Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4
Competition Code: 1604_FS_ENRG_ENCATES4

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Camtronics Ltd Control Techniques Ltd	Ultra-efficient low-cost Gallium Nitride inverter for domestic energy storage applications	£305,139	£209,397
Project description - provided by applicants			
This project aims to prove the technical feasibility and quantify the economics of a new Gallium Nitride (GaN) invertertechnology through design, build and testing of a prototype GaN inverter for grid-connected domestic energy storage applications.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
42 Technology Ltd	Disaggregated Energy Sensing for the Smart Grid	£77,552	£54,286
Project description - provided by applicants			
42 Technology, a product design, R&D and technology development company is undertaking a feasibility studyinto the use of an innovative metering technology (which they previously developed and patented) to separatedemand from various different electrical appliances at a single metering point. The information is expected tohelp householders to save up to 6% of the electricity bills and also reduce harmful CO2 emissions with aminimum amount of additional equipment.Specifically the project will demonstrate the ability of their technology to gather the rich data required and todistinguish between different appliances being used simultaneously. This may lead to new IP being created around the way the energy used by the different appliances is teased apart.For further information please contact www.42technology.com			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Powervault Ltd	SmartSTOR	£123,470	£86,709
Project description - provided by applicants			
The UK has committed itself to the universal roll out of smart meters - 53million for all homes and smallbusinesses with 3.6million installed so far. An enabler for half hourly billing, smart meters are seen as aprecursor to smart tariffs - British Gas launching their Free Time tariff this year, exclusively targeting smartmeter customers. Designed to better align end user electricity costs with the marginal cost of procurement,time-variable pricing, be it time of use tariffs, or critical pricing (e.g. France's Tempo Bleu), is driven by theincreasing presence of variable renewable generation, e.g. wind, on our energy system. However, relying onconsumer behaviour change alone to respond to these price signals would fail to achieve the full potentialbenefits for the network, and likely entail higher energy bills for consumers. To enable customers to adjusttheir consumption to realise savings and avoid expensive peak periods, without compromising their lifestyles,requires access to load flexibility, which is intelligently controlled, can achieved optimised outcomes for allstakeholder. The SmartSTOR project will look to investigate the techno-economic opportunity available.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Intelligent Power Generation Ltd	Novel Turbine for the Optimisation of Landfill Gas in Electricity Generation	£293,714	£205,598
Project description - provided by applicants			
This project proposes the development of a novel micro-turbine for the optimisation of LFG in electricitygeneration. The project result will have direct application across all UK landfill sites producing > 80m3/hour(~2000sites), has strong export potential to the EU, and application in developing countries depending on theavailable infrastructure. Intelligent Power Generation Ltd (IPG) will develop and test at lab scale a novel 300kWcross flow turbine. By utilising a novel ceramic turbine design IPG will overcome the limitations of currentInternal Combustion Engines, used by all active UK LFG energy projects, which are unable to combust LFG atlow volumes <245m3/hour OR low methane content <30% and have a low efficiency of just 25% when methanecontent is <40%. By replacing ICE's with the XFT there will be a 63% increase in electricity generated from thesame volume of LFG thus improving UK energy security. Currently just 456 of the ~22,000 UK landfill sites areproducing electricity, by extending the operational life of projects the novel turbine produced will enable manyclosed sites with a low LFG yield to be brought back online =>providing access to an untapped energy source.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Geetec Ltd ABB Group	Proof of technical feasibility and economics of a disruptive low-cost variable speed drive technology	£303,966	£209,276
Project description - provided by applicants			
The penetration of VSDs in the drive market is growing, however, high upfront cost and long payback are majorbarriers to their widespread uptake. Geetec have developed a patented induction motor technology, with two statorwindings and a brushless rotor, that only requires a fractionally-rated inverter to achieve similar performance andefficiency as those of commercial VSDs. Its main applications include a wide range of industrial variable speed pumps,fans and compressors. This project aims to prove the technical feasibility and quantify the performance and economicsof Geetec's VSD technology through design optimisation, build and testing of a 20 kW prototype system.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Fraunhofer UK Research Ltd Synaptec Ltd The European Marine Energy Centre Ltd Systems Engineering & Assessment Ltd	Cable Lifetime Enhancement via Monitoring using Advanced Thermal and electrical Infrastucture Sensing	£160,905	£133,728

Project description - provided by applicants

Offshore renewable energy such as tidal, wave and offshore wind is an increasingly important part of the UKenergy supply. However, there are challenges when it comes to operating in an offshore environment. Cableinfrastructure can be vulnerable to being dragged or worn. Installation, repair and maintenance operations areall costly. The cable transmission capacity can limit the amount of energy taken from a device or device array.This project seeks to investigate the feasibility of two types of sensor technology measuring a wide range ofcable parameters, that can operate over the optical communications fibre that is already present in mostpower cables. These systems can provide real time monitoring of electrical performance and also the physicalcondition of offshore cabling infrastructure. The expected outcome from the project are sensor subsystemdesigns that have been validated in the laboratory and in samples of marine power cable at partner test sites.This will allow the UK team to move forward to larger scale development and testing with a core of largeindustry partners

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University of Birmingham Dearman Engine Company Ltd	LAir Dearman Engine for Power and Cooling in Confined Spaces	£296,722	£237,148
Project description - provided by applicants			
The global demand for power and cooling is ever increasing leading to increased fossil fuel consumption andCO_2 emissions. According to the International Energy Agency (IEA), the world's demand for electricity willincrease by more than 70% by 2040 compared to the levels in 2015. Also, it is predicted that the energydemand for space cooling will overtake space heating by 2060 and will exceed it by 60% by 2100 to reach10,000TWh. The project will deliver a cost-effective zero emission system for power and cooling in confinedspaces, by adapting the cutting-edge Dearman Engine (DE), a rankine-cycle expander currently powered byliquid nitrogen (LN_2) to utilise liquid air. The use of LAir instead of LN_2 provides very attractive proposition forDearman given its availability, simpler production process but most importantly its safety features. TheUniversity of Birmingham in collaboration with Dearman will develop a LAir driven Dearman engine andcorrelate its performance with LAir composition and properties from storage to exhaust.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Designcraft Ltd Cranfield University	EPICTidal: Establishing the performance implications of employing lower cost methods for the manufacture of large scale tidal turbine rotors	£178,041	£148,062
Project description - provided by applicants			
EPICTidal : "Establishing the performance implications of employing lower cost methods for the manufacture oflarge scale tidal turbine rotors"One of the costliest components in current tidal turbines is the rotor blades. This project will assess theperformance implications of adopting new cost effective manufacturing processes for large diameter horizontalaxis tidal turbines. The project aims to significantly reduce the cost of these key components thus wideningaccess to this clean renewable power generation technology. The benefit will extend both to the UK, which is aworld leader in the development of the technology and home to the largest European natural tidal resources,and to developing nations with similar abundant access to this form of energy. The team in Cranfield Universitywill undertake the assessment of the performance of cheaper, innovative, simpler and easier to manufactureblades. This project will be undertaken in partnership with Designcraft Ltd, the leading composite blademanufacturer to the UK Tidal Industry.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Heriot-Watt University Auraventi Ltd Scene Connect Ltd Findhorn Foundation College Ltd Auroville Consulting Auroville Centre for Scientific Research	SCORRES Smart Control of Rural Renewable Energy & Storage	£297,797	£253,122

Project description - provided by applicants

India has ambitious investment plans for developing solar energy to twenty times that which is currentlyinstalled in the next five years. The SCORRES project will develop replicable, commercially & technically viablesmart energy systems for rural & agricultural communities that are cognisant of the requirments of keystakeholder groups (e.g. communities, farmers, regulators, technology providers and investors). These systemswill include distributed renewable energy sources, such as solar-PV, electrical storage, system control softwareand demand managment control technology. Systems will be capable of being grid connected and of working instand-alone mode to widen acces to electricity, addressing poverty and improving lives and health. Systemcontrol technology will be developed and tailored for the Indian market by UK partners and will utiliseinnovative, patented forecasting technology. Feasibility of the smart energy systems will be assessed in twopilot trials, namely a rural village and a vegetable farm which will be deployed & managed by the Indian Partners.

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Tension Technology International Ltd Nylacast Ltd Brunel University London The European Marine Energy Centre Ltd	RCRM Reliable Connectors for Renewable Moorings	£306,268	£234,474
Project description - provided by applicants			
Wave, tidal and offshore floating wind arrays could supply a significant amount (up to 20%) of the UK's energyneeds. However, current weaknesses in mooring lines present a barrier for developers who are attempting toharness and exploit this energy source. This project is focused on investigating the feasibility of producingstate-of-the-art multi-material hybrid end and in-line rope connectors. The components will incorporate ahigher strength, lightweight corrosion resistant metal core with a high wear resistant nylon surface. To datemulti-material solutions have never been used in these components and this will enhance the in-service life ofthe ropes. This will ultimately increase durability, reliability and productivity of the energy device as well asreduce maintenance and costs whilst improving safety.			

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Nava Technology Ltd	Reducing the levelised cost of energy for silicon solar cells through a low-cost efficiency-boosting tandem technology	£298,230	£208,761
Project description - provided by applicants			
This project aims to prove the technical feasibility of a potentially disruptive technology that can reduce the LevelisedCost of Energy (LCOE) for the widely-available silicon based photovoltaic (PV) modules by >20%. Navatec has developeda solution-based nanostructured hybrid tandem technology that is printed on top of a silicon solar cell and boosts themodule efficiency by >3% (absolute value), producing more electricity from the same unit area.			

