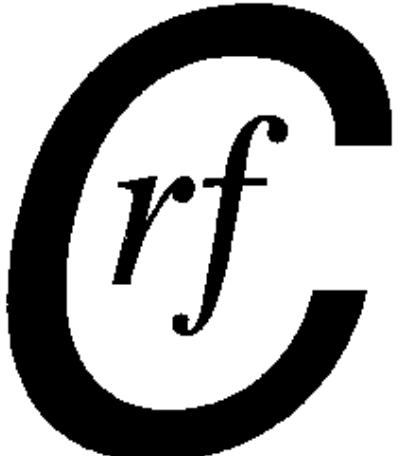


No. 64

May 2012

NEWSLETTER

*of
the
Coal Research Forum*



EDITOR'S MUSINGS:

We are now well into 2012 and it might just be that the current weird weather and unseasonal climatic events (both nationally and internationally) may now have begun to sow seeds of doubt in the minds of the "climate-change-unconvinced" brigade. The discussion over whether climate change is real or not seems to have died down rather having been replaced albeit briefly within the media by the 100th anniversary of the loss of the Titanic. Are there any lessons on global warming to be learned there?

It appears that the UK government is going to try again to get the CCS competition up and running. It is stated to be a 'new competition' rather than a re-launch. Despite this will it be any more successful than the earlier attempts? Already there have been concerns over the feasibility of the application of carbon capture and storage on a large scale.

Furthermore, the uncertainty over whether the gap in the nuclear programme left by the withdrawal of E.ON and RWE can be filled, and if so at what price, has done nothing to reassure anyone that the long term carbon reduction target set for the UK will be met. Together with the difficulty in stimulating growth at this time, a more challenging energy scenario facing the UK government is difficult to imagine. It is hardly surprising therefore that 'fracking' has been given the amber if not green light by the government.

Not all gloom and doom though! The biennial CRF conference on coal research and its application is approaching fast and for those who have not had a look at details of the upcoming conference (ECCRIA 9), the website will provide details on this link <http://9.eccria.org/ibis/eccria9/home> Registration is now open and it is hoped and expected that this popular conference will be as successful as its eight predecessors.

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Student Bursaries for 2012-2013

Up to 6 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, (please see the Calendar of Coal Research Events for details), such as the "Ninth European Conference on Coal Research and its Applications", (9th ECCRIA), to be held at the University of Nottingham in September 2012, (please see page 1, Editor's Musings). 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.

Andrew Minchener – OBE

I am sure all of you will want join with members of the CRF Executive Committee in congratulating Andrew on the well-merited award of being made an Officer of the Most Excellent Order of the British Empire, that is, the OBE. This award was made in the 2012 New Year Honours List, in recognition of his 'services to international science and clean energy collaboration with China'. For those of you who are not aware of his background and working career the following brief notes may be enlightening.



Andrew has been working in China for some 25 years and to date has visited there some 135 or so times. His background is primarily in fossil fuel usage, which developed out of his original career at the British Coal Corporation, Coal Research Establishment. After the industry was rationalised (or closed, as most of those involved understood it), he became part of one of the spin-off companies, CRE Group Limited, which provided energy and environment technical services and consultancy. At the end of 2001, he left and set up as an independent consultant, working for a wide range of organisations, including the International Energy Agency, IEA Clean Coal Centre, Asian Development Bank, World Bank, various parts of the European Commission, UK DTI, UK Department of Energy and Climate Change, UK Department for International Development and the UK Foreign and Commonwealth Office. All of these

activities have a broadly common theme, namely improving the efficiency of fuel use while limiting the environmental impact. This has covered technical and economic issues but increasingly has involved strong policy dialogues and dissemination, knowledge transfer and other outreach actions. The environmental aspects have broadened from addressing so-called conventional pollutants (dust, SO₂, NO_x) to include CO₂ and climate change matters. For much of the last decade there has been considerable involvement with the UK government departments listed above, as well as close cooperation with a very wide range of their Chinese counterparts, universities, institutes and industrial organisations.

2011 International Conference on Coal Science and Technology (ICCS&T)

9th to 13th October 2011

Oviedo, Spain

Report by Cheng Heng Pang, Final Year PhD Student
University of Nottingham.

For a PhD student working in relation to co-firing coal with biomass like myself, The 2011 International Conference on Coal Science and Technology (ICCS&T) proved to be educational and meaningful. The conference was held in Oviedo, Spain on the 9-13 October 2011. Personally, it was a success on many levels. For starters, the conference venue was the Palacio de Exposiciones y Congresos, a modern architecture which reminded us that the traditional fuel of coal had come a long, meaningful way.

The high attendance rate coupled with the involvement of participants from various countries across the globe provided a useful platform for communications to take place on an international level. This is particularly valuable for young researchers like me. My talk entitled 'Characterisation of biomass and link with char morphology and ash behaviour' during the 'Biomass Processing' session on the last day was well received by the crowd. Many of them were curious as to how we have managed to successfully predict burnout behaviour and ash characteristics of biomass based on the amounts of lignin, cellulose and hemicellulose. I have benefitted much from the advices and experiences of other researchers during my presentation as well as others, particularly in sessions related to ash and co-firing. It was interesting to understand works being carried out in other parts of the world. This has led to communications with some participants which have continued even after the conference via the exchange of emails.

One particular presentation which caught my attention was the talk given by Dr Miguel Castro-Diaz during the 'Coal Pyrolysis and Liquefaction: Thermoplasticity of Coal' session on the first day. The talk was about the effects of biomass addition to coal coking. It was interesting to see how the renewable source of energy-biomass could play a part in coal carbonisation, which is very different to the solid fuel combustion processes, which is my area of research.

With interesting activities planned every night, the conference was not 'all work and no play'. The 'Espicha' typical Asturian dinner at the Llagar de Castielo, Gijon, and the conference dinner at the Hotel de la Reconquista showcased the Asturian hospitality and good food!

2011 International Conference on Coal Science and Technology (ICCS&T)

9th to 13th October 2011

Oviedo, Spain

Report by Mr Abdul Nuamah
Faculty of Engineering
The University of Nottingham

The International Conference on Coal Science and Technology is a biennial event, aimed at creating an awareness of the importance of coal in economic development. It provides a platform to showcase new research activities and technological advances to mitigate the environmental challenges faced/caused by coal in power generation and other coal industries.

These efforts would sustain the utilisation of coal as a major energy source without limited effect on the environment.

The 2011 event was held in Oviedo, capital of the Spanish principality of Asturias. The location boasts of a rich Spanish culture and a pristine landscape which making it a tourist favourite. More significantly, the city a previous mining, had a stake in the conference as it is a testament to both the benefit and adverse effects of coal utilisation.

The conference ran from the 9-13 October, 2011 at an ultra-modern conference centre comprising an exhibition centre, a five star hotel-which hosted most delegates, lecture and discussion rooms and refreshment areas. Registration took place throughout the duration of the conference with participants receiving information packs detailing the various events and venues and various attractions in the host town.

Presentation of research papers started on the 10th October with exciting plenary lecture chaired by Moliner R. and presented by Kandiyoti R. on the topic, *Thermal breakdown in middle rank coals*. The plenary lecture of the next day was chaired by Colin Snape and presented by D.J. Harris on the topic, *The role of coal science in the development and deployment of high efficiency energy technologies*. The third day (12th October) was chaired by H.H. Schobert and presented by Malhotra R. on the topic; *A cubic mile of oil: realities and options for averting the looming global energy crisis*. Whereas the last day was on *Carbon looping technologies for CO₂ capture*, which was chaired by J.Van Heerden and presented by C. Abanades.

Daily presentations were grouped under major research interests/topics and done in various lecture rooms across the conference centre. For example the first day saw presentations of about 40 research work but were grouped under four major sections; Section A: Coal combustion, Section B: Coal characterisation and structure, Section C: Coal pyrolysis and liquefaction: thermoplasticity of coal and Section D: Carbons from coal. This made it very easy to follow proceedings, as delegates could easily locate and move to presentation rooms of interest.

At the discussion area, space was assigned to each section to allow delegates with similar research interest to interact, and discuss further issues that the limited time of presentation could not afford. This did not work very well as it ended up being a space for delegates to put up finishing touches to their presentation and relaxing.

The conference was well patronised by delegates, as were the individual presentations which were all well attended. The presentation was interspersed with tea breaks and a lunch with lots of delicious food to choose from. These breaks also allowed delegates the opportunity to interact and also look at the presentation posters displayed in the discussion area. Delegates were entertained at the end of each day with special Spanish treats, culminating in a unique conference dinner on the last night of the conference.

The conference concluded with a fascinating Spanish cultural display and an acceptance speech by a representative of the next host- Pennsylvania, USA- who promised a similarly well organised and fascinating conference. Overall, this was a well organised and patronised conference. Most delegates deemed it highly successful and served as a highly educative and productive event for me, personally.

The 12th Annual APGTF Workshop:
'Carbon Capture & Storage – can the UK maintain a
leadership role?'

Advanced Power Generation Technology Forum,
in conjunction with the Coal Research Forum

1 Victoria Street Conference Centre,
Westminster, London
Tuesday 13th & Wednesday 14th March 2012

These notes are a summary of the event which was attended, in part, by the CRF Secretary. Overheads from most of the speakers can be found on the following link:

http://www.apgtf-uk.com/index.php?option=com_content&view=article&id=93:12th-apgtfagenda&catid=35&Itemid=141

Day 1 was entitled "RD&D Activities in the UK – A good news story". The welcome and introduction was made by the APGTF Chair, Philip Sharman whose message was that the one certainty around the development of a new industry is that it will be difficult. Given the recent disappointing news concerning the cancellation of the Longannet CCS project and the lack of clarity around the programme for future demo projects, it felt it was easy to feel despondent about CCS in the UK. However, he believed there remains a positive story to tell on progress being made in research, development and pilot-scale demonstration, all of which is worth shouting about!

