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NEWSLETTER

of the Coal Research Forum

EDITOR'S MUSINGS:

Well the dust is beginning to settle now but is the picture any clearer? Not from where I am standing and no, it wasn't a nightmare – it really did happen. What am I talking about – there can only be one thing - BREXIT. I know we all thought the outcome might be close but I am sure few of us expected that. I am struggling to find one positive benefit that this has given us either now or even in two years from now. It is also remarkable that the champions of BREXIT have now largely disappeared from public view. Whilst there are a number of issues that concern me, the one that makes me particular worried, and I guess others who read this, is continuing funding for research. What will happen to it and how will the UK universities cope without it? Some uncertainty, at least in the short term, has been dispelled by a statement from the chancellor that for two years the UK taxpayer will foot the bill for existing, or about to start, EU projects. The depressed value of the pound against the euro will also make the cost of these projects more expensive for the UK government to fund. I will concede that it is a step in the right direction but it clearly does not address the longer term. I simply cannot believe that high value, multinational projects similar to the EU-funded programme will ever be viable and funded by the UK for UK universities.

By the time that this issue hits the streets our main event ECCRIA 11 will be over. I hope it will have been successful and I know that a number of people have put a great deal of effort into making it so. This year's conference featured the final dissemination event of the RELCOM (Reliable & Efficient Combustion of Oxygen/Coal/Recycled Flue Gas Mixtures) project in which 12 papers presented showcasing the main activities of the project partners.

The joint symposium between the CRF, the Minerals Engineering Society and the South Midlands Mining & Minerals Institute took place on 26th May entitled "Minerals Engineering – 2016 A Global Perspective" at the Yew Lodge Hotel in Kegworth and a report on the proceedings is included in this newsletter.

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Student Bursaries for 2016-2017

Travel and subsistence bursaries of up to £300 are on offer to bona-fide full-time students who wish to attend appropriate National and International coal-related conferences, (please see the Calendar of Coal Research Events for details of future conferences), and whose supervisor is a member of the Coal Research Forum. To apply, please send the abstract submitted to the conference with a brief supporting letter from your supervisor together with details of the expected expenditure and other sources of funding applied for, to:

Prof. J.W. Patrick,
Dept. of Chemical and Environmental Engineering,
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Nottingham NG7 2TU

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, this report will provide some brief details of the beneficiary, their topic of study and the reasons for wishing to attend the conference. Potential applicants should see the template for these reports on the CRF website, www.coalresearchforum.org, where such reports must comply with these requirements.

Please note that these bursaries are only for travel and subsistence to attend the conference, (i.e. not for conference or other fees). In addition, priority will be given to applicants who will be attending the whole of a conference rather than one day of a multi-day event and will be using the conference accommodation provided should this be required. It may not be possible to fund all applications for bursaries or meet the request in full as this will depend on the funds available at the time.

Report of Minerals Engineering Society Meeting
"Minerals Engineering 2016 – A Global Perspective"
co-sponsored by CRF and SMMMI
26th May 2016
Yew Lodge Hotel, Kegworth

The regular joint annual meeting of the MES, the CRF and the SMMMI (South Midlands Mining and Minerals Institute) was once again held at the popular venue of the Yew Lodge Hotel in Kegworth. A series of six papers were presented covering a number of different current mineral processing activities.

The first paper, "Polyhalite Processing – A World First" was presented by Rob McConnell, Surface Operations Manager, Boulby Mine. Notes on this presentation will follow in the next CRF Newsletter. Polyhalite is a hydrated potassium, calcium and magnesium sulphate salt, described by the following formula: $K_2SO_4 \cdot 2MgSO_4 \cdot 2CaSO_4 \cdot 2H_2O$. It is usually white, colourless or grey, but may also be red or pink if iron oxides are present. Polyhalite has a hardness of 3.5 on the Mohs scale and a specific gravity of approximately 2.8 grams per cubic centimeter (g/cc). It exhibits a triclinic crystal habit, although it is commonly extremely fine-grained or aphanitic. Polyhalite may be formed from primary precipitation or as a secondary mineral produced by the replacement of anhydrite. Both origins of polyhalite occur through reaction of gypsum or anhydrite with potassium and magnesium-rich solutions.

"Mine to Mill Optimisation at Mountsorrel Quarry" was presented by Matthew Ruszala, Birmingham University. Notes on this presentation will follow in the next CRF Newsletter.

Mountsorrel Quarry is a granite quarry operated by Tarmac and located between the villages of Mountsorrel and Quorn in the Charnwood district of Leicestershire. The quarry supplies granite to construction projects across Leicestershire, as well as the wider Midlands and East of England. The quarry is important to the local economy and currently employs 149 people, 90 per cent of whom live within a 10 mile radius of the site.

The third paper was entitled "Modifications to Arcelor Mittal Coal Preparation Plants in Kazakhstan2 and was presented by Steve Frankland Drago Associated Ltd. Notes on this presentation will follow in the next CRF Newsletter. JSC ArcelorMittal Temirtau is the largest mining and metallurgical sector of the Republic of Kazakhstan and is an integrated mining and metallurgical complex, with its own coal, iron ore and energy base. JSC ArcelorMittal Temirtau specialises in the production of flat and long products, including polyester, zinc and aluminium, and also produces sinter, iron ore and coal concentrate, coke, pig iron, steel, including slabs, strip, lonžeronnuû Lane, electric-welded pipes and related products blast furnace and coke-chemical production.

The fourth presentation was given by Dr Yousef Ghorbani of Cambourne School of Mines and was entitled "OptimOre Project". This project is part of the EU HORIZON 2020 Research and Innovation Programme which is the funding mechanism by which the EU Strategic Implementation Plan (SIP) for raw materials is realised. The title of the project is "Increasing yield on tungsten and tantalum ore production by means of advanced and flexible control on crushing, milling and separation processes". The project involves eight partners from four different countries and has seven advisory industrial members and a value of €5M.

The project partners and their activities were listed as follows:-
Universitat Politècnica de Catalunya (ES) - Coordinator and Milling Systems;
Chalmers University of Technology (SE) - Crushing Systems;
University of Exeter (UK) - Gravity Separation;
Universidad de Oviedo (ES) - Documentation and System Analysis;
Technological University Bergakamedie Freiberg (DE) - Magnetic Separation;
INTERKONSULT Ltd. (UK) - Integration, Validation, Dissemination and Exploitation;
EDMA Innova S.L. (ES) - Intelligent Control Systems;
Helmoltz-Zentrum Dresden Rossendorf (DE) - Froth Flotation.

The main objective of the OptimOre project is to optimise the crushing, milling and separation ore processing technologies for tungsten and tantalum mineral processing. It will be achieved by means of improved fast and flexible fine tuning production process control based on new software models, advanced sensing and deeper process physical study. These measures should increase yield by 7% to 12% on the current best production processes, increasing energy saving by 5% compared to the best available techniques.

Dr Ghorbani described the work package assigned to Camborne, WP5, which involved a review of gravity separation models; the development of improved gravity separator models and the incorporation of quantitative mineralogical information within these models

Work has been carried out on the characterisation of the mineralogical and chemical composition of the Penouta Balsa Grande tailings sample using QEMSCAN and XRF. Gravity separation tests were conducted on the Penouta sample using Mozley separator, Knelson and Heavy Liquid Separation (HLS). The gravity concentrate obtained through these tests was further analysed using QEMSCAN and EMPA and have shown interesting results. In order to model the gravity separation process Camborne have put together a synthetic ore sample to investigate process variables with a shaking table. This synthetic ore was prepared using combinations of three minerals of different densities. A high density fraction wolframite of SG 7.1 to 7.5 was used together with minerals of an intermediate density such as olivine (SG 3.32) and almandine garnet (SG 3.5 to 4.3) and silica sand/quartz (SG 2.65).

The team were conducted shaking table tests on this sample aiming at obtaining effective parameters for the modelling of gravity separation systems. They are also assessing the potential for automated control equipment for grade control with the shaking table. A visit was made to Wolf Minerals Tungsten plant at Drakelands, Plymouth where representative samples from different parts of the spiral separator circuit were collected. The elemental and mineralogical composition of these samples at different size fractions will be characterised using XRF, QEMSCAN and EMPA.

Camborne School of Mines has continued on the use of synthetic ores to assist in modelling of a shaking table. They have also completed quantitative mineralogical and geochemical analyses for all streams in the Spiral circuit of the Wolf Minerals Tungsten plant at Drakelands. This data has been used to create a mass balance for the spiral circuit and led to a greater understanding of the altered nature of the ore minerals which vary in Fe:W ratio, with associated changes in response to separation. Mineralogical analyses have been undertaken on other processing streams from the plant and multi-gravity separation is currently being undertaken to potentially improve the flowsheet.

Today – one and half year into the project – the Consortium has benefited from close collaboration with European owners of tungsten and tantalum deposits. In regard to integration and validation, the objective is to integrate the hardware and software elements for validation in the laboratory and in the field. The validation will be carried out in three stages: 1) virtual simulated environment using proprietary software and expertise; 2) using a pilot test plant facility provided by Wardell Armstrong International (UK) and 3) at an operational mine site.

Process simulation is also an important part of monitoring improvements to technological developments. Current individual processes such as crushing, grinding, milling and separation will be simulated and integrated into flow sheets that will be evaluated either on a test plant or final plant configuration.

System dynamics will be used to assess the balance of process inputs and outputs. The aim will be to increase the desirable outputs (e.g. recovery) and reduce the undesirable inputs (e.g. costs).

The performance of optimised mineral processing technology will be tested at various university mineral processing laboratories and, on a larger scale, at the Wardell Armstrong Pilot Plant in the UK. Plant configuration will be based on the virtual flow sheets developed previously in the project which will serve as the blueprint for the processes to be achieved. In addition, operational intelligence will be gathered during the pilot plant test work itself and analysed to determine relationships that affect processing efficiency that cannot be defined from standard models. The pilot plant work will form the basis of tests in actual industrial plants.

The final stage of the work package will be to integrate all of the individual processes into the process being deployed at an operating mine site both for tungsten and tantalum. At this stage it is anticipated that the experience accumulated during the virtual and pilot test work phases will enable the consortium to design, operate and monitor an improved mineral processing system that will demonstrate efficiency improvements at an operating mine. The ultimate aim will be that the mine site adopts the modified process as standard operating practice. Outputs from the validation stage will form an important input to Work Package 10 to exploit the results of the project in the European minerals sector.

The fifth presentation was entitled “Handling Data in Coal Quality Monitoring” and was given by Gary Wain of Bretby Gammatech. Gary began by reviewing the early work at Gammatech on the Ash Eye and Heat Eye on-line analysers and then moved on to the latest systems with EyeGraffix with remote software. Gary showed a pictures of three systems being monitored live from Kazakhstan using wide EyeGraffix display in the main control room of the Temirtau plant.

