UKERC ENERGY RESEARCH ATLAS: INTERDISCIPLINARY RESEARCH CENTRES

Section 1: An overview which includes a broad characterisation of research activity in the sector and the key research challenges

Section 2: An assessment of UK capabilities in relation to wider international activities, in the context of market potential

Section 3: major funding streams and providers of *basic research* along with a brief commentary

Section 4: major funding streams and providers of *applied research* along with a brief commentary

Section 5: major funding streams for *demonstration activity* along with major projects and a brief commentary

Section 6: Research infrastructure and other major research assets (e.g. databases, models)

Section 7: Research networks, mainly in the UK, but also European networks not covered by the EU Framework Research and Technology Development (RTD) Programmes.

Section 8: UK participation in energy-related EU Framework Research and Technology Development (RTD) Programmes.

Section 9**:** UK participation in wider international initiatives, including those supported by the International Energy Agency.

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1. Overview

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During the 1990s, when UK energy R&D had a relatively low profile, energy research activities became fragmented within most universities. With energy research activity scaling up again, a number of institutions have created new energy centres and networks cutting across standard departmental and faculty structures. The trend has been motivated by a variety of reasons: the increased profile of energy and climate change challenges; industry interest in establishing alliances with preferred universities; the need to bring people from with different competences to address inherently interdisciplinary challenges; greater awareness within institutions of colleagues with complementary skills; the need to showcase research capabilities to the outside world; and the desirability of creating the capacity to respond to major funding opportunities such as the Energy Technologies Institute. This section of the Research Landscape describes a range of initiatives in individual universities. These initiatives take a range of institutional forms described in Section 3 of this landscape.

2. Capabilities Assessment

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Not applicable.

3. Basic and applied strategic research

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This section of the research landscape focuses on general university-based energy research centres or networks whose activities either cover multiple research topics within the overall energy domain or whose work is intrinsically interdisciplinary. It covers a wide range of initiatives and it is difficult to make generalisations about the nature of the various centres, institutes, groups and networks. The design of each reflects the needs of particular institutions. In order to take as systematic an approach as possible, we have divided the initiatives into four broad categories:

A) Cross-Departmental Networks. These may be described by their universities as centres, institutes, networks or, in one case, a laboratory. The common thread is that they attempt to co-ordinate energy research activity across traditional departmental or faculty boundaries. These networks tend to be recent creations, often set up by universities to establish an interdisciplinary research capability or to act a "shop-window" for the institution's energy research portfolio.

B) Interdisciplinary Centres. Centres which are located within a single department, or which have a distinct identity outside the traditional faculty/departmental structure, have been placed in this category.

C) Externally Funded Centres. This covers one Centre established within a single institution as a direct consequence of research council funding.

D) Cross-Institutional Collaborations. These involve several universities and have generally developed as a result of collaborations developed in response to external funding opportunities. UKERC and the Tyndall Centre were established as a result of cross–research council funding. The Joule Centre in the North-West is supported by the North West Development Agency. These are relatively new activities as a result of the turnover of research council funding and the growing interest in energy research.
Where individual centres or networks have a strong focus in a particular scientific area – e.g. science and engineering, environmental science or social science/economics – these have been identified.

For reference, the complete set of networks/centre is listed here.

Cross-Departmental Networks - science and engineering

- Institute of Energy Technologies, University of Aberdeen
- Institute for Energy Research and Policy, University of Birmingham
- Cambridge University Energy Network, University of Cambridge
- Sustainable Environment Research Centre (SERC), University of Glamorgan
- Energy Futures Lab, Imperial College
- Centre for Sustainable Energy, Lancaster University
- Energy Technologies Research Institute, University of Nottingham
- Renewable Energy Group, University of Exeter
- The Sir Joseph Swan Institute, Newcastle University

Cross-Departmental Networks - environmental science

- Earth, Energy and Environment University Interdisciplinary Institute, University of Leeds
- Institute for Research on Environment and Sustainability (IRES), University of Newcastle upon Tyne
- Centre for Research in Energy and the Environment (CRE+E), Robert Gordon University
- Centre for Environmental Strategy (CES), University of Surrey

Interdisciplinary Centres with a science and engineering focus

- Energy Technology Centre, Cranfield University
- New and Renewable Energy Group, Durham University
- Institute for Energy Systems, University of Edinburgh
- Energy and Resources Research Institute, University of Leeds
- Centre For Renewable Energy Systems Technology, Loughborough University
- Energy and Environment Research Unit, Open University
- Sustainable Energy Research Group, University of Southampton
- Institute for Energy and Environment, Strathclyde University
- Centre for Sustainable Technologies, University of Ulster
- Centre for Sustainable Technologies (CST), University of Ulster
- Energy Research, University of Reading

Interdisciplinary Centre with a built environment/renewables focus

- The Institute of Energy and Sustainable Development, De Montfort University

Interdisciplinary Centre with an environmental focus

- Sustainable Energy Research Team, International Centre for the Environment (ICE), University of Bath
- Environmental Change Institute, Oxford University

Interdisciplinary Centre with social science/economics focus

- Imperial College centre for Energy Policy and Technology (ICEPT), Imperial College
- The Sussex Energy Group, University of Sussex

Externally Funded Centre with an environmental science focus

- The Centre for Social and Economic Research on the Global Environment (CSERGE) , University of East Anglia

Cross-Institutional Collaborations

- ERPem Joint Research Institute – Energy
- Energy Technology Institute
- Joule Centre for Energy Research & Development
- The Low Carbon Research Institute
- The Tyndall Centre for Climate Change Research
- UK Energy Research Centre
- Welsh Energy Research Centre

Table 3.2: General University-based Energy Centres and Networks

Name	Description	Sub-topics covered	No of staff	Field
Institute of Energy Technologies, University of Aberdeen	***Cross-Departmental Network with a science and engineering focus.*** The University of Aberdeen's energy research capability is coordinated through the Institute of Energy Technologies, which is based in the College of Physical Sciences. Energy-related research in the University covers a broad spectrum - from characterising reservoirs of oil and gas, through the application of knowledge management in the oil and gas industry to the development of renewable energy technologies such as wave and bio-energy. It is a cross-departmental research institute.	• HP/HT Testing Facility • Fuel Cell Photocatalysis • Knowledge Management • SMART Fields • Petroleum Economics • Environmental Economics • Low Energy Buildings • Downhole Drilling • Safety Engineering • Materials • Environmental Impact • Assessment • Remediation of Drill Cuttings • Reservoir Characterisation • Seismic Interpretation • Future Sub-Surface Use & Sequestration • Biomass and Bioenergy • Wave Energy • Systems & Feasibility Studies		• Chemistry • Computing Science • Economics • Energy Efficiency • Engineering • Environmental Science • Petroleum Geology • Renewables
Institute for Energy Research and Policy, University of Birmingham	***Cross-Departmental Network with a science and engineering focus.*** The Institute for Energy Research and Policy was founded in 2005, recognising the wide range of high-quality research in energy at the University of Birmingham, ongoing for more than fifty years, and the increasing importance of energy for our lives and our environment. Advances in science and technology, and appropriate governmental and commercial policies, are both needed to deal with the challenge of global climate	• Fuel Cells • Nuclear Physics • Future (internal combustion) Engines and Future Fuels • Sustainability in the built environment • Hydrogen storage and purification • Sustainable energy systems • Electricity Distribution • Energy Policy&Economics • Railways • Superconductors	51 staff	• Chemistry • Civil engineering • Metallurgy and Materials • Economics • Mathematics • Social Sciences • Electrical Engineering • Mechanical Engineering • Physics • Computer Sciences • Biosciences

Name	Description	Sub-topics covered	No of staff	Field
	change, increased energy costs, the threat of energy supply disruptions and increasing difficulty in replacing energy reserves in certain locations around the world. The vision for the Institute is a network of researchers from a range of disciplines engaged on projects of international excellence, contributing their expertise to each project.	• Turbines • Carbon capture • Environmental impacts • Pipelines • Wind Energy		• Chemical Engineering • Geography, Earth and Environmental Science
Cambridge University Energy Network, University of Cambridge	***Cross-Departmental Network with a science and engineering focus.*** The mission of CUEN is to bring together the academic community within and outside of the University to share their knowledge and interest in the various aspects of energy. It serves to promote a structured, cross disciplinary approach to teaching and research into the generation of energy, both within and outside of the University, along with collaboration with relevant industries. To accomplish these aims, CUEN organises a series of activities which include discussion groups, lectures and symposiums. The flagship event is the Cambridge Annual Energy Symposium.	• Emission trading • Existing and emerging energy technologies • Energy security • Scenario planning in a carbon-constraint world • Environmental and legislative issues arising from energy generation	9	• Sustainable and renewable energy • Economics and finance within the energy industry • Policy making • Chemical, power and environmental engineering

Name	Description	Sub-topics covered	No of staff	Field
Sustainable Environment Research Centre (SERC), University of Glamorgan	***Cross-Departmental Network with a science and engineering focus.*** The Sustainable Environment Research Centre (SERC) is made up by the Wastewater Treatment Research Unit and the Hydrogen Research Unit in the University of Glamorgan, Wales. SERC is truly interdisciplinary: group members have expertise in biochemistry, chemistry, physics, mechanical and control engineering, renewable energies, chemical engineering, business and communicating science and they are from different departments in the University of Glamorgan. Team members have experience in operating lab scale, pilot scale and full-scale biological process plants, and have participated in a number of large national and international collaborative projects, both Research Council and EU funded. The Sustainable Environment Research Centre undertakes national and world-leading research into waste treatment and the sustainable production of energy from waste and grown biomass.	• Waste water treatment • Hydrogen	7 academic staff 23 research staff	• Biochemistry • Chemistry • Physics • Mechanical Engineering • Control Engineering • Renewable Energies • Chemical Engineering • Business and Communicating Science • Environmental Engineering
Energy Futures Lab, Imperial College	***Cross-Departmental Network with a science and engineering focus.*** The Energy Futures Lab at Imperial College is a major multidisciplinary, cross-faculty research initiative designed to meet broad energy challenges and facilitate the transition to a sustainable energy	• Energy efficiency • Fossil fuel decarbonisation • Transport • The urban environment • Nuclear energy • Electrical networks • Power generation	13 staff	• Biology • Business Studies • Chemical Engineering • Chemistry • Computing Science • Earth Science and Engineering

Name	Description	Sub-topics covered	No of staff	Field
	economy. Building on the existing capabilities at Imperial College in key areas, such as energy efficiency, fossil fuel decarbonisation, transport, the urban environment, nuclear energy, electrical networks, power generation, renewable energy technologies, as well as the analysis of energy systems, policy, economics and risk, the Lab will provide a vehicle, and develop programmes, for advancing research specifically aimed at understanding and solving wide cross-cutting energy problems.	• Renewable energy technologies • The analysis of energy systems, policy, economics and risk		• Policy and Technology • Electrical Engineering • Materials
Renewable Energy Group, University of Exeter	It is a multidisciplinary grouping with expertise linking engineering and physical sciences to policy and economics research. The present group was initiated in 2005 and since then has expanded to include 10 academic staff. It has strong links with academics from across the University including the Department of Geography, the School of Engineering, Computing and Mathematics and the Centre for Ecology and Conservation.	• Marine • Biofuels • Electrical • Wind • PV and Thermal • Energy Policy	12 academic staff, 7 research associates and 7 PhD students	• Biosciences • Environmental Science • Electrical Engineering • Mechanical Engineering • Chemical Engineering
Centre for Sustainable Energy, Lancaster University	***Cross-Departmental Network with a science and engineering focus.*** The Centre for Sustainable Energy is one of five integrating research centres of the Lancaster Environment Centre in Lancaster University. The centre builds on areas of current strength for both organisations and generates additional interdisciplinary research and training opportunities.	• Biomass • Low-head hydro • Wave power • Carbon management • Atmospheric deposition • Small-scale hydro		• Biological Sciences • Environmental Science • Electrical Engineering • Chemical Engineering

Name	Description	Sub-topics covered	No of staff	Field
The Sir Joseph Swan Institute, Newcastle University	***Cross-Departmental Network with a science and engineering focus.*** The mission of the Sir Joseph Swan Institute is to provide an intellectual lead in the pursuit of the low-carbon economy of the future, by developing new technologies which reconcile human needs for energy conversion and use with social and ecological needs.It provides the focus for energy related research across the University and incorporates researchers from 11 academic schools specialising in natural science, social science and engineering.	• Energy Biosciences • Clean Energy from the Geosphere • Fuel Cells and Hydrogen • Carbon Neutral Culture • Renewable Electricity • Social Aspects of Energy • Photovoltaics • Marine Renewables • Nuclear • Transport	79 staff	• Biosciences • Chemical Engineering • Electrical Engineering • Environmental Science
Energy Technologies Research Institute, University of Nottingham	***Cross-Departmental Network with a science and engineering focus.*** The Energy Technologies Research Institute was founded in 2006 to draw this research together and represents a multi-disciplinary team of bio scientists, social scientists, chemists, physicists and engineers. Together, these researchers work extensively with external partners both in the UK and internationally to find innovative solutions to the increasing need of governments, industry and society to establish sustainable and secure energy supplies at affordable prices while providing technologies to mitigate global warning.	• Clean fossil fuels and carbon abatement technologies • Hydrogen and fuel cells • Renewable energy production • Infrastructure technologies for green energy • Energy efficient technology in the built environment • Environmental impact, economic and social aspects	64 Researchers	• Biosciences • Built Environment • Chemistry • Chemical Engineering • Civil Engineering • Economic Geography • Electrical Engineering • Electronic Engineering • Environmental Engineering • Environmental Science • Materials • Mechanical Engineering

Name	Description	Sub-topics covered	No of staff	Field
Sustainable Energy Research Team, International Centre for the Environment (ICE), University of Bath	***Interdisciplinary Centre with an environmental focus.*** Lead on UKERC studies of 'Energy Demand Reduction in Industry'. Forms part of the 'Demand Reduction' Theme co-ordinated by Dr B Boardman of the University of Oxford's Environmental Change Institute. Are part of the SUPERGEN 3 'Highly Distributed Power Systems' Consortia; involved with the integrated appraisal (environmental, energy and economic analysis) of a range of renewable micro energy generators. Funded by Great Western Research, the UKERC and the Environment Agency to undertake bio-energy research. Is part of the e.on/EPSRC strategic partnership working on "Transition pathways to a low carbon economy" Interdisciplinary research team focussing on sustainable energy and employing a diverse range of assessment methods.	• Life Cycle Assessment (LCA) • Microgeneration • Embodied Energy & Carbon • Energy Demand Reduction in Industry • Thermodynamic Analysis • Bioenergy Production • Environmental Footprinting • Environmental Economics	4 staff 6 students	• General Engineering (incorporating Mineral and Mining Engineering) • Mechanical, Aeronautical and Manufacturing Engineering • Environmental Sciences • Built Environment • Economics and Econometrics
The Earth, Energy and Environment University Interdisciplinary Institute, University of Leeds	***Cross-Departmental Network with an environmental science* and environmental management *focus.*** The Earth, Energy and Environment Interdisciplinary Institute (the EEE Institute), is aimed at addressing the challenges associated with the use and management of Energy.	• Advanced Energy Systems & Renewable Energy. • Carbon Cycle Management. • Atmospheric Emissions. • Energy efficiency. • Modelling and Simulation. • Transport Combustion and Environmental Monitoring and Modelling.	120 research staff 11 managers	• Earth and the Environment • Engineering • Fluid Dynamics • Geophysics • Chemistry • Informatics and Computing • Atmospheric

Name	Description	Sub-topics covered	No of staff	Field
	The EEE institute is bringing energy related areas together on projects that have critical importance for government, private sector organisations, and the ordinary person in the street, alike. It is also applying research findings and new technologies to improve environmental management and increase efficient use of waste, transport and energy on our Campus.	• Environmental Management including waste, transport, purchasing and carbon management • Sustainability and Environmental Policies Research.		Dynamics • Fuel and Energy • Materials and Transport Studies • Environmental management
Energy Systems Analysis Group, Institute for Research on Environment and Sustainability (IRES), University of Newcastle upon Tyne	***Cross-Departmental Network with an environmental science focus.*** IRES is an interdisciplinary, cutting-edge research institute based within the University of Newcastle upon Tyne. Within the Institute, we draw together researchers from a number of different academic schools of the university, including biologists, geochemists, civil engineers, toxicologist, medical scientists, social scientists and geographers, all of whom are involved in some aspect of environmental research. Through our collaborative, interdisciplinary structure, the aim of this centre is to use existing expertise to develop new, holistic solutions to some of the most pressing environmental issues. Another aim is to form new strategic national and international alliances in order to develop a fundamental understanding of the processes involved in the Earth's terrestrial, oceanic and atmospheric environments.	• Earth Systems • Water Systems • Bioresource Systems • Energy Systems • Health Systems • Social Systems	59 research staff 14 technical staff 7 support staff	• Biology • Geosciences • Medical Sciences • Geography • Social Sciences • Environmental Science • Earth Science

Name	Description	Sub-topics covered	No of staff	Field
Centre for Research in Energy and the Environment (CRE+E), Robert Gordon University	***Cross-Departmental Network with an environmental science focus.*** CRE+E is a multidisciplinary research centre delivering expertise in renewable energy, advanced water and air treatment technology, environmental sensing and environmental catalysis. No other group in the UK has such diverse capability, with teams of physicists, engineers, environmental scientists, chemists and biologists from different departments of the university.	• Energy • Environmental Sensing • Contaminant Remediation	16 research staff	• Physics • Environmental Engineering • Chemistry • Biology
Centre for Environmental Strategy (CES), University of Surrey	***Cross-Departmental Network with an environmental science focus***. The Centre for Environmental Strategy – CES for short – is a centre for multi-disciplinary research and teaching on the relationships between human activities and the environment. Its work forms part of the agenda which is now known as Sustainable Development, attempting to reconcile the techno-economic, ecological and social constraints which limit what humans can do on and with the planet. Our research spans the full range of academic disciplines and although CES has a strong engineering base, its members also include environmental scientists and managers, physicists, mathematicians, economists, sociologists, policy analysts and philosophers.	• Ecological economics and ethics • Environmental management and policy-making • Environmental systems analysis • Sustainable energy • Development of educational software	41 staff 26 PhD students 15 EngD students	• Economics • Environmental engineering • Policy and technology

Name	Description	Sub-topics covered	No of staff	Field
Energy Technology Centre, Cranfield University	***Interdisciplinary Centre with a science and engineering focus.*** The Centre, established in 2005, is a research centre in the Sustainable Systems Department. It offers specialist research, training and consultancy in wet and dry renewable energy, biomass conversion and energy from waste, process simulation, diving and underwater technology and offshore materials engineering.	• Offshore technology and subsea engineering • Risk and reliability engineering • Power generation technology		• Engineering • Materials • Environmental Science
New and Renewable Energy Group, Durham University	***Interdisciplinary Centre with a science and engineering focus.*** The New & Renewable Energy Group (NAREG) is a research group in the School of Engineering. NAREG has strong links with business and industry and is currently working with a number of partners on new and renewable energy projects. The Group has three very well equipped laboratories that are currently being used for range activities of academic and industrial interest.	• Condition monitoring of renewable systems • Hybrid electric arrangements • Network integration of New & Renewable systems • Rapid design of electromagnetic devices • Reliability • Solar car • Solar power • Thermo-mechanical energy conversion • Wave power • Wind power	10 staff 8 research students	• Electrical Engineering • Computing Science • Mechanical Engineering • Renewable Technologies
Institute for Energy Systems, University of Edinburgh	***Interdisciplinary Centre with a science and engineering focus.*** The Institute for Energy Systems (IES) is one of five multi-disciplinary research institutes within the School of Engineering and Electronics at the University of Edinburgh. It leads the EPSRC-funded SUPERGEN Marine Energy Research Consortium (Lead and Finance	• Marine energy and coastal defence • Power systems operation and control • Energy and climate change • Machines and power electronics	14 academic staff 9 research staff 27 research students	• Electrical Engineering • Renewables • Ocean engineering • Energy systems

Name	Description	Sub-topics covered	No of staff	Field
	Hub). It is a partner in the EPSRC SUPERGEN Future Network Technologies and the Asset Management and Performance of Energy Systems (AMPerES) consortia. It was selected to co-host the Research Councils' UK Energy Research Centre (UKERC), with responsibility for the theme Future Sources of Energy.			
Energy and Resources Research Institute, University of Leeds	***Interdisciplinary Centre with a science and engineering focus.*** Energy and Resources Research Institute is one of three institutes within the School of Process, Environmental and Materials Engineering. It is involved in many forefront areas of energy and resource research, with an activity spectrum ranging from environmental and pollution monitoring to developing biomass resources and processes.	• Disposal of waste by landfilling • lift ride quality issues • photovoltaic/thermoelectric power • Geostatistical modelling • Spatial data • Stochastic modelling • Ore reserves • Mineral extraction • Environmental impact assessment • Production of Hydrogen from renewable source • Low emissions combustion technologies • Mining and tunnelling • Gas filtration • Sustainable energy • Biomass and coal combustion models • Environmental catalysis • Aviation • Technology for low carbon economy • Evolutionary computing • Advanced power generation	16 staff	• Mining Engineering • Combustion Engineering • Environmental Engineering • Energy Engineering • Tunnel Engineering • Chemical Engineering

Name	Description	Sub-topics covered	No of staff	Field
		technology • Mathematical modelling • Multi-scale pollution dispersion models • Chemical models in chemical engineering • dispersion of traffic related pollutants • Uncertainty Analysis • Waste and biomass pyrolysis • Waste Incineration		
Centre For Renewable Energy Systems Technology, Loughborough University	***Interdisciplinary Centre with a science and engineering focus.*** Centre for Renewable energy Systems Technology (CREST) was established in 1993, using funds made available by Professor Tony Marmont. The primary activity is to undertake research and education in renewable energy. Today, after more than a decade of operation, CREST is firmly established within the Department of Electronic & Electrical Engineering at Loughborough University as one the leading international groups working in the field of renewable energy, with an international reputation both in research and education.	• Networks and systems • Wind power systems • PV systems • PV materials and devices • Building-integrated PV	5 academic staff 3 visiting academics 8 research staff 5 teaching and administrations 23 research students	• Electrical Engineering • Environmental Engineering • Renewable Energy Systems • Mechanical Engineering
Energy and Environment Research Unit, Open University	***Interdisciplinary Centre with a science and engineering focus.*** The Energy and Environment Research Unit (EERU) was set up in 1986 to undertake and co-ordinate research on sustainable energy technologies and to support the development of environmentally sound	• The human energy system • The biosphere seen as a solar-powered system • The interaction between these systems	6 academic staff 7 research staff 1 project officer 3 secretarial staff 15 postgraduate students	• Physics • Electrical engineering • Environmental engineering • Biology • Renewable energy

Name	Description	Sub-topics covered	No of staff	Field
	approaches to the generation and use of energy.		4 associated researchers/consultants	systems • Policy study
Energy Research, University of Reading	***Interdisciplinary Centre with a science and engineering focus.*** The Sustainable Energy and Environmental Engineering Group of the University of Reading is based in the School of Construction Management and Engineering. The part of the Sustainable Energy and Environmental Engineering Group based in the Engineering building has previously been known as the "Energy Group".	• Modelling energy use • Measuring energy use and behaviours using social surveys • Use of energy in homes	6 staff	• Policy Study • Renewable energy • Environmental Sciences
Sustainable Energy Research Group, University of Southampton	***Interdisciplinary Centre with a science and engineering focus.*** The Sustainable Energy Research Group within the School of Civil Engineering and the Environment undertakes research in core areas of energy, specifically in the built environment and in renewables. The Group's interests include building envelopes and their impact on energy and comfort, photovoltaics and marine current energy converters.	• Photovoltaics • Marine Energy • Microgeneration • Urban Energy and Carbon Studies • Smart Building Technologies • Thermal and Light Modelling • Renewable Energy Education • Pollution Control	20 research staff	• Electrical Engineering • Environmental Engineering • Civil Engineering • Renewable energy systems
Institute for Energy and Environment, Strathclyde University	***Interdisciplinary Centre with a science and engineering focus.*** This Institute represents the one of the largest electrical power engineering and energy technology University groups in Europe, comprising more than 150 staff members. It undertakes a balanced portfolio of basic, strategic and applied research in electrical power engineering.	• Control, Protection and Artificial Intelligence Applications • Dielectric Materials and Pulsed Power • High Voltage Technology and UHF Diagnostics • Machines and Power Electronics • Power System Analysis • Energy Systems Modelling and	21 academic staff 84 researchers 4 secretarial staff 4 technicians	• Electrical Engineering • Materials

Name	Description	Sub-topics covered	No of staff	Field
		Simulation		
Centre for Sustainable Technologies (CST), University of Ulster	***Interdisciplinary Centre with a science and engineering focus.*** The Centre for Sustainable Technologies (CST) is a multi-disciplinary research centre incorporating the Northern Ireland Centre for Energy Research and Technology (NICERT) tackling many aspects of the diverse sustainability agenda. CST research can be broadly divided into a number of areas. RENEWABLE ENERGY Activities: Advanced Integrated collector/storage solar water heaters, Solar Energy systems, Computational Fluid Dynamics and Ray Tracing, Photovoltaic (PV) facades, Quantum Dots CLEAN COMBUSTION OF FUELS Activities: Advanced Power Cycles, Waste Utilisation Technologies Fossil Fuel Power Generation, Greenhouse Gas Emission Reduction, Biomass Utilisation Technologies, Emissions Reduction Technologies and Carbon Dioxide Sequestration, Fuel Cell Integration Studies, Evaluation Software Development (e.g. ECLIPSE) ENERGY EFFICIENCY IN BUILDINGS AND INDUSTRY	• Waste Utilisation Technologies • Fossil Fuel Power Generation • CHP Studies • Greenhouse Gas Emission Reduction • Biomass Utilisation Technologies • Emissions Reduction Technologies • Heat Pumps • Energy Efficiency • Solar Thermal • PV • Advanced glazings • Thermal energy storage • Transport • Hydrology • Low energy architecture • Advanced procurement methods	10 Academics 6 Research Fellows 10 PhD students 3 technicians	• Environmental Engineering • Electrical Engineering • Renewables • Mechanical Engineering

Name	Description	Sub-topics covered	No of staff	Field
	Activities: Advanced Glazing Systems, Sensible Heat storage, Heat Pumps, Refrigeration, Air-conditioning, Component, fluid and system optimisation and integration, Energy Efficiency in industrial processes, CHP Sizing & Integration, Pinch Technology			
The Institute of Energy and Sustainable Development, De Montfort University	***Interdisciplinary Centre with a built environment/renewables focus.*** The Institute of Energy and Sustainable Development (IESD) is a specialist research, consultancy and teaching group based within De Montfort University, which aims to make a worthwhile and significant contribution to sustainable development. The Institute's work focuses on the clean, efficient use of energy in the built environment and developing ways in which greater use can be made of renewable energy in domestic buildings, industry and commerce.	• Computer simulation to support sustainable urban development • Urban energy management • Low energy heating • Ventilation and cooling and new building energy concepts • Social-psychological aspects of energy use and renewable energy technologies • Climate and energy policy development • Development and assessment of building integrated renewable energy systems	10 academic staff 13 researchers 28 research students 4 support staff	• Environmental Engineering • Social Sciences • Policy and Technology • Renewable Energy
Environmental Change Institute, Oxford University	***Interdisciplinary Centre with an environmental focus.*** Environmental Change Institute (ECI) is an interdisciplinary unit administered within the Oxford University Centre for the Environment that undertakes research on environmental issues, teaches an MSc in Environmental Change and Management, and fosters university-wide networks and outreach on the environment.	ECI research and teaching is characterised by a focus on global and regional environmental change, projects that bring together the natural and social sciences, and by an orientation to applied and public policy. Many of the research projects have a goal of influencing and informing public policy and decisions about the environment. The Institute is currently organized around three	Approximately 10 Senior Research Fellows, 40 Core researchers 10 support staff 30 PhD students	• Global and regional environmental change and governance • Applied and public polity study • Lower carbon futures • Ecosystem Dynamics • Climate Change

Name	Description	Sub-topics covered	No of staff	Field
		major research themes - Climate, Energy, and Ecosystems		
Imperial College Centre for Energy Policy and Technology (ICEPT), Imperial College	***Interdisciplinary Centre with social science/economics focus.*** ICEPT has become a leading UK centre for world class research and policy advice, with a particular focus on the interface between energy policy and technology and on expertise in modelling and assessing long term energy transitions and related policy processes. Its research addresses bioenergy, hydrogen and fuel cells, decentralised and sustainable energy systems, and transitions to low carbon energy systems. ICEPT leads the UKERC Technology and Policy Assessment function (TPA). Disciplinary backgrounds of ICEPT members include economics, law, engineering, biology, ecology, chemistry, and physics.	• BioEnergy • Decentralised Energy • Energy in Developing Countries • Hydrogen and Fuel Cell Energy • Transitions, Innovation and Policy • UKERC Technology and Policy Assessment	4 academic staff 6 Senior Research Staff 12 Research Associates 15 Visiting Appointments and Academic visitors 30 PhD researchers	• Bioenergy • Policy Study • Electrical Engineering • Environmental Engineering • Economics • Law
The Sussex Energy Group, University of Sussex	***Interdisciplinary Centre with social science/economics focus***. The Sussex Energy Group undertakes academically rigorous, inter-disciplinary research that engages with policy-makers and practitioners to identify sustainable, economically efficient ways of achieving the energy transition. Although climate change is a significant factor, there are many other reasons why we need to address the energy transition, including security of supply, fuel poverty and the attractions of innovations such as renewable energy resources, distributed	• Appraisal • Governance • Transitions	16 staff	• Politics and International Studies • Business and Management Studies • Policy and regulation • Consumer attitudes and behaviour

Name	Description	Sub-topics covered	No of staff	Field
	generation and combined heat and power.			
The Centre for Social and Economic Research on the Global Environment (CSERGE) , University of East Anglia	***Externally Funded Centre.*** CSERGE is a leading interdisciplinary research centre in the field of environmental and sustainable development. It consists of a number of collaborating disciplines including economics, political science, geography, information systems and the natural sciences. It has won national and international praise for its pioneering research on wetlands, forests, coastal management and climate change. It has also been commended for its work on the analysis of the governance process and for its innovative theoretical and applied environmental economics work. It is also one of the few institutes in which waste recycling and disposal and energy management issues, including life cycle analysis, have been researched and deployed in real world situations. One of the core investments in CSERGE is a 5 year (2001-2006) funding award from the UK's Economic and Social Research Council (ESRC) for an interdisciplinary Programme on Environmental Decision Making (PEDM). Funding sources also include RELU (The Rural Economy and Land Use Programme), Leverhulme Foundation and the EU.	• Management of Natural Resources • Governance for sustainability • Global Environmental Problems • Waste and energy management • Environmental policy and management • Environmental valuation • Social resilience, justice and equity • Risk assessment • Institutional analysis • Environment and human development • Sustainable consumption	60 research staff 3 administrative Staff 6 research students	• Environmental Science • Economics • Political science • Geography • Information systems

Name	Description	Sub-topics covered	No of staff	Field
ERPem Joint Research Institute - Energy	***Cross-Institutional Collaboration.*** The JRI vision is to be world-leading in Marine and Renewable Energy research, and to be at least nationally pre-eminent in all other areas of energy research. The JRI in Energy combines research activities that: • Map all the way down the renewable energy supply chain from wind, hydro, marine and solar energy sources, through their conversion to electricity, to their power systems delivery and end-use, with those that • Characterise and better manage hydrocarbon resources, develop cleaner coal and gas technologies, and reduce and store energy by-products in environmentally better ways. The aim is to engage the relevant disciplines in these areas and create new technologies or improve those existing to assist society to meet its energy needs in an environmentally, financially and socially affordable manner without reduction in security of supply.	• Marine Energy and Coastal Defence • Renewable Energy and Climate • Energy Conversion and Network Delivery • Photovoltaics and Solar Energy • Fuel Cells and Energy Storage • Urban Energy Demand and Supply	29 academic staff 17 research staff 67 PhD students	• Environmental Science • Electrical Engineering • Chemical Engineering
Energy Technology Institute (ETI)	***Cross-Institutional Collaboration.*** The Energy Technologies Institute is a UK based company formed from global industries and the UK government. It is	• Marine • Offshore Wind • Distributed Energy (DE) • Carbon Capture and Storage (CCS)		• Engineering • Environmental Science

