

Newsletter of The Energy Sector

ENERGY SECTOR UPDATE

Dear Members of the RSC Energy Sector,
Welcome to the April 2011 Newsletter!

We held our last AGM meeting on the 10th November hosted by the University of Leeds. This was also a very good opportunity to hold a meeting of the Committee and to welcome the new members of the Committee.

Three technical meetings have been jointly organised with other groups in the last year. This is particularly important under the new rules for RSC membership funds that will be related to our ability to attract members. However, we need to have a strategy for the Energy Sector to plan and organise seminars and events while keeping a healthy budget. Three members of the committee have agreed to serve in a Task Force to develop a strategy for future RSC Energy Sector activities: David McCaffrey (chair), Chris Satterley and Richard Wain. They are already making significant progress and have identified the main areas the group will focus on. Please contact them if you have some thoughts you would like to share with them.

Prof. Mercedes Maroto-Valer, Chair.

ENERGY SECTOR ACCOUNTS 2010

In 2010 the Energy Sector arranged three meetings on various topics. In line with Energy Sector tradition, costs of attending meetings have been kept low to make them as accessible as possible. However, price increases associated with meetings, particularly those which make use of Burlington House facilities, have placed pressure on costs in 2010 leading to an overall deficit from these activities.

The Committee has been able to offset increased costs in part by replacement of the paper Newsletter with an all-electronic publication. Additionally, for 2010 a one-off transitional adjustment to income from RSC was also made, following the replacement of individual membership subscriptions with a central subscription grant. This exceptional income allowed the Sector to generate an annual surplus of £1,371 in 2010. It is however essential for the Energy Sector to maintain reserves to ensure that it is in a position to underwrite low cost events and thereby offer them at an affordable cost to its members.

Dr. Michael Whitehouse, Treasurer.

FUTURE STRATEGY TASK FORCE

At the last RSC Energy Sector Committee Meeting, (4th February 2011), there was a discussion on the strategy for future seminars and events. The main focus was how to generate a moderate surplus from these events to enable the Energy Sector to provide a better service to meet the needs and wishes of its members and to progress and expand its activities.

In order to consider these matters in more detail, the Chair appointed a small 'Future Strategy Task Force' from within the Committee to investigate this matter further. This Task Force will be chaired by Dr. David McCaffrey, with Dr. Chris Satterley and Richard Wain as Task Force members. The main remits are:

- 1) To identify the subject matter of potential seminars, which are of relevance to the members, and which they will support and attend.
- 2) To ensure that all future seminars and other activities are planned on a sound financial basis and are budgeted to make a surplus.

The first meeting of this Task Force took place on 6th April 2011 where a good start was made and a number of actions identified to progress this task:

- Commenced analysis of the membership to identify the subject matter for future potential seminars. The Task Force has prepared a subject list of potential seminars, which is currently being converted into an online survey to determine member's interests. This survey will be circulated by email in the next weeks and should give the Task Force an indication of the type of events that the members would support and equally importantly, those that they would not support.
- Initiated a review of previous Energy Sector seminars and events so that appropriate lessons can be learnt and mistakes avoided for future events. The Task Force put particular emphasis on the preparation of a general policy and mode of operation for all future seminars and events.
- A review of financial arrangements for future seminars and other activities either organised solely by the Energy Sector or in conjunction with other organisations, to ensure that these are planned on a sound financial basis and are budgeted to make a surplus.

The Task Force is preparing a report, with the aim to complete this activity by Autumn 2011. Members are most welcome to contact the Task Force.

Dr. David McCaffrey, Task Force Chair.

WHAT'S 'HOT' IN THE ENERGY SECTOR

ENERGY GENERATION PATENTS 2010-2011

The October 2010 Newsletter contained a Map of Energy Generation Patents for 2009-2010. That result has been updated (map below), using an identical search strategy, for the period 2010-2011, in the Micropatent



