises an Ash Eye fully integrated with a moisture meter. The Heat Eye combines the instantaneous ash and moisture measurements to obtain an instantaneous "total inerts" value. This total inerts value is converted into NCV by using a calibration based upon the correlation of total inerts with NCV previously measured by conventional means.

The Heat Eye is suitable for use with run-of-mine (ROM) coal or for raw coal monitoring, for the control of a diverting system for out-of-specification material, for washed coal – for input to washing plant control system, in blending control systems, for final product monitoring and monitoring of coal deliveries at power stations, and in coking plants and cement works.

The benefits of using Heat Eye are that in blending control systems information obtained enables suppliers to produce a more consistent product leading to higher financial gain. For example, this can be achieved by adjusting the ash content to counter uncontrolled changes in moisture to provide a product with a consistent NCV. Furthermore, the Heat Eye information enables a supplier to quickly and effectively adjust the blend characteristics to meet the demands of customers requiring different NCV specifications. In power station applications the Heat Eye information can be used to ensure the boilers are fed with fuel with a NCV falling within specification. In extreme cases, low CV material can be diverted away from the boilers.

The seminar was formally ended by the closing address which was given by Mr Greg Kelley, the chairman of the MES Symposia and Exhibitions Committee. Greg thanked the speakers for ensuring that a full day of presentations was possible and for the lively question and answer sessions that followed. The consensus was that as for the previous similar ventures, this one had also been a resounding success. He also thanked the attendees and wished them a safe journey home.

The following press release was received from the Fossil Fuel Foundation (of South Africa).

### **Release of the South African coal roadmap**

Coal is the major primary energy source for South Africa. More than 90% of the country's electricity, 20-30% of the liquid fuel, and approximately 70% of its total energy needs are currently produced from coal. Coal also plays a significant role in the South African chemicals industry, is an essential component of its steelmaking industry and provides significant export revenues. Overcoming the challenges facing our country, including poverty, unemployment and inequality, will have to include provision of safe and affordable access to energy for all its inhabitants. Despite an abundant endowment of coal in South Africa, its continued use presents many challenges and its future contribution demands careful stewardship.

The need for a South African Coal Roadmap was identified in 2007 by key role players from Eskom, coal producers and Government, to be developed under the auspices of the Fossil Fuel Foundation (FFF). Various delays resulted in the initiative only formally commencing during 2010.

The Coal Roadmap explores the activities and interventions required for role players in the coal industry to maximise its contribution to South Africa in the face of an uncertain future. The initiative was supported by a wide range of stakeholders including the Departments of Energy and Mineral Resources, Eskom, Sasol, coal producers and other stakeholders. Convened by the Fossil Fuel Foundation and supported by the South African Energy Development Institute (SANEDI), the Roadmap was produced by The Green House, who acted as project managers for the initiative. Phase I of the project examined the current state of the SA coal industry and key issues facing it. Phase II comprised a detailed scenario analysis approach, supported by detailed

modelling. Key trigger points, developmental needs and infrastructure requirements were identified.

The work has been completed and is being distributed to inform and support the decision-making required to support this key industry. The Roadmap should be read in conjunction with the associated Scenarios and Technical Reports and can be accessed from the websites of FFF ([www.fossilfuel.co.za](http://www.fossilfuel.co.za)) and SANEDI ([www.sanedi.org.za](http://www.sanedi.org.za)).

6 August 2013

## **NEWS ALERTS IN COAL AND ENERGY RESEARCH**

Please be aware that links to some of the news articles are not retained on the web indefinitely. Consequently, links which were active when the newsletter was written may, in time, become unavailable. It is hoped that this will not detract from the value of the article.

### **Biomass fuel subsidies to be capped says UK energy secretary**

The UK government is turning away from its controversial policy of subsidising UK power stations to generate electricity from burning wood. It is proposing that subsidies for bespoke biomass burning plants should be capped at 400 MW. It will end subsidies for biomass burning in existing stations by 2027.

There was an outcry in May when the BBC revealed that millions of tonnes of wood were being shipped from the USA to help meet Britain's renewables targets. Wood is classed a renewable fuel because trees soak up CO<sub>2</sub>. Burning wood is counted as carbon-neutral, even though it takes the lifetime of a new tree to reabsorb the carbon emitted when an existing tree is burned.

Environmentalists are relieved, but say the policy should never have been approved in the first place. The UK's biggest power station, Drax in Yorkshire, has been converting half its boilers from coal to wood. Most of this wood it burns is imported, particularly from the US. Ed Davey, the Energy Secretary, told the BBC that biomass was a temporary solution to meet climate change targets while renewable energy systems were being developed. "Making electricity from biomass based on imported wood is not a long-term answer to our energy needs – I am quite clear about that," he said.

There has been fierce controversy about the sustainability of powering British homes with American wood. Critics say that it takes 50 years or more for a new tree to absorb the CO<sub>2</sub> released when an existing tree is burned. But calculations by the government's chief energy scientist, David Mackay, on the carbon emissions from wood-burning are so controversial that they remain formally unpublished. In a statement to the BBC, the energy department, DECC, now acknowledges that burning biomass in dedicated power stations offers poor value carbon savings compared with wind power or even gas. It says it still aims to incentivise sustainable biomass burning for heat and Combined Heat and Power, which uses leftover heat to make electricity. A DECC spokesman said in the long term, it hoped to be able to burn biomass from sustainable sources, then capture the emissions using carbon capture and storage technology. This would actually remove CO<sub>2</sub> from the atmosphere. There will be a debate, though, over what sustainable means. The UK's largest power station, Drax, is converting some of boilers to burn wood. The biomass policy was largely ignored in the media until it became clear that millions of tonnes of wood would be burned. At first, the firms involved said they were only burning waste from the timber industry, mainly in the US.

An investigation by BBC News confirmed allegations by green groups that whole trees were sometimes being pelleted to be burned. But the timber companies said those trees were being cut anyway, either as part of tree-thinning operations, or as part of forest clearance by the small private landowners who dominate forestry in the south-eastern US. This presented a more complex picture, in which the key question was not whether whole trees were being burned,

but whether biomass policies were diverting material from other uses, such as pulp and paper. The figures on this are unclear.

Harry Huyton from the RSPB said environmentalists were pleased the government was stepping back from subsidies on biomass. "We have consistently raised our concerns around creating a large and unsustainable demand for wood for power generation in the UK because of the serious threat this poses to climate change and forest ecosystems," he told the BBC. "We believe that the UK should focus on building a bioenergy sector that is based on domestic feedstocks, such as wastes and arisings from forestry and agriculture." Recent signs that government support for large scale wood-fired power stations is cooling are welcome, but we need further action to ensure this sector develops without unacceptable impacts on our climate and wildlife." The Renewable Energy Association, which promotes biomass, is dismayed at the government's change in attitude. "It is madness for the government to have capped biomass burning at a time when we are in a capacity crunch for electricity," said the group's chief executive, Gaynor Hartnell. "Firms that have been working hard to develop capacity have been told that only a fraction will now be needed. "There's been a big NGO [non-governmental organisation] backlash against biomass and we have to make sure it isn't driven out altogether."

Biomass, like biofuel for transport, was an apparent solution seized in haste after EU leaders in 2007 agreed that renewables would supply 20% of all energy by 2020. The UK delegation did not realise this included oil and gas, as well as electricity, and inadvertently signed up for a near-impossible target of 15% renewables. Entrepreneurs stepped in to fill the gap and biomass will supply a large portion of the EU's target. The government's former climate change ambassador, John Ashton, told me: "The biomass policy appeared with trace. I can't remember a single strategic discussion over how it would be deployed. It's no way to run a long-term carbon reduction strategy."

**16<sup>th</sup> July 2013, Roger Harrabin, BBC News**

<http://www.bbc.co.uk/news/business-23334466>

### **The coal-mining racket threatening Ukraine's economy**

**24<sup>th</sup> April 2013, Gulliver Cragg, BBC News**

Sometimes, they are little more than holes, in the woods outside villages or even in backyards and under houses, but Ukraine's illegal coal mines can also be huge, open-cast operations. What started as hand-to-mouth survival, 20 years ago, is now big business.

Mihailo Volynets, the wiry head of Ukraine's Independent Miners' Union, presents the situation flatly: "We know how much coal there is from the state mines and from the private mines, and we know how much coal is up for sale."

About 6.5m tonnes more coal - 10% of Ukraine's total output - is for sale than is officially mined. "There's no explanation... maybe Martians brought it," Mr Volynets jokes, without laughing. Illegal mining in the Donbass and Luhansk regions of eastern Ukraine is there for all to see. Coal trucks routinely rumble along roads where there are no legal mines. For more see...

<http://www.bbc.co.uk/news/world-europe-22170976>

### **Underground coal gas power project on cards in Free State**

**24<sup>th</sup> April 2013, Martin Creamer, Engineering News**

A project that will supply underground coal gas from a deep, stranded coal deposit in the Free State to an independent power producer (IPP) is at an advanced stage of planning. Former Sasol executives **Johan Brand** and **Eliphus Monkoe**, who bought 1.4-billion tons of coal near Theunissen from BHP Billiton, have teamed up as African Carbon Energy (Africary), which has been operating since 2007.

A memorandum of understanding has been signed with a still-to-be-named IPP, which will build, own and operate a 50 MW combined-cycle gas turbine (CCGT) power plant and buy the underground coal gasification- (UCG-) produced syngas as a fuel gas from Africary.

"We will be transforming the face of coal mining and electricity production in South Africa," Brand told *Mining Weekly Online* in an interview on the sidelines of the Fossil Fuel Foundation UCG workshop on Wednesday.