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Immaterial Labs Ltd Centre for Process Innovation Ltd Johnson Matthey PLC	Monolithic metal-organic framework materials for exceptional natural gas uptake.	£296,664	£244,610
Project description - provided by applicants			
Traditionally, the storage and transportation of natural gas requires either 1) high-compression at 250 bar(CNG), or 2) liquefaction at -162 °C (LNG). Both these methods are energy-intensive and costly. A third muchcheaper option uses a porous material to enable gas to be adsorbed at the molecular level at lower pressures.Immaterial designs and manufactures porous metal organic frameworks (MOFs). Our MOFs enable theefficient storage of gas without the need for high compression or liquefaction. In doing so, we are able to driveenormous savings in the transportation and storage of natural gas. Innovate UK funding will enable this projectto assess the technical feasibility of an industrial-scale process for the synthesis of high-value MOF materials.			

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Glass Technology Services Ltd Graphoidal Developments Ltd Swansea University	Novel C-Bond coating to enable light weighting of glass products	£291,607	£213,894
Project description - provided by applicants			
This project will adapt a new coating technology to enhance surface protection of glass to increase strengthand enabling light-weighting of flat and container glass products. UK glass production is an energy intensiveindustry consuming ~9TWh/yr, 70% of this energy is used to melt the glass in the furnace. Reducing the weightof glass products will reduce the energy required and CO2 produced during manufacture. Basic engineeringformula demonstrate a direct correlation between glass strength and wall thickness; therefore increasing glassstrength will enable product thickness to be reduced leading to associated weight savings. Being a brittlematerial, surface defects with dimensions in the order of microns can lead to catastrophic glass failure. Glassstrength will be maximised through aligning coating formulation to surface flaws, maximising crack filling &pinning potential, minimising driving force for crack propagation. In demonstrating that the coating has thepotential to strengthen glass and reduce weight of glass products by 10-15%, the project will show how thetechnology to reduce energy consumption by >1TWh and CO2 emissions by 250kT.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Dycotec Materials Ltd Sharp Laboratories of Europe Ltd University of Warwick - WMG	PHOENIX: Printable Hard carbOn Electrodes for Na-Ion batteries with eXtra capacity	£193,696	£127,333
Project description - provided by applicants			
This feasibility project enables a low cost sodium ion battery (NIB) option for Residential Energy storage (RES)to partner with PV. The project aims to transfer knowledge from the conductive ink industry into the batteryindustry and develop carbon pastes and electrodes to enable a low cost NIB as an alternative rechargeablebattery technology to lithium ion batteries. Dycotec Materials Ltd, will work with Sharp Laboratories of EuropeLtd and Warwick Manufacturing Group (WMG). Combining Sharp's NIB technology with Dycotec's capability incarbon paste formulation and WMG's large scale coating know-how, the PHOENIX project will demonstrate thefeasibility of a non-toxic aqueous based carbon paste for manufacture of a novel hard carbon anode. Enablinga low cost anode formulation and coating for a cost effective sodium ion battery technology, optimised for theRES markets.			

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Sustainable Marine Energy Ltd	PLAT-I Feasibility & Validation - Floating Inshore Tidal & River Energy Platform	£225,000	£157,500
Project description - provided by applicants			
Sustainable Marine Energy Limited (SME) is seeking funding from the Innovate UK Energy Catalyst - Early Stage- to carry out detailed design and test tank validation of a novel floating platform for the capture of renewableenergy from tidal and river currents. The primary project output will be a complete validated design of thePLAT-I (I:Inshore) platform ready for first full scale production. The first units will be demonstrated in 2 pilotdeployments in late 2017 - one in Orkney and another in Singapore - with plans for subsequent arrayexpansion. The PLAT-I platform will be integrated with other innovative system elements - mooring system,rock-bolt subsea anchoring and next generation in-stream turbine from Schottel Hydro - to form a completecommercial product offering. The PLAT-I system exhibits the potential for a transformative impact in UK andinternationally as it will be specifically designed for deployment in less energetic, lower flow deploymentlocations that have hereto not been considered to be viable in terms of strength of onsite tidal or river flowresource.			

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Coventry University Midland Pig Producers Ltd Severn Trent Water Ltd WRK Design & Services Ltd Green Fuels Research Ltd	Novel production of renewable hydrogen from animal and human waste	£298,748	£242,443
Project description - provided by applicants			
The development and upscaling of renewable hydrogen sources are a prerequisite if the UK is to effectivelyhelp solve the energy 'trilemma' of reducing emissions from electricity generation, improving security ofsupply and reducing costs. Hydrogen is seen as an alternative clean energy source to replace pollutingtraditional fuels however, 95 % of the world's hydrogen is derived from non-renewable fuels. Alternativerenewable sources of hydrogen are required. This feasibility project brings academia and industry together todevelop a combined biological / electrochemical process to convert animal and human waste to renewablehydrogen. It will focus on removing technical barriers which are limiting scale up and commercialisation.Success will lead to significant electricity generation from abundant, low value, potentially polluting wastestreams and the development of the process will open the way for the technology to be exploited in otheroverseas markets and other industry sectors such as food manufacturing and processing.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Agile Impressions Ltd E-Car Club Ltd	Storage Enabled Vehicle Charge Point (SEVCP)	£149,688	£98,120
Project description - provided by applicants			
From 3,500 electric vehicles ("EVs") sold in 2013, the UK market has surged to >76,000 sales by 2016 (NextGreen Car). Expected to account for 60% of UK new car sales by 2030, mass electrification of mobility posesconsiderable changes for electricity networks, an extra 20GW of peak demand (EFES).E-mobility innovators Agile Impressions and E-Car Club, the UK's first fully electric pay as you drive car club,designed a novel solution intended to meet the market need for EV electricity demand management - StorageEnabled Vehicle Charge Point ("SEVCP").A proposed feasibility study will undertake a complimentary package of technical and commercial developmentresearch to refine an initial concept, validate feasibility and synergise the proposition with the emerging marketneed.			

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Gnosys Global Ltd University of Southampton	Enhanced Electrical and Thermal Rating Power Cables for Renewables Connections in Developing Countries	£292,913	£238,072
Project description - provided by applicants			
This research project addresses the need to develop advanced insulation systems for use in next generationhigh voltage power transmission equipment used in on-shore and off-shore power networks in developing anddeveloped countries. Its seeks to explore and exploit the technological potential of recent findings that it ispossible to simultaneously and significantly improve the heat conduction in insulating materials alongsideenhancing the electrical breakdown strength to provide the prospect of obtaining new electrical insulatingmaterials that could revolutionise the design and operation of electrical power networks. This finding and itsconsequences are contrary to accepted scientific wisdom and its novelty offers considerable engineeringopportunity. It has massive technological potential since the thermal management of power equipment is amajor issue, particularly in connection with fluctuating power flows, as in renewables generation, and that mayoccur in the operation of future SMART Grids. It will facilitate the development of high perfomance powercables with increased current and voltage ratings and improved reliability at reduced system cost.			

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CREATIVenergie Scene Connect Ltd Centre For Agricultural Mechanization and Rural Technology - Camartec Echo East Africa Ltd University of Nottingham	Smart Biogas Networks	£255,764	£211,716
Project description - provided by applicants			
Biogas digesters transform waste organic matter into methane gas, providing a source of clean renewableenergy, a safe alternative to the pollution caused by burning wood. However construction of biogas digesters isonly a first step to providing clean energy. Maintenance is crucial; many digesters constructed are out of actionat any one time and functioning digesters are not always operated to their full potential. When digesters breakor operate below expectations, it is often difficult for households to identify and contact a technician with thespecialist skills to repair the system. This leads to biogas digesters remaining defective or completely broken,forcing users to supplement their energy supply by, or revert to, burning wood again. Failure leads tounavoidable health, financial and environmental costs and damages the reputation of biogas technology. TheSmart Biogas Network, the technological solution being explored in this project, will connect owners ofdefective or broken biogas plants across Tanzania with those who can fix them, hence improving the security ofclean, renewable energy supply with potential wider applicability across sub-Saharan Africa and South Asia.			

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Silent Sensors Ltd Centre for Process Innovation Ltd University of Bath Bridgestone NV/Europe	TYRELESS - Integrated piezoelectric Energy Havesting systems for smart truck tyre monitoring	£299,180	£250,094
Project description - provided by applicants			
The purpose of the project is to develop an autonomous & integrated sensor system for Tyre Pressure andManagement System (TPMS). Development includes; a) printed kinetic harvesting element (based onpiezoelectric materials), b) power management and sensing devices that enable real-time monitoring ofindividual tyre performance within a truck to reduce fuel costs and enhance truck safety. The novel activeharvesting elements will be co-developed by Bath University and CPI (the HVM Manufacturing Catapult).This early stage prototype consists of an EH/S element alongside a pressure sensing MCU and RfID circuitcapable of relaying data remotely without connection to the tyre. The practical work includes fabrication andtesting to understand the power that can be harvested, the operating temperature window and the lifetime ofthe EH/S transducer. The project is looking to develop a system for the lead company to exploit in the fleetoperator market and a leading tyre manufacturer long term.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
University of Cambridge Beko PLC	Development of a sustainable solid-state barocaloric cooler	£213,590	£154,360
Project description - provided by applicants			
The proposed research project is aimed at developing an affordable energy-efficient solid-state cooler that isbased on caloric materials. Switching to such affordable efficient cooling technology would reduce the powerconsumption that is required for refrigeration and air-conditioning, which is rapidly increasing in low-incomeand lower-middle-income developing countries, and would obviate the need for greenhouse gases. This wouldease the looming energy crisis, help protecting the environment, and promote the welfare and economicdevelopment of a large number of developing countries, for example by permitting setting up widespread coldchains for perishable foodstuffs, or vaccines.			

