



Newsletter of The Energy Sector



ENERGY SECTOR UPDATE



Dear Members of the RSC Energy Sector,

Welcome to a special bumper Christmas 2011 Newsletter in lieu of the traditional October edition! We held our last AGM meeting on the 22nd September at Imperial College London. This was a good opportunity to recount how the Energy Sector had developed since being established in 1996, and we now have a membership of almost 650.

There is no doubt that energy is indeed of interest to many RSC members and we recognise the need to ensure we are engaging RSC members through relevant activities. This is particularly important under the new rules for RSC membership funds that will be related to our ability to attract members.

Having realised the need to have a strategy for the Energy Sector to plan and organise seminars and events while keeping a healthy budget, a Task Force was set up to develop a strategy for future RSC Energy Sector activities. The April 2011 Newsletter informed on the initial progress made by the Task Force and further information is reported in this issue.

This year we jointly organised 'The European Industrial Emissions Directive (IED)' seminar with the Environment Division of the Coal Research Forum (CRF) and the Combustion Engineering Association (CEA), held on the 22nd September at Imperial College London. There are on-going plans for seminars and conferences for 2012 that will follow the operational procedures recommended by the Task Force. In addition, this year we took active part in consultation documents and we also provided input into the RSC position on the UK energy mix.

We have said good bye to two members of the committee, Dr Steve Waygood and Mr Graham Henney. We would like to thank them for their long-standing contributions to the Energy Sector going back to its inception. We opened nominations to fill these two vacancies on the committee following the RSC Interest Group Rules and I am pleased to report that Dr Anna Weston and Mr John Greene are duly appointed to the committee.

Finally, I welcome all the members' suggestions and involvement in the Energy Sector activities and would like to extend an invitation to contact me if you want to be involved.

Prof. Mercedes Maroto-Valer, Chair.

NEW COMMITTEE MEMBERS

Dr. Anna Weston *MRSC*

I am delighted to join the Executive Committee of the Energy Sector and hope I will be able to represent the views of the carbon sequestration community.

I am currently employed as a Knowledge Transfer Manager at the Environmental Sustainability Knowledge Transfer Network (ESKTN) where my role is to drive the development of innovation in the area of carbon sequestration. There are 15 Knowledge Transfer Networks in the UK who are funded by the Technology Strategy Board to improve the UK's innovation performance, by increasing the breadth and depth of the knowledge transfer of technology into UK-based businesses, and by accelerating the rate at which this occurs.

My role involves working with academics and industrialists who are changing the way we think about carbon dioxide, from it being a pollutant and a problem to a useful resource which can be used to rejuvenate arable land, make building materials and even replace fossil fuels. This could potentially lead to the development of a whole new manufacturing industry in the UK.

I also work closely with policy makers, government bodies and NGO's to influence their thinking in this area and hopefully their future decisions. Prior to this role I led the RSC's Roadmap programme, which gave me a good understanding of the challenges facing the chemical sciences in meeting future energy demands.

I aim to bring my knowledge and new way of thinking to the Energy Sector Committee. I hope to make use of my high level contacts (from academia, industry, NGOs and government departments and bodies), highlight relevant funding opportunities to Energy Sector Members and utilise my experience of organising bespoke events for the scientific community.

Although I do work closely with the more traditional carbon capture and storage experts, I would welcome comments and thoughts from Energy Sector members working in this area and will do my best to ensure that they are reflected in the RSC's Energy Sector activities.

Please feel free to contact me:
Anna.Weston@earth.ox.ac.uk.



NEW COMMITTEE MEMBERS

Mr. John Greene *MRSC*

I have worked in the Power Generating Industry for the large part of my career in Chemistry. This was initially in the Central Electricity Generating Board (CEGB) and its successor companies (National Power and Nuclear Electric). This was followed by a five year spell working for North West Water (now United Utilities) and provided project management support for the commissioning of several new Wastewater Treatment Plants on the coast in the North West. This has been followed by ten years working for AMEC in both Nuclear and Conventional Power Generation. I have served on the RSC Ethics Committee and have always supported RSC activities and interests.

LONG SERVICE AWARDS

We will be honouring Alan Williams with a RSC Long Service Award for his contribution as a former chair of the Energy Sector Executive Committee since its inception. As Steve Waygood and Graham Henney leave the committee, we will also honour them for their exceptional service for well over a decade to the Energy Sector by presenting them with RSC Long Service Awards. These awards will be presented in early 2012 and the committee thanks Alan, Steve and Graham for their work and support.

