

NEWSLETTER



*of
the
Coal Research Forum*



EDITOR'S MUSINGS:

This chilly weather tells me that it is the time of year once again for me to wish everyone seasonal greetings! The committee of the Coal Research Forum hope that all of our readers have enjoyed a happy and peaceful Christmas and are looking forward to a successful and rewarding 2013.

In 2012 we held our biennial conference and in September ECCRIA 9 was hosted by the University of Nottingham. This was the second time that the event had been held at this location although in 2012 it used the newer setting of the Jubilee Campus. The number of delegates was similar to recent previous events, despite the economic downturn, and included a good number of overseas visitors. The consensus view was that it had been an enjoyable and useful conference.

I think it is fair to say that by now the rugby scrums and mêlées involving Christmas shopping, (at these for those of us who still shop in the traditional way!) and the feeling of nausea brought on by the thought of more turkey are but distant memories. The shortest day has passed and although many more cold days are inevitable, the prospect of a better summer, though still some way off, beckons. So what did we make of 2012? Although different for each of us many will have found it to be quite challenging. The economy seems almost wilful in its failure to respond to the 'medicine'; the summer was a more than usual disappointment and the floods have been devastating for many. However, not to worry, we now have an Energy Bill! Whilst this may seem to be a step in the right direction, the pace of its gestation and final birth has been glacial and the concerns about its health are many. To quote a recent article in the Independent, John Heyes, the newly appointed Minister for Energy and Climate Change has "to master a brief of mind-bending technical complexity and changeability". Can it be that after the release of this bill, the Government will finally be persuaded to reveal what it is proving so hard for them to do? That is to tell the beleaguered consumer what many in the industry have known for a long time - that the true cost of low-carbon energy will hit them big time or will they continue to prevaricate with the next general election not that far away? Only time it will tell.

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9th European Conference on Coal Research and Its Applications **10th to 12th September 2012,** **University of Nottingham**

The ninth biennial coal research conference organised by The Coal Research Forum was held at the University of Nottingham in early September 2012. This was the second time that the event had been hosted by Nottingham having previously been held there in 1998.

The main aim of the event, formally known as the 9th European Conference on Coal Research & Its Applications or ECCRIA9 is to bring together researchers in universities with participants from industry, who are carrying out research or are interested in the application of this research in industry. The policy of the conference organisers is to cost the event in such a way as to encourage the attendance of research students, who will most benefit from the opportunities to showcase their work and to network with other researchers.

The conference was held from Monday 10th to Wednesday 12th September at the Jubilee Campus Business School in the South Building.

The welcome address was given by Professor Sam Kingman who is Research Dean for the Faculty of Engineering at the University of Nottingham. The conference keynote speaker was Dr John Topper, Director of IEA, Clean Coal, who gave a very interesting talk entitled "Outlook for Coal World-Wide".

A full programme of oral presentations covered two and a half days in which 73 papers were given in 9 parallel sessions. The themes of the conference A sessions were Oxyfuel combustion; carbon capture and storage and biomass co firing and the B session themes were coal-derived products; corrosion ash and deposition; gasification and Fischer Tropsch synthesis; underground coal gasification; emissions and their control; IGCC and pre-combustion and characterisation.

A poster session of fifteen papers was held on Monday evening in conjunction with a buffet dinner served in the in the South Building foyer. Topics covered by the posters were varied and included aspects of emissions and pollutant measurement, in-line measurement techniques, coal carbonisation, plant modelling, CO₂ studies, chlorine functionality, coal bed methane, activated carbons and coal tar pitch.

A total of 113 delegates attended the conference. In addition to a large contingent from the UK there was representation from a number of European countries such as Spain, Italy, Germany, Greece, Poland, Denmark and Finland with some long distance travellers from India, China, Japan, Malaysia, and Russia.

The Conference Dinner was held on Tuesday night in the impressive surroundings of Senate Chamber of the Trent Building. This venue provided a very pleasant atmosphere in which an excellent meal was enjoyed by all.

The conference was formally closed on Wednesday lunchtime by Professor Colin Snape who is the Director of the Energy Technologies Research Institute, Faculty of Engineering at the University of Nottingham. Colin thanked the delegates for attending and hoped they had enjoyed the latest ECCRIA conference. However, unlike in the recent Olympic Games closing ceremony he was unable to hand over the baton to the next conference organiser as the venue is still to be finalised!

A link to the presentations, which are on the Coal Research Forum website, is:
<http://coalresearchforum.org/conference.html>

My experience at ECCRIA 9

Eni Oko

Process Systems Engineering Group,
School of Engineering,
Cranfield University

The 9th European Conference on Coal Research & Its Applications (ECCRIA 9) was my first time at a technical conference and as I expected it was a meeting point for experts from the industry and academics that had interest in coal related research. During the event, I presented a poster titled "Dynamic Modelling and Validation of Coal-fired Subcritical Power Plant". The poster drew attention of participants. Some questions asked by participants have stimulated fresh ideas on how to get the best out of the project.

Also, presentations by different participants were hugely helpful. The presentations covered different areas of coal related researches pursued in different countries across the world. A number of these presentations were directly relevant to my current study, which involves developing a dynamic model for a subcritical coal-fired power plant. I also had the opportunity of obtaining first hand explanation from the authors.

Finally, experts from across the world (South Africa, Poland, Greece, Japan, UK, etc.) were present at the event. The event therefore availed me the opportunity to network with experts from different countries across the world. The benefits of such network will include knowledge/resource sharing and can also help in shaping research focus to avoid duplication and consequently save resources.

Student Bursaries for 2013-2014

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

Prof. J.W. Patrick
School of Chemical & Environmental Engineering
The University of Nottingham
University Park
Nottingham NG7 2RD

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

**BF2RA Robens Coal Science Lecture
Institute of Physics
London
8th October 2012**



Dr Andrew Minchener OBE (left) receiving his medal from
Professor Jim Harrison

The 61st Robens Coal Science Lecture took place on 8th October 2012 at the Institute of Physics in London, and was attended by about 100 participants. This lecture, the first to be organised by BF2RA, was entitled **Clean Coal: New Global Challenges and Potential Opportunities**. It was given by Dr Andrew Minchener OBE, a former senior staff member at the British Coal Corporation, Coal Research Establishment and one of its spin-off companies, CRE Group Limited. Since the end of 2001, he has worked for a wide range of organisations, including the International Energy Agency, IEA Clean Coal Centre, Asian Development Bank, World Bank, European Commission DGRTD and DG Energy, UK DTI, UK Department of Energy and Climate Change, UK Department for International Development and the UK Foreign and Commonwealth Office. He has also carried out the task of preparing and up-dating the “Coal Research and Engineering Needs in the UK” document for the CRF. His expert activities for these organisations 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 together with dissemination, knowledge transfer and other outreach actions. He has been particularly active in China, a country that he has visited some 140 times over a 25 year period, working in close cooperation with a very wide range of their universities, institutes and industrial organisations.

Andrew began by stating that, with hindsight, he should have titled his presentation as **China; The New Champion for Clean Coal Technology**. By way of introduction, he explained that on a global basis energy use is continuing to increase rapidly and, despite the rise in the use of natural gas, nuclear and renewable energy, the major growth has been in coal, both through the use of indigenous supplies and through international trading. However, the geographical focus has changed, and, while coal use in many OECD countries is in decline, there continues to be a surge in demand within the rapidly developing countries, particularly in Asia, as coal continues to underpin their economic growth and provides security of supply. Consequently, it is essential that every opportunity is taken to ensure that utilisation efficiency gains are achieved with an acceptable environmental impact. In this regard, Andrew stressed that in China, which is the largest coal based economy in the world, there is an ongoing transformation to clean coal use. It also seems very likely that development partners and early adopters in China will engage in a concerted way to provide the means for introducing cleaner coal technologies into other developing countries within Asia.

Andrew explained that China has medium to longer term visions of how it intends to develop the country, covering economic, environmental and social issues. Within this overall framework it operates on a five year planning cycle where specific targets are set across all

aspects of the country's economy. Thus for the period 2011-2015, there are specific energy sector targets, with:

- Energy intensity to be cut by 16% from 2010 levels;
- CO₂ intensity to be cut by 17% from 2010 levels;
- Non-fossil fuel use to account for 11.4% of primary energy consumption, with a target of 15% for 2020;
- SO₂ emissions to be cut by 8% from 2010 levels;
- NO_x emissions to be cut by 10% from 2010 levels;
- Heavy metals pollution to be reduced at least to 2007 levels;
- Water consumption per unit of value-added industrial output to be cut by 30%.

In the power sector, with a capacity of 930 GWe at the end of 2010, the intention is to:

- establish 235 GWe capacity for non-fossil energy sources, including
 - 40 GWe of nuclear power projects
 - 120 GWe of hydropower stations,
 - At least 70 GWe of wind power capacity
 - 5 -15 GWe of solar power
- establish 270 GWe of coal fired power plants, comprising 600, 660 or 1000 MWe high efficiency supercritical and ultra-supercritical units.
- Close some 50 GWe of older less efficient coal power plants

Andrew then noted that unlike in OECD countries, coal use covers a wide range of sectors. While its major use is for power production, there is also significant use for coking, for cement manufacture, as well as for chemicals production. He also stressed that it is essential to separate past perceptions from the current reality in China. For example, in the power sector, the government is following the strategic approach advocated by the IEA to improve the efficiency of power production while also introducing very tight controls for conventional emissions. At the same time it is playing a major role in developing CCS, such that it can subsequently be integrated into the power plant when the implementation conditions are appropriate. He proceeded to provide a wealth of information on the government's approach on all three aspects, with very strong policy drivers backed up by regulatory control. This covered the introduction of very large supercritical and ultra-supercritical power plants, while at the same time closing small, obsolete and uneconomic units. The new power plants have very high standard ESPs and, in some cases, bag filters for particulate control, large modern FGD units to limit SO₂ emissions, and, increasingly, SCR systems to control NO_x emissions. At the same time, the new emissions legislation requires the power plant owners to retrofit all existing power plants with these systems by the middle of 2014. He also stressed that China's lower cost base and standardised approach to manufacturing the various components has resulted in the power plants becoming very competitively priced compared to alternative suppliers. China is also now the world's leading supplier of ESPs systems, has installed more FGD capacity in the last ten years than the rest of the world has managed in the last thirty, and in due course is likely to become a major force within the global SCR market.

With regard to CCS, various studies have shown that under current and planned policies, national absolute CO₂ emissions will continue to rise although at a decreasing rate and that with further introduction of low/zero carbon technologies, emissions may reach a plateau by about 2030. That said, CCS will be required if emissions are to subsequently decline. Currently, CCS is not an economic priority, although it is a technological development priority. China has a major R&D programme supported by the Ministry of Science and Technology and the National Science Foundation. The focus is to develop less energy intensive capture options, covering all the current technology variants. At the same time, several of the State Owned Enterprises have taken forward some promising options to establish industrial pilot scale demonstrations. These include a post combustion amine solvent scrubbing trial on a coal fired power plant, with an annual CO₂ capture capacity of 120,000 tonnes, and a natural gas based project where CO₂ is stripped from a gas deposit and used for EOR. In particular, the post combustion project was established from concept to implementation in less than a year and the cost of CO₂ capture has been reported to be under US\$30/tonne. There is also a recognition that

the rapid growth in gasification for chemicals production offers some low cost opportunities for CO₂ capture, especially since there are large groupings of gasification projects being established that could offer further economies of scale through CO₂ hubs being established. So far pre-combustion CO₂ removal from a large scale gasifier has been established, with up to 100,000 tonnes of CO₂ to be stored each year in an aquifer. Discussions are underway with several multi-lateral donors about larger scale operations being established for many of these technology variants.