<http://www.engineeringnews.co.za/article/underground-coal-gas-power-project-on-cards-in-free-state-2013-04-24>

### **Japan turns back to coal-fired power plants**

**26<sup>th</sup> April 2013, Brian Robins, Sydney Morning Herald**

The Japanese government is moving to speed up the environmental assessment process for new coal-fired power plants as its power sector struggles with a surging energy bill in the wake of the forced idling of much of the country's nuclear power plants following the Fukushima power plant meltdown in 2011.

At present, it can take up to four years for approvals for new plants to be processed. According to Japanese media reports, the government intends to make 12 months the maximum period for assessing and approving new coal-fired power plants as its utilities seek to develop more power stations to stem surging energy supply bills. For more read....

<http://www.smh.com.au/business/japan-turns-back-to-coalfired-power-plants-20130425-2ihb0.html>

### **New Report: A crisis in UK energy policy looks inevitable**

**2<sup>nd</sup> May 2013, Benny Peiser, Canada Free Press**

EU policy makers have grossly underestimated the difficulties and risks of their drive to decarbonise the power sector. They have failed to take into account the huge changes in the economic, commodity and financial environments and adjust policy accordingly. A crisis in UK energy policy looks increasingly likely and therefore utility companies and investors would be prudent in limiting their future exposure. For more see....

<http://canadafreepress.com/index.php/article/54907>

### **How to clean seaweed from beaches: dry it and use it for energy**

**3<sup>rd</sup> May 2013, Science Daily**

A research group at the University of Alicante has invented an algae removal and treatment system that turns this underused residue into a renewable source of energy: biomass. The process involves several stages of washing, drying and compacting without leaving the beach. Therefore, according to the team led by Professor Irene Sentana Gadea, the system is cheaper, more efficient and more environmentally friendly than the procedure commonly followed now. With the invention, protected with a national patent, up to an 80 percent of the weight and volume currently removed would stay on the beaches, as now with the seaweed water and sand are also sent to rubbish tips or treatment plants. Professor Eloy Sentana Cremades says that as well as considerable savings on transportation, the new procedure would allow to give more uses to the dried seaweed. For more see....

[http://www.sciencedaily.com/releases/2013/05/130503094138.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130503094138.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

### **Improving materials that convert heat to electricity and vice-versa: turning waste heat into electricity**

**5<sup>th</sup> May 2013, Science Daily**

Thermoelectric materials can be used to turn waste heat into electricity or to provide refrigeration without any liquid coolants, and a research team from the University of Michigan has found a way to nearly double the efficiency of a particular class of them that's made with organic semiconductors. Organic semiconductors are carbon-rich compounds that are relatively cheap, abundant, lightweight and tough. But they haven't traditionally been

considered candidate thermoelectric materials because they have been inefficient in carrying out the essential heat-to-electricity conversion process.

Today's most efficient thermoelectric materials are made of relatively rare inorganic semiconductors such as bismuth, tellurium and selenium that are expensive, brittle and often toxic. Still, they manage to convert heat into electricity more than four times as efficiently as the organic semiconductors created to date. This greater efficiency is reflected in a metric known by researchers as the thermoelectric "figure of merit." This metric is approximately 1 near room temperature for state-of-the-art inorganic thermoelectric materials, but only 0.25 for organic semiconductors. University of Michigan researchers improved upon the state-of-the-art in organic semiconductors by nearly 70 percent, achieving a figure-of-merit of 0.42 in a compound known as PEDOT:PSS.

"That's about half as efficient as current inorganic semiconductors," said project leader Kevin Pipe, an associate professor of mechanical engineering as well as electrical engineering and computer science. Pipe is a co-author of a paper on the research published in *Nature Materials* on May 5, 2013. PEDOT:PSS is a mixture of two polymers: the conjugated polymer PEDOT and the polyelectrolyte PSS. It has previously been used as a transparent electrode for devices such as organic LEDs and solar cells, as well as an antistatic agent for materials such as photographic films.

[http://www.sciencedaily.com/releases/2013/05/130505145941.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130505145941.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **New mechanism converts methane to energy faster, captures CO<sub>2</sub>** **7<sup>th</sup> May 2013, Science Daily**

Chemical engineering researchers have identified a new mechanism to convert natural gas into energy up to 70 times faster, while effectively capturing the greenhouse gas carbon dioxide (CO<sub>2</sub>). "This could make power generation from natural gas both cleaner and more efficient," says Fanxing Li, co-author of a paper on the research and an assistant professor of chemical and biomolecular engineering at North Carolina State University.

At issue is a process called chemical looping, in which a solid, oxygen-laden material -- called an "oxygen carrier" -- is put in contact with natural gas. The oxygen atoms in the oxygen carrier interact with the natural gas, causing combustion that produces energy.

Previous state-of-the-art oxygen carriers were made from a composite of inert ceramic material and metal oxides. But Li's team has developed a new type of oxygen carrier that include a "mixed ionic-electronic conductor," which effectively shuttles oxygen atoms into the natural gas very efficiently -- making the chemical looping combustion process as much as 70 times faster. This mixed conductor material is held in a nanoscale matrix with an iron oxide -- otherwise known as rust. The rust serves as a source of oxygen for the mixed conductor to shuttle out into the natural gas.

In addition to energy, the combustion process produces water vapour and CO<sub>2</sub>. By condensing out the water vapour, researchers are able to create a stream of concentrated CO<sub>2</sub> to be capture for sequestration. Because the new oxygen carrier combusts natural gas so much more quickly than previous chemical looping technologies, it makes smaller chemical looping reactors more economically feasible -- since they would allow users to create the same amount of energy with a smaller system. For more see....

[http://www.sciencedaily.com/releases/2013/05/130507124807.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130507124807.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Poyry report to DECC: Outlook for new coal-fired power stations in Germany, the Netherlands and Spain**

**7<sup>th</sup> May 2013, DECC, Poyry**

This report aims to provide a better understanding of the economic, policy and regulatory environment for coal-fired generation in other EU Member States with particular emphasis on the development of new coal plants. Key points from the report are: there are new coal and lignite plants currently under construction in Germany and the Netherlands (including 10 in Germany and 3 in the Netherlands).

In Germany, these plants were all brought forward prior to the current European economic crisis and when new plants were expected to get free EU ETS allowances in Phase III (something that has now been overruled). The construction and commissioning of these 10 projects was then delayed due to technical issues with the boiler design. Poyry's analysis suggests coal faces diminishing load factors in Germany due to renewable energy policies which give dispatch priority to renewables, and Poyry do not expect to see additional unabated coal and lignite projects coming forward in Germany.

In the Netherlands, final investment decisions for the three plants currently under construction were also made prior to the economic crisis. Poyry further notes that the Netherlands' electricity system is already greatly oversupplied, so the outlook for these plants is uncertain. In Spain, Poyry notes economic conditions do not encourage the construction of any new coal plant. Link to the full report is:

<https://www.gov.uk/government/publications/poyry-report-to-decc-outlook-for-new-coal-fired-power-stations-in-germany-the-netherlands-and-spain>

## **Memorial unveiled to Bevin Boys who worked in Welsh pits during WWII**

**7<sup>th</sup> May 2013, Sion Morgan, Wales Online**

Thousands of men who worked in Welsh coal mines during World War II have been honoured by a memorial unveiled in Staffordshire. The "Bevin Boys" as they came to be known were recognised at a ceremony in The National Memorial Arboretum at Alrewas. More than 48,000 young men, many of them conscripts, joined regular miners underground all over Britain to keep supplies of coal flowing during the war. They were drafted in when thousands of experienced miners joined the armed services or transferred to higher-paid "war industries." By the summer of 1943 more than 36,000 men had left the coal industry. The British Government decided that it needed around 40,000 men to take their places. They became known as Bevin Boys when, in December 1943, Labour and National Service Minister Ernest Bevin devised a scheme whereby a ballot took place to put a proportion of conscripts into the collieries rather than the armed services. Alongside the ballotees were also men who volunteered for service in the coal mines rather than military.

<http://www.walesonline.co.uk/news/wales-news/memorial-unveiled-bevin-boys-who-3416799>

## **North East coal's future assessed 20 years after closure**

**9<sup>th</sup> May 2013, Ian Reeve, BBC News**

Twenty years ago mining at the Durham coalfield that once boasted more than 200 deep shaft mines stopped for the last time. Easington was the last pit to close. Two decades on, and coal has not ceased to be important. Much of it is now imported, the rest comes from opencast mining. But one company has big plans to exploit the remaining north-east of England coal reserves. Harry Bradbury is looking out to sea from the beach at Tynemouth in North Tyneside. But it is not just the view he is taking in. His company, the Newcastle-based Five Quarter, has been given licences by the government to drill for and extract gas from massive coal reserves under the sea and off the North East coast. In his mind's eye, he can see the vast potential beneath the waves. For more see....

<http://www.bbc.co.uk/news/uk-england-22432130>

## **China wrestles with stubborn air polluters** **10<sup>th</sup> May 2013, Steven Mufson, Washington Post**

Early on in Beijing's winter of pollution-wracked discontent, one of China's biggest power companies, Huadian, turned off the coal scrubbers at its Datong plants and let emissions of sulfur dioxide, a leading cause of acid rain and respiratory illness, soar to more than four times government standards. Huadian saved money by turning off the scrubbers, which suck up power.

What's more, Huadian falsified paperwork and sold its electricity at a premium rate that the government offers to power plants with low emissions. Regulators caught the company. Twice. Beijing is downwind of Datong, and coal-fired power plants like Huadian's are just one of the culprits for the extreme bout of air pollution here over the winter, when the city's air-quality index went off the charts that regulators use elsewhere. At a level of 755, U.S. Embassy readings in mid-January were more than twice [what the Environmental Protection Agency says is so "hazardous"](#) that people should avoid going outdoors.