FUTURE STRATEGY TASK FORCE

The April 2011 Newsletter reported on the formation of a Future Strategy Task Force served by three committee members, David McCaffrey (chair), Chris Satterley and Richard Wain who are developing a strategy for future RSC Energy Sector activities. The Future Strategy Task Force has continued to make significant progress in achieving its remit over the last six months, since the last Energy Sector Newsletter.

The Task Force has prepared an electronic survey, approved by the Executive Committee, which was circulated to Energy Sector members by email in early July 2011, with follow up reminders. With a closing date of 15th September 2011, the objective of this survey was to analyse the membership of the Energy Sector and identify their main interests so that the Executive Committee can plan for future Energy Sector activities and seminars of direct relevance to its members.

There were nearly 200 responses from members to this survey and the Task Force held its second meeting on the closing date of the survey, when it carried out a preliminary analysis of these survey results. This preliminary analysis suggests that the membership would be interested in attending seminars on several areas of the nuclear industry including materials issues and nuclear waste

management, in the renewables field regarding energy storage and solar fuels/photovoltaics, as well as some specific issues in the fossil fuel industry.

In parallel with this survey, the Task Force has begun the drafting of their report to the Executive Committee. This report contains five sections, which include, a background and introduction describing the remit and methodology of the Task Force, a section on the general policies and procedures recommended by the Task Force for the operation of the Energy Sector, an analysis of the membership of the Energy Sector and the identification of their interests for future Energy Sector activities and seminars, the recommended procedure for the efficient planning of future Energy Sector events and seminars and a review of financial models for these events.

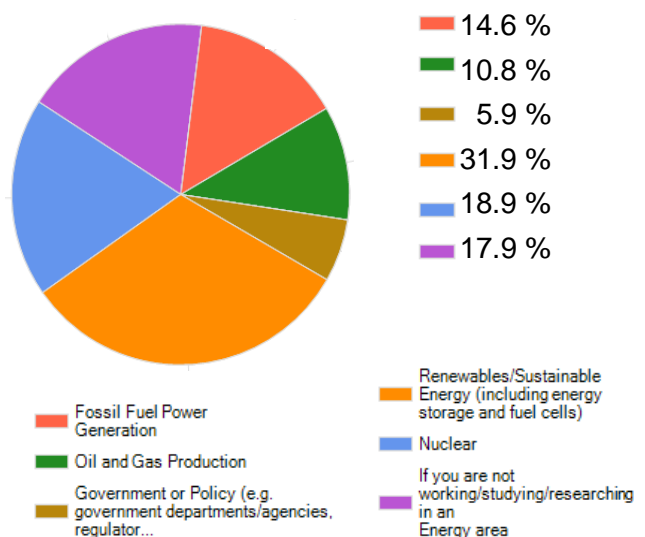
A preliminary draft of this document was presented to the Executive Committee in June 2011, when many useful comments and inputs were received. The preliminary results of the member's survey were presented to the Executive Committee in September, together with a more complete draft of the report, when again useful input was received.

The target of the Task Force is to carry out a full in depth analysis of the survey results and to complete its report containing these results for presentation to the Executive Committee before Christmas.

Dr. David McCaffrey, Task Force Chair.

MEMBER ENERGY INTERESTS

The electronic survey set out to analyse the Energy Sector membership and identify their main interests to inform on future Energy Sector activities. The complete analysed results will be disseminated in due course as part of the findings from the Future Strategy Task Force. However, below gives an indication of the areas of Energy that the respondents said they worked or undertook research in.



WHAT'S 'HOT' IN THE ENERGY SECTOR

SHALE GAS ROCKS NORTH WEST ENGLAND

The recent discovery of large reserves of shale gas in Lancashire could help secure the UK's long term energy supplies, but is there a cost? Caudrilla Resources announced the discovery in September, estimating a total gas reserve of some 200 trillion cubic feet.¹ Even if only 10% of the total reserve was commercially viable to extract, it could still meet the UK's gas supply demand for the next 15 years and provide thousands of jobs in the region.² These findings represent only one area of the UK (437 square miles) and the on-going exploration of other sites is anticipated to find further large reserves. Similar discoveries in the USA have helped to drive the cost of gas down by as much as 50%, but extracting the gas has not been without consequences.