Andrew then noted that China needs to balance medium to longer term strategic energy and environmental objectives with finding solutions to short term difficulties. While it is pursuing a low carbon development path with Chinese characteristics, with clearly defined targets and priority actions, some major challenges remain. He reiterated that China is already becoming the focal point and prime driver for improved clean coal utilisation throughout much of Asia and that this could develop further to fulfil a leadership role in clean coal technology with carbon capture and storage, as there is tremendous scope to build on the clean coal base to integrate CCS techniques as necessary.

Within this major development programme, there has been considerable international cooperation and Andrew acknowledged that the UK has featured prominently on CCS issues, with DECC having supported a ground-breaking near zero emissions from coal capacity building project in Northern China, the FCO supporting a CCS-ready capacity building initiative in Guangdong Province, while the EPSRC is supporting various CCS related cooperative R&D projects, all of which have increased Chinese capacity and raised awareness of CCS among many stakeholders.

At the same time, Andrew suggested that there is a need for broader clean coal R&D innovation and knowledge transfer between China, other developing countries and the UK. While UK industry continues to build its contractual links with Chinese equipment suppliers, as has been presented in previous lectures, Andrew stressed that the UK still has a strong clean coal R&D base, including CCS, in UK universities while the IEA Clean Coal Centre represents a centre of excellence for coal based knowledge transfer.

He highlighted the approach by the University of Nottingham, which has established overseas campuses, including one at Ningbo, China, which has led to the development of an engineering doctorate school on the lines of the Eng.D. Centre in Efficient Fossil Energy Technologies at Nottingham. The aim is to train 50 PhD students on aspects of:

- advanced combustion and gasification leading to cleaner power generation
- coal-to-liquid transport fuels (petrol, diesel and higher fuel alcohols)
- non-conventional hydrocarbons, such as shale gas
- the whole spectrum of carbon capture technologies covering integrated multi-pollutant control

At the same time, this has provided the university with direct opportunities for research collaboration with Chinese universities and industrial partners. The current focus is on the research, development and commercialization of NO_x and SO_x removal technologies, techniques to address deposition, erosion and corrosion caused by biomass utilization in coal-fired power stations, better understanding of the formation of fine particulates (PM_{2.5}, PM₁₀) and its control, and CO₂ capture based on novel solid absorbents.

There are also further opportunities for the Clean Coal Centre. Andrew noted that while the Centre may be best known for its clean coal study reports, increasingly it is undertaking more dissemination and outreach activities, with the recognition by its members and sponsors that there needs to be some focus on developing economies.

In conclusion, Andrew stated that:

- Coal extraction and utilisation are set to continue to expand over the next two decades
- Increasingly the focus for coal use will be China, India and the rest of Asia

- While China is taking very significant steps to improve efficiency and limit environmental impact, there is considerable scope to do better in many of the other Asian countries by creating conditions to enable the use of advanced, cleaner, more efficient technologies
- The UK continues to have valuable expertise and experience that should be utilised for the global greater good, especially in developing countries where economic growth is linked to coal use.

Short list for UK's £1bn CCS competition announced

Four bidders have been short listed for the next phase of the UK's £1bn Carbon Capture and Storage (CCS) competition. The UK is providing funding to support the development of CCS technology, which if developed at scale, could allow the safe removal and storage of carbon emissions from coal and gas plant. The four were selected from eight bids received after a thorough evaluation process that considered project deliverability, value for money, and the Government's timetable to deliver a cost-competitive CCS industry in the 2020s.

The successful projects are now being invited to take part in a period of intensive commercial negotiations with Government before decisions on which projects to support further are taken in the New Year. Secretary of State for Energy and Climate Change, Edward Davey said: "We have received some quality bids from industry, who have really risen to the challenge set by the competition. "The projects we have chosen to take forward have all shown that they have the potential to kick-start the creation of a new CCS industry in the UK, but further discussions are needed to ensure we deliver value-for-money for taxpayers. "Today's announcement is an important step towards an exciting new industry, one that could help us reduce our carbon emissions and create thousands of jobs." "We have one of the best offers in the world and are a leading country in Europe. We will remain in close contact with the European Commission in the coming months as they take their decisions on which projects to support with European funding." Three of the UK's short listed bids also applied for European Commission funding from New Entrant Reserve (NER) allowances.

The Government has written to the Commission to inform them that it is willing to support these projects in the Commission's Competition, subject to their ultimate success in the UK Competition. The Commission will make a final decision on whether to support a UK CCS project at the end of the year.

The four short listed bids, all full chain capture, transport and storage projects are in alphabetical order:

- **Captain Clean Energy Project:** A proposal for a new 570MW, fully abated coal Integrated Gasification Combined Cycle (pre-combustion) project in Grangemouth, Scotland with storage in offshore depleted gas fields. Led by Summit Power, involving Petrofac (CO2 Deepstore), National Grid and Siemens.
- **Peterhead:** A 340MW Post-combustion capture retrofitted to part of an existing 1180MW Combined Cycle Gas Turbine power station at Peterhead, Scotland. Led by Shell and SSE.
- **Teesside Low Carbon Project:** A Pre-combustion coal gasification project (linked to c330MWe net power generating capacity fuelled by syngas with 90% of CO2 abated) on Teesside, North East England with storage in depleted oil field and saline aquifer. A consortium led by Progressive Energy and involving GDF SUEZ, Premier Oil, and BOC.
- **White Rose Project:** An Oxyfuel capture project at a proposed new 304MW fully abated supercritical coal-fired power station on the Drax site in North Yorkshire. Led by Alstom and involving Drax, BOC and National Grid.

Following further decisions in the early 2012 the Government expects that projects will undertake engineering studies before final decisions to build. The precise timetable for this will be dependent on the projects selected.

Background information:

1. DECC published the first UK CCS Roadmap on 3 April. This set out the action the Government is taking to enable the development of a new CCS industry in the 2020s, including:

- the Competition, the 'CCS Commercialisation Programme', which aims to drive down costs by supporting practical experience in the design, construction and operation of commercial scale CCS with £1bn capital funding, and additional support, subject to affordability, through low carbon Contracts for Difference;
- £125m funding for Research and Development, including a £20m innovation competition to support the development and demonstration of CCS at component and pilot scale. Decisions on projects to support under this competition are expected to be announced in the coming weeks;
- planned long term Contracts for Difference through Electricity Market Reforms to drive investment in commercial scale CCS in the 2020s and beyond;
- commitments to working with industry to address other important areas including developing skills and the supply chain, storage and assisting the development of CCS infrastructure (and we will be publishing a storage strategy shortly); and
- a focus on international engagement, in particular on learning from other projects around the world to help accelerate cost reduction in the UK, and sharing the knowledge we have generated through our programme.

The CCS Commercialisation Competition was open for bids between 3 April and 3 July. 8 bids were received and 4 of them are now being taken forward as set out above.

The NER300

3. The NER300 is a European Commission competition for CCS and innovative renewable projects. The Commission is due to announce awards from its first round of funding at the end of this year. In order to do that Member States need to state which projects they are prepared to support from the list that the Commission has published. The Commission have informed us that no more than 2 or 3 CCS projects (across Europe) will receive funding in this round. The maximum support available for CCS projects is around £250m per project. Each Member State is allowed to support 3 projects in total (i.e. CCS and renewables projects combined), although projects on the Commission's reserve list are allowed to be supported without limitation at this stage.

4. With a maximum of 2 or 3 CCS projects able to be supported across Europe, the UK will not secure funding for 3 UK CCS projects. The UK has therefore confirmed support for the 1 UK renewable project on the Commission's candidate list of projects and for the 2 CCS candidate projects that remain in the UK process. The UK has also confirmed our continued support for the 1 renewable and 1 CCS project the UK has on the NER reserve list. (The CCS reserve project also remains in the UK process).

5. For clarity, the NER projects the UK has supported are:

- Teesside CCS, White Rose Oxyfuel CCS and Sound of Islay Tidal as our 3 candidate projects;
- Peterhead CCS and Kyle Rhea Tidal Turbine Array as the reserve projects

6. Significant UK Government funding is required for the CCS projects. Our support for the CCS projects is therefore subject to them ultimately being successful in the ongoing UK Government competitive process. We have written to DG Climate Action to explain the next steps in our process and to reconfirm the substantial financial offer we have committed to CCS. DG Climate Action will now consider our response and we understand they aim to make Award Decisions to successful projects by the end of this year.

http://www.decc.gov.uk/en/content/cms/news/pn12_136/pn12_136.aspx

Industry Body Calls For New Coal Strategy

5th December 2012, CoalImp press release

CoalImp, the Association of UK Coal Importers, has called for a new coal strategy to complement the Government's gas strategy, announced today. Nigel Yaxley, managing director of CoalImp said: "This year approximately 40 per cent of the UK's electricity has been generated from coal, and at times it has been supplying over 50% of demand. "UK consumers have been protected from the full impact of high prices of gas-fired electricity by the diversity of our power generation system, which can still benefit from the reliability, flexibility and relatively low cost of coal, the world's most abundant fuel.

"Last week's Energy Bill was rightly concerned mainly with future investment, but by failing to acknowledge the importance of coal today the Government risks a less competitive UK economy tomorrow." Nigel Yaxley added that Government plans for long-term decarbonisation of the electricity system must not rely too heavily on any one fuel or technology.

"CoalImp fully welcomes the Government's commitment to Carbon Capture and Storage (CCS), but there is a risk that it is too little too late," he said. "CCS is crucial in a world context where coal remains the fastest growing fossil fuel, and a recent report has confirmed that CCS has the potential to compete with other low carbon forms of energy by the 2020s."

The managing director of CoalImp has also noted Energy and Climate Change Secretary Ed Davey's warning that development of UK shale gas resources will not lead to an era of cheap gas. "This is one of the main reasons we have called for the development of a new strategy for coal," he explained. "It's vital we ensure that the UK can continue to benefit from the world's most abundant and low cost fuel at the same time as leading the way to a future where coal is utilised in a clean and fully sustainable manner. "Failure to do this will mean the UK's extensive coal infrastructure and associated jobs will be lost, the electricity system will lose valuable diversity, and prices will rise." "By providing low cost, reliable electricity, coal can already address several of the most pressing issues facing the UK energy sector. Carbon capture and storage would mean it can also be low carbon. A clear bridge is needed from today, when coal is still generating 40 per cent of our electricity from the reliable workhorses we take for granted, to the CCS-equipped plants of the future."

Note: CoalImp is the trade association for companies involved in importing coal to the UK, including major end users, rail companies, ports and other companies with a physical presence in the supply chain.