Philip Sharman continued by presenting a talk on the APGTF's 2011 technology strategy. This formed Part 1 of the event which was entitled "**CCS RD&D technology – what needs to be done and when?**"

Part 2 entitled "**UK CCS RD&D – programmes and funding updates**" followed which was made up of four presentations and a Q&A session. Andrew Green, Programme Manager CCS, spoke about "The Energy Technologies Institute's CCS RD&D activities"; Derek Allen, Lead Technologist for Carbon Abatement Technologies provided information on "The Technology Strategy Board's CAT RD&D activities"; Jason Green, Head of RCUK Energy Programme described "The Research Councils' Energy Programme's CCS research activities" and Peter Sage, Technical Officer BF2RA outlined "The Biomass and Fossil Fuel Research Alliance (BF2RA) – an update".

Part 3 entitled "**UK CCS RD&D – what is being done: large-scale activities**" followed after a coffee break and comprised three presentations and a Q&A session. Robin Irons, Technical Head, Zero Emission Plant, E.ON New Build & Technology began the session with his talk entitled "E.ON's FEED study – a CCS systems approach"; Steven Marshall, Director, Low-Carbon Generation, Petrofac then made a presentation entitled "Learning from DEMO1 to shape future demonstration and deployment of CCS in the UK". Matthew Hunt, CCS Sales Manager, Doosan Power Systems presented a talk called "The CC100+ pilot capture project at Ferrybridge power station".

During the lunch break on Day 1 a poster session was held. This was followed by a keynote address from the Secretary of State for Energy & Climate Change, Ed Davey, entitled "CCS in the UK – moving things forward".

Part 3 continued after the keynote address with a further three talks and a Q&A session. The first presentation in the sector was by Dorian Matts, Steam Raising Manager, RWE npower and was entitled "Carbon capture pilot plant demonstration at Aberthaw power station". Rosemary Whitbread, Principal Consultant, Health and Safety Laboratory then followed with her talk entitled "Safe CO₂ pipeline transport – understanding the hazards and risks". The final

technical paper in this session was given by Tony Espie, Advisor CO₂ Storage, BP Alternative Energy and was entitled "CO₂ storage RD&D".

The theme for Part 4 was "**UK CCS research**" was given by representatives from two of the leading universities in this field and was entitled "Achieving impact in CCS research". The presenters from academe were Professor Mohammed Pourkashanian (University of Leeds) and Professor Jon Gibbins (University of Edinburgh); the third presenter was Jacqui Williams from the EPSRC.

Day 1 closed with Part 5 which was entitled "**Are priorities being addressed? Is there sufficient knowledge transfer?**" This was a panel session involving the earlier speakers of the day and was chaired by Philip Sharman.

Day 2 opened with another keynote speaker this time David Clarke, Chief Executive of the Energy Technologies Institute, who spoke about "Building towards a commercial reality".

Part 6, comprising two papers, was entitled "**UK strategy – priorities and initiatives for CCS**". The first of these was given by Adam Dawson, CEO, Office of Carbon Capture & Storage, DECC and was entitled "Innovation in CCS – maintaining UK momentum". The second paper in this session was given by Stephen Brown, Director, CO₂Sense and was titled "Regional networks for integrated CCS". A Q&A session then followed.

After a refreshment break Keynote talk 3: "The trillionth tonne – CCS for climate change mitigation" was given by Professor Myles Allen of Oxford University.

Part 7 followed a similar format to Part 6 and was entitled "**The international scene – progress, achievements and priorities**". The first speaker was Pierre Deschamps, Adviser to President Barroso, European Commission who provided "CCS – A European update". This was followed by John Gale, General Manager, IEA Greenhouse Gas R&D Programme who described "CCS developments worldwide including CCS in CDM". A Q&A session then followed.

Part 8 followed lunch, which also included a poster session. The session was entitled "**Other key issues for CCS in the UK**". It contained four presentations and a Q&A session. The first paper was given by Simon Shackley, Lecturer in Carbon Policy, University of Edinburgh and was entitled "Turbulent times in climate and energy policy: how is it influencing public perceptions of CCS?" This was followed by Professor Colin Snape of the University of Nottingham with an offering entitled "Training the next generation of research leaders". The third paper was given by Bruce Adderley, Manager, Climate Change Breakthrough Technology, Tata Steel and was entitled "CCS for industrial sources". The final technical paper in this session was given by Amit Bhave, CEO of Computational Modelling Cambridge Ltd and was entitled "Techno-economic studies of biomass to power with carbon capture technologies (ETI funded project)".

The workshop concluded with Part 9 which was entitled "Can the UK maintain a leadership role in CCS?" and was a panel discussion chaired by Philip Sharman and involving the speakers of the day.

A report of the workshop was produced by Dr Tony Oliver (APGTF) and the main findings are summaries below. Special thanks and acknowledgements are made for the use of these findings.

REPORT ON PANEL SESSIONS

Tony Oliver, APGTF

INTRODUCTION

While CCS certainly remains a relevant and important technology to address climate change, and while the magnitude of the challenge and the need for rapid action is generally recognised,

the global context for CCS has changed considerably over the last couple of years and progress has been slow. In the UK too, the context has changed: the Electricity Market Reform activity, the decision not to proceed with the Longannet CCS project, the interest in CCS for gas-fired plant....

So, it was timely that the APGTF 2012 Workshop reflected on this new context and considered whether the UK can 'maintain a leadership role'.

Day 1: 'RD & D activities in the UK – a good news story?'

The one certainty around the development of a new industry is that it will be difficult. Given the recent disappointing news on 'Demo 1' and the lack of clarity around the programme for future demonstration projects, it is easy to feel despondent about CCS in the UK. However, there is a very positive story to tell on progress being made in RD&D which is worth shouting about!

In August, the APGTF published its latest technology strategy 'Clean Fossil Power Generation in the 21st Century - Maintaining a Leading Role'. This laid out a 'blueprint' for RD&D to provide the carbon abatement technologies for fossil fuels that the UK will need in order to meet our climate change targets. Day 1 of the Workshop used this strategy as a framework to look in detail at the progress of the technologies and the challenges ahead.

The Secretary of State for Energy and Climate Change (Edward Davey) announced a £20 million innovation programme to support CCS R&D with the primary aim of reducing the cost of CCS.

Day 2: 'Building on firm foundations for a commercial reality'

Building on the UK's successful RD&D landscape that was examined in Day 1, Day 2 addressed the question - How do we turn CCS into a commercial reality? By looking at how things are shaping up for CCS in the future - globally, in Europe and in the UK - Day 2 enabled us to have a 'stock-take' of where we are. In addition, some of the technical and non-technical issues that are also crucial to the longer term and more widespread deployment of CCS were considered.

DAY 1 PANEL SESSION

The panel was chaired by Philip Sharman, Chair of the APGTF and the panel members were:

Tony Espie BP Alternative Energy
Jon Gibbins Edinburgh University
Robin Irons E.ON
Greg Kelsall Alstom Power
Steve Marshall Petrofac

The broad objectives of the panel session were to consider:

*What RD&D needs to be done in the UK?
Whether we have got our priorities right and if there is sufficient knowledge transfer.*

The Chair started the session by posing the following question to the panel and then the delegates were invited to provide answers or comments as appropriate.

What are the highest priorities and biggest stumbling blocks that could impact on achieving the target of commercialisation and roll out of CCS in the UK by 2020?

A variety of answers and comments were put forward from the panel and from the floor; the main points are listed below.

- There are no fundamental technical problems but there are business barriers mainly associated with cost and risk both of which need to be reduced.
- One of the main issues is the lack of knowledge of the key stakeholders. Key risks are seen as in transport and storage. High risk or uncertainty results in higher cost.

- Scale-up is still an issue with risk uncertainty and cost and also with multi injections into a single storage site.
- On storage, some risks and uncertainties are known about; others can be resolved by suitable investigations.
- The planned large demos are needed to ensure progression to commercial roll-out.
- A robust analysis of Electricity Market Reform (EMR) and its impact is needed for CCS.
- EMR could be the key driver for CCS in the UK, more so than the carbon price.
- CCS plant must be 'dispatchable', flexible power to provide back-up security for a mixed portfolio with renewables and nuclear.
- There is a need to communicate the cost/benefit of CCS in terms of its value in providing flexibility and security on the grid.

The Chair then posed another question:

Is there sufficient knowledge transfer in place and in particular have we learnt the lessons from 'Demo 1'?

A variety of answers and comments were put forward and the main points are listed below.

- Learning is going on in procurement but it is not clear if it is in the commercial process.
- There is a need to think more of reducing or managing commercial risk.
- It is becoming clear that post the full scale demos, there needs to be a commercial driver to ensure completion of the move to commercialisation. Will the EMR or carbon price provide it?
- The £20m R&D package that was announced was welcomed and should help reduce costs. However, the timescales are likely to be such that this may not benefit the initial full scale demonstrations but it should be beneficial for subsequent full scale plant. Technology and knowledge transfer will be key.

The discussion was then opened up to cover any relevant topic and the additional points that were made are listed below:-

- There are alternative approaches for CCS and fossil fuels that could be considered for the future, for example, have the CO₂ capture up-front to produce renewable SNG which can then be injected into the gas grid.
- IGCC piggy backs on GT technology from aerospace and industry was encouraged to take advantage of this (some key manufacturers are already doing this).
- There is still the issue of the skills gap and whether we will be able to manage it.

DAY 2 PANEL SESSION

The panel was again chaired by Philip Sharman, Chair of the APGTF and the panel members were:

Bruce Adderley Tata Steel
 Myles Allen University of Oxford
 Jeremy Carey SSE
 Mike Farley Doosan Power Systems
 John Gale IEAGHG

The broad objectives of the panel session were to consider:

- *Whether the UK can maintain a leadership role in CCS*
- *Looking out over the next decade, what the UK must do to be amongst the leaders.*

The Chair started the session by posing the following question to the panel and then the delegates were invited to provide answers or comments as appropriate.