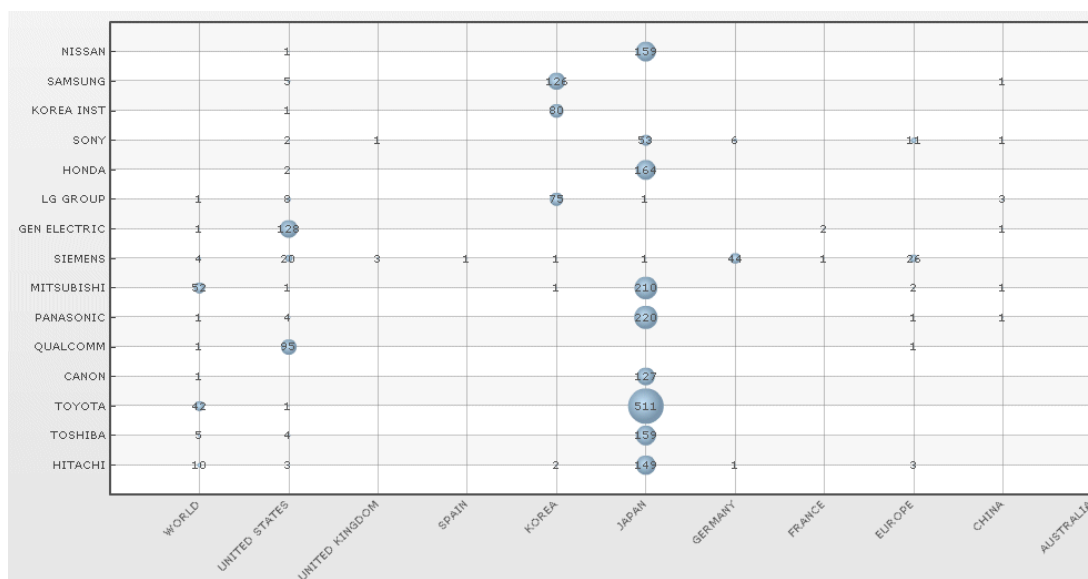
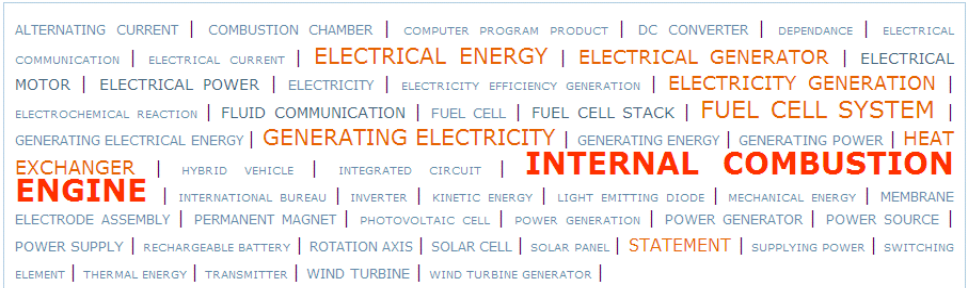
Aureka® database. This generated a list of almost 13,000 publications, even after reducing to one member per patent family.

In some ways it's unfair to directly compare this with the previous map, but - as expected - many of the peaks remain as major features of the landscape. For example, 'Voltage, Circuit, Power Supply' had a major peak in 2009-2010, the 2010-2011 one is a little larger, but is otherwise very similar. Topics such as Fuel Cells and Wind Turbines continue to appear as major features. Interestingly, the Wind peak covers a little more ground and contains in the region of 1000 publications. The peak for Photovoltaic technology is a similar size to the previous one.

A new feature is the advent of a separate peak for Light Emitting Sources related to LEDs and the like and also a small showing of

Piezoelectric Power Generation. The presence of a distinct 'islet' for Heat Exchangers suggests that innovation continues in an area long thought to be traditional engineering technology.

The Patent Map is only one way to inspect the data. Another qualitative view is afforded by the Analysis tool within the Orbit.com database and through running an identical search, the 'tag cloud' (shown to the right) gives an interesting insight and flags up very strongly the continued importance of the Internal Combustion Engine, which has no unique peak within the Aureka® map.



Finally, a more analytical way of expressing the results is to look at the major patent assignees and where they are filing.

There are huge numbers of publications appearing in Japan, much more than the USA and very many more than China. The latter oft considered the emerging patent giant,¹ though not it would seem in the field of energy generation....

¹ 'Astonishing' Chinese patent growth marks world recovery – 'Asia led a recovery in international patent applications last year, as "astonishing" growth in filings by innovative Chinese companies left US firms by the wayside, the UN patent agency said Wednesday ' Reported 9th February 2011 <http://www.physorg.com/news/2011-02-astonishing-chinese-patent-growth-world.html>

REPORTS FROM RECENT MEETINGS

JOINT COAL RESEARCH FORUM / RSC ENERGY SECTOR SEMINAR ON 'TECHNICAL AND ECONOMIC ASPECTS OF CO-COMBUSTION OF BIOMASS'

University of Leeds, Leeds, 10 November 2010

The morning session chaired by Prof. Mohamed Poukashanian began with Jeremy Tomkinson (NNFCC, York) who gave an excellent overview of the current situation regarding biomass policy in the UK, highlighting the stringent UK national target of 15% renewables as specified in the Renewable Energy Directive (RED) and the various policy mechanisms to encourage the uptake of renewables. Steve Critchley of REA on Biomass Sustainability Regulation & Reporting followed with a talk about the RED which gives mandatory standards on sustainability with five requirements ranging from chain of custody/audit to restrictions on the type of land that can be used for biomass cultivation. Thereafter, Lesley Sloss (IEA CCC) gave a comprehensive overview on the impact of biomass co-firing on emissions, which tend to be reduced with increased biomass use. However, there is a huge variety of biomass types available with very different chemical properties to coal, so there will always be exceptions to the rule. The morning session concluded with Colin Snape (Nottingham University) who gave an overview of the EPSRC EngD Centre and the EngD projects related to biomass currently running at Nottingham. These projects include the impact of storage on biomass quality and handleability, two projects on biomass combustion, one on torrefaction and one on biomass incorporation into smokeless fuels.