Energy-Facts.org

Another news sheet from Dr Frank Clemente has been obtained with an article on the renewed importance of coal to liquid conversion. More details can be found on the following link:
<http://energy-facts.org/Library/tabid/100/Default.aspx>

UCGA responds to anti UCG reports on Frack Off 10th October 2012, UCG Association

The UCG Association has responded to negative and, in their view, inaccurate reporting on the effects of UCG by the activist group Frack Off. Their statement is as follows:

"The recent statement by the so-called Extreme Energy Action network "Frack-Off", on Underground Coal Gasification (UCG) is so wholly misleading, scientifically and factually incorrect and written in such alarmist tones - that we have decided to take the unprecedented

action of issuing a press release to refute the many unfounded claims. The article entitled - 20 Impacts of Underground Coal Gasification -has so many discrepancies that we have answered each point in turn.

Please click on the link below to see the full UCGA response:

http://www.ucgassociation.org/index.php?option=com_content&view=article&id=328:ucga-responds-to-anti-ucg-reports&catid=38:current-news&Itemid=429

Global CCS Status report

The Global CCS Status report identifies trends in the development of CCS, including the global slow-down in CCS demonstration and the decrease in public funding available for CCS, as well as more positive developments such as the uptake of CCS in China and the increased use of enhanced oil recovery for generating additional revenue streams for CCS projects.

To download report click on following webpage and follow the link below:

<http://www.globalccsinstitute.com/get-involved/in-focus/2012/10/global-status-ccs-2012>



EERA Bioenergy

The following article has been received from Kai Sipilä who is the EERA Bioenergy Joint Programme Coordinator for EERA Bioenergy. The overall objective of this Joint Programme is to align pre-competitive research activities at EERA institutes to give a technical-scientific basis to further develop the net generation biofuels routes and to explore the possibilities for joint technology development. The more efficient use of R&D investments that this Joint Programme foresees contributes to an acceleration of the development of next-generation conversion technologies. The EERA Bioenergy Programme will develop new technologies and improve the competitiveness of next generation biofuels with four main sub-programmes:- thermo-chemical processing; sugar platform; algae based biofuels and cross cutting topics such as raw material supply, energy systems and sustainability.

European Energy Research Alliance (EERA)

The European Energy Research Alliance (EERA) represents one of the most important initiatives in the public research domain in Europe. Created in 2007 by ten founding institutions, EERA involves today more than 2,000 researchers from over 150 European organisations. By cooperating and aligning their activities in 13 Joint Programmes (JP), energy research organisations in Europe will be able to accelerate the development of low-carbon technologies and support the European Strategic Energy Technology Plan (SET-Plan). For further information on EERA, please visit www.eera-set.eu.

Joint Programme on Bioenergy

The EERA Bioenergy programme started at the beginning of 2010, with full activities continuing until 2013. There are 29 RTD institutions participating from 13 countries with estimated personal resources of 100 person years. Currently there are five focused Sub Programmes on transportation biofuels and bioenergy production:

- Biomass thermochemical processing coordinated by ECN;
- Sugar platform coordinated by NLEG;
- Biofuels from algae coordinated by DTU;
- Cross-cutting issues in bioenergy coordinated by INRA;
- Stationary power and heat from bioenergy coordinated by SINTEF.

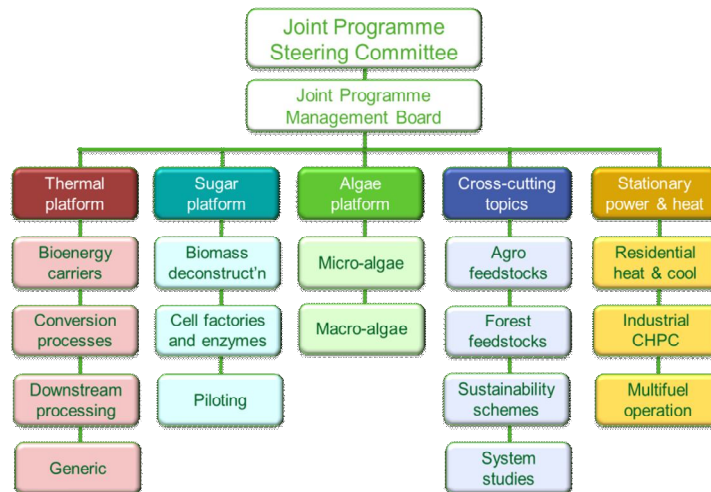


Figure 1: EERA Bioenergy Structure.

In the initial phase, key priority areas and Sub Programmes were selected to follow the priority areas of the European Industrial Bioenergy Initiative (EIBI) and its seven value chains which focus on creating new solutions for biofuels in transport. EERA acts as a complementary tool to EIBI in the SET-Plan for 2020. The SET-Plan will accelerate the technological development and market introduction of new solutions in order to reach the ambitious 2020 targets in Europe. A new Sub Programme on Heat and Power has been approved supporting the RTD activities highlighted in the European technology platform of Renewable Heating and Cooling. There are 17 participants in this Sub Programme coordinated by SINTEF.

Integration of activities

At the EERA annual conference held in Brussels in May 2012, strategic evaluations of new programmes including EERA Bioenergy were presented. The evaluators highlighted the need for strong integration of RTD activities, research infrastructure and future joint activities in order to provide solid RTD support to industrial research and development activities, and to serve as a collaborative basis for increasing the cooperation among national bioenergy research programmes.

EU FWP7 call

In the current EU FWP7 call, a new instrument of integrated research programmes is launched which will open up new attractive opportunities for the EERA Bioenergy Joint Programme (JP). We are actively drafting the application to be delivered at the beginning of January 2013, and if approved by the EC, will start a new phase of work at the end of 2013 for five years. Additionally, the EC and eight member states have opened the call ERANET+ 'bioenergy sustaining the future'. The seven areas in this call are following the EIBI value chains. Each project consortium should include two industrial and one RTD member from two countries. For industrial large scale innovative investments, the so called flag ship projects are waiting a final decision from the EC and member states in the NER300 call boosting the demonstration of the next generation biofuels production technologies.

Achievements

The EERA Bioenergy JP has been operational for two years. Networking has been successful and the first joint efforts and deliverables can be seen. In order to boost the external visibility and networking opportunities we have launched the EERA Bioenergy website www.eera-bioenergy.eu, plus the newsletter 'EERA Bioenergy NEWS'. We will be holding an advisory board meeting in January 2013, when representatives from national agencies and industrial persons from technology platforms and energy initiatives will give guidelines on how the collaboration and impact from the EERA Bioenergy JP can be further developed and activated.

The EERA Bioenergy JP has successfully created new joint reports, publications, project

programmes, workshops and promotional activities, such as the website, flyers and posters. During 2012 we have successfully improved our working processes and networking skills.

2013 onwards

The forthcoming year 2013 will be very challenging when actively creating new processes and joint efforts for European and national bioenergy related programmes with increasing interaction with industrial stakeholders.

Further details can be found at www.eera-bioenergy.eu.



The following, which for many will hopefully be new information, is taken from the website of Bettercoal, <http://bettercoal.org/about-us.aspx>

"In 2010, a group of energy utilities started discussions on establishing a new initiative that would promote the continuous improvement of corporate responsibility in the coal supply chain. Since then we've been talking to a range of global stakeholders including NGOs, civil society and coal suppliers to define the scope of this initiative.

Bettercoal was registered as a not-for-profit organisation on 28 Feb 2012 and we're in the process of recruiting an Executive Director to head up the initiative's activities. The Executive Director will work closely with the **Bettercoal** Board of Directors and the independent Stakeholder Advisory Group.

Our vision and mission

The **Bettercoal** vision is a coal supply chain that protects the environment, respects the rights of people and contributes positively to the livelihoods of workers and communities. Our mission is to advance the continuous improvement of the ethical, social and environmental performance of coal mines by improving business practices through engagement with stakeholders and based on a shared set of principles.

To do this we are working with a variety of global stakeholders on the development of the **Bettercoal** Code, which sets out the principles and provisions that members expect coal mining companies and other stakeholders to align with. Once in place, this globally recognised code of practice will form the basis for self-assessments by mine operators and independent third party site assessments in the mines themselves.

The focus of **Bettercoal** will predominantly be on mines that supply the international markets however the standards, tools and experiences will be made open source for the benefit of stakeholders across the world."

26 September 2012

Bettercoal invites Stakeholder Comments on Draft Code through Global consultation

Bettercoal today announced that the Draft **Bettercoal** Code is now available for stakeholder review and comment through its consultation website <http://consult.bettercoal.org/>

The Code will be available on the website in four languages – English, Spanish, Russian and Bahasa Indonesian. Stakeholders who have registered at the Code consultation website will be able to provide their comments over a minimum period of 60 days. For more information click to following link: <http://bettercoal.org/news.aspx?NewsArticleId=8>

Permission granted for Surface Coal Mine in Scotland

20th November 2012

Environmental firm, SLR Consulting has secured planning permission for the phased extraction of 945,000 tonnes of coal at Rigg North, Kirkconnel in Dumfries and Galloway, Scotland. Working for Aardvark TMC Ltd, on behalf of ATH Resources Plc, permission was granted following an Environmental Impact Assessment (EIA) where SLR was able to demonstrate the project's compliance with the local development plan. The EIA covered issues including landscape and visual amenity, ecology, hydrology, air quality, noise, blasting, transportation and the potential for cumulative effects to occur. The surface mine, which is intended to produce coal for the energy sector and for domestic usage, will be developed over seven years with coal extraction taking place over five years. Peter Wheelan, SLR Senior Planner and Project Manager for the instruction, who is based in the Glasgow office, said: "Although surface mining can raise significant environmental issues, Scottish coal extraction is necessary and continues to play an important role in sustaining diverse energy supplies". ATH Resources Project Manager Jo Davies, said: "SLR was very professional to work with and managed to secure planning permission for a major project within a tight deadline and on budget." The 170 hectare development will now be subject to a legal agreement, required to control the operational phasing of surface mines in the vicinity and to safeguard site restoration. Rigg North, which will be operated as a successor to ATH's existing Glenmuckloch Surface Coal Mine, is expected to create around 30 jobs.

For more information go to: www.slrconsulting.com

Obituary for Professor John Ward, University of Glamorgan

John Ward, Emeritus Professor of Energy Technology at the **University of Glamorgan** has died after an illness, which first became apparent when he collapsed at the 2011 INFUB Meeting, an annual meeting, which he helped organise for many years.

John had a long career in academia and industry in the UK and the USA, working for what became British Steel at Port Talbot, travelling to Washington on the Queen Mary to work during the period of JFK and returning to the UK to work in Cranfield University, the Open University and latterly at the University of Glamorgan. He was an exponent of a range of heat transfer and thermo-fluid modelling approaches which were appropriate to industrial users, and he spent most of his 50 years as a practising heat transfer specialist teaching what he had put into practice to undergraduates, PhD students and industry engineers.

His lifetime in the heat transfer business led to over 140 publications as well as numerous conference presentations and courses, including modelling modules for **IFRF** Industrial Combustion courses. His work was recognised by his inclusion on editorial boards and governing boards of Professional Bodies as well as through the award of the David Gunn Memorial Medal for Services to Combustion Engineering by the UK Combustion Engineering Association in 2002. His wise and unassuming character made him many friends throughout the combustion field. He will be greatly missed.

ARTICLES FROM THE TECHNICAL PRESS

News alerts in coal and energy research

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

Scientists team up to research food waste as an energy source

4th August 2012, Kamalpreet Badasha, Supply Management

A network of scientists is researching how food waste such as coffee, citrus residue and cashew shells, can be made into a valuable commodity for **energy** use. The University of York's [Green Chemistry Centre of Excellence](#) research facility is exploring how waste from the food supply chain can be used as an alternative carbon source for bio-fuel, bio-material and bio-chemical. It launched the [Biowaste Industrial Symbiosis Network](#), which is made up of engineers, biotechnologists and food technologists, to further develop the research.