Leakages of fracking fluid which are used under high pressure to break the rock bed underground and release the gas have been shown to pollute groundwater supplies in several regions of the USA, killing plants and animals in the affected areas.³ In response, fracking has ceased in New York until a full investigation has been undertaken into the potential side-effects of the process.

These incidents, along with Caudrilla Resources accepting responsibility for a recent series of small earthquakes in the North West of England, have caused concern and led to the creation of opposition groups. Further concerns have been raised over the future of the UK's renewable energy policy, when vast quantities of energy are sitting on the doorstep.

1 'Drilling results spur hope of big shale gas reserves' Reported 22nd September 2011 <http://www.cuadrillaresources.com/cms/wp-content/uploads/2011/09/FT-22-09-11.jpg>

2 'Our coal industry is in tatters and the gas is running out. Is there an alternative? Incredibly, there really is' Reported 5th November 2011 <http://www.dailymail.co.uk/home/moslive/article-2053686/UK-shale-gas-Coal-industry-tatters-gas-running-alternative.html>

3 'Natural gas from shale rock promises energy revolution' Reported 8th September 2010 <http://www.bbc.co.uk/news/science-environment-11175386>

VOLATILE MONTHS FOR PHOTOVOLTAICS WHILST WIND POWER TAKING OFF



The sudden announcement by the UK Government to slash the Feed in Tariff (FiT) rates for small-scale solar energy producers (<4 kWh) in October caused a rush to complete installations by 12th December 2011. According to the changes, installations that were operational before this date would continue to receive 43.3p per kWh for the next 25 years, whilst new installations would only receive 21p per kWh.¹ Many projects could not be completed in time and planned installations to both private properties and council houses across the country have been shelved.

However, environmental charity Friends of the Earth, along with two solar energy companies - Solarcentury and HomeSun – have successfully applied for a judicial review of the Government's actions, claiming that they acted unlawfully.² A report commissioned by Friends of the Earth and Cut Don't Kill suggested that the changes could cost 29,000 jobs and lose £230 million per year in tax income. If the High Court rules against the Government, many more installations should be possible before the revised deadline.

Meanwhile, wind power has rapidly gained momentum, with small-scale wind turbines receiving planning permission on farmland across the country. Anglesey alone currently has 55 active planning applications, causing concern amongst residents that the island will be overcome with larger installations, which has led to a review of local planning policy. In addition, UK Prime Minister David Cameron recently announced the Government's commitment to off shore wind farms as part of a drive to develop a £200bn renewable energy infrastructure for the country.³

1 'UK Government proposed changes to solar PV Feed-in-Tariffs' <http://www.energysavingtrust.org.uk/Generate-your-own-energy/Financial-incentives/UK-Government-proposed-changes-to-solar-PV-Feed-in-Tariffs>

2 'Solar subsidy cut challenge allowed' Reported 15th December 2011 <http://www.bbc.co.uk/news/uk-16201496>
<http://www.angleseyagainstwinturbines.co.uk/directions.php>

3 'PM backs wind investment drive' Reported 28th November 2011 http://www.decc.gov.uk/en/content/cms/news/pn11_102/pn11_102.aspx

Photographs courtesy of <http://www.publicdomainpictures.net/>





REPORTS FROM RECENT MEETINGS



JOINT COAL RESEARCH FORUM (CRF) / COMBUSTION ENGINEERING ASSOCIATION (CEA)
/ ROYAL SOCIETY OF CHEMISTRY ENERGY SECTOR (RSC-ES) SEMINAR ON
'EUROPEAN INDUSTRIAL EMISSIONS DIRECTIVE'
Imperial College London, London, 22nd September 2011

Over 70 scientists, engineers and civil servants attended the recent European Industrial Emissions Directive (IED) Seminar in London jointly hosted by the CRF, CEA and RSC-ES. The meeting was opened by David Gent, Vice-Chair of the CEA, who welcomed the attendees and outline the role and activities of the CEA, CRF and RSC, including the CEA's important role representing UK industrial-scale boiler users on LCPD and IED issues and within relevant technical working groups.

