Sussex Energy Group

University of Sussex
SPRU – Science & Technology Policy Research

Welcome to the Sussex Energy Group Newsletter

The energy policy agenda of the new coalition government is taking shape. A key issue in the wake of the Comprehensive Spending Review is energy market reform. A range of associated policy initiatives are designed to provide greater incentives for low carbon investment. A carbon price floor, an emissions performance standard and a Green Investment Bank are all planned.

This leads to a series of questions: which reform model will be the most effective? What will the interactions be between policy instruments? Perhaps most important, can market reform build in incentives for smaller players and the demand side? This debate is inevitably dominated by the need for new forms of large-scale low carbon energy supply – but there is a risk that reform will crowd out other forms of investment if not thought through.

In our recent research and engagement activities, we have engaged in many of these questions. This has included high level interactions with officials and Ministers on issues of investment, peak oil and nuclear new build. Energy Minister Charles Hendry MP visited SPRU on 25th October to answer questions from our students and to discuss a range of policy issues with members of the SEG team.

One focus of our new project portfolio is carbon capture and storage (see page 3). In a project for the UK Energy Research Centre, we are analysing economic, legal and technical uncertainties for CCS in with colleagues at other universities. It is welcome that the government has confirmed funding for the first UK demonstration of CCS in the spending review – a demonstration that will be a positive step in the process of clarifying and perhaps dealing with some of these uncertainties. Funding for further plants is also promised, including an important decision to focus on gas as well as coal.

Another important focus is renewable energy. Our research co-funded by Friends of the Earth identified policies to help accelerate the pace of renewables deployment. A key conclusion was the need for more action on the 'forgotten middle' of renewables policy, in between large offshore windfarms and household solar panels. We have started a new project to follow up on this, focusing on innovation in energy at the community scale – and how examples of good practice can be learned from and scaled up (see page 3).

We continue to have a significant research focus in developing countries. Again, investment is an important challenge. We have advised UNCTAD on strategies to bring renewable energy to rural areas in developing countries (see page 2), and Rob Byrne's recent PhD thesis has looked in depth at solar PV in Kenya and Tanzania (see page 4). In addition, we are continuing to work with the UK government on low carbon innovation and technology transfer to India and China. We will be contributing to the UN Conference of the Parties in Cancun at a side event. Whilst international climate policy has lost significant momentum after Copenhagen, the search for practical ways to support and finance low carbon innovation in developing countries remains high on the agenda.

SEG Newsletter No. 7
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SEG in the media

Andy Stirling was a guest speaker on Radio 4's *Moral Maze* on the 16th June 2010 talking about how we should judge risk at the cutting edge of science and technology.

Jim Watson was a guest speaker on Radio 4's *You and Yours* programme on 1st July 2010 talking about a new kind of kite turbine developed to generate electricity from wind. You can listen to it here: http://www.bbc.co.uk/programmes/p008n1w6

Gordon MacKerron was featured in an article in the *Daily Telegraph* on the 17th July, and contributed to a special energy supplement on the 23rd October. He is on a panel of experts debating the future of energy in the UK and contributed to the Telegraph's and Shell's *Age of Energy* summit. You can see a video of Gordon speaking at this event here: http://www.telegraph.co.uk/sponsored/earth/future-of-energy/7889718/Shell-Age-of-Energy-event-Gordon-MacKerron-video.html

Gordon MacKerron also appeared in the BBC4 documentary, *The Secret Life of the National Grid*, which aired in October 2010:http://www.bbc.co.uk/programmes/b00vfc7b

Friends of the Earth commissioned report on UK renewables

Jim Watson, Ivan Scrase and Lee Stapleton authored a report on UK renewables policy which was released on the 27th July. The report, co-funded by Friends of the Earth, explains how the UK arrived at its current moment of optimism in terms of a "we can do it" attitude to ramping up the amount of energy the UK derives from renewable sources. Under European legislation the UK is required to increase the contribution of renewables to 15% of energy demand by 2020. The scale and nature of the opportunities and challenges the UK faces in meeting its obligation are explored in the report and a package of policy proposals are put forward under three banners - promoting renewable energy at many scales; new energy network infrastructures; and implementing an activist low carbon industrial policy. The report concludes that, if implemented, these proposals would give stronger grounds for optimism that the '15% by 2020' obligation can be met and momentum built for sustained renewables growth beyond 2020.