Is the current range of proposed Government led activities sufficient to allow us to maintain this leadership role? If not, what would have the most impact in keeping us in this position?

A variety of answers and comments were put forward from the panel and from the floor; the main points are listed below.

- Ultimately, to be up with the leaders for commercialising CCS, we either have to be the cheapest (difficult) or we have to go for differentiation.
- Differentiation by going for flexibility in operation will give us a chance of leading.
- At the moment, in Europe, the Dutch look as though they will be first to full-scale demonstration.
- Politics/policy and finance are more crucial than technology.
- 'Trillionth tonne' concept unlikely to be adopted in Europe as we are already committed to Emission Trading Scheme (ETS). However, it may be worth pursuing for developing countries.
- DECC not talking about four full scale demos anymore; instead they are talking of a programme moving to commercialisation with one demo and other 'bits'. There is a danger of 'letting politicians off the hook'.
- The EMR must provide sufficient money to make CCS competitive.
- If CCS got the same funding as offshore wind, then it would happen.
- We need to convince Treasury that CCS is the most 'market friendly' clean technology.
- From an industrial perspective, it is likely that industry will be behind power generation for significant roll-out. Again politics/policy and finance are the biggest hurdles.

The post-graduate students in the audience were then asked for their views on careers in CCS and the following comments were made:

- There does seem to be a future career to be had with CCS, particularly for good engineers.
- There appears to be a need for engineering graduates across the whole clean technologies sector.
- China and South East Asia look as though they are the only areas providing the numbers of (engineering) graduates that are likely to be required for the future.

The discussion was then opened up to cover any relevant topic and the additional points that were made are listed below:

- In some industries, CO₂ utilisation could make a contribution but scale is an issue.
- In answer to a question 'What is meant by a technology or product being commercial?', the following comments were made:
 - an OEM will offer a guarantee on 'what it says on the box'.
 - the rate of return after tax, risk etc is better than the next best option.
- The storage end is the highest risk and therefore needs the highest risk premium.
- CO₂ into depleted gas fields can be done now.
- Saline aquifers need ~10 years time frame before they can be utilised commercially.
- It is still possible to achieve commercialisation by 2020 with the right support etc and with a managed 'ramping-up' in industry.
- The concern over methane leakage impacts on climate change is an unnecessary diversion.

CHAIR'S CLOSING REMARKS

The APGTF Chair thanked the speakers, panellists and delegates for making it a successful workshop and he thanked the main sponsors and co-organisers for supporting the event. The output from the workshop will be fed into the Government and other national and international funding agencies to help ensure success with CCS for the UK. Finally, the

Chairman said that he hoped there would be significant progress on the main issues raised for CCS to report at next year's workshop.

ARTICLES FROM THE TECHNICAL PRESS

Brussels earmarks billions for energy research, with smart grids a priority

3rd January 2012, Keith Nuthall, Utility Week

The development of smart networks will be a priority for research budgets worth billions of Euros proposed by the European Commission that can be tapped by innovative utilities seeking to boost their research and development spending. The money will be part of the new proposed Euro €80 billion European Union (EU) research programme called Horizon 2020 - which will run from 2014 to 2020. For more see....

http://www.utilityweek.co.uk/news/news_story.asp?id=196325&title=Brussels+earmarks+billion+s+for+energy+research%2C+with+smart+grids+a+priority

China to levy carbon tax before 2015

5th January 2012, unattributed, The Economic Times

China's biggest energy-consuming companies are likely to face a direct tax on carbon dioxide emissions by 2015, the Xinhua-backed Economic Information Daily reported on Thursday, citing government sources. It said proposals for a new environmental taxation system had already been submitted for review to the Ministry of Finance and were expected to be implemented before the end of the 2011-2015 five-year plan. For more see....

<http://economictimes.indiatimes.com/news/international-business/china-to-levy-carbon-tax-before-2015/articleshow/11373653.cms>

RWE seeks alliance to create biomass from CO2

6th January 2012, unattributed, BusinessGreen

RWE Power is set to expand a multi-million Euro project designed to turn carbon dioxide into biomass, marking a major step forward for its "clean coal" programme. Together with biotechnology company BRAIN, RWE this week announced it had reached a major milestone in a project that aims to find micro-organisms that can eat up CO2 and create bio-materials. For more see...

<http://www.businessgreen.com/bg/news/2135459/rwe-seeks-alliance-create-biomass-co2>

U.S. DOE awards Babcock & Wilcox \$2.8 million for CCS research

7th January 2012, unattributed, Carbon Capture Journal

The Babcock & Wilcox (B&W) subsidiary Babcock & Wilcox Power Generation Group (B&W PGG) has been awarded \$2.8 million in funding from the U.S. Department of Energy (DOE). The funding will be used to study chemical formulations to improve the performance of B&W PGG's Regenerable Solvent Absorption Technology (RSAT™) process used to capture CO2 from coal-fired power plants. The project will be managed by DOE's National Energy Technology Laboratory under its Innovations for Existing Plants (IEP) Program. For more see...

<http://www.carboncapturejournal.com/displaynews.php?NewsID=886>

China's renewables surge dampened by growth in coal consumption

12th January 2012, Jonathan Watts, Guardian

China tripled its solar energy generating capacity last year and notched up major increases in wind and hydropower, government figures showed this week, but officials are still struggling to cap the growth in coal burning, which is the biggest source of carbon dioxide emissions in the world. The latest evidence of China's promotion of renewable energy has been welcomed by climate activists, but they warn that the benefits are being wiped out by the surge in coal consumption. After burning an extra 95m tonnes last year, China will soon account for half the coal burned on the planet. This has alarmed state planners concerned about the impact of air

pollution and climate change, but their efforts to cap the nation's energy consumption are said to have run into resistance from local governments who fear restrictions on economic growth. For more see.....

<http://www.guardian.co.uk/environment/2012/jan/12/china-renewable-energy-coal-consumption?newsfeed=true>

UK government set to invest in tidal-energy demonstration

12th January 2012, unattributed, The Engineer

The UK government is to invest more than £10m in research and development to help demonstrate that wave and tidal energy can be generated at scale and with lower energy-production costs. According to a statement, 'Marine Energy — Supporting Array Technologies' is a competition for collaborative R&D funding that will support the applied research, experimental development and demonstration of technologies that solve common issues faced by those developing and deploying the first marine-energy arrays. For more see.....

<http://www.theengineer.co.uk/sectors/energy-and-environment/news/uk-government-set-to-invest-in-tidal-energy-demonstration/1011400.article>

Shell to shut its main UK research base and transfer its work overseas

15th January 2012, Terry Macalister, Guardian

Hundreds of scientists to be relocated as oil multinational aims to shift most research and development work to Germany by 2014. Shell is to shut its main UK research and development base and transfer the work overseas in a bitter blow to Britain's knowledge economy. Hundreds of senior scientists working at the centre at Thornton in Cheshire will be scattered to other offices in a move that follows the sale of the nearby Stanlow refinery and is seen by some as a more general retreat by Shell from the UK. For more see.....

<http://www.guardian.co.uk/business/2012/jan/15/shell-shutting-main-uk-research-base>

Company's plan for coal gasification in Swansea Bay

16th January 2012, Iolo ap Dafydd, BBC News Wales

An energy company has revealed it wants to apply for planning permission and a permit to drill for coal and extract the gas from under Swansea Bay. Clean Coal Ltd has five licences around the coast of Britain and is trying to locate reserves which are off shore and too deep to be mined traditionally. It is thought up to 1bn tonnes of coal could lie beneath the surface. For more see...

<http://www.bbc.co.uk/news/uk-wales-16567883>

EPA publicises greenhouse gas emissions data

17th January 2012, Rebecca Trager, RSC Chemistry World, March 2012.

The US Environmental Protection Agency (EPA) has for the first time released comprehensive greenhouse gas (GHG) emissions data on large facilities and made them available online. Now, citizens can view and sort this data from over 6700 facilities to identify nearby sources of GHGs, hold businesses accountable for their emissions and provide information to state and local governments. For more see....

<http://www.rsc.org/chemistryworld/News/2012/January/greenhouse-gas-emissions-epa-public-data.asp>

Seaweed biofuel could become alternative to oil, coal

20th January 2012, unattributed, News.com.au

THE humble seaweed could become a real biofuel alternative to coal and oil as scientists say they have unlocked the secret of turning its sugar into energy. A newly engineered microbe can do the work by metabolising all of the major sugars in brown seaweed, potentially making it a cost-competitive alternative to petroleum fuel, said the report in the US journal *Science*. The team working on the breakthrough say the technology could be developed to lead to commercialisation within the next three years. The team at the Berkeley, California-based Bio Architecture Lab engineered a form of *E. coli* bacteria that can digest the seaweed's sugars into ethanol, it said. For more see...

<http://www.news.com.au/technology/sci-tech/seaweed-biofuel-could-become-alternative-to-oil-coal/story-fn5fsgyc-1226249045900>

Geothermal heat could generate more electricity says Ontario inventor Ian Marnoch

20th January 2012, Tyler Hamilton, The Star.com

The Geological Survey of Canada put out a research paper in 2010 that concluded the country has enough geothermal heat to power itself many times over. The big question is how much of that heat can be economically tapped? As a general rule, the hotter and shallower the resource the more economical it is to exploit based on current technologies. The higher the temperature the easier it is to extract the volume of heat required to spin a turbine and generate electricity. But there aren't many places in Canada, beyond northern B.C., Alberta and the Yukon, that have that right combination of temperature and depth. Everywhere else, you'll have to drill deep – as much as 10 kilometres down – to find enough heat. That's a deal-breaker with respect to cost and risk. It's also a nut Ian Marnoch of Port Severn, Ont., is trying to crack. For the past seven years the Ontario inventor has been developing a new kind of "heat engine" that he says can generate electricity more economically from lower-grade heat. And that heat could come from anywhere: the ground, the sun, or an industrial waste process. For more see....