<http://www.supplymanagement.com/news/2012/scientists-team-up-to-research-food-waste-as-an-energy-source/>

Manchester University to be base for £60m energy research centre

7th August, unattributed, Manchester Evening News

Manchester is set to be the centre of a new multi-million pound **energy research** centre. The centre, based at Manchester University, will be funded by oil company BP. Academics will work with staff at universities in Cambridge, London and Illinois the US as part of the International Centre for Advanced Materials. Science and engineering experts aim to find new materials to be used in the energy industry, particularly those which can be used at high pressure underground. Manchester University was chosen as the base for the £60m centre thanks to its links with BP and high standards in materials research. A number of new academic posts, many in Manchester, will be created as part of the project.

http://menmedia.co.uk/manchestereveningnews/news/business/s/1585480_manchester-university-chosen-for-60m-bp-sponsored-energy-research-centre

Dry coal beneficiation trials successful, but not suitable for export coal

17th August 2012, Chantelle Kotzé, Creamer Media's Mining Weekly

Initially, Genet Mineral Processing and diversified miner Exxaro's **coal** subsidiary, Exxaro **Coal**, imported two 10 t FGX sorters, reports **research** association Coaltech executive director Johann Beukes. The Chinese-manufactured units were secured by Exxaro Coal and Genet Mineral Processing for small-scale testing by themselves and Coaltech. In 2009, Genet Mineral Processing imported two 240 t units, which are processing 400 000 t/m of coal for State-owned power utility Eskom at its Middelkraal mine, in Witbank, says company processing manager **Johan Cowan**. For the past two years, Coal-tech has investigated whether the use of dry coal beneficiation at South African mines would be viable. "Dry coal beneficiation is significantly cheaper than wet beneficiation and is suitable for use in areas such as the Waterberg, which hosts about 40% of South Africa's remaining coal resources and has limited water supplies," says Beukes. The method, which costs about 70% less than wet beneficiation, will also be tested in the Waterberg in the near future. Successful tests have already been conducted at mines in Mpumalanga, which have similar water-infrastructure constraints, he explains. However, the only drawback of dry beneficiation is that it cannot be used to beneficiate export-grade coal, Beukes points out.

<http://www.miningweekly.com/article/dry-coal-beneficiation-trials-successful-but-not-suitable-for-export-coal-2012-08-17>

SwRI gets DoE contract to develop new technology for coal-fired plants **20th August 2012, unattributed, Energy Business Review**

Southwest Research Institute (SwRI), along with its industry partner Thar Energy, has won a contract from the US Department of Energy (DOE) to develop a clean technology for coal-fired plant emissions. Under the contract, SwRI will demonstrate supercritical carbon dioxide (sCO₂) power cycle using pressurized oxy-combustion process, which uses pure oxygen as the primary oxidant instead of air. SwRI's Mechanical Engineering Division program director Dr. Klaus Brun said the new power cycle is expected to improve the overall system efficiency while generating an output stream of sequestration-ready CO₂ at pipeline pressures. "The power cycle leverages developments in pressurized oxy-combustion technology, an SwRI-developed cryogenic CO₂ compression scheme and recent developments in supercritical CO₂ power cycles," Brun said. According to Brun, the two key objectives of the \$0.7m contract are to achieve 90% CO₂ removal without going beyond 35% of increase in the electricity costs; and to attain improved overall plant efficiencies with 90% CO₂ capture and 2,200 psi compression.

<http://fossilfuel.energy-business-review.com/news/swri-gets-us-doe-contract-to-develop-new-technology-for-coal-fired-plants-200812>

Cooled coal emissions to clean air & lower health & climate-change costs **28th August 2012, unattributed, environmentalresearchweb**

Refrigerating coal-plant emissions would reduce levels of dangerous chemicals that pour into the air – including carbon dioxide by more than 90 percent – at a cost of 25 percent efficiency, according to a simple math-driven formula designed by a team of University of Oregon physicists. The computations for such a system, prepared on an electronic spreadsheet, appeared in Physical Review E, a journal of the American Physical Society. In a separate, unpublished and preliminary economic analysis, the scientists argue that the "energy penalty" would raise electricity costs by about a quarter but also reap huge societal benefits through subsequent reductions of health-care and climate-change costs associated with burning coal. An energy penalty is the reduction of electricity available for sale to consumers if plants used the same amounts of coal to maintain electrical output while using a cryogenic cleanup. "The cryogenic treatment of flue gasses from pulverized coal plant is possible, and I think affordable, especially with respect to the total societal costs of burning coal," said UO physicist Russell J. Donnelly, whose research team was funded by the U.S. Department of Energy for the work detailed in the published journal article.

<http://environmentalresearchweb.org/cws/article/yournews/50638>

US DoE invests \$5.6 million in methane hydrates research **31st August 2012, Herman Wang, Platts**

The US Department of Energy on Friday announced it is investing \$5.6 million in 14 research projects on methane hydrates, which the agency says could be a major source of natural gas. Methane hydrates are ice-lattice structures with frozen natural gas, and they are found worldwide, including under the Arctic permafrost and on the ocean floor. DoE said the projects announced Friday would complement a successful, first-of-its-kind test earlier this year that was able to extract a steady flow of natural gas from methane hydrates on the North Slope of Alaska.

<http://www.platts.com/RSSFeedDetailedNews/RSSFeed/NaturalGas/6604245>

Government invest £9m in low carbon energy storage **5th September 2012, Miranda Dobson, bdaily**

Government investment of £9m into energy storage research and development has been announced alongside a further £4m from industry investors. A specialist site called the UK Energy Storage R&D Centre will advance electric and hybrid vehicle batteries at the High Value Manufacturing Catapult from the University of Warwick. The market for electric and hybrid batteries is estimated to be worth £250m for the UK by 2020, and this investment is the most recent in a series of funding over the next four years behind low carbon and electric vehicles. Business Minister Michael Fallon said: "[This] will put the UK in a much stronger, competitive position to capitalise on a growing worldwide market for low carbon vehicles, alongside other

world leaders in the field including the United States, Japan and Germany. "This £13 million facility will help accelerate the development of battery cells for the next generation of vehicles, is a vital investment in the future of the automotive sector. It complements over £5.5 billion that global vehicle manufacturers have committed to UK projects in the last 18 months." Research carried out in electrochemistry at the West Midlands base will focus on developing a new generation of batteries that will be more economic and have heightened stability, and maintain a higher energy density level than current batteries on the market. The centre will concentrate on battery research immediately but has the capabilities to research storage for other transport types including off road, commercial, rail and marine vehicles, as well as fuel cell technology. David Bott, Director of Innovation Programmes at the Technology Strategy Board said: "The establishment of this centre will help to increase the global competitiveness of the UK's emerging Low Carbon Vehicle's industry. "By locating the centre within the new High Value Manufacturing Catapult, it will be possible to draw on capabilities that have already been developed in energy storage and help to speed up the commercialisation of new products. The benefits that this centre brings will also spill over into wider markets." Government investment of £9m into **energy storage research** and development has been announced alongside a further £4m from industry investors. A specialist site called the UK **Energy Storage R&D Centre** will advance electric and hybrid vehicle batteries <http://bdaily.co.uk/environment/05-09-2012/government-invest-9m-in-low-carbon-energy-storage/>

Wind could meet all of the world's energy needs, says research

13th September 2012, unattributed, Energy Efficiency News

There is enough wind to easily meet all of the world's **energy** needs, according to new US **research**. Writing in the peer-reviewed academic journal Nature Climate Change, Kate Marvel of Lawrence Livermore National Laboratory along with Ben Kravitz and Ken Caldeira of the Carnegie Institute estimate that more than 400 TW of power could be extracted from surface winds. Currently, the world uses around 18 TW of power, so surface wind alone – which is harnessed by both on- and offshore turbines – could meet future needs 20 times over. The research also looked at high-altitude winds, which could be harnessed in the future via technology bringing together turbines and kites. These winds could provide some 1800 TW of power – 100 times current demand.

<http://www.energyefficiencynews.com/articles/i/5366/?cid=3>

Carbon capture research focuses on absorbents

13th September 2012, Sam Shead, The Engineer

Research on carbon capture in the UK is focusing on the abilities of various carbon-based materials to absorb the carbon dioxide from flue gases. The need to reduce carbon emissions in a bid to negate the impacts of climate change are only too apparent but there has yet to be a single country that has been able to neglect the carbon-emitting fossil fuels the world has become so dependent on. Renewable energy sources are out there in abundance but the truth of the matter is they aren't yet efficient enough to compete with relatively low priced fossil fuels. According to a report published by the Royal Academy of Engineering, the price of producing electricity from a gas power station is 2.2p per kWh, while the price of electricity from an offshore wind farm is 7.2p per kWh.

<http://www.theengineer.co.uk/sectors/energy-and-environment/in-depth/carbon-capture-research-focuses-on-absorbents/1013887.article>

Nuclear fusion – your time has come

16th September 2012, Jeff Forshaw, The Guardian

In the words of Professor Chris Llewellyn Smith, director of **energy research** at Oxford University, "with enough money we could probably build a fusion reactor now but it would not be economical. The challenge is to make it reliable and competitive. A fusion reactor called [Iter](#) is currently under construction in France and is due to start operation in 2020. Its principal goal is to determine the viability of fusion at the scale of a power station. Success is widely

anticipated and there are already plans afoot to build a "demonstration power plant" to start operating in the 2030s.

<http://www.guardian.co.uk/science/2012/sep/16/nuclear-fusion-iter-jet-forshaw?newsfeed=true>

UK-China collaboration to tackle climate change and energy security

18th September 2012, David Thorpe, Energy and Env. & Mgmt (EAEM) Magazine

The UK and China have formed a strategic alliance aimed at understanding how, together, they can best tackle climate change and ensure energy security. Similar projects are also ongoing between the UK and 12 other countries and involve the development of climate and energy modeling software. The arrangement with China is built upon collaboration between British officials and China's Energy Research Institute (ERI) to adapt the UK government's [2050 Pathways Analysis Calculator](#) to their own particular needs. This online tool, originally developed by David Mackay, chief scientific adviser at DECC, allows individuals and organisations to explore the energy-related risks and trade-offs of different actions into the future; for example, the balance between energy efficiency and building power generation capacity, and the implications of deploying different types of plant from new nuclear to wind power.

<http://www.eaem.co.uk/news/uk-china-collaboration-tackle-climate-change-and-energy-security>

Jobs hopes raised with £3m offshore energy research centre plan

21st September 2012, Sandy McKenzie, Gazette Live

A £3.3M offshore **energy research** centre planned for Middlesbrough could be a catalyst for hundreds of jobs. Middlesbrough Council is considering plans to develop a Centre for Offshore Renewable Energy at the proposed Teesside Advanced Manufacturing A £3.3M offshore energy research centre planned for Middlesbrough could be a catalyst for hundreds of jobs. Middlesbrough Council is considering plans to develop a Centre for Offshore Renewable Energy at the proposed Teesside Advanced Manufacturing Park (TAMP) on the South West Ironmasters site. The centre will directly create about 20 engineering jobs while a further 200 production jobs could be created by firms attracted to the site. The hope is that the centre will drive forward the development of TAMP.

