UKERC

UKERC ENERGY RESEARCH ATLAS: SOCIO-ECONOMIC ISSUES

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1. Overview

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Characterisation of the field

The UK socio-economic energy research community has grown significantly in recent years both in terms of size and prominence. This can largely be attributed to a substantial increase in funding to support research in this area from both the Economic and Social Research Council (ESRC) and Engineering and Physical Sciences Research Council (EPSRC), predominantly via the Research Councils Energy Programme (RCEP). This financial and institutional support has served to reinforce the socio-economic energy research community and has led to the emergence of a healthy number of socio-economic energy research groups, many of which are considered to be international leaders in this field. However, although socio-economic energy research is prospering at present in the UK, it continues to be dwarfed by techno-centric energy research being undertaken by the engineering community.

The UK socio-economic energy research landscape is a particularly broad and diverse field of research. In general, researchers in this area take the starting position that energy systems constitute complex systems, which are comprised of a multitude of inter-connected 'technical' (e.g. technology, infrastructure etc.) and 'social' elements (e.g. institutions, user practices, regulation, business models etc.) that together are capable of satisfying our energy needs. Whilst other more traditional energy research communities (e.g. engineering) examine the development and implementation of energy technologies relating to specific aspects of the wider energy system (e.g. energy generation, distribution, transmission and supply technologies), the socio-economic research community examines the interplay between these technical components and the more 'social' phenomena that pervade the energy system. In essence, the community emphasises the importance of non-technical system components in satisfying our energy needs.

The socio-economic research community incorporates a variety of scholars operating within different scientific disciplines. Broadly, the community includes economists, social scientists, psychologists, human geographers, business study experts, historians and political scientists. Economics has traditionally been the most dominant discipline in this field. However, significantly more attention has in recent years been given over to the cultural and political underpinnings of energy generation and consumption. For instance, a growing number of research projects in the UK have begun to apply concepts from sociology, psychology, Science & Technology Studies (STS), innovation studies, business studies, geography, planning and environmental management in order to tackle key energy research challenges.

An important characteristic of the UK socio-economic research landscape is its focus on engaging with inter-disciplinary energy research projects. Consequently, the UK socio-economic energy research community has a wealth of experience of engaging with characteristically distinct but complementary research communities, such as engineering, mathematics, physics etc. It is generally understood that this community is at the fore-front of inter-disciplinary energy research in the UK and is making an important contribution to its inter-disciplinary capabilities. However, whilst engagement between the socio-economic research community and the science, technology, engineering and mathematics (STEM) communities has improved in recent years, there remains significant scope to improve the way in which these communities interact. As such efforts should continue to be made to strengthen the links between these communities via inter-disciplinary initiatives, such as UKERC and the SUPERGEN programme.

This document is concerned only with UK research projects, funding programmes and institutes that are a) primarily concerned with energy issues and b) which incorporate a significant focus on social science and/or economics research. Those that do not fulfil these criteria are

excluded from this report. It is also important to note that only interdisciplinary initiatives that include a significant focus on socio-economic energy research are examined in this report. Those initiatives where socio-economic research represents less of a focus are instead incorporated in the 'Interdisciplinary Centres' landscape document.

Research Challenges

The range of research challenges undertaken by the socio-economic energy research community is particularly broad given the variety of disciplines that operate in this area. However, the majority of research in this field is centred around improving our understanding of how we can deliver a more environmentally sustainable, affordable and secure energy system, given the emphasis on achieving these aims across both government and industry.

A number of scholars in this field adopt a 'whole energy system' perspective to address these key energy research challenges, approaching the energy system as an integrated whole, where both technical and non-technical are inter-connected. This approach is typified in many respects by the Dutch 'transitions' perspective, which presents a means of helping us to think about how we might be able to foster radical socio-technical innovation in order to facilitate a transition to a sustainable energy system. This approach is sensitive to socio-economic phenomena such as path dependency, lock-in and co-evolution that can help to explain how energy system change unfolds and importantly in this context, how we might influence this change to help us address key energy research challenges via 'transition management'.

Moving beyond system change, other research has approached the UK energy system as an integrated whole such as that which examines the design and potential impacts of national government's energy policy (e.g. Electricity Market Reform, Green Deal etc.). This type of research typically examines the trade-offs between policies designed to meet different government policy objectives (security, sustainability, competitiveness and social inclusion) and potential solutions that could help to resolve these issues. Scholars have also examined the geopolitics of energy, focusing in particular upon the UK's relationship with other nations (e.g. Russia, US) or confederations (e.g. EU, Middle East) and how these can influence key issues such as energy security and affordability in the UK.

Research that has not adopted a 'whole system' perspective has tended to focus instead on socio-economic issues relating to specific parts of the energy supply chain. Much of this work has focused upon the upper end of the energy supply chain, i.e. energy generation, transmission and distribution. For instance, many scholars have examined the types of energy policy, regulatory framework and governance arrangements that could be implemented to manage energy generation, transmission and distribution in order to help us address real world issues (e.g. energy poverty, energy security and climate change). Additionally, research has also included economic assessments of upstream energy infrastructure, examining the costs and benefits associated with investments in different types of technology. Other work has focused more upon the politics of energy infrastructure, such as the attitudes of different demographic groups towards the development of energy generation, transmission and distribution infrastructure, such as nuclear and wind power. This has provided valuable insight into how and why different socio-economic react towards different types of energy strategies and investments.

Whilst work has traditionally been focused at the upper end of the energy supply chain there have been a growing number of research projects exploring socio-economic phenomena at the lower end of this chain, i.e. energy supply and consumption. In terms of energy supply a lot of research has examined the ways in which we could address issues such as energy poverty, energy security and climate change via the introduction of energy supply company oriented regulation and market mechanisms (e.g. Energy Company Obligation, Green Deal, Feed-in-Tariff etc.). Other work has challenged the prevailing paradigm of energy supply in the UK, examining for instance how alternative energy

business models (e.g. Energy Service Companies) or decentralised energy governance arrangements (e.g. community or city-owned energy companies) could help to address these issues.

Significant research has also been undertaken into energy consumption, analysing socio-economic phenomena that exist at the 'demand side' or in other words 'beyond the meter'. Much work has for example drawn upon a combination of psychological, sociological and economic theory to improve our understanding of the factors responsible for shaping consumers' energy decision making processes and that in turn characterise the type and level of their energy demand.

Drawing upon these insights research has also explored the types of technical and non-technical interventions that could be made within the home and/or the workplace, which are capable of minimising energy demand. In recent years much work has examined how the implementation of smart (e.g. smart meters), decentralised energy generation and energy efficiency technologies could play in achieving this aim, as well as the types of strategies that could promote their uptake.

In summary, research in this area has generally responded to the same challenges that currently face both government and industry. In order to address these challenges the socio-economic research community has engaged in research projects that focus upon a wide-range of socio-economic phenomena, operating at a variety of spatial levels and within various different aspects of the energy system. The result is a diverse research landscape whose outputs are particularly relevant to both policy makers and industry leaders alike.

2. Capabilities Assessment

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Generally the UK is understood to possess an internationally strong socio-economic research base. However, whilst the UK is particularly strong in some research areas, it possesses weaker capabilities in others. Focusing on the former first the UK is considered to be particularly strong in the following areas of socio-economic energy research:

- **Dynamics of energy system change and innovation** – Analysis and modelling of the interplay between social and technical energy system components and how these characterise energy system change. A specific focus on the development, uptake and potential impact of energy innovations, both technical and non-technical.
- **Energy economics** – The application of economics and econometric modelling to analyse the costs and associated benefits of a variety of energy system developments, both technical (e.g. new generation capacity) and non-technical (e.g. new market regime).
- **Energy system governance** – Exploration of existing and alternative governance arrangements for energy systems and analysis of their respective impacts upon the broader energy system (e.g. generation, supply, consumption etc.) and their potential to address key challenges (e.g. climate change, energy security). Particular focus on decentralised governance led by communities and local authorities.
- **Design and impacts of energy policy and regulation** – Examination of the effectiveness, costs and benefits of policies and regulation designed to promote: competition within energy markets; uptake of innovative technologies; and sustainable energy consumption practices in order to address key energy challenges (e.g. energy security)
- **Energy use behaviours and decision-making in the home** – The factors responsible for characterising the type and level of energy demand, as well as consumers' engagement with energy technologies. Strong focus on the uptake and potential impact of smart technologies.

An underdeveloped but fast growing capability of the UK energy research community is around energy business model innovation. A number of projects (particularly around energy infrastructure) have recently emerged that are exploring the range of potential alternative energy business models and the role they could play in addressing key energy challenges.

Other medium-level capabilities relate to the politics and acceptability of energy policy and infrastructure development. Much of this work examines how these developments impact upon different socio-economic groupings, as well as the ethical implications of these impacts.

Finally, one cross-cutting area of research that is currently underdeveloped but gaining additional traction is around energy investment decision making. Whilst traditionally energy economics has long been established in this field, this related research area draws upon alternative economics theories (e.g. evolutionary economics) that can help to provide insight into the factors (e.g. bounded rationality) responsible for shaping decision making around energy investment both in the home and work place.

The UK is considered to possess weaker research capabilities in other areas, such as commercial energy use behaviours and decision-making. Whilst the UK possesses strong capabilities in understanding the factors that characterise domestic energy consumption, much less is currently known about those that characterise energy consumption in a commercial context, across the various different sectors of the UK economy. To some extent DECC's newly established Energy Efficiency

and Deployment Office (EEDO) and the new inDemand End-Use Energy Demand Centre will help to address this gap in the research landscape.

The UK also currently possesses poor capabilities around low-carbon skills or green jobs. In particular, little research has examined the types of structures that need to be in place in order to deliver the wealth of skills that will be required to drive forward a transition to a sustainable energy system and maintain this system in the future. Little is understood about the strategies that could potentially address concerns around a future skills shortage in the UK energy sector.

Finally, the socio-economic energy research community has typically focused its attentions on UK-specific energy research at the expense of research that draws international comparisons of the UK and other countries' energy systems. Consequently, relatively little is known about the differences and similarities between energy systems in different countries and importantly whether valuable lessons could be shared between these to help address its energy challenges.

Table 2.1: Capability Assessment

UK Capability	Area	Market potential
High	• Energy economics	Global – High in short term
	• Energy scenario building and modelling	Global – High in short term
	• Design and impacts of energy policy and regulation	Global – Medium in medium term
	• Energy system governance	Global – Medium in medium term
	• Dynamics and drivers of energy system change and innovation	Global – Medium in medium term
	• Domestic energy use behaviours and decision-making	Global – High in medium term
Medium	• Energy business model innovation	Global – High in medium term
	• Politics and acceptability of energy	Global – High in medium term
	• Energy investment decision making	Global – Medium in medium term
Low	• Low carbon skills and training	Global – High in medium term
	• Commercial energy use behaviours and decision-making	Global – High in medium term
	• International comparisons of energy systems	Global – High in short term

3. Basic and applied strategic research

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The level and coherence of the socio-economic energy research community has grown significantly between 2005 and 2013, largely due to the availability of a significant amount of new funding designed to support its research, the majority of which has been made available via programmes managed by the Research Councils' Energy Programme.

UKERC continues to represent the main driver of socio-economic energy research in the UK, leading 5 inter-disciplinary energy research themes including: *energy demand; energy supply; energy & environment; energy systems*; and *technology & policy assessment*. UKERC is currently preparing a bid to extend its operations into a third phase. Alongside UKERC's work a significant amount of socio-economic energy research has been channelled via the various SUPERGEN consortia and hubs. Whilst socio-economic research comprises only one part of these centres' research programme, the sheer size of these research groups means they warrant mention in this context.

One of the most significant developments in this field in the last year has been the creation of 5 new End Use Energy Demand research centres, which will run from 2013 – 2018. These have been established to strengthen and support the research base around energy consumption behaviour and specifically, measures to promote levels of energy efficiency. The centres will receive funding via the Research Councils UK Energy Programme (RCUK), as well as a number of industrial partners, with total investment will reach the order of £39 million. The centres are as follows:

UK InDemand Centre
RCUK Centre for Energy Epidemiology
Centre for Sustainable Energy Use in Food Chains
DEMAND: Dynamics of Energy, Mobility and Demand Centre
Research Centre on Innovation and Energy Demand

Other initiatives also continue to make an important contribution to end-use energy demand research. These primarily include the People, Energy and Buildings, Transforming Energy Demand in Buildings Through Digital Innovation (Buildteddi) and the ESRC Climate Change Leadership Fellowships research programmes. Research is also being conducted through the Sustainable Lifestyles Research Group (SLRG) (University of Surrey).

A number of other large research consortia are leading research into energy policy, regulation and governance. These include the Liveable Cities: Transforming the Engineering of Cities to Deliver Societal and Planetary Wellbeing research programme, the Centre for Climate Change, Economics and Policy (LSE & Leeds) and the Innovation, Governance and Affordability for a Sustainable and Secure Economy (iGOV) (Exeter) project. Work that explicitly challenges the prevailing centralised energy governance paradigm has been funded via the Energy and Communities Collaborative Venture.