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4
Competition Code: 1604_FS_ENRG_ENCATES4

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
AND Technology Research Ltd University of Reading	Responsive Algorithmic Enterprise (RAE)	£171,430	£144,516
Project description - provided by applicants			
This project aims to develop new algorithms for energy control utilising appliance signature data from threecase-studies (a car-park, a plastic factory and a village community). The algorithms will be used for peak loadmanagement and load balancing and will be designed to rectify previously identified issues in monitored datadue when simple demand response is applied. In addition the algorithms will be able to take advantage ofsecondary power sources such as PV, wind and battery storage. This is a collaboration between the Universityof Reading using their expertise in energy data analytics and optimisation and AND Technology Research withthe expertise in energy monitoring and control. Trials will then be undertaken through simulation and testedusing energy monitoring equipment that has been pioneered by AND Technology Research. This equipment isdesigned for cost effectiveness and is targeted at the organisations operating at a meso level. In summary, theUniversity of Reading and AND Technology Research will develop predictive control algorithms for meso-levelenergy management based on the energy data available from monitoring.			

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4
Competition Code: 1604_FS_ENRG_ENCATES4

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Steama Company Ltd	Assessing the potential for smart, wireless electricity meters in off-grid Sub-Saharan Africa	£295,357	£206,750
Project description - provided by applicants			
Small distributed mini grids have long been touted as a green solution to supplying electricity across vastdistance & replacing the use of harmful fossil fuel sources to the 620m unconnected in rural Sub-Saharan Africa(SSA) , However, the inability to monitor, control & collect payment for electricity in off-grid SSA is cited as oneof the biggest barriers to the development of the mini-grid market (Energy Map;2015). We aim to design &assess the technical & operational feasibility of a low cost, ruggedized, LPWAN (Low-power wide area network)wireless smart meter & mobile payment system designed explicitly for rural, off-grid SSA. Our proposed systemutilises emerging mobile technology to connect thousands of energy consumers to minigrid electricity. Usingcloud technology, advanced data analytics, PAYG mobile payments & a range of intelligent power & dataalgorithms, our system will allow the retail of affordable electricity even in the most challenging, remotelocations. This will enable the widespread roll-out of metered electricity to rural communities, significantlyreducing the economic, health & environmental damage caused by unsustainable energy sources.			

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Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Advanced Reheat Ltd	Feasibility Study into Novel LNG Regasification Cycle	£202,810	£141,967
Project description - provided by applicants			
A feasibility study into the technical, commercial, environmental and fuel efficiency benefits arising from anovel LNG regasification cycle developed by Advance Reheat Limited. This cycle allows LNG to be reheated atan import terminal while generating electricity at 70%+ (LHV) efficiency. If implemented in the UK for all LNGimports by 2020 it would reduce total UK gas demand by 0.90% and would generate 2.5% of UK total electricitydemand. The key objectives of this study are:Phase 1 is carried out by Advanced Reheat Limited to develop the thermodynamic model of the system and toconfirm the availability of system components from existing supply chain and gaps requiring further work.Phase 2 is primarily carried out by global engineering firm Technip. They will produce a detailed technical andcommercial report of the technology including an analysis of the risks and a probabilistic assessment of thelikely installed cost of such a system.This report will act as the basis for future commercialisation of the technology and dissemination of key results.			

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Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
M Squared Lasers Ltd	Novel Gas Leak Imager for the Oil & Gas Sector	£178,058	£124,641
Project description - provided by applicants			
The ability to directly image gas emissions has significant application in areas as diverse as oil & gas, health andsafety within the workspace, environmental monitoring, security and process control. Our aim is to develop anactive, low-cost gas imager using a laser illumination source and a single pixel camera system. The imagingdevice is based compressive sensing using only a single pixel detector coupled to a spatial light modulator,similar to that used in digital data projectors. The reliance on a single pixel, rather than specialist infrareddetector arrays, means the system developed can be extremely low-cost. Crucially, it can be extended all theway into the infrared where currently no cost-effective imaging solutions are available.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Swanbarton Ltd University of Bath University of Botswana	EMBOSSA: Energy Management in Botswana and Sub Saharan Africa	£233,345	£194,857
Project description - provided by applicants			
Swanbarton, a UK SME, will lead a consortium of University of Bath, University of Botswana Clean EnergyResearch Centre (CERC) and Yuasa Batteries UK in testing the technical and commercial feasibility of a systemto support electricity consumers in Sub-Saharan Africa. The system will help householders and businesses byensuring that essential services are not interrupted by the power cuts that frequently occur in the region.			

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Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Centre for Process Innovation Ltd Dyesol UK Ltd	Surface Treatment of Perovskite Solar Cell Inorganic Titania Meso-Porous Substrates (STOPIT)	£273,473	£204,400
Project description - provided by applicants			
This collaborative early stage project focuses on investigating the potential of developing higher efficiencystable perovskite solar cells (PSC) by the improvement of the meso-porous Titania cathode substrate structuresby surface treatment processing. Various methods will be utilised to realise the surface treatments and fullyprocessed PSCs will be fabricated and tested to verify the performance and stability benefits. This collaborativeR&D project will focus on improving the efficiency, stability and processing of the PSC technology, in order tomove towards developing viable and manufacturable thin film PSCs suitable for implementation in the BuildingIntegrated Photovoltaic (BIPV) market. Building on existing perovskite PV material stack technologies; newprocess methods and the incorporation of improved electronic layers will be explored, developed and tested.The benefits will also include lower cost (<$0.2/ Wh) and an expected improved stability and scalableprocessing routes for manufacturing. It will secure a UK R&D capability with the key supplier of technology andmaterials for perovskite solar cells with the support of the HVM Catapult and its facilities.			

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Innovate UK

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Competition Code: 1604_FS_ENRG_ENCATES4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Inspection Technologies Ltd	Ureactor	£97,897	£68,528
Project description - provided by applicants			
ITL is a small and rapidly growing R&D focused company whose strategic goals are to develop andcommercialize new and innovative technologies and to see them implemented across many sectors of industry.We intend to develop a laboratory-scale bio-reactor vessel design which utilizes recent bio-technologybreakthroughs in urea enzyme production to rapidly accelerate and control the production of ammonia (NH3)from indoor animal waste streams such as pigs, cattle and chickens. The ammonia gas generated from thesewaste slurries can be safely extracted and stored for modified diesel engine power generation or sold on theopen market and additionally would detoxify an otherwise hazardous nitrogen containing waste product.The availability and installation of micro ammonia-fuelled CHP in the form of the UReactor to converthazardous waste to useful, zero carbon, low-cost energy would have great social,environmental and economicbenefits for developing countries such as Sub-Saharan Africa and South Asia.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Fraunhofer UK Research Ltd Thales UK Ltd Wind Farm Analytics Ltd	Advanced Motion systems For Intersecting Beam Implementation of Anemometric LIDAR	£220,666	£181,493
Project description - provided by applicants			
Wind LIDAR (LIght Detection and Ranging) is a technique that is used to remotely measure the wind speed andis being used throughout the wind industry from site prospecting to wind turbine control. Floating Wind LIDARhas been more recently introduced to replace expensive offshore meteorological masts, however multipleintersecting beams are required to give a true 3D wind direction and this cannot be done with today's floatingWind LIDAR designs. Existing floating LIDAR cannot adequately measure turbulence because of their divergingbeams whereas the converging beam LIDAR offers this capability which is critical to appropriate wind turbinetype selection. This project seeks to investigate the feasibility of constructing an advanced motion control thatcan enable multiple Wind LIDAR beams to be intersected even when operating in the open sea from floatingplatforms. This enhancement of details will lead to more accurate turbine performance assessment,optimisation and also offer the opportunity to investigate and monitor what are the actual wind profiles hittingthese enormous offshore structures by offering volumetric 3d wind mapping.			

