

Company	Location	Company and Project Summary
<b>AEL</b> 	Lambourn	<p>AEL are an expert in composite materials and manufacturer of components for the renewable energy sector. This project is to design, build and prove a test facility for tidal turbine blades capable of applying the necessary static and cyclic loadings to confirm static strength and stiffness and operational life of pre-production blades. This approach will provide the marine energy industry with the confidence necessary to accelerate the establishment of tidal energy devices as a viable energy source and improve the confidence of financiers to invest in the sector. The facility will be designed to cope with blade performance requirements anticipated out to 2020.</p>
<b>Aerogenerator Project Ltd</b>	Colchester	<p>APL and EPM Technology of Derby will design, build and test a 30kW Vertical Axis Wind Turbine which they will then market. It will also be used to demonstrate and generate information to scale up for the offshore sector. The 30kW wind turbine will generate electricity profitably with a reduced environmental impact. It is half the height of a conventional turbine (radar friendly), has no foundation and is quieter - the drive train is baffled low down and rotates three times slower (bird friendly). These benefits will improve planning prospects, the greatest hurdle for onshore wind.</p>
<b>Agility Eco Services</b> 	Epsom	<p>The URBANEER project (Urban Residential Block ANalysis for Energy Efficiency and Renewables) aims to address Mid to High Rise Towerblocks that are complex buildings to retrofit low carbon measures into in an optimised fashion. The project addresses the technical challenges of optimising both energy efficiency and renewable energy measures, coupled with social challenges of dealing with many residents with differing social support needs, and challenges around funding retrofit projects.</p>
<b>Agility Global Ltd</b> 	London	<p>Agility has designed and brought to market, the first product in its urban--range motorcycle family ("URF"), the Saietta R. Saietta R was designed for use in an urban context, and it is highly competitive in this category. However, the market continues to lack a competitive electric extra--urban, long--range motorcycle. Agility's proposed EEF Project Agility Saietta Ultra high efficiency Long Range electric motorcycle Family (LRF Project) builds on the technology innovation behind Agility's URF vehicles. The project will produce a production prototype of the LRF motorcycle.</p>
<b>Anakata Wind Power Resources Ltd</b> 	Oxford	<p>The ANAKATA team has a history of success in Formula 1 motor racing, and are experts in diffuser technology. The company has developed and tested a 2.5kW micro wind turbine to demonstrate the technology is commercially viable, and has filed patents on its technology. During 2013, Anakata has generated revenue from initial sales of its first micro wind turbines. This initial sales success provides a platform to grow the business and access more valuable markets by developing larger medium-size wind turbines. The project will apply the technology to larger turbines by developing a 50 – 100kW demonstration unit. This will require innovative diffuser geometry, structural design, and use of composite materials if it is to produce a commercially viable wind turbine.</p>

<p><b>ANTACO</b></p> 	<p>Woking</p>	<p>The project involves developing a small-scale pilot plant for the production of bio-coal from biowaste using Hydrothermal Carbonization. HTC is a process which replicates the natural process of coal formation. Biowaste is processed using heat and pressure to chemically transform it into a carbon dense material similar to fossil coal. To date the process has not been commercially viable due to technical limitations such as batch processing. Antaco have developed to laboratory scale and patented a potentially cost effective engineering solution which could enable commercial production of biocoal on an industrial scale.</p>
<p><b>ANVIL SEMI-CONDUCTORS</b></p> 	<p>Coventry</p>	<p>Anvil Semiconductors has developed a unique technology to enable the production of Silicon Carbide (SiC) power switches at a similar cost to conventional Silicon semiconductor devices by growing thin layers of SiC on Si wafers rather than using expensive bulk SiC. When this world-leading production technology is brought to fruition it will be utilised in high efficiency, carbon saving, power electronic systems for mass market applications (such as lower voltage power convertors and invertors) where savings can have a large impact on overall energy use and emissions.</p>
<p><b>Avalon Sustainable Energy Solutions (ASES)</b></p> 	<p>Brentwood</p>	<p>Avalon Sustainable Energy Solutions (ASES) in collaboration with University College London (UCL) are proposing an innovative solution to drastically reduce the cost and disruption of insulation for up to 800,000 properties in the UK. Avalon Sustainable Energy Solutions in partnership will be insulating narrow cavities with a material that has insulation properties well advanced of anything on the market used for cavity wall insulation – a material in a league of its own for cavity fills. We propose to take a product which has been tested and used on a small scale elsewhere in a different context for buildings; and bring it to the UK to address our narrow ‘hard to treat’ cavity walled properties. We estimate this could bring savings of hundreds of millions of pounds to energy efficiency programmes at no compromise to standards and with improvements in processes and disruption.</p>
<p><b>Blue Sky Bio Ltd</b></p>	<p>Chester</p>	<p>Biomethane produced by Anaerobic Digestion (AD) of organic material has a very small share of the renewable energy market. This project aims to develop and significantly grow the share of biogas in the renewable energy market by increasing the amount of methane gas produced per Tonne of digested organic material, as well as by expanding the types of organic materials that can be effectively used in AD. The project will involve the development of the Technology from a proven laboratory scale unit to full scale pilot demonstration. In addition to quantifying the maximum biogas production for standard organic waste sources - water, food and industrial, alternative waste stream materials will be tested to check their potential for AD.</p>
<p><b>Bowman Power Group Ltd</b></p>	<p>Southampton</p>	<p>This project will develop a turbogenerator system, which converts engine exhaust gas into electricity, thus increasing the power output of the engines by 10-15%, without burning additional fuel. The technology is based on Bowman Power’s successful turbogenerator technology now in widespread use on smaller diesel engines. Bowman Power is a UK company that has developed this technology over the last 10 years. The project is supported by Rolls-Royce</p>