The severity of the pollution — extreme even by Chinese standards — has rattled Chinese leaders. While they have, on occasion, closed factories and restricted traffic to clear the air for special events [such as the 2008 Olympics](#), so far they have lacked the will or the capacity to reduce air pollution on a sustained basis. For more read....

[http://www.washingtonpost.com/world/china-wrestles-with-stubborn-air-polluters/2013/05/09/627e9870-b13f-11e2-9fb1-62de9581c946\\_story.html](http://www.washingtonpost.com/world/china-wrestles-with-stubborn-air-polluters/2013/05/09/627e9870-b13f-11e2-9fb1-62de9581c946_story.html)

## **European energy chief puts forward case for funding coal** **12<sup>th</sup> May, Terry Macalister, The Guardian**

One of [Europe's](#) most influential government-owned investors in the [energy](#) industry has hinted it may expand funding of high-carbon [coal](#) projects despite mounting pressure from [climate change](#) campaigners to rule out such investments. Riccardo Puliti, energy chief at the European Bank for Reconstruction and Development (EBRD), warned against an "ideological" policy on carbon intensity in funding decisions without giving weight to other considerations. The EBRD, which is based in London and owned by more than 60 countries, including the UK, is reviewing its energy policy. It has a €37.5bn (£32bn) loan book, with 41% of its investments last year channelled into the energy and infrastructure sectors.

Puliti's comments came as scientists declared the highest day-long concentration of CO<sub>2</sub> in human history and a line of global institutions such as the International Energy Agency have called for public subsidies of fossil fuels to be phased out. But Puliti defended the EBRD, which has just provided €100m (£85m) to a new lignite plant at Sostanj in Slovenia and is understood to be ready to finance new coal operations in Kosovo and Serbia. Lignite is a particularly polluting form of coal. For more see....

<http://www.guardian.co.uk/environment/2013/may/12/riccardo-puliti-ebrd-europe-coal-funding>

## **Could carbon dioxide be injected in sandstone? Would it stay there?** **14<sup>th</sup> May 2013, Science Daily**

As CO<sub>2</sub> levels in Earth's atmosphere top 400 parts per million, options such as storing the greenhouse gas in porous sandstone rock formations found in abundance on the sea floor are of increasing interest. But how do we know if CO<sub>2</sub> can be safely injected into spongy sandstone, and that once it is there, that it will stay there? Two petroleum engineering and applied geophysics professors at the Norwegian University of Science and Technology (NTNU) are using X-rays and CAT scanners to probe the secrets of undersea rock formations and their ability to store CO<sub>2</sub> safely in perpetuity. Their results are promising. For more read on.....

[http://www.sciencedaily.com/releases/2013/05/130514085304.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130514085304.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Carbon Capture: Making Use of Minerals**

**22<sup>nd</sup> May 2013, Science Daily**

Ammonium salts could provide a viable way of removing carbon dioxide from the atmosphere via carbon mineralization. Removing excess carbon dioxide (CO<sub>2</sub>) from the atmosphere may be essential to curb severe climate change. Possible, but expensive, methods include burying the gas underground between rock layers or 'scrubbing' the CO<sub>2</sub> in power station cooling towers before it is released. James Highfield at A\*STAR's Institute of Chemical and Engineering Sciences, together with co-workers at the National Junior College of Singapore and Åbo Akademi University in Finland, has now described a cheaper and more permanent solution that would prevent the CO<sub>2</sub> escaping back into the atmosphere.

Their work focused on using carbon mineralization, a process that involves a reaction between CO<sub>2</sub> and minerals, such as magnesium silicates, to form solid carbonates. Mineralization occurs naturally between the atmosphere and rocks, and the carbonates remain geologically stable for millions of years. Crucially, plentiful raw materials would be available to conduct this type of CO<sub>2</sub> removal on a vast scale. For more see.....

[http://www.sciencedaily.com/releases/2013/05/130522131020.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130522131020.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Top-class biofuel from the depths of the forest**

**22<sup>nd</sup> May 2013, Science Daily**

Tops and branches from tree-felling sites are reborn in the laboratory as compact pellets. However, the energy industry will not act until the price is right. Norway possesses major unexploited energy resources in the form of these branches and tops. Samples of this logging waste regularly arrive at SINTEF to be transformed into fuel.

In the raw form in which the biomass arrives at the laboratory, it is regarded as a problematic and therefore low-value fuel. But when the scientists and technicians have finished processing it, they are left with a valuable source of heat -- ready for use in industrial heating furnaces that are currently fuelled with wood pellets or chips, and for domestic pellet stoves. The transformation is effected via a process called torrefaction, a sort of extreme sauna for timber and vegetation. For more read....

[http://www.sciencedaily.com/releases/2013/05/130522085213.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130522085213.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Coal project could boost Carbon Capture and Storage ambition**

**23<sup>rd</sup> May 2013, Kelley Price, GazetteLive**

A groundbreaking North Sea coal project can lend more weight to Teesside's rejected bid for a Carbon Capture and Storage network, bosses have claimed. Five Quarter will tap into one of the biggest deep-sea coal reserves in the world, in the North Sea. Now bosses are almost ready to start spending a £15m Regional Growth Fund win. It's a ringing endorsement for the project - and the Durham-based company would be a key user of a pipeline network on Teesside to capture carbon and transport it to voids deep beneath the North Sea. CCS is seen as an essential technology to meet the UK's carbon reduction needs going forward. But Teesside Low Carbon, the heavyweight consortium behind the area's bid to bring CCS to the area, was knocked back for a £1bn Government competition to speed up commercialisation of the technology. Boss of Five Quarter, Dr Dermot Roddy says the project gives Teesside's already strong case for a CCS network yet more leverage. He said: "Investors are highly encouraged by the offer of Government funding for our project. For more see....

<http://www.gazettelive.co.uk/business/coal-project-could-boost-teessides-4005153>

## **Scientists develop CO<sub>2</sub> sequestration technique**

**28<sup>th</sup> May 2013, Science Daily**

Lawrence Livermore scientists have discovered and demonstrated a new technique to remove and store atmospheric carbon dioxide while generating carbon-negative hydrogen and producing alkalinity, which can be used to offset ocean acidification.

The team demonstrated, at a laboratory scale, a system that uses the acidity normally produced in saline water electrolysis to accelerate silicate mineral dissolution while producing hydrogen fuel and other gases. The resulting electrolyte solution was shown to be significantly elevated in hydroxide concentration that in turn proved strongly absorptive and retentive of atmospheric CO<sub>2</sub>. Further, the researchers suggest that the carbonate and bicarbonate produced in the process could be used to mitigate ongoing ocean acidification. For more see....

[http://www.sciencedaily.com/releases/2013/05/130528143758.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130528143758.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Concern over Scottish coal mine clear up cost**

**29<sup>th</sup> July 2013, Julia Horton, The Scotsman**

Demands are growing for a public inquiry into failures to clean up coal mines across Scotland, after a new report revealed a potential £60 million shortfall in funds in one region alone. A document published by East Ayrshire Council has revealed just £30m has been set aside to restore opencast mine sites to their previous natural state, with the estimated cost between £48m and £90m. Scottish Coal collapsed earlier this year and is now in liquidation. It has been criticised for failing to fully restore nearly a dozen mines that experts believe are now liabilities, because the cost of restoring them is greater than their value. The energy and waste group Hargreaves is the frontrunner to buy the six operational Scottish Coal mines in East Ayrshire, Fife and South Lanarkshire, but it is unclear whether a deal will also be done for another 11 sites. For more see.....

<http://www.scotsman.com/news/environment/concern-over-scottish-coal-mine-clear-up-cost-1-2943844>

## **New European Energy Research Alliance UK website launched**

**29<sup>th</sup> July 2013, UKERC**

Following the approval of two new joint programmes in the European Energy Research Alliance (EERA) the web portal for UK participants in EERA initiatives has been significantly updated. The website can now be accessed at [eera.ukerc.ac.uk](http://eera.ukerc.ac.uk) with information regarding what EERA is and how it works for academics not currently involved in a joint programme. One of the major improvements is that each programme now has its own page which can be found [here](#). These will be updated and managed by the UK lead for the programme and should provide information for new participants about who to contact to get involved.

To register for future updates on the progress of the EERA joint programmes please complete the [registration form here](#) and for any EERA related questions please email [eera@ukerc.ac.uk](mailto:eera@ukerc.ac.uk).

## **Cheap coal 'threatens UK pollution targets'**

**30<sup>th</sup> May 2013, Roger Harrabin, BBC News**

Coal on the global market is so cheap that it threatens government attempts to tackle climate change, the chairman of the Environment Agency has warned. Lord Smith says the UK's share of electricity generated by coal is up to 40% – the highest since 1996. Unless this trend is curbed, he says, the UK will miss its targets on curbing climate change and sulphur pollution.

The price of coal has been driven down by the dash for shale gas in the US. Gas is much less polluting than coal, so carbon dioxide (CO<sub>2</sub>) emissions have fallen in the US. But European power generators have gobbled up the resulting cheap coal, driving carbon emissions up in several nations. The EU's statistical agency Eurostat estimates that from 2011 to 2012, CO<sub>2</sub>

emissions increased by 3.9% in the UK. The rise is most likely to be due to increased coal burning. UK emissions of sulphur, which is damaging to health, have risen when they are supposed to be falling.