For further information contact Jim Watson or Lee Stapleton on w.j.watson@sussex.ac.uk and l.stapleton@sussex.ac.uk respectively

UNCTAD commissioned report on RETs for rural development

Jim Watson and SEG DPhil student Oliver Johnson recently completed a report on the use of off-grid renewable energy technologies (RETs) to increase access to modern energy services in rural areas. The report was commissioned by the United Nations Conference on Trade and Development (UNCTAD) and was the first in a new series of publications aimed at exploring current issues in science, technology and innovation, with particular emphasis on their impact on developing countries. The report fed into an Expert Meeting on Green and Renewable Technologies as Energy Solutions for Rural Development and the 13th Session of the UN Commission of Science and Technology for Development earlier this year. It has also been distributed to 54 member universities within UNCTAD's Virtual institute programme, which provides capacity-building services for academics in transition and developing countries.

The paper reviewed experiences of six case studies (Nepal, Eritrea, Guatemala, China, Argentina, Lao PDR) in order to reveal ways to overcome barriers to deployment of RETs in rural areas. Success factors identified included the development of local capabilities to install, operate, maintain and adapt RETs to meet local needs, raising awareness of RETs within rural areas, full engagement of local stakeholders throughout the deployment process and provision of financial incentives to reduce costs and risks.

The report concluded that integration of RET deployment in rural areas into wider rural development programmes was vital to ensure suitability and harmonization. It advised governments and donors to work together to develop appropriate financial mechanisms to stimulate RET uptake and market development. It also emphasised the importance of improving local capacity through adequate training in areas such as installation, operation and maintenance, as well as awareness-raising activities. For more information contact Oliver Johnson on o.w.johnson@sussex.ac.uk

SEG-Department of Economics workshop on trade and climate change

Danielle King and Tom Reilly were recently involved in organising a workshop with colleagues in Economics entitled 'Climate change and trade: an agenda for Cancun'. The workshop took place on Thursday 27th May with 25 attendees from a variety of organisations based as far away as America and Canada. Keynote speakers were Aaron Cosbey (Associate and Senior Advisor in Trade and Investment, IISD) and Jarek Pietras (Director General for Environment at the Council of the EU). For more information, see SEG policy briefing no.8.

New projects

Community Innovation in Sustainable Energy
This three year research project commencing in October is led by Adrian Smith and funded by EdF Energy via the EPSRC and aims to study the diffusion of community energy projects in the UK. Recent years have seen a surge in interest and activity in small-scale, sustainable energy projects led by local communities. Examples include solar water heating clubs and insulation clubs, which provide mutual support for system installation; energy awareness and behaviour networks, which provide guidance and reassurance to neighbours on energy matters relevant to them; and co-operatively-owned small-scale renewable energy systems, such as micro-hydro and wind energy. It will explore the extent of networking between projects, and whether this is assisting in the innovation of community energy. The performance of projects will also be assessed and independent advice will be provided to policy-makers and energy businesses about the merits and processes for supporting community energy. Further information, including a blog, can be found through the project website.

Carbon capture and storage
SEG has recently started working on two projects on carbon capture and storage both funded by the Research Councils: a 2 year project entitled "Carbon Capture and Storage: Realising the Potential?" which is led by Jim Watson and also involves Florian Kern and a 3 year project entitled "Multiscale Whole Systems Modelling and Analysis for CO_2 Capture, Transport and Storage" also led by Jim Watson. The first of these CCS projects is conducting an independent, inter-disciplinary assessment of CCS viability from now to 2030. It focuses on innovation and the understanding of uncertainties in CCS development and investment in order to: inform UK government policies; advance knowledge for technology appraisal; and contribute to UKERC's research programme.