Related to this work is research that explicitly examines the dynamics of energy innovation systems and energy system change (i.e. transitions). The most significant projects in this field include the Realising Transition Pathways - Whole Systems Analysis for a UK More Electric Low Carbon Energy Future consortium; the Research Centre on Innovation and Energy Demand; the RCUK Energy Strategy Fellowship (Imperial); and a number of projects as part of the ESRC Climate Change Leadership Fellowships research programme.

Recently a number of socio-economic research initiatives have been funded that examine the key socio-economic aspects of developing a radically new energy infrastructure for the UK in the future. These include the Infrastructure Transitions Research Consortium (ITRC); Re-Engineering the City 2020-2050: Urban Foresight and Transition

Management consortium and projects funded under the Innovative business models around infrastructure interdependencies programme.

Finally, research into the ethics & acceptability of key energy system developments, such as energy policy and infrastructure developments is primarily being undertaken under the ESRC Climate Change Leadership Fellowships and the Energy, Equity and Security research programmes.

A number of charitable trusts make smaller yet important contributions to socio-economic research. These include the Esmee Fairbairn Foundation, the Ashden Trust and the Joseph Rowntree Foundation, which for instance issued a call in 2010 on 'a socially just transition to a low carbon economy and society'.

Table 3.1: Research Funding

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
End Use Energy Demand (EUED) Research Centres	EPSRC	Research into energy efficiency measures, reduction in demand for energy, and reduction in demand for energy services / mobility will all contribute to reducing carbon emissions from energy use. This includes research extending from the built environment to industrial processes and products, from materials to design and from markets and regulation to organisational and individual behaviour. All of the EUED Centres will be multidisciplinary collaborations of leading academics who will contribute to a central EUED research theme, which they will define themselves. The main criterion will be that the research theme should be directed towards helping to satisfy the UK's 2050 greenhouse gas emissions target. 5 centres have been funded as part of this programme: UK Indemand Centre (£6.2m) The academic consortium will be led by the University of Cambridge, partnered with the universities of Bath, Leeds and Nottingham Trent University. The Centre will receive funding by ESRC and EPSRC as part of the Research Councils UK Energy Programme. The focus of the Centre will be energy demand and the use of energy intensive materials in the UK industrial sector in order to develop understanding of the operation and performance of the material and energy system in UK industry. The main aim will be to identify policy, business and consumer incentives to initiate change across the industrial sector.	£39,000,000	2013 - 2018	£7,800,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		RCUK Centre for Energy Epidemiology (£5.7m) The RCUK Centre for Energy Epidemiology will be funded by EPSRC and ESRC as part of the Research Councils UK Energy Programme. The main objective of the Centre will be to provide an evidence base for government and industry by maximising the value of existing and future large energy data. It is anticipated that empirical evidence will be provided on the impacts of energy policy and investment. The overarching goal will be to enhance accountability and support energy efficiency investments in the UK. Centre for Sustainable Energy Use in Food Chains (£5.7m) The Centre will be a consortium led by Brunel University, partnered with the universities of Manchester and Birmingham. The aim of the Centre will be to develop approaches, processes and technologies to minimise energy demand in all stages of the food chain, from production to distribution, retail and consumption. DEMAND: Dynamics of Energy, Mobility and Demand Centre (£3.9m) The Centre will be led by the University of Lancaster, partnered with the universities of Aberdeen, Manchester, Leeds, Reading, Sheffield, Sussex and UCL. Funding will be provided by EPSRC and ESRC as part of the Research Councils UK Energy Programme. The overarching aim of the Centre will be to bridge the gap and work across the boundaries of mobility and building energy use. The societal viability of technological and infrastructural innovation will be assessed, integrating historical research with future			

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		planning. Research will focus on infrastructure, buildings and transport systems. Research Centre on Innovation and Energy Demand (£3.5m) The Centre will be funded by ESRC and EPSRC and will be a consortium between the universities of Sussex and Oxford. Its main objective will be to inform and support UK energy and climate policies, by providing insight on the emergence, adoption and impact of 'low-energy innovations', i.e. new technologies, organisational arrangements and behaviours that are likely to improve energy efficiency and reduce energy demand.			
UK Energy Research Centre (UKERC)	NERC/EPSRC/ ESRC	UKERC was established in 2004 following a successful £14m bid to establish an organisation designed to bring together all researchers working on energy problems in the UK. Its UKERC was renewed for a second phase in 2009, following a successful £18.5m bid. UKERC is currently preparing a bid for a third phase, which if successful would commence in 2014. UKERC carries out world-class research into sustainable future energy systems. It constitutes the hub of UK energy research and an important gateway between the UK and the international energy research communities. In terms of research UKERC is currently undertaking work in the following areas: • Technology and Policy Assessment • Energy and Environment • Energy Supply • Energy Demand • Energy Systems	£32,500,000	2004 - 2014	£3,600,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		Beyond research, UKERC also engages in a number of other important activities. These include: • The National Energy Research Network (NERN) • The UKERC Research Atlas • A delivery partner for TSB's Knowledge Transfer Network (KTN) for Energy Generation and Supply • The Energy Data Centre • UKERC's Meeting Place UKERC also plays a key role in supporting learning and developing skills via a host of interdisciplinary PhD studentships, an international PhD summer schools and its Sparks network for early-career energy researchers.			
SUPERGEN Consortia & Hubs	EPSRC	SUPERGEN is part of the Research Council's Energy Programme, led by EPSRC in partnership with BBSRC, ESRC and NERC, and is a key initiative in Sustainable Power Generation and Supply. It aims to contribute to the UK's environmental emissions targets through a radical improvement in the sustainability of the UK's power generation and supply. SUPERGEN takes a radically different and long-term approach to supporting research in order to promote significant step change rather than incremental progress. The approach includes the involvement of multidisciplinary partnerships working in major programmes of work, rather than individual research groups working in isolation and the involvement of appropriate user or industrial collaborations to encourage the take up of research without inhibiting innovation.	£98,000,000 (approximately)	2004 - 2013	£2,560,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		With the first consortia launched in 2003, the SUPERGEN program now supports 8 consortia and 5 Hubs. There are significant pockets of social science research in some of the consortia it supports, notably: the Sustainable Hydrogen Energy Consortium (SHEC); Flexible Networks; Bioenergy; and Marine. These were re-funded in 2007 with a significant cross-consortium social science element. In 2010 EPSRC carried out a consultation to determine how/if the SUPERGEN programme should continue post 2012. The new structure (of a Hub) will permit the inclusion of social science elements where appropriate.			
Innovative business models around infrastructure interdependencies	EPSRC	Two large projects have been funded through this programme: i-BUILD: Infrastructure Business models, valuation and Innovation for Local Delivery Continued delivery of our civil infrastructure, particularly given current financial constraints is likely to require alternative models to mobilise the necessary finance. The i-BUILD centre will bring together three UK universities with world-leading track records in engineering, economics and social sciences to examine innovative business models around infrastructure interdependencies primarily at the scale of neighbourhoods, towns and cities where infrastructure is most dense and interdependencies between infrastructures, economies and society are most profound. International Centre for Infrastructure Futures (ICIF) The Centre will create a shared, facilitated learning environment in which social scientists, engineers,	£7,000,000	2013 - 2017	£1,750,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		industrialists, policy makers and other stakeholders can research and learn together to understand how better to exploit the technical and market opportunities that emerge from the increased interdependence of infrastructure systems. The Centre will focus on the development and implementation of innovative business models and aims to support UK firms wishing to exploit them in international markets. The Centre will undertake a wide range of research activities on infrastructure interdependencies with users, which will allow problems to be discovered and addressed earlier and at lower cost. Because infrastructure innovations alter the social distribution of risks and rewards, the public needs to be involved in decision making to ensure business models and forms of regulation are socially robust. As a consequence, the Centre has a major focus on using its research to catalyse a broader national debate about the future of the UK's infrastructure, and how it might contribute towards a more sustainable, economically vibrant, and fair society.			
Liveable Cities: Transforming the Engineering of Cities to Deliver Societal and Planetary Wellbeing	EPSRC	Liveable Cities is an ambitious, five-year programme of research to develop a method of designing and engineering low carbon, resource secure, well-being maximised UK cities. This will be achieved via the development of a unique City Analysis Methodology (CAM) that will measure how cities operate and perform in terms of their people, environment and governance, taking account of wellbeing and resource security. The CAM will be used to establish future visions of low carbon, resource secure, liveable UK cities from which the	£6,300,000	2012 – 2017	£1,260,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		team will back cast to determine what needs to be done now to achieve these visions. Using the CAM, the Liveable Cities team will develop realistic and radical engineering solutions for achieving the UK's ambitious carbon reduction targets and will test them in three UK cities: Birmingham, Lancaster and Southampton.			
Transforming Energy Demand in Buildings Through Digital Innovation (Buildteddi)	EPSRC	This initiative is jointly funded by the Research Councils' Energy and Digital Economy programmes. It is designed to support joint research projects concerned with the application of digital technologies to transform energy demand reduction within the envelope of a single building. The two largest funded projects under this programme included REDUCE: Reshaping Energy Demand of Users by Communication Technology and Economic Incentives and LEEDR: Low Effort Energy Demand Reduction	£6,000,000	2010 - 2014	£1,500,000
Towards a Sustainable Urban Environment		This research programme has supported projects examining the need for integration and connectivity of both technical and non-technical components across different spatial and temporal scales in order to develop sustainable urban environments. The three energy related projects funded were as follows: • Re-Engineering the City 2020-2050: Urban Foresight and Transition Management • Challenging Lock-in through Urban Energy Systems (CLUES) • SECURE: SElf Conserving URban Environments	£5,200,000	2010 - 2015	£1,040,000
Infrastructure Transitions Research Consortium (ITRC)	EPSRC	This is an interdisciplinary research programme on the long term dynamics of interdependent infrastructure systems - including energy, transport, water, waste, information and communications.	£4,700,000	2011 - 2015	£1,175,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		The aim is to develop and demonstrate a new generation of models to look at the performance, risk and interdependence of infrastructure systems in order to inform analysis, planning and design of infrastructure. This will be followed by using the models to test out different strategies for national infrastructure and see how different strategies perform with regards to reliability and security of supply, cost, carbon emissions and how they would respond to future changes in demographics and to environmental change. ITRC is undertaking 5 key work packages: 1. Balancing infrastructure capacity and demand under uncertainty 2. Understanding future risks of infrastructure failure 3. Managing infrastructure as a complex adaptive system 4. Enabling tools for the above 3 work packages 5. Developing integrated strategies for transitions in national infrastructure			
Centre for Climate Change, Economics and Policy (CCCEP)	ESRC	Hosted jointly by the University of Leeds and the London School of Economics and Political Science, CCCEP brings together some of the world's leading researchers on climate change economics and policy, across many different disciplines. The Centre has five inter-linked research programmes: • Developing climate science and economics • Climate change governance for a new global deal	£4,650,000	2008 - 2013	£930,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		• Adaptation to climate change and human development • Governments, markets and climate change mitigation • The Munich Re Programme: Evaluating the economics of climate risks and opportunities in the insurance sector CCCEP are currently preparing a bid for a second phase to continue the centre beyond 2013.			
Whole Systems Energy Modelling Consortium (WholeSEM)	EPSRC	The UCL Energy Institute will lead a ground breaking £5.7 million whole systems energy modelling consortium (wholeSEM); a new initiative to develop, integrate and apply state of the art energy models. The consortium is led by University College London and consists of Imperial College London, the University of Cambridge and the University of Surrey representatives. The wholeSEM consortium will make an internationally leading research impact, prioritising on key modelling areas of high relevance to interdisciplinary energy systems. The research will focus on: 1. How does energy demand co-evolve with changes in practice, supply, and policy? 2. How will the endogenous, uncertain and path dependent process of technological change impact future energy systems? 3. How can the energy supply-demand system be optimised over multiple energy vectors and infrastructures? 4. What are the major future physical and economic interactions and stresses between the energy system and the broader environment?	£4,600,000	2013 - 2017	£1,150,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		The consortium, funded by EPSRC under the RCUK Energy Programme, will employ extensive integration mechanisms to link and apply interdisciplinary models to key energy policy problems, with substantive bilateral engagement with stakeholders in academia, government and industry.			
Energy and Communities Collaborative Venture	ESRC and EPSRC	How individuals and communities use energy, their understanding of energy use and effective, community management of energy and energy regulation will form the basis of seven new Energy and Communities initiative projects. The projects are a part of the Energy Research Programme which will work with communities from the outset of their research to find appropriate ways to reduce energy demand. The £4 million investment from the Economic and Social Research Council (ESRC) and the Engineering and Physical Sciences Research Council (EPSRC) is expected to have significant impact within the communities that they are working with and beyond, to other communities looking to address energy demand reduction in the context of increasing challenges in energy security and equity. Projects funded by this programme include but are not limited to: • The Role of Community-Based Initiatives in Energy Saving • Heat and the City: Comparing the trajectory of sustainable heat and energy conservation in the municipal communities of Glasgow and Edinburgh • Sustainability Invention and Energy Demand Reduction: Co-designing communities and practice	£4,000,000	2010 - 2015	£800,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
Energy challenges for complexity science	EPSRC	This programme supports research designed to develop and apply the tools and techniques of complexity science to energy research challenges. In doing so the initiative aims to promote knowledge exchange between the complexity science and energy research communities.	£4,000,000	2009 – 2014	£800,000
Adaptation And Resilience Of The UK Energy System To Climate Change	EPSRC & UKCIP	This jointly funded programme has supported multidisciplinary consortia concerned with the adaptation and resilience of energy generation and transmission systems in the context of current climate and projected changes. Specifically this programme supports research multidisciplinary research into the implications of projected climate changes on the energy generation and transmission system. The programme has funded three projects: • Adaptation and Resilience In Energy Systems (ARIES) • Adaptation and Resilience of Coastal Energy Supply • Resilient Electricity Networks for Great Britain (RESNET)	£3,000,000	2011 - 2016	£600,000
People, Energy and Buildings	EDF & EPSRC	The Research Councils Energy Programme (RCEP) and EDF provided approximately £3 million to support a collaborative research programme in the general area of the social and economic sciences of energy efficiency in buildings. The key projects funded included: • People, Energy and Buildings: Distribution, Diversity and Dynamics (PEB:D3) • Conditioning Demand - Older People, Diversity and Thermal Experience • Community Innovation in Sustainable Energy	£2,850,000	2010 - 2014	£712,500

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
Established Career Fellowships	EPSRC	EPSRC has recently granted two established research fellowships to undertake socio-economic research. These grants have been awarded to individuals who have exhibited research excellence, an ability to set the research agenda, strategic vision, inspirational team leadership's skills and significant profile and influence in the research domain. Two fellowships have so far been awarded: • Prof. Jim Skea is leading on the RCUK Energy Strategy Fellowship, the aim of which is two-fold: 1) map the UK's energy research needs; and 2) undertake an international comparison of the effectiveness of energy innovation systems. • Prof. Catherine Mitchell is leading the Innovation, Governance and Affordability for a Sustainable and Secure Economy fellowship. The focus of this project is to examine the relationships between innovation, governance, energy demand and affordability.	£2,850,000	2012 - 2017	£570,000
Realising Transition Pathways - Whole Systems Analysis for a UK More Electric Low Carbon Energy Future	EPSRC	This project extends the work of the £2.1m Transition Pathways consortium project, which was jointly sponsored by E.ON UK and the EPSRC and ran from 2008 to 2011. The original project entailed innovative collaboration between engineers, social scientists and policy analysts to both develop and analyse a set of 'transition pathways' towards a UK low carbon electricity system, which could meet the UK's target of an 80% cut on 1990 levels of greenhouse gas emissions by 2050. The team developed and applied tools to analyse the technical feasibility, social acceptability and environmental and economic impacts of these pathways. Building on this work the aim of the new project is to	£2,600,000	2012 - 2016	£650,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		explore what needs to be done to achieve a transition that successfully addresses the energy policy 'trilemma', i.e. the simultaneous delivery of low carbon, secure and affordable energy services. It focuses on electricity, but in a context that includes the electrical provision of heat and transport, and key EU developments and policies. The project will inform thinking and decision-making about technological and behavioural developments, and the roles of key energy system 'actors', governance arrangements and regulations in a low carbon transition. The project will: 1. Analyse actors' choices and decisions in past, current and prospective developments in electricity supply and demand; 2. Analyse the social, behavioural and technical drivers and implications of electricity users' responses to incentives on the demand side and how to integrate these responses into electricity systems; 3. Undertake techno-economic modelling and energy and environmental assessments of the developments in electricity supply (including transmission and distribution networks) needed to meet this responsive demand.			
ESRC Climate Change Leadership Fellowships	ESRC	Climate change has contributed to a rise of both policy and research debates, within the UK and internationally. These six leadership fellows propose innovative approaches and application of leading edge social science to addressing key research issues in mitigating and/or adapting to climate change. The fellowships are intended to complement existing initiatives in the field, and will form an important further step in mobilising leading UK expertise to respond	£1,540,000	2008 - 2012	£385,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		readily to the social science research challenges raised by climate change. The six fellowships are: • Dr Harriet Bulkeley, Durham University - *Urban Transitions: climate change, global cities and the transformation of socio-technical systems* • Prof Peter Newell, University of East Anglia - *The Governance of Clean Development: CDM and Beyond* • Prof Simon Caney, University of Oxford - *Equity and Climate Change* • Dr Karen Turner, University of Strathclyde - *Investigating the pollution content of trade flows and the importance of 'environmental trade balances' in addressing the problems of climate change* • Prof Nick Pidgeon, Cardiff University - *Risk Perception, Climate Change and Public Engagement* • Prof Elizabeth Shove, Lancaster University - *Transitions in practice: climate change and everyday life*			
Climate Change & Social Justice	Joseph Rowntree Foundation	The Joseph Rowntree Foundation is one of the largest social policy research and development charities in the UK, spending about £10 million a year on a research and development programme that seeks to better understand the causes of social difficulties and explore ways of overcoming them. The Joseph Rowntree Foundation Climate Change and Social Justice programme supports the development of socially just responses to climate change in the UK. There are currently two calls under this programme: • A socially just transition to a low carbon economy	£914,000	2009-2011	£457,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		and society • Just adaptation responses to climate change in the UK			
Energy, Equity and Security	EPSRC & ESRC	The research programme supported research that examined how we might be able to develop both an equitable and secure energy system in the UK. Two projects were funded through it: • Britain's Energy Security in a Multipolar World • Interdisciplinary Cluster on Energy Systems, Equity and Vulnerability (InCluESEV)	£900,000	2009 - 2012	£300,000
Leverhulme Trust	-	The Leverhume Trust, makes awards in all fields for the support of research and education, putting special weight on: originality; significance; the ability to judge and take appropriate risk in the project; and the removal of barriers between traditional disciplines. The Trust presents a potential important source of funding for socio-economic research. For instance, between 2007 - 2011 approximately £1m was awarded to support the Energy futures and risk: exploring public perceptions project being led by Cardiff University, and supported by Leeds and UEA. The project explores risk attitudes and behaviour in relation to climate change and energy choices, as well as aspects of public deliberation about this critical environmental challenge.	n/a	on-going	£60 million across all its activities (i.e. not just energy related research)
Sustainable Lifestyles Research Group (SLRG)	Defra, ESRC & Scottish Government	The Sustainable Lifestyles Research Group (SLRG) is funded by the Department for the Environment, Food and Rural Affairs (DEFRA), the Economics and Social Research Council (ESRC) and the Scottish Government. Its aim is to develop an integrated understanding of the complex relationships between people's lifestyles and practices and sustainability.	n/a	2010 - 2013	

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
		Specific objectives are: • to develop new and relevant understandings of the processes which lead to changes in people's behaviours and practices; • to build a sound conceptual basis for understanding and influencing change processes aimed at sustainable living; • to provide advice on realistic strategies to enable more sustainable lifestyles This research centre has continued the work undertaken by the Research Group on Lifestyles Values and Environment (RESOLVE).			
Ashden Trust		The Ashden Trust is a grant-making charity established in 1989 and is one of the Sainsbury Family Charitable Trusts. We primarily support programmes which have a focus on climate change, sustainable development or on improving the quality of life in poorer communities. The trust's long-term focus on climate change, sustainable development and improving the quality of life in poorer communities allows us to explore a range of ways to tackle these enormous challenges under six category headings: • Sustainable Development International • Sustainable Development UK • Sustainable Regeneration • People at Risk • Arts and Sustainability • Social Investment Fund • Low Carbon Fund	n/a	on-going	£1,000,000
Esmee Fairbairn	-	The Esmée Fairbairn Foundation is one of the largest	n/a	on-going	£5,100,000

Funding Stream	Funding Agency	Description	Committed Funds	Period	Representative Annual Spend
Foundation		independent grant making foundations in the UK. It makes grants to organisations which aim to improve the quality of life for people and communities in the UK, both now and in the future. It has an Environment Programme which includes "the low carbon economy" as a major theme. This aims to stimulate changes in policy, planning and practice that will support the achievement of a low carbon economy and lessen the detrimental effects of greenhouse gas emissions. The Environment programme wishes to promote environmental improvements which balance the needs of people and wildlife. Integral to this is: • countryside which is rich in diverse habitats and species • a reduction in carbon emissions, together with well-planned, sustainable urban and rural developments, offering a good quality of life to all • a UK food industry supplying a wide range of high quality, sustainably produced goods, which are predominantly made locally. Within the broad objectives stated above, the programme supports three interrelated themes: UK Biodiversity, a Low Carbon Economy and Sustainable Food Systems.			across their Environment strand, which includes non-energy related projects
TOTAL					

Table 3.2: Key Research Providers in UK Universities

Name	Description	Sub-topics covered	No of staff	Field
Institute for Sustainable Energy and the Environment, University of Bath	The mission of I-SEE is to focus, integrate and enhance fundamental and applied research on sustainable energy and the environment. It will seek to enhance both the University's effectiveness at meeting this agenda, and its national and international reputation as a research institute focussed on major real-world issues. I-SEE engages with 13 Departments/Schools and 7 research centres across the University bringing together experts from the fields of engineering, technology, physical sciences, social sciences and economics.	• Climate change and its mitigation • Energy efficiency improvement and demand reduction • Future energy sources and energy storage • Energy generation, transmission and distribution • Technology assessment of energy systems • Low carbon transportation and advanced / alternative fuels • Environmental sustainability • Effective policy & practice around sustainable behaviour • Well-being, capability and resilience in communities • The economics and ethics of sustainability • Next generation • Enabling research and technology transfer	3 executive members and 3 board members	• Economics and Econometrics Geography & Environmental Sciences
Energy at Birmingham University of Birmingham	Energy at Birmingham is a vibrant community of more than 100 academics across seventeen Schools and four Colleges researching in energy fields, as well as hundreds of research fellows, doctoral researchers and taught students. The group collaborates with industrialists and institutions across the world. Birmingham has the critical mass and connections for students and academics to thrive in our intense Energy research environment.	• Energy Policy & Society – covers Bioenergy, Biohydrogen, Distribution, Energy & the Environment, Energy in Manufacturing, Hydrogen, Materials, Nuclear, Oil & Gas, Policy & Society,Transport	n/a	• Business and Management • Economics • Engineering Geography & the Built Environment • Politics and International Studies

Name	Description	Sub-topics covered	No of staff	Field
	They are partners in the Midland Energy Consortium with the Universities of Nottingham and Loughborough, and a founding partner of the Manufacturing Technology Centre.			
Electricity policy Research Group, University of Cambridge	The Electricity Policy Research Group's (EPRG) research programme commenced in October 2005. It is based at the Faculty of Economics and at the Judge Business School, University of Cambridge. EPRG's research team have broad expertise in economics, technology policy and political science. Their core research discipline is economics, within a framework that encourages collaboration between experts from different academic traditions, drawing on insights from engineering, political science and law. Via EPRG's Energy Policy Forum (EPF), the group offers rigorous independent research output that informs public and private sector decision making in the electricity and energy industry.	• Regulation and Markets • Technology and Innovation • Governance and Politics • Climate Change Policy	1 Director, 10 researchers, 45 Associate researchers and 13 PhD students	• Economics and Econometrics • Engineering & Technology • Politics and International Studies
Undertaking Risk Group University of Cardiff	The Understanding Risk Group is an interdisciplinary social sciences (psychology, sociology and technology studies, geography) research unit focusing on the impacts upon individuals and communities, and acceptability to people, of environmental and technological risk within everyday life.	• Psychology of climate change; • Public attitudes towards and acceptability of energy supply systems; • Sustainable behaviour change and energy demand reduction; • Social conflicts and siting of large scale energy	20 researchers, 9 external collaborators, 5 PhD students	• Geography & Environmental Studies • Psychology • Sociology

Name	Description	Sub-topics covered	No of staff	Field
		technologies; • Risk perception, communication and public engagement		
The Centre for Energy, Petroleum and Mineral Law and Policy, University of Dundee	The Centre for Energy, Petroleum and Mineral Law and Policy at the University of Dundee is the internationally renowned graduate school in the field of international business transactions and natural resources and energy law and policy. The centre's interdisciplinary approach to teaching, research and consultancy provides a unique perspective on how governments, business and communities operate, providing the professionals of today with the ability to meet the challenges of tomorrow. Stimulated by oil and gas developments in the North Sea, the Centre was established in May 1977.	• Energy and Investment • Energy, Natural Resources and the International Trading System • Energy and Sustainability: New Technologies, New Markets and Environmental Risks • Energy and Natural Resources Security • Governance of the Extractive Industries • Economics of Energy & Natural Resources	20 academic and research staff, 17 PhD students	• Business and management studies • Economics and econometrics • Law • Politics and international studies
Durham Energy Institute University of Durham	The Durham Energy Institute tackles the societal aspects of energy technology development and use. This is increasingly recognised as an important aspect of energy research, which has previously been overlooked. The Durham Energy Institute draws upon its existing considerable knowledge base, skills and expertise to promote technical scientific excellence in energy science, as well as solve technological-social problems associated with energy provision, demand and use	• Society and Energy • Business, Economics and Law • Low Carbon Transitions • Risk and Resilience • Methodologies • Critical Perspectives • Energy for Development	15 researchers, 23 PhD students	• Business & Management Studies • Economics & Econometrics • Geography & Environmental Studies • Law • Sociology

Name	Description	Sub-topics covered	No of staff	Field
	The institute aspires to initiate the behavioural step change required for society to realise a low carbon future; in the process establishing DEI as an internationally leading institution, which is recognised worldwide as a centre for integrating energy science with society.			
3S: Science, Society and Sustainability University of East Anglia	3S are a group of faculty, researchers and postgraduate students taking forward critical social science approaches to researching the social and political dimensions of environment and sustainability issues. The overall aim of the group is to conduct world-leading research that better understands, and can potentially transform, relations between science, policy and society in responding to the unprecedented sustainability challenges facing our world. Their approach is: • interdisciplinary, working at the interface between science and technology studies, human geography and political science, as well as linking with the natural sciences and humanities; • engaged, working collaboratively with publics, communities, civil society organisations, government and business; and • reflexive, through being theoretically informed, self-aware and	• Knowledges and Expertise • Participation and Engagement • Science, Policy and Governance • Transitions to Sustainability • Sustainable Consumption	8 faculty members, 8 research staff, 3 associates, 14 PhD students	• Development Studies • Geography and Environmental Studies • Law • Psychology • Politics and International Studies • Social Sciences

Name	Description	Sub-topics covered	No of staff	Field
	constructively critical.			
Energy Policy Group, University of Exeter	The Energy Policy Group at the University of Exeter provides an academic hub for the interdisciplinary study of energy policy and sustainability, specialising in the transition from the current unsustainable energy systems to sustainable ones providing clean energy for all. Research carried out by the group is interdisciplinary and collaborative, both within the University and with outside organisations. The group provide objective research, analysis and policy advice to policy makers, industry, NGOs, and the public. The research work of the group is funded by grants from UK research councils and also through consultancy with national and international stakeholders.	• Energy Innovation • Energy Governance • Energy Security • Energy Infrastructure and Supply • Impact of economic regulation and market arrangements on the development of a sustainable electricity network	1 Director, 6 academic staff, 14 associates and 8 PhD Students	• Economics and Econometrics • Geography and Environmental Sciences • Politics and International Studies • Social Sciences
Energy Futures Lab Imperial College	The Energy Futures Lab is concerned with facilitating the move towards a more secure energy supply in the future. To achieve this aim, the centre provides a focal point for multi-disciplinary research across Imperial College London by facilitating and funding energy related research that brings together the university's different departments.	• Sustainable Power • Clean Fossil Fuels • Low Carbon Transport • Energy Infrastructure • Policy and Innovation	n/a	• Geography and Environmental sciences • Economics & Econometrics • Engineering & Technology
Grantham Institute for Climate Change Imperial College	The Grantham Institute was founded with a mandate to drive forward climate change related research, translating this into impacts and communicating our knowledge to help shape decision-making. The Institute is	• Risks, extremes and irreversible change • Sustainable futures	3 directors, 5 policy team members, 20 PhD students (specific to	• Economics and econometrics • Chemistry • Politics and International studies

Name	Description	Sub-topics covered	No of staff	Field
	already integrating researchers and capabilities from all areas of Imperial College with the skills necessary to tackle the challenges of climate change, through which we will work to offer practical scientific and technical knowledge of the highest quality.		socio-economic theme)	• Applied Mathematics • Social Sciences
Imperial College Centre for Energy Policy and Technology, Imperial College London	ICEPT provides nationally & internationally recognised interdisciplinary research, policy advice and postgraduate training, specialising in the interface between technology and policy. They provide objective research, analysis and policy advice to governments, industry, NGOs, and other stakeholders.	• Biomass & Bioenergy • Renewable Energy & Low Carbon Generation • Energy in Developing Countries • Infrastructure, Vectors & Alternative Fuels • Markets, Policy & Systems Transitions • UKERC Technology & Policy Assessment • Research Councils UK Energy Programme Strategy Fellowship	3 directors, 10 senior research staff, 13 research associates/assistants, 20 visiting staff and 13 PhD researchers	• Economics and Econometrics • Geography and Environmental Sciences • Law • Social Sciences
The Centre for the Study of Environmental Change, Lancaster University	CSEC is an interdisciplinary centre, now based in Lancaster's Department of Sociology, which exists to develop a fuller understanding of the social, political and cultural dimensions of debates around environment and new technologies, and of their implications for public policy and society.	• Risk, environment and modernity • Climate change – modelling, uncertainty and policy • Public perceptions of the disposal of nuclear waste • New Social Movements and environmental politics • Participation in technological innovation • The valuation of nature	4 academic staff and 3 PhD	• Geography and Environmental Sciences • Politics • Sociology • Social Sciences
The Society and Environment research theme, The Lancaster	The Society and Environment research theme is focused on the interdisciplinary investigation and critical analysis of contemporary social and environmental	• Climate change mitigation and the social and political dimensions of transitions in energy and transport systems and in patterns of consumption	5 staff working on socio-economic energy	• Geography and Environmental Studies • Sociology

Name	Description	Sub-topics covered	No of staff	Field
Environment Centre, Lancaster University	challenges. The work of the group is shaped by theoretical interests in • knowledge, expertise and governance; • space, scale, time and socio-spatial relations; • everyday practice, resilience and systemic socio-technical change	• Geographies of everyday life and how these relate to changing identities, mobilities and consumption practices over the life course • Processes of globalization, the dynamics of change and their implications for flows of people, commodities, resources and knowledges; global production networks	related projects	
Sustainability Research Institute University of Leeds	The Sustainability Research Institute conducts internationally recognised, academically excellent and problem-oriented interdisciplinary research and teaching on environmental, social and economic aspects of sustainability. The institute draws on various social and natural science disciplines, including ecological economics, environmental economics, political science, policy studies, development studies, business and management, geography, sociology, science & technology studies and environmental sciences	• Business and organisations for sustainable societies • Economics and policy for sustainability • Environmental change and sustainable development • Social and political dimensions of sustainability • Energy system change and transitions	15 research staff working on energy related research	• Business and Management Studies • Economics and Econometrics • Geography & Environmental Sciences • Politics and International Studies • Sociology
Centre for Integrated Energy Research, University of Leeds	The Centre for Integrated Energy Research was initiated in October 2010, through a substantial investment by the University of Leeds' Transformation Fund. The Centre is designed to draw together expertise of around 50 leading researchers, from across the engineering, design, social and	• Energy and Cities • Energy and Transport • Energy and Information and Communication Technologies • Energy Demand Reduction and Management • Energy Storage	14 staff	• Economics & Econometrics • Engineering & Technology • Geography & environmental studies

Name	Description	Sub-topics covered	No of staff	Field
	behavioural sciences. Researchers at the University of Leeds are always welcome to join and contribute to this vibrant community. Through world-class research integrating technological, economics and policy, and socio-technical aspects of energy, the Centre aims to deliver key tools needed to enable, enhance and accelerate transition to low carbon, secure, economically viable and socially equitable energy systems at national, European and global levels. CIER's mission is to integrate energy science and technology with energy economics and policy to enable and support UK industry, and society more broadly, to achieve national, European and future global energy targets.	• The Energy-Water Interface • Public Perceptions of Energy and the Energy System Socio-technical Perspectives and Energy Transitions		• Politics & International Studies • Sociology
The Grantham Research Institute on Climate Change and the Environment London School of Economics	The mission of the Grantham Research Institute on Climate Change and the Environment is to be a world-leading centre for policy-relevant research, teaching and training in climate change and the environment. The Institute's vision is a world in which climate change and other global environmental challenges are managed effectively to promote prosperity and well-being. The purpose of the Institute is:	• Global response strategies; • Green growth; • Practical aspects of climate policy;	1 chair, 3 directors, 25 researchers, 19 visiting staff, 36 PhD students (NOTE: some individuals may not work specifically on socio-economic research)	• Economics & Econometrics • Finance • Geography & Environmental Studies • Politics and International Studies • Development Studies

Name	Description	Sub-topics covered	No of staff	Field
	• increase knowledge and understanding by performing world-class research on climate change and the environment; • promote better informed decision-making about climate change and the environment by engaging with a wide range of key audiences around the world; and • educate and train new generations of researchers through our undergraduate and postgraduate programmes.			
Sustainable Consumption Institute University of Manchester	The Sustainable Consumption Institute (SCI) examines issues related to environmental sustainability through the lens of consumption. A key current focus is on climate change; it is imperative that international, national and company climate change strategies and targets are grounded in climate science. The challenge facing society means that we cannot rely only on technology based solutions to combat climate change and move to a low carbon based economy; it will be vital to also change patterns of consumption and production.	• Sustainable Consumer Behaviours and Lifestyles; • Stimulating Eco-Innovation for Sustainable Production and Distribution; • Climate Change and Carbon: Mitigation, Adaptation and Vulnerability. • Sustainable Cities • Ecosystem Services • Energy system change and transitions	19 full-time, researchers 23 part-time associated staff or research assistants; 23 postgraduate students	• Geography and Environmental Sciences • Sociology • Psychology

Name	Description	Sub-topics covered	No of staff	Field
Energy and Environment Research Unit The Open University	The Energy and Environment Research Unit (EERU) was set up in 1986 to co-ordinate research on sustainable energy technology and to support the development of environmentally sound approaches to the generation and use of energy. Broadly the unit aims to: • to advance and disseminate knowledge of energy systems and their interactions with the biosphere, with particular emphasis on those systems which enable the energy needs of society to be met sustainably; • to promote interdisciplinary research in fields related to energy and the environment.	• why we use energy • hoe efficiency can be improved without loss in quality of energy derived utilities • physical, technological, economic, social and environmental aspects of energy supply systems • design, develop and assess specific devices and systems for improved energy efficiency and renewable energy supply; • interactions between energy use, human society and the biosphere via modelling • energy policy assessment	12 research staff and 5 post-graduate students	• Geography and Environmental Studies • Mathematics • Politics and International Studies • Sociology
Environmental Change Institute University of Oxford	The ECI was founded 20 years ago with a mission "to organize and promote interdisciplinary research on the nature, causes and impact of environmental change and to contribute to the development of management strategies for coping with future environmental change", a statement that still embodies the ECI's ethos of purposeful environmental research and knowledge exchange. Its Lower Carbon Futures programme is interdisciplinary, with researchers from many backgrounds who are all committed to extending our knowledge of energy systems	• Energy, Behaviour and Society • Energy in Buildings • Energy and Transport • Infrastructure and Smart Grids • Policy, Equity, Security and Fuel Poverty • Renewable Energy	16 Research Staff, 1 visiting fellow, 1 emeritus staff and 3 PhD students	• Architecture & Built Environment • Economics & Econometrics • Geography and Environmental Studies • Politics and International Studies

Name	Description	Sub-topics covered	No of staff	Field
	and developing practical ways of reducing their environmental impact.			
Environment Group, Policy Studies Institute	The Environment Group at PSI is an interdisciplinary research group which operates at the interface between policy and research. The Group's aim is to inform progress towards a more sustainable future, through the provision of robust, independent, policy-focused research. The Group conducts applied research to analyse, investigate and understand: • how a transition to environmentally sustainable development might come about; • the environmental policies at all levels of government, and in other institutions, which might help to bring it about; • the roles of science and technology and behaviours and attitudes in helping to bring about environmentally sustainable development; • the linkages between environmental policy and economic and social concerns which need to be taken into account if the environmental policies are to be both implemented and effective.	• Innovation and sustainability; • Climate change impacts and adaptation – focusing on social justice issues; • Research translation and the evaluation of research impacts on environmental policy; • Understanding, influencing and communicating sustainable behaviours; • Energy-environment-economy modelling and policy; • Environmental policy and economic performance;	10 Staff	• Economics & Econometrics • Geography & Environmental Sciences • Politics and International Studies • Policy and regulation • Social Studies
SURF - The Centre for Sustainable Urban and Regional Futures	SURF's work cuts across the themes of governance, knowledge and innovation and environment and energy to consider the	• Governance • Knowledge and Innovation • Environment and Energy	6 research staff, 2 visiting staff,	• Architecture & Built Environment • Geography &

Name	Description	Sub-topics covered	No of staff	Field
University of Salford	relationships between cities, regions and sustainable knowledge-based development. Its aim is to generate understanding about how political, economic, social, technological and environmental changes interact to affect urban and regional futures.		2 PhD students	Environmental Sciences • Social Sciences • Town and Country Planning
Centre for Environmental Strategy, University of Surrey	The Centre for Environmental Strategy (CES) is an internationally-acclaimed centre of excellence on sustainable development. It takes an inter-disciplinary approach to the analysis of sustainable systems, integrating strong, engineering based approaches with insights from the social sciences to develop action-oriented, policy relevant responses to long-term environmental and social issues.	• Sustainable Systems: Tools for Analysis and Design • Social and Economic Research on Sustainability: Developing Concepts and Themes • Policy, Strategy and Governance	20 research/academic staff, 10 visiting staff, 2 emeritus staff and 27 post-graduate students	• Architecture & Built Environment • Economics & Econometrics • Engineering & Technology • Geography and Environmental Studies • Politics and International Studies • Social Studies
Surrey Energy Economics Centre (SEEC) University of Surrey	SEEC undertakes original energy economics research and since being established it has produced papers across the whole spectrum of energy economics, including the international oil and gas market, North Sea oil & gas, energy efficiency, UK & international coal, gas privatisation & regulation, electricity privatisation & regulation, measurement of efficiency in energy industries, energy & development, energy demand modelling & forecasting, and energy & the environment.	• Econometric studies of energy demand in developed and less developed countries • Energy intensity and energy efficiency Energy Policy • Energy security • Energy scenarios • Energy taxes • Efficiency studies of energy industries • Oil industry • Oil price modelling and forecasting • Petroleum fiscal regimes • Regulation and economics of	6 research staff and 4 Master/PhD students	• Econometrics and Economics • Law • Mathematics • Politics and International studies

Name	Description	Sub-topics covered	No of staff	Field
		utility markets • Road transport fuel demand and the rebound effect • Traffic generation and land use in the UK • Transport choices and lifestyle effects		
Sussex Energy Group, SPRU, University of Sussex	The Sussex Energy Group undertakes academically rigorous, inter-disciplinary research that engages with policy-makers and practitioners. The aim of its research is to identify ways of achieving the transition to sustainable, low carbon energy systems whilst addressing other important policy objectives such as energy security. The Group has funding from a diverse array of sources. It is core partner in the Tyndall Centre for Climate Change Research and part of the UK Energy Research Centre.	• Transitions to Sustainable energy systems • Governance of sustainable energy systems • Strategic appraisal for sustainable energy systems	18 staff, 4 visiting fellows, 10 PhD students,	• Business & Management Studies • Economics and Econometrics • Politics and International Studies • Sociology • Social Studies
Tyndall Centre Universities of Manchester and East Anglia	The Tyndall Energy Theme brings together natural and physical scientists, social scientists, engineers and economists to conduct interdisciplinary and policy relevant research. Its research is funded through a diverse range of sources, and the centre contributes regularly to parliamentary processes, government consultations, and the media, as well as the academic literature.	• Energy assessments • Energy behaviours • Energy perceptions • Energy scenarios and pathways • Energy transitions • Energy governance • Low carbon growth and technology transfer • The Governance of Clean Development: CDM and Beyond	Around 81 researchers across 7 universities	• Development Studies • Engineering and Technology • Geography & Environmental Sciences • Politics and International Studies • Social Sciences

Name	Description	Sub-topics covered	No of staff	Field
UCL Energy Institute University College London	The UCL Energy Institute brings together different perspectives, understandings and procedures in energy research, transcending the boundaries between academic disciplines. . Whilst the Institute has its own core activity it also acts as an umbrella for energy-related research at UCL, bringing together leading researchers on different topics. This enables UCL to draw on all its disciplines to address the energy challenge. The Institute has a core research, teaching and enterprise activity and also acts as an umbrella for energy research across the college. It has its own multidisciplinary team of researchers and students and also coordinates teams from across the University, providing critical mass and capacity for ambitious projects. Core researchers at the UCL Energy Institute carry out world-leading research in the fields of buildings, energy systems, people and energy, policy and law, smart energy and transport. These research themes are not mutually exclusive, and many researchers work across two or more themes, ensuring a truly interdisciplinary approach to energy research.	• Buildings • Energy Systems • People & Energy • Policy & Law • Smart Energy • Transport	45 research staff; 37 MPhil/PhD students; 26 affiliates and associates (NOTE: some individuals may not work specifically on socio-economic research)	• Architecture & Built Environment • Economics and Econometrics • Engineering & Technology • Geography & Environmental Sciences • Law • Mathematics • Politics and International Studies

Name	Description	Sub-topics covered	No of staff	Field
Stockholm Environment Institute University of York	SEI is an independent international research institute. They have been engaged in environment and development issues at local, national, regional and global policy levels for more than 20 years. SEI was formally established in 1989 by the Swedish Government and celebrated its 20th anniversary in October 2009. The Institute has established a reputation for rigorous and objective scientific analysis in the field of environment and development. Their goal is to bring about change for sustainable development by bridging science and policy. They do this by providing integrated analysis that supports decision makers.	• Managing Environmental Systems • Reducing Climate Risk • Transforming Governance • Rethinking Development	38 staff	• Development Studies • Geography and Environment Studies • Politics and International Studies

4. Applied research

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Unlike more traditional energy research that deals with the development of energy technologies, socio-economic research examines non-technical phenomena. Consequently, applied research in this context takes on a different meaning because these social phenomena are characteristically distinct to technical components and therefore do not follow the same passage through the early Technology Readiness Levels (TRLs), i.e. a) basic technology research; b) research to prove its feasibility; c) technology development and d) technology demonstration. In this context, applied research can be understood to refer to research that serves to integrate many of the theoretical and empirical insights gained from university-led research into more 'real-world' applications. This may for instance relate to drawing upon university research to inform the design of government policy, business strategy or city planning. In essence, applied socio-economic research can be understood as the application of socio-economic insights into real-world contexts.

A significant amount of socio-economic energy research is undertaken outside the universities through a combination of consultancies (e.g. McKinsey & Company, Pori Energy Ltd), think-tanks (e.g. Forum for the Future), independent research organisations (e.g. The Centre for Sustainable Energy) and government bodies (e.g. DECC's Energy Efficiency Deployment Office). These organisations play a critical role in ensuring that key insights from 'basic principles' socio-economic research are integrated into the fabric of our energy system.

There are important links between these organisations and university research. The most policy-oriented university research groups (e.g. ICEPT; UCL Energy Institute) both collaborate and compete with consultancy companies for individual research contracts from industry, government departments and the European Commission. Also, many individuals and groups within universities are researching similar topics to the independent organisations, leading to an exchange of information and research results.

Whilst the majority of this research is either funded by the organisations undertaking the research or by their clients, a handful of funding schemes have also been made available to support this more applied, socio-economic research stream. The most notable schemes are supported by Government agencies such as the Department for Energy & Climate Change (DECC), Department of Business, Innovation & Skills (BIS) and Office for the Electricity & Gas Market (Ofgem), as well as quasi-government organisations such as the Energy Technologies Institute (ETI).

The most important funding development in recent years that is likely to have an important impact upon applied socio-economic research has been the establishment of Ofgem's new funding regime 'Revenue = Incentives + Innovation + Outputs' (RIOO). This regime will make a significant amount of funds available from 2015 for energy infrastructure oriented applied research. Although the details of this are still being developed, it is thought a proportion of these funds will be available for socio-economic research that will facilitate the rollout of initiatives with demonstrable and cost effective low carbon and environmental benefits.

Table 4.1: Research Funding

Programme	Funding Agency	Description	Committed Funds	Period	Typical Annual Spend
Innovation funding for low-carbon technologies	DECC & BIS	In 2010, following the Spending review, the UK government committed £200m a year by 2014-15 to support manufacturing and business development. There was a specific focus on supporting potential high growth companies and the commercialisation of technologies. Furthermore, funding was allocated for an elite network of Research and Development intensive technology and innovation centres. Subsequently, DECC has released a number of open competitions to support energy innovation, which have spanned nearly all aspects of the energy system. Whilst these competitions have incorporated a very strong focus on supporting the uptake of innovative energy technologies, nearly all successful bids are likely to have to marry both technological expertise, with socio-economic insights that will inform the manner in which these technologies are further developed and in turn, commercialised/implemented. The programmes are as follows: • £20 million for the development of innovative carbon capture and storage (CCS) technologies • Up to £15 million to support power generation technologies through the Energy Entrepreneurs Fund, which with £20 million from the Buildings Programme allocation brings the total budget for the Energy Entrepreneurs Fund to £35 million • Up to £20 million for the Marine Energy Array		2010 – 2015	£200m

Programme	Funding Agency	Description	Committed Funds	Period	Typical Annual Spend
		Demonstrator (MEAD) Capital Grant scheme, which will support the deployment of the first arrays of wave and/or tidal stream energy devices • up to £35 million for the Buildings Innovation programme, which is designed to drive down the costs of saving energy and reducing carbon emissions in homes and businesses, including: • up to £20 million for buildings technologies supported through the Energy Entrepreneurs Fund • up to £10 million for the non-domestic building improvements scheme, 'Invest in Innovative refurb' • up to £3 million for a Small Business Research Initiative (SRBI) competition on advanced heat storage and £2.8 million to trial thermal (hot-water) storage integrated with heat pumps in domestic buildings • up to £30 million for the Offshore Wind Component Technologies Development and Demonstration scheme • up to £2 million for the development and demonstration of a bioenergy process that optimises wetland management activities and utilises the biomass arisings • part of an up to 8 million euro collaboration with the Biotechnology and Biological Sciences Research Council (BBSRC) and the Technology Strategy Board (TSB) to form a European consortium aiming to encourage bioenergy generation through a call entitled 'Bioenergy Sustaining the Future' (BESTF)			

Programme	Funding Agency	Description	Committed Funds	Period	Typical Annual Spend
		• part of an up to £15 million collaboration with TSB, Nuclear Decommissioning Authority (NDA) and the Engineering and Physical Sciences Research Council (EPSRC) on the civil nuclear supply chain • up to £60 million for the development of offshore wind manufacturing at port sites			
Consumers and Vehicles	ETI	This in-depth project has been looking at the potential long-term performance and cost of plug-in vehicles, as well as consumer reactions and behaviours in buying and using them. It has explored supporting infrastructure, and has included in-depth surveys with 3,000 consumers and real-world testing with 40 drivers. The project was the first of three projects in the Plug-in Vehicle Economics and infrastructure focus area.	£4.5 million between three transport electrification projects	2010 - 2011	
Consumer behaviour study	ETI	The ETI project will lead to a comprehensive behavioural study involving householders focused on heat and energy consumption in the UK. The study – which will involve thousands of householders - is part of the ETI's £100 million Smart Systems and Heat technology programme. The aim is to design and demonstrate the first of its kind smart energy system in the UK. The research will provide insight into consumer requirements for heat and energy. The project is needed to help answer questions as to how consumer demand for energy and heat (in particular space heating and hot water) can best be met. The solutions developed by the project will inform the development of future energy products and services	£3 million	2012 - 2014	

Programme	Funding Agency	Description	Committed Funds	Period	Typical Annual Spend
		targeted at consumer requirements. The findings will help determine further system design work by the ETI in the first phase of the programme.			
Low Carbon Networks Fund	Ofgem	As part of the electricity distribution price control arrangements that run from 1 April 2010 to 31 March 2015, Ofgem established the Low Carbon Networks (LCN) Fund. The Fund allows up to £500m support to projects sponsored by the distribution network operators (DNOs) to try out new technology, operating and commercial arrangements. The objective of the projects is to help all DNOs understand what they need to do to provide security of supply at value for money as Great Britain (GB) moves to a low carbon economy.	£500m	2010 - 2015	
Network Innovation Competition	Ofgem	From 2015 to 2023, Ofgem will adopt a new funding regime called RIIO (RIIO stands for Revenue = Incentives + Innovation + Outputs). RIIO-ED1, the regime concerned with electricity distribution, the Low Carbon Network (LCN) Fund will be replaced by the Network Innovation Competition (NIC) and will apply to electricity transmission and distribution companies. For the first two years of the scheme, the NIC fund for electricity will be £90m per year. This scheme will operate alongside two other schemes: • The Network Innovation Allowance (NIA) – aims to fund small-scale innovation projects. Value defaults to 0.5% of allowed revenues unless companies excel in demonstrating a well thought through innovation plan up to a maximum size 1% of allowed revenue. • The Innovation Roll-out Mechanism (IRM) – a mechanism to enable companies to apply for		2015 - 2023	Approx. £90m/year

Programme	Funding Agency	Description	Committed Funds	Period	Typical Annual Spend
		additional funding to roll-out a proven innovation, which meets defined criteria.			
Support for Innovation	TSB	Business, rather than the Technology Strategy Board, is the source and delivery agent of innovation. TSB offers a range of programmes and tools, each with different strengths, to support businesses on the innovation journey. Funding for Research, Development and Demonstration projects ranges from small proof -of-concept grants and feasibility studies through to large multi-partner collaborative R&D and demonstration projects. The businesses TSB supports range from pre start-up, start-up and early stage micro businesses, to large multi-nationals. There are different models depending on the specific needs of companies, sectors and technologies. TSB also provides academic-business knowledge transfer opportunities, open innovation networking platforms, the route for UK businesses to access European support for innovation and technology and opportunities for innovative businesses through our growing network of Catapult centres. Their Support for Innovation schemes include: • Biomedical Catalyst • Catapult centres • Collaborative research and development • _connect • Demonstrators • Feasibility Studies		2012 - 2015	Approx. £25m

Programme	Funding Agency	Description	Committed Funds	Period	Typical Annual Spend
		• IC Tomorrow • Innovate UK • Innovation Vouchers • International programmes • Knowledge Transfer Networks • Knowledge Transfer Partnerships • Launchpad • Missions • Micro and Nanotechnology Centres • SBRI • Smart • State aid • Working with SMEs			

Table 4.2: Key Research Providers

Name	Description	Sub-topics covered	No of staff	Sector
ARUP	Arup brings depth of experience to energy challenges worldwide – in oil and gas, power and energy strategy. Most relevant to the socio-economic theme is ARUP's Energy Strategy department which offers practical advice on energy technology and regulation. They join up technical, commercial, planning and policy expertise to help clients make informed plans – and take decisive action – to improve performance through energy and carbon management. Drawing on relevant, real-world expertise in financial modelling, energy, infrastructure and more, they help their clients meet their energy and carbon challenges. For instance, they were responsible for updated the City of Melbourne's Zero Net Emissions by 2020 strategy.	• Energy strategy • Energy storage • Carbon management • Renewable energy supply • Thermal and nuclear power systems • Heat, gas and electricity transmission and distribution • Oil and gas supply	10,000 staff globally working across Arup's full remit, which extends beyond energy	Consulting engineers
Carbon Trust	The Carbon Trust's mission is to accelerate the move to a sustainable, low carbon economy. They are independent experts on carbon reduction and resource efficiency, who reinvest surpluses from group commercial activities into our mission. The Carbon Trust engages in 4 main areas: • Advice - Whether you're a business, government or public sector body, they can support you to develop low carbon strategies and policies to reduce your	• Global carbon reduction business advice • International carbon policy and market advice • Carbon footprint measurement • Commercialising clean technologies • Carbon footprint certification • Energy Efficient equipment procurement and installation	Approx. 200 staff	Management consultancy

Name	Description	Sub-topics covered	No of staff	Sector
	carbon emissions. Their advice will help you cut energy costs and gain a competitive edge in a challenging economic climate. • Footprinting - They measure and certify the environmental footprint of your organisation, its supply chain and products or services, so you can identify efficiencies and maximise your low carbon credentials. • Technology - They help to develop and deploy low carbon technologies by supporting both equipment suppliers and our clients throughout the journey of bringing clean technologies to market and by helping to put energy efficiency and other low carbon solutions into practice, with complementary financing solutions. • Investment - The Carbon Trust has set up and invested in a number of innovative and pioneering low carbon companies. The Carbon Trust has catalysed more than £123million of private-sector co-investment into pre-commercial technologies through focused programmes that de-risk their commercialisation.			
The Centre for Low Carbon Futures (CLCF)	CLCF is a collaborative research organisation focused on translational research, primarily related to energy use and carbon reduction activities in the EU, China, India and Latin American countries.	• Climate Smart & Low Carbon Cities • Energy Storage • Food Security • Global Leadership Programme	A core team of 7 people that coordinate projects that engage personnel from	Social science research

Name	Description	Sub-topics covered	No of staff	Sector
	It was founded by the Universities of Hull, Leeds, Sheffield and York in 2009, with the University of Birmingham joining in 2012 CLCF's activities are funded by member university funds, governments, research councils and international agencies. Following their initial funded research agenda, in 2011/12 they have leveraged the flow of an additional £15m research funds to our member institutions.	• Sustainable Production and Consumption • Carbon Capture, Storage and Utilisation • Renewable Energy	its 5 core members and its various different partners	
The Centre for Sustainable Energy (CSE)	CSE help people and organisations from the public, private and voluntary sectors meet the twin challenges of rising energy costs and climate change. Its vision is a world where sustainability is second nature, carbon emissions have been cut to safe levels and fuel poverty has been replaced by energy justice. Its mission is to share our knowledge and practical experience to empower people to change the way they think and act about energy CSE's achieves these aims by giving advice, managing innovative energy projects, training others to act, and undertaking research and policy analysis.	• Cutting carbon emissions • Saving energy • Tackling fuel poverty • Delivering renewable energy • Planning for sustainable energy • Exploring energy justice	Approx. 50 staff	Management consultancy
Chatham House (officially known as The Royal Institute of International Affairs)	Chatham House is one of the world's leading organisations for the analysis of international issues. The Institute works to stimulate debate and research on political, business, security and other key issues in the international arena.	• Promoting Climate Security • Enabling Energy Security • Strengthening Sustainable Development Solutions	12 Programme Staff and 19 Associate Fellows	NGO

Name	Description	Sub-topics covered	No of staff	Sector
	The Energy, Environment and Resources Department (EEDP) conducts high-level research on critical issues of energy security, environment and resource governance and to influence and enable decision-makers - governments, NGOs and business - to take well-informed decisions that contribute to achieving sustainable development. Chatham House is Europe's leading foreign policy think-tank. It is an independent membership-based organization that brings together people from government, politics, business, NGOs, the academic world and the media.			
Committee on Climate Change	The Committee on Climate Change (CCC) is an independent body established under the Climate Change Act to advise the Government on emissions targets, and to report to Parliament on progress made in reducing greenhouse gas emissions. The CCC's Priorities are to: • Provide independent advice to Government on setting and meeting carbon budgets and targets. • Monitor progress in reducing emissions and achieving carbon budgets. • Conduct independent research and analysis into climate change. • Engage with representatives interested in climate change from across the UK in order to share research and information	• The science of climate change • Mitigation: reducing carbon emissions • Legal context • Adapting to climate change	13 staff on the committee (including adaptation). Approx. 41 staff in total	NGO

Name	Description	Sub-topics covered	No of staff	Sector
	on climate change and gain input into our analysis.			
CO2Sense	CO2Sense helps businesses and public-sector organisations to cut their greenhouse gas emissions and their costs. We help businesses that sell low-carbon products to become more successful. We work with some of the largest companies in the world to develop projects that will make huge savings in carbon emissions. They have worked with thousands of businesses, from household names to small entrepreneurs. The organisation has also provided investment into low-carbon projects. Over the past 4 years they have supported over 20 projects, investing over £10m. CO2Sense are a not-for-profit consultancy and so they don't profit from their activities. Any profits from their consultancy and investment activities are reinvested back into the organisation to continue forward its activities.	• Resource efficiency • Low-carbon innovation • Low-carbon electricity and heat generation	Approx. 30 staff	Management consultancy (formerly an NGO)
Energy Efficiency Deployment Office, DECC	The Energy Efficiency Deployment Office (EEDO) has been set up to drive a step change in energy efficiency. Energy efficiency is at the heart of the government's approach to tackling dangerous climate change and ensuring safe, secure and affordable energy supplies. Energy efficiency is often the quickest and most cost effective solution when compared with the alternative and provides growth and job opportunities through the supply chain. EEDO represents the government's centre of	• Energy Efficiency • Low carbon energy policy making	n/a	Regulator

Name	Description	Sub-topics covered	No of staff	Sector
	expertise on energy efficiency and aims to support the coherent delivery of our existing energy efficiency policies. It has recently set out the Government's Energy Efficiency Strategy, including where there is potential for further energy efficiency across the economy, and how this might be brought about.			
Ecolane Transport and Environment Consultancy	Ecolane provides independent advice on how to reduce the environmental impact of road transport through the promotion of low carbon vehicles.	• Life cycle assessment of low carbon vehicles • Vehicle emissions audits • Consumer attitude surveys • Analysis of vehicle purchasing behaviour • Modelling the impacts of vehicle taxation	n/a	Consulting Engineers & Management Consultancy
E4tech (UK) Ltd	E4tech is an independent technologically-informed business consultancy in sustainable energy. Its international team have backgrounds in industry, consultancy and research. E4tech provides services relating to technology, policy and business across a wide range of energy areas. Its clients include investors and financial institutions, governments and public agencies, energy, industrial and automotive companies.	• Fuel Cells • Hydrogen • Bioenergy • Sustainable Buildings • Energy systems • Novel Energy • Solar Energy	10 staff (based in London)	Management consultancy
Energy Research Partnership (ERP)	The Energy Research Partnership is a high-level forum bringing together key stakeholders and funders of energy research, development, demonstration and deployment in Government, industry and academia; plus other interested bodies, to identify and work together towards shared goals. The Partnership has been designed to give	• Buildings Technologies (future ERP project) • Flexible Thermal Generation (future ERP project) • Public Engagement • Hydrogen • Resource Use Strategies • International Abatement Opportunities	4 staff	Social science research

Name	Description	Sub-topics covered	No of staff	Sector
	strategic direction to UK energy innovation, seeking to influence the development of new technologies and enabling timely, focussed investments to be made. It does this by: i. Influencing members in their respective individual roles and capacities ii. Communicating views more widely to other stakeholders and decision makers as appropriate. ERP's remit covers the whole energy system, including supply (nuclear, fossil fuels, renewables), infrastructure, and the demand side (built environment, energy efficiency, transport).	• Flexibility Options • Industrial Energy Efficiency • International Engagement • Nuclear • Energy Storage • Bioenergy		
Energy Savings Trust (EST)	EST is a non-for-profit organisation that gives evidence-based insight and advice to empower millions to lead affordable, low-energy lifestyles works. It works on the ground in communities and with households, and runs UK-wide trials on new and emerging technologies. Doing so means it can act as the linchpin between national and local governments, industry and millions of consumers. EST exists to: • Give free independent and impartial advice online • Forge partnerships to reach more people more quickly • Help communities to get started with low-carbon projects • Help drive the green economy	• Energy efficiency • Community energy	Approx. 200 staff	Management consultancy

Name	Description	Sub-topics covered	No of staff	Sector
	• Undertake new pioneering research to help us find practical solutions towards a low-carbon life			
Forum for the Future	Forum for the Future are an independent non-profit who work globally with business and government to inspire new thinking, build creative partnerships and develop practical solutions. We share what we've learned so that others can benefit – and act. Working with pioneering partners, they have worked to transform the essential systems of food, energy and finance to secure a more fulfilling life for us and future generations. Over the past 15 years, Forum for the Future has: • Changed the debate about sustainable business by highlighting the opportunities it offers, and been instrumental in altering the way leading companies operate – from Aviva to Unilever; • Trained thousands of leaders, across society, through our master classes and Masters Programme, so they are knowledgeable about sustainable development and equipped to face the global challenges like climate change and shortages of vital resources; • Promoted long-term thinking and created shared, positive visions of tomorrow with businesses, government	• Energy • Food • Finance • Other Sectors (e.g. shipping, healthcare etc.) • Futures & Diagnosis • Innovation • Sustainable Business • Scaling Up	approx. 13 working on energy specific projects	Social science research & management consultancy

Name	Description	Sub-topics covered	No of staff	Sector
	and NGOs, through our ground-breaking futures and scenarios work; • Sparked innovation of new products, services and business models that will make our world more sustainable.			
Green Alliance	Green Alliance is an influential environmental think tank working to ensure UK political leaders deliver ambitious solutions to global environmental issues. It understands that political decision-making and have helped to change policy, bringing climate change and environmental issues into the mainstream. It works closely with partners in the third sector, business and other spheres to advocate proposals influential on all sides of the political spectrum. Its activities include: • Research • Advocacy • Convening high-profile events with senior politicians and key influencers.	• Political Leadership • Sustainable Economy • NGO Engagement • Low Carbon Economy • Sustainable Business • Resource Stewardship • Localism • Green Living	16 staff	Social Science research & management consultancy
Institute for European Environmental Policy (IEEP)	The Institute for European Environmental Policy (IEEP) is an independent research organisation concerned with policies affecting the environment in Europe and beyond. The Institute's aim is to disseminate knowledge about Europe and the environment and to analyse and present policy options. Its focus on European policy making is shared by few and	• Agriculture & Land Management • Climate Change & Energy • Environmental Economics • Industrial Pollution • Water, Marine & Fisheries • Resource Use, Waste & Chemicals • Biodiversity	4 directors and 38 researchers	NGO Social Science research

Name	Description	Sub-topics covered	No of staff	Sector
	we have a reputation based on being first in the field and possessing a history of knowledge and involvement acquired over thirty years. It undertake research and consultancy on the development, implementation and evaluation of environmental and environment-related policies in Europe. Its research work involves both pressing short-term policy issues and long-term strategic studies. Its project portfolio varies from year to year but the institute is committed to being at the forefront of thinking about the environmental aspects of EU policies and keeping an open dialogue with policymakers and stakeholders.	• Global Issues & External Action • Governance		
McKinsey & Company	McKinsey & Company is a global management consulting firm. They are the trusted advisor to the world's leading businesses, governments, and institutions. Their mission is to help leaders make distinctive, lasting, and substantial improvements in performance, and constantly build a great firm that attracts, develops, excites, and retains exceptional people. McKinsey aims to advance understanding of sustainability and resource productivity issues, including carbon abatement, the economics of strategic resources such as water, land, energy and materials, and the circular economy. They aim to lay out the challenges and opportunities for sustainable growth and climate resilience,	• Advanced Electronics • Electric Power & Natural Gas • Financial Services • High Tech • Infrastructure • Oil & Gas • Private Equity & Principal Investors • Public Sector • Retail • Semiconductors • Social Sector • Telecommunications • Travel, Transport & Logistics	Over 10,000 employees working globally, not all on energy specific projects	Management consultancy

Name	Description	Sub-topics covered	No of staff	Sector
	and propose pathways for transformational change.			
NERA Economic Consulting	NERA Economic Consulting is a global firm of experts dedicated to applying economic, finance, and quantitative principles to complex business and legal challenges. For half a century, NERA's economists have been creating strategies, studies, reports, expert testimony, and policy recommendations for government authorities and the world's leading law firms and corporations. The firm brings academic rigor, objectivity, and real world industry experience to bear on issues arising from competition, regulation, public policy, strategy, finance, and litigation.	• Economic regulation • Industry restructuring • Institutional structures regulatory reform • Public policy • Competition policy	26 staff in London office	Management consultancy
Pori Energy Ltd	Pöyry is a global consulting and engineering company dedicated to balanced sustainability and responsible business. With quality and integrity at our core, it deliver best-in-class management consulting, total solutions, and design and supervision. Our in-depth expertise extends to the fields of energy, industry, urban & mobility and water & environment. Pöyry has 7000 experts and a local office network in about 50 countries. Pöyry Energy Consulting is Europe's leading energy consultancy providing strategic, commercial, regulatory and policy advice to Europe's energy markets.	• Hydropower • Power & Heat • Renewable Energy • Nuclear Energy • Transmission & Distribution	Approx. 250	Management consultancy
Oxford Economic Research Associates (OXERA)	Oxera is one of Europe's foremost independent economics consultancies. Established in 1982, they have built a reputation for providing critical economic insight to an international list	• Financial services • Communications • Energy • Water	6 directors, 8 Managing consultants, 19 Senior	Management consultancy

Name	Description	Sub-topics covered	No of staff	Sector
	of clients including governments, regulators and major companies. Oxera applies economic analysis to 'real-world' problems in order to help companies, policy-makers and regulators make strategic decisions. Oxera works with customers to develop truly innovative ideas and insightful analyses that achieve forward-thinking, tangible results.	• Transport	consultants, 15 Advisers and associates	
Oxford Institute for Energy Studies	The Oxford Institute for Energy Studies was founded in 1982 as an autonomous centre for advanced research into the social science areas of energy issues. The Institute is committed to the idea of dialogue – between consumers and producers, government and industry and academics and decision makers. This is reflected in the membership of the Institute and in the composition of its research team, which is drawn from different national, academic and professional backgrounds. The aim is that co-operation between researchers from these varied backgrounds, will lead to a more informed and balanced understanding of the behaviour, motivations and objectives of the various economic forces, agents and policy makers that operate in or influence the performance of international energy markets.	• the economics of petroleum, oil, gas, nuclear power, solar and renewable energy; • the politics and sociology of energy; • the international relations of oil-producing and oil-consuming nations; • the economic development of oil-producing countries and the energy problems of other • developing countries; and • the economics and politics of the environment in its relationship with energy.	1 Director, 3 Programme Directors, 23 Research Fellows, 14 visiting Research Fellows, 17 Research Advisors, and 5 Administrative Staff	Social science research
Redpoint Energy	Redpoint Energy is a specialist energy consultancy, advising clients on investments, strategy and regulation across Europe's liberalised power, gas and carbon markets.	• Market analytics • Investment analytics • Risk analytics • Energy policy and regulation	10 staff	Management consultancy

Name	Description	Sub-topics covered	No of staff	Sector
	Since its formation in October 2004, Redpoint has established itself as one of Europe's leading strategic and analytical energy consultancies. Redpoint's clients include some of Europe's largest energy companies and financial institutions. It provide advice and analysis on areas including electricity trading arrangements, generation asset investment, risk measurement, retail pricing strategies and carbon market price formation.	• Electricity Market Reform • Generation optimisation		
Ricardo	Ricardo is a leading global provider of product innovation, engineering solutions, clean technology and strategic consulting. Through its advanced and well-equipped technical facilities in North America, Europe and Asia they serve a wide and balanced customer base including the market-leading brands across a range of industrial sectors, as well as government agencies and national and international regulatory authorities. Ricardo's mission is to deliver value through innovation and technology. Its vision is to be a world leader in transportation and sustainable energy technology, development and consulting. Ricardo recently acquired AEA, now Ricardo AEA, which is a global sustainability consultancy. It combines world-leading energy, climate change and environmental expertise with powerful IT, knowledge management and economics capability.	• Marine • Clean Energy and Power Generation • Rail • Defence • Agricultural & Industrial Vehicles • Commercial Vehicles • Motorcycles & Personal Transportation • High Performance Vehicles & Motorsport • Passenger Car • Government	n/a	Management consultancy

5. Development and Demonstration Funding

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Not applicable

6. Research Facilities and Other Assets

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Not applicable

7. Networks

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Table 7.1 Networks

Network	Established	Description	Membership	Activities
British Institute of Energy Economics (BIEE)	1980	The British Institute of Energy Economics (BIEE) is the leading professional association for energy economics and related disciplines in the UK. With a history spanning more than 30 years, BIEE has established itself as a unique link between academia, the industry and policy makers in the energy sector. The BIEE has a diverse membership drawn from the academic, business, finance and consulting communities, as well as students in full time education. The role of the BIEE is to bring together these diverse stakeholders in order to facilitate and promote research, discussion and debate on key energy issues. To fulfil this role the BIEE has a programme of meetings, seminars and	Individual and corporate membership. Membership is drawn from universities, government, international agencies, regulatory bodies, industry and the financial sector.	Membership fees support a programme of meetings and publications, which further the BIEE's aims.

		conferences held primarily in London, Oxford and Scotland. BIEE is the UK affiliate of the International Association of Energy Economics (IAEE).		
Energy Institute	2003	The Energy Institute (EI) is the professional body for the energy industry, delivering good practice and professionalism across the depth and breadth of the sector. The purpose of the EI is to develop and disseminate knowledge, skills and good practice towards a safer, more secure and sustainable energy system. In fulfilling this purpose the EI addresses the depth and breadth of energy and the energy system, from upstream and downstream hydrocarbons and other primary fuels and renewables, to power generation, transmission and distribution to sustainable development, demand side management and energy efficiency. The strategic aims of the EI are: • To promote the role, status and contribution of energy professionals in society and maintain professional standards • To equip energy professionals with tools to enable their positive contribution to society • To ensure the availability of good quality energy education and learning provision • To provide a forum for debate to facilitate the development and dissemination of energy knowledge and good practice • To enhance public understanding of energy resources and their role in society	Individual (fee required)	• Training courses • Conferences, seminars, dinners, lunches and other events dealing with all sectors of the energy business • International network of branches • Education and career website called EnergyZone • Hosts an information centre to find technical and market information on the energy industries • Undertakes a focused technical work programme that comprises original independent research and investigations, technical responses to legislation and regulation, workshops and seminars, to provide the international industry with information and guidance on relevant technical issues. • Develop and disseminate knowledge, skills and good practice towards a safer, more secure and sustainable energy system.

Knowledge Transfer Networks (KTN)	Energy Generation and Supply KTN est. in 2009	Knowledge transfer is critical to enable UK businesses to compete successfully at the forefront of global technology and innovation. Knowledge Transfer Networks (KTNs) are one of the Technology Strategy Board's key tools for doing this – facilitating the UK's innovation communities to connect, collaborate and find out about new opportunities in key research and technology sectors. As a single overarching national network in a specific field of technology or business application, a KTN brings people together to stimulate innovation – from businesses of any size, research organisations, universities, and technology organisations, to government, finance and policy. There are 15 KTNs and all 15 KTNs collaborate to form a 'network of networks'. The networks include: • Aerospace, Aviation and Defence • Biosciences • Chemistry Innovation • Creative Industries • Electronics, Sensors, Photonics • Energy Generation and Supply • Environmental Sustainability • Financial Services • HealthTech and Medicines • ICT • Industrial Mathematics • Materials • Modern Built Environment	Individuals or Organisations	Benefits of joining a KTN • Networking - frequent opportunities to network with other businesses and academics through targeted events, meetings and Special Interest Groups organised by the KTN • Information and news - free access to on-line services such as reports, newsletters, webinars/e-training, events diaries, e-conferencing and collaboration tools and general sector/application specific information • Funding opportunities - advice on Technology Strategy Board Collaborative R& D calls, Knowledge Transfer Partnerships and other sources of funding for innovation • Policy and regulation - a communications route between their community, Government and EU, giving members the opportunity to influence policies and regulation in the UK and abroad.

		• Nanotechnology • Transport The heart of the KTN community is '_connect', which us an online networking platform. This is where 'open innovation' happens and innovators use free, online tools in a secure and confidential setting to explore some of the challenging projects and issues they face together. In addition to the KTNs, you can find a wide range of networking and collaboration groups.		
National Energy Research Network (NERN)	2007	The National Energy Research Network (NERN) aims to bring together energy researchers from all disciplines, giving members visibility of a wide and multifaceted area and providing opportunities through information and through interaction with other members.	Individuals and organisations	• Newsletter & information dissemination • International and domestic networking • Events
Network for Comfort and Energy Use in Buildings		This is a network of researchers, consultants, designers and manufacturers concerned with building-related energy issues and the requirements for human thermal comfort. The aim of the network is to define and promote the research effort needed to understand and enhance the thermal comfort of building occupants whilst also minimising the energy use of buildings, in particular those without year-round mechanical heating and cooling. Outputs from members of the network include research to underpin new norms and standards for indoor climate and design guidance for building controls. The network is a centre for information in this field of research and advice on the implications of the work for the training of building professionals. Membership currently	Individual	Network activities are proactive (Workgroups), reactive (Consultancy) and interactive (meetings).

		stands at more than 300, with representation from 33 countries.		
Sustainable Development Research Network (SDRN)	2001	SDRN aims to facilitate and strengthen the links between providers of research and policymakers across government, in order to improve evidence-based policymaking to deliver the UK government's objectives for sustainable development. Its specific objectives are to: • Facilitate the provision of research and evidence to policymakers • Engage government policymakers, scientists and members of the research community • Promote sustainable development in the research and academic communities • Work with funding bodies to encourage relevant research • Advise the Defra Sustainable Development Unit on SD research issues	Membership of the network is free and open to all those with a professional interest in UK SD Research and policy	SDRN undertakes a wide variety of activities to promote the use of sustainable development research within policy-making. In particular, the network: • Undertakes Research and Evidence Reviews • Organises a rolling series of seminars, workshops and lectures • Organises an Annual Sustainable Development Research Conference • Produces the SDRN mailing, a fortnightly e-newsletter for all members

8. UK Participation in EU Framework Programmes

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Table 8.1: EU Framework Programmes

Project	Objectives	Action Line	Type of Action	UK Participants	Co-ordinator and partners	Total Funding	EU Funding	Duration	Annual spend
ACCSEPT: Acceptance of CO2 Capture, Storage - Economics, Policy, and Technology	The aim of the ACCSEPT project is to contribute to the timely and responsible application of CO2 capture and storage (CCS) by measuring EU social acceptance of CCS; assisting with the establishment of CCS guidelines for the EU ETS; and by identifying and addressing gaps in existing socio-economic studies.	FP6: POLICIES-3.2 The development of tools, indicators and operational parameters for assessing sustainable transport and energy systems performance	Specific Support Action	Institute For European Environmental Policy; The University Of Manchester; Baker & Mckenzie Llp	Det Norske Veritas (DNV) 4 partners	€0.399m	€0.399m	2006-01-01 - 2007-12-31 24 months	€0.2m
BARENERGY: Barriers for energy changes among end consumers and households	The main objective in this proposal is to develop methods to identify the relevance and strengths of various barriers for energy behaviour changes among end consumers and households, and to discuss how activities from political authorities, energy producers and NGOs can overcome these barriers.	FP7: ENERGY-2007-9.1-02 Energy behavioural changes	Small or medium-scale focused research project	University of Surrey; Centre for Sustainable Energy	Statens Institutt for Forbruksforskning, Norway 8 partners	€2m	€1.46m	2008-01-01 to 2010-06-30 30 months	€0.58m

Project	Objectives	Action Line	Type of Action	UK Participants	Co-ordinator and partners	Total Funding	EU Funding	Duration	Annual spend
CASES: Cost assessment for sustainable energy systems	The CASES Co-ordination Action has three principal objectives: i. To compile detailed estimates of both external and internal costs of energy production for different energy sources for the EU-25 Countries and for some non-EU Countries under energy scenario s to 2030 ii. To evaluate policy options for improving the efficiency of energy use, taking account of the full cost data; III. To disseminate research findings to energy sector producers and users and the policy making community.	FP6: SUSTDEV-1.2.8 Socio-economic tools and concepts for energy strategy	Coordination action	UNIVERSITY OF BATH	FONDAZIONE ENI ENRICO MATTEI 25 partners	€1.61m	€1.41m	2006-04-01 - 2008-09-30 30 months	€0.56m

Project	Objectives	Action Line	Type of Action	UK Participants	Co-ordinator and partners	Total Funding	EU Funding	Duration	Annual spend
CHANGING BEHAVIOUR: Contextualising behavioural change in energy programmes involving intermediaries and policymaking organizations working towards changing behaviour	This project aims to support the shift toward end-user services in European energy policy. It will: i. develop a sophisticated but practical model of end-user behaviour and stakeholder interaction ii. integrate knowledge of context (e.g., national culture and institutions), timing and actors into demand management practice iii. pilot the transfer of context-tailored demand side programmes from one European country to another iv. create a toolkit for practitioners to manage the social and technical change involved in demand management programmes (i.e., energy efficiency and renewable-based end-user generation).	FP7: ENERGY-2007-9.1-02 Energy behavioural changes	Small or medium-scale focused research project	University of Salford, SURF Centre; Manchester Knowledge Capital (M:KC); Manchester Enterprises (ME)	National Consumer Research Centre, Finland 13 partners <Note : This www has an English link at the top left of the page>	€3.22m	€2.48m	2008-01-01 to 2010-12-31 36 months	€0.83m
CREATE ACCEPTANCE: Cultural influences on renewable energy acceptance and tools for the development of communication strategies to	The objectives of this project are to increase the competitiveness RES and RUE technologies by developing a tool that can measure, promote and improve social acceptance of these technologies by means of: i. Assessing the already developed Socr obust tool platform for the suitability in general by mapping	FP6: SUSTDEV-1.2.8 Socio-economic tools and concepts for energy strategy	Specific Targeted Innovation Project	University of Salford	ECN POLICY STUDIES 11 partners	€1.98m	€1.35m	2006-02-01 - 2008-01-31 24 months	€0.675m

Project	Objectives	Action Line	Type of Action	UK Participants	Co-ordinator and partners	Total Funding	EU Funding	Duration	Annual spend
promote acceptance among key actor groups	its potential to contribute to societal embedding of RES and RUE technologies and identification of the limitations to assess the social acceptance of RES and RUE ii. Determine the key elements of social acceptance of RES and RUE technologies by assessing the regionally historical and recent social acceptance of renewable energy technologies such as hydrogen, biomass, CO2 capture and sequestration, solar thermodynamics, and wind iii. Enhance the Socrobust tool platform into a multi-stakeholder tool for assessing and promoting social acceptance by integrating knowledge gained in objectives (i.), and (ii.), and by designing the necessary instruments and procedures to create a region and target-group specific strategy to address the social acceptance of the deployed technology iv. Validation and deployment of the multi-stakeholder tool in five selected demonstration projects, covering a wide range of RES and RUE technologies as well as various regions in EUROP.								

Project	Objectives	Action Line	Type of Action	UK Participants	Co-ordinator and partners	Total Funding	EU Funding	Duration	Annual spend
ESTORAGE: Solution for cost-effective integration of renewable intermittent generation by demonstrating the feasibility of flexible large-scale energy storage with innovative market and grid control approach	The objective of eStorage is to develop cost-effective solutions for the widespread deployment of flexible, reliable, GWh-scale storage across EU, and to enhance grid management systems to allow the integration of large share of renewable. The key issue we plan to address is the need for power regulation during low demand periods, when only inflexible baseload generation and intermittent renewable generation are operating. In contrast to conventional generation, a storage plant able to regulate its consumption could help to avoid curtailing wind.	FP7-ENERGY	Collaborative project (generic)	Imperial College	ALSTOM HYDRO FRANCE 6 partners	€22.11m	€12.76m	2012-10-01 to 2017-09-30 60 months	€2.55m
IRENE-40: Infrastructure roadmap for energy networks in Europe	The IRENE-40 project will identify strategies for investors and regulators to build a more secure, ecologically sustainable and competitive European electricity system. The strategies will be presented in a roadmap, i.e. a timeline with actions and a description of development stages towards future electricity networks over the coming 40 years. It will provide investment strategies for the individual stakeholders. The roadmap will rely on a scenario selected from a set of options, identified during the project and in discussion with the stakeholder community.	FP7-ENERGY	Collaborative Project (Generic)	Imperial College	AREVA T&D UK LTD 8 partners	€5.52	€3.85m	2008-09-01 to 2012-08-31 48 months	€0.963m

Project	Objectives	Action Line	Type of Action	UK Participants	Co-ordinator and partners	Total Funding	EU Funding	Duration	Annual spend
ITESLA: Innovative Tools for Electrical System Security within Large Areas	7 Transmission System Operators (Belgium, France, Greece, Norway, Portugal, Spain and United Kingdom) and CORESO, a TSO coordination centre, together with 13 RTD performers propose a 4 year R&D project to develop and to validate an open interoperable toolbox which will bring support, by 2015, to future operations of the pan-European electricity transmission network, thus favouring increased coordination/harmonisation of operating procedures among network operators. Under the coordination of RTE, new concepts, methods and tools are developed to define security limits of the pan European system and to quantify the distance between an operating point and its nearest security boundary: this requires building its most likely description and developing a risk based security assessment accounting for its dynamic behaviour. The chain of resulting tools meets 3 overarching functional goals: i. to provide a risk based security assessment accounting for uncertainties around the most likely state, for probabilities of contingencies and for	FP7-ENERGY	Collaborative project (generic)	Imperial College; National Grid	RTE Réseau de transport d'électricité 19 partners	€19.44m	€13.23m	2012-01-01 to 2015-12-31 48 months	€3.03m

Project	Objectives	Action Line	Type of Action	UK Participants	Co-ordinator and partners	Total Funding	EU Funding	Duration	Annual spend
	corresponding preventive and corrective actions ii. to construct more realistic states of any system (taking into account its dynamics) over different time frames (real-time, intraday, day ahead, etc.) iii. to assess system security using time domain simulations (with less approximation than when implementing current standard methods/tools)								
NEEDS: New Energy Externalities Development for Sustainability	The NEEDS proposal addresses Priority 6.1: Sustainable Energy Systems and, more specifically, Sub-priority 6.1.3.2.5: Socio-economic tools and concepts for energy strategy. Its ultimate objective is to evaluate the full costs and benefits (i.e. direct + external) of energy policies and of future energy systems, both for individual countries and for the enlarged EU as a whole.	FP6: SUSTDEV-1 Sustainable energy systems	Integrated Project	University of Bath; University of Newcastle Upon Tyne; Institute of Occupational Medicine	ISTITUTO DI STUDI PER L'INTEGRAZIONE DEI SISTEMI' 67 partners	€11.7m	€7.59m	2004-08-31 - 2008-08-30 48 months	€1.9m
OPTIMATE: An Open Platform to Test Integration in new MArkeT DEsigns of massive intermittent energy sources dispersed in several regional power markets	Five Transmission System Operators (Belgium, France, Germany and Spain) together with seven RTD performers propose a 3 year research and demonstration project to compare pros and cons of new market designs aiming at the integration of massive intermittent energy sources dispersed in several regional power markets. Under the technical coordination of RTE, they	FP7-ENERGY	Collaborative project (generic)	University of Manchester	TECHNOFI SA 11 partners	€4.26m	€2.62m	2009-10-01 to 2012-09-30 36 months	€0.87

Project	Objectives	Action Line	Type of Action	UK Participants	Co-ordinator and partners	Total Funding	EU Funding	Duration	Annual spend
	will implement a novel network/system/market modelling approach to provide the consortium with an open simulation platform able to exhibit the comparative benefits of several market design options. Such options may originate either from anyone of the four studied markets or from partners that have already worked for the UK or Danish electric systems. Market participants and TSO are players of such a simulation: each area is represented by aggregated realistic data over one year and system security rules are fulfilled at any time.								

9. International Initiatives

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Table 9.1: International Activities

http://www.iea.org/techno/Framework_text.pdf

Name	Type	Description	UK Contact Point
Climate Technology Initiative (CTI)	IEA Implementing Agreement	The Climate Technology Initiative (CTI) is a multilateral initiative, operating as an Implementing Agreement under the International Energy Agency (IEA). CTI's objective is to enable countries to work together to foster international co-operation for accelerated development and diffusion of climate-friendly and environmentally sound technologies and practices. CTI participating countries undertake a broad range of co-operative activities in partnership with developing and transition countries and other international bodies. The CTI works closely with the United Nations Framework Convention on Climate Change (UNFCCC) process, including its Secretariat and the Expert Group on Technology Transfer (EGTT), relevant IEA Implementing Agreements and other international organizations or initiatives. The CTI was established at the first Conference of Parties to the UNFCCC in 1995 by 23 IEA/OECD Member Countries and the European Commission. In 2003, the CTI gained a new status as an IEA Implementing Agreement. The CTI's activities are designed to be consistent with the UNFCCC objectives, in particular the framework for technology transfer incorporated in the Marrakech Accords and adopted at the Seventh Conference of the Parties to the UNFCCC. As an IEA Implementing Agreement, the CTI intends to continue its current programme and to	n/a

		extend it into new areas consistent with its overall objectives. CTI activities include: • Technology Needs Assessments • Seminars and Symposia • Implementation Activities • Training Courses • Information Dissemination • Support Activities	
Demand-Side Management Programme	IEA Implementing Agreement	The IEA DSM Programme promotes energy efficiency and demand-side management for global sustainable development and for business opportunities. The overall objective of the Implementing Agreement on Demand Side Management is to help DSM technologies reach their full market potential, thereby allowing energy systems and utility investments to function more effectively and giving energy system investments enhanced value for gas and electricity customers.	Tom Bastin, DECC Matt Alexander, Solstice
Energy Conservation in Buildings and Community Systems (ECBCS)	IEA Implementing Agreement	The Implementing Agreement on Energy Conservation in Buildings and Community Systems (ECBCS) focuses its work on ways to improve energy efficiency in buildings. Whilst this programme is predominantly focused on building design and construction, it also incorporates a socio-economic focus. ECBCS administers the Future Buildings Forum and in cooperation with other buildings-related Implementing Agreements, the Forum organises workshops aimed at identifying long term energy, environmental, economic and technical issues related to buildings and the R&D needs associated with them.	Clare Hanmer, The Carbon Trust
European Council for an Energy Efficient Economy (ECEEE)	International network	ECEEE is a membership-based non-profit association. We generate and provide evidence-based knowledge and analysis of policies, and we facilitate co-operation and networking through our Summer Studies, workshops, and social media.	n/a
International Association of Energy Economics (IAEE)	International network	The IAEE is a worldwide non-profit professional organization which provides an interdisciplinary forum for the exchange of ideas, experience and issues among professionals interested in energy economics. To achieve this goal, it publishes The Energy Journal – a	Benjamin J. Klooss, BP

		quarterly, academic publication, and holds International American and European Energy Conferences each year.	
LCS-RNet	International network	The International Research Network for Low Carbon Societies is a global network for understanding the transition to low carbon societies. Its objectives are: promotion of information exchange and research cooperation; dialogues between researchers and various stakeholders including policy-makers, businesses, citizens; contribution to international policy-making processes on climate change including G8 process by providing research outcomes.	Jim Watson, UKERC
Renewable Energy Technology Deployment (RETD)	IEA Implementing Agreement	The Implementing Agreement for Renewable Energy Technology Deployment (RETD) engages in collaborative activities seeking to advance renewable energy technology improvement and cost reduction for all renewable energy technologies by facilitating international deployment efforts. RETD's mission is to measurably improve cooperation between participating governments in identifying cross-cutting barriers to deployment and providing "best practice" solutions, thus strengthening international collaboration for technology deployment. To provide guidance to the private sector and policy makers on innovative business strategies and projects that encourage technology deployment by fostering public-private partnership projects. To inform and facilitate on-going international dialogue and public awareness of renewable energy deployment by contributing concrete examples on deployment solutions.	Nick Clements, DECC
International Smart Grid Action Network (ISGAN)	IEA Implementing Agreement	The programme will consist of efforts to improve understanding of smart grid technologies, practices, and systems, to accelerate their development and deployment, and to promote adoption of related enabling government policies. It will create a network of national stakeholders to facilitate dynamic knowledge sharing, technical assistance, and project coordination, where appropriate, across five topic areas: • Policy, Standards and Regulation • Finance and Business Models	John Baker, EA Technology

		• Technology and Systems Development • User and Consumer Engagement • Workforce, Skills and Knowledge	
Sustainability Transitions Research Network (STRN)	International network	STRN is a wholly independent research-driven network governed by a steering group composed of leading researchers in the field. Membership of the STRN is open to anyone who is interested in research on sustainability transitions. The network aims to provide a space where researchers can engage in a vibrant intellectual exchange on the challenges of sustainability and find help and support in accessing resources, research topics and audiences for their work. The mission of the network is: • to provide a meeting place for the international and multi-disciplinary community of scholars working in the field of sustainability transitions; • to deepen the scientific understanding of sustainability transitions through a program of networking, research coordination and synthesis activities; to be a leading resource for practitioners such as actors in the arenas of policy making, civil society, and business who are working to advance societies into more sustainable directions.	Frank Geels, University of Manchester