Lord Smith urges the government to commit to long-term targets to remove almost all carbon pollution from electricity generation by 2030. MPs are due to vote on this issue next week. He also urges ministers to resist any attempts by power generators to keep open old coal stations which are due to close under an EU directive on air pollution. Lord Smith told the BBC: "There's lots of talk about a dash for gas but in effect we're in a dash for coal that's completely unsustainable. The government must ensure it doesn't continue." Lord Smith says it is important the UK develops its own reserves of shale gas, so long as gas power stations are able to store the resulting CO<sub>2</sub> emissions in the future. "If we lock ourselves into gas generation for the next 40 years without capturing the CO<sub>2</sub> emissions, we will never meet our targets on climate change," he said. "At the current rate of progress we will miss our future carbon budgets." A government spokesman said measures were in place to ensure new coal power stations could not be built unless they captured their carbon emissions. There were no plans, he said, to extend the life of old coal power stations.

<http://www.bbc.co.uk/news/science-environment-22711416>

## **Land-based carbon offsets: false hope? Forest and soil carbon is important, but does not offset fossil fuel emissions**

**30<sup>th</sup> May 2013, Science Daily**

Leading world climate change experts have thrown cold water on the idea that planting trees can offset carbon dioxide emissions from fossil fuels. Professor Brendan Mackey of Griffith University Climate Change Response Program is the lead author of an international study involving researchers from Australia and the U.K. Their findings are reported in "Untangling the confusion around land carbon science and climate change mitigation policy," published in the scientific journal *Nature Climate Change*.

"While protecting and restoring natural forests is part of the solution, the reality is that for all practical purposes fossil fuel CO<sub>2</sub> emissions are irreversible," Professor Mackey said. The findings highlight the urgent need for policy-makers worldwide to re-think the issue as many decision-makers, national and internationally, assume that fossil fuel emissions can be offset through sequestering carbon by planting trees and other land management practices.

"There is a danger in believing that land carbon sinks can solve the problem of atmospheric carbon emissions because this legitimises the ongoing use of fossil fuels," Professor Mackey said. For more see...

[http://www.sciencedaily.com/releases/2013/05/130530095020.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130530095020.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Even with defects graphene is the strongest material in the world**

**31<sup>st</sup> May 2013, Science Daily**

In a new study, published in *Science*, Columbia Engineering researchers demonstrate that graphene, even if stitched together from many small crystalline grains, is almost as strong as graphene in its perfect crystalline form. This work resolves a contradiction between theoretical simulations, which predicted that grain boundaries can be strong, and earlier experiments, which indicated that they were much weaker than the perfect lattice.

Graphene consists of a single atomic layer of carbon, arranged in a honeycomb lattice. "Our first Science paper, in 2008, studied the strength graphene can achieve if it has no defects -- its intrinsic strength," says James Hone, professor of mechanical engineering, who led the study with Jeffrey Kysar, professor of mechanical engineering. "But defect-free, pristine graphene exists only in very small areas. Large-area sheets required for applications must contain many small grains connected at grain boundaries, and it was unclear how strong those grain

boundaries were. This, our second Science paper, reports on the strength of large-area graphene films grown using chemical vapor deposition (CVD), and we're excited to say that graphene is back and stronger than ever." For more see...

[http://www.sciencedaily.com/releases/2013/05/130531114733.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/05/130531114733.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Roman seawater concrete holds the secret to cutting carbon emissions**

**4<sup>th</sup> June 2013, Science Daily**

The chemical secrets of a concrete Roman breakwater that has spent the last 2,000 years submerged in the Mediterranean Sea have been uncovered by an international team of researchers led by Paulo Monteiro of the U.S. Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab), a professor of civil and environmental engineering at the University of California, Berkeley. Analysis of samples provided by team member Marie Jackson pinpointed why the best Roman concrete was superior to most modern concrete in durability, why its manufacture was less environmentally damaging -- and how these improvements could be adopted in the modern world. "It's not that modern concrete isn't good -- it's so good we use 19 billion tons of it a year," says Monteiro. "The problem is that manufacturing Portland cement accounts for seven percent of the carbon dioxide that industry puts into the air."

The Romans made concrete by mixing lime and volcanic rock. For underwater structures, lime and volcanic ash were mixed to form mortar, and this mortar and volcanic tuff were packed into wooden forms. The seawater instantly triggered a hot chemical reaction. The lime was hydrated -- incorporating water molecules into its structure -- and reacted with the ash to cement the whole mixture together. For more see....

[http://www.sciencedaily.com/releases/2013/06/130604135409.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/06/130604135409.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Lignite still Germany's primary energy source**

**4<sup>th</sup> June 2013, Karin Jäger, Deutsche Welle**

Lignite, or soft brown coal, will likely remain a major part of Germany's energy mix, although its excavation cuts deep scars in the ground. One coal-rich region in western Germany is Europe's largest.

The smokestacks from the five huge lignite-fired power plants along the edges of the gaping open-pit mines between Cologne, Mönchengladbach and Aachen can be seen for miles around. They generate enormous quantities of electricity, despite lignite coal being regarded as a major climate killer and cause of climate change. Burning lignite releases more carbon-dioxide than other fossil fuels, such as hard anthracite coal, natural gas, or oil.

Still, Germany produces more than 15 percent of its energy by burning lignite coal. The advantage is that Germany has large deposits and it does not need to import it. The disadvantages are that mining lignite gobbles up land, forcing the relocation of entire towns, while damaging the surrounding environment for many decades.

The state of North Rhine-Westphalia's environment minister, Johannes Remmel, a member of the Green party, told DW, "We happen to have these power plants and they will remain a major part of the energy mix through 2050." For more see....

<http://www.dw.de/lignite-still-germanys-primary-energy-source/a-16854175>

## **Methane leaks could negate climate benefits of US natural gas boom: report**

**4<sup>th</sup> June 2013, Suzanne Goldenberg, The Guardian**

Reduction in carbon emissions triggered by America's shift from coal to gas is being offset by a sharp rise in methane. Methane leaks could undo the climate change benefits of America's

natural [gas](#) boom, [a new report](#) said on Tuesday. The report, produced by the Centre for Climate and [Energy](#) Solutions (C2ES), said [America's shift from coal to gas](#) had produced important climate gains. Carbon dioxide emissions [fell last year to their lowest point since 1994](#), according to the Department of Energy. Energy-related carbon dioxide emissions were 12% below 2005 levels. But the report said those reductions were not enough, on their own, to escape the most catastrophic consequences of climate change. They were also being offset by a sharp rise in methane, the most powerful greenhouse gas on a human timescale, that was being released into the atmosphere at well sites, compressor stations and along pipelines. For more see...

<http://www.theguardian.com/environment/2013/jun/04/methane-leaks-negate-climate-benefits-gas>

## **Carbon Capture and Sequestration: Research, Development, and Demonstration at the U.S. Department of Energy**

**10<sup>th</sup> June 2013, Peter Folger, Congressional Research Service**

The above report is accessible via the following link:-

<https://www.hsdl.org/?view&did=738845>

## **Global warming to cost coal-fired power generators \$1.8tn – IEA**

**11<sup>th</sup> June 2013, unattributed, RT.com**

The International Energy Agency predicts a major reshaping of the global energy market as quicker than expected climate change could heat up the planet by an additional 5.3 degrees C if carbon emissions aren't cut. Last year carbon emissions from fossil fuels hit a record 31.6 bn tonnes, up 1.4%, according to the IEA's World Energy Outlook report. That's despite positive figures from the two largest green house gas emitters the US and China.

American emissions of carbon dioxide from fossil fuels fell by 200 million tonnes to levels last seen in the mid-1990s due to a transition from coal power to natural gas and renewable energy, the Guardian reports. European emissions fell 50 million tonnes due to economic contraction and renewable energy growth, despite an increase in coal energy use. The Chinese growth of emissions by 300 million tonnes is the smallest over the past decade as China continues to invest into diversifying its energy sources and installing more renewables and more energy efficiency. The agency says the energy sector accounts for two-thirds of global CO<sub>2</sub> emissions that are believed to fuel climate change. For more see...

<http://rt.com/business/global-power-cost-energy-522/>

## **Coal's slow burn**

**11<sup>th</sup> June 2013, Todd Williams and Stuart Pearson, Electric Light & Power**

Anticipated coal-fired plant retirements spurred by Environmental Protection Agency (EPA) regulations and persistent low natural gas prices continue to increase. There are 986 electric generation coal units in the U.S. with a total nameplate capacity of 307 gigawatts (GW). They generated some 37 percent of 2012 total electric energy, down from 42 percent in 2011. Coal's share of generation is projected to continue to decline as units come offline and are not replaced.

More than 600 units do not have the requisite pollution controls, including flue gas desulfurisation (FGD) or selective catalytic reduction (SCR) installed and are at risk for compliance with proposed EPA rules. For more details visit:-

<http://www.elp.com/articles/print/volume-91/issue-3/sections/colas-slow-burn.html>

## **World's deepest ERT imaging system for CO<sub>2</sub> sequestration developed**

**12<sup>th</sup> June 2013, Science Daily**

Lawrence Livermore National Laboratory researchers have broken the record for tracking the movement and concentration of carbon dioxide in a geologic formation using the world's

deepest Electrical Resistance Tomography (ERT) system. The research provides insight into the effects of geological sequestration to mitigate the impact of greenhouse gases.

The team led by LLNL's Charles Carrigan obtained time lapse electrical resistivity images during the injection of more than 1 million tons of carbon dioxide (CO<sub>2</sub>) more than 10,000 feet deep in an oil and gas field in Cranfield, Miss., which represents the deepest application of the imaging technique to date. The previous depth record of about 2,100 feet was held by the CO<sub>2</sub>SINK Project Consortium in Ketzin, Germany.

