INTRODUCTION TO THE DAY: Gavin Bridge (University of Manchester)

Aims of the series:

- build research capacity within human geography on issues of energy transition, energy security and climate change, and the spatial organisation and governance of new energy systems;
- promote inter-disciplinary collaboration;
- generate new ways of thinking about energy transition as a geographically-constituted process.

A summary of the key strands of dialogue so far:

Through the 4 seminars of the series we have sought to unpack ‘energy transition’ and the ‘new energy paradigm’ in order to move from an historical concept to a geographical understanding (Seminar 1); examine how approaches to energy security rest on assumptions about the geographical scale at which energy systems should be governed, including a set of interventions that challenged the standard framing of energy security by considering issues of materiality, resilience and agency (Seminar 2); discuss how attitudes and behaviour towards energy are grounded in cultural political economy (Seminar 3); and explore contending geographies of centralisation and distribution, infrastructure systems (Seminar 4).

Discussions have been grounded – specific places, technologies, approaches: part of the richness of the series as a whole has been this engagement with ‘actually-existing’ energy systems. The elements of change and energy transition discussed in a geographical context have highlighted the multiple dimensions of energy transition, and the capacity of the concept to conceal different understandings.

Preview of academic paper emerging from the series (contact Gavin Bridge):

Paper illustrates how the low-carbon energy transition is fundamentally a geographical process – one that involves reconfiguring current spatial patterns of economic and social activity; and it provides a set of basic concepts with which to map the geographies of a low-carbon energy system and so guide choices among different potential energy futures.
Discussed six ‘geographical components’ of transition:

- Location
- Energy landscape
- Territoriality
- Uneven development/spatial differentiation
- Scaling and scale
- Spatial lock-in

KEYNOTE: Professor Martin Pasqualetti, Arizona State University
“The Changing Energy Landscapes of North America”

- There is a **drop in oil production** in Mexico; a **rise in economic instability**; a **rise in energy insecurity** (more energy comes from imports); a **rise in environmental impacts of energy** (water and air pollution - BP Gulf Oil spill, mountain top removal coal mining in West Virginia); a **rise in energy poverty** (the coal-rich Navajo Indian Reservation in Arizona); a **rise in the water costs of power** (the amount of water used for irrigation is almost equal to the amount of water used for power production).

- Distinguishing between **conventional energy** and its landscapes; **transitional energy** and its landscapes; and **sustainable energy** and its landscapes.

- Latest energy landscapes are defined by an increase in the development of shale gas (Barnett, Marcellus); a move towards looking for oil in colder places; a move towards offshore oil; a move to the West to look for coal, oil, shale oil, geothermal energy (Nevada, South Eastern California) and solar energy (Arizona); a move towards oil sands in Alberta, Canada; a move towards Mexico for electricity connection, natural gas, solar and wind).

- **Transitional energy landscapes** in North America are defined by a drive towards: more LNG and thus LNG terminals (perhaps offshore); larger energy landscapes such as oil sands; Coalbed methane (with implications for the water supply and property rights); shale gas (huge environmental implications for the water supply).

- **Sustainable energy landscapes** in North America include: the continuous decrease of their cost and price; some fossil fuel incentives are transferred to RES and nuclear power; struggle to accept the landscapes of solar parks (Nevada), solar photovoltaic, Stirling energy solar systems, solar power towers and wind parks (Palm Springs); shifting of opposition from traditional energy landscapes to transitional energy landscapes and towards sustainable energy landscapes; co-existence of sustainable energy landscapes (geothermal, wind and solar) and agricultural landscapes; preference towards distributed solar generation (roof top solar energy).

**Summary:**

- Social and environmental issues will compel energy transition.
- Energy transition will entail accepting a portfolio of RES landscapes and some transitional energy landscapes.
- Energy transition will see enhanced North American energy alliances.
Key questions:

- How social, geopolitics, poverty and security landscapes help us understand the physical landscape expression of “a place of extraordinary energy hunger”- North America?
- Why are the landscapes in North America changing?
- Where are they changing?
- How are they changing?