The project team consists of researchers from the Universities of Sussex, Edinburgh, Cardiff and Imperial College. In July 2010 Jim and Florian were invited to visit Ofgem to inform them about this project and talk about other SEG research more generally. The second of these projects aims to answer questions such as: What would an optimised, evolving CCS system relevant to a region of the UK look like? What would its economic, environmental impact, safety and operability metrics be? How can these metrics be optimised and what trade-offs exist at this level? The project team consists of researchers from the Universities of Sussex, Cranfield, Imperial College London and the British Geological Survey. The engineering modelling focus of this second project is complimented by consideration of the role and place of CCS in the future UK energy system according to various national energy scenarios alongside detailed consideration of the economic dimensions and implications of CCS deployment – both of which are the responsibility of the Sussex team. For further information contact Jim Watson: w.j.watson@sussex.ac.uk

DPhil spotlight: Rob Byrne passes his viva

Rob Byrne, now a Research Fellow in SEG, recently passed his *viva voce* in which he defended his thesis "Learning drivers: rural electrification regime building in Kenya and Tanzania". Andrew Barnett, SPRU Honorary Fellow, and Rob Raven, from Eindhoven University, examined the thesis. The work builds on the socio-technical transitions literature and extends its application to developing-country contexts. Using SNM (strategic niche management), the thesis investigates the evolution of SHS (solar home system) markets in Kenya and Tanzania over the past 25 years or so. The motivation for the research was Rob's own involvement in Tanzania between 1997 and 2000, where he managed a small project that attempted to develop the SHS market around Arusha. During this time, the project became connected with other efforts in Tanzania that were trying to replicate the perceived successes of the Kenyan SHS market. However, in spite of the attempts to imitate the activities in Kenya, these efforts did not appear to make much difference to developments in Tanzania.

From a policy perspective, SHSs are seen as one way to achieve the long-standing objective of rural electrification in developing countries. This interest in SHSs has grown as the mainstream approach of grid extension and central generating capacity has failed to achieve much impact, particularly in sub-Saharan Africa. Furthermore, experiences with SHSs in places such as Kenya have helped to raise hopes not only that rural electrification can be significantly hastened but also that this can be done while avoiding GHG (greenhouse gas) emissions, influencing organisations such as the GEF (Global Environment Facility) to promote SHSs in developing countries.

SHSs in Kenya became available in the mid 1980s and over 200,000 systems have now been sold through a private market. Consequently, this is considered an example of successful private sector led development and a model for other developing countries. Until recently, Tanzania had almost no SHS market, despite the efforts noted above. However, sales of SHSs began to grow quite rapidly from the early 2000s and the trend appears to be gaining pace, with an estimated 285 kWp sold in 2007 (equivalent to about 15,000 systems), having risen by 57% in one year. At the time of the field research (2007-2008), there were two large donor-funded SHS projects underway in the country.

The research explains the dynamics of these two 'niches' over the past 25 years. It finds that the Kenyan niche has benefited more from donor support than is usually acknowledged, and has done so in important ways. Conversely, the Tanzanian niche has involved private actors to a much greater extent than the presence of large donor-funded projects might suggest, and also in important ways. The thesis also makes theoretical and methodological contributions. It demonstrates a way to connect SNM's first and second-order learning to expectations and visions concepts; it dimensions expectations and visions; and presents a tool for systematic investigation of socio-technical trajectory developments. Finally, the thesis suggests a number of ways in which the SNM framework could be enhanced. These include stronger theorising about learning, and ways to begin incorporating power, politics and risk into the theory.

Comings and goings

Sabine Hielscher joined SEG in October 2010 to work on the Community Innovation in Sustainable Energy project (see page 3). She comes to us from the School of Art and Design, Nottingham Trent University. A second new member of staff, Jin Park, will arrive to work on this project in January 2011.

We also welcomed three new DPhil students in October. Tammy-Ann Sharp is looking at the role of carbon capture and storage technologies in the future UK energy system, Mari Martiskainen (a current team member) is examining the role of community energy in a number of European countries, and Rachael Durrant is looking at the role of civil society in sustainability transitions. Meanwhile, Rob Byrne and Rudi Haum successfully passed their DPhil vivas. Well done to both of them.

Thomas Reilly left SEG in July, having completed a short project on climate change and international trade in conjunction with the department of economics.