"The images provide information about both the movement of the injected CO<sub>2</sub> within a complex geologic formation and the change with time of the distribution of CO<sub>2</sub> in the porous sandstone reservoir," Carrigan said. For more see...

[http://www.sciencedaily.com/releases/2013/06/130612133401.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/06/130612133401.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Nickel phosphide nanoparticles for cleaner energy technologies**

**15<sup>th</sup> June 2013, unattributed, Azonano.com**

Cheaper clean-energy technologies could be made possible thanks to a new discovery. Research team members led by Raymond Schaak, a professor of chemistry at Penn State, have found that an important chemical reaction that generates hydrogen from water is effectively triggered -- or catalyzed -- by a nanoparticle made of nickel and phosphorus, two inexpensive elements that are abundant on Earth. Schaak explained that the purpose of this nanoparticle is to help produce hydrogen from water -- a process that is important for many energy-production technologies including fuel cells and solar cells. "Water is an ideal fuel, because it is cheap and abundant, but we need to be able to extract hydrogen from it," Schaak said. Hydrogen has a high energy density and is a great energy carrier, Schaak explained, but it requires energy to produce. For more see...

<http://www.azonano.com/news.aspx?newsID=27614>

## **Energy special: Get ready for the 'fire ice' revolution**

**15<sup>th</sup> June 2013, Charles C. Mann, The Spectator**

On Saturday, 8 June, the research vessel *Kaiyo Maru No. 7* left the port of Joetsu, in western Japan, to begin a three-year survey of the Sea of Japan — the latest step in a little-known research programme that in a decade or less could profoundly change the international balance of power.

*Kaiyo Maru*, a 499-ton trawler, is hunting for beds of methane hydrate, a cold, white, sherbet-like substance found off coastlines in Japan and much of the rest of the world. The United States Geological Survey estimates that as much as 2.8 trillion cubic metres of this mixture of frozen water and natural gas may exist. Although only part of this vast deposit is accessible, methane hydrate — 'ice that burns' — may be the Earth's single biggest fossil-fuel source. (Natural gas consists primarily of the colourless, odourless gas methane — the two terms are almost interchangeable.)

Canada, China, Germany, India, Korea, New Zealand, Norway, Taiwan and the United States have also been investigating this combustible slush. But Japan's \$700 million programme, which began in 1996, is the most advanced and extensive. In March, Tokyo completed its first production test, in another deposit 80 kilometres off the coast of eastern Japan. Jubilant, the Ministry of Economy, Trade and Industry announced plans to commercialise 'ice that burns' by fiscal 2018. For more see....

<http://www.spectator.co.uk/features/8931741/energy-special-get-ready-for-the-fire-ice-revolution/>

## **How useful is fracking anyway? Study explores return on investment** **17<sup>th</sup> June 2013, Science Daily**

The value of a fuel's long-term usefulness and viability is judged through its energy return on investment; the comparison between the eventual fuel and the energy invested to create it. The energy return on investment (EROI) study published in the *Journal of Industrial Ecology* finds that shale gas has a return value which is close to coal. In the United States, gas is mined from horizontal, hydraulically fractured wells in the Marcellus Shale of Pennsylvania. The study compares the total input energy with the energy expected to be made available to end users.

The analysis indicates that the EROI ratio of a typical well is likely between 64:1 and 112:1, with a mean of approximately 85:1. This range assumes an estimated ultimate recovery (EUR) of 3.0 billion cubic feet per well. This is similar to the EUR of coal, which falls between 50:1 and 85:1.

"Our analysis indicates that gas can be extracted from shale efficiently, from an energy perspective. The energy return on (energy) investment ratio (EROI) does seem to be at least as favorable as coal," said lead author Mike Aucott. "However, a comparison with coal is difficult. There appear to be large amounts of coal still available. Estimates of the amount of gas available from the shale plays vary widely. It is not clear yet whether there is anywhere near enough to rival coal over the long haul." For more visit:-

[http://www.sciencedaily.com/releases/2013/06/130617111355.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/06/130617111355.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Forty per cent of remaining gas may be 'unconventional'** **18<sup>th</sup> June 2013, unattributed, UKERC**

According to new research, which builds on a recent report by UKERC on 'unconventional' gas for the European Commission, 40% of the world's remaining gas resources could come from unconventional sources such as shale gas. However, the study warns that there are huge uncertainties about exactly how much unconventional gas will be available in the future, particularly given the relative absence of peer-review and insufficient information on data, assumptions and methodology.

The review "Unconventional gas – A review of regional and global resource estimates" is published in the journal *Energy* and looks at over sixty studies on unconventional gas resources (shale gas, tight gas and coal bed methane). The paper finds that using 'best' estimates around 286 trillion cubic metres of unconventional gas could be feasibly recovered.

For more see...

<http://www.ukerc.ac.uk/support/article3001>

## **Simple and inexpensive process to make a material for CO<sub>2</sub> adsorption** **19<sup>th</sup> June 2013, Science Daily**

Researchers from Ulsan National Institute of Science and Technology (UNIST), S. Korea, developed a novel, simple method to synthesize hierarchically nanoporous frameworks of nanocrystalline metal oxides such as magnesia and ceria by the thermal conversion of well-designed metal-organic frameworks (MOFs).

The novel material developed by the UNIST research team has exceptionally high CO<sub>2</sub> adsorption capacity which could pave the way to save Earth from CO<sub>2</sub> pollution.

Nanoporous materials consist of organic or inorganic frameworks with a regular, porous structure. Because of their uniform pore sizes they have the property of letting only certain substances pass through, while blocking others. Nanoporous metal oxide materials are ubiquitous in materials science because of their numerous potential applications in various areas, including adsorption, catalysis, energy conversion and storage, optoelectronics, and drug

delivery. While synthetic strategies for the preparation of siliceous nanoporous materials are well-established, non-siliceous metal oxide-based nanoporous materials still present challenges. For more see:-

[http://www.sciencedaily.com/releases/2013/06/130619161552.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29](http://www.sciencedaily.com/releases/2013/06/130619161552.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy+%28ScienceDaily%3A+Matter+%26+Energy+News%29)

## **Too green to be true? Highly effective method for converting CO<sub>2</sub> into methanol**

**20<sup>th</sup> June 2013, Science Daily**

Université Laval researchers have developed a highly effective method for converting CO<sub>2</sub> into methanol, which can be used as a low-emissions fuel for vehicles. The team led by Professor Frédéric-Georges Fontaine presents the details of this discovery in the latest issue of the *Journal of the American Chemical Society*.

Researchers have been looking for a way to convert carbon dioxide into methanol in a single step using energy-efficient processes for years. "In the presence of oxygen, methanol combustion produces CO<sub>2</sub> and water," explained Professor Fontaine. "Chemists are looking for catalysts that would yield the opposite reaction. That would allow us to slash greenhouse gas emissions by synthesizing a fuel that would reduce our dependence on fossil fuels."

For more see....

[http://www.sciencedaily.com/releases/2013/06/130620111230.htm?utm\\_source=feedburner&utm\\_medium=email&utm\\_campaign=Feed%3A+sciencedaily%2Fmatter\\_energy%2Ffossil\\_fuels+%28ScienceDaily%3A+Matter+%26+Energy+News+---+Fossil+Fuels%29](http://www.sciencedaily.com/releases/2013/06/130620111230.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy%2Ffossil_fuels+%28ScienceDaily%3A+Matter+%26+Energy+News+---+Fossil+Fuels%29)

## **Research sheds light on coal seam gas versus renewable energy**

**26<sup>th</sup> June 2013, unattributed, Phy.Org.**

A shift from coal-fired to gas-fired power generation will not significantly lower carbon dioxide emissions, new research by the Global Change Institute at The University of Queensland has found. Energy economics researcher Professor John Foster said the modelling indicated that a transition to gas-fired generation reduced emissions only marginally, and that wholesale prices would be higher than with a renewable energy option.

"The findings contradict a widely-held view that renewable energy is too expensive compared to fossil fuels, and too unreliable to be a major component of Australia's [future energy](#) generation by 2035," he said. "There is no justification for the claim that a high proportion of energy sourced from renewables will drive up wholesale costs, in comparison to a power system heavily dependent on [coal seam gas](#)," Professor Foster said. For more visit...

<http://phys.org/news/2013-06-coal-seam-gas-renewable-energy.html>

## **Coal-fired retrofit market \$532bn by 2020?**

**28<sup>th</sup> June 2013, unattributed, Environmental Leader**

Improving efficiency, reducing operating costs and meeting environmental regulations will result in a retrofit and upgrade investment market to the tune of \$532 billion at coal-fired power plants in the US and Europe by 2020, according to the McIlvaine Company's utility tracking system.

Although natural gas is now fairly low cost, the Department of Energy predicts the US will burn more coal in 2035 than it does now, McIlvaine says. [Coal](#) consumption at European utilities is substantially higher this year since it's cheaper than alternatives; McIlvaine says there is great incentive to burn coal cleanly and economically.

The market research firm says Europe is committed to coal, citing France's contracts to upgrade three 600 MW coal-fired boilers and to extend the life for another 25 years, as well as Eastern Europe's dependence on coal.

In both the US and Europe, the largest expenditures will be improvements in combustion efficiency, McIlvaine forecasts. The average US plant emits 30 percent more CO<sub>2</sub> and uses 30 percent more coal than a new ultra-super critical power plant that has an efficiency of 45 percent to 48 percent, and consumes less coal than a traditional coal plant to produce the same amount of electricity, so it emits less CO<sub>2</sub> per kilowatt generated. McIlvaine says upgrades will not be able to fully duplicate a new ultra-super critical plant, but they can improve efficiency by 10 percent or more.