<http://www.gazettelive.co.uk/news/teesside-news/2012/09/21/jobs-hopes-raised-with-3m-offshore-energy-research-centre-plan-84229-31879798/>

Atmospheric aerosol climate caution

1st October 2012, Science Daily

Carbon dioxide is not the only problem we must address if we are to understand and solve the problem of climate change. According to research published this month in the International Journal of Global Warming, we as yet do not understand adequately the role played by aerosols, clouds and their interaction and must take related processes into account before considering any large-scale geo-engineering.

<http://www.sciencedaily.com/releases/2012/10/121001141140.htm>

Finland plans to phase out coal use in energy production by 2025

2nd October 2012, Sara Gates, Huffington Post

If all goes according to plan, Finland will become the [first European country to stop using coal](#), with a goal to [phase out the energy source by 2025](#). Currently, Finland imports all of its coal from nearby countries such as Russia and Poland. Annual import volumes range from [less than 3 million to 9 million tons](#), depending on the rainy or dry climate, according to the [Finnish Coal Info](#) association's website. Eliminating coal usage could help the country save millions of euros a year, since coal imports cost Finland between [70 million to more than 300 million euros](#) (\$91 million to more than \$388 million) annually, according to Finnish Coal Info. Instead of utilizing the fossil fuel, the country intends to increase sources of renewable energy -- many of which are government subsidized.

http://www.huffingtonpost.com/2012/10/02/finland-coal-use-phase-out-2025-energy_n_1932444.html?utm_hp_ref=green

Methane emissions can be traced back to Roman times

3rd October 2012, Science Daily

Emissions of the greenhouse gas methane into the atmosphere can be traced back thousands of years in the Greenland ice sheet. Using special analytical methods, researchers from the Niels Bohr Institute, among others, have determined how much methane originates from natural sources and how much is due to human activity. The results go all the way back to Roman times and up to the present, where more than half of the emissions are now human-made.

<http://www.sciencedaily.com/releases/2012/10/121003132322.htm>

Energy crisis is going to be expensive and paid for by householders

5th October 2012, Damian Reece, Daily Telegraph

When Ed Milliband published Labour's **energy** white paper in July 2009 he made it clear to Cabinet colleagues, and anyone else who was listening, that the priority was transforming Britain into a low carbon nation.

The document said the threat to our security of supply was "low" and in response to that assessment this column wrote: "It might be today but by 2012, for instance, it could easily be much higher." Today, Ofgem confirmed that the risk is indeed much higher and warned that the amount of spare generation capacity on the system could fall from 14pc to 4pc in 2015-16. In other words we have arrived at the "cliff face" Ofgem had previously identified, back in its 2009 Project Discovery analysis, about 18 months earlier than feared. Any sustained economic recovery during that period would force demand up to a level where the system could not cope and the lights, production lines, computers and the like would have to be switched off and power rationed. Ofgem had warned this might happen but had assumed that by now we would be well on track to deliver new nuclear, wind power, biomass plants and clean coal to make any 2016 energy gap a brief and temporary affair. None of the above are anywhere near being delivered. This is in part because investment has dried up due to the credit crunch and uncertainty over the [eurozone crisis](#) and in part because of policy dither and Whitehall delay. So the energy gap is now much bigger, stretching out for many years at least until the early 2020s.

The solution to this much wider energy gap is the same as it was when it was narrow and more manageable – it's just going to be, predictably, more expensive. The answer is gas, lots of it, paid for by higher consumer bills rather than direct, tax-funded subsidies. The uneconomic business of running gas-fired power stations will have to be made to pay and companies, such as Centrica, will have to be persuaded to bring stations out of their current mothballed state. Supplying them with gas to burn is another challenge as global demand pulls capacity away. The Coalition has legislation planned to meet this emergency, to be unveiled next month. Let's hope it's in better shape than its policies for running the railways.

<http://www.telegraph.co.uk/finance/comment/damianreece/9590389/Energy-crisis-is-going-to-be-expensive...-and-paid-for-by-householders.html>

Blackouts possible as coal power stations go offline early

5th October 2012, Terry Macalister, Guardian

Britain faces the possibility of power blackouts and even higher electricity prices within three years as a result of coal-fired and other polluting power stations being phased out more quickly than expected. The warning, in a report by the energy regulator, Ofgem, could embolden the government to trigger an early "dash for gas" which critics fear would mean higher carbon pollution for decades to come. Ofgem believes that the spare generating capacity available to cope with peaks and troughs in power demand will fall from the current level of 14% to just 4% as early as 2015. "There could be insufficient power within three years of around 29,600 megawatt hours, equivalent to the annual demand of approximately 9,000 households," says the Ofgem report. It also mentions the possibility of blackouts. Ofgem pointed out that National Grid, which runs the pylons and pipes and co-authored the report, can safeguard the

position of householders if all else fails by cutting power to businesses and industrial customers under the terms of special contracts.

<http://www.guardian.co.uk/business/2012/oct/05/blackouts-coal-power-stations-ofgem>

“Fast moving” on CO2 capture

10th October 2012, Andrew Herndon, Bloomberg

China, which is developing more than half of the carbon-capture and storage projects announced within the last year, is quickly becoming a leader in deployment of systems to cut emissions from power plants, according to the Global CCS Institute.

<http://www.businessweek.com/news/2012-10-10/china-fastest-moving-on-co2-capture-global-ccs-institute-says>

Nottingham gets first hydrogen vehicle refuelling station

15th October 2012, unattributed, The Engineer

A new sustainable **energy research** facility at Nottingham University will provide the city's first hydrogen vehicle refuelling station. The £9m Energy Technologies Building on the University of Nottingham Innovation Park will launch on Wednesday, when a hydrogen-powered black cab and transit van will be the first vehicles to officially use the new filling station.

<http://www.theengineer.co.uk/sectors/energy-and-environment/news/nottingham-gets-first-hydrogen-vehicle-refuelling-station/1014264.article>

FuelCell Energy carbon capture project advances to phase II

17th October 2012, unattributed, globe newswire

FuelCell **Energy** will continue **research** that evaluates the use of Direct FuelCells® (DFC®) to efficiently and cost effectively separate carbon dioxide (CO2) from the emissions of **coal** fired power plants. This three and half year research project that began in late 2011 involves system design, cost analysis, and long-term testing of a Direct FuelCell® (DFC®) stack, with funding occurring in stages upon reaching certain progress milestones. Approximately \$0.8 million from the total DOE award of \$3 million was authorized to continue the development of the carbon capture system development based on DFC technology. This funding authorization follows favorable results achieved from the technology and economic analysis conducted in the initial stage of research.

<http://globenewswire.com/news-release/2012/10/16/497418/10008498/en/FuelCell-Energy-Carbon-Capture-Project-Advances-Into-Phase-II.html>

Carbon Energy signs UCG technology deal with China's Shanxi Coal

19th October 2012, Bevis Yeo, Proactive Investors Australia

Carbon **Energy** (ASX: CNX) has signed its first international technology license agreement, making it Chinese **coal** giant Shanxi **Coal** Transportation and Sales Group's exclusive underground **coal** gasification technology partner for the Shanxi Province. Shanxi Coal is China's second largest coal company with coal rights across the Shanxi Province having produced about 40 million tonnes of coal in 2011. It also transported 350 million tonnes and traded 250 million tonnes of coal in the same year. [Carbon Energy](#) will receive a technology fee of US\$10 million, a commercial schedule of rates for technical and engineering services it provides and a royalty stream.

<http://www.proactiveinvestors.com.au/companies/news/34667/carbon-energy-signs-ucg-technology-deal-with-chinas-shanxi-coal-34667.html>

Supercritical geothermal plant cuts energy emissions

22nd October 2012, Kate Ravillious, environmentalresearchweb

However, producing and transporting supercritical carbon dioxide requires **energy**, and it is not clear if the **energy** costs will sufficiently outweigh the benefits of the geothermal **energy** produced. To address this question Frank and his colleagues did a life-cycle analysis of a theoretical supercritical carbon-dioxide geothermal power plant. They considered the energy

costs involved, including mining coal for the coal-fired power plant, building both the coal and geothermal power stations, and producing the supercritical carbon dioxide. Assuming no leakage of carbon dioxide to the surface, and capture of 5% of the flow of supercritical carbon dioxide in the rock formation, the team calculated that a combined coal-fired plant and supercritical carbon-dioxide-driven geothermal plant would produce just 15% of the greenhouse-gas emissions produced by a stand-alone coal-fired plant generating the same overall amount of electrical energy.

<http://environmentalresearchweb.org/cws/article/news/51235>

An innovation that uses air to produce power

26th October 2012, unattributed, Daily News & Analysis

The Gujarat Energy Research and Management Institute (GERMI) has developed an instrument to convert compressed air into high voltage electricity. The instrument developed by a second year mechanical engineering student of Kanchipuram, Siddharth Machana, along with principal research scientist at the institute Omkar Jani, is expected to be highly cost-effective and more environment friendly than conventional batteries. "This is just a prototype. We are working on how to produce high volume of electricity from it," said Jani at a meet held to showcase the achievements of the institute. The institute has applied for a patent for this instrument. This is among the five innovations for which they have applied for a patent. Jani, however, clarified that this was not the first attempt in the world to convert compressed air to high voltage electricity. "But this is the first to use a unique combination of compressed air and spring to produce the energy with minimum loss," he said.

http://www.dnaindia.com/india/report_an-innovation-that-uses-air-to-produce-power_1756494

US shale gas drives up coal exports

26th October 2012, Science Daily

A report by researchers at The University of Manchester has concluded that whilst the US is burning less coal due to shale gas production, millions of tonnes of unused coal are being exported to the UK, Europe and Asia. As a result, the emissions benefits of switching fuels are overstated. US CO₂ emissions from domestic energy have declined by 8.6% since a peak in 2005, the equivalent of 1.4% per year. However, the researchers warn that more than half of the recent emissions reductions in the power sector may be displaced overseas by the trade in coal.

<http://www.sciencedaily.com/releases/2012/10/121029082223.htm>

Big coal is putting climate change targets hopelessly out of reach

29th October 2012, Fiona Harvey, Business Insider

Cheap **coal** has flooded Europe, driving up consumption. A report from the Tyndall Centre for Climate Change **Research**, at the University of Manchester, published recently, found carbon dioxide emissions from domestic **energy** in the US fell by 8.6% from 2005, the equivalent of 1.4% per year. But more than half of the power sector emissions were displaced overseas by the trade in coal. John Broderick, lead author on the Tyndall Centre report, said predictions of a golden age of gas created by fracking technology were misplaced. He warned: "We must seriously consider whether a so-called golden age would be little more than a gilded cage, locking us into a high-carbon future."