Finally, we have hosted Mariona Fressoli from the Universidad Nacional de Quilmes in Buenos Aires in October. His visit was organised in conjunction with the SPRU-IDS STEPS Centre. He has an IDRC-funded project to investigate the development and use of 'social technologies' in five South American countries. As part of our exchange programme with Tsinghua University, China, Zhou Lingling has just arrived to spend five months working on her thesis on embodied carbon emissions and international trade.

External appointments

Jim Watson has joined the panel for the Institute of Public Policy Research (IPPR) programme on New Era Economics. The programme is considering the kind of economy the UK should become in the wake of the financial crisis. It is also asking how new economic thinking can help to inform economic policy. Other panellists include Carlotta Perez (Honorary Fellow, SPRU) and a range of prominent economists and thinkers including John Kay, Paul Omerod and David Marquand.

Adrian Smith has been appointed to chair a cross-party scrutiny review panel for Brighton and Hove Council on renewable energy.

Recent academic publications

Ockwell, D. Haum, R., Mallett, A. and Watson, J. (2010) Intellectual property rights and low carbon technology transfer: Conflicting discourses of diffusion and development. Global Environmental Change 20 (4).

Smith, A., Voβ, J.P. and J. Grin (2010) Innovation studies and sustainability transitions: the allure of the multi-level perspective, and its challenges *Research Policy* 39, 435-448.

Sorrell, S. (2010) Energy, economic growth and environmental sustainability. *Sustainability* 2, 1448-1848.

Sorrell, S. (2010) An upstream alternative to personal carbon trading. Climate Policy 10, 4.

Sorrell, S., Miller, R., Bentley, R. and Speirs, J. (2010) Oil futures: A comparison of global supply forecasts. *Energy Policy* 38, 4990-5003.

Sorrell, S. and Spiers, J. (2010) Hubbert's legacy: a review of curve fitting methods to estimate ultimately recoverable resources. *Natural Resources Research* 19, 209-230.

Sorrell, S., Speirs, J., Bentley, R., Brandt, A. and Miller, R. (2010) Global oil depletion: a review of the evidence. *Energy Policy* 38, 5290-5295.

Sussex Energy Group

The Sussex Energy Group (SEG) at SPRU (Science & Technology Policy Research), University of Sussex, is a team of 19 researchers dedicated to understanding the challenges and opportunities for transitions to a sustainable energy economy. We undertake academically excellent and inter-disciplinary social science research that is also centrally relevant to the needs of policy-makers and practitioners. We pursue these questions in close interaction with a diverse group of those who will need to make the changes happen. Core funding to the group is provided by the Economic and Social Research Council.

SEG members and key research areas

Jim Watson - Director of SEG, Senior Fellow
Energy policies, energy and development, energy security
Steve Sorrell – Deputy Director of SEG, Senior Fellow
Emissions trading, energy efficiency, climate policy
Rob Byrne – Research Fellow
Low-carbon development, renewable energy technologies, socio-technical transitions
Frank Geels – Professorial Fellow
Transitions to sustainability, socio-technical systems, innovation studies
Florian Kern - Research Fellow
Governance of system innovation, energy innovation policy
Markku Lehtonen - Research Fellow
Knowledge in policy making, biofuels, governance
Mari Martiskainen - Research Fellow
Consumer behaviour, energy demand in households, energy efficiency
Francis McGowan - Senior Lecturer in Politics
European energy policy, party politics of energy choices, policy evaluation and the energy sector
Gordon Mackerron - Director of SPRU, Professorial Fellow
Security of supply, energy policy, nuclear power
David Ockwell – Senior Lecturer in Geography
Low carbon technology transfer, discourse analysis, inter-disciplinary research
Mike Parker - Honorary Fellow
Climate change policy, urgency, time critical pathways
Raphael Sauter - Research Fellow
European energy policy, security of supply
Adrian Smith - Senior Fellow
Governance, technology, politics
Lee Stapleton - Research Fellow
Energy efficiency, quantitative techniques, renewable energy
Andy Stirling - Professorial Fellow
Appraisal, diversity, resilience
Sabine Hielscher – Research Fellow
Community Energy, innovation, socio-technical transitions
Danielle King – Project Co-ordinator

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