For more visit:-

<http://www.environmentalleader.com/2013/06/28/coal-fired-retrofit-market-532bn-by-2020/>

### **E.ON pulls out of Orkney Pelamis marine energy project**

**2<sup>nd</sup> July 2013, Unattributed, BBC News**

The German power giant E.ON is pulling out of a marine energy research project in Orkney. E.ON had been working with Pelamis Wave Energy, based in Edinburgh, to test one of the company's wave energy converters at the European Marine Energy Centre. E.ON has blamed the decision on delays in the development of wave energy technology. It said it will now focus its efforts on wind, biomass and solar energy instead. A spokeswoman told BBC Scotland the company still believed marine energy could provide commercial opportunities in the future.

For more visit...

<http://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-23146280>

### **Carbon breakthrough claimed at coal-fired power plant**

**2<sup>nd</sup> July 2013, Ben Cubby, Sydney Morning Herald**

One of Australia's biggest coal-fired power stations will be fitted with a world-first carbon capture plant that will produce renewable diesel or jet fuels. Bayswater power station, near Muswellbrook in the Hunter Valley, will see some of its carbon dioxide emissions captured on site and fed into sealed tanks packed with algae, which will then be harvested and turned into biofuels.

The ambitious \$140 million plan has earned the backing of the federal and state governments, and Macquarie Generation, the NSW state-owned power generator that operates Bayswater. In the first phase, to start next year, 400 closed tanks the size of shipping containers will be pumped with carbon dioxide from the Bayswater chimneys, to stimulate the growth of artificial algal blooms. The algae - essentially a form of vegetable oil - will then be processed at a nearby facility into fuel for sale.

The project will make a small but measurable difference to Bayswater's greenhouse gas emissions. It currently pumps out about 19 million tonnes of carbon dioxide gas a year, but the project will capture about 270,000 tonnes of that CO<sub>2</sub>, ramping up to about 1.3 million tonnes in a few years' time. It should also produce relatively little waste, with carbon being absorbed into algal growth while waste vegetable matter will be converted into pellets for stock feed.

For more see...

<http://www.smh.com.au/business/carbon-economy/carbon-breakthrough-claimed-at-coalfired-power-plant-20130702-2p9sp.html>

### **Slag performance database for coal uses in gasification**

**4<sup>th</sup> July 2013, unattributed, CSIRO**

[CSIRO](#) has developed an experimental database and modelling toolkit for making assessments of the suitability of coals for gasification technologies. As the coal gasification market grows, coal deposits previously ranked of low value can become a marketable resource.

"Traditionally, coals have been selected for their tendency to not slag or foul boiler tubes in combustion power stations," senior research scientist at CSIRO Dr Alexander Ilyushechkin said. "However, with the gasification market, which relies heavily on a slagging coal, set to increase in the coming years, significant coal deposits are likely to become more marketable." He said

there are more than 130 gasification installations around the world using over 50 million tonnes of coal each year. He cited the US Gasification Technologies Council and said this will climb by more than 70 per cent in the next three years. "This provides a growing export potential for Australian coals, which will increase the value of the coal resource and extend the life of the mine."

Recent study by CSIRO for the Australian National Low Emissions Coal Research and Development agency showed slags produced from gasification are apt for product manufacturing such as concrete production. It also showed their environmental impact in terms of leaching of heavy metals is miniscule. Using its database of coal slag viscosity, CSIRO can analyse and assess coal in terms of its slagging behaviour and assist coal producers in valuing their resources by matching them to different gasification technologies.

It is based on measurements of slag viscosity behaviour for hundreds of different coals and artificial ashes. It can be used to gauge the behaviour of a particular fuel's mineral matter under conditions relevant to the leading gasification technologies. CSIRO can directly measure the viscosity of slags at temperatures up to 1600°C, giving an insight into how the slag will behave in a gasifier and pinpointing the cause of any problematic behaviour. This is the best way for typifying slag flow behaviour and for determining optimum amount of flux that could be added to improve performance.

<http://www.ferret.com.au/c/CSIRO/Slag-performance-database-for-coal-uses-in-gasification-n2505925>

## **New nanomaterial holds potential for CO<sub>2</sub> emission reduction**

**10<sup>th</sup> July 2013, unattributed, Azonano.com**

The new nanomaterial, described in the Journal of the American Chemical Society, efficiently separates the greenhouse gas carbon dioxide from nitrogen, the other significant component of the waste gas released by coal-fired power stations. This would allow the carbon dioxide to be separated before being stored, rather than released to the atmosphere.

"A considerable amount of Australia's - and the world's - carbon dioxide emissions come from coal-fired power stations," says Associate Professor Christopher Sumbly, project leader and ARC Future Fellow in the University's School of Chemistry and Physics. "Removing CO<sub>2</sub> from the flue gas mixture is the focus of a lot of research. Most of Australia's energy generation still comes from coal. Changing to cleaner energies is not that straightforward but, if we can clean up the emissions, we've got a great stop-gap technology." The researchers have produced a new absorbent material, called a 'metal-organic framework', which has "remarkable selectivity" for separating CO<sub>2</sub> from nitrogen. "It is like a sponge but at a nanoscale," says Associate Professor Sumbly. "The material has small pores that gas molecules can fit into - a CO<sub>2</sub> molecule fits but a nitrogen molecule is slightly too big. That's how we separate them."

Other methods of separating CO<sub>2</sub> from nitrogen are energy-intensive and expensive. This material has the potential to be more energy efficient. It's easy to regenerate (removing the CO<sub>2</sub>) for reuse, with small changes in temperature or pressure. "This material could be used as it is but there are probably smarter ways to implement the benefits," says Associate Professor Sumbly. "One of the next steps we're pursuing is taking the material in powder form and dispersing it in a membrane. That may be more practical for industrial use."

The project is funded by the Science Industry Endowment Fund and is a collaboration between researchers in the Centre of Advanced Nanomaterials, in the School of Chemistry and Physics, and the CSIRO.

<http://www.azonano.com/news.aspx?newsID=27813>

## **Survey reveals public support for move to renewable energy**

**16<sup>th</sup> July 2013, unattributed, The Engineer**

Researchers have found that a significant portion of the British public support moves to an efficient, clean, fair, and safe energy system but distrust remains a concern.

A new report titled *Transforming the UK energy system – public values, attitudes and acceptability* brings together the findings from two in-depth phases of research carried out over a period of 30 months; a series of six in-depth deliberative workshops with members of the public held across England, Scotland and Wales, and a nationally representative survey of 2,441 members of the public.

Funded by the UK Energy Research Centre (UKRC) the research was carried out by a team from Cardiff University's School of Engineering, School of Psychology, and Welsh School of Architecture. For more see....

<http://www.theengineer.co.uk/survey-reveals-attitudes-to-energy/1016727.article>

## **First metric ton of CO2 captured at coal power plant in Le Havre**

**16<sup>th</sup> July 2013, unattributed, Penn Energy**

CO2 capture tests were initiated at Alstom's and EDF's research demonstration unit, which was selected for funding by the ADEME in 2010, with the capture of the first metric ton of CO2 on July 11. Funded at 25% by the ADEME's research demonstration fund, this €22 million investment is part of the EDF Group's determination to invest in research and innovation towards reducing the environmental impact from power stations that use fossil sources of energy.

A dozen engineers from the Research and Development teams at EDF and Alstom are driving the tests. The intent of these tests is to confirm the predicted quantity of energy and amine solvent required to operate the unit, so as to assess whether the process is worthwhile from a cost and an environmental standpoint. They will also look at how the unit performs in an industrial setting, as well as how flexible it is to use within a fully operating power plant. Such tests represent a crucial step in developing efficient industrial solutions for capturing CO2.

For more visit:-

<http://www.pennenergy.com/articles/pennenergy/2013/07/first-metric-ton-of-co2-emissions-captured-in-le-havre.html>

## **UK University wins £6m for energy storage research facility**

**16<sup>th</sup> July 2013, Priyanka Shrestha, Energy Live News**

The University of Birmingham has been granted a £6 million fund to create a new facility to support research into energy storage technologies. Cryogenic energy storage systems – which uses liquid nitrogen to store and release energy – use off-peak electricity to liquefy air. The cryogenic liquids that is formed is stored in a vessel and vapourised into gas during an expansion process which drives a turbine.

The system uses off-peak electricity during peak times and help solve the “wrong-time wrong-place” energy generation and supply problems. The technology is expected to provide a relatively cheap way of storing power, particularly from [intermittent sources such as wind turbines](#), to better match the supply of electricity to demand.

The University claims the new centre will be the UK's “first” dedicated research facility for energy storage using cryogenic liquids, comprising new laboratories, equipment and a major demonstration plant. The project is part of a wider investment worth £85 million to support research in universities across the nation. For more visit...

<http://www.energylivenews.com/2013/07/17/uk-university-wins-6m-for-energy-storage-research-facility/>

## **Fracking Research Finding No Water Taint Near Drill Site**

**19<sup>th</sup> July 2013, Mark Drajem, Bloomberg Business Week**

Energy Department researchers so far have found “nothing of concern” in a study of whether chemicals used in hydraulic fracturing for natural gas at one site in Pennsylvania traveled toward shallower groundwater.

The preliminary evidence, if ratified in a final report, would bolster claims by the industry that the boom in drilling doesn't pose risks to drinking water. Chances are low that fluids pumped more than a mile underground to free trapped gas could leak and contaminate drinking water, although that's not the only hazard from the practice known as fracking, said Fred Baldassare, senior geoscientist at Echelon Applied Geoscience.