<http://www.businessinsider.com/big-coal-is-putting-climate-targets-hopelessly-out-of-reach-2012-10>

Renewable energy will overtake nuclear power by 2018, research says

30th October 2012, Fiona Harvey, The Guardian

Renewable **energy** capacity will overtake nuclear power in the UK by 2018, if current rates of growth continue, and will provide enough power for one in 10 British homes by 2015, according to new **research**. The amount of electricity supplied by [wind energy](#) alone is up by a quarter since 2010, in a surprisingly good year for the [renewables industry](#). While the government has notably cooled on [wind power](#) – more than 100 Tory MPs signed a statement this year opposing

new windfarms, and the chancellor of the exchequer, George Osborne, has queried the future of subsidies – the industry has continued to grow, with investment in offshore wind up by about 60% to £1.5bn in the past year. Planning approvals for onshore windfarms also rose, up by about half, to reach a record level, according to the trade association [Renewable UK](#).
<http://www.guardian.co.uk/environment/2012/oct/30/renewable-energy-nuclear-power>

The man who would stop hurricanes with car tyres

4th November 2012, John Vidal, The Guardian

One of Britain's leading marine engineers, Stephen Salter, emeritus professor of [engineering](#) design at Edinburgh university and a global pioneer of wave power research, has patented with Microsoft billionaires [Bill Gates](#) and Nathan Myhrvold the idea of using thousands of tyres lashed together to support giant plastic tubes which extend 100m deep into the ocean. Wave action on the ocean surface would force warm surface water down into the deeper ocean. If non-return valves were used, he says, the result would be to mix the waters and cool the surface temperature of the ocean to under 26.5C, the critical temperature at which [hurricanes](#) form. According to Salter, who has written to the government's chief scientific officer setting out his scheme, harnessing energy from the waves to cool the surface temperature of the ocean makes ecological sense. The naturally working pumps would be located in "hurricane alley", the warm corridor in the Atlantic through which the most damaging storms typically develop and pass. Salter claims that the hydrological problems have been solved but that research funding is urgently needed. "If you can cool the sea surface, you would calm the hurricanes. I estimate you would need about 150-450 of these structures. They would drift around and send out radar signals so that no one would collide with them," he said.

<http://www.guardian.co.uk/technology/2012/nov/04/stephen-salter-tyre-hurricane-sandy>

Capturing carbon with clever trapdoors

7th November 2012, Science Daily

The quest to capture carbon dioxide is crucial to a cleaner future and once captured, carbon dioxide can be compressed and safely stored. It is also a useful source for chemical manufacture. However, current processes are inefficient and require several stages of refining and extraction before a pure form of carbon dioxide is produced. Engineers have developed a novel method of collecting and storing carbon dioxide that will reduce the cost of separating and storing carbon dioxide.

<http://www.sciencedaily.com/releases/2012/11/121108104430.htm>

Alaska ice tested as possible new energy source

11th November 2012, unattributed, Fox News

The U.S. Department of Energy and industry partners over two winters drilled into a reservoir of methane hydrate, which looks like ice but burns like a candle if a match warms its molecules. There is little need now for methane, the main ingredient of natural gas. With the boom in production from hydraulic fracturing, the United States is awash in natural gas for the near future and is considering exporting it, but the DOE wants to be ready with methane if there's a need. "If you wait until you need it, and then you have 20 years of **research** to do, that's not a good plan," said Ray Boswell, technology manager for methane hydrates within the DOE's National **Energy** Technology Laboratory.

<http://www.foxnews.com/science/2012/11/11/alaska-ice-tested-as-possible-new-energy-source/>

Energy efficiency could replace 22 UK power stations

12th November 2012, Jessica Shackleton, The Guardian

Government launches wide-ranging energy efficiency strategy including £39m pot for research into changing behaviour. The government has unveiled a wide-ranging package of new efficiency measures that could cut the UK's energy use by 11% by 2020, while providing a major boost to the economy and living standards. The Department of Energy and Climate Change (DECC) today unveiled the UK's [first national Energy Efficiency Strategy](#), which aims to kick start "a revolution" in UK energy efficiency across all sectors, including housing manufacturing,

and transport. The strategy identifies four significant barriers that have consistently hampered energy efficiency improvements: an underdeveloped market; lack of information on energy efficiency; misaligned financial incentives, which mean the person who is responsible for making improvements does not always receive the benefits of their actions; and the hassle of installing efficiency measures. The document argues that domestic energy efficiency is effectively targeted by existing initiatives, such as the Green Deal, but warns there is a greater need for policies that drive improvements in commercial, industrial and public sector energy efficiency.

<http://www.guardian.co.uk/environment/2012/nov/12/energy-efficiency-uk-close-power-stations>

Funding support for 5 new research centres to focus on energy efficiency 12th November 2012, unattributed, Click Green

One of the UK **Research Councils'** biggest investments in **research** to support **energy efficiency** policy and contribute to cutting carbon use and greenhouse gas emissions was unveiled today. Five new End Use Energy Demand (EUED) research centres, that will look into the complexities of energy use across society and how energy can be both saved and used more efficiently, are to receive over £26 million funding from two research councils, the Engineering and Physical Sciences Research Council (EPSRC) and the Economic and Social Research Council (ESRC), and a further £13 million from industrial partners.

<http://www.clickgreen.org.uk/news/national-news/123739-funding-support-for-5-new-research-centres-to-focus-on-energy-efficiency.html>

Methane from waste could power homes thanks to £4 million research 12th November 2012, unattributed, environmentalresearchweb

The UK could gain an edge in the race to become the most efficient converters of waste into energy when a £4million research project comes to fruition. Experts at the University of Exeter have been awarded the funding for groundbreaking research into creating biomethane, which can be burned to produce energy. It is one of six large projects across the country to receive a share of a £20 million cash pot announced by Chancellor George Osborne yesterday. The grants are designed to revolutionise the application of synthetic biology in bio-industries. The funding from the Biotechnical and Biological Sciences Research Council (BBSRC) has been awarded to synthetic biology projects which could ultimately help to promote economic growth.

<http://environmentalresearchweb.org/cws/article/yournews/51463>

Methane leaking from coal seam gas field, testing shows 14th November 2012, Ben Cubby, Sydney Morning Herald

Vast amounts of methane appear to be leaking undetected from Australia's biggest coal seam gas field, according to world-first research that undercuts claims by the gas industry. Testing inside the Tara gas field, near Condamine on Queensland's Western Downs, found some greenhouse gas levels over three times higher than nearby districts, according to the study by researchers at Southern Cross University. The report quotes "The study has potential national consequences because last week's energy white paper forecast a massive expansion of Australian coal seam gas drilling, and called for environmental objections to be removed to make large-scale gas extraction easier". Methane, carbon dioxide and other gases appear to be leaking up through the soil and bubbling up through rivers at an astonishing rate, the researchers said. "The concentrations here are higher than any measured in gas fields anywhere else that I can think of, including in Russia," said Damien Maher, a biochemist who helped conduct the tests. "The extent of these enriched concentrations is significant."

<http://www.smh.com.au/environment/climate-change/methane-leaking-from-coal-seam-gas-field-testing-shows-20121114-29c9m.html>

Tapping into carbon dioxide storage potential of mine waste 15th November 2012, Science Daily

It's time to place an economic value the greenhouse gas-trapping potential of mine waste and start making money from it, says mining engineer and geologist Michael Hitch of the University

of British Columbia's (UBC) Norman B. Keevil Institute of Mining Engineering. Hitch studies the value of mine waste rock for its CO₂-sequestration potential, or "SP." He says mining companies across Canada will, in future, be able to offset CO₂ emissions with so-named "SP rock," and within 25 years could even be selling emissions credits.

<http://www.sciencedaily.com/releases/2012/11/121115133314.htm>

Clean coal stalwart re-awarded research chair

16th November 2012, Leandi Kolver, Creamer Media's Mining Weekly

Falcon held the chair for the last five years while it was still run by the Department of Science and Technology and the South African National **Energy Research** Institute. "Recently, the chairs were handed to the NRF to join the South African Research Chairs Initiative (SARChI) suite of chairs and I was, in effect, re-awarded this chair under the SARChI umbrella," says Falcon. The chair entails being responsible for research in clean coal technology, which includes undertaking own research and supervising postgraduate research students as well as lecturing.

<http://www.miningweekly.com/article/research-in-clean-coal-technology-important-for-sa-future-2012-11-16>

First standard for geologic storage of carbon dioxide

16th November 2012, Science Daily

Scientists have announced the first bi-national carbon capture and storage (CCS) standard for the geologic storage of carbon dioxide (CO₂) for Canada and the United. CSA Group, a leading developer of standards, codes and training programs, and the International Performance Assessment Centre for Geologic Storage of Carbon Dioxide (IPAC-CO₂ Research Inc.), an environmental non-government organization (ENGO), announced the world's first bi-national carbon capture and storage (CCS) standard for the geologic storage of carbon dioxide (CO₂) for Canada and the United States. The CSA Z741 Geological storage of carbon dioxide standard is a bi-national Canada-USA consensus standard, developed with a technical committee of more than 30 professionals representing industry, regulators, researchers and NGOs from both sides of the border. The genesis of the standard was a seed document developed by IPAC-CO₂ based on their research. It is intended that the new standard will also be used as a basis for the international CCS standards through the International Organization for Standardization (ISO). *CSA Z741 Geological storage of carbon dioxide* standard provides essential guidelines for regulators, industry and others around the world involved with scientific and commercial CCS projects.

<http://www.sciencedaily.com/releases/2012/11/121116161023.htm>

CCS will be cost competitive within a decade

22nd November 2012, Outlaw.com –

Carbon capture and storage technology is on track to compete with other forms of low carbon energy generation by the 2020s, according to a Government-commissioned report. The interim [report](#) (70-page / 1MB PDF) from the CCS Cost Reduction Task Force was published as the Government announced the winners of a competition for £20 million worth of funding for innovative small-scale projects to drive down the costs of the fledgling technology. In addition, the newly-established CCS Research Centre announced that it was setting aside another £1.8 million in Government funding for university-led CCS research projects.

<http://www.out-law.com/en/articles/2012/november/ccs-will-be-cost-competitive-within-a-decade-according-to-government-commissioned-report/>

Electricity from the marshes

23rd November 2012, Science Daily

An unexpected source of new, clean energy has been found: the Plant-Microbial Fuel Cell that can generate electricity from the natural interaction between living plant roots and soil bacteria. The technique already works on a small scale and will soon be applied in larger marshland areas throughout the world. On 23 November, researcher Marjolein Helder will defend her PhD research on generating electricity via plants at Wageningen University, part of

Wageningen UR. She has also founded a spin-off company called Plant-e with her colleague David Strik. The Plant-Microbial Fuel Cell draws electricity from the soil while the plants continue to grow. Plants produce organic material via photosynthesis. The roots excrete up to 70 % of this material (unused) into the soil. Bacteria around the roots break down the organic residue, thereby forming a new source of electricity. The degradation processes causes electrons to be released. Marjolein Helder and her colleagues placed an electrode close to the bacteria to absorb these electrons and generate electricity via the potential difference thus created.

<http://www.sciencedaily.com/releases/2012/11/121123092129.htm>

Commissioning 28.3D Loesche mill for RWE Power 23rd November 2012, unattributed, International Mining

This new vertical roller mill will cover the increasing demand for lignite dust. It was a challenging major project, completed in just 13 months of construction work. The milling plant increases production by 500,000 t. Loesche had the contract for the delivery and assembly of the coal mill, from the upper edge of the foundations. Apart from the technology and the complete process equipment it also included the preparation of the complete mill building as the general contractor. Loesche has numerous references as well considerable experience and know-how in the dry-grinding process of solid fuels and the milling technology with all its associated components.