The afternoon session chaired by Dr. Will Quick began with a talk by Nigel Burdett on the development of the 500MW co-firing facility at Drax Power Station, which is the world's largest co-firing facility. Bill Livingston (Doosan Babcock Energy) presented a general introduction to the main biomass types used by utilities, including pre-treatment options. Quality control of the biomass feedstock was considered to be an important issue. The final speaker, Jenny Jones (Leeds University) introduced the scale and scope of biomass co-firing in the UK at present, followed by a closer look at related research projects at Leeds University, including work on characterisation and combustion of biomass, torrefaction of biomass and work investigating biomass markets. The meeting concluded with a general discussion chaired by Prof Poukashanian on key issues in biomass utilisation in large-scale power generation.

The full report by Dr. Will Quick can be found at <http://www.coalresearchforum.org/crfnews.pdf>

7th PHOTOVOLTAIC SCIENCE, APPLICATIONS AND TECHNOLOGY CONFERENCE (PVSAT-7)

Heriot-Watt University, Edinburgh, 6-8 April 2011

PVSAT is an annual 3-day conference hosted by The Solar Energy Society and is the UK's primary scientific meeting for presenting leading research in solar photovoltaic (PV) science & technology. Invited speakers cover international research activities, manufacturing developments, markets and policy. This year was the largest event so far with 150 delegates enjoying 43 oral presentations and 54 poster papers.

Jeremy Leggett (Executive Chairman, Solar Century) kicked-off the meeting by video link with a passionate challenge for the UK to employ a sustainable energy policy and avoid a future energy crisis arising from complacent "groupthink" that led to the recent global banking crisis. Peter Fath (CTO, Centrotherm AG) turned the somewhat mundane topic of equipment manufacture into an entertaining and illuminating vision in which gigantic automated PV manufacturing plants are being assembled (largely in China) and showed how crystalline silicon PV manufacturing costs will be reduced to €0.67/Wp by 2013 (currently €0.86/Wp). Paula Mints (Navigant Consulting, USA) gave an update on the global PV market that more than doubled in 2010. She estimated global PV business revenue at US \$105 billion in 2010 with 18.5 GWp of new installations. 95% of global PV electricity generation capacity has been installed since 2005 at a compound annual growth rate of 65% over the last 6 years.

PVSAT-8 will be held at Northumbria University on 2-4 April 2012.

Dr. Nigel Mason

THE ENERGY SECTOR WEBSITE AND MyRSC ONLINE COMMUNITY

The Energy Sector has a website located at www.rsc.org/energysector which gives the mission and responsibilities of the group as well as forthcoming events in addition to those reported in the Newsletters. RSC members also have the opportunity to network with scientists across the globe, find members in your area, and follow the Energy Sector activities using the online community forum at <http://my.rsc.org/home> Members are invited to join the Energy Sector at MyRSC and we welcome any ideas or suggestions.

CALENDAR OF UPCOMING EVENTS

STAKEHOLDER WORKSHOP: CCS FUTURE POTENTIAL IN THE IRISH SEA

The British Geological Survey, Keyworth, United Kingdom 16th May 2011

Strategic development of Carbon Capture and Storage (CCS) networks provides the potential for point source CO₂ emitters to share the considerable cost of CCS infrastructure, permitting, construction and operation. The availability of sufficient and timely storage space is a vital prerequisite for CCS and will greatly influence the development of CCS networks. Exploiting Irish Sea storage capacity presents a relatively unexplored area in comparison to the UK east coast, and this workshop will build upon work done by Eunomia in this area. The objectives of the workshop are:

1. To discuss the future potential for CCS network development to exploit Irish Sea storage potential.
2. To define key steps needed to address gaps in our collective understanding of how, when and where such networks might develop.

The National Centre for Carbon Capture and Storage (<http://www.ncccs.ac.uk>) invites key stakeholders from industry, relevant research organisations and government to attend and discuss the issues. For further information please contact Dr Sarah Mackintosh (sarah.mackintosh@nottingham.ac.uk) or 0115 823 2736.