KEYNOTE: Dr Bernice Lee, Chatham House
“Moving toward a low-carbon development model? Lessons from China”

- There has been a rapid increase in investment (by the Chinese government and international donors alike) in Low Carbon Development in China in the past 10 years, resulting in awareness of the changes that need to take place at high political level. The challenges for China now are to provide answers to the What, When and How questions of transition.

- The transition taking shape in China can be defined as moving towards a Lower Carbon Development, with a parallel focus on energy and water governance. The energy transition in China has a certain specificity which might not fit with conventional understandings of security and impact (China imports only 5% of its coal, but the amount equals the total coal use of Australia).

- The energy transition in China is taking place in parallel with a strong awareness nationally about how the trade value chain has changed internationally, moving away from low value production towards services. The government’ strategy for transitioning towards a Lower Carbon Development is economic restructuring and industrial upgrading with carbon targets. It will involve the introduction of new tax and policy measures in pilot areas in China; trade-offs between regions and industry sectors, and the replacement of significant amounts of infrastructure.

- Another Chinese specificity is the wide economic differences between regions, resulting in a lack of understanding what it means to shift to Lower Carbon Development in poorer regions. Some Chinese provinces’ GDP per capita is closer to pre-crisis Lisbon, while others compare to Africa.

- A significant worry is the lack of agreement about the point of peaking of economic activity. The transition towards Lower Carbon Development puts China in a collusion course between basic industry thinking and “green” policy.

- Strategic planning for Lower Carbon Development necessitates investing (by the Chinese government and international donors alike) in energy statistics. Although,
many Chinese citizens and politicians feel uncomfortable with being (seen as) first movers in Lower Carbon Development, the Chinese government wants to send a message about its commitment: any Chinese official found cheating on the energy statistics will be fired.

- If bottlenecks for investment in innovation are not removed, it will be unlikely that China will become a leader in Lower Carbon Development.

Key questions:

- How to re-organize the domestic energy sector?
- What would carbon tax in China look like?

DISCUSSION:

- An analogy can be drawn between issues of openness and innovation in China and Russia.

- What are the health and poverty impacts of the energy transition taking place in China? The poverty and health impacts of energy transition are off the policy radar, a trend which is seen worldwide. A lot of sensitivity needs to be built into addressing energy poverty and associated health issues in this respect.

- To what extent is the middle category (between traditional and sustainable energy) a transitional process? The need for fuels that could firm up RES needs to be acknowledged. This might require referring to transition fuels as “alternative fossil fuels”. The transition stage is the buffer of where we are now and where we need to be. Energy efficiency should be considered part of the buffer stage only. Resource efficiency and energy efficiency in China could be a significant part of the transition/buffer stage; however, they are not an economic driver for citizens.

- There are as many challenges with the new fuels, energy resources and landscapes as there are with the old ones.

KEYNOTE: Dr Nana de Graaf, Vrije Universiteit, Amsterdam
“Expansion and Integration of non-Western National Oil Companies”

- The terminology National Oil Companies (NOC) and International Oil Companies (IOC) greatly simplifies reality, as oil companies are increasingly transnational.

- The revival of the energy security debate and increasing discussions of the geopolitics of energy have been underpinned by the rivalry between centers of accumulation and growth (East Asia and the BRICS) which have also brought about
higher oil demand and prices. Tensions in the oil sector have surged with the resurgence of resource nationalism in Russia, Venezuela and Kazakhstan and a wave of “new protectionism” in the West, which pitted EU against Gazprom. The 21st century sees a rebound of the state in the context of transnationalisation.

- Focusing on relations between companies instead of comparing individual properties and viewing NOCs and IOCs as opposing each other, it transpires that there is increased cooperation between the five top NOCs for the period 1997-2007. The trends defining the period between 1997 and 2007 for the five top NOCs are parallel expansion and integration.