<http://www.thestar.com/business/article/1118737--geothermal-heat-could-generate-more-electricity-says-ontario-inventor-ian-marnoch>

Fossil futures

23rd January 2012, Giles Crosse, Industrial Fuels & Power

The International Energy Agency (IEA) has just released its medium-term market report on coal. Giles Crosse examines the data, and other research enabling low carbon futures. According to the IEA, despite public calls in many countries for reducing reliance on coal as a primary but high carbon energy source, global demand continues to escalate. The agency argues that coal has traditionally been seen as a low-cost and price-stable source of energy, but recently coal prices have increased and become much more volatile. Moreover, while coal is viewed as a very secure energy source, infrastructure bottlenecks and weather-related events can dramatically tighten the market. For more visit....

<http://www.ifandp.com/article/0015322.html>

Shale Gas a Bridge to More Global Warming

24th January 2012, Stephen Leahy, IPS News

Hundreds of thousands of shale gas wells are being "fracked" in the United States and Canada, allowing large amounts of methane, a highly potent greenhouse gas, to escape into the atmosphere, new studies have shown. Shale gas production results in 40% to 60% more global warming emissions than conventional gas, said Robert Howarth of Cornell University in New York State. "Shale gas also has a larger greenhouse gas footprint than oil or coal over the short term," said Howarth, co-author of a study called "Venting and Leaking of Methane from Shale Gas Development" to be published in the journal Climatic Change. For more visit....

<http://www.ipsnews.net/news.asp?idnews=106531>

Cambridge University reveals breakthrough for super-efficient solar cells

8th February 2012, unattributed, ClickGreen

New solar cells could increase the maximum efficiency of solar panels by over 25%, according to scientists from the University of Cambridge. Scientists from the Cavendish Laboratory, the University's Department of Physics, have developed a novel type of solar cell which could harvest energy from the sun much more efficiently than traditional designs. The research, published today, could dramatically improve the amount of useful energy created by solar panels. For more see....

<http://www.clickgreen.org.uk/research/trends/123152-cambridge-university-announces-breakthrough-for-next-generation-of-solar-panels.html>

The secret ingredient in cleaning up coal plants' mercury? It's coal

9th February 2012, Gabriel Nelson, Environment & Energy Publishing

It took 20 years of experimentation in the laboratory, at power stations and in statehouses, but a technology touted by the utility industry as part of its shift to "clean coal" is almost ready for its big moment. The first large-scale test of activated carbon, a substance made from raw coal, took place in the late 1990s at Xcel Energy Corp.'s Comanche power plant in Pueblo, Colo. Because of state laws, more than 150 coal-burning boilers nationwide now use the equipment to scrub out mercury. With the first federal mercury limits now set to follow in 2015 after years of legal wrangling, pollution-control companies expect to add 500 to 700 more pieces of mercury-trapping equipment at coal-burning plants over the next few years at a cost of about \$1 million apiece. Another idea, called "refined coal" or "enhanced coal," could also help power companies meet the new rules for less money than it would cost to build new equipment at aging power plants. Coal companies developing the technology, hoping to gain market share as the stricter rules take effect, have devised proprietary chemical treatments that allow coal to be burned with lower emissions. For more see....

<http://www.eenews.net/public/Greenwire/2012/02/09/3>

World's biggest offshore windfarm opens

11th February 2012, unattributed, People & Planet.

UK Secretary of State for Energy and Climate Change Edward Davey opened the world's biggest offshore windfarm on 9 February. The new site, located near Walney in Cumbria, north-west England, comprises 102 turbines, enough to power 320,000 homes. It sits alongside 60 other turbines generating off the Cumbrian coast, with more planned. For more see...

<http://www.peopleandplanet.net/?lid=30226§ion=36&topic=23>

MIT Research: Liquid Batteries for Utilities Could Make Renewables Competitive

13th February 2012, David Chandler, RenewableEnergyWorld.com

The biggest drawback to many real or proposed sources of clean, renewable energy is their intermittency: The wind doesn't always blow, the sun doesn't always shine, and so the power they produce may not be available at the times it's needed. A major goal of energy research has been to find ways to help smooth out these erratic supplies. New results from an ongoing research program at MIT, reported in the Journal of the American Chemical Society, show a promising technology that could provide that long-sought way of levelling the load — at far lower cost and with greater longevity than previous methods. The system uses high-temperature batteries whose liquid components, like some novelty cocktails, naturally settle into distinct layers because of their different densities. For more see....

<http://www.renewableenergyworld.com/rea/news/article/2012/02/mit-research-liquid-batteries-for UTILITIES-could-make-renewables-competitive>

Alkane extends into coal bed methane extraction

17th February 2012, unattributed, This is Nottingham

ALTERNATIVE energy group Alkane is to begin exploring for commercial quantities of coal-bed methane in North Notts. Alkane has joined forces with Aberdeen Drilling Management (ADM) to drill a borehole in the centre of a 100 square kilometre (60 square mile) site near Bevercotes. Alkane has the right to extract under licence. ADM is a highly experienced company specialising in drilling wells and bore holes. The unmined coal fields are known to contain considerable amounts of methane and the exploration will determine whether there is enough to extract commercially. This is Alkane's first move into the extraction of coal bed methane (CBM). ADM will initially carry out geological research before committing to drilling bore holes. For more see....

<http://www.thisisnottingham.co.uk/Alkane-extends-coal-bed-methane-extraction/story-15254994-detail/story.html>

Drax calls for higher Government subsidies to transform plant

21st February 2012, Emily Gosden, The Daily Telegraph

Drax has cancelled plans for a dedicated biomass plant next to its coal-fired power station and said it needs higher government subsidies if it is to invest £450m to convert its existing plant to run mostly on biomass. The planned biomass-only plant on its Yorkshire site had been abandoned because the level of government subsidy made the investment case "highly challenging". The company said it was "exploring options" for another planned biomass plant at Immingham, Lincolnshire. For more see...

<http://www.telegraph.co.uk/finance/newsbysector/energy/9096615/Drax-calls-for-higher-Government-subsidies-to-transform-plant.html>

Old king coal

25th February 2012, unattributed, The Economist

"Our civilisation", wrote George Orwell over 70 years ago, "is founded on coal." Unlike Europe's, Asia's still is. In 2010, according to the International Energy Agency (IEA), a think-tank, coal accounted for just one-fifth of primary energy supply in the OECD countries. But, in the world as a whole, coal accounted for almost half of the increase in energy use from 2000-10. Coal, says Edward Cunningham of Boston University, is experiencing an "historically incredible" resurgence, and may even overtake oil as a fuel by 2025. There is plenty of it and, compared with rival fuels, it is cheap. And often dirty. Asia has been responsible for over two-thirds of the growth in global energy demand over the past two decades. As, above all, China and India race towards prosperity, they will burn coal in huge volumes. The resulting emissions of carbon dioxide will be among the biggest hurdles in the way of a global agreement on limiting climate change. For more see...

<http://www.economist.com/node/21548237>

Windfarms axed as UK loses its taste for turbines

27th February, Juliette Jowit, Guardian

The government and energy industry have quietly shelved plans for windfarms equivalent to four large traditional coal and nuclear power stations, amid growing public and political anger over the cost and sight of the turbines. A report by the Electricity Networks Strategy Group (ENSG), which is the most up-to-date view of government officials, the regulator Ofgem, and leading industry investors, estimates that 28.3GW of onshore and offshore wind power may have been built by 2020. The estimate has fallen by 4GW in the two years since its last forecast. Another 1GW of other renewables such as tidal and wave power have also been removed from the forecast. For more see....

<http://www.guardian.co.uk/environment/2012/feb/27/windfarms-axed-uk>

Which Fossil Fuel will Bridge the Gap to a Renewable Energy World?

27th February 2012, Kurt Cobb, OilPrice.com

Which of the following can we count on to act as a "bridge fuel" to a renewable energy economy?

- A. Oil
- B. Natural gas
- C. Coal
- D. None of the above

The correct answer is D. None of the above.

Mark Twain is reported to have said: "It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so." What most environmentalists think they know for sure is that oil, coal and natural gas are all abundant—so abundant, in fact, that many environmentalists believe they are forced to make a Hobson's choice of natural gas as a so-called "bridge fuel" to a renewable energy future. Though natural gas produces fewer greenhouse gas emissions per unit of energy than coal or oil when it is burned, it still

contributes mightily to climate change. In fact, according to [research by a Cornell University team](#), natural gas from shale, which will make up an increasing share of U.S. gas supplies, is worse than conventionally produced gas which is now declining. Because shale gas wells are drilled in a way that releases considerable volumes of unburned methane into the atmosphere, shale gas is probably also worse than coal. For more visit....

<http://oilprice.com/Energy/Energy-General/Which-Fossil-Fuel-will-Bridge-the-Gap-to-a-Renewable-Energy-World.html>

Analysis reveals folly of betting UK's energy future on cheap gas over wind

29th February 2012, Damian Carrington, Guardian

Targeting subsidies to create viable new energy sources carries less risk than backing gas as cheap or low-carbon. Electricity produced by wind turbines in the UK may be cheaper than that generated by burning [gas](#) within five years, even if the climate-warming pollution from the latter is allowed to be pumped straight into the air. That is one startling implication of a comprehensive analysis produced for the Guardian by experts at Imperial College London and the UK [Energy](#) Research Centre. The chart, which is from preliminary analysis, reveals the folly of betting the UK's energy future on the hope of cheap gas, the preferred option of many of the critics of renewable energy. This is not because [wind power](#), or any other energy source, is certain to be cheaper. Instead, says Dr Robert Gross at Imperial College, it is because the principle of targeting subsidy to create viable new energy sources is well founded and the notion of gas as a cheap and relatively low-carbon energy source is not. Look at the range of gas cost forecasts from 2020 onwards: they are much wider than those for wind. For more see...