Mr Gent chaired the first session with the keynote presentation delivered by Mr Richard Vincent, Head of Industrial Pollution Control, DEFRA. Mr Vincent presented a comprehensive review of the IED, highlighting that the IED was a recasting of 7 other European Directives concerned with industrial emissions (including the LCPD, IPPC & WID). The main change with previous directives is concentrated in the area of Large Combustion Plant (> 50 MW_{th}) with new, reduced emissions limits for both current and new plant. Unlike the LCPD, the IED's emissions limit values (ELVs) could only be finalised based on the adopted Best Available Technique (BAT) conclusions from the BREF documentation that was still in the early stages of production. The IED is due to come into force for existing Large Combustion Plant from the 1st of January 2016. Mr Vincent concluded that he fully expected the UK to utilise the Transitional National Plan (TNP) and other arrangements within the IED to assist industry in making that transition

Dr Tim Rotheray from the Combined Heat and Power Association (CHPA) followed on with a view from the users of combustion plant. Dr Rotheray stated that the CHPA broadly supported the IED and welcomed the news that the LCP definition was maintained at 50 MW_{th} and above. However, concern was expressed at the ELV levels and their impacts on small, currently operational plant. CHP users were concerned that the investment costs needed to meet these limit values could be excessive and potentially commercially damaging. Dr Rotheray finished with a plea to regulators that the IED should be considered in the wider policy context when applying it to LCP.

Anthea Day, Sembcorp Industries (operator of boiler plant at the former ICI Wilton site) reported on the activities on the CEA IED and BREF Technical Working Group and her role as representative on the BREF Seville Technical Working Group. Ms Day described the UK's position on the last BREF exercise as there being a lack of data on which the BREF was based and that more data was required for the latest BREF currently in production in Seville. The IED gives three options for operators of large combustion plant; 1) Comply with the ELVs, 2) Join a TNP (emissions trading schemes) or 3) opt for limited life derogation (up to 17,500 hours) an option much more suitable for utility operators rather than industrial. Ms Day finished her presentation with an update of the latest status of the BREF process; inputs to this have been coordinated in the UK by the CEA Technical Working Group for industrial boilers.

Steve Freeman from the Confederation of Paper Industries was next to give a view from his sector. There are currently 42 paper mills operational in the UK all operating under the EUETS as of 2010, supplying 4.2 million tonnes of paper products per annum. Mr Freeman detailed the reduction in the number of mills by over 50% in the last 10 years in the UK and expressed concern over some of the changes being brought in by the IED. In particular, concern was expressed about the consultation timescales within the IED and the fact that the BREF was significantly delayed, leading to uncertainty over ELVs. Mr Freeman also discussed the effects of the interactions of the IED with other legislation that may further increase costs to his sector that were not foreseen in the individual legislation and the effects on emissions from transport that also affect the paper industry.

John Henderson from the Environment Agency began the second session (chaired by Prof. Mercedes Maroto-Valer, RSC Energy Sector Chair) provided details about the Agency's expectations for the transition to the IED arrangements and added further description of the TNP and limit life derogations available under the directive. Mr Henderson also stated that there was a unified UK position obtained in the Technical Working Groups between the government, NGOs and industry on the LCP BAT going into the BREF process, putting the UK in a relatively strong position. Also mentioned was the requirement, in the IED, for new plant to be carbon capture ready and the cost implications this may have. Mr Henderson finished by confirming the Agency's commitment to work with industrial partners to help them comply with the IED.

Report continued on the next page

REPORTS FROM RECENT MEETINGS

Dr Ian Rodgers, RWE npower plc, gave a perspective of the challenges faced by the utility sector and particularly RWE plant in the UK. Some new challenges for the sector include defined ELVs for CCGT plant (not present in the LCPD) and tighter SO₂ and dust ELVs for coal plant, although the flexibilities put in place in the final IED draft were welcomed. The utilities sector is facing decisions on which of the 3 routes allowed in the IED to take and this is likely to be undertaken on a plant-specific basis (as for the LCPD). Dr Rodgers highlighted that due to the link between ELVs and BAT conclusions, some decisions on this may have to be made without full knowledge of the requirements, increasing their inherent risk. He also mentioned the effect of other legislation such as the National Emissions Ceiling Directive and the Gothenburg Protocol on mercury emissions and that their interaction with the IED was important in determining the overall costs to the sector.