Gary then described the problems that existed with the earlier form of Ash Eye equipment. These were that information on ash were stored on local controllers next to the conveyor; on-site IT systems support infrastructure was limited; maintenance had to be done locally; no data was accessible to management unless they stood by the conveyor and wrote down the ash % figures directly which was clearly not practical. Finally, if a remote monitor was installed this was the only place that the data was held.

There is now a solution! The Matrix Data Delivery (MDD). In this data transport is handled by the monitoring computers connected to Bretby systems; there are remote maintenance features for performance monitoring, software updates, bug fixes, calibration updates, giving savings by not having OEM engineers visits to site, therefore increasing equipment uptime. Only one fixed IP address network connection is required and there is no need for increased local IT support network, saving costs. Up to 25 on line systems may be connected to one PC, then this terminal can mirror the data to up to 10 other EyeGraffix terminals. All connected terminals see the data as if they were connected to the on line monitored system. The data is then passed to other EyeGraffix terminals, linking together to form a matrix of terminals or nodes.

Gammatech have a customer in Kazakhstan using this system. Previously the customer took coal samples manually and waited for the lab results to then change the process. Gammatech installed two systems at Temirtau on raw coal, followed by another on the clean coal belt then two more at a sister plant in Vostochnaya. The data is made available in the local control room, customers back office system and in our UK office in Sheffield.

Security is a very important issue particularly with this customer as a result of which much focus was placed on this issue leading to the development of a unique encrypted PassKey. A proprietary protocol was designed for this task with the result that no possibility exists for any other system to gain access to any part of the computer or network. In regard to the future Gary concluded his talk by mentioning a number of innovative features which may result in the development of even more sophisticated systems.

The last paper in the symposium was entitled “The Barruecapardo Tungsten Project” and was given by Dr Richard Maslen of Fairport Engineering. Richard began by outlining the project history which began in 2012. Cost & Definition and Feasibility studies were completed by June 2016 and were followed by a tungsten concentrate offtake agreement and basic engineering studies by August 2014, A mining concession was granted in November 2014 and financial closing with Oaktree Financing was completed in June 2015.

Tungsten minerals such as scheelite, $CaWO_4$ and wolframite $(Fe,Mn)WO_4$ occur in veins in a granite matrix together with pyrite (FeS) and arsenopyrite (FeAsS).

The Barruecopardo mine is located in the province of Salamanca, western Spain and is part of the autonomous community of Castile-Leon. It is approximately 70km west of the city of Salamanca and 350 km west-north west of Madrid. The central service town in the area is Vitigudino.

The project intends to process 1.1M tonnes of ore per year which has a WO3 content of from 0.25% to 0.35%. The required enrichment ratio is about 250 which means that a pre-concentrate of 30 to 35% WO3 is needed followed by a final concentrate which will have >70% WO3.

The run-of-mine ore is sized at <800mm and this is first reduced to <5mm and then to <153µ for the final concentrate. There are three stages of ore crushing which reduce the size of the ore to <20mm. The ore is then processed in a jig washer circuit followed by a spiral separation circuit. The pre-concentrate is then fed to a shaking table and froth flotation circuit. The product is then dried and bagged and the tailings go for processing and water treatment.

Newsletters and reports from other organisations

The Coal Hub produces a number of interesting articles on coal, a selection of them can be seen below:-

Use of State aid to Moderate the Social Impacts of Coal Mine Closures in Spain
Spanish plans for the orderly closure of 26 uncompetitive coal mines. However, neither CARBUNION (Spanish Federation of Coal Producers) nor the Trade Unions know the content of the Plan notified by the Spanish Government to the EU Commission.
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CCS and the Role of Coal after COP21
Coal is an indispensable part of fuel mix over next coming decades, Application of CCS is conditions in equa non, There are several ways to reduce CO2 emissions from coal-firing
Download

Climate and Energy Policy Solutions For China
This report endeavours to provide insight into which climate and energy policies can most cost-effectively drive down China's emissions on the basis of various fuels and other metrics.
Download

Decarbonisation and The Consequences For The German and European Energy Market
India to double coal consumption by 2020. Price of Fossil fuels - slowly falling, Carbon constraints increasing (& temperatures increasing). Key role for gas in the transition - and for secure supplies.
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Asia's Tigers: Reconciling Coal, Climate and Energy Demand
According to a number of reports, Asia is on the verge of a huge expansion in coal burning, with two countries, China and India, accounting for the majority of an estimated 2,457 new coal-fired power stations either planned or in construction world
Download

India's Energy and Climate Policy
Within the energy and climate debate perhaps no issue is more contentious than the degree to which emerging economies should rely only on non-fossil fuel resources and energy efficiency to meet their growing energy demand.
Download

Poland's Coal Industry
Poland still has strong coal mining sector, which includes: coal producers, producers of mining machines and equipment, service companies and research - scientific institutions; sector creates about 500 thousands jobs
Download

Reshaping Coal as a Fuel Source
Coal will continue to grow as a global fuel source while declining in the U.S. and Europe. Coal and petroleum will drive growth in lesser developed countries.
Download
http://egh.newsweaver.com/COALNewsletter/1cteho33in61mtoe8x582w?a=6&p=50582580&t=28634173

Energy KTN
https://connect.innovateuk.org/web/energyktn/overview

Existing technology and a co-ordinated, co-located series of deployments can cut CCS costs – New ETI report

- A sequential, co-located series of deployments in the UK using existing technology can reduce initial CCS “demonstration” costs by up to 45% - exceeding the likely cost reductions from technology advances.

- Initial cost reductions can be achieved without creating new capture technology platforms – making use of economies of scale, sharing infrastructure and physical demonstration
- After 2030 technology innovation should play an increasing role in ongoing cost reduction

Loughborough, 24 May 2016 – A new report from the Energy Technologies Institute (ETI) has reinforced the importance of carbon capture and storage (CCS) to a UK low carbon energy system and identified an effective way of reducing costs deploying existing technology and utilising shared infrastructure, rather than investment in further technology advances.

"Reducing the costs of CCS: Developments in capture plant technology" says that successfully deploying CCS would save UK consumers and businesses tens of billions of pounds in a low carbon transition by providing low carbon electricity, capturing industrial emissions, creating low carbon fuels and delivering negative emissions when used in combination with bioenergy.

The ETI has previously carried out modelling of CCS at process plant, techno-economic, financial and energy system level to build knowledge of the role and value of CCS and better understand the barriers facing the industry.

Much of that work has focussed on risk and cost reduction in transportation and storage, but, the latest report concentrates on the cost of capture, which is the single largest cost element of the operational CCS chain. Critics of the technology say it is unproven and expensive. However, the report's author and ETI CCS Strategy Manager Den Gammer said: **"**The high capital cost of CCS means technology risks have to be carefully managed, but initial cost reduction can be achieved without creating new capture technology platforms by making use of economies of scale, sharing infrastructure and through physical demonstration. CCS uses proven technologies which need to be combined into new value chains. "The cost of capture is the largest single cost element in CCS but capture technology is from a mature technology base and further improvements in cost and performance are expected."

The ETI believes that one pathway to reducing the cost of CCS is to deliver a small number of large plants sequentially using proven technologies. "Our analysis shows that cost reduction through sequential deployments of existing technology can drive down costs by as much as 45% largely through a combination of economies of scale, infrastructure sharing and risk reductions through deployment." Den Gammer added.

"Cost reduction can only be achieved through commercial scale deployment in the UK , investment in infrastructure including storage sites and by having a policy environment that is attractive for CCS investors. "Investment in anchor projects provides a transport and storage infrastructure for subsequent projects to build on and paves the way for the introduction of higher risk emerging technologies once the overall CCS risk is reduced. "A strategy of waiting for global technology advances to reduce costs and risks will not address UK specific costs and risks in transport and storage."

The report says that post combustion amines and pre-combustion gasification technologies will continue to be the capture technologies of choice in power production for several years, but after 2030 technology innovation should play an increasing role in ongoing cost reduction.

It also highlights the potential for hydrogen storage combined with CCS which can provide considerable flexibility and improve energy security. The report, infographic and explanatory video can be found at http://www.eti.co.uk/reducing-the-cost-of-ccs-developments-in-capture-plant-technology-2/

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About the ETI
The ETI is a public-private partnership between global energy and engineering companies – BP, Caterpillar, EDF, Rolls-Royce and Shell – and the UK Government. The role of the ETI is to act as a conduit between academia, industry and the government to accelerate the development of low carbon technologies. We bring together engineering projects that develop affordable, secure and sustainable technologies to help the UK address its long term emissions reductions targets as well as delivering nearer term benefits. We make targeted commercial investments in nine technology programmes across heat, power, transport and the infrastructure that links them. Government representation is through the Department for Business, Innovation and Skills with funding channelled through Innovate UK and the Engineering and Physical Sciences Research Council who also sit on the ETI board. The Department of Energy and Climate Change are observers on the ETI board.

SUMMARIES 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. Please also note that many of the news articles were written ahead of the UK vote on continuing membership of the EU.

River on fire in Greens MP's video is natural, not fracking, says CSIRO
24th April 2016, Calla Wahlquist, The Guardian
The CSIRO has defended its independence after a Greens MP, whose footage of burning methane on a Queensland river went viral, accused the government-funded research body of "making excuses" for the coal seam gas industry. Jeremy Buckingham, a member of the New South Wales parliament's upper house, posted the video, which showed him lighting the surface of the Condamine river with a barbecue lighter and sending flames licking around the boat, on his Facebook page on Friday. By Sunday it had been shared 13,000 times and had 2.2m views.

The CSIRO began studying methane seeps in 2012 in the Condamine river, which is near Chinchilla, about 300km west of Brisbane, after locals reported seeing bubbles. The gas is most evident at an area called Pumphole where the video was filmed. It is just over 5km from the gas field but there is a gas well within 900m, according to Buckingham.

Speaking to Guardian Australia, Buckingham said it was "implausible" that the gas flow was not linked to the coal seam gas industry, which expanded in the area in 2011. "It would be the most remarkable coincidence that the very thing that we warned would happen has happened in the middle of a gas field and it's totally unrelated," he said. But Professor Damian Barrett, research director of the CSIRO's onshore gas programme, insisted it was "unlikely" that the gas seep was linked to fracking in the region.
For more visit:- https://www.theguardian.com/environment/2016/apr/24/river-on-fire-in-greens-mps-video-is-natural-not-fracking-says-csiro

RWE joins UK coal retreat with reduced Aberthaw operations
25th April 2016, unattributed, Reuters
RWE npower will reduce operating hours at its 1,600 megawatt Aberthaw coal-fired power plant in Wales from April 1 next year, it said on Monday, as the British power sector eyes

government plans for all coal plants to shut by 2025. RWE npower said it would discard its current production model to focus on generating electricity only when needed.