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Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Extreme Low Energy Ltd Lancaster University	Extreme Low Energy Server Cooling	£208,044	£176,227
Project description - provided by applicants			
ICT infrastructures are responsible for a significant proportion of electricity consumed, exceeding 1560TWh andcorresponding to ~8% of the global demand. The energy usage of datacentres has a growth of roughly 11% peryear over the last decade. However, in datacentres, IT equipment only uses half of the total energy, with theremaining 50% used for cooling and electrical power. The dominating factor is the mechanical cooling plantprovided by convection fans, accounting for 33% of the energy consumption. This study will systematicallyassess the feasibility of an alternative air moving system using piezo actuators for DC based server cooling incomparison to conventional fan technology for server cooling in datacentres. The combined technology ofusing alternative air cooling and DC power will significantly reduce the demand of electricity required from ICTinfrastructures and the cost of operating such systems, cutting the energy use for server cooling byapproximately three quarters compared to the conventional technology. The disruptive innovation will also becommercially analysed against business as usual to facilitate the realisation of its potential.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Frontier Technical Ltd Howell Marine Consulting Ltd Tarmac Trading Ltd University of Strathclyde University of Sunderland Enterprises Limited The Council of the City of Sunderland	MARLIN Modular Floating Platform for Offhore Wind: Concept Assessment	£299,938	£242,948

Project description - provided by applicants

Floating offshore wind in deep waters is a massive renewable energy resource ready to be tapped into toachieve carbon reduction targets. Prohibitive costs and advanced infrastructure requirement have limitedgrowth of this sector even in developed countries. In developing countries the resource has remained entirelyunexploited. Project MARLIN aims to test feasibility of a new cost-effective universal concept of modularconstruction of floating platforms for offshore wind. Using the concept of compact easily transportablemodules as building blocks, the MARLIN team will design, construct and test models and prototypes ofstructures that will be capable of supporting wind turbines in all weathers in most of the coastal regions of theworld. The modular floating platform technology will be developed for commercial exploitation and will formthe basis of a new UK-based business. Beyond contributing to carbon targets the outcomes of the project couldhave transformative economic effects on coastal communities across the world.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Tide Mills Ltd Mojo Maritime Ltd CSB Consilium Ltd Coastal Science Ltd Community Energy Plus Mylor Ventures Limited University of Cape Town	Tide Mills UK & Africa (TiMUKA)	£299,098	£195,441

Project description - provided by applicants

The UK was once home to over 200 tide mills, which used water mills driven by flood and ebb tides, in a similarway to inland water mills. Indeed, the first generation of tidal energy is thought to date back to 60AD, at a siteon the Thames. The TiMUKA - Tide Mills UK & Africa - project is designed to enable the restoration of historictide mills in UK, using technologies and civil engineering installation methods that may also be used to installadvanced tide mills in developing countries, starting in Sub Saharan Africa. The project will draw on ground-breaking work by UK leading tidal energy experts, Tide Mills Limited supported by Mojo Maritime, in achallenging programme designed rapidly to deliver clean, renewable and predictable tidal energy at communityscale to coastal communities, starting in the UK and Africa, but ultimately world wide.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Sensor Works Ltd Fraunhofer UK Research Ltd	SMART-NoDE: Sensor Monitoring And ReporTing	£190,300	£161,368
Project description - provided by applicants			
The offshore wind power generation industry is critically dependent upon high capital-cost turbines. Suchassets are required to operate over long periods of time, often in harsh conditions and high stresses, withminimal maintenance. The ever increasing size, complexity and remote location of wind turbines results inmaintenance contributing a significant proportion of the cost-per-unit generated. The industry needs sensorand digital technologies to provide a route to faster and better maintenance decision-making boosting safety,productivity and efficiency, and helping to maintain profitability. At a time of lower prices, revenues and capitalspending, sensor technologies combined with data analytics stand out as a leading contributor for reducingcosts. Data driven analytics can be employed to detect when equipment is going to fail, or can be used to runthat same equipment close to design capacity, to maximise asset use. We propose an intelligent sensortechnology that complements our existing vibration measurement expertise with lubricant analysis: a potentpredictive data analytics tool which will bring advanced asset management to the industry.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Lontra Ltd	PowerBlade - Blade Compressor Concept Exploration for Power Generation Feasibility Study	£297,056	£207,939
Project description - provided by applicants			
10-12% of all power generated in the UK is used for compressed air. Air compressors are heavily relied uponwithin the Power Generation industry in many ways that impact on the energy trilemma. The Powergenindustry requires reliable, efficient, low cost compressor technologies to (1) Minimise C02 emissions of thepower generation operation itself (2) Avoid wasting energy that could be sold (3) Assist in making renewables aviable and reliable solution. LONTRA'S innovative and proven Blade Compressor® concept has demonstratedefficiency gains of >20% with better reliability compared to lobe compressors in wastewater treatment. Thisoffers significant savings to the Powergen industry.This project will explore the technical and commercial feasibility of a new version of the Blade Compressorconcept to address the needs in Power Generation further advancing energy efficiency & affordability, andinitial exploration for compressed air energy storage. This will be achieved through a scaled design of the BladeCompressor® concept, mathematical modelling including temperature and pressure limits.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Trusted Renewables Ltd Active Development Ltd University of Hertfordshire	DAEDALUS: Reaching the sun with solarcoins and smart solar panels	£297,387	£244,083
Project description - provided by applicants			
India is now a middle income country but local electricity grids are unreliable and outages can last severalhours. We explore innovative business and financing models for rooftop solar panels and local storage whichcan replace diesel generators and improve access to clean reliable energy. With reducing panel costs, feed-in-tariffs and net metering subsides are falling. However, installations need funding and we consider howblockchains and cryptocurrencies such as SolarCoins can reward investors or repay loans. These may also helplocal enterprises securely trade solar power in new ways. A key enabler is a smart card chip added to a solarpanel which can be linked to distributed ledger technology to track large numbers of assets. They can alsoprevent fraud such as diesel generated power being claimed to be renewables. We will build a test-bed atUniversity of Hertfordshire to demonstrate benefits of cryptocurrencies and distributed ledgers along with oursmart solar panel hardware. We use this to share technical skills and expertise with local partners in SouthAsian or sub-Saharan African countries of interest to DFiD.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Ocean Flow Energy Ltd Stellenbosch University	STARFLOAT - multifloat-spar for enabling the economic exploitation of deep water wind	£122,224	£93,978
Project description - provided by applicants			
Floating foundations for offshore wind turbines will allow wind farms to be built further offshore in the deeperwater that exists around the Atlantic Margins of the UK, Europe and southern Africa. For this market to berealised innovative floating foundation solutions are required to arrive at costs of energy that are competitiveor can better the economics of nearshore wind farms that employ fixed foundations. The Starfloat solutionproposed by Oceanflow Energy involves a novel multifloat-spar structure employing an innovative cost cuttingbuild, assembly and deployment process to allow the economic exploitation of deeper water wind farm sites. Inmany parts of the world and particularly off the south west coast of Africa scarcity of fresh water is a threat tothe existence of communities and an obstacle to their economic development. Placing reverse osmosis freshwater generating plant offshore powered by electricity from wind energy could displace expensive diesel drivenRO plant. This feasibility study is to demonstrate the viability of the platform technology for economicelectricity production and fresh water generation depending upon the needs of the community.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Element Energy Ltd SSE Energy Supply Ltd	Engaging Household Energy Savings and Demand Response Opportunities	£293,447	£185,519
Project description - provided by applicants			
Smart meters are being rolled out widely in GB and internationally including many developing countrieswhere smart meters are being used to combat prevalent electricity theft and losses. With smart meter databecoming available to consumers online, there are valuable new opportunities to engage households in energysaving and demand side response, which are not currently captured. This project will examine the technicalfeasibility of a new type of online display that will provide real-time comparative feedback on consumption (i.e.how real-time consumption compares to the historical consumption of similar households at that specific timeof day and season shown to deliver as much as 6% savings) as well as a direct DSR engagement and real-timepeak reduction comparative feedback facility (to encourage and reward households that reduce their demandwhen requested e.g. in response to intermittent renewable generation and electricity network loadingrequirements). This innovative project will be the first time this is applied in a real-time context with thepotential to reduce household electricity bills, increase network stability and support renewables connection.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Perlemax Ltd University of Sheffield Cambridge Carbon Capture Ltd	Enhancing the Methane Generation from Food Waste Anaerobic Digestion Mediated by Fluidic Oscillator Generated Microbubbles	£279,789	£219,922
Project description - provided by applicants			
As a society, we are wasting a lot of food with global food wastage estimated at 2 billion tonnes p.a. Growingpopulation and the growth of the middle class is only going to increase this problem. That which cannot berepurposed as animal feed is mitigated using appropriate waste treatment facilities. One of these strategies isto use an airtight container to let microbes degrade this waste into biogas(predominantly a mixture ofmethane(CH4)+CarbonDioxide(CO2) and other gases in minor amounts) and manure in an oxygen freeenvironment in a process known as anaerobic digestion(AD). This process is relatively clean, generates biogaswhich can be used for energy generation and reduces the greenhouse gas emissions due to uncontrolledrelease of methane in the landfill.Our proposed solution enhances this process by periodic sparging of CO2microbubbles in order to increase the CH4 yield by 110%. It is also planned to sweeten (separate CO2) thebiogas released by mineral carbonation mediated by microbubbles. Increase of process efficiencies via totalprocess integration at site is another objective making this project an inherently sustainable energy solution.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Africa Power Ltd divi LLC University of Southampton	Low cost, graduated PAYG solar home systems for Africa	£299,992	£231,867
Project description - provided by applicants			
Africa Power is developing an affordable, upgradeable SHS product line for off-grid rural African households,and conducting initial beta testing in at least two countries, beginning with Tanzania and Zambia. Unlike otherSHS in the local market, these low-cost systems require zero deposits and are fully upgradeable to include moreappliances once the basic system is paid off, enabling even the poorest households to climb the Energy Ladderover time. All systems are integrated with a portable PAYG key-fob, an innovation that manages payment anddata collection, using Bluetooth technology for transmission in remote, low/no-connectivity areas. With ourresearch partners we will further conduct a feasibility analysis for developing higher-powered solar systems toallow the productive use of power for all sectors in an off-grid community, including businesses and communityfacilities such as schools and health clinics. The reduction of costs as well as our proven distribution modelthrough our established local partners, will enable Africa Power to create scalable and viable power distributionservices in Sub-Saharan Africa reaching 300,000 off-grid households in 5 years.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Fraunhofer UK Research Ltd Wind Farm Analytics Ltd Renewable Advice Ltd	Blade Integrated Optics For Offshore Wind LIDAR (BIOFOWL)	£270,860	£228,962
Project description - provided by applicants			
This project seeks to explore the technical feasibility of incorporating remote laser wind measurementinstrumentation within the interior body of wind turbine blades, including use of blade LIDAR windowsconformal to the existing blade shape. This will pave the way for wind turbine integrated intersecting beamlaser wind measurement - a technique that will enable incoming wind profiles to be measured withunprecedented detail - this is of great importance when it comes to optimising and protecting the massive windenergy generating assets that are being installed offshore and onshore around the UK, enabling the UK toreduce further its reliance on fossil fuels and offering export opportunities to a long term global growth market.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Natural Synergies Ltd Practical Action Blue Vine Consulting Ltd University of Strathclyde	Robust Decentralised Low Energy Faecal Sludge Dewatering leading to Sustainable Energy Resource, Sanitation ,and Clean Water	£297,982	£235,665
Project description - provided by applicants			
Natural Synergies (NS) together with partners University of Strathclyde, Practical Action and Blue VineConsultants are involved in a project that concerns faecal sludge dewatering/treatment leading to energysecurity/generation, sanitation utilising locally available resource and GHG emission savings. NS aims in thistechnical/financial feasibility study is to develop stand-alone dewatering process for rural UK/EU, increasingenergy efficiency/generation, reducing transport costs/carbon footprint and in developing countries (DC) as alow cost faecal sludge management using for decentralised/localised sanitation and in both cases leading to anintegrated AD based off-grid energy generation, localised sanitation with clean pathogen free water andsustainable fertiliser. The system once developed will aim at reducing cost of water treatment in UK/EU forsavings to be passed on to the end-user; whilst in DC it will encourage creation of an entrepreneurialpartnership, womens empowerment and security in the overall FSM supply chain and towards non-specialisedcomponent manufacture if possible using local industries leading to job creation in the UK/EU and in DC.			