<http://www.im-mining.com/2012/11/23/commissioning-283d-loesche-mill-for-rwe-power/>

Milestone along way to CO₂-free power plants 27th November 2012, Science Daily

A new method for capturing carbon dioxide (CO₂) emitted by power plants could reduce their CO₂ emissions by more than 90%, while utilizing less energy and incurring less expense than former approaches. The TU Darmstadt, which operates one of the world's largest pilot systems for capturing CO₂, has been investigating the "carbonate-looping" method for the past four years, with success. Yet another major benefit of the method is that it may be retrofitted to existing power plants. The TU Darmstadt's Institute for Energy Systems and Technology has been conducting pilot-scale investigations of various innovative methods for CO₂-capture. Means are being developed for virtually totally avoiding CO₂-emissions, while keeping energy inputs and operating costs extremely low. In conjunction with that work, the "carbonate-looping" method has emerged as a particularly promising approach that the Darmstadt researchers have meanwhile studied for more than 1,000 operational hours. The carbonate-looping method involves initially employing naturally occurring limestone for binding CO₂ contained in power-plant flue gases in a first-stage reactor. The now pure CO₂ is then reliberated in a second-stage reactor and may subsequently be further processed or stored.

<http://www.sciencedaily.com/releases/2012/11/121127094001.htm>

Cranfield opens clean energy research centre 29th November 2012, Brian Tingham, Plant Engineer

Cranfield University's new £2 million energy laboratory was opened on Tuesday 27 November (2012) by Jonathan Holyoak, head of policy for the Office of Carbon Capture and Storage. It comes just one week after publication of a study by the Carbon Capture and Storage (CCS) Cost Reduction Task Force, which showed significant potential for the CCS industry, likely to bring investment and jobs across the whole energy sector. The laboratory is equipped with a range of near industrial-scale equipment for R&D on clean and renewable energy technologies, and supports research into CCS, clean fossil fuel technologies, bioenergy and energy-from-waste.

<http://www.plantengineer.org.uk/article/46510/Cranfield-opens-clean-energy-research-centre.aspx>

EU parliament budgets €6 billion for clean energy **29th November 2012, Joanna Schroeder, Domestic Fuel**

The European Parliament's Energy and Research Committee (ITRE) voted to allocate 6 billion Euros to clean energy research. This is nearly two-thirds of the entire energy research budget, of 80 billion Euros, to cover renewables, energy efficiency, smart grids, and storage. "MEPs have understood how crucial wind energy and other renewables are to the EU's economic growth, technology leadership, fighting climate change, and that sufficient R&D funding is essential to further their development in line with the [EU's climate and renewable energy priorities](#)," noted Vilma Radvilaite, Regulatory Affairs Advisor at the [European Wind Energy Association](#) (EWEA). "With 75% of its energy funding going to renewables, energy efficiency, smart grid and storage technologies and an additional 15% going to the Intelligent Energy Europe Programme, Horizon 2020 gives a real boost to green growth," she added. The ITRE Committee also made a specific commitment to the development of wind energy research with the agreement that they would create a separate budget line for wind energy and other [Strategic Energy Technology Plan](#) technologies. The Horizon 2020 R&D program is set to run between 2014-2020 but needs to be presented to the European Council for approval.

<http://domesticfuel.com/2012/11/29/eu-parliament-budgets-e6-billion-for-clean-energy/>

Geoscientists cite "critical need" for research to unleash promising energy resources

30th November 2012, Science Daily

Developers of renewable energy and shale gas must overcome fundamental geological and environmental challenges if these promising energy sources are to reach their full potential, according to a trio of leading geoscientists. Their findings will be presented on Dec. 4 at the fall meeting of the American Geophysical Union (AGU) in San Francisco. "There is a critical need for scientists to address basic questions that have hindered the development of emerging energy resources, including geothermal, wind, solar and natural gas, from underground shale formations," said Mark Zoback, a professor of geophysics at Stanford University. "In this talk we present, from a university perspective, a few examples of fundamental research needs related to improved energy and resource recovery."

<http://www.sciencedaily.com/releases/2012/11/121130222247.htm>

Findhorn in £2.3m Heriot-Watt University green energy research

1st December 2012, unattributed, BBC News

The Moray eco-village of Findhorn is to play a key role in £2.3m green **energy research** led by Edinburgh's Heriot-Watt University. The researchers want to develop a way of synchronising the demand for locally-generated energy on a community scale.

<http://www.bbc.co.uk/news/uk-scotland-north-east-orkney-shetland-20556034>

The Energy Bill – Winds of change

1st December 2012, unattributed, The Economist

The government unveils an ambitious, and expensive, plan to make the power sector greener. NO ONE should accuse David Cameron's coalition government of timidity: the ambitions attached to its new energy bill, unveiled as *The Economist* went to press, are vast. The bill is designed to remake Britain's electricity market and unleash some £110 billion (\$176 billion) of investment into new energy infrastructure, particularly the low-carbon kind.

A revolution is required. Around a fifth of Britain's electricity-generating capacity will shut over the next decade, including a lot of old nuclear and dirty coal-fired power stations. Ofgem, the energy industry's regulator, has warned of possible power cuts by 2015. Replacing capacity on this scale would be daunting even if the country were not heavily indebted and emerging from recession. As an engineering feat, it will be the equivalent of building infrastructure for the London Olympics every two years for a quarter of a century, says John Loughhead of the UK Energy Research Centre. Making matters more difficult, Britain is committed to getting as much as 30% of its electricity from renewable sources by 2020. And renewables are expensive.

To encourage the necessary splurge in wind turbines, solar panels and electricity storage, investors will therefore be guaranteed an attractive, long-term price for the electricity they produce. This will require annual subsidies rising to £7.6 billion (in today's money) by 2020, which consumers will cover in their electricity bills. This is over three times the current renewables subsidy: it is expected to raise the average household bill by at least £95 a year. In tough times, this is controversial. Edward Davey, the energy secretary, claims this largesse will prove cost-effective in the longer term, as the price of fossil fuels goes up and the cost of renewables comes down.

To encourage that, National Grid, which runs the electricity-transmission network, is due to start auctioning electricity-supply contracts as early as 2017. This competition should start forcing down prices. Bidding would first take place within each technology, perhaps starting with onshore wind, a relatively cheap renewable source on a gusty island. But by the 2020s, it is hoped, such auctions will be held across technologies. "We would be the first country in the world to achieve that," boasts Mr Davey.

Partly because of that novelty, some doubt that the auctions will begin so soon. And meanwhile, big decisions, such as on setting contract prices for renewables and creating incentives for new gas-fired power plants, will lie with the government. That is ominous. Governments—as the EU-mandated renewables target shows—have a penchant for arbitrary goals rather than lowest-cost solutions. "Experience suggests the government will choose badly, be lobbied extensively and will not have enough information," says Guy Newey of Policy Exchange, a think-tank.

A more rational way to encourage investment in low-polluting electricity generation would be to levy a tax on polluters. The EU does so, in effect, through its Emissions Trading System, the world's biggest carbon market. Yet, due to a combination of mismanagement and economic recession, the carbon price on the ETS has been too low to push polluters into cleaner technologies. And even a higher carbon price, or tax, might not drive the necessary innovation, according to new research from E3G, a consultancy. A separate European effort to solve that problem, by throwing money into research and development of technology to capture and store carbon emissions from thermal-power stations, has also failed to show progress. This makes the alternative approach adopted in the new energy bill—picking renewables winners—understandable, even if no less inelegant or costly.

The bill is a clear victory for greens. Yet they have suffered disappointments, too. The independent Committee on Climate Change, which advises the government, recommended that the bill should contain a target to decarbonise Britain's electricity sector by 2030. This is absent, at the urging of George Osborne, the chancellor of the exchequer, who has made little secret of his disdain for the government's expensive environmental policy. But the bill does contain an option to insert a decarbonisation target in 2016, after the next general election. A victory for the opposition Labour Party, which is leading in opinion polls, might well see this taken up.

<http://www.economist.com/news/britain/21567408-government-unveils-ambitious-and-expensive-plan-make-power-sector-greener-winds>

DNA analysis of microbes in a fracking site yields surprises

3rd December 2012, Science Daily

Researchers have made a genetic analysis of the microbes living deep inside a deposit of Marcellus Shale at a hydraulic fracturing, or "fracking," site, and uncovered some surprises. They expected to find many tough microbes suited to extreme environments, such as those that derive from archaea, a domain of single-celled species sometimes found in high-salt environments, volcanoes, or hot springs. Instead, they found very few genetic biomarkers for archaea, and many more for species that derive from bacteria.

<http://www.sciencedaily.com/releases/2012/12/121203145834.htm>

Proliferation warnings on nuclear "Wonder-fuel" thorium

5th December 2012, Science Daily

Thorium is being touted as an ideal fuel for a new generation of nuclear power plants, but new research suggests it may not be as benign as portrayed. The element thorium, which many regard as a potential nuclear "wonder-fuel," could be a greater proliferation threat than previously thought, scientists have warned. Writing in a Comment piece in the new issue of the journal, *Nature*, nuclear energy specialists from four British universities suggest that, although thorium has been promoted as a superior fuel for future nuclear energy generation, it should not be regarded as inherently proliferation resistant. The piece highlights ways in which small quantities of uranium-233, a material useable in nuclear weapons, could be produced covertly from thorium, by chemically separating another isotope, protactinium-233, during its formation.

<http://www.sciencedaily.com/releases/2012/12/121205132246.htm>

New technique finds use for ozone-destroying chemical waste product

6th December 2012, Science Daily

A team of chemists at USC has developed a way to transform a hitherto useless ozone-destroying greenhouse gas that is the byproduct of Teflon manufacture and transform it into reagents for producing pharmaceuticals. Because of the popularity of Teflon, which is used on everything from cooking pans to armor-piercing bullets, there's no shortage of its waste byproduct, fluoroform. Major chemical companies such as DuPont, Arkema and others have huge tanks of it, unable to simply release it because of the potential damage to the environment. Fluoroform has an estimated global warming potential 11,700 times higher than carbon dioxide.

But one man's trash is another man's treasure, and G.K. Surya Prakash -- who has spent decades working with fluorine reagents -- saw the tanks of fluoroform as an untapped opportunity. The team will publish their discovery in a paper entitled "Taming of Fluoroform (CF₃H): Direct Nucleophilic Trifluoromethylation of Si, B, S and C Centers," in the Dec. 7 issue of *Science*.

<http://www.sciencedaily.com/releases/2012/12/121206142023.htm>

Regenerated coal mine site could create 200 hospitality jobs

7th December 2012, Ed Warle, news.caterer.com

Plans are underway to convert a **coal** mine in Wales into a tourist resort which could provide up to 200 hotel jobs, along with a number of other roles within the tourism industry. Coal recovery at the East Pitt open cast mine in the Amman Valley is due to end in 2018, and a planning permission application has already been submitted for the creation of a 120-bed five star hotel, 78 holiday lodges, a water activity centre and a camp site.

<http://news.caterer.com/article/view/hotel/801503026/regenerated-coal-mine-site-could-create-200-hospitality-jobs/>

Vietnam begins building £1.37 billion Mekong Delta power plant

8th December 2012, unattributed, Bloomberg

Vietnam Electricity began building a 28.5 trillion-dong (\$1.37 billion) **coal**-fired electricity plant in the Mekong Delta province of Tra Vinh as the country seeks to reduce its dependence on hydropower. The Duyen Hai 3 power station will have a capacity of 1,244 megawatts, with annual projected output of about 7.8 billion kilowatt-hours, the government said on its website. The plant will use about 3.6 million metric tons of domestic coal a year. Vietnam is seeking to curb reliance on hydropower to avoid shortages during the dry season. By building coal-fired capacity it can take advantage of reserves that have made it Southeast Asia's biggest coal-producing nation after Indonesia. Vietnam's coal output has more than tripled since 2001, BP Plc data show.