"We must ... recognise that the current market for energy generation remains extremely challenging and demand for coal generation over the coming years is expected to be low compared with recent times," the company said in a statement.

The British government's announcement in November that it wants to close all coal-fired plants by the middle of next decade and two power companies have since said they will shut down plants. SSE has said it will shut most units at its Fiddler's Ferry plant, though it has since extended operations by a year. Engie in February announced the closure of its Rugeley station this summer.

Coal plants are struggling to compete with cheaper gas generation and renewable energy such as wind and solar. Operators of high-polluting plants, such as coal stations, also pay a hefty extra tax on carbon emissions. A spokeswoman for RWE npower said its move at Aberthaw will result in job losses but that details have not been finalised. The company has also decided to adapt technology at the station to allow it to burn a wider range of coal, which will lower emissions of nitrogen oxide by 30 percent. Aberthaw has won contracts in Britain's capacity market auctions to remain on standby in the winters of 2018/19 and 2019/20.
For more visit:- http://finance.yahoo.com/news/rwe-npower-lower-output-coal-163918301.html

Carbon dioxide making earth greener, reveals new research

26th April 2016, Subodh Varma, Times of India

The earth is getting greener because of higher carbon dioxide (CO2) levels in the atmosphere, new research shows. Observations by Nasa satellites over the past 33 years show that there has been a steady increase in leaves on plants and trees, which scientists think is because of the higher CO2 levels. Leaves absorb CO2 and combine it with water to produce food for the plants.
For more visit:-
http://timesofindia.indiatimes.com/home/science/Carbon-dioxide-making-earth-greener-reveals-new-research/articleshow/51991931.cms

China bans some new coal power plants

26th April 2016, Brian Spegele, The Australian

China's government is banning construction of new coal-fired power plants in areas with surplus power supply, a move that could weigh on already-struggling coal markets. The new measures outlined by China's top economic planner, the National Development and Reform Commission, underscore the central government's deep concern with overcapacity across China's economy, a result of weakening industrial demand as growth slows.

Beijing has previously said it aimed to curb thermal power overcapacity; analysts said the fact that it now came from an official NDRC communiqué was the clearest signal yet that it won't tolerate new coal capacity in regions that already have excess supply.

Weaker demand for coal inside China could ultimately lead to higher exports, which would exacerbate the huge supplies of coal sloshing around global markets. The higher supplies could drive down global benchmark prices and hit the bottom lines of major US and international coal producers. The global commodities downturn has proven particularly tough on global coal companies. St. Louis-based Peabody Energy and Arch Coal are among the large US miners to file for chapter 11 bankruptcy protections in recent months. The US sector has shed 31,000 jobs since 2009.
For more visit:- http://www.theaustralian.com.au/business/mining-energy/china-bans-some-new-coal-power-plants/news-story/b6f4491ed2c7b88caed1056b0f5d4881

Linc Energy administrator says UCG ban 'a surprise', company will struggle to meet liabilities

28th April 2016, Isabel Roe, ABC News

Troubled oil and gas company Linc Energy could owe creditors more than $120 million, and its assets have been seriously devalued by a ban on underground coal gasification, the administrator says. Linc Energy went into voluntary administration earlier this month and administrators met creditors and staff in Brisbane on Wednesday. The company had been running an underground coal gasification (UCG) trial at Chinchilla in Queensland's Western Downs.

For more visit:- http://www.abc.net.au/news/2016-04-28/coal-gasification-ban-surprise-to-linc-energy-administrator/7365576

Exxon to join research on fuel cells that capture carbon emissions

5th May 2016, David Koenig, Portland Press Herald

Exxon Mobil and FuelCell Energy say that they will jointly work on technology to reduce the cost of capturing carbon emissions from power plants. The companies will try to develop technology that uses carbonate fuel cells to generate power while capturing carbon dioxide, which scientists say is the most prevalent greenhouse gas responsible for climate change.

It is a sensitive subject for Exxon Mobil Corp., based in Irving, Texas. Officials in several states are investigating the company, which they accuse of misleading investors and the public by understating the risk of climate change. If the fuel-cell approach proves feasible, it could be used in coal- or natural gas-fired plants, the companies said. Shares of FuelCell Energy Inc. jumped 20 percent initially but gave up most of the increase by afternoon trading.

Capturing significant amounts of carbon from power plants has been an elusive goal for the fossil-fuel industry. There have been several demonstration projects in the U.S. and elsewhere but they haven't produced the desired results, partly because of high costs. Environmentalists say the money should instead be spent on renewable energy that is cleaner from the start.

For more visit:- http://www.pressherald.com/2016/05/05/exxon-to-join-research-on-fuel-cells-that-capture-carbon-emissions/

Is fracking for gas as dirty as coal?

5th May 2015, James Conca Forbes Energy

Coal and natural gas together produce two-thirds of our electricity, almost equally split between them. Nuclear produces 19%, hydro produces 7%, and renewables about 7%. Oil produces even more energy than either coal or gas, but it is used almost entirely for transportation. So if coal is still producing a third of our electricity, why is the coal industry going bankrupt? Sure, coal used to produce about 50% of our electricity just ten years ago, but 33% is still the largest share of this market, tied with natural gas.

At the end of April, Peabody Energy, the largest private producer of coal in the world – founded in 1883 – declared bankruptcy. The company, valued at $20 billion in 2011, is now worth just $38 million. Four other American coal companies also declared bankruptcy this past year. The total value of companies in the Dow Jones U.S. Coal Index has plummeted well over 90% percent in the last five years.

"The U.S. coal industry is imploding," says Brad Plumer at *Vox*. The reasons are tougher regulations, a flood of cheap natural gas from fracking, and a sudden decrease in demand from China, something the industry had bet the farm on.

Even though coal is much cleaner than ever before, State energy portfolios are eliminating coal, and increasing natural gas, as fast as possible. According to Stephen Moore at The Washington Times, "U.S. coal plants have reduced their emissions significantly in the past several decades." But the shift away from coal is accelerating because of regulations discouraging companies from

building new coal-fired plants, and State energy portfolios that dictate an increasing amount of power coming from renewables.
For more visit:- http://www.forbes.com/sites/jamesconca/2016/05/05/is-fracking-for-gas-dirty-enough-for-a-coal-resurgence/#4a00400237f7

Plastic bags might kickstart the carbon capture industry

6th May 2016, Richard S. Middleton, Energy.Gov

You just can't drink enough soda to create a market for bottling and storing all the excess carbon dioxide in the atmosphere. But as researchers look for ways to stave off global warming by reducing atmospheric CO2, many have turned to a related idea. Carbon capture, utilization and storage (CCUS) is one strategy--along with others such as solar energy, biofuels and energy efficiency--that can work together to rein in runaway greenhouse gases.

If CCUS were applied broadly across the U.S. manufacturing sector, it could save hundreds millions of tons of industrial greenhouse gas emissions from entering the atmosphere every year. The trick is demonstrating that it makes economic sense. A team led by Los Alamos National Laboratory worked out a CCUS model that just might deliver the financial return investors need. It relies on a surprising source: the ethylene manufacturing plants that make plastic bags and packaging from natural gas.

The Los Alamos–led research team explored capturing CO2 from ethylene manufacturing plants. The ethylene plants, clustered in the U.S. Gulf Coast, can recover their carbon capture costs by selling the CO2 to nearby depleted oil fields and using the gas to extract up to 15 percent more oil.
For more visit:- http://energy.gov/articles/plastic-bags-might-kickstart-carbon-capture-industry

Novel functionalised nanomaterials for CO2 capture

9th May 2016, unattributed, ScienceDaily

Mitigating rising CO_2 levels is of prime importance. In a new development, scientists at the Tata Institute of Fundamental Research, Mumbai, have developed a novel design of CO_2 sorbents that show superior CO_2 capture capacity and stability over conventional materials.

The immobilization of functional amines on a porous solid support can result in stable and efficient CO_2 sorbent materials compared to similar liquid sorbents. A critical disadvantage however, is a drastic decrease in the textural properties of these supports (i.e., their surface area and pore volume), leading to a decrease in the CO_2 capture capability. To overcome this challenge, scientists at TIFR Mumbai, have designed novel functionalised nanomaterials that allows higher amine loading with a minimal decrease in surface area. For more visit:- https://www.sciencedaily.com/releases/2016/05/160509105607.htm

Research shows inaccuracies in emission measurements of important greenhouse gas nitrous oxide

12th May 2016, unattributed, ScienceDaily

Nitrous oxide, carbon dioxide and methane are the most important greenhouse gases. Nitrous oxide also participates in the destruction of stratospheric ozone. To mitigate global warming, we have to control nitrous oxide emissions. A recent study by the University of Eastern Finland, the University of Helsinki and the Natural Resources Institute Finland provides new knowledge on nitrous oxide emissions and shows that there can be significant inaccuracies in the traditional emission measurements.
For more visit:- https://www.sciencedaily.com/releases/2016/05/160512085119.htm

Chinese coal giant's emissions to fall after upgrades

10th May 2016, unattributed, Xinhua.com

China's largest coal producer Shenhua Group has completed upgrades to its coal-fired power plants in the Beijing-Tianjin-Hebei region that will dramatically reduce their emissions. A milestone in China's efforts to be more environmentally friendly, Shenhua's upgrades will take emissions of dust, sulfur dioxide (SO2) and nitrogen oxides (NOx) from the company's 22 power units in the region below 10 milligrams per cubic meter, 35 milligrams per cubic meter and 50 milligrams per cubic meter, respectively.

This compares to current national emission standards for the three substances of 20 milligrams per cubic meter, 50 milligrams per cubic meter and 100 milligrams per cubic meter. Following the change, annual emission of dust, SO2 and NOx by Shenhua facilities in the Beijing-Tianjin-Hebei region will go down by 84 percent, 71 percent and 83 percent, Shenhua said in a statement on Tuesday.

For more visit:- http://news.xinhuanet.com/english/2016-05/10/c_135348477.htm

Coal made its best case against climate change, and lost

11th May 2016, Dana Nucitelli, The Guardian

Peabody Energy, the world's largest private sector coal company (now bankrupt), recently faced off against environmental groups in a Minnesota court case. The case was to determine whether the State of Minnesota should continue using its exceptionally low established estimates of the 'social cost of carbon', or whether it should adopt higher federal estimates.

The social cost of carbon is an estimate of how much the damages from carbon pollution cost society via climate change damages. In theory, it represents how much the price of fossil fuels should increase to reflect their true costs.