Note: you can see all Innovate UK-funded projects here
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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4
Competition Code: 1604_FS_ENRG_ENCATES4

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Woodview Technology Ltd Wood Group Kenny UK Ltd University of Leeds	Corrosion Prediction in Residual CO2 Streams: Shifting the Paradigm	£183,244	£132,732
Project description - provided by applicants			
Cost-effective Carbon Capture and Storage (CCS) offers one option for meeting the goals of the ParisAgreement, reached at COP 21 in December 2015. Whilst there have been major efforts to developtechnologies for capture and storage, transportation between the two points has received less attention todate. The behaviour of dense phase and supercritical CO2 mixtures containing a large amount of possibleimpurities is not well understood. Accurate predictions of the physical properties and corrosion potential ofthese mixtures will be needed for the cost-effective design and operation of both capture and disposal systems.The overall goal of this project is to improve the predictive tools for both physical properties and corrosionrates and to demonstrate their accuracy against laboratory and field data in order to increase the confidenceand gain industry acceptance of the predictions being made. An experimental framework will provide thenecessary inputs for the corrosion-related aspects of the model, whilst the phase equilibria model will enableexact conditions to be described.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Phycofeeds Ltd Cranfield University	Solar Oil	£90,000	£75,000
Project description - provided by applicants			
Phycofeeds provides sustainable and carbon neutral biofuel and base inputs to food commodities fromsunshine, waste and algae. Our newly developed technology has the capacity to transform and revolutionisethe biofuels and aquatic biomass food provision industry. Phycofeeds uses freely available solar energy, veryhot and pressurised water, heat processing and nutrient recycling in order to convert aquatic waste andbiomass into biofuels and nutrient rich waste water. Our technology is used to recycle waste, grow algae anduse the sun to make fish feed and biofuel. We do not use fossil fuels, and we recycle our water for completesustainability - our technology has not been used before. Through this process, Phycofeeds simulates naturalenergy formation and carbon allocation in a sustainable pathway, as designed, and neatly performed by nature.			

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Innovate UK

Results of Competition: **Energy Catalyst - Early Stage - Round 4**
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Participant organisation names	Project title	Proposed project costs	Proposed project grant
CO2i Ltd Green Fuels Research Ltd May Barn Horticultural Consultancy Ltd	DryGro Energy Crops	£275,102	£192,572
Project description - provided by applicants			
The DryGro Energy Crops (DEC) project will develop a way of producing biofuels on land that is currently tooarid to support crops. Using the DryGro system that reduces the amount of water required to produce biomassby 99% compared to conventional agriculture, DEC will explore the production of biofuel in Kenya and examinethe potential for application in other arid areas.A detailed Life Cycle Assessment and Integrated Sustainability Assessment will be undertaken to determine thesocial, environmental and developmental impact of this approach. It is anticipated that the DEC approach willreduce the negative impacts on food production, water security, biodiversity and land tenure associated withexisting biofuel production methods.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
The Sustainable Home Survey Company C.I.C.	NUFIS - Natural Under-Floor Insulation System	£197,300	£138,110
Project description - provided by applicants			
SHS is an energy advisory organisation that has delivered 15,000 assessments and energy efficiencyinterventions (~120,000 tCO2 savings) under the ECO scheme and has developed innovative retrofit solutions.Working in the energy efficiency industry over the last 5 years we identified a large untapped opportunity:Domestic space heating accounts for 15% of current GHG emissions. Up to 25% of a home's heat loss exitsthrough the ground floor (Pelsmakers, 2016) this affects 6.5 million homes in the UK (EHS, 2012). Traditionalfloor insulation has not become widespread due to the a) high upfront costs (£4-5k); b) high disruption (3-4weeks); c) lack of suitable thermal insulation product.To address this, we developed an innovative, low-cost "Natural Under-Floor Insulation System" ("NUFIS") that:i) eliminates structural disruption; ii) cuts costs by speeding up the installation; iii) uses nature-based, ECOfriendly thermal insulation material; and makes underfloor insulation accessible to the mass market.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Deciwatt Ltd	GravityLight - creating an affordable and viable off-grid energy solution	£199,844	£139,891
Project description - provided by applicants			
This application is to establish the TECHNICAL FEASIBILITY of a novel, off-grid and low cost human-poweredlighting solution: GravityLight. GravityLight offers RENEWABLE, RELIABLE AND LOW COST light, specificallydesigned for users in developing countries with little if any access to grid power, using kerosene lamps for lightinstead. GravityLight is an innovative solution using a suspended mass (a bag filled with readily availablematerials eg. rocks) mechanically connected to a bespoke gearbox, generator and high efficiency LED light. Theuser lifts the suspended mass to obtain instant light anytime.Testing the GravityLight proposition has confirmed it's potential but also highlighted key R&D questions,limiting its market potential. This project uses 2 stages of primary research: 1) user feedback to define the costtargets and system requirements (eg. brightness, duration and power requirements); 2) stress testing geartrainmaterials and evaluation of brushless motor technology to evaluate the feasibility of increasing the longevityand performance of GravityLight and significantly reducing its size to deliver a lower technology cost.			

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Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Power Migrations Partners Ltd KERA-Charity	Using Energy Storage to Help Climate Change Victims and to Stop Modern Slavery	£254,150	£150,760
Project description - provided by applicants			
Power Migration Partners Ltd (PMP), which is a British technology startup, has invented a novel flow batterytechnology that is low-cost, long-lasting and easily scalable. This is called the graphite-sulphur Single-Liquid(SLIQ) flow battery. PMP has formed a consortium with KERA-charity which is a south Asian charity based in SriLanka, to carry out R&D and to assemble a trial feasibility prototype of a multipurpose Emergency EnergySupply Unit (EESU) to support disaster relief efforts. When not used as an EESU, this system will be used as anenergy storage system in a Solar PV powered computer training lab to teach essential computer & Englishlanguage skills to plantation workers, especially for women and children who are unfortunately being used bylarge plantation companies as modern day slaves. The end result of this project has the potential to savehuman lives, especially in developing countries. The project will be finished within 1 year. While supportingsome of the poorest and most vulnerable people on planet earth, this project will open up a marketopportunity exceeding £2.6 billion for British businesses by 2020 using a strategic business model			

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Innovate UK

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Competition Code: 1604_FS_ENRG_ENCATES4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Blue Vine Consulting Ltd Aceleron Ltd ALP Technologies Ltd	Zero Emission Vehicle Battery Remanufacturing for Energy Storage Applications (Project ZEBRA)	£246,315	£172,420
Project description - provided by applicants			
Each year in the European Union 9 Million Tonnes of End of Life (EoL) automotive waste is created. Theintroduction of EVs into the waste stream will have a significant impact on this by introducing large volumes ofEoL battery packs. The current method of disposal of automotive batteries is to break them down to a materiallevel, a process that is wasteful and energy intensive. This project, involving Aceleron, Blue Vine Consultantsand Alp Technologies will demonstrate that these EoL automotive batteries can be safely disassembled, testedand rebuilt into ES devices. These devices can be used in the developing regions to store electricity at low cost.Often in developing regions electricity is unreliable, or solar power is used, meaning at night no power isavailable. The ES device developed in this project will improve the lives of people who do not have regularaccess to electricity. In this project the battery packs will be demonstrated by Alp Technologies.			