<http://www.bloomberg.com/news/2012-12-08/vietnam-begins-building-1-37-billion-mekong-delta-power-plant.html>

Big Pit gets power from solar panels

9th December 2012, unattributed, South Wales Argus

Wales' national coal mining museum is now benefitting from solar energy following the installation of PV panels, which will bring in an income of around £400,000 over the next 25 years. Big Pit has installed 200 photovoltaic solar panels on the roof of the Big Pit museum building in Blaenavon. They have also fitted a further 200 panels to the roof of the National Collection Centre in Nantgarw. The installation, paid for by Amgueddfa Cymru - National Museum Wales' own resources, cost around £70,000.

http://www.southwalesargus.co.uk/news/10096185.Big_Pit_gets_power_from_solar_panels/

UK Coal completes overhaul

10th December 2012, unattributed, Yorkshire Post

Britain's biggest coal producer finished a complicated reshuffle of its business today in a move that safeguards 2,500 jobs. UK Coal, which was renamed Coalfield Resources, has split its operations into two businesses - a mining arm called Mine Holdings and property division Harworth Estates. Ownership of the South Yorkshire-based group has been broken up between the company, a newly established Employee Benefit Trust and the Pension Fund.

<http://www.yorkshirepost.co.uk/business/business-news/uk-coal-completes-overhaul-1-5210431>

Wind & solar power plus with storage could power grid 99.9% of the time

10th December 2012, Science Daily

Renewable energy could fully power a large electric grid 99.9 percent of the time by 2030 at costs comparable to today's electricity expenses, according to new research by the University of Delaware and Delaware Technical Community College. A well-designed combination of wind power, solar power and storage in batteries and fuel cells would nearly always exceed electricity demands while keeping costs low, the scientists found. "These results break the conventional wisdom that renewable energy is too unreliable and expensive," said co-author Willett Kempton, professor in the School of Marine Science and Policy in UD's College of Earth, Ocean, and Environment. "The key is to get the right combination of electricity sources and storage -- which we did by an exhaustive search -- and to calculate costs correctly."

<http://www.sciencedaily.com/releases/2012/12/121210133507.htm>

In-line hydropower system generates power from water pipelines

10th December 2012, Science Daily

Generating electricity from water is not a new thing. Hydro power stations have already sprung up across the world in China, United States and Canada. However, scientists will not stop exploring advanced technologies for further improvement to benefit people's lives. Recently, PolyU's Department of Building Services Engineering and the Water Supplies Department (WSD) of the Hong Kong Special Administrative Region Government have been working together to turn water mains into an alternative source of power. A novel in-line hydropower system generates power from water pipelines. In full operation, an array of in-pipe turbines is expected to save 700kWh of electricity and reduce 560 kg of carbon dioxide emission per year. The novel device consists of an external hydroelectric generator and highly efficient spherical water turbine which dips into flowing water and reclaims residual pressure. When water passes through, the turbine drives a central rotating shaft and a micro generator to produce electricity.

<http://www.sciencedaily.com/releases/2012/12/121210080420.htm>

GE introduces new dust control solutions for coal handling operations

11th December 2012, unattributed, Equities.com

GE (NYSE: GE) today introduced a new line of products in North America designed to maximize the value of **coal** brought into power plants by reducing material losses and mitigating fuel degradation brought about by oxidation. GE's new PowerTreat* portfolio of products includes capabilities to prevent fugitive dust emissions and promotes safe handling

practices. GE made the announcement at this week's POWER-GEN International 2012 trade conference in Orlando, Fla.

<http://www.equities.com/news/headline-story?dt=2012-12-11&val=812924&cat=utility>

China's most environmentally friendly coal power plant starts operation 13th December 2012, unattributed, Power Engineering Magazine

China's largest power producer the Huaneng Group put its demonstration integrated gasification combined cycle (IGCC) power station, the most environmentally friendly coal-fired power station in the country, into operation here on Wednesday. The station, the first of its kind with proprietary intellectual property rights in China, has just 10 percent of a common coal-fired power station's pollutant emissions and is expected to achieve zero carbon dioxide emissions in the future.

<http://www.power-eng.com/news/2012/12/13/china-s-most-environmentally-friendly-coal-fired-power-station-starts-operation.html>

Eskom mulls big biomass co-firing plan in bid to lower coal emissions 14th December 2012, Terence Creamer, Creamer Media's Engineering News

South Africa's State-owned electricity utility Eskom is considering an ambitious plan to begin burning biomass alongside **coal** at some of its power stations, as part of a strategy aimed at lowering the group's sizeable carbon footprint. In 2011/12, the coal-heavy utility produced a material 231.9-million tons of carbon dioxide emissions, while burning 125.21-million tons of coal and selling 224 785 GWh of electricity. Nevertheless, the group has set an objective of reducing its relative emissions between now and 2025 and its absolute emissions by 10% against the existing baseline over the longer term.

<http://www.engineeringnews.co.za/article/eskom-mulls-big-biomass-co-firing-plan-in-bid-to-lower-coal-emissions-2012-12-14>

Fracking gets g-ahead but how much shale gas do we actually have?

16th December 2012, Gary White and Emma Rowley

In what was possibly the least surprising decision ever, the Government last week formally gave the green light for **fracking** to resume in the UK, initiating – at least many hope – our very own shale revolution to rival that seen in the US.

<http://www.telegraph.co.uk/finance/commodities/9748653/Fracking-gets-go-ahead-but-how-much-shale-gas-do-we-actually-have.html>

Coal plant's carbon capture project passes first 100,000-ton milestone

17th December, John Platt, Mother Nature Network

How can we reduce the emissions from the more than 600 coal-fired electric plants in the United States? One method is to try to capture the carbon dioxide emitted by the plants before it enters the atmosphere and then sequester it underground. A new technology designed to do just that went into operation in June 2011 and captured its 100,000th ton of CO₂ this fall, according to a report from [Power Engineering](#) magazine.

<http://www.mnn.com/earth-matters/wilderness-resources/stories/coal-plants-carbon-capture-project-passes-first-100000>

New RFCS coal-related projects started in 2012

Project Number	Project category	Short title	Title	Duration (months)	Start date	Co-ordinator	Total Funding (€)
RFCR-CT-2012-00001	TGC 1	FEATureFACE	Electromagnetic coal face environmental observation and recognition for feats in process optimization and occupational health and safety.	36	01.07.2012	Rheinisch-Westfälische Technische Hochschule, Germany	3,585,251
RFCR-CT-2012-00002	TGC 1	INREQ	Enhanced effectiveness and safety of rescuers involved in high risk activities by designing innovative rescue equipment systems.	36	01.07.2012	Institut Techniki Gorniczej Komag Poland	3,312,628
RFCR-CT-2012-00003	TGC 1	COMEX	Complex mining exploitation: optimizing mine design and reducing the impact on human environment.	36	01.07.2012	Institut National De L'environnement Industriel E France	3,787,333
RFCR-CT-2012-00004	TGC 1	AVENTO	Advance tools for ventilation and methane emissions control.	36	01.07.2012	Asociacion Para La Invest. Y El Desar. Industrial De España	3,268,736
RFCR-CT-2012-00005	TGC 2	NOEMI	Nitrogen oxides emissions minimization through improvement of vertical heat distribution inside heating flues.	42	01.07.2012	Arcelormittal Maizieres Research S.A. France	1,231,394
RFCR-CT-2012-00006	TGC 3	ACCLAIM	Advanced coal chemical-looping combustion, aiming at highest performance.	30	01.07.2012	Chalmers Tekniska Högskola Ab Sweden	3,200,765
RFCR-CT-2012-00007			No data				
RFCR-CT-2012-00008	TGC 3	RECaL	Novel calcium looping CO2 capture process incorporating sorbent reactivation by recarbonation.	36	01.07.2012	Endesa Generacion Sa España	2,697,943
						TOTAL	21,084, 050

Technical Group Coal (TGC) 1 projects:-

Coal mining operation, mine infrastructure and management and unconventional use of coal deposits

Technical Group Coal (TGC) 2 projects:-

Coal preparation, conversion and upgrading

Technical Group Coal (TGC) 3 projects:-

Coal combustion, clean and efficient coal technologies, CO2 capture

CALENDAR OF COAL RESEARCH MEETINGS AND EVENTS

Date	Title	Location	Contact
Wednesday 20 th and Thursday 21 st February 2013	"13th Annual APGTF Workshop: Carbon Capture & Storage - a Showcase of UK Research and Development", Organised by the Advanced Power Generation Technologies Forum, (APGTF) in collaboration with the Coal Research Forum	The IVS Conference Centre, 1, Victoria Street, Westminster, London	Mr. Philip Sharman, Chairman of the APGTF, Tel : 07976-847305 E-mail : philip.sharman@evenlodeassociates.co.uk
Wednesday 10 th April 2013	"The Emissions Control of NOx, SOx and Particulates" Coal Research Forum Annual Meeting and CRF Environment Divisional seminar	Cranfield University, Bedfordshire, UK	Dr. David J.A.McCaffrey Tel : 01242 236973 E mail : mail@coalresearchforum.org And Prof. Trevor Drage Tel : 0115 951 4099 E-mail : trevor.drage@nottingham.ac.uk
Thursday 2 nd May 2013	Combustion Diagnostics, Control, Computational Methods & Process Optimisation Organised by BFRC in collaboration with the Coal Research Forum	University of Kent, Canterbury, UK	To submit a paper or poster for this event, please contact, Mr. Roger Dudiil, Chairman, BFRC E-mail : comms.bfrc@sky.com Tel : 07583-685928 or Dr. Gang Lu, University of Kent E-mail : g.lu@kent.ac.uk Tel : 01227-823706
Thursday 9 th May 2013	Minerals Engineering 2013, organised by the Minerals Engineering Society, (MES), and co-sponsored by the Coal Research Forum, (CRF), and the South Midlands Mining and Minerals Institute, (SMMMI).	Yew Lodge Hotel, Kegworth, East Midlands, UK	To submit a paper for this event, please contact, Mr. Andrew Howells, Secretary of the MES, E-mail : hon.sec.mes@lineone.net Tel : 01909-591787 Mobile : 07510-256626.
12 th to 16 th May, 2013	Clean Coal Technologies Conference (CCT)	Thessaloniki, Greece	See Web link: http://www.cct2013.org/ibis/CCT2013/home
Early October 2013, date to be advised	The 2013 Coal Science Lecture Organised by the Biomass and Fossil Fuel Research Alliance, (BF2RA), with sponsorship from the Coal Research Forum, (CRF), speaker 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.co.uk
Early Autumn 2013, date to be advised	BF2RA Project Review Seminar Organised by the Coal Research Forum in collaboration with the Biomass and Fossil Fuel Research Alliance, (BF2RA).	Venue to be advised	Dr. David J.A.McCaffrey Secretary of the Coal Research Forum Tel : 01242-236973 E mail : mail@coalresearchforum.org