Mr Nigel Webley, Hamworthy Combustion Engineering Ltd., discussed the impact of the IED on oil & gas burners for LCP applications. Overall the picture presented was encouraging in that gas and gas oil low NOx burners were already capable of meeting the requirements of the IED under Appendix V. The only issue was reducing emissions with Heavy Fuel Oil usage.

Mr Peter Quinn, Tata Steel Europe, discuss the Steel Industry's perspective on the new legislation highlighting concerns with the new status of BAT AELs in determining ELVs. Mr Quinn stated that there was concern that this reduced the discretion of the competent authority in the member state to set appropriate emissions limits that genuinely had best environmental benefit. Also of concern was the rigour of the BAT/BREF process with limit data being the basis for the current BREF document. Mr Quinn finished his presentation outlining why he felt that the Iron and Steel LCP should be considered a special case under the LCP BREF due to some of the technical difficulties in applying abatement.

The final presentation of the day was delivered by Mr David Gent, this time representing British Sugar plc. Mr Gent outlined the current status of the sugar industry in the UK and that interesting fact that British Sugar are also one of the largest tomato producers in the UK utilising CO₂ from their CHP flue gas. Mr Gent echoed many of the concerns addressed above around the IED, but was also keen to look at its implications beyond combustion such as the requirement for additional inspections and waste capacity threshold. Mr Gent concluded by stating the need to recognise the value of CHP in the BREF, BAT and ELVs.

The meeting was brought to a close by Dr Trevor Drage, Chair of the Environment Division of the CRF with a short question and answer session. Overall, the meeting provided a significant amount of information on the IED and highlighted the common concerns across all industry sectors of the impacts of the new status of the BREF on existing plant and the need to consider the IED in the broader legislative and policy context.

Presentations from each of the speakers are also available from the Coal Research Forum website (<http://www.coalresearchforum.org/pastmeetings.html>)

Chris Satterley

26th EUROPEAN PHOTOVOLTAIC SOLAR ENERGY CONFERENCE & EXHIBITION (EU PVSEC) Hamburg, Germany, 5-9 September 2011

EU PVSEC is the world's largest scientific conference dedicated to photovoltaic (PV) solar energy and this year attracted 4,467 delegates to the conference and over 40,000 to the exhibition. The European PV Industries Association (EPIA) used this occasion to publish a new study on *Solar Photovoltaics: Competing in the Energy Sector*. Based on anticipated cost reductions and increasing performance of PV systems, EPIA forecast that PV will become competitive with grid electricity as soon as 2013 in some markets (e.g. Italy) and by 2020 across Europe. The EPIA study predicts Solar PV electricity will reach grid-parity for 24 million UK households by 2020 based on assumptions that PV system costs will decline by 50% and wholesale electricity prices will increase by a compound annual rate of 6.7% (2011-2020). With escalating silver metal prices, a key technology challenge emerged at the conference was to demonstrate solutions to reduce the cost of the printed silver metal contacts applied to the silicon cell that now represent half of the wafer-to-cell conversion cost and consumes 10% of annual global silver production. Base-metal plating technologies appear to be one promising solution.

Nigel Mason

REPORTS FROM RECENT MEETINGS

USING CO₂ AS A SUSTAINABLE FEEDSTOCK FOR THE FINE CHEMICALS INDUSTRY

Newcastle University, Newcastle, UK 21st September 2011

This was the third in a series of one day meetings organised by the EPSRC grand challenge network CO₂Chem with support from the University Research Centre in Catalysis and Intensified Processing at Newcastle University. This meeting focused on the applications of carbon dioxide in the production of small scale high value chemicals associated with the fine chemical and pharmaceutical sectors.

After a welcome by Professor Mike North and a introduction to the new Newcastle Institute for Research on Sustainability (NIREs) (<http://www.ncl.ac.uk/sustainability/>) by Professor Steve Bull, Professor Peter Styring gave an update on the CO₂Chem Network, introducing their latest report 'Carbon Capture and Utilisation the green economy' (www.lowcarbonfutures.org/.../clcf_ccu_report_21_july_final_sm.pdf).

A number of presentations were delivered throughout the day. This included two keynote speeches by Dr Richard Heyn (SINTEF Materials and Chemistry) and Dr Charlotte Williams (Imperial College London). Richard's presentation highlighted the many types of chemical reactions that CO₂ can undertake and Charlotte's addressed the work her research group had been undertaking in the catalytic activation of CO₂ for polymer synthesis.