The coal company called forth witnesses that represented the fringe 2–3% of experts who reject the consensus that humans are the primary cause of global warming, including Roy Spencer and Richard Lindzen, while their opposition invited witnesses like Andrew Dessler and John Abraham who represent the 97% expert consensus.

John Abraham previously summarized the proceedings and ruling in favor of the higher carbon cost estimates, but it's worth delving into some of the details of the climate science and economics arguments to see why the judge ruled against the coal company and its contrarian witnesses. The losing case from the coal company witnesses (rebutted by John Abraham here and here) can be summarized as follows:

- Warming has been less than models predicted [False]
- This means the climate's sensitivity to the increased greenhouse effect is low [False]
- Carbon pollution is great anyway and should be subsidized, not taxed [False]

In between these primary arguments, Peabody coal's witnesses made a variety of false and/or conspiratorial statements, dredging up numerous long-debunked climate myths.

For more visit:- https://www.theguardian.com/environment/climate-consensus-97-per-cent/2016/may/11/coal-made-its-best-case-against-climate-change-and-lost

Newcastle University to open £20m energy research centre

11th May 2016, Michael Holder, businessGreen

A £20m research and testing centre designed to provide real-time understanding of UK energy use and ultimately help drive down customer bills will today be announced by Newcastle University. The EPSRC National Centre for Energy Systems Integration will allow experts to test the entire UK energy system in real time with a view to informing government policies for optimising the energy network.

Earmarked to be fully up and running in September 2016, the Centre will look at the energy system as a whole - including renewables, gas, power, heating and cooling - drawing on the

expertise of academics from the universities of Newcastle, Heriot-Watt, Sussex, Edinburgh and Durham. According to Newcastle University, the facility will help bridge an information gap that is hampering the drive towards delivering a fully integrated, smart energy network, while also improving energy efficiency, pushing down customer bills, and reducing carbon emissions.
For more visit:- http://www.businessgreen.com/bg/news/2457572/newcastle-university-to-open-gbp20m-energy-research-centre

Crisis looms as our coal-fired power stations start to break down

13th May 2016, John Rees, This is Money

Coal-fired power stations are likely to break down more often as the deadline for closure approaches, leaving the UK vulnerable to power shortages. The warning from energy chiefs comes after seven power stations either broke down or were not available last Monday. On Tuesday, the UK generated no power from coal for the first time since the 19th Century. Renewable energy took up the slack.

The failures led National Grid, which runs the power network, to make an emergency request for more power supplies. The company would not confirm how many power stations were offline but a number were understood to be coal-fired. National Grid said it issued a 'notification of inadequate system margin', only its second since 2008, which warns providers that the gap between supply and demand is too small and more power is needed.

Providers then compete to supply more energy but the shortage sent the wholesale price of energy spiralling from about £50 per megawatt hour to £1,250. 'We are shutting a third of the coal-fired power plants that were available last winter,' said Peter Atherton, energy analyst at Jefferies investment bank. The Government plans to phase out coal-fired power by 2025, replacing the capacity with gas-fired and renewable schemes.

Coal supplied about 17 per cent of the UK's electricity at the end of 2015, down from over 30 per cent in 2014. Nine coal-fired power stations remain in the UK. 'We are replacing big, reliable pieces of kit,' said Atherton, 'but for every megawatt of power from coal, we need something like ten megawatts of solar power and three to four megawatts of wind power to guarantee the same amount of generating capacity.'
Source: http://www.thisismoney.co.uk/money/news/article-3590573/Crisis-looms-coal-fired-power-stations-start-break-down.html

G7 host Japan mocks UN climate deal with coal binge, say greens

22nd May 2016, Ed May, Climate Change News

Japan stands alone among G7 countries in planning to radically ramp up coal use, according to a new 'scorecard' developed by London-based think tank E3G. Despite a coal capacity double that of other G7 members at 288 gigawatts, the US topped the scorecard due to its domestic and international efforts to limit coal use.

More the 100GW of coal-fired capacity is now slated for closure stateside, according to the report, while Washington's climate diplomacy has turned the screw on overseas financing of the world's most carbon-intensive fossil fuel. France and the UK tied in second, reflecting what the report terms "positive government interventions" since the scorecard's last publication in October 2015. The study comes days before G7 leaders are due to meet in Toyama, Japan from 26-27 May, amid a growing campaign from green groups against the Abe administration's energy plans.
For more see:- http://www.climatechangenews.com/2016/05/22/g7-host-japan-mocks-un-climate-deal-with-coal-binge-say-greens/

Doosan Babcock wins coal-to-biomass conversion deal in U.K

24th May 2016, Jung Min-Hee, Business Korea

Doosan Heavy Industries & Construction announced on May 22 that its British subsidiary Doosan Babcock has won the contract to convert coal-fired Lynemouth power station in the U.K. into a biomass power plant. Under the latest deal, Doosan Babcock will convert three 140MW coal boilers run by Lynemouth Power since 1972 in Northumberland, a county in North East England, to biomass using boilers. Doosan Babcock has already successfully completed a total of 12 coal-to-biomass conversion projects in the overseas market like the UK, France, Poland and Canada. In November last year, the company also bagged a deal in the domestic market to convert the Yeongdong Plant Unit 1, an aged thermal power plant, into a biomass-fired plant. Hyun Ho-joon, head of the boiler business unit at Doosan Heavy Industries, said, "Biomass-based energy generation can reduce air pollutants by 65 to 75 percent compared to existing fossil fuels. After the Paris Climate Agreement, countries all across the world are making every effort to reduce greenhouse gases and the power generation industry at home and abroad is paying more attention to fuel conversion projects."

Source:- http://www.businesskorea.co.kr/english/news/industry/14769-coal-biomass-doosan-babcock-wins-coal-biomass-conversion-deal-uk

Brexit to damage RE investment

25th May 2016, unattributed, RE News

Leaving the European Union would damage investor confidence in UK renewables, according to University College London's head of international energy and climate change policy. Professor Michael Grubb said the leaders of the Leave campaign are "hostile" to renewable energy and the sector would be further damaged if the UK votes to leave the EU on 23 June.

"Renewable energy has been affected quite a lot by domestic policy but [the UK] would no longer have the collective points of contacts with those driving renewable energy policy in the EU," he said. Addressing the Energy and Climate Change select committee's examination of the implications of the EU referendum, Grubb added there was little advantage in the UK negotiating an independent energy trade deal given its integration with EU gas and power networks. "The UK would be in a weak negotiating position as we are a net energy importer," he said.

The Centre for Policy Studies' political and energy analyst Tony Lodge said the Climate Change Act, Carbon Price Floor and carbon budgets showed the UK is a low-carbon exemplar and being part of the EU is holding it back. "These are domestic policies which have seen the UK leading on decarbonisation without the need for EU directives to push it along. That is something that the UK can be proud about." Lodge added the 12.4GW of coal and oil plant closed by the EU's Large Combustion Plant Directive and 11GW expected to close by 2021 under the Industrial Emissions Directive had "destabilised" UK energy policy.

Chatham House energy research fellow Antony Froggatt said it was uncertain whether leaving the EU would necessarily result in the UK ditching the IED and LCPD. Froggatt said post-Brexit priorities would be in other areas such as finance and migration and it could be several years before the UK could overturn these directives, if ever.

Source :- http://renews.biz/102817/brexit-to-damage-re-investment/

Appalachian coal ash richest in rare earth elements

27th May 2016, unattributed, ScienceDaily

The first comprehensive study of the content of rare earth elements in coal ashes from the United States shows that coal originating from the Appalachian Mountains has the highest concentrations of scarce elements like neodymium, europium, terbium, dysprosium, yttrium and erbium that are needed for alternative energy and other technologies. The study also reveals how important developing inexpensive, efficient extraction technologies will be to any future recovery program.

For more visit:-
https://www.sciencedaily.com/releases/2016/05/160527122944.htm?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+sciencedaily%2Fmatter_energy%2Ffossil_fuels+%28Fossil+Fuels+News+--+ScienceDaily%29

Arizona researchers study how a little plant may absorb a lot of carbon from coal-fired power plants

30th May 2016, Andrew Bernier, Arizona Science & Innovation Desk

Taking a deep breath when viewing Arizona landscapes may seem unwise with smokestacks on the horizon. But new research from a local partnership is hoping a tiny plant, one known for taking over pools, can absorb carbon dioxide from coal burning power plants, and then maybe use those plants for fuel, food and medicine.

Inside ASU's Arizona Center for Algae Technology and Innovation (AzCATI), large glass test tubes connected to gas lines bubble and stir. Inside each one, a different strain of algae species swirl in reaction to various levels of carbon dioxide. AzCATI Professor Thomas Dempster is looking to see which of these species is growing the most. "Part of our selection process is to isolate each of the strains, bring it back into the laboratory, and expose it to nutrients and carbon dioxide to do growth trials" said Dempster. "We'll immediately eliminate a number of the isolates that don't grow well at all. They have no potential for carbon capture."

These algae strains were taken from nine different water sources at Salt River Project's (SRP) Coronado Generating Station, a coal-fired power plant just northeast of St. Johns in eastern Arizona. The plant produces more than 6 million tons of CO2 annually and with new EPA carbon regulations, SRP needs to bring that number down which is what brought SRP engineer Sam Villalobos to AzCATI.
For more visit:- http://science.kjzz.org/content/311963/arizona-researchers-study-how-little-plant-may-absorb-lot-carbon-coal-fired-power

Climate change mitigation: Turning carbon dioxide into rock

9th June 2016, unattributed, ScienceDaily

An international team of scientists have found a potentially viable way to remove anthropogenic (caused or influenced by humans) carbon dioxide emissions from the atmosphere - turn it into rock. The study has shown for the first time that the greenhouse gas carbon dioxide can be permanently and rapidly locked away from the atmosphere, by injecting it into volcanic bedrock. The carbon dioxide reacts with the surrounding rock, forming environmentally benign minerals.

The study, published in *Science*, has shown for the first time that the greenhouse gas carbon dioxide (CO_2) can be permanently and rapidly locked away from the atmosphere, by injecting it into volcanic bedrock. The CO_2 reacts with the surrounding rock, forming environmentally benign minerals.
For more visit:- https://www.sciencedaily.com/releases/2016/06/160609142426.htm

Biggest US coal company funded dozens of groups questioning climate change

13th June 2016, Suzanna Goldenberg and Helena Bengtsson, The Guardian

Peabody Energy, America's biggest coalmining company, has funded at least two dozen groups that cast doubt on manmade climate change and oppose environment regulations, analysis by the Guardian reveals. The funding spanned trade associations, corporate lobby groups, and industry front groups as well as conservative think tanks and was exposed in court filings last month. The coal company also gave to political organisations, funding twice as many Republican groups as Democratic ones.