“A lot of us never thought there was much of a risk of fluid migration,” Baldassare, a former Pennsylvania Department of Environmental Protection official who is not involved in the study, said today in an interview. “We have so much confining pressure that the opportunity for water to move is just really minimal.”

For more visit:-

<http://www.businessweek.com/news/2013-07-19/fracking-research-so-far-finds-no-water-taint-near-drilling-site>

## **Scottish coal-fired power plant could remain online until 2025**

**17<sup>th</sup> July 2013, Samuel Dodson, Energy Global**

Scottish energy minister, Fergus Ewing, has told BBC Radio Scotland that the coal-fired power plant at Longannet in Fife, could continue operating until 2025. Longannet is the third largest coal-fired power plant in Europe, using up to 1000 tph of coal. Plans to use carbon capture and storage (CCS) techniques, then store captured carbon emissions beneath the North Sea, have stalled. Ewing said that the successful development of CCS technology was vital to reducing carbon emissions. The energy minister said, “If you look at the European position as a whole, the International Energy Agency (IEA) has made it clear that, without CCS, it will be difficult or impossible for [carbon emissions] targets to be achieved.” “CCS is not an add on option, it is an essential part of a long-term, low carbon electricity generation policy.”

Longannet first opened in 1969 and began operations in 1973. The plant has four 600 MW turbines, with a net electricity output of 2304 MW. The power plant is currently experiencing a major overhaul, as operators look to improve the plant's efficiency and environmental performance. Neil Clitheroe, CEO of Scottish Power Retail and Generation, said Longannet continued to play “a pivotal role” in producing electricity. “The work over the summer this year will help [Longannet] remain an important part of Scotland's energy mix,” Clitheroe said.

[http://www.energyglobal.com/news/coal/articles/Scottish\\_power\\_plant\\_will\\_run\\_until\\_2025\\_271.aspx#.Ug9CVWJwbc](http://www.energyglobal.com/news/coal/articles/Scottish_power_plant_will_run_until_2025_271.aspx#.Ug9CVWJwbc)

## **Fracking's safety gets boost from federal research**

**21<sup>st</sup> July 2013, Ben Wolfgang, The Washington Times**

The leading federal research effort into the controversial drilling method known as fracking has turned up no evidence so far linking the process to water contamination — a connection continually drawn by many environmentalist critics along with some Democrats in Congress.

Department of Energy research, being conducted at a Marcellus Shale natural gas well in western Pennsylvania, thus far has shown that chemicals used in the hydraulic fracturing practice have stayed thousands of feet below drinking-water supplies. The study was begun about a year ago, but federal officials say final results are still months away.

“We are still in the early stages of collecting, analyzing and validating data from this site. While nothing of concern has been found thus far, the results are far too preliminary to make any firm claims. We expect a final report on the results by the end of the calendar year,” says a statement from the department's National Energy Technology Laboratory. For more see...

<http://www.washingtontimes.com/news/2013/jul/21/frackings-safety-gets-boost-from-federal-research/>

## **Consumers to pay 'dirty' coal power subsidies for years**

**22<sup>nd</sup> July 2013, Oliver Wright, The Independent**

Britain's dirtiest coal power stations are to be allowed to bid for hundreds of millions of pounds' worth of subsidies that could allow them to stay open well into the 2020s. Senior ministers are so worried about the possibility that the UK could suffer electricity blackouts over the next few years they have agreed to let Britain's coal stations bid for "capacity payment" handouts – paid for through people's energy bills – which could allow them to upgrade their facilities. If successful, the money would help make coal generation economic well into the 2020s – but significantly reduce the UK's ability to cut its carbon emissions.

The move comes at a time when energy experts are predicting a renewed future for coal, despite the fact that it produces double the amount of CO<sub>2</sub> as gas generation. In April 2012 coal took over from gas as Britain's dominant fuel for electricity for the first time since 2007, driven by a collapse in the international price and a rise in the cost of gas. In addition, the tax the Government levies on companies emitting carbon currently stands at £16 per ton, rising to £30 a ton in 2020. But analysts warn that at the current prices this would have to rise to more than £40 to make such coal generation uneconomic.

For more see...

<http://www.independent.co.uk/news/uk/home-news/consumers-to-pay-dirty-coal-power-subsidies-for-years-8724925.html>

## **Coal mine managers warned of fire risk before huge blaze**

**23<sup>rd</sup> July, Nicola Dowling, BBC Business News**

Safety inspectors urged management to close part of a coal mine months before a huge underground fire broke out. The blaze closed Daw Mill Colliery earlier this year, leaving hundreds of miners out of work and forcing part of the company into administration. One of the last deep mines in the country, Daw Mill in Warwickshire was owned by UK Coal. Chief executive Kevin McCullough said he did not believe the company could have prevented the fire. But the Health and Safety Executive (HSE) and the Union of Democratic Mineworkers said they had warned many months earlier that there were dangers ahead on what is known as the 32s coalface. "Our advice to UK Coal was they should consider stopping that particular face sooner rather than later, because they were heading for a geological fault," said the chief inspector of mines, Steve Denton. According to experts, mining through a fault is very dangerous, because it significantly increases the risk of roof collapse, fire and other hazards. One experienced miner described it as "madness".

For more see....

<http://www.bbc.co.uk/news/business-23383209>

## **Scottish coal mines to reopen**

**23<sup>rd</sup> July 2013, Samuel Dodson, Energy Global**

Five Scottish coal mines will restart production, having been acquired by Hargreaves Services in a deal worth £8.4 million. The plans to restart production come two months after Hargreaves completed another deal in Scotland, this time buying sites from KPMG, as liquidator of Aardvark (TMC) Ltd., in May.

Hargreaves Services said coal production has already restarted at the sites acquired from KPMG and that the business was performing in line with expectations. The Durham based company, which has significant operations in South Yorkshire, said it was focused on integrating the newly acquired surface mining assets into the group.

Hargreaves said it plans to create 300 jobs over three months, rising to 500 within a year. The company will not take full ownership of the mines, due to the cost linked with restoration once work has ceased at the mines. Instead, Hargreaves will operate the mines for coal

extractions and restoration work, hoping to market an estimated 1 million tpa of coal. Hargreaves Services group finance director, Iain Cockburn, said the restart of production at the coal mines "provides wider development and regeneration opportunities to help address the legacy of unfulfilled restoration obligations."

"We will work collaboratively with our local communities, key stakeholders and regulators." He added: "We are committed to supporting the Scottish Mines Restoration Trust and we will encourage other industry participants to do likewise."

Hargreaves Services released a statement in which they acknowledged risked and pressures remain in the coal and coke markets, but that the group was "confident" it is well placed to overcome these.

[http://www.energyglobal.com/news/coal/articles/Scottish\\_coal\\_mines\\_to\\_reopen\\_277.aspx#.Ug9HdGJwbc](http://www.energyglobal.com/news/coal/articles/Scottish_coal_mines_to_reopen_277.aspx#.Ug9HdGJwbc)

## **Germany spent €708m on energy research in 2012**

**31<sup>st</sup> July, Priyanka Shrestha, Energy Live News**

Germany spent a total of €708 million (£619m) on research and development of energy technologies last year, according to reports. The figure is believed to have increased from €399 million (£349m) in 2006 – a 77% rise in the last seven years. Reports claim a new study showed most of the research benefitted energy efficiency and renewable power projects, which accounted for around €500 million (£437.2m) of the total funding last year.

Some of the projects included reducing noise from offshore wind power and making buildings more energy efficient. The study also showed Germany spent €133 million (£116.3m) on research into nuclear fusion and €75 million (£65.3m) on safety linked to its atomic reactors and disposal of nuclear waste as the country shuts its nuclear reactors. German Economy Minister Philipp Roesler said: "Research and development of modern energy technologies are an important condition for the success of the energy switch."

<http://www.energylivenews.com/2013/07/31/germany-spent-e708m-on-energy-research-in-2012/>

## **Germany's Grim Nuclear Phase Out**

**5<sup>th</sup> August 2013, unattributed, Canada Free Press**

In 2000, Germany committed to cut its carbon dioxide emissions by 40 percent from 1990 levels by 2020. To achieve this ambitious goal, Germany planned to increase its use of renewable power sources and to take advantage of the country's most commercially-viable source of carbon dioxide-free energy—nuclear power. But despite Germany's goals a decade ago, they are now building coal-fired electricity generation and shuttering nuclear power plants. Germany has apparently realized two important lessons—coal provides low-cost, reliable electricity and switching to renewables is wildly expensive. For more see...

<http://canadafreepress.com/index.php/article/57035>

## **New clean coal technology approved for US project**

**6<sup>th</sup> August 2013, Diarmaid Williams, Power Engineering**

Hamon Research-Cottrell, a subsidiary of Hamon Corporation, has received full notice to proceed with the engineering, procurement and installation of a Regenerative Activated Coke Technology (ReACT™) system at the 321 MW Wisconsin Public Service Weston coal-fired power plant unit 3 in the US.

ReACT™ is an integrated multi-pollutant control technology that removes SO<sub>2</sub>, NO<sub>x</sub> and mercury from coal-fired plants by adsorption with activated coke to attain emission levels found at the best controlled coal-fired plants. This system will reduce plant SO<sub>2</sub> emissions by more than 90 per cent, mercury by 90 per cent or more, and NO<sub>x</sub> by more than 20 per cent.

This proven technology simultaneously controls multiple pollutants using only a fraction of the

water that conventional wet scrubbers demand, while producing a saleable sulfuric acid by-product commonly used in the fertilizer, paper-making, and many other industries. HRC holds the license for the ReACT™ technology and provides innovative clean air technologies to a wide array of industries including power generation.