The event also included breakout sessions to identify and challenges and opportunities in this area and a discussion session around the formation of consortia for the EU Seventh Framework Programme (FP7) Fine Chemicals from CO₂ part of the NMP call (supported by myself and Steve Hillier from Chemistry Innovation KTN). For more information on this call please see my blog: <https://ktn.innovateuk.org/web/westona/blogs>.

The take home message from the event for me was that there is a wide range of research going into making products from CO₂ which is showing that CO₂ can be successfully converted into some useful products which have a market value. Yes, there is no getting way from the large amounts of energy required to undertake these reactions and the fact they might well generate more CO₂ than they use, however when you start to combine these reactions with renewable energy technologies and advances in catalysis it all starts to get a little more interesting. Watch this space.

Anna Weston

EUROPEAN FUNDING SUPPORT

The EU Energy Focus, which is the new name for the UK Energie Helpline, is a free, Government funded service that aims to ensure that UK companies, research institutions and other organisations are well informed and have every chance of success in applying for and securing European funding for energy-related projects.

The support service covers the following programmes:

- 1) Seventh Framework Programme (FP7) - with a budget of 2.35 billion euros, there is significant EU funding for energy projects for research and technological development between 2007 and 2013.
- 2) Intelligent Energy Europe – with a budget of 727 million euros, this is the EU's tool for removing barriers to market uptake of technologies.
- 3) Fuel Cell and Hydrogen Joint Undertaking – supports research and technological development and demonstrations activities in the areas of fuel cell and hydrogen energy.
- 4) European Local Energy Assistance – provides technical assistance to structure and implement projects that will attract outside finance for cities and regions.
- 5) Energy Efficient Buildings Public Private Partnership – focuses on funding projects that wish to develop building and district concepts that have the potential to reduce energy use.

Services include: telephone and email helpline; monthly email updates; factsheets; one-to-one proposal clinics; information events; proposal review; and online support sessions.

For more information, go to the website (<http://www.energiehelpline.co.uk/>) or contact Kerry Young on 0161 874 3636 at energie@enviros.com.



CALENDAR OF UPCOMING EVENTS



THE EUROPEAN FORUM FOR ENERGY RESEARCH 2nd EUROPEAN ENERGY CONFERENCE (E2C)

Maastricht, Netherlands 17-20 April 2012

The biennial European Energy Conference will provide a forum focusing on the different aspects on the conversion of primary energy, renewable, fossil based and nuclear and the groundbreaking ideas in energy research. Participants will be provided with a vision of how the future of energy within Europe will look supported by keynote lectures which will include the recent achievements and challenges faced in each area. Topic areas include:

- Materials science for energy conversion and energy efficiency.
- Materials aspects related to nuclear fission and fusion.
- The progress in the nanosciences leading to improved materials for solar cells, batteries, fuel cells and thermoelectric materials; and including organic and inorganic light emitting materials for efficient illumination.
- The processes of the conversion of sunlight to electricity, heat and fuels – (artificial) photosynthesis, fuels from bacteria, algae and enzymatic processes optimised crops for fuel production.
- Improved efficiency of energy generation and usage involving more efficient catalytic processes for chemical substances and energy conversion.
- Aspects which have the potential to become “game changers” in the energy landscape including climate related effects and which require scientific exploration, e.g. in mobility and transport.

Further details can be found at <http://www.energy-conference.eu/>

9th EUROPEAN CONFERENCE ON COAL RESEARCH AND ITS APPLICATIONS (ECCRIA 9)

University of Nottingham, Nottingham 10-12 September 2012

Organised by the Coal Research Forum and building on the success of the previous ECCRIA conferences, this ninth conference bring together researchers in universities with participants from industry, who are also carrying out research or are interested in the application of the research in industry.

Papers are invited which describe applications in coal utilisation and preparation with particular reference to the following areas:

- Improving efficiency and reducing emissions for clean coal technologies in conventional combustion power generation, including co-firing with biomass and wastes, ash and slag issues.
- Advanced power generation, including enabling technologies.
- Industrial combustion.
- Gasification.
- CO₂ removal, transport and storage technologies, including oxyfuel combustion and chemical looping.
- Coal characterisation and plant diagnostics.
- All emissions issues, including alternative NO_x reduction techniques to meet 2016 NO_x limits.
- Carbonisation and other metallurgical uses
- Coal-derived products
- Coal preparation and handling.
- Underground coal gasification and coal bed methane, and all other coal conversion processes, including coal to liquids.