Peabody, the world's biggest private sector publicly traded coal company, was long known as an outlier even among fossil fuel companies for its public rejection of climate science and action. But its funding of climate denial groups was only exposed in disclosures after the coal titan was forced to seek bankruptcy protection in April, under competition from cheap natural gas.

Environmental campaigners said they had not known for certain that the company was funding an array of climate denial groups – and that the breadth of that funding took them by surprise. The company's filings reveal funding for a range of organisations which have fought Barack Obama's plans to cut greenhouse gas emissions, and denied the very existence of climate change.
For more visit:- https://www.theguardian.com/environment/2016/jun/13/peabody-energy-coal-mining-climate-change-denial-funding

Electricity generated with water, salt and a 3-atoms-thick membrane

13th June 2016, unattributed, ScienceDaily

Proponents of clean energy will soon have a new source to add: osmotic power. Or more specifically, energy generated by a natural phenomenon occurring when fresh water comes into contact with seawater through a membrane. Researchers have developed a system that generates electricity from osmosis with unparalleled efficiency. Their work uses seawater, fresh water, and a new type of membrane just 3 atoms thick.

Researchers at EPFL's Laboratory of Nanoscale Biology have developed an osmotic power generation system that delivers never-before-seen yields. Their innovation lies in a three atoms thick membrane used to separate the two fluids. The results of their research have been published in *Nature*.

The concept is fairly simple. A semipermeable membrane separates two fluids with different salt concentrations. Salt ions travel through the membrane until the salt concentrations in the two fluids reach equilibrium. That phenomenon is precisely osmosis.

If the system is used with seawater and fresh water, salt ions in the seawater pass through the membrane into the fresh water until both fluids have the same salt concentration. And since an ion is simply an atom with an electrical charge, the movement of the salt ions can be harnessed to generate electricity.
For more visit:- https://www.sciencedaily.com/releases/2016/07/160713143004.htm

Why Europe is to blame for the UK's acute energy policy failures

20th June 2016, Tony Lodge, The Telegraph

Too much electricity in the summer and too little in the winter. Fifty-year-old coal plants being paid tens of millions of pounds to stay on because replacements aren't being built. Electricity prices more than double those in the US. Panic measures to buy in more and more foreign electricity.

These acute failures in British energy policy go to the heart of the EU referendum debate. How can a country once heralded for its energy market liberalisation, its balanced electricity generating grid and comparatively low prices face such a crisis? What has gone wrong and why?

In advance of the EU referendum this week, it is important to understand and detail the extent to which Brussels' diktat, with Whitehall acquiescence, has fundamentally undermined British energy security and blurred the investment case for long-overdue new power stations.

Last month, the Commons Energy Select Committee asked me to give oral evidence on the implications of a Brexit for the energy sector. My message was clear: a vote to leave can help restore policy integrity to a sector in deep trouble.

EU policies have done real damage to our security of supply. They have forced the premature closure of coal and oil-fired power stations before their replacements are ready. This issue is the main reason for Britain's looming energy crunch.
For more visit:- http://www.telegraph.co.uk/business/2016/06/20/why-europe-is-to-blame-for-the-uks-acute-energy-policy-failures/

Methane emissions from onshore oil and gas equivalent to 14 coal plants powered for one year

21st June 2016, unattributed, EcoWatch

When we talk about climate change all too often we focus on carbon dioxide, the main greenhouse gas. But there is a much more potent greenhouse gas, methane, which is much more efficient at trapping radiation than CO2. Some estimates put it at 87 times more potent over a 20 year lifetime than carbon dioxide. And who is the biggest culprit for releasing methane in the U.S.? It is the oil and gas industry, which is the largest industrial source of methane pollution in the country, releasing 33 percent of all methane emissions in 2014.

There are a staggering amount of old and new wells with the potential to release methane. At least 3.5 million wells have been drilled in the U.S., with a quarter of those still active. Many old and new ones are leaking the potent greenhouse gas. Adding to the problem, there will be thousands of old wells leaking methane which the authorities do not even know the whereabouts of.

First let's look at existing wells. A new report, published by the Center for American Progress on Monday, reveals that the onshore oil and gas industry's methane emissions totalled more than 48 million metric tons of carbon dioxide equivalent or CO2e, in 2014. To put this into perspective, this is the equivalent of 14 coal-fired power plants powered for one year. The worst culprits were ranked in order and came out as: ConocoPhillips, Exxon, Chesapeake Energy, EOG Resources and BP.
For more visit:- http://www.ecowatch.com/methane-emissions-from-onshore-oil-and-gas-equivalent-to-14-coal-plant-1891179510.html

The Antarctic ozone hole has finally started to 'heal,' scientists report

30th June 2016, Chris Mooney, The Washington Post

In a major new paper in the influential journal Science, a team of researchers report strikingly good news about a thirty year old environmental problem. The Antarctic ozone "hole" — which, when it was first identified in the mid-1980s, focused public attention like few other pieces of environmental news — has begun, in their words, to finally "heal."

"If you use the medical analogy, first the patient was getting worse and worse, and then the patient is stabilized, and now, the really encouraging thing, is that the patient is really starting to get better," said MIT atmospheric scientist Susan Solomon, lead author of the study, and former co-chair of the United Nations' Intergovernmental Panel on Climate Change. And moreover, that patient — the Earth's vital ozone layer — is getting better directly because of our choices and policies.

The initial, Nobel Prize winning discovery that ozone depleting chemicals called chlorofluorocarbons (CFCs) — carried in refrigerants, spray cans, foams and other substances — could damage the stratospheric layer that protects us from ultraviolet solar radiation (and thus, skin cancer) came in 1974. But it wasn't until the sudden discovery of a vast seasonal ozone "hole" over Antarctica in 1985 that the world was shocked into action.
For more visit:-
https://www.washingtonpost.com/news/energy-environment/wp/2016/06/30/the-antarctic-ozone-hole-has-finally-started-to-heal-scientists-report/?utm_term=.007826cf429d

Climate change is the biggest opportunity of our age

1st July 2016, Rosalie Starling, Energy Global

In his lecture as the 2016 recipient of the Energy Institute (EI)'s Melchett Award, Sir David King FRS HonFEI, Foreign Secretary's Special Representative for Climate Change, professed the importance of clean energy innovation in tackling the challenge of climate change.

Addressing more than 230 energy professionals in London, Sir David outlined the UK's current commitments regarding energy and climate change legislation. He reiterated the long term goal, as stated in the COP21 agreement, to hold the increase in global average temperatures to well below a 2°C increase above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.?

He described the low carbon transition as the 'greatest opportunity of our age', highlighting the economic benefits of the transition to a low carbon economy. In 2014, more renewable energy was installed worldwide than fossil fuel. And in the UK this activity generated £46.2 billion turnover and employed 238 500 workers during 2014.

Having been appointed as Chief Scientific Advisor to the UK Government in 2000, one of his first actions was to initiate a report, engaging 120 scientific, engineering and social science experts, to analyse the risks of climate change, and make proposals for action to manage these risks. Following this, an all-party agreement was formed and has remained the axis of the UK Government's action on climate change.
For more visit:-
http://www.energyglobal.com/downstream/the-environment/01072016/Climate-change-is-the-biggest-opportunity-of-our-age-3621/

Scientists at NC A&T make coal ash breakthrough

1st July 2016, Taft Wireback, News & Record Greensboro

Researchers at N.C. A&T (North Carolina Agricultural & Technical State University) say they have found a way both to store coal ash underground for decades without harming the environment and to recycle it into a variety of tough, lightweight building materials. The findings at the university's Center for Composite Materials Research promise to lift the powdery, greyish material's standing in the world, said Kunigal Shivakumar, the director of the on-campus center.

"This coal ash is not waste," Shivakumar said. "It is a valuable resource if we handle it properly. ... We have a problem, and yes, we have a method of solving the problem." The new technique involves mixing large quantities of coal ash with polyurethane to make a substance that could be pressed into a range of forms to make a variety of building supplies, such as exterior siding, decking and interior moldings.
For more visit:- http://www.greensboro.com/news/dan_river/scientists-at-nc-a-t-make-coal-ash-breakthrough/article_7a4ceadc-2c48-57e2-939e-da68234fe1cb.html

Brexit likely to impact EU research funding for Oxford

4th July 2016, Catherine Pye, Cherwell

Cherwell has found that contributions from public and private donors within the EU, which represented 12% of Oxford's aggregate income from research grants last year and are maintained through close institutional co-operation, may be impacted by Brexit post-2020, depending on the outcome of negotiations. Research donations and contracts are Oxford's single largest source of income, representing 42% of the university's consolidated income in 2014-15.

The exact figure of EU research funding to Oxford has been disputed; Times Higher Education claim a fifth of Oxford's research funding comes from the EU, whilst Digital Science claims the figure is up to a quarter. However, according to Oxford University financial statements, in the 2015 academic year, out of the £522.9 million the university received in research grants £60.4

million came from the European Commission and other EU government bodies, and £8.5 million came from other EU grantors, meaning 13.1% of funding came from EU sources.
For more visit:- http://www.cherwell.org/2016/07/04/brexit-likely-to-impact-eu-research-funding-for-oxford/

New research: climate may be more sensitive and situation more dire

5th July 2016, Dana Nuccitelli, The Guardian

Scientists use a variety of approaches to estimate the Earth's climate sensitivity – how much the planet will warm as a result of humans increasing greenhouse effect. For decades, the different methods were all in good general agreement that if we double the amount of carbon dioxide in the atmosphere, Earth's surface temperatures will immediately warm by about 1–3°C (this is known as the 'transient climate response'). Because it would take decades to centuries for the Earth to reach a new energy balance, climate scientists have estimated an eventual 2–4.5°C warming from doubled atmospheric carbon (this is 'equilibrium climate sensitivity').

However, a 2013 paper led by Alexander Otto disrupted the agreement between the various different approaches. Using a combination of recent climate measurements and a relatively simple climate model, the 'energy budget' approach used in Otto's study yielded a best estimate for the immediate (transient) warming of 1.3°C and equilibrium warming of 2.0°C; within the agreed range, but less than climate model best estimates of 1.8°C and 3.2°C, respectively.

This new energy budget approach, which was replicated by several subsequent studies, seemed to indicate the Earth's climate is a bit less sensitive to carbon pollution than previously thought. As a result, the IPCC adjusted its estimated range for equilibrium climate sensitivity from 2–4.5°C in its 2007 report to 1.5–4.5°C in its 2014 report. This suggested perhaps a slightly less dire climate situation.
For more visit:- https://www.theguardian.com/environment/climate-consensus-97-per-cent/2016/jul/05/new-research-climate-may-be-more-sensitive-and-situation-more-dire

EDF scraps planned coal plant upgrade over low power prices

8th July 2016, Emily Gosden, The Telegraph

EDF Energy has pulled out of Government subsidy contracts to keep its two coal-fired power stations running in winters 2019-20 and 2020-21, after scrapping plans for major upgrades to the plants. The French-owned energy giant said the planned work to its Cottam and West Burton A power plants in Nottinghamshire was no longer viable due to the steep fall in wholesale electricity prices since it was awarded the contracts in 2014. Under the Government's capacity market scheme, power plants are offered subsidy contracts to guarantee their availability in future winters.