15th INTERNATIONAL CONFERENCE ON ENVIRONMENTAL DEGRADATION OF MATERIALS IN NUCLEAR POWER SYSTEMS – WATER REACTORS

Cheyenne Mountain Resort, Colorado Springs, Colorado, United States 7-11th August 2011

The purpose of this conference is to foster the exchange of ideas to address materials problems and explore remedies for nuclear plants that use water coolant. The conference is of interest to utility engineers and consultants involved in design, construction and operation of water reactors, as well as researchers concerned with the fundamental nature of materials degradation in reactor systems. Topic areas include:

- Primary- and secondary-side degradation of reactor components
- Irradiation effects on mechanical properties
- Irradiation-assisted stress corrosion cracking
- Water chemistry issues and control
- General and localised corrosion, stress corrosion, corrosion fatigue.
- Remedial measures to prevent and mitigate problems
- Materials degradation in spent fuel and radioactive waste disposal
- Life management from the laboratory to the plant
- Balance of plant environmental degradation problems

More details can be found at <http://www.tms.org/meetings/specialty/ED2011/home.aspx>

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.

19 - 24 June 2011. **37th Photovoltaic Specialists Conference**, Seattle, USA. Website: www.ieee-pvsc.org

20 - 22 June 2011. **2nd International Conference on Energy Process Engineering - Efficient Carbon Capture for Coal Power Plants (ICEPE 2011)**, Frankfurt, Germany. Website: www.ICEPE2011.de

28 June - 1 July 2011. **5th European Combustion Meeting**, Cardiff, Wales. Website: www.ecm2011.org

5 - 8 July 2011. **4th International Symposium on Advancing the Chemical Sciences - Challenges in Renewable Energy (ISACS4)**, MIT, Boston, USA. Website: <http://www.rsc.org/ConferencesAndEvents/ISACS/RenewableEnergy/registration.asp>

17 - 20 July 2011. **The 7th International Symposium on Coal Combustion (7th ISCC)**, Harbin, P.R China. Website: www.7thISCC.net

5 - 9 Sept 2011. **26th European Photovoltaic Solar Energy Conference and Exhibition**, Hamburg, Germany. Website: www.photovoltaic-conference.com

7 - 8 Nov 2011. **2nd International Conference on Green & Sustainable Technology**, Greensboro, North Carolina, USA. Website: <http://greenconference.ncat.edu/index.html>

COMMITTEE MEMBERSHIP

Chair

Prof. Mercedes Maroto-Valer
Dept. Chemical and Environ. Engineering
University of Nottingham
University Park
Nottingham, NG7 2RD
Tel: 0115 846 6893
E-Mail: mercedes.maroto-valer@nottingham.ac.uk

Treasurer

Dr. Michael Whitehouse
RWE Npower PLC.
Windmill Hill Business Park
Whitehill Way
Swindon,
Wiltshire, SN5 6PB
Tel: 0179 389 4118
Email: michael.whitehouse@RWENpower.com

Secretary

Dr. Chris Satterley
E.ON New Build & Technology Ltd.
Technology Centre
Ratcliffe on Soar
Nottingham, NG11 0EE
Tel: 0247 618 3312
Email: chris.satterley@eon-engineering.com

Newsletter Editor

Dr. Rachel L Gomes
L4 B04, Dept. Chemical and Environ. Engineering
University of Nottingham
University Park
Nottingham, NG7 2RD
Tel: 0115 846 8874
Email: rachel.gomes@nottingham.ac.uk

Dr. Martin Brown
GL Industrial Services UK Ltd
Holywell Park
Ashby Road
Loughborough
Leicestershire, LE11 3GR

Mr. Neil Edwards
Johnson Matthey Technology Centre
Blounts Court
Sonning Common
Reading
Berkshire, RG4 9NH

Mr. Graham Henney
1, Southlands
Tynemouth
Tyne and Wear, NE30 2QS

Prof. Jenny Jones
Energy and Resources Research Institute
Houldsworth Building
The University of Leeds
Leeds, LS2 9JT

Dr. Nigel B Mason
PV Consulting Ltd.
Holmedene Farm
Moor Lane, Elton
Matlock, DE4 2DA

Dr. David McCaffrey
McEnergy Consultancy
35, Roberts Road
Prestbury, Cheltenham
Gloucestershire, GL52 5DJ

Dr. Will Quick
E.ON New Build & Technology Ltd.
Technology Centre
Ratcliffe on Soar
Nottingham, NG11 0EE

Mr. Richard Wain
Rolls-Royce PLC.
PO Box 2000
Derby, DE21 7XX

Dr. Steve Waygood
RWE Npower PLC.
Windmill Hill Business Park
Whitehill Way, Swindon
Wiltshire, SN5 6PB

The next Energy Sector Newsletter will be in October 2011

All Newsletters will now be 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.

If you would like to continue receiving a hard copy of the Energy Sector Newsletter, please contact the Newsletter Editor confirming your postal address.