- Alongside resource nationalism and increasing influence of state-owned oil companies there is a trend of transnationalisation in their development. Instead of NOCs vs IOCs, OPEC vs West power is increasingly diffused, there is more interdependence, more hybrid forms of cooperation and more coalitions of interest being formed among NOCs and IOCs.

**Summary:**

- State-owned energy companies and international energy companies are increasingly cooperating.

- State-owned companies are increasingly acting as IOCs.

**KEYNOTE: Dr Duncan Macqueen, International Institute for Environment and Development**

“Banking on biomass as the mainstay of renewables for green economies”

- Forests are fragile environments vulnerable to climate change, which are mopping up 30% of carbon dioxide emissions. Timber is no longer a forestry issue but an energy issue.

- Large areas of the poor world are heavily reliant on biomass for fuel; while the developed world is increasing its interest in and demand of biomass. According to International Energy Agency estimates, biomass will account for 30% of global energy by 2050, with the main importers being UK, Italy, Netherlands and Sweden. While the use of biomass will grow in the UK, it will decrease in poor countries like Malawi. REAPs will add an *additional* 40 million odmt demand for pellets for electricity by 2020, while an *additional* 50 million odmt will be needed for heat generation.

- Europe has run out of biomass material within the continent and needs to import biomass from elsewhere (Canada, US, Latin America and Africa) in order to feed its
A contracted long term (min 20 years) commitment to deliver large quantities of biomass is a prerequisite for financing of biomass stations. The ideal of there being sufficient biomass for more sustainable energy production has two significant problems: \textit{scale} (an enormous amount of land needs to be converted to forests) and \textit{sustainability} (large scale of monocrops with a very long life cycle).

There are two differentiated biomass landscapes: the \textit{informal} biomass markets for wood and charcoal of the poor, which are used unsustainably and lead to resource depletion; and the \textit{formal} markets for biomass energy dominated by the West, which are regulated, taxed and with secured forest rights.

Sustainable biomass means that instead of big international companies coming to poor countries like Malawi to make use of the biomass resource, locals should be put in charge of the biomass sector with the right regulation and economic incentives (tax to subsidies). The impact of the Northern biomass boom on the poor in the South should be further investigated. Significant part of the benefits of the biomass demand end up with the international companies and European consumers (in the form of carbon dioxide reductions), while poor countries do not get the opportunity to pull themselves out of poverty despite of the boom of the biomass industry in their countries.

PANEL DISCUSSION ON CURRENT ENERGY RESEARCH,
Chair: Dr Nick Eyre (Environmental Change Institute, OUCE, University of Oxford)

Professor Gordon Walker, Lancaster University

- Current energy research evolves around the energy consumption involved in sustaining indoor living: \textit{interior energy geographies}. The research covers issues related to energy poverty in the home and keeping indoor comfort.

- Another parallel area of research covers issues related to energy consumption and the aging population. Energy consumption is analysed as a consequence of needing/wanting energy services and as part of performing and reproducing everyday life.

- The research involves working across scales and seeking the relationships, networks and connectedness between interior spaces and people’s behavior.

**Key questions:**
How is energy insecurity in the home and national energy security connected and disconnected?

What are the consequences of energy security for energy consumption?

What is the relationship between indoor climate change and outdoor climate change?

How is the temperature demands of non-humans (such as fridges and computers) reflected in producing globally standardized indoor climates of 22°C?

How are the dynamics of the living spaces of aging society co-evolving with the dynamics of energy consumption?

For more information on the projects please visit:

http://inclusesev.kcl.ac.uk/project-workpackages/wp1-concept-evr/

http://www.sed.manchester.ac.uk/research/marc/research/projects/conditioning/

Professor Peter Pearson, Cardiff University

- Energy issues cannot be confined to only one discipline.