Existing plants can generally secure one-year contracts, but can get three-year contracts if their plans involve investing significant sums in "refurbishment". EDF had secured contracts estimated to be worth more than £60m a year for both power plants to keep running through winters 2018-19, 2019-20 and 2020-21, in return for committing to invest at least £385m in them by 2018. "Since then the steep fall in wholesale electricity prices has led to a revised level of investment, which means the units will now revert to one year agreements for 2018-19," EDF said. For more visit:-
http://www.telegraph.co.uk/business/2016/07/08/edf-scraps-planned-coal-plant-upgrade-over-low-power-prices/

Banks Group aims to open UK surface coal mine in 2018

8th July 2016, Susan Twidale, Yahoo Finance

Banks Group plans to open a surface coal mine in Britain in 2018, it said after securing permission for the project this week, hoping to fill a gap in domestic supply left by the closure of the country's last deep-cast coal mine last year.

The site, at Highthorn in Northumberland, northeast England, is expected to produce 3 million tonnes of coal over the six- to seven-year life of the mine. "Now we have secured planning permission (for Highthorn) we will move to the next stage, towards making a final investment decision and expect to begin operation in 2018," Barney Pilgrim, projects director at British development firm Banks, said in an interview with Reuters. Demand for coal in the country has dwindled over the last decade as coal-fired power stations close due to environmental regulations and industrial sources of demand such as steel decline.
For more visit:- http://finance.yahoo.com/news/banks-group-aims-open-uk-125931891.html

Company to explore turning farm waste into BioCoal

10th July 2016, Nicholas Burgin, The Columbus Telegram

Nebraska's known for its golden corn, cattle and wide-open spaces. But take a drive across the state and you'll also see fields of spent cornstalks in the fall, piles of cow manure and Eastern red cedar creeping into grassland.

Enginuity Worldwide, a company out of Mexico, Missouri, wants to turn that agricultural waste into a product it's calling BioCoal, which it says looks and burns just like regular coal and could help reduce the carbon footprint of coal-fired electricity. The Nebraska Department of Environmental Quality last month announced it awarded Enginuity Worldwide a $250,525 grant to explore the feasibility of producing the biomass fuel from the state's agricultural waste.

One of the difficulties inherent in reducing the carbon emissions of Nebraska's electricity is that the state's utilities already are massively invested in existing generation infrastructure, the vast majority of which is fuelled by coal. The U.S. Energy Information Administration reports 61.5 percent of the state's power was coal-generated last year. Instead of scrapping existing power plants to reduce carbon, utilities can replace a percentage of the coal they burn with carbon neutral BioCoal, said Enginuity Worldwide President Nancy Heimann during a recent interview.

The company says that if every U.S. coal-burning plant mixed 10 percent of BioCoal into its fuel supply it would reduce the industry's emissions by 11 percent. "We're not suggesting a replacement of all coal because coal is a very effective way to make power. What we're suggesting is this is just a tool in the tool box that mitigates carbon," she said. "Anyone that currently uses coal that is looking to diversify their fuel portfolio, we can be beneficial in that regard." Produced by compressing and heating agricultural waste through friction, BioCoal has the same energy output as coal, the company says. The process for creating it is similar to how nature makes coal using compression, but Enginuity does it in two minutes and 40 seconds. For more visit:- http://columbustelegram.com/news/state-and-regional/company-to-explore-turning-farm-waste-into-biocoal/article_6b4be33a-8670-57ea-8a8f-ae91661de14e.html

China building 200 GW of coal-fired power despite capacity glut: Greenpeace

13th July 2016, David Stanway, Yahoo News

China is building another 200 gigawatts (GW) of coal-fired power capacity despite tough new measures designed to cut the use of fossil fuels and tackle overcapacity, environmental group Greenpeace said on Wednesday.

China's coal-dominated thermal power sector has continued to expand rapidly amid an unexpectedly sharp slowdown in energy consumption growth, as well as a state-led effort to tackle smog, cut carbon emissions and encourage cleaner forms of electricity.

According to National Energy Administration (NEA) data, China's total thermal capacity grew 7.8 percent in 2015 to 990 GW, outstripping a 0.5 percent increase in consumption. Another 24 GW went into operation in the first five months of 2016.

Greenpeace said more than 1 trillion yuan ($150 billion) could be "wasted" on new capacity in the next five years, leading to a surplus of 400 GW. China is currently estimated to have around 200 GW of excess capacity.
For more visit:- https://www.yahoo.com/news/china-building-200-gw-coal-fired-power-despite-032544722.html

Brexit to add £350m to energy bills

16th July 2016, Emily Gosden, The Telegraph

Brexit uncertainty will increase by a sixth the costs of a Government scheme to keep the lights on, adding more than £350m to consumer energy bills, leading analysts have forecast. Doubts over the future operation of the energy market and increased financing costs will lead energy companies to demand greater subsidies to build and operate power plants, consultancy Cornwall Energy claimed in a report.

Under the Government's "capacity market" scheme, energy companies are offered subsidies to guarantee their power stations will generate electricity when needed in future winters. The policy is intended to encourage the construction of new gas plants to replace Britain's ageing coal and nuclear power stations. Earlier this month, ministers set out detailed plans for the amount of power plant capacity they would recruit through the scheme for winter 2020-21, via a reverse auction process to be held this December.
For more visit:-
http://www.telegraph.co.uk/business/2016/07/16/brexit-to-add-350m-to-energy-bills/

'King Coal' Richard Budge, of RJB Mining, dies aged 69

18th July 2016, unattributed, BBC News

A businessman who was dubbed "King Coal" after buying most of the UK's coal mines when the industry was privatised has died. Richard Budge ran Doncaster-based RJB Mining company and took control of 17 deep mines in 1994 at a cost of £815m. Only two other UK deep mines were in production at the time.

The 69-year-old had battled prostate cancer for nine years. Budge, from Retford, Nottinghamshire, was married and had two children. Born in Boston, Lincolnshire, he joined the family engineering business after university before buying a small deep mine in Northumberland. He took on three deep mines which were not included in British Coal's privatisation process and RJB Mining eventually became one of the biggest independent coal producers in Europe.

Budge quit in 2001 and bought the struggling Hatfield pit near Doncaster, spending £110m to bring the pit back to life. Speaking in 2007, he said: "Most people think it is unbelievable that you can reopen an old colliery, but we have done that." In 2013, the Yorkshire Post reported the mining mogul had been declared bankrupt. He was a trustee of the National Coal Mining Museum and helped found campaign group the Confederation of UK Coal Producers.
Source:- http://www.bbc.co.uk/news/uk-england-south-yorkshire-36825236

Dirtier than coal: burning forests for 'green' energy

19th July 2016, Matt Williams, The Ecologist

The UK imports millions of tons of American wood pellets every year to be burned in power stations for 'climate friendly' electricity, writes Matt Williams. But his recent visit to the southern US showed him that this practice is devastating beautiful, natural forests rich in wildlife - while the UK government's own research shows that it's worse for the climate than the coal it replaces. For more visit:-
http://www.theecologist.org/News/news_analysis/2987920/dirtier_than_coal_burning_forests_for_green_energy.html

Scientists unlock 'green' energy from garden grass

21st July 2016, unattributed, ScienceDaily

Garden grass could become a source of cheap and clean renewable energy, scientists have claimed. A team of UK researchers, including experts from Cardiff University's Cardiff Catalysis Institute, have shown that significant amounts of hydrogen can be unlocked from fescue grass with the help of sunlight and a cheap catalyst.

It is the first time that this method has been demonstrated and could potentially lead to a sustainable way of producing hydrogen, which has enormous potential in the renewable energy industry due to its high energy content and the fact that it does not release toxic or greenhouse gases when it is burnt. Co-author of the study Professor Michael Bowker, from the Cardiff Catalysis Institute, said: "This really is a green source of energy.

"Hydrogen is seen as an important future energy carrier as the world moves from fossil fuels to renewable feedstocks, and our research has shown that even garden grass could be a good way of getting hold of it." The team, which also includes researchers from Queen's University Belfast, have published their findings in the Royal Society Journal Proceedings A. For more visit:-
https://www.sciencedaily.com/releases/2016/07/160721072755.htm

Britain's energy dilemma: if not nuclear power, then what?

30th July 2016, Robin McKie, The Guardian

Britain faces a problem in coping with its complex energy demands. It needs to provide extra energy to meet rising demands for power in coming decades but at a reasonable cost – while also reducing carbon emissions by considerable levels in order to meet its climate change commitments. This is not an easy combination to achieve. However, Hinkley Point was considered by many experts to be a crucial aid in reaching these goals.

With its massive 3.2bn watt capacity, Hinkley Point C would provide 7% of the nation's electricity when completed. Night and day, it would help to generate the power that would keep the nation working while renewable energy sources, mainly wind plants, would provide the rest of the electricity needed by homes and offices. "You have to have some baseload source to provide power when it is utterly calm and renewables are not providing energy," explains Bob Ward, of the Grantham Research Institute. "Gas and coal plants – which can also supply that baseload – will no longer be viable in future because of their carbon emissions, which cause global warming. You are then left with nuclear."
For more visit:- https://www.theguardian.com/uk-news/2016/jul/30/hinkley-point-c-if-not-nuclear-then-what-renewables-ccs

A new leaf: Scientists turn carbon dioxide back into fuel

30th July, unattributed, ScienceDaily

In a new study from the U.S. Department of Energy's Argonne National Laboratory and the University of Illinois at Chicago, researchers have found a similar way to convert carbon dioxide into a usable energy source using sunlight. To make carbon dioxide into something that could be a usable fuel, Curtiss and his colleagues needed to find a catalyst -- a particular compound that could make carbon dioxide react more readily. When converting carbon dioxide from the atmosphere into a sugar, plants use an organic catalyst called an enzyme; the researchers used a metal compound called tungsten diselenide, which they fashioned into nanosized flakes to maximize the surface area and to expose its reactive edges.

While plants use their catalysts to make sugar, the Argonne researchers used theirs to convert carbon dioxide to carbon monoxide. Although carbon monoxide is also a greenhouse gas, it is much more reactive than carbon dioxide and scientists already have ways of converting carbon monoxide into usable fuel, such as methanol. "Making fuel from carbon monoxide means travelling 'downhill' energetically, while trying to create it directly from carbon dioxide means needing to go 'uphill,'" said Argonne physicist Peter Zapol, another author of the study.