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Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Solapak Systems Ltd Great Lakes Energy Ltd Trade Without Borders (HK) Ltd Iota Electronics Ltd University of Southampton	Efficient VERsatile Energy Services Solution Through DC - EVERESST DC	£257,402	£200,196
Project description - provided by applicants			
EVERESST DC promotes a DC Micro-Grid Platform (DCMGP) (or system) encompassing a unique product andbusiness solution for organisations seeking to provide modern energy services into energy-poor regions. Oursolution is not just hardware, it is a partnership approach to modern energy access that actively engages endusers and stakeholders to encourage efficiency as a natural way of modern energy life.			

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Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Solaris Photonics Ltd Thin Metal Films Ltd Cranfield University	Development of Low Cost Alkaline Solar Cells	£299,661	£238,212
Project description - provided by applicants			
Photovoltaic (PV) devices are one of the major green alternatives for low carbon, clean and renewable energy.The conversion efficiency of solar power into electricity using PV technology is currently limited owing tounwanted heat generation and higher production cost. The innovative alkali thin film PV technology (APVspatented by Solaris Photonics) promises to overcome these problems, and its development could meet theessential objective of lower cost electricity generation with higher efficiency (14-30%). The current proposal isfocussed on continuing to develop the APV to obtain an optimised functional prototype which delivers highefficiency whilst ensuring durability and long lifetime. The project aims to fabricate high efficiency low-costpre-industrial prototype alkali PV cells utilising thermal evaporation deposition, switching to an all sputteringmanufacturing process in the long term. The proposed APV technology could become highly competitive withthe cost of conventionally generated electricity at point of use.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Ubuntu Power Ltd	African off-grid solar power and mobile connectivity	£535,000	£200,000
Project description - provided by applicants			
Ubuntu Power is a socially driven business focused on providing affordable solar power and unrestrictedInternet to off-grid communities in Sub Saharan Africa, starting with Kenya.Our mission is to kick-start a virtuous cycle of economic growth in underserved communities by providing themwith two of the most pivotal and empowering services: Clean and affordable electricity and greater access toinformation			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Big Solar Ltd The Energy & Resources Institute (TERI)	Feasibility Study for an Off-Grid, Cutting Edge, Low Cost PV Product	£175,134	£143,612
Project description - provided by applicants			
Over 1.2 billion people globally are without access to electricity. Whilst the take up of photovoltaic (PV)modules has expanded dramatically from 6GW in 2009 to 58GW in 2015, the level of adoption in off-grid ruralareas, particularly in India, SE Asia and Africa has been very low, primarily due to prohibitively high cost andweight limiting take up in remote locations. Big Solar Limited (BSL) is developing Power Roll, a groundbreaking flexible, ultra- lightweight and ultra-low cost solar PV product. Power Roll is a unique PV technologythat will allow consumers to generate renewable energy at a cost cheaper than carbon based technologies andsignificantly less expensively than other PV technologies. Power Roll will be manufactured at a fraction of thecost of, and is up to 50 times lighter than current PV products, allowing for mass take up in off grid areas. BSLhas been successful in proving the concept of the Power Roll design and architecture. This project is focussedon the development of applications that will address the needs of rural off-grid communities in the Indian andSE Asia markets. BSL is working with The Energy and Resources Institute (TERI) an Indian partner on the project.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Senseye Ltd	Automated diagnostics for Solar enabling 'power by the hour'	£79,924	£55,947
Project description - provided by applicants			
This early stage feasibility project is to research and evaluate the application of IoT-inspired machine learningtechnologies to perform automatic diagnostics, improving the efficiency and productivity of solar sites. Inaddition, a new business model potential enabled by this high level of automatic will be investigated.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Gamos Ltd Loughborough University University of Surrey	eCook - a transformational household solar battery-electric cooker for poverty alleviation	£269,134	£228,721
Project description - provided by applicants			
The project proposes examining in greater detail the feasibility of using solar electric cooking (eCook) in Africa.The proposition is that if the current downward trends in solar photovoltaic technology costs and in energystorage costs (specifically lithium iron phosphate batteries) continue, then by 2020 a system sized for cookingwould have a lifetime monthly cost comparable to the monthly spend on biomass (mainly charcoal) made by asizeable proportion of biomass users. Biomass based cooking is a root cause of acute respiratory infectionswhich leads to millions of deaths per year. It is also a contributor to climate change emissions, and a cause oflocal deforestation with wider impacts. Increases in urban populations are leading to increases in charcoalprices; globally some 300 million households currently spend more than $10 a month on biomass fuel.Sustainable Development Goal 7 calls for 'access to affordable, reliable, sustainable modern energy for all' by2030. The strategic use of solar photovoltaics and batteries for cooking would be a gateway enablinghouseholds to convert their current biomass expenditure into decentralised electrical infrastructure.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Tetreon Technologies Ltd University of Oxford	Novel Gas-Phase Texturing of Silicon with Ozone-HF	£90,524 £41,779	£63,154 £41,779
Project description - provided by applicants			
This project is a collaboration between a UK based SME manufacturing industrial tools for silicon solar cell production and the semiconductor research group at the University of Oxford. The objective is to improve the optical performance of multicrystalline silicon solar cells. Due to its cost advantage multicrystalline is currently the dominant material for the manufacture of solar cells, accounting for more than 60% of total production. However the performance of multicrystalline devices is lower than mono-crystalline equivalents. Perhaps the biggest cause of this difference is the lower optical performance of multicrystalline cells, due to a less effective surface texture. This project will develop a new, gas-phase texturing process to significantly improve the surface texture of multicrystalline silicon solar cells and improve their power output. This process will be cheaper, cleaner and more effective than current approaches.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
University of Sussex	Electrical and thermal storage optimisation in a virtual power plant	£80,083	£80,083
Durham University		£52,741	£52,741
Moixa Technology Ltd		£83,491	£58,444
Sunamp Ltd		£67,004	£46,903
UK Power Networks Services (Commercial) Ltd		£5,000	£0

Project description - provided by applicants

Energy storage is currently receiving great attention from policy-makers, industry as well as research institutions, as it is considered one of eight great technologies for the future of energy. Combining electricity and heat for minimising cost and emissions in future networks is an emerging research field. Sussex researchers have tested the use of advanced systems to optimise use of electricity and heat, but energy storage was not part of that system. Building on combined electricity and heat, a storage-enabled system groups together the capacity of electrical and thermal energy systems as one large flexible “power plant” for balancing demand and supply in a cost-efficient way. This project will focus on energy storage for electricity and heat, with the possibility of adding more in future research. The challenges this project will address are: (i) feasibility assessment of the proposed storage control techniques through realistic simulations, (ii) deriving functional requirements / specifications of storage controller software & hardware, (iii) testing the feasibility of lab-based storage control implementations.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Gasconsult Limited	Development of the ZR-LNG Process for Mid-scale liquefaction and monetization of stranded gas reserves	£300,000	£210,000
Project description - provided by applicants			
GASCONSULT LIMITED has developed and patented a new natural gas liquefaction technology, Zero Refrigerant LNG (ZR-LNG). The technology is highly differentiated; unlike competing processes it uses no external refrigerants, relying on use of the natural gas feed in an optimised system of expanders to effect refrigeration. This eliminates certain process equipment reducing cost and footprint. Make-up refrigerant is low cost natural gas as opposed to imported nitrogen or a cocktail of liquid hydrocarbons making the process particularly suited to remote locations and less developed economies. The ZR-LNG system is highly efficient, almost equal to sophisticated base load dual refrigerant processes and fully 30% better than the dual nitrogen expander process. These unique features offer the potential to monetize otherwise stranded natural gas. Innovate UK has awarded Gasconsult a grant to permit engineering development of the ZR-LNG concept for a coal bed methane prospect in Botswana. Thereafter it can be considered for the many new LNG projects expected to be developed world-wide in the coming decades.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Engas (UK) Ltd	Affordable biomethane production, storage, and refuelling kit for the world markets.	£192,617	£134,832