<http://www.guardian.co.uk/environment/2012/feb/29/wind-energy-cheaper-gas-analysis?newsfeed=true>

UK power blackouts now unlikely, research shows

29th February 2012, Terry Macalister, Guardian

New gas-fired plants coming on-stream by 2016 expected to make up for closure of coal and nuclear power stations. The severe economic slowdown and increased [energy efficiency](#) in Britain means widely feared power blackouts between 2015 and 2020 will be avoided, new research predicts. Windfarms, plus a new generation of nuclear and [gas](#)-fired plants, will ensure that the decade up to 2030 will also see enough electricity generated to meet the country's needs, argues [Bloomberg New Energy Finance \(BNEF\)](#). For more visit.....

<http://www.guardian.co.uk/environment/2012/feb/29/uk-power-blackouts-now-unlikely>

How much of an environmental bad guy are the Alberta oilsands?

29th February 2012, Janet Davison, CBC News

If some of the headlines were to be believed, a recent report from one of Canada's more prominent climate scientists seemed to suggest that maybe the Alberta oilsands won't be such a big environmental bad guy after all. Coal is really the black devil when it comes to pumping greenhouse gases into the air. Trouble was, that's not exactly what the research published in the journal *Nature Climate Change* said. The research by Andrew Weaver, considered one of Canada's top climate scientists, and Neil Swart, one of his PhD students at the University of Victoria, was very specific. For more see.....

<http://www.cbc.ca/news/technology/story/2012/02/28/f-oilsands-climate.html>

EU universities to collaborate closely on energy

4th March 2012, Robert Visscher, University World News

European universities are going to work more closely together to beat the energy problems of the future, following the first meeting of the European Platform of Universities Engaged in Energy Research, Education and Training. Many European universities are already seeking answers to the question of what happens as fossil fuels run out. But the problem is of such massive proportions that closer collaboration will be needed and – until now – it has been hard for institutions to find out what others are doing and how they can contribute to current

research. "We brought them together so they can learn from each other's best practice," said John Smith, deputy secretary general of the European University Association (EUA), who jointly organised the meeting at the Delft University of Technology in The Netherlands on 23 and 24 February. For more read....

<http://www.universityworldnews.com/article.php?story=20120302075709938>

Study: Eliminating Coal-Fired Power is Worth 0.2 Degrees in 100 Years

5th March 2012, Robert Rapier, Consumer Energy Report

Who could have dreamed solving climate change would be so easy? A new paper in Environmental Research Letters called "[Greenhouse gases, climate change and the transition from coal to low-carbon electricity](#)" concludes that replacement of all of the world's currently operating coal-fired power plants — which produce about 40% of the world's electricity — and replacing them with renewable energy would have an impact of 0.2 degrees Celsius 100 years from now. For much more visit....

<http://www.consumerenergyreport.com/2012/03/05/study-eliminating-coal-fired-power-is-worth-0-2-degrees-in-100-years/>

Controversial green energy report 'very, very poor', says government economist

5th March 2012, Jessica Shankleman, Guardian

Report by AF Consult on renewable energy 'flawed' says government, as sponsor KMPG walks away from its findings. The government and renewable energy businesses have slammed the findings of a controversial report that claimed 2020 carbon reduction targets could be achieved more cost effectively by building nuclear and gas-fired power stations instead of wind farms.

The report, [Powerful Targets](#), launched yesterday by independent consultancy AF Consult, was based on [a study originally developed with consultancy KPMG](#) last year, which formed the basis of a number of media reports attacking the cost of renewable energy. As revealed by [BusinessGreen](#), [KPMG subsequently refused to release the full findings](#) over concerns they were "ripe for misinterpretation", after the methodology was attacked by green groups, including trade body RenewableUK. The full report by AF Consult has been published independently from KPMG and contains starker findings than the [initial paper](#). For more see...

<http://www.guardian.co.uk/environment/2012/mar/05/green-energy-report-poor-government>

Coal: The Rock That Burns

7th March 2012, Ed Hiserodt, New American

"Load sixteen tons, and what do you get? Another day older and deeper in debt... " — Tennessee Ernie Ford. Coal is very low on the scale of subjects for ballads or charming folklore. Like Rodney Dangerfield, it just doesn't get any respect. What does a naughty boy get in his Christmas stocking? A lump of coal. As a career, few brave souls outside Appalachia would have a goal in life of riding a rail car several miles — down several thousand feet below the surface — to attack the "face" of a coal seam. The thought terrifies me — and probably many others. Coal is not the most pristine mineral in the world. Yet, more than any other mineral on Earth, this ugly, dirty little rock deserves credit for the greatest material prosperity mankind has ever known. For more visit.....

<http://www.thenewamerican.com/tech-mainmenu-30/energy/11062-coal-the-rock-that-burns>

Life as tough as coal: photographs from India's "rat-hole" mines

8th March 2012, Bret Lewin, National Post

It's estimated that half of India's coal is mined in the Jaintia Hills of the economically depressed state of Meghalaya. To protect environmental degradation the Supreme Court banned commercial logging in Meghalaya in 1981. With this new law in place locals soon turned to digging on their property for coal. Nearly 20 years after coal was first discovered the Jaintia Hills – an area once touted as 'the Scotland of the East' – the landscape is now scarred with mining pits and the roads clogged with endless lines of trucks transporting coal to neighboring Bangladesh. With such a large industry, coal extraction in Meghalaya remains completely

unregulated and mining is practiced in an unscientific manner that has been coined 'rat hole' mining. For more and disturbing photographs visit.....

<http://news.nationalpost.com/2012/03/08/life-as-tough-as-coal-photographs-from-indias-rat-hole-coal-mines-in-the-jaintia-hills/>

Kingsnorth power plant to close in a year as EU rules hit

8th March 2012, Emily Gosden, The Daily Telegraph

Kingsnorth power station in Kent is to be shut in March 2013 with the loss of 123 jobs, energy giant E.ON announced. The coal-fired plant, which generates enough power for nearly 2m homes, will be forced to close because it will run out of its allocated operating hours under EU environmental legislation, the power company said. Under the Large Combustion Plant Directive (LCPD), polluting power stations that were not adapted to meet emissions-reduction targets will have to close by the end of 2015, or when they use up an allowance of 20,000 generating hours from January 2008 – whichever comes first. For more see.....

<http://www.telegraph.co.uk/finance/newsbysector/energy/9131849/Kingsnorth-power-plant-to-close-in-a-year-as-EU-rules-hit.html>

China to Simply Cap Coal Use Within 3 Years

8th March 2012, Susan Kraemer, Clean Technica.com

Here's a completely new approach to climate policy, from the always innovative China. Set a cap – not on carbon emissions, but – simply on lumps of coal. (Well, not on lumps of coal, exactly, but on tonnes of coal.) Once you use up your limit: that's all there is. Stop using coal. Now **that** would really focus your mind on finding an alternative! Beijing's policy-setters at the National Energy Administration (NEA), in attempting to grow the world's fastest growing economy sustainably, have decided on a new way to reduce carbon emissions. Set an absolute cap for coal use for the entire nation, at about 4.1 billion tonnes of standard coal. For more....

<http://cleantechica.com/2012/03/08/china-to-simply-cap-coal-use-within-3-years/>

Former head of energy giant approved as EPSRC chair

9th March 2012, John Morgan, Times Higher Education

The former head of energy firm E.ON UK will become chair of the Engineering and Physical Sciences Research Council after his appointment was approved by MPs. Paul Golby's four-year appointment to the EPSRC was backed in a report published today by MPs on the Science and Technology Committee. The government had chosen him as its preferred candidate, leading to the standard pre-appointment hearing for a key public official. The current EPSRC chair, Sir John Armitt, steps down at the end of this month. Dr Golby was formerly chairman and chief executive of E.ON UK. He is currently chairman of EngineeringUK, as well as being chair of council and pro-chancellor of Aston University – where he took his undergraduate degree and PhD. For more visit....

<http://www.timeshighereducation.co.uk/story.asp?sectioncode=26&storycode=419299&c=1>

New boy finds energy debate skewed to the point of gobbledegook

9th March 2012, Michael Deacon, The Daily Telegraph

Huhne's successor finds himself at a distinct disadvantage when it comes to talking the lingo. You've got to feel for Ed Davey. Not only has he been saddled with the job of Energy Secretary, he's had just a month to learn a whole new language. When debating wind farms, solar panels and the like, MPs do not speak English. They speak a denser, more complex tongue known as Energese. Trying to comprehend Energese is extremely hard for the beginner. From time to time you catch a word or phrase you recognise from English, but in Energese circles such lexical borrowing is generally frowned on. Like the Académie Française, founded in the 17th century to prevent French being contaminated by lesser languages, the Energese authorities are determined to keep English out. For more see....

<http://www.telegraph.co.uk/news/politics/9131733/Sketch-the-impenetrable-language-of-wind-farm-fans.html>

Nuclear Woes Push Japan Into A New Energy Future

11th March 2012, Christopher Joyce, North Country Public Radio

All of Japan's nuclear power plants will be offline by April and might never restart. That's forcing the country to increase its reliance on coal, oil and natural gas. This could cost the country an extra \$100 million per day and significantly increase carbon dioxide emissions. Economist Mitsutsune Yamaguchi at the University of Tokyo says its nuclear power plants are now idle. "Out of 54 existing plants, only two are in operation, and by the end of April it will become zero," Yamaguchi explained in an interview in Washington, D.C. Yamaguchi has been on several government panels studying what to do about the country's energy dilemma. Several nuclear plants are still damaged from the quake and the rest have been idled as Japan sorts out what kind of energy it wants in the future. For more see....