- Current project on Transition of the Electricity Sector to a Low Carbon Economy, explores what a more electric future (based on increased electricity use) will look like. The project builds on transition and innovation literature and aims to construct a set of transitional pathways for Low Carbon governance. Scenarios need steps on the way to things happening and the opening and closing of options.

- Experiences of past transitions in the energy sector were taken into consideration to create three pathways constructed around the positions of three active actors: architects, state actors and civil society. These are: market rules pathway (liberalised energy markets); central coordination pathway in electricity supply; a thousand narratives pathway.

- The project explored the resilience and robustness of the pathways (for example, the government is under a number of pressures (such as the Arab Spring) to reconsider whether liberalised energy markets can deliver the energy transition that is needed.

- Branching points for the pathways are the use of smart meters and appliances and the introduction of carbon capture and storage.

Key questions:

- Do too many competing pathways, choices and technologies get too much for people?

- How do you go from analysing past transitions (e.g. from town gas to natural gas) to analysing the future (e.g. expansion of electrification)?

- How can the project address the specificity of English regions and the process of regionalisation?
For more information on the project please visit:

http://www.lowcarbonpathways.org.uk/

Dr David Ockwell, Sussex Energy Group, University of Sussex

• Current research project focuses on Low Carbon technology transfer to developing countries, with the empirical work taking place in the UK, India, China, Kenya, Tanzania and Ghana. Low Carbon technology transfer is related to an understanding of urgency and the need to be used for the public good. However, most of the Low Carbon technology is still being developed.

• Instead of horizontal technology transfer, flowing from North to South, the project is drawing from innovation literature and focuses on the knowledge component of technology transfer.

• Outstanding geographical research concerns are related to the directions of the flow of Low Carbon technology transfer; the extent of the flows; the qualitative nature of the flows (hardware vs knowledge); the maturity of technology flows and mapping the distribution of technology flows.

• There are multiple ways in which “technology needs” are defined and the interests that these definitions are serving. The context specificity (recognition of situated needs which include, but are not limited to cultural and gender specificities, ecological interests, urban vs rural needs) needs to be taken into account in the transfer of Low Carbon technology.

• The notion that Low Carbon technology is new and innovative needs to be challenged. Over 75% of registered Clean Development Mechanism projects are limited to a handful of countries and 5 types of hardware, of which wind energy is the only relatively new technology.

• The cost and benefits of financing hardware and capacity building in developing countries to participate and use Low Carbon technology need to be distilled.

Summary:

• There is a need to unpack context specificity and articulate situated technology needs in Low Carbon technology transfer.

Key questions:

• Transfer of what technology and to whom?
Professor Michael Bradshaw, University of Leicester

- Discussed the EPSRC-funded research cluster “Energy Security in Multipolar World” (ESMW – headed by Prof. Catherine Mitchell, University of Exeter). ESMW adopts an interdisciplinary approach, bringing together energy policy, international relations and supply chain analysis. It explores different dimensions of energy security in the UK. ESMW aims to create a network reaching out beyond universities, which involves government, NGOs, business, consultants and community.

- The first stage of the project included defining energy security in the context of the 21st century; distilling the theoretical underpinnings of energy security; outlining the role of supply chain requirements to avoid an “energy gap”, and the importance of individuals and communities to energy security.

- The nature of energy security is such that it means different things to different actors. A paper outlining the different definition of energy security in the UK is to be published.

Key questions:

- How much energy security is the taxpayer prepared to pay for?
- Who is responsible for energy security in the UK (in a privatised, liberalised energy system)? For example, who should pay for gas shortage?

For more information on the project please visit:

http://www.exeter.ac.uk/energysecurity/index.shtml

PANEL DISCUSSION:

- Although research in partnership with the private energy sector is encouraged, the challenges of preserving the independence of research need to be acknowledged. Researchers need to differentiate themselves from discourses of energy companies about what is feasible and what is not.

- Research Council framings (e.g. ‘whole energy system’) have a powerful influence on the constitution and scope of projects.