Project description - provided by applicants

Engas UK, a startup in Horsham, West Sussex has developed a disruptive compact, gas purification system that will now enable farm-scale anaerobic digestion (AD) plants to offer value added services, e.g. transport fuel production, energy storage for matching the electricity demand with instant supply, and using the by- product CO2 into greenhouses to grow more tomatoes. This innovation will build capabilities in the UK and help to create new business models for farm scale AD sector that was not possible by using current imported technologies from the EU. These innovations will significantly improve the financial return from farm AD plants without government subsidies. Engas has partnership for manufacturing of their novel purification system to produce 98% pure bio-CNG fuel and 95% pure Bio-CO2 at 70% lower cost and at 50% greater efficiency. Engas will build a 25Nm3/h of gas purification unit under this project. Engas will also export this technology to India to convert waste generated from 50,000 fruit & vegetable markets into bio-CNG fuel. Engas has formed partnerships in India and received financial support from the Indian Government.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
AltEnergis PLC Swansea University	AltEnergis self-charging portable power pack technical feasibility study	£170,340 £99,861	£119,238 £99,861
Project description - provided by applicants			
Piezoelectricity is a growing area of energy generation within micro-electronics, where electricity is generated at no cost from stress, strain, movement and vibrations. The market for piezoelectric devices is highly diverse but traditionally, target applications have relatively high power consumption, and piezoelectric devices have only been able to produce small power outputs which have limited their potential. Our technology is able to offer a hundred fold increase in energy generation over traditional piezoelectric devices, it brings about new opportunities to use piezoelectricity viably in such an application.This also overcomes challenges affecting the battery industry mainly surrounding the safe and environmentally-friendly recycling and disposal of any electronics with a battery fitted - as our device will help reduce the reliance on the usable life of a battery as they can create their own charge perpetually.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Cambridge Carbon Capture Ltd	Zero Emissions H2 from Natural Gas	£177,004	£123,903
WRK Design & Services Ltd		£115,000	£80,500
Don Bosco Technical College		£7,999	£7,999

Project description - provided by applicants

The hydrogen economy is seen as one of the curcial ways to decarbonise transport and domestic and industrial heat. However, bulk hydrogen will be needed to fuel the hydrogen economy so a means of producing hydrogen with zero emissions is needed if there is to be any environmental benefit. This project is looking at the feasibiliy of producing bulk hydrogen from natural gas which is converted to hydrogen and CO2 using a Steam Methane Reformer, then using Cambridge Carbon Capture Ltd's Patented CO2LOC CO2 capture and mineralisation technology to strip out the CO2 and convert it to a commercially useful mineral by-product. The commercial focus of the project is to produce a zero emissions H2 refuelling station for fuel cell vehicles thereby providing vital refuelling infrastructure removing a significant barrier to the uptake of these types of vehicles.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Glass Technology Services Ltd Swansea University	Enabling CO2 sequestration using Proppants Optimised for Pure Propane Stimulation: ECO PrOPPS	£203,078 £92,941	£142,155 £92,941
Project description - provided by applicants			
The 'Enabling CO2 sequestration using Proppants Optimised for Pure Propane Stimulation' project, ECO- PrOPPS, will build upon existing patented proppant technology (developed under IUK project 'Glass PrOPPS') to develop functional glass proppants which can be 'activated' on-demand to seal up a shale gas well at the end of life, as such enabling the well to be used as a store for significant volumes of CO2 gas (potentially up to three times the CO2 generated by combustion of the methane extracted). The glass proppant will be designed to be compatible with 'pure propane stimulation' (PPS), offering many benefits over conventional water-based fracking, one of which is the reduced damage to the shale rock thus maximising the potential for CO2 absorption. If successful this technology could enable 'carbon-negative' energy plants.		

Note: you can see all Innovate UK-funded projects here
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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Biopower Technologies Limited	CAKEFUEL - Production of clean sustainable fuel from Sewage	£45,586	£31,910
Imperial College London		£149,997	£149,997
Efficiency Technologies Limited		£153,261	£107,283

Project description - provided by applicants

CAKEFUEL is an innovative approach to produce a carbon neutral sustainable clean fuel derived from sewage sludge and cake. The critical aspects of the project involve the removal of toxic heavy metals, recovery of useful elements, treatment of biological hazards and the creation of stable emulsion fuels for use in power generation. Sewage fractionation enables a lower energy solution to address the needs of production of sustainable fuels, reduction of environmental hazards, and a global application. The CAKEFUEL solution will be capable of being integrated in a 2MW CHP off grid solution to enable application both within the UK and in the developing world.

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Cranfield University	Production of liquid fuels through pyrolysis conversion of low-grade plastic-rich wastes	£94,974	£94,974
Syngas Products Group Limited		£171,336	£119,935
WestAfricaENRG Ltd		£33,673	£16,837

Project description - provided by applicants

The technology proposed here will contribute to all aspects of the energy trilemma as well as offering a community-scale solution for waste management. This project will investigate, process model and validate a further step being added onto an existing Advanced Thermal Treatment (ATT) plant, post-pyrolysis, which will enable valuable products to be recovered. These products will include liquid fuels, and the work described here will build on a process model developed during a round 3 Energy Catalyst project, validated through pilot- scale pyrolysis trials of specified waste materials. The stored fuels opens up the opportunity of stored fuels for local use derived from low-value, but ever-present, materials. The objectives of this project are to: 1) determine the types and abundance of plastics available in feedstocks, 2) model and validate the chemical composition of the feedstocks and the conversion to condensed liquid outputs, and 3) develop a business case for commercialisation of the liquid fuels and chemical products in both the UK and in Nigeria. This proving process will help unlock further investment and ensure that the UK is at the forefront of flexible ATT processes.

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Fleet Renewables Ltd	Lowering Civil Engineering Costs for Pumped Hydro Storage	£73,004	£51,103
University of Exeter		£110,132	£110,132
G&T Technology Ltd		£86,694	£60,685

Project description - provided by applicants

Energy storage is highly topical in the industry at present and solutions which can reduce the cost while increasing the reliability and longevity of the storage system are desperately needed in order to facilitate the roll out of renewable energy technologies. Pumped hydro storage has been used for a number of years and at various scales to balance a mismatch between the supply and demand of electricity. The wider deployment of pumped storage is limited though as the civil engineering costs can be prohibitive or if the local topography has insufficient vertical separation between reservoirs, the storage capacity can be too low to make the scheme viable. This project proposes to develop a concept which would significantly reduce the cost of pumped hydro systems and could greatly increase the number of sites where the technolgy could be deployed.

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Blue Tech Ventures T/A Marine South East (Commercial)	OPEC - Offshore Platform for Enery Competitiveness	£71,923	£50,346
Offshore Renewable Energy Catapult		£29,996	£29,996
Houlder Limited		£30,521	£18,313
Beckett Rankine Limited		£37,564	£26,295
Stellenbosch University		£46,300	£46,300

Project description - provided by applicants

It is acknowledged that foundations costs impose a large cost burden on today's offshore wind and wave energy systems. The OPEC project is addressing the critical cost by advancing a novel concept that would replace traditional foundations, and achieve a 20% reduction in the cost of energy produced by these systems. OPEC comprises a large floating structure, fabricated cost-effectively in reinforced concrete modules, designed to support multiple wind and wave devices and also aquaculture facilities. This sharing of foundation costs across multiple facilities means that unit costs are significantly reduced. The project is also exploring deployment of such systems in developing island states and isolated coastal communities, which currently suffer from very high electricity costs, and which would benefit economically from new aquaculture production. Such deployment would also provide valuable demonstration of OPEC, to enhance it credibility to investors in UK and other developed markets.

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Rotaheat Limited Cranfield University	Technical feasibility study to scale thermal heat generator	£128,114 £90,151	£89,680 £90,151
Project description - provided by applicants			
Heat is a basic need of society, accounting for approximately half of all energy consumed. Heat is traditionally generated through the combustion of fossil fuels. Zero carbon solutions to heat have limited adoption, in part due to issues in successfully addressing all elements of the energy 'trilemma' of reducing emissions, improving security of supply and reducing cost. This project has the key objectives to explore and evaluate alternative designs suitable for scaling a novel heat generator to a size suitable for light industrial consumers of thermal energy. A whole-system approach will be adopted, exploiting the multidisciplinary project team. The patented UK technology employed harvests renewable kinetic energy sources, such as wind, river or tidal flows, to generate heat without dependence on electricity or other forms of energy. The successful outcome of this project will directly influence the goals for the development and launch of commercial production models.			

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Innovate UK

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Oxford Photovoltaics Limited Centre for Process Innovation Limited	A device level transparent moisture barrier for perovskite-on-silicon tandem solar cells (PEMBA).	£160,634 £138,285	£112,443 £138,285
Project description - provided by applicants			
PEMBA refers to a collaborative project to develop a transparent coating to improve moisture barrier resistance directly on top of a perovskite-on-silicon (PoS) tandem photovoltaic (PV) device, between Oxford Photovoltaics Ltd and the Centre for Process Innovation Ltd. The main purpose of this work is to extend the lifetime of the PoS wafer and in turn, enhance its performance when employed in the field as a solar module. The use of an atomic layer deposition batch coating tool will be investigated to create a uniform and conformal coating directly over the PV device. In addition to the experimental work, an exercise in defining how to scale up this solution to meet the demands of PV wafer fabricators, who require throughputs of 4000wafers per hour, will also be conducted.			

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Eksagon Group Ltd	2DMEA	£179,745	£125,822
University of Manchester		£121,868	£121,868
Project description - provided by applicants			
Converting and storing renewable energy is one of the most fundamental issues facing our society today. One of the most promising alternatives to fuel fossils is methanol. This fuel can be cheaply and renewably produced from agricultural or municipal waste and as so, it would allow the UK and Europe to reduce its dependence on foreign fuel supplies. But in order to exploit this fuel renewably, we need a new generation of materials that can cheaply and resiliently convert this ful into electrical power. At the centre of new technologies always lie new materials. And so, graphene – a Nobel Prize winning material – is set make a profound impact on the energy market. The project will aim to use graphene in energy conversion and storage with the goal of achieving the holy grail of energy: clean, renewable, scalable and high capacity.			