		
<b>Carbon Cut UK Ltd</b>	Dorset	<p>Carbon Cut has developed a retrofit cavity wall tray which will enable retrofit cavity wall insulation to be placed in continuous cavities to an unlimited height, in “hard-to-treat” mid/high rise accommodation blocks. It also can replace damaged cavity trays so to enable retrofit cavity wall insulation in mid/high-rise buildings. An advantage with this system/product is that flats within older accommodation blocks can be individually insulated/or not as required or desired by the owners. Every building insulated can save 40%+ on heating/cooling costs, and carbon emissions. Retrofit cavity wall insulation is by far the cheapest way to insulate existing buildings and is ¼ the cost of other retro-insulation processes such as external cladding. This innovative low-cost cavity tray and installation method broadens the range of older buildings in which cavity wall insulation can be installed.</p>
<b>Carbon Cycle Limited</b>	Sutton	<p>The aim of this project is to optimize within a large scale test bed a new low energy process to produce ammonium sulphate (a fertilizer that supplies nitrogen and sulphur) and precipitated calcium carbonate (for making bright white paper). Both products have large markets measured in the tens of millions of tons used per annum. Based upon experimental data, if emissions from creating ammonia feed stock are included, this process is anticipated to cut the carbon emissions required to produce these materials by 88%. If the emissions to make ammonia are not counted, the process is strongly carbon negative. Current production routes to ammonium sulphate and precipitated calcium carbonate are very energy intensive. Our new method creates at ambient temperatures materials that others can only create at near 1000 °C, thus our process represents a new competitive route to these products with a fraction of the carbon footprint compared to the current state of the art technology.</p>
<b>C-Capture</b> 	Leeds	<p>C-Capture Ltd (C-CL) was spun out from Leeds University to commercialise an innovative family of amine-free PCC solvents that can already match the steam requirements of the best 2G amine solvents but also have significantly reduced toxicity, environmental impact and corrosion characteristics. In this project, variants of C-CL’s amine-free chemistry will be screened for suitability in the laboratory and scaled-up on the company’s dedicated pre-pilot test rig in order to identify optimum candidates. These will then be tested on PCC simulation rigs to confirm their superiority to 2G amine solvents. The results will be used in licensing negotiations with manufacturers of CCS plant and chemicals.</p>
<b>CCM Research Ltd</b> 	Oxford	<p>CCm technology converts captured CO<sub>2</sub> into stable value-added materials with multiple uses across global priority sectors of food/ agriculture, advanced materials &amp; energy storage. The patented process is based on high primary capture efficiencies from novel cellulose/amine capture material which retains 95% of flue sourced CO<sub>2</sub></p>
<b>Celtic Renewables</b>	Edinburgh	<p>Celtic Renewables is commercialising an innovative patented process technology, based on proven ABE fermentation, which converts sugars into biofuels (butanol and ethanol), and three other high value commodities, acetone, animal</p>

<p><b>Ltd</b></p> 	<p>feed and hydrogen. Butanol has recently been recognised as an advanced biofuel with significant advantages over ethanol both as a fuel and as a blending component. Initially the company is focusing on converting problematic by-products of the whisky industry, which present significant disposal and environmental issues, due to annual production of millions of tonnes of these residues. The purpose of the project is to complete the industrial-scale process blueprint for the innovative fermentation technology so that it is commercially and technically robust, and to develop the strategic partnerships in order to establish the first industrial production plant by 2015.</p>
<p><b>Ceres Power Ltd</b></p> 	<p>Horsham</p> <p>Ceres Power has developed and trialled a low temperature solid oxide fuel cell and fuel cell stack for domestic and other heat and power applications. This project builds on the Fuel Cell Module (FCM) components, design and layout, that have been enhanced to provide electrical efficiency of &gt;50% (Lower Heating Value) on mains natural gas, delivering up to 1,800kg annual CO2 savings, and over £700 energy cost savings per home per year. Ceres Power's low heat to power ratio fuel cell module (FCM) is ideally suited to small-scale distributed generation applications such as micro-CHP where efficiency, cost and robustness are key drivers for market uptake. With British Gas, Ceres has developed a design specification for UK micro-CHP (which includes the FCM) that is retrofittable with UK housing stock making installation and operation a relatively simple exercise.</p>
<p><b>CONCURRENT THINKING Ltd</b></p> 	<p>Warwick</p> <p>Concurrent is a provider of data centre energy management software and hardware solutions covering both IT and infrastructure. Typically, energy savings of up to 20% can be achieved without the need for a total rebuild of a data centre. To obtain more dramatic savings, as well as further incremental savings over time, much more automation is needed. This requires software that interacts with building and rack management systems, as well as servers, operating systems and virtual machines, in order to continuously optimise efficiency – much as an avionics system might maintain the optimal trim of an aircraft. This project aims to evolve the state-of-the-art in data centre energy management and demonstrate this in real world environments involving world-leading partners.</p>
<p><b>Chimney Sheep</b></p>	<p>Cumbria</p> <p>This project is to put the Chimney Sheep™ through various tests to demonstrate its efficacy, to calculate the carbon savings it makes, to calculate