Authors of accepted papers will be invited to submit a full paper for inclusion in a Special Issue of the journal, Fuel. Research students are also strongly encouraged to submit papers, attend and give presentations and there will be a reduced fee for students.

Further details can be found at <http://9.eccria.org/ibis/eccria9/home>

CALENDAR OF UPCOMING EVENTS

2nd INTERNATIONAL WORKSHOP ON CO-FIRING BIOMASS WITH COAL

Hotel Phoenix, Copenhagen, Denmark 27-28 March 2012

Building on from the first workshop held at Drax in January 2011, issues including biomass percentages and quality involved with co-firing, the current co-firing situation at power plants, and future directions will be discussed.

Organised by the IEA Clean Coal Centre with assistance from IEA Bioenergy Task 32, KEMA and VGB, this workshop will conclude with a tour of the Avedøre power plant. There will be sessions on:

- The status of co-firing.
- Operational experience.
- Biomass fuels - including torrefaction.
- Ashes from co-firing.
- Sustainability/certification.
- Future of co-firing

The workshop will be attended by representatives from all parts of the biomass supply, processing and combustion chain as well as researchers from many countries.

Further details can be found at <http://co-firing2.coalconferences.org/ibis/Co-firing2/home>

FURTHER UPCOMING EVENTS

A selection of forthcoming events relevant to the Energy Sector is given below. Please contact the Newsletter Editor if you would like to write a brief article about any meetings you attend.

18 January 2012. **1st UK Solar to Fuels Symposium**, Chemistry Centre, London. This is a free one day symposium following the release of an RSC report about Solar Fuels. Website:

<http://www.rsc.org/ConferencesAndEvents/RSCConferences/Solar/index.asp>

1 February 2012. **Rushlight Clean Technologies Show**, Central Hall Westminster, London. Of interest to organisations that are developing and deploying clean technologies or those wishing to adopt or invest in clean technologies. Website: <http://www.rushlightevents.com/>

19th January 2012. **Cutting Energy Costs and Improving Waste Efficiency Conference**, Warrington. This one day conference is aimed to help businesses make smart choices about the technologies that drive energy and environmental efficiencies. Website: <http://www.envirolink.co.uk/events/>

21 February 2012. **Recent Advances in Energy Saving in the Water Industry**, The Village Hotel, South Leeds. A one day event which will examine the options that have been implemented for energy reduction throughout the wastewater treatment process. Website: <http://www.aquaenviro.co.uk/view-product/Recent-Advances-in-Energy-Saving-in-the-Water-Industry->

21 February 2012. **Potential Environmental Effects of CO₂ Leakage in the Marine and Terrestrial Environment: Understanding, Monitoring, Mitigation Workshop**, University of Nottingham, Nottingham. The Environmental Sustainability Knowledge Transfer Network (KTN) is jointly organising an UKCCS meeting with the NCCCS, Plymouth Marine, and Energy Generation & Supply KTN. For more information please contact Antony.Benham@nottingham.ac.uk or go to the website <http://co2meeting.eventbrite.co.uk/>

22 – 23 February 2012. **Energy from Waste 2012**, Cavendish Conference Centre, London. The 8th International Energy from Waste conference will bring together key participants leading the work in waste derived energy in the UK and implications of EU policy. Website: <http://www.efwlondon.eu/>

3 - 4 April 2012. **CO₂Chem Big Event**, Sheffield, UK. Just announced is a two day event to bring together academics, industry and policy makers focused on utilising CO₂ in synthesis and transforming the chemicals industry. More details are soon to be available on their website: <http://co2chem.co.uk/>

24 - 28 September 2012. **Nuclear Plant Chemistry Conference (NPC 2012)**, Paris Tour Eiffel Novotel Convention Centre, Paris, France. There is a call for papers for this four day international conference in water chemistry of nuclear reactor systems. Website: <https://www.sfen.fr/NPC-2012>

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The Committee wishes each of our Energy Sector members a Happy New Year

The next Energy Sector Newsletter will be in April 2012. All Newsletters are in electronic format sent to your email address. Please note that if you have opted out of receiving RSC emails then you will not be able to receive our electronic Newsletter and so need to contact the RSC to change your preferences.

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