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
University of Oxford	Micro CHP - Prototype 1-30 kWe Engine/Generator Systems	£133,863	£133,863
Hymatic Engineering Company Limited (The)		£143,620	£71,810
Project description - provided by applicants			
Micro CHP – Prototype 1-30kWe Engine/Generator systems This project seeks to demonstrate the technical feasibility of using a novel linear engine/generator in micro (domestic) CHP systems. The technology used is well proven in space coolers applications and has demonstrated high efficiency, high reliability and long life with mainetance free operation. This development has been the result of a concerted effort to generate designs suited to the high volume, low cost manufacture that is required.			

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
EIGHT19 LIMITED University of Cambridge	PINSTRIPE - Photon INcrease by Splitting To Realise Improved Photovoltaic Efficiency	£224,776 £74,954	£157,343 £74,954
Project description - provided by applicants			
PINSTRIPE is a short project to demonstrate the technical feasibility of a new approach to increasing the conversion efficiency of photovoltaic modules by splitting high energy visible photons into 2 infra-red photons before they are absorbed by the module. By increasing the photon flux absorbed, greater power can be generated.			

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

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Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Innovative Technology and Science Limited	Radiation Resilient Ultrasonic System (RRUS)	£39,997	£27,998
TWI Limited		£100,404	£100,404
Precision Acoustics Ltd		£110,032	£77,022
University of Sheffield		£47,004	£47,004

Project description - provided by applicants

Limited access and high thickness components typically limit non-destructive inspection in the nuclear industry to Ultrasonic testing (UT) techniques. Radiation endurance of commercially available UT sensors is limited to cumulative doses of 1 to 2 MGy even for models branded as radiation resistant. Severe operational difficulties can occur due to unexpected sensor failure and recurrent sensor replacement is both time consuming and expensive. The RRUS project will explore the constructed and testing of novel, radiation resilience, probes manufactured from exotic materials and a variety of assembly techniques. This goal will be to provide the nuclear industry with a reliable UT solution for prolonged inspection and monitoring. Two scenarios are envisaged: a) high radiation - inspection close to fission nuclear reactors and b) low radiation - inspection in nuclear waste disposal sites. Our main objective is to manufacture and test a series of prototype probes tailored to determine the design most suited to each condition.

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

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Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
ClearAirTech Limited University of Bath	Testing/validation of on-vehicle catalytic fuel reformer/emission reducer for improved combustion.	£33,942 £29,119	£23,759 £29,119
Project description - provided by applicants			
ClearAirTech Ltd has developed technology which, in field trials, has been shown to reduce noxious exhaust emissions and fuel consumption from internal combustion engines. Further tests are planned to determine just how these benefits are achieved through Grant funding from Innovate UK. ClearAirTech Ltd will work in conjunction with the Powertrain and Advanced Research Centre at the University of Bath to undertake this important research work. Positive results are anticipated from this research which should, in the medium term, enable ClearAirTech Ltd to market the technology to Original Equipment Manufacturers and to the retrofit markets both here and abroad. The technology is particularly suited to developing countries, where high levels of transport generated pollution are prevalent affecting the health of millions of people Worldwide.			

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
SG Biodrying Ltd	A novel industrial waste heat recovery system for pollutant removal, water production and cooling	£66,325	£46,428
University of Nottingham		£115,365	£115,365
Venturi Jet Pumps Ltd		£40,523	£28,366
Ashwell Biomass Ltd		£48,853	£34,197

Project description - provided by applicants

The project aims to optimise and construct a prototype driven by industrial waste heat, suitable for sustainable cooling, water production and pollutant removal. Through the utilisation of an innovative moist airflow system (MAS), the proposed system will harness low grade waste heat (80°C or over) released from any industrial coal/biomass fired boiler. The harnessed low grade energy will be used to drive an 'œejector cooling system' and generate clean water. Moreover, by making use of a novel photocatalytic MOP, the industrial pollutants (CO2, SOx, NOx, POx) can be removed effectively and the clean air will be released into the atmosphere. Economically, the proposed project will help to improve energy efficiency and offer a more affordable energy system to most existing industrial processes. In addition there will be environmental impact through, improved air quality and better living conditons for UK and global citizens.

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Innovate UK

Results of Competition: **Energy Catalyst - Early Stage - Round 4**

Competition Code: **1604_FS_ENRG_ENCATES4**

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
PMW Technology Limited	A3C Carbon Capture	£153,980	£107,786
University of Chester		£22,993	£22,993
University of Sheffield		£19,523	£19,523
WSP UK Limited		£5,552	£2,776
GL Industrial Services UK Limited		£8,204	£4,102
Costain Limited		£4,000	£0

Project description - provided by applicants
Carbon dioxide is a major greenhouse gas and methods of capturing these emissions from power stations and industry are being developed. Studies have shown that without capturing our carbon emissions it will be very much more expensive to meet our decarbonisation commitments. However the changing mix of power plant and growing role of renewable technologies is making conventional carbon capture processes appear less attractive while industrial application is restricted by process complexity and high costs. The future generation mix will comprise renewable and nuclear generation supported by fossil fuelled power stations working when power from nuclear and intermittent sources cannot meet demand. PMW Technology has brought together concepts from other sectors to create a disruptive carbon capture technology that is about half the cost of the alternatives when applied to this future generation mix. Working with academics from Chester and Sheffield Universities and industrial partners, PMW Technology will validate the process and map its characteristics to target future development on the most effective design to remove carbon cheaply.

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

Total available funding for this competition is £10M from Innovate UK with Co-Funding from DFID and EPSRC

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Asset International Ltd	Basalt fibre reinfored HDPE for wave energy converters	£92,306	£55,300
Sea Energies Offshore Marine Limited		£24,276	£16,993
Brunel University London		£101,360	£101,360

Project description - provided by applicants

This project addresses the renewable energy theme, with the objective of establishing the technical feasibility of basalt fibre reinforced High Density Polyethylene (HDPE) as a material for the primary structure of an ocean wave energy converter (WEC). HDPE offers a low cost structural material that is resistant to UV, corrosion and biofouling increasing the lifetime and reducing the maintenance requirements for a wave energy converter. While fibre reinforced HDPE has been previously investigated, the use of basalt fibres is innovative and offers superior properties compared to a standard E-glass which is commonly used in fibre composite manufacture. Basalt fibre is also chemically inert and when combined with recycled HDPE potentially offers a high performance, low cost, green structural material for WEC's. The project will develop a suitable composition for the material that provides improved mechanical properties over unreinforced HDPE while retaining exiting advantages of the material when used in the ocean environment.

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Innovate UK

Results of Competition: Energy Catalyst - Early Stage - Round 4

Competition Code: 1604_FS_ENRG_ENCATES4

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Archangel Lightworks Ltd	Conformal perpendicular concentrators	£115,736	£81,015
Project description - provided by applicants			
Novel concentrators investigated and proven, exploring several prototype production methodologies to show feasibility			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
DuckDuck Ltd Energy Research Institute Unisearch	Creating virtual demand response assets using predictive modelling, with special application to Thailand	£129,620 £53,194	£90,734 £53,194
Project description - provided by applicants			
DuckDuck and and the Energy Research Insititute at Chulalongkorn University in Thailand are working with I-ON (South Korea) to understand how Demand Response and distributed solar power can be combined to contribute to the growth in solar production. Under Demand Response schemes, electricity users (factories, offices, households etc.) are paid to temporarily reduce their demand when the electricity grid is under strain. Solar power is intermittent (the sun shines when it shines), but aggregated Demand Response can help balance out solar power's variability. The consortium is using predictive algorithms to aggregate many small and inconsistent electrical loads into large predictable loads which can be offered for demand response. This can then be assessed in trials, by testing various demand response schemes.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Teignbridge Propellers International Ltd	Tidal Turbine Cost Reduction Through Ship Propulsion Technology Transfer	£159,697	£95,818
Regen SW		£39,834	£27,884
Project description - provided by applicants			
Tidal stream and run-of-river energy has long been recognised as a valuable renewable energy alternative to carbon intensive sources of electricity which still dominate global supply. However, at more than twice the cost of offshore wind and more than four times the cost of onshore wind, the high capital and operational costs associated with this technology present a significant market barrier to deployment in developed and developing countries. This innovative project will tackle the challenge of high costs by exploring the transfer of technology from the established ship propulsion industry. The project will work backwards from acceptable investor financial returns to a set target capital and operational budgets for the key systems in tidal turbines and will focus on the development of reduced cost systems for incorporation in small 50-250kW, lowtech turbines focused on markets in developing countries.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Whiskerstay Limited	An Automated Pull-in and Lock-Off System for Offshore Wind Farm Cable Installation	£64,917	£45,442
Project description - provided by applicants			
This project considers a novel device for the automated pull-in and lock-off of medium and high voltage subsea cables during offshore wind farm installation. The mechanical lock-off system aims to decrease the dependency of operations on viable weather windows for personnel transfer by automating the cable clamping process inside each turbine support structure. The risks associated with time delays will be minimised, as will those relating to personnel transfer between vessels and turbine supports structures during weather windows with marginal sea states.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Cable Coatings Limited	Low Cost Method to Boost Grid Capacity: A Feasibility Study	£196,000	£137,200
Project description - provided by applicants			
Novel low cost power cable coating to boost electrical grid capacity.			

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