<http://www.northcountrypublicradio.org/news/npr/148136383/nuclear-woes-push-japan-into-a-new-energy-future>

Germany harnesses green power in desolate east

12th March 2012, Vera Eckert, Reuters

Germany's solution to a large part of its energy dilemma may lie in a muddy field in desolate, windswept flatlands in the northeast. In an area 75 miles north of Berlin that until now has attracted more birdwatchers than cutting-edge industries, start-up Enertrag AG, with the help of partners Vattenfall, Total and Deutsche Bahn, is operating one of the first plants to generate wind power and convert it into hydrogen. For more read...

<http://uk.reuters.com/article/2012/03/12/us-germany-power-hydrogen-idUKBRE82B0DF20120312>

China, India 2030 Coal Imports May Hit 1.4b Tons

14th March 2012, Jo Winterbottom, Jakarta Globe

China's thermal coal imports could soar to one billion tons in 2030 from just 175 million in 2011, while India's imports will be at least 400 million tons in that same year, five times last year's levels, research consultants Wood Mackenzie said. Imports will rise as surging growth boosts demand for electricity in two of Asia's largest economies, which rely heavily on coal for power generation, Wood Mackenzie's coal market analyst Prakash Sharma told Reuters. For more visit...

<http://www.thejakartaglobe.com/business/china-india-2030-coal-imports-may-hit-14b-tonnes/504763>

China irrigation system responsible for rising emissions, research shows

14th March 2012, Jonathan Watts, Guardian

New study highlights energy and climate costs of watering crops in drought-plagued northern China. The irrigation of Chinese farm fields with more water pumped from ever deeper underground is responsible for 33m tonnes of carbon dioxide per year – equivalent to the entire emissions of New Zealand – [a new study](#) revealed on Wednesday. The research, carried out by a team of UK and Chinese scientists, highlights the rising but often overlooked energy and climate costs of irrigating crops in drought-plagued northern China, where farmers have to mine aquifers because surface rivers and lakes are increasingly polluted and over-exploited by factories and cities. For more visit....

<http://www.guardian.co.uk/environment/2012/mar/14/china-irrigation-emissions?newsfeed=true>

Fracking ignites public reactions

15th March 2012, unattributed, RSC Chemistry World, Business Roundup, Greentech

A record number of comments have been sent to the New York State Department of Environmental Conservation regarding a revised proposal to allow horizontal hydraulic fracking in the state. Over 40,000 comments were registered, a spokeswoman told the New

York Times, compared with 13,000 comments attracted by the original draft in 2009, indicating the strength of public opinion on the matter.

For more see...

<http://www.rsc.org/chemistryworld/Issues/2012/March/BusinessRoundup.asp>

Vattenfall fills last Emec berth on Orkney

15th March 2012, unattributed, BBC News Scotland

The last remaining berth at Scotland's ocean energy research centre in Orkney has been filled by one of Europe's leading energy companies. Vattenfall said it hoped to start testing a wave energy conversion machine at the European Marine Energy Centre (Emec) in 2014. The machine had been built by Edinburgh-based Pelamis Wave Power. For more see...

<http://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-17374694>

US consortium to build carbon capture and storage plant at Grangemouth

20th March 2012, Severin Carrell, Guardian

Plans for a new "clean coal" power plant close to Edinburgh have been unveiled by a US-led consortium that is hoping to capture nearly all its CO2 emissions when it begins operating.

The Seattle-based Summit Power Group has said it would build the new carbon capture and storage (CCS) power station near Grangemouth oil refinery but only if it wins substantial financial backing in the UK government's next funding round for CCS proposals. The proposal, dubbed the Caledonia Clean Energy project, is one of the most ambitious so far unveiled in the trouble-hit race to build a fully operational commercial carbon capture power station in the UK. For more see.....

<http://www.guardian.co.uk/environment/2012/mar/20/petrofac-carbon-capture-storage-grangemouth>

Global Waste-to-Energy Market to Reach \$29.2 Billion by 2022, Forecasts Pike Research

23rd March 2012, unattributed, MarketWatch

In 2011, the world generated an estimated 2 billion tons of municipal solid waste (MSW). Over the next decade this number will grow much higher, increasing global demand for solutions that convert waste into heat and electricity, a family of processes known as waste-to-energy (WTE). WTE encompasses thermal and biological conversion technologies that unlock the usable energy stored in solid waste. High upfront capital costs and attractive economics for landfilling, however, represent persistent barriers to widespread adoption. Although more than 800 thermal WTE plants currently operate in nearly 40 countries around the globe, these facilities treated just 11% of MSW generated worldwide in 2011 compared to the 70% that was landfilled. According to a new report from Pike Research, this number is expected to grow rapidly over the next decade. Waste-to-energy systems will treat at least 261 million tons of waste annually by 2022, with a total estimated output of 283 terawatt hours (TWh) of electricity and heat generation, up from 221 TWh in 2010. Under a more optimistic scenario, WTE will potentially treat 396 million tons of MSW a year, producing 429 TWh of power. For more see..

<http://www.marketwatch.com/story/global-waste-to-energy-market-to-reach-292-billion-by-2022-forecasts-pike-research-2012-03-23>

Research shows fog worse than rain in absorbing toxic mercury

23rd March 2012, Sid Perkins, The Seattle Times

Researchers have found that coastal fog can carry toxic mercury that can harm ecosystems and human health. In horror movies, fog often provides creepy atmospherics, hiding threats from hideous creatures, bandits, axe murderers and the like. A new study suggests fog can harbour real horrors. Researchers have found that coastal mists may carry toxic mercury that can harm ecosystems and human health. Mercury pours into the atmosphere from coal-fired power plants and various industrial processes, including some used in refining ores and paper manufacturing. It's a neurotoxin that isn't easily excreted by organisms that ingest it, so it

becomes increasingly concentrated in animals at higher levels of a food chain. For more detail see..

http://seattletimes.nwsource.com/html/health/2017827025_fog24.html

EU push for ocean energy set to fall short

26th March 2012, Nina Chestney and Martin Roberts, Reuters

Europe's wave and tidal power technology is likely to disappoint EU expectations for 2020 and take over a decade to contribute to energy supply in a significant way, even though it is chalking up rapid growth and drawing in big industrial investors. The nascent industry has attracted a flurry of investor activity over the past year, securing an estimated few hundred million Euros from companies such as Siemens and Vattenfall. It is making fast progress from prototype devices toward full-scale sea trials and promises to be more reliable than many types of renewable power that depend on the weather. But those numbers are far less than European Union expectations for 8.5 billion Euros (\$11.3 billion) of investment and generation capacity of 3.6 gigawatts installed by 2020. The technology, like other renewables, needs government financing help to reach commercial scale and then subsidies after that as it grows to more cost efficient. For more see...

<http://uk.reuters.com/article/2012/03/26/us-renewables-ocean-idUKBRE82P0EC20120326>

MIT RESEARCH: A new dimension for solar energy

26th March 2012, David Chandler, Penn Energy

Intensive research around the world has focused on improving the performance of [solar photovoltaic](#) cells and bringing down their cost. But very little attention has been paid to the best ways of arranging those cells, which are typically placed flat on a rooftop or other surface, or sometimes attached to motorized structures that keep the cells pointed toward the sun as it crosses the sky. Now, a team of MIT researchers has come up with a very different approach: building cubes or towers that extend the solar cells upward in three-dimensional configurations. Amazingly, the results from the structures they've tested show [power](#) output ranging from double to more than 20 times that of fixed flat panels with the same base area. More at....

http://www.pennenergy.com/index/power/display/3115004055/articles/pennenergy/power/renewable/2012/march/mit-research_a_new.html

EPA emission standards may rule out new coal power plants

27th March 2012, Neela Banerjee, Los Angeles Times

Proposed new (US) emissions standards would limit carbon dioxide produced by new power plants, which would probably prohibit construction of any coal-fired facilities. Taking aim at the gases that the vast majority of scientists say are the main contributor to climate change, the Obama administration proposed rules limiting carbon dioxide emissions from new power plants, a move that could essentially bar new coal-fired electric generation facilities. For more..

<http://www.latimes.com/news/nationworld/nation/la-na-epa-emissions-20120328,0,4962478.story>

RWE and E.ON halt UK nuclear plans at Wylfa and Oldbury

29th March 2012, BBC News

There has been a setback to the government's plan to attract investment in new nuclear power stations. Two key players, RWE npower and E.ON, have announced they will not develop new nuclear power projects in the UK. The two were planning to invest in new plants in Anglesey and Oldbury-on-Severn, near Bristol, under a joint venture called Horizon Nuclear Power. The government says it is disappointed but there remains "considerable interest" in the project. The firms blamed problems raising finance for power projects and costs associated with decommissioning nuclear power plants in Germany. They formed Horizon Nuclear Power, based in Gloucester, in 2009. For more see....

<http://www.bbc.co.uk/news/world-17546420>

Ironbridge Power Station plans switch to wood pellet fuel

30th March 2012, unattributed, BBC News

A Shropshire coal-fired power station could change fuel sources, under plans put forward by owners E.ON. Ironbridge Power Station, which generates up to 1,000MW of electricity, is planning to convert to use wood pellets as its main fuel. E.ON has applied for permission to build a football pitch sized store on site for the pellets, which would be sourced principally from North America. Due to be decommissioned in 2015, it currently burns coal from Russia.

<http://www.bbc.co.uk/news/uk-england-shropshire-17563391>

Government relaunches £1bn CCS technology competition

3rd April, unattributed, The Engineer

The UK government is relaunching its £1bn competition to support the development of carbon capture and storage (CCS) technology. The Department of Energy and Climate Change (DECC) announced today that the scheme would consider technologies to remove carbon dioxide (CO₂) emissions from gas as well as coal power plants, unlike the previous contest, which collapsed last year. The competition has also been opened to pre-combustion projects that split natural gas or gasified coal into CO₂ and hydrogen, as well as post-combustion technologies that involve trapping CO₂ after the fossil fuel has been burnt. For more see...