Although the reaction to transform carbon dioxide into carbon monoxide is different from anything found in nature, it requires the same basic inputs as photosynthesis. "In photosynthesis, trees need energy from light, water and carbon dioxide in order to make their fuel; in our experiment, the ingredients are the same, but the product is different," said Curtiss. For more visit:-
https://www.sciencedaily.com/releases/2016/07/160730154602.htm

Progress for plans to bring coal mining back to West Cumbria

31st July, Greg Hoare, ITV News

Plans to bring more than 500 mining jobs to west Cumbria are moving forwards. West Cumbria Mining intends to create a coking coal mine off the coast near Whitehaven. The company says there is more than 750 million tonnes of coal across the area, and it plans to produce two to three million tonnes of hard to semi-soft coking coal a year. The coal would be sold to steel companies in the UK and Europe, and the man behind the plan, CEO Mark Kirkbride, says a recent steel industry slump shouldn't affect their plans.
For more visit:- http://www.itv.com/news/border/2016-07-31/progress-for-plans-to-bring-coal-mining-back-to-west-cumbria/

Recycling carbon dioxide

3rd August 2016, unattributed, ScienceDaily

Turning carbon dioxide into stored energy sounds like science fiction: researchers have long tried to find simple ways to convert this greenhouse gas into fuels and other useful chemicals. Now, a group of researchers led by Professor Ted Sargent of the University of Toronto's Faculty of Applied Science & Engineering have found a more efficient way, through the wonders of nanoengineering.

Drs. Min Liu and Yuanjie Pang, along with a team of graduate students and post-doctoral fellows in U of T Engineering, have developed a technique powered by renewable energies such as solar or wind. The catalyst takes climate-warming carbon-dioxide (CO_2) and converts it to carbon-monoxide (CO), a useful building block for carbon-based chemical fuels, such as methanol, ethanol and diesel. For more visit:-
https://www.sciencedaily.com/releases/2016/08/160803140144.htm

Scientists convert carbon dioxide, create electricity

4th August 2016, unattributed, ScienceDaily

While the human race will always leave its carbon footprint on the Earth, it must continue to find ways to lessen the impact of its fossil fuel consumption. "Carbon capture" technologies -- chemically trapping carbon dioxide before it is released into the atmosphere -- is one approach. In a recent study, Cornell University researchers disclose a novel method for capturing the greenhouse gas and converting it to a useful product -- while producing electrical energy.

Lynden Archer, the James A. Friend Family Distinguished Professor of Engineering, and doctoral student Wajdi Al Sadat have developed an oxygen-assisted aluminium/carbon dioxide power cell that uses electrochemical reactions to both sequester the carbon dioxide and produce electricity.
Their paper, "The O_2-assisted Al/CO_2 electrochemical cell: A system for CO_2 capture/conversion and electric power generation," was published July 20 in *Science Advances*.

The group's proposed cell would use aluminium as the anode and mixed streams of carbon dioxide and oxygen as the active ingredients of the cathode. The electrochemical reactions between the anode and the cathode would sequester the carbon dioxide into carbon-rich compounds while also producing electricity and a valuable oxalate as a by-product. For more visit:-
https://www.sciencedaily.com/releases/2016/08/160804171642.htm

Melting ice sheet could expose frozen Cold War-era hazardous waste

4th August 2016, unattributed, ScienceDaily

Climate change is threatening to expose hazardous waste at an abandoned camp thought to be buried forever in the Greenland Ice Sheet, new research has found. Camp Century, a United States military base built within the Greenland ice sheet in 1959, doubled as a top-secret site for testing the feasibility of deploying nuclear missiles during the Cold War. When the camp was decommissioned in 1967, its infrastructure and waste were abandoned under the assumption they would be entombed forever by perpetual snowfall. For more visit:-
https://www.sciencedaily.com/releases/2016/08/160804141252.htm

Hot 'new 'material found to exist in nature

6th August 2016, unattributed, Science Codex

One of the hottest new materials is a class of porous solids know as metal organic frameworks (MOFs). These man=made materials were introduced in the 1990s, and researchers around the world are working on ways to use them as molecular sponges for applications such as hydrogen storage, carbon sequestration, or photovoltaics.

Now, a surprising discovery by scientists in Canada and Russia reveals that MOFs also exist in nature – albeit in the form of rare minerals found so far in Siberian coal mines. The findings, published in the Journal Science Advances, "completely changes the normal view of these highly popular materials as solely artificial, 'designer' solids, says senior author Tomislav Friščić, an associate professor of chemistry at McGill University in Montreal. "This raises the possibility that there might be other, more abundant MOF materials out there."
For more visit: - http://www.sciencecodex.com/hot_new_material_found_to_exist_in_nature-187766

Global warming limit 'close to being broken'

7th August 2016, unattributed, RTE News

A global warming limit agreed by world leaders with great fanfare has come close to being broken just eight months on, it is reported.

Climate change scientists have warned it may be nearly impossible to keep global warming below the 1.5C target set at the Paris negotiations in December after temperatures peaked at 1.38C above pre-industrial levels in February and March. The Intergovernmental Panel on Climate Change (IPCC) is due to meet in Geneva this month to outline how the Paris deal, which slashed the limit from 2C to 1.5C, will be implemented.

However, co-chair of the IPCC working group on adaptation to climate change, Stanford University Professor Chris Field, told the newspaper staying below 1.5C looked "impossible or at the very least, a very, very difficult task". Targets for bringing an end to the use of coal-powered fire stations and the combustion engine are reported to be on the likely agenda in Geneva.

Dr Ben Sanderson, of the National Centre for Atmospheric Research in Boulder, Colorado, suggested that it would take a global effort with such measures on an unprecedented scale to keep the target - a "tall order". "If the world puts all its resources into finding ways to generate power without burning fossil fuels, and if there were international agreements that action must happen instantly, and if carbon emissions were brought down to zero before 2050, then a rise of no more than 1.5C might just be achieved," Dr Sanderson said.

Professor Jim Skea, a member of the UK government's committee on climate change, said "negative emission technology" would have to play a part by actively removing carbon dioxide from the atmosphere.
For more visit:- http://www.rte.ie/news/2016/0807/807499-global-warming/

Brexit worsens U.K. energy supply risk as coal closures loom

22nd August 2016, Rachel Morison, Bloomberg

Britain's decision to leave the European Union may push back its planned exit from coal, a mainstay in the nation's energy supply for more than a century. As the region's second-biggest economy plans to close its last coal-fired power plant in less than a decade, it will be forced to rely more than ever on imports of natural gas and electricity. By leaving the EU, Britain could lose easy access to foreign supplies through the bloc's single market, just as it plans to almost triple the number of power cables linking it to European nations by 2022.

U.K. utilities have closed coal plants that made up 9 percent of total generation capacity in the past year, adding to a shrinking supply margin that forced National Grid Plc to pay about 150 million pounds ($196 million) to keep already idled stations on standby since 2014. Some of the gap was meant to be filled by Electricite de France SA's 18 billion-pound Hinkley Point C reactor, now thrown into doubt by new Prime Minister Theresa May's call for more time to review the project.

"Brexit could make keeping the lights on more challenging," said Alex Harrison, counsel at Hogan Lovells in London, who specializes in electricity markets and utilities. If security of supply is threatened, "we may even see coal-fired generation being kept on post 2025," he said. Exiting the EU will put Britain at a disadvantage, as it may be excluded from having a say in rules for the bloc's wholesale power and gas markets, according to Paul Dorfman, a senior research fellow at the Energy Institute, University College London. "The U.K. won't be taken into account in decisions about the EU energy market and there is a real potential risk that Brexit will adversely affect Britain's energy market," Dorfman said.

For more visit:- http://www.bloomberg.com/news/articles/2016-08-22/brexit-worsens-u-k-energy-supply-risk-as-coal-retirement-looms

Climate change began in the 1830s: new research

25th August 2016, unattributed, 9news

Human-induced global warming started as early as the Industrial Revolution in the 1830s – much earlier than previously thought, research published today reveals. A study published in Nature showed the comparatively low levels of greenhouse gases of the 1830s brought about changes in global temperature.

"The results were clear. The climate warming we are witnessing today started about 180 years ago," lead researcher Nerilie Abram from ANU said. "When manufacturing was really just starting and we were only just starting to harness fossil fuels, even those small increases in carbon dioxide in the atmosphere were enough to make a measurable impact on Earth's climate."

The findings contradict common belief that human-caused climate change was a phenomenon which began in the 20th century. "In the tropical oceans and the Arctic in particular, 180 years of warming has already caused the average climate to emerge above the range of variability that was normal in the centuries prior to the Industrial Revolution," Associate Professor Abram said. The scientists tracked historical temperatures by analysing coral, cave decorations, tree rings and ice cores. Carbon dioxide emissions started to rise in the Industrial Revolution largely due to the development of the steam engine, which burned wood and coal to power boats and factories.

Source:- http://www.9news.com.au/technology/2016/08/25/11/10/climate-change-began-in-the-1830s-new-research

US DOE invests $28M in research projects to enable near-zero-emitting fossil fuel–based power generation

25th August 2016, Sonal Patel, Power Magazine

Fourteen research and development projects to scale up coal-based advanced combustion power systems and gasification processes and improve costs and endurance of solid oxide fuel

cells (SOFCs) have won investments of more than $28 million from the Department of Energy (DOE).
The Energy Department on August 24 announced it has selected the projects to help "enable cost-competitive, fossil fuel–based power generation with near-zero emissions."
The projects include:

- **Chromium Vapor Sensor for Monitoring SOFC Systems**—Auburn University (Auburn, Ala.). DOE: $171,465
- **Development of Chromium and Sulfur Getter for SOFC Systems**—University of Connecticut (Storrs, Conn.). DOE: $500,000
- **High Temperature Anode Recycle Blower for SOFC**—Mohawk Innovative Technology (Albany, N.Y.) in collaboration with FuelCell Energy. DOE: $600,000
- **Highly Selective and Stable Multivariable Gas Sensors for Enhanced Robustness and Reliability of SOFC Operation**— General Electric (Niskayuna, N.Y.) in partnership with SUNY Polytechnic Institute and GE-Fuel Cells LLC. DOE: $545,290
- **Minimizing CR-Evaporation From Balance of Plant Components by Utilizing Cost-Effective Alumina-Forming Austenitic Steels**— West Virginia University (Morgantown, W.Va.) in partnership with Oak Ridge National Laboratory, Carpenter Technology Corporation, and FuelCell Energy. DOE: $369,999
- **Robust SOFC Stacks for Affordable and Reliable Distributed Generation Power Systems**— Redox Power Systems (College Park, Md.), the University of Maryland Research Center, and the Center for Advanced Life Cycle Engineering. DOE: $3,000,000
- **Transformational SOFC Technology**—Fuel Cell Energy (Danbury, Conn.). DOE: $3,000,000
- **Metal-Supported Ceria Electrolyte-Based SOFC Stack for Scalable, Low Cost, High Efficiency and Robust Stationary Power Systems**—Cummins Power Generation (Minneapolis, Minn.). DOE: $3,935,630
- **Performance and Reliability Advancements in a Durable Low Temperature Tubular SOFC**— Acumentrics (Walpole, Mass.) and the University of South Carolina. DOE: $2,456,233

For more visit:- http://www.powermag.com/doe-invests-28m-in-research-projects-to-enable-near-zero-emitting-fossil-fuel-based-power-generation/

Researchers work towards using carbon dioxide as an energy source

26th August 2016, Christopher Maynard, Consumer Affairs

While automakers are scrambling to win the race for autonomous vehicles, eco-conscious consumers may be more interested in developments regarding clean-burning fuels. Concerns over global warming and climate change continue to mount, and scientists are continuously working on new ways to provide energy at a lower environmental cost.

Now, a group of researchers from the University of Toronto (UoT) believe that carbon dioxide may be the answer. They theorize that using silicon could enable the energy sector to turn carbon dioxide emissions into an energy-rich fuel source. The best part, they say, is that this new energy source would generate no harmful emissions in the exchange. Experts have thought of using carbon dioxide as a fuel source for some time, but up to this point they couldn't produce a material that met the necessary qualifications, of which there are many. "A chemistry solution to climate change requires a material that is a highly active and selective catalyst to enable the conversion of carbon dioxide to fuel. It also needs to be made of elements that are low cost, non-toxic and readily available," said Geoffrey Ozin, a chemistry professor at UoT and head of its Solar Fuels Research Cluster.

However, silicon could potentially be a perfect element for this process; it is the seventh most abundant element in the whole universe and the second most abundant element in the earth's crust, so finding enough of it wouldn't be too much of a problem. Scientists believe that they could produce energy via silicon by allowing it to convert carbon dioxide with the aid of natural sunlight. In basic terms, engineers would create or harvest silicon nanocrystals that would absorb sunlight. As a result, these crystals could convert carbon emissions into carbon monoxide, which could be used as an energy source.

"Making use of the reducing power of nanostructured hydrides is a conceptually distinct and commercially interesting strategy for making fuels directly from sunlight," said Ozin. While researchers are currently working towards finding ways to increase the activity of the nanocrystals, enhance the scale, and boost production rates, they believe that they can eventually create a demonstration unit, which could lead to a pilot solar refinery if successful.
Source:- https://www.consumeraffairs.com/news/researchers-work-towards-using-carbon-dioxide-as-an-energy-source-082616.html

Hinkley Point Nuclear Plant 'Not Essential' For UK Energy

26th August 2016, unattributed, Sky News

A new nuclear power plant at Hinkley Point is not needed for the UK to meet its energy and climate change targets, a report claims. The Energy and Climate Intelligence Unit (ECIU) argues that more wind farms and gas-fired power stations would be enough to keep the lights on, while also saving £1bn a year.

The new power infrastructure would also have to be combined with measures to manage energy demand, but the ECIU says its research shows Hinkley Point C is "not essential". Hinkley's future was thrown into doubt last month after Prime Minister Theresa May unexpectedly delayed approving the project**,** prompting China to urge a decision "as soon as possible".
For more visit: http://news.sky.com/story/hinkley-point-not-essential-for-uk-energy-10552188

Death knell for coal as UK stockpiles reach record low

26th August 2016, Tereza Pultarova, Engineering & Technology Magazine

The UK's stockpiles of coal have shrunk to less than 500,000 tonnes in 2015, the lowest level since the end of the First World War, heralding an end of the fossil fuel's era. The data released by the Department of Business, Energy and Industrial Strategy (BEIS) demonstrate the declining importance of coal in energy generation in the UK. This year, the dying industry witnessed several milestones on its way to extinction.

The number of workers employed in the sector dropped to only 2,000, a new record low. In May, the Carbon Brief website reported several instances when no electricity was being produced using coal – the first time since late 19th century. All of these events lasted for up to half a day. The diminishing presence of coal in the UK's energy mix is in line with the UK government's pledge from last November to completely eliminate the use of coal in energy generation by 2025. As it seeks to meet its emission reduction targets, the government intends to first replace coal with less polluting natural gas and nuclear generation before moving on towards fully renewable resources such as wind, solar or tidal power.

The stocks of coal have been low for several years but in 2015 for the first time dropped below 500,000. Some seven million tonnes were available in 1995, while as much as 22 million tonnes was held at collieries in 1965. The size of the UK coal industry has been declining since the miners' strike of 1984-5, which began a rolling programme of pit closures across the country.

In 1984, just before the strike began, a total of 139,000 people were employed by mining companies. A decade later the number had dropped to 7,000. At its height in the 1920s, the UK coal industry used to employ over a million people in 3,000 coal mines, with coal towns in

Yorkshire, East Midlands and north-east England housing generations of miners. By 1963, the number of operating collieries dropped to 1,000. In 1987, only 100 were still running. The UK's last deep coal mine, in Kellingley, North Yorkshire, closed in December 2015.
Source:- http://eandt.theiet.org/news/2016/aug/coal-stocks-record-low.cfm

EPSRC - new projects started after 1st September 2015

Conventional Generation & Combustion Projects - None

CCS projects

Grant reference no	Title	Start date	End date	Organisation	Value (£)
EP/K000446/2	UKCCSRC - The United Kingdom Carbon Capture and Storage Research Centre	01.01.16	30.09.17	University of Sheffield	4,041,368
EP/N032942/1	Cation-Controlled Gating for Selective Gas Adsorption over Adaptable Zeolites	01.07.16	30.06.19	University of St Andrews	348,301
EP/N024567/1	CCS from Industrial clusters and their Supply chains (CCSInSupply).	01.04.16	31.03.19	Newcastle University	1,024,865
EP/N029429/1	CO2 shipping-compression, liquefaction and dehydration (CO2 LIQUID)	01.06.16	31.05.18	Cranfield University	101,215
EP/J020184/2	Computational Modelling and Optimisation of Carbon Capture Reactors	12.09.15	11/11/17	University of Surrey	227,091
EP/N09966/1	Direct CO2 Capture	01.11.15	31.10.16	University of Cambridge	122,432
EP/N007859/1	Multi-scale engineering toolbox for systematic assessment of porous materials in the context of adsorption and membrane separations	01.03.16	31.08.18	University of Edinburgh	764,651
EP/N02450/1	Novel adsorbents applied to integrated energy-efficient industrial CO2 capture	01.04.16	31.03.19	Heriot-Watt University	985,463
EP/N013883/1	Photonic fibre technologies for solar fuels catalysis	01.02.16	31.01.18	University of Southampton	486,940
EP/N009525/1	Polymer-promoted Cu-catalysed conversion of CO2 to CH4	21.01.16	30.04.16	Swansea University	99,422
EP/N00938X/1	Ultra-small Metal Particles for the Storage and Conversion of CO2, CH4 and H2	01.12.15	30.11.17	University of Greenwich	100,297
EP/N009533/1	Utilisation of Solar Energy and Electrocatalytic Processes for the Low Energy Conversion of CO2 to Fuels and Chemicals	01.03.16	28.02.19	Cardiff University	1,296,214
EP/N024613/1	Versatile Adsorption Processes for the Capture of Carbon Dioxide from Industrial Sources - FlexICCS	01.06.16	31.05.19	University of Edinburgh	860,548

£10,458,807

BIOENERGY projects

Grant reference no.	Title	Start date	End date	Organisation	Value (£)
EP/N509930/1	A highly efficient, cost-effective syngas and emissions filtration platform technology for cleaner energy	01.02.16	31.01.17	University of Surrey	109,027

EP/K036548/2	Development of fast pyrolysis based advanced biofuel technologies for biofuels	12.09.15	11.07.18	University of Surrey	750,196
EP/N009746/1	Liquid Fuel and bioEnergy Supply from CO2 Reduction	01.03.16	29.02.20	Newcastle University	1,924,296
EP/N009924/1	Low carbon jet fuel through integration of novel technologies for co-valorisation of CO2 and biomass	01.06.16	31.12.19	Heriot-Watt University	1,800,518
EP/N030141/1	Negative Emission Technologies and the food-energy-water-neXus (NETX)	01.04.16	31.03.19	University of Exeter	235,429
EP/P510336/1	Pre-commercial technology validation of a clean cold renewable syngas production plant.	01.06.16	31.05.17	Cranfield University	81,247
EP/N021746/1	Study of Novel Biofuels from Biomass - Methyl-Furans (MF)	01.05.16	30.04.19	University of Birmingham	931,604
EP/P51035X/1	Upgrading woody biomass to biocoal using a novel microwave induced plasma technology	01.04.16	31.03.17	Liverpool John Moores University	54,611
EP/N030095/1	Urban green infrastructure: optimising local food and fuel production for regional sustainability and resilience	01.06.16	31.05.21	University of Sheffield	777,682
					£6,664,610

CALENDAR OF COAL RESEARCH MEETINGS AND EVENTS

Date	Title	Location	Contact
3rd to 6th October 2016	6th Annual Coal Power Asia Conference	Shangri-La Hotel, Kuala Lumpur, Malaysia	Web site: http://www.coalpowerasia.com Email: karellano@accessintel.com
6th and 7th October 2016	5th International Advanced Coal Technologies Conference	Jackson Hole, Wyoming, USA	For more information, visit: - http://www.uwyo.edu/ser/conferences/international-conferences/2015-iactc.html
9th and 10th November 2016	1st IEA CCC Workshop of Coal Quality	Habitat Centre, New Delhi, India	For more information visit:- http://coalqt.coalconferences.org/ibis/CoalQT/home
13th to 18th December 2016	Coal-Gen	Orange County Convention Center, Orlando, Florida USA	For more information visit:- http://www.coal-gen.com/index.html
6th to 8th February 2017	Eurocoalash 2017	Brno, Czech Republic	For more information visit:- http://www.fch.vut.cz/eca2017/
March 2017	12th IEA CCC Workshop on Mercury Emissions from Coal	South Africa	For more information visit:- http://www.iea-coal.org.uk/site/2010/our-conferences-and-workshops?
8th to 12th May 2017	The 8th International Conference on Clean Coal Technologies	Cagliari, Italy	For more information visit the Conference website: www.cct2017.org
17th to 19th July 2017	2nd Chemistry in Energy Conference	University of Sheffield	For more information visit:- http://www.maggichurchouseevents.co.uk/cec/