Engineering and procurement activities have already commenced and the project is expected to be completed and in-service by December 31st, 2016.

<http://www.powerengineeringint.com/articles/2013/08/new-clean-coal-technology-approved-for-us-project.html>

### **US Coal 207 plants will close in the next decade – Report 7<sup>th</sup> August 2013, unattributed, Coal Guru**

According to Reuters, Mr Obama, US President, apparent "war on coal" will result in 207 coal plants shuttering their doors over the next decade or so. Whether due to environmental regulations or cheap natural gas, these coal plants will close their doors, resulting in a loss of over 40,000 megawatts of electricity. That's less than 1% of all the electricity used by the country in a year, but because multiple plants are closing in the same location, energy prices for people living within their reach will increase. Not to mention the job losses from closing those plants.

As 207 plants are slated to close, 138 have already shut down since Obama took office in 2009 and began his anti-coal onslaught. If all 207 of those facilities cease operating, it will leave the nation with 439 coal fired plants, a loss of 32% of the nation's coal plants.

Coal currently accounts for about 40% of the nation's energy supply, so losing this many coal plants will be devastating. Renewable energy account for only 12% of current consumption, and that percentage isn't growing very quickly. Mr Dan Kish, senior vice president of policy at the Institute for Energy Research, said that these coal plants will have to be replaced with newer, more expensive forms of energy, like renewables. Some of the plants are being converted into natural gas plants, but building new power supplies will be costly. And where will the money come from to build these plants?

Mr Kish said that "The fact is that with the regulatory flurry that only looks to get worse, people will have to accept that their energy bills will increase. The president said as much in 2008." Mr Kish was referring to Obama's 2008 statement to a San Francisco fund-raising dinner that "electricity rates will necessarily sky-rocket" under his then proposed energy program.

[http://www.coalguru.com/north\\_america/us\\_coal\\_207\\_plants\\_will\\_close\\_in\\_the\\_next\\_decade\\_report/11821](http://www.coalguru.com/north_america/us_coal_207_plants_will_close_in_the_next_decade_report/11821)

### Latest information on newly-funded EPSRC funded projects

Notification has been received from the EPSRC of the following recently-awarded projects:-

#### Panel Name : EPSRC Future Conventional Power Research Consortium

Date of Panel : 22 November 2012

Rank	Grant Reference	Principal Investigator	Holding Organisation	Grant Title	Value (£)
1.	<a href="#">EP/K021095/1</a>	Thomson, Professor R	Loughborough University	Flexible and Efficient Power Plant: Flex-E-Plant	1,997,000
2.	<a href="#">EP/K02115X/1</a>	Hogg, Dr S	Durham University	Development and Evaluation of Sustainable Technologies for Flexible Operation of Conventional Power Plants.	1,944,441

#### Panel Name : Nanotechnology GC3 Stage Gate

Date of Panel : 26 February 2013

Rank	Grant Reference	Principal Investigator	Holding Organisation	Grant Title	Value (£)
1.	<a href="#">EP/K035274/1</a>	Williams, Professor CK	Imperial College London	Nano-structured Catalysts for CO2 Transformation to Fuels and Products	1,488,166
2.	<a href="#">EP/K035355/1</a>	De Leeuw, Professor NH	University College London	Bio-inspired sulfide nanocatalysts: From proof of concept to 'real' catalysis	1,086,897

#### Panel Name : EPSRC Challenges in Geological Storage for CCS

Date of Panel : 06 March 2013

Rank	Grant Reference	Principal Investigator	Holding Organisation	Grant Title	Value (£)
1.	<a href="#">EP/K035967/1</a>	Durucan, Professor S	Imperial College London	CO2 injection and storage - Short and long-term behaviour at different spatial scales	1,212,205
2.	<a href="#">EP/K036033/1</a>	Gilfillan, Dr SMV	University of Edinburgh	Fingerprinting captured CO2 using natural tracers: Determining CO2 fate and proving ownership	236,178
3.	<a href="#">EP/K035878/1</a>	Chadwick, Dr A	NERC British Geological Survey	DiSECCS: Diagnostic Seismic toolbox for the Efficient Control of CO2 Storage	893,883
4.	<a href="#">EP/K036025/1</a>	Harrington, Dr J	NERC British Geological Survey	The impaCt of hydrOcarbon depletioN on the Treatment of cAprocks within performance assessment for CO2 InjectioN schemes - CONTAIN	925,473

## CALENDAR OF COAL RESEARCH, MEETINGS AND EVENTS

Date	Title	Location	Contact
<p><b>Wednesday 25th September 2013</b></p> <p><b>NOTE : This Event is being co-sponsored by the CRF and CRF Members can attend at the IMechE Members rate.</b></p>	<p><b>Know Your Enemy : Avoiding Project Failure and Cost Increases through Bulk Material Characterisation.</b></p>	<p><b>Institution of Mechanical Engineers,</b> 1 Birdcage Walk, Westminster, London, SW1H 9JJ.</p>	<p><b>Anissa Bensahih, Events Executive Assistant/Process Industries Division,</b> Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, London, SW1H 9JJ. <a href="http://www.imeche.org">www.imeche.org</a> Tel : 020 7304 6966 Fax : 020 7222 9881 E-mail : <a href="mailto:A.Bensahih@imeche.org">A.Bensahih@imeche.org</a> Full programme/download brochure : <a href="http://www.imeche.org/events/S1779">www.imeche.org/events/S1779</a></p>
<p>29<sup>th</sup> September to 3<sup>rd</sup> October 2013</p>	<p>ICCS&amp;T 2013, International Conference on Coal Science &amp; Technology</p>	<p>Penn Stater Hotel &amp; Conference Center, 215, Innovation Boulevard, State College, PA 16803, USA.</p>	<p>For details visit:- <a href="http://www.iccst.info/live/index.php?c=k">http://www.iccst.info/live/index.php?c=k</a></p>
<p><b>Monday 7th October 2013</b></p>	<p><b>The 2013 Coal Science Lecture</b> Organised by the Biomass and Fossil Fuel Research Alliance, (BF2RA), with sponsorship from the Coal Research Forum, (CRF), to be given by Professor Colin Snape, University of Nottingham.</p>	<p><b>The Institute of Physics , 76, Portland Place , London , W1B 1NT.</b></p>	<p><b>Mr. J.D.Gardner, BCURA Company Secretary, Gardner Brown Ltd., Calderwood House, 7 Montpellier Parade, Cheltenham , GLOS , GL50 1UA.</b> Tel : 01242-224886 Fax : 01242-577116 E-mail : <a href="mailto:john@gardnerbrown.co.uk">john@gardnerbrown.co.uk</a></p>
<p>13<sup>th</sup> to 16<sup>th</sup> October 2013</p>	<p>2013 Gasification Technologies Conference.</p>	<p>Colorado Springs, CO, USA.</p>	<p>Alison Kerester, Gasification Technologies Council, 3030 Clarendon Blvd., Suite 330, Arlington, VA 22201, USA. E-mail : <a href="mailto:akerester@gasification.org">akerester@gasification.org</a> Internet : <a href="http://www.gasification.org">www.gasification.org</a></p>
<p><b>Tuesday 15<sup>th</sup> October 2013</b></p>	<p><b>BF2RA Project Review Seminar Organised by the Coal Research Forum in collaboration with the Biomass and Fossil Fuel Research Alliance, (BF2RA).</b></p>	<p><b>School Of Chemical And Environmental Engineering, University of Nottingham. Room A1, The Coates Building.</b></p>	<p><b>Dr. David J.A.McCaffrey, Secretary of the Coal Research Forum.</b> Tel : 01242-236973 E-mail : <a href="mailto:mail@coalresearchforum.org">mail@coalresearchforum.org</a></p>
<p>16<sup>th</sup> and 17<sup>th</sup> October 2013</p>	<p>Seminar on Carbon Capture &amp; Storage 2013: Reporting One Year On.</p>	<p>London, UK.</p>	<p>Taz Khatun, Institution of Mechanical Engineers, 1, Birdcage Walk, London, SW1H 9JJ. E-mail : <a href="mailto:t.khatun@imeche.org">t.khatun@imeche.org</a> Internet : <a href="http://www.imeche.org/events/S1763">www.imeche.org/events/S1763</a> Tel : 020 7973 1306.</p>
<p>7<sup>th</sup> and 8<sup>th</sup> November 2013</p>	<p>3rd IEA Clean Coal Centre Network Workshop on Underground Coal Gasification.</p>	<p>Brisbane, Queensland, Australia</p>	<p>John Kessels, IEA Clean Coal Centre, Gemini House, 10-18 Putney Hill, London SW15 6AA. E-mail : <a href="mailto:John.Kessels@iea-coal.org">John.Kessels@iea-coal.org</a> Internet : <a href="http://ucg3.coalconferences.org">ucg3.coalconferences.org</a></p>
<p><b>Thursday 21<sup>st</sup> November 2013</b> <b>NOTE : Attendance at this event is without charge to CRF Members.</b></p>	<p><b>The RSC Energy Sector 2013 Young Members Event and Poster Competition.</b> <b>NOTE : The CRF is providing 3 poster prizes for this event.</b></p>	<p><b>UK Energy Research Centre, South Kensington, London.</b></p>	<p><b>Dr. Chris Satterley, (Secretary), E.ON New Build &amp; Technology Ltd., Technology Centre, Ratcliffe on Soar, Nottingham, NG11 0EE.</b> Tel : 0247 618 3312, E-mail : <a href="mailto:chris.satterley@eon-engineering.com">chris.satterley@eon-engineering.com</a></p>