<http://www.theengineer.co.uk/sectors/energy-and-environment/news/government-relaunches-1bn-ccs-technology-competition/1012248.article>

UK to launch £13m Centre for Carbon Capture and Storage research

3rd April 2012, unattributed, ClickGreen

The Engineering and Physical Sciences Research Council(EPSRC) and the Department of Energy and Climate Change (DECC) today announced a £13 million investment to establish a UK Carbon Capture and Storage (CCS) Research Centre. The project will form part of the Research Councils UK (RCUK) Energy Programme which is led by EPSRC. EPSRC will invest £10 million over a five-year period, with funding of £3 million from DECC to establish new capital facilities that will support innovative research. DECC is also launching its CCS Commercialisation Programme and Roadmap today which will set out the Government's vision for achieving commercial deployment of CCS in the UK in the 2020s, including investing £125 million in CCS research and development between 2011-2015. The new Centre, which will have its coordination base at the University of Edinburgh, will bring together over 100 of the UK's world-class CCS academics and provides a national focal point for CCS research and development. More see....

<http://www.clickgreen.org.uk/news/national-news/123388-uk-to-launch-13m-centre-for-carbon-capture-and-storage-research.html>

A History of Energy

7th April 2102, Dave Elliott, Environmental researchweb

Bent Sorensen, a leading Danish alternative energy pioneer, who wrote a seminal and massive text book on 'Renewable Energy' and many other important research papers (see <http://energy.ruc.dk>), has turned his hand to a slightly different project and produced a 'History of Energy' (Earthscan). It looks in fascinating detail at the history of energy production and use, mainly in Denmark, from the Stone Age to the present day, linking that to social, economic and political developments and influences. So we move through early pre- history, the middle ages , the industrial revolution, the second world war and then on to the more recent battle against nuclear and the dramatic growth in the use of renewables. In each era there is a detailed analysis of Danish energy generation and use, with, through most of history, ambient energy sources, food and muscle power inevitably playing the dominant role, but fossil fuels then rapidly taking over, leading to massive increases in energy use in recent decades-much of it based on imported fuel. For more visit.....

<http://environmentalresearchweb.org/blog/2012/04/a-history-of-energy.html>

Glasgow to be global energy research hub

11th April 2012, Helen McArdle, HeraldScotland

Global energy experts are to study in Glasgow as part of an international degree programme launched today by Alex Salmond. The First Minister will unveil details of the bespoke MBA (Master of Business Administration) course during a meeting with Scottish Power and Iberdrola chairman Ignacio Galan at the group's training centre in Madrid. It will be run jointly by Scottish Power, its parent company Iberdrola, the University of Strathclyde and the Comillas Pontifical University ICAI in the Spanish capital. Iberdrola employees from more than 40 countries will study technical and commercial aspects of worldwide energy markets in Scotland and Spain. The first students will be enrolled next year. Mr Salmond said: "The energy industry – particularly renewables – offers the opportunity to re-industrialise Scotland and leading an international education partnership like this gives us an enormous competitive advantage. "Not only will students from countries such as the US, Brazil and Mexico come to Scotland, Scottish Power staff will be able to learn alongside colleagues from around the world and equip themselves with the skills to work in any number of countries." For more see....

<http://www.heraldscotland.com/news/home-news/glasgow-to-be-global-energy-research-hub.17279760>

UK invests £60 million in climate research centre

11th April 2012, Nina Chestney, Reuters

The UK government pledged 60 million pounds (\$95 million) to support the Met Office Hadley Centre's Climate Programme until at least 2015 to keep Britain at the forefront of climate science research. The Met Office Hadley Centre is one of the world's leading climate change research centres. Largely funded by the UK government, it informs and advises on climate science issues. "This investment will significantly improve their capacity to produce the groundbreaking robust evidence for which they are internationally renowned," UK Energy and Climate Change Minister Greg Barker said in a statement on Wednesday. For more see...

<http://uk.reuters.com/article/2012/04/11/uk-climate-funding-idUKBRE83A0UL20120411>

Consortium lands £3.7m for energy storage research

11th April 2012, Tom Gibson, Energylive news

Three UK universities have been awarded funding from the Government-funded Engineering and Physical Sciences Research Council (EPSRC) to research the technology and economics of energy storage. The University of Warwick is leading the £3.7 million 'Integrated Market-fit and Affordable Grid-scale Energy Storage' project along with the universities of Nottingham and Loughborough. The project hopes to identify secure, environmentally-friendly and affordable power for the UK. For more see.....

<http://www.energylivenews.com/2012/04/11/consortium-lands-3-7m-for-energy-storage-research/>

German Power's Slump Squeezes EON, RWE: Energy Markets

12th April 2012, Rachel Morison, Bloomberg Businessweek

German power prices are extending their longest streak of quarterly declines as record wind and solar output squeezes profits at coal-fed stations run by RWE and E.ON to less than a third of their U.K. counterparts. Baseload electricity for 2013, the European benchmark contract, fell 1.1 percent this month after four consecutive quarterly drops. Utilities in the U.K., including Centrica Plc, are earning more than three times as much as German generators based on next-month clean-dark spreads, a profit measure that includes coal, power and emissions prices. Germany is building solar, wind and coal capacity to replace the 17 reactors that supplied about a fifth of its electricity, following last year's disaster in Fukushima, Japan. Europe's biggest economy gives green energy priority access to the grid and has a greater share of renewables than the U.K. Solar and wind generation units cost less to operate than fossil plants, pushing down electricity prices and profits. For more visit....

<http://www.businessweek.com/news/2012-04-12/german-power-s-longest-slump-squeezes-eon-rwe-energy-markets>

Nanotechnology cuts water use, energy costs

13th April 2012, unattributed, Nanowerk

Nuclear and coal power plants are some of the thirstiest machines on earth. The turbines that spin inside of them to generate electricity require tons and tons of steam, and all of that water has to come from somewhere. Recent studies have estimated that roughly two-fifths of the nation's freshwater withdrawals and three percent of overall freshwater consumption goes to supplying the steam generators at large power stations in the United States. In order to cut down on the enormous quantities of water required to operate these plants, scientists have begun to look for new technologies that could improve their efficiency and reduce the demand for water. As part of a larger consortium involving partners from several energy companies, universities, and government agencies, researchers at the U.S. Department of Energy's Argonne National Laboratory are developing a special class of nanoparticles that partially melt as steam evaporates from a plant's cooling towers, absorbing a significant percentage of the diffused heat in the system. For more visit....

<http://www.nanowerk.com/news/newsid=24899.php>

1,000 jobs on cards for Wallsend after grant boost

14th April 2012, Adrian Pearson, Evening Chronicle

Tyneside is celebrating today as a Government research grant paves the way for more than 1,000 jobs. Tyneside engineering firm OGN has been handed £640,000 to design a new foundation jacket for offshore wind turbines. The Government wants to see some 6,000 of the turbines put up across the UK coast line, meaning OGN is preparing to open a factory running 24/7 next year. That £50m project will see Tynesiders build the devices coming out of the research work backed by the Government grant. For more see....

<http://www.chroniclelive.co.uk/north-east-news/evening-chronicle-news/2012/04/14/1-000-jobs-on-cards-for-wallsend-after-grant-boost-72703-30758301/>

The Tantalizing Promise And Peril Of Nuclear Fusion

15th April 2012, Ken Silverstein, Forbes

Suppose an energy source could be developed that would be safe, sustainable and boundless. Then suppose, again, that it would cost billions upon billions to potentially bring this "ideal" power to market. Those are the issues that certain nation-states are grappling with as they decide whether to continue their expensive but valuable research into [nuclear fusion](#), which harnesses the power of the sun and stars to create unprecedented levels of energy. National and international scientists are trying now to recreate this process in the labs, albeit with much difficulty. "Despite fusion's tantalizing benefits, it has been largely ignored in energy policy discussions because it is viewed as a technology too immature to affect energy production over the next few decades, when it is most needed," says the [Lawrence Livermore National Laboratory](#). The lab, which is part of a \$3.5 billion research effort to help commercialize fusion, says that the United States is in a "unique position to change this paradigm." For more see...

<http://www.forbes.com/sites/kensilverstein/2012/04/15/nuclears-strongest-potential-weapon-fusion/>

Steelmaking resumes at Redcar

15th April 2012, Chris Tighe, Financial Times

The [Redcar blast furnace was relit](#) on Sunday afternoon marking the resumption of steelmaking on Teesside and confirming the rebirth, after a two-year gap, of a bedrock north-east heavy industry that dates back 160 years. The relighting of the blast furnace, Europe's second biggest, was carried out by 11-year-old Wills Waterfield. His father, Geoff Waterfield, who died in August aged 43, was the union leader who led the Save Our Steel campaign which helped give the former Teesside Cast Products site, centred on the blast furnace, a future and generate employment for many years to come. TCP was acquired from [Tata Steel](#) by [Sahavirya Steel Industries](#), Thailand's biggest steel company, in a \$469m deal in March 2011. The blast furnace, which had been mothballed in February 2010, has been relined and TCP transformed into a new

operational business, SSI UK. By the end of 2012, it is expected to export its full annual capacity of 3.6m tonnes of steel slab to Thailand, for use in south-east Asia, fulfilling SSI's aspiration to become a fully integrated steelmaker. For more see....

<http://www.ft.com/cms/s/0/3d46442a-8744-11e1-ad68-00144feab49a.html#axzz1sESdoh7C>

Fracking 'should continue with checks'

17th April 2012, Richard Black, BBC News

A controversial gas extraction method which triggered two earth tremors near Blackpool last year should continue, but under strict conditions, a government-named panel of experts says.

The process - fracking - involves pumping water and chemicals into shale rock at high pressure to extract gas. Shale gas is seen as a way of ensuring relatively cheap energy supplies. But critics have warned of possible side effects - including the contamination of ground water. Test fracking by the Cuadrilla company near Blackpool stopped in 2011 when two earthquakes were felt at the surface. The government-appointed panel believes there will probably be more quakes but that they will be too small to do structural damage above ground. It recommends more monitoring. For more see....

