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Press Release

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ETI evaluates the future of UK biomass with projects worth £4.57 million

Domestic biomass, sustainably grown in the UK, could provide up to 10%¹ of the UK's energy needs by 2050 and significantly contribute to the reduction of greenhouse gas (GHG) emissions.

Three new bio energy projects by the Energy Technologies Institute (ETI), valued at £4.57 million, are looking to:

- Establish an in-depth field trial to study ecosystem and sustainability when converting land to bio energy crop production;
- Explore at an engineering level, the cost-effectiveness, technology challenges and technology developments required for biomass to power combined with Carbon Capture and Storage (CCS);
- Explore the key challenges in developing sustainable UK bio energy supply chains for heat, power, and transport fuels production and consider the best use of UK biomass from an energy security, affordability and GHG reduction perspective.

Energy and Climate Change Minister Greg Barker said: "Bio energy has the potential to play a key role in low carbon energy generation in the future, which is why we need groundbreaking innovation today. These projects being run by the ETI will greatly deepen our understanding of this kind of energy, helping the sector to grow and thrive and ensure the best ideas and research are given every chance to succeed."

The ETI is a public private partnership tasked with developing "mass scale" technologies that will help the UK meet its 2020 and 2050 energy targets. Akira Kirton, the Technology Strategy Manager of the ETI, who launched the projects today at All-Energy in Aberdeen, said: "There are well-known and potentially controversial sustainability issues surrounding the large-scale use of biomass, especially around the subject of land-use change. However, there is the potential for biomass to produce up to 10% of the UK's energy needs and our models suggest that combined with CCS it may be the single most important element in creating a cost effective and sustainable UK energy system for 2050. There has already been extensive research carried out overseas to look at the use of biomass, but nothing on the UK exclusively. These projects will analyse a wide range of biomass crops and energy conversion technologies to inform the development and deployment of effective bio energy solutions, and will also guide the ETI's bio energy strategy and help inform the UK benefits case for the sector."

The largest of the three projects is the three-year long £3.28 million Ecosystem Land-Use Modelling trial to study the impact of bio energy crop land-use changes on soil carbon stocks and GHG emissions. The project will develop a model to quantitatively assess changes in levels of carbon, nitrogen and water in soil, combined with the GHG flux which results from the conversion of land to bio energy crop production. Categorisation and mapping of this data using Geographic Information

Systems will allow recommendations on the most environmentally efficient agricultural and crop management techniques for bio energy crop scenarios. The project is being delivered through the Centre for Ecology & Hydrology, in conjunction with Aberystwyth University, Forest Research, the University of Aberdeen, the University of Edinburgh, the University of Southampton and the University of York.

Project two is the nine-month long £835,000 Biomass Systems Value Chain Modelling project, which will develop a spatial model linking bio energy crop growth with technology options for logistics, pre-processing and final use as heat, power or transport fuel. The project will develop an economic value chain optimisation framework and look at the carbon impact of sustainably developing UK biomass resources whilst converting these to various energy vectors. It will also consider the relevant agronomic, techno-economic and geographic factors associated with the cultivation, collection, processing, transmission and distribution of biomass. The project is being delivered through E4tech, in conjunction with AgraCEAS Consulting, Black & Veatch, EDF through EIFER (European Institute For Energy Research), Forest Research, Imperial Consultants, Rothamsted Research and The University of Southampton.

Project three is the six-month long £455,000 Biomass to Power with CCS project which will provide clarity on what further developments are required to better understand the biomass to power with CCS sector and what opportunities it could generate for the UK. The research will incorporate feedback from existing international demonstration projects that incorporate biomass co-firing, as well as dedicated biomass to power conversion. The project is being delivered through CMCL Innovations, in conjunction with Cambridge University, Doosan Babcock, Drax Power, EDF Energy, E4tech, Imperial Consultants, and Leeds University.

Dr Geraint Evans, Head of Energy and Fuels at the National-Non Foods Crops Centre (NNFCC), adds: "Biomass will have a major role to play in meeting renewable energy targets. These projects are important as they will seek to align the UK's agricultural and technological strengths, to develop sustainable supply chains for UK biomass. UK grown biomass remains an under used resource which has the potential to play a strong part in the future bioeconomy and in meeting 2050 targets."

Dr Jonathan Scurlock, Chief Adviser on Renewable Energy at the National Farmers' Union (NFU), said: "A wide range of bio energy feedstocks from agricultural land, including co-products like straw, perennial energy crops, and rotational crops like silage maize, can help to grow the non-food crops market without compromising UK food production. Together they can make a substantial contribution to national renewable energy goals, both in the near future and in the long term."

Professor Douglas Kell, Chief Executive of the Biotechnology and Biological Sciences Research Council (BBSRC), said: "We welcome these projects. Biomass has great potential to contribute to the UK's energy supply but we must ensure that this is done sustainably and not at the expense of food security. Projects like these are essential in order to ensure that the strength of the UK's academic biosciences community can be harnessed to make the maximum possible contribution to the knowledge-based bioeconomy and to society."

These projects bring together leading capabilities in the UK and from Europe in agro economics and crop modelling; technology assessment and development, as well as advanced economic and technology modelling.

The projects will build on the high-quality work already delivered by the UK academic sector in projects such as the TSEC Biosys Project² and the SuperGen Bio-Energy projects³, as well as leverage the work of the BBSRC Sustainable Biology Centre, the NERC Land Based Renewables programme, the Carbon Trust, the Department of Energy and Climate Change, the Department for the Environment, Food and Rural Affairs, Forestry Commission and Forest Research, the NFU and the NNFCC and others in the bio energy community; adding both an industrial and commercial edge to bio energy modelling. The UK Gallagher Review⁴ on Indirect Effects of Bio-fuels sector in 2008 highlighted that due to uncertainties in measuring

and monitoring the CO2 life cycle for bio-fuels (due to direct and indirect land-use changes), the UK will need to be more cautious in its progress towards bio-fuels. Globally, land-use change accounts for more than 20% of annual CO2 emissions.

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Notes to Editors:

For further information, please call Richard Robinson on 01509 202026.

1/ Based on the DECC pathway assessments (taken from the HMG DECC 2050 Pathways Analysis report, July 2010), a figure of 10% is well within the high and low case options for bio-supply availability from domestic resources. The actual figure will clearly depend on final UK demand in 2050, availability of land for energy production, as well as supply-chain and technology constraints (some of which will be evaluated in more detail in this project). There are clearly also questions of sustainability of certain land-use to energy crop conversions. <http://tinyurl.com/2v48tnh>

2/The TSEC BIOSYS project brought together a multi-disciplinary consortium with strong expertise in bio energy research, to explore the potential of bio energy in the UK and to influence its successful development. TSEC BIOSYS research explored sectoral bio energy demand in the UK; the spatial distribution of energy crops in the UK under current and future climates; specific supply chain costs and environmental issues and impacts and stakeholder concerns. The project reviewed and mapped the policy landscape, and is developing narratives describing the sector's evolution and prospects. These narratives explore the differing perspectives of key actors across the range of supply chains and their responses to different bio energy futures. BIOSYS research has also developed and enriched the bio energy/bio-fuels supply chains and data in the UKERC (UK Energy Research Centre) MARKAL modelling of UK energy scenarios. www.tsec-biosys.ac.uk/

3/SUPERGEN Bio energy is a consortium of academic, research and industrial organisations collectively studying the production of different types of biomass and investigating their behaviour in thermal conversion processes, with particular emphasis on the interaction and interface between production and conversion. Conversion processes are being investigated to improve their performance. Finally the bio energy products are being expanded to include transport fuels and renewable chemicals within the context of a biorefinery. A wide range of system studies are included to evaluate the performance, cost, and socio-economic benefits of a wide range of bio energy chains. www.supergen-bioenergy.net

4/The Gallagher Review examined the "indirect effects" of biofuels and whether bio-fuels cause greenhouse gas emissions and harm to biodiversity by contributing to land-use change and the effect of bio-fuel on food prices. <http://tinyurl.com/23mwu4m>

Background on the ETI:

- The Energy Technologies Institute is a UK-based private company formed from global industries and the UK Government. The ETI brings together projects and partnerships that create affordable, reliable, clean energy for heat, power, transport and the supporting infrastructure. The Energy Technologies Institute aims to develop projects that develop and demonstrate affordable, reliable, clean energy for heat, power, transport and the supporting infrastructure. This will accelerate the reduction of greenhouse gas emissions by increasing commercial investor confidence in deployment of a range of low carbon solutions. This will also increase the security of energy supplies.
- The ETI's six private sector members are BP, Caterpillar, EDF Energy, E.ON, Rolls-Royce and Shell. The UK Government has also committed to match support from four further private sector Members and is engaged directly in the ETI's strategy and programme development through its partner organisations, the Department for Business Innovation and Skills (BIS), the Technology Strategy Board, the Engineering and Physical Sciences Research Council (EPSRC) and the Department for Energy and Climate Change (DECC). The ETI's public funds are received from BIS through the Technology Strategy Board and EPSRC.
- The ETI will accelerate the deployment of affordable, secure low-carbon energy systems from 2020 to 2050 by demonstrating technologies, developing knowledge, skills and supply-chains and informing the development of regulation, standards and policy. For more information, please go to: www.energytechnologies.co.uk