Name	Description	Sub-topics covered	No of staff	Field
	hosted by Loughborough University, a member of a Midlands Energy Consortium which also includes the universities of Birmingham and Nottingham. Its industry members include BP, EDF energy, E.on, Rolls-Royce, Shell and Caterpillar. Its public sector members are DECC, DfT, DIUS, EPSRC and TSB. The ETI brings together projects that create affordable, reliable, clean energy for heat, power and transport. It will demonstrate technologies, develop knowledge, skills and supply-chains, inform the development of regulation, standards and policy, and so accelerate the deployment of affordable, secure low-carbon energy systems from 2020 to 2050.	• Transport • Energy Networks		
Joule Centre for Energy Research & Development	***Cross-Institutional Collaboration.*** The Joule Centre for energy Research & Development is a partnership of North West Universities, commercial organisations and other stakeholders associated with the energy industry. It has emerged out of the complimentary strengths of the participating organisations across a range of disciplines and energy areas.	• Energy infrastructure • Offshore generation • Hydrogen/Fuel cells • Energy consumption • Condition monitoring • Energy assessment & modelling	4 staff	• Mechanical Engineering • Civil Engineering • Electrical Engineering • Mathematics • Chemical Engineering • Computing • Environmental Engineering
The Low Carbon Research Institute	***Cross-Institutional Collaboration.*** The aim of the Low Carbon Research Institute (LCRI) is to create a virtual organisation that will change the	• Low carbon energy generation, storage and distribution - Photovoltaics - Hydrogen energy systems - Marine energy	NA	• Electrical Engineering • Chemical Engineering • Environmental

Name	Description	Sub-topics covered	No of staff	Field
	landscape of the academic discipline of energy research in Wales. The LCRI will develop capacity and facilities around the existing areas of low carbon and energy expertise in Wales whilst being international in its outlook, developing a strategic long term programme of research. The Welsh School of Architecture are the lead partner in coordinating the application and administering funding with other partner Institutions' being Cardiff School of Engineering (Cardiff University), School of Chemistry (University of Wales Bangor), Sustainable Environment Research Centre (University of Glamorgan), School of Engineering (University of Wales Swansea) and the Centre for Solar Energy Research (CSER), Glyndwr University.	- Bioenergy • Carbon reduction and energy efficiency - Low/zero carbon built environment - Large scale power generation • Energy Graduate School • Dissemination and Partnerships with industry, research and government		Science
The Tyndall Centre for Climate Change Research	***Cross-Institutional Collaboration.*** The Tyndall Centre brings together scientists, economists, engineers and social scientists, who together are working to develop sustainable responses to climate change through trans-disciplinary research and dialogue on both a national and international level - not just within the research community, but also with business leaders, policy advisors, the media and the public in general. It has 6 partner institutions within the Tyndall Consortium.	• Informing international climate policy • Constructing energy futures • Building resilience to climate change • International development • Sustainable coasts • Engineering cities • Integrated modelling	60 full-time equivalent researchers, affiliates, PhD and staff	• Policy Study • Civil Engineering • Environmental Science • Economics

Name	Description	Sub-topics covered	No of staff	Field
	The Tyndall Centre's energy programme incorporates cultural, political and institutional factors along with technical, economic and scientific analyses, with an emphasis on international decarbonisation over economic and scientific analyses, with an emphasis on international decarbonisation over the next 50 years.			
UK Energy Research Centre	Cross-Institutional Collaboration. The UK Energy Research Centre is the focal point for UK research on sustainable energy. It takes an independent, whole-systems approach, drawing on engineering, economics and the physical, environmental and social sciences. The Centre's role is to promote cohesion within the overall UK energy research effort. It acts as a bridge between the UK energy research community and the wider world, including business, policymakers and the international energy research community and is the centrepiece of the Research Councils Energy Programme.	• Energy Demand • Energy Supply • Energy and Environment • Energy Systems • Technology and Policy Assessment • National Energy Research Network • UK Energy Research Atlas • Meeting Place • Energy Data Centre	About 100 staff 28 PhD students	• Engineering • Environmental Science • Economics
Welsh Energy Research Centre	***Cross-Institutional Collaboration.*** WERC is a partnership of internationally recognised experts from Welsh Universities, including Architecture and Engineering at Cardiff, Engineering at Swansea, the Bangor Photovoltaics group, and the Hydrogen and Energy			• Engineering • Environmental Science • Chemical Engineering

Name	Description	Sub-topics covered	No of staff	Field
	from Waste group at Glamorgan University. WERC carries out interdisciplinary industrial research across all aspects of energy and provides an energy research base for Welsh Industry.			

4. Applied research

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Not applicable.

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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Not applicable.

8. UK Participation in EU Framework Programmes

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Not applicable.

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9. International Initiatives

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Not applicable.