<http://www.bbc.co.uk/news/science-environment-17726538>

Research: £1bn CCS fund does not go far enough

19th April 2012, Will Nichols, BusinessGreen

Scientists have expressed concerns over government plans to bury emissions captured from coal and gas-fired power plants, arguing technical, economic, financial, and social uncertainties remain and could throw the technology's development off course. In the conclusion of a two-year study funded by the UK Energy Research Centre (UKERC), researchers welcome this month's launch of a [roadmap and a new £1bn government competition](#) to accelerate carbon capture and storage (CCS) in the UK. But lead author Professor Jim Watson of the University of Sussex warned the measures within the roadmap and the promised £1bn financial support package may not be sufficient to make such an expensive technology a commercial reality. For more visit....

<http://www.businessgreen.com/bg/news/2168890/research-gbp1bn-ccs-fund>

Biomass and Fossil Fuel Research Alliance (BF2RA) – Project Portfolio

The Biomass and Fossil Fuel Research Alliance (BF2RA) was established in September 2009 with the objectives of promoting research and other scientific studies into:-

- the production, distribution and use of biomass and fossil fuel and their derivatives.
- the minimisation of by-products arising from the use of biomass and fossil fuel and to assess the environmental impact caused by such materials and the development of products thereof and
- the provision of funding for such work and to publish the useful results, to make grants to any person or persons engaged in or connected with research work, and to advance the education of such persons.

Currently membership of BF2RA comprises seven 'world-class' power generation, equipment supplier and coal utilisation organisations and has to date established a portfolio of 9 R&D projects.

The first 3 projects were recruited in 2010 and started October 2010 onwards. Of the rest, 5 were recruited in 2011 from the 1st BF2RA Open Call and the 6th from competitive submissions by two institutions against a detailed project specification. These latter 6 projects commenced late 2011 and early 2012.

Current projects are either PhD or EngD studies with 3 or 4 year durations.

Presented below are summary details of the BF2RA project portfolio.

Grant 01 - Dynamic Modelling and Simulation of Supercritical Coal-fired Power Plant with CO₂ Capture Ability (2011 to 2014)

Cranfield University. Academic Supervisor - Dr Meihong Wang

The aim of this project is to develop a dynamic model for the whole supercritical coal-fired power plant. It is proposed to model the water/steam cycle and the air/flue gas cycle of a typical supercritical coal-fired power plant. This dynamic model for supercritical coal-fired power plant will be linked with the dynamic model for CO₂ post-combustion capture plant (being developed by another PhD project). This will enable us to explore a key design and operation issue - whether such a supercritical plant with CO₂ capture ability can satisfy the UK grid requirement.

Grant 02 - Intelligent Flame Detection Incorporating Burner Condition Monitoring and On-Line Fuel Tracking (2010 to 2013)

University of Kent. Academic Supervisor – Professor Yong Yan

This project aims to develop a cutting edge flame monitoring technology that can also indicate the condition of the burner and track the type of coal and/or biomass fuels. Specific objectives are: to develop a technology for flame stability measurement, burner condition monitoring and on-line fuel tracking through digital imaging and flame signature analysis; to evaluate the technology under a range of biomass firing, coal/biomass co-firing, and oxy-fuel fired conditions on a combustion test facility and on a full scale multi-burner furnace; and to make recommendations for improvements of existing furnaces through the use of the new technology.

Grant 03 - Impact of Biomass Torrefaction on combustion behaviour in co-firing (2010 to 2014)

University of Nottingham. Academic Supervisor – Professor Colin Snape

The principal aims of this project are to investigate a number of the key fundamental issues associated with the development of torrefaction technology for a wide range of biomass materials that will help to promote the more widespread use of torrefied materials especially in the UK.

Grant 04 - Avoiding Sintering of Coal-Fired Shallow Fluidised Beds (2011 to 2015)

University of Nottingham. Academic Supervisor – Dr Hao Liu

The project is focusing on the investigations of the main causes of bed sintering/defluidization during 'lump' coal combustion in shallow fluidized bed combustors. The project will also investigating the effect of co-firing biomass on the bed materials' sintering and fluidization. The 'alkali getter' technique will be explored to alleviate/avoid bed sintering/defluidization during co-firing biomass with lump coal in shallow fluidized beds.

Grant 05 - Milling and Conveyance of Biomass (2011 to 2015)

University of Nottingham. Academic Supervisor – Dr Carol Eastwick

The aim of the project is twofold, to investigate milling behaviour of a range of biomass materials and to investigate how these milled biomasses impact pipe wear. This is being achieved by bench scale milling, analysis of the milled products and design and use of a test rig to rank milled products in a test pipeline.

Grant 06 - A New Classification System for Biomass and Waste Materials for use in Combustion (2011 to 2015)

University of Nottingham. Academic Supervisor – Professor Colin Snape

The overall aim of this project is to develop a classification system for non-coal materials, analogous to those which have been widely applied in the utilisation of coals. This includes characterisation of biomass and waste materials in terms their elemental and chemical analyses and investigation of de-volatilisation and char burn-out and to develop the new classification system as a predictive tool for combustion behaviour and its efficacy when applied to blends with coals.

Grant 07 - Reduction of agglomeration in fluidised beds (2012 to 2015)

Universities of Sheffield and Leeds. Academic Supervisor – Professor Chris Wilson

Work to include characterisation of currently available biomass based on availability and suitability for stationary combustion. To study the chemistry of blending multiple biomass types with coal, to evaluate the performance of biomass/waste coal mixtures at pilot scale using a 350 kW Fluidised Bed Combustor and to evaluate emissions and combustion efficiency performance.

Grant 08 - Modelling chemical and micro-structural evolution across dissimilar interfaces in power plant alloys (2011 to 2015)

University of Nottingham. Academic Supervisor – Professor Graham McCartney

This project addresses the Materials Development priority theme of the BF2RA call in that it is directly relevant to the performance, in-service, of fusion welded joints between dissimilar alloys (e.g. steels and nickel alloys or different steel grades). It will also be pertinent to the development of advanced plant components which require protective coatings by weld overlay or thermal spraying for the more aggressive operating environments of biomass combustion.

Grant 09 - Development of a Novel Feeding System for Pressurised Combustion/Gasification Processes (2012 to 2015)

University of Sheffield. Academic Supervisor – Professor Vida Sharifi

The overall objective of this project is to develop a novel and reliable feeder for continuously feeding solid fuel such as coal, biomass and waste into high pressure environments. Such a feeder will aim to enhance the commercial viability of high pressure biomass/coal gasifiers and combustors and to achieve this will need the following properties - high reliability, low construction, maintenance and operating costs, low power consumption and wide applicability.

BF2RA held its 2nd Open Call for Proposals in early 2012 and is currently reviewing proposals submitted. BF2RA plans to recruit several additional projects from this Call with start dates of October 2012 onwards.

For further information about BF2RA and Membership please visit www.bf2ra.org or email technical@bf2ra.org

CALENDAR OF COAL RESEARCH MEETINGS AND EVENTS

Date	Title	Location	Contact
15 th to 17 th May 2012	Electric Power 2012	Baltimore Convention Center, Baltimore , Maryland, USA	For more information visit: http://www.electricpowerexpo.com/
24 th May 2012	Minerals Engineering 2012, organised by the Minerals Engineering Society, (MES), and co-sponsored by the Coal Research Forum, (CRF), and the South Midlands Mining and Minerals Institute, (SMMI).	Hilton Hotel, East Midlands Airport	Contact: MES Treasurer, 11, Needless Inn Lane Woodlesford Leeds, LS26 8EG or visit www.mineralsengineering.org

3 rd to 7 th June 2012	The 37 th International Technical Conference on Clean Coal & Fuel Systems	Sheraton Sand Key, Clearwater, Florida, USA	For more information visit: http://www.coaltechnologies.com/pages/all_for_papers.html
14 th to 17 th August 2012	COAL-GEN	Kentucky International Convention Center	For more information visit: http://www.coal-gen.com/index.html
Monday 10 th to Wednesday 12 th September 2012	9 th European Conference on Coal Research and its Applications, (9 th ECCRIA)	University of Nottingham, Nottinghamshire	For more information visit http://9.eccria.org/ibis/eccria9/home or contact Mr. David Couling, E.ON New Build & Technologies Ltd. Tel : 02476-192724 E mail : david.couling@eon.com
25 th to 27 th September 2012	EUROCOALASH 2012	Thessaloniki, Greece	For more information visit: http://www.eurocoalash.org/index.php?start&lng=2
Monday 8 th October 2012	The 2012 Coal Science Lecture, sponsored by the Biomass and Fossil Fuel Research Alliance, (BF2RA), and the Coal Research Forum, (CRF), to be given by Dr Andrew J. Minchener, OBE, Andalin Consultants, formerly Head of the Industry and Environment Group, CRE Group Ltd., Stoke Orchard, Cheltenham, title of lecture to be announced.	The Institute of Physics, 76, Portland Place, London, W1B 1NT.	Mr J D Gardner, BCURA Company Secretary, Gardner Brown Ltd., Calderwood House, 7 Montpellier Parade, Cheltenham, GLOS, GL50 1UA Tel : 01242-224886 Fax : 01242-577116 E-mail : john@gardnerbrown
17 th and 18 th October 2012	Carbon capture and storage - ready, steady, go!	I.MechE 1 Birdcage Walk London SW1H 9JJ	For information visit: http://events.imeche.org/EventView.aspx?EventID=1442
15 th to 18 th October 2012	2012 Pittsburgh Coal Conference	David L. Lawrence Convention Center 1000 Fort Duquesne Blvd Pittsburgh, PA 15222	For more information visit http://www.engineering.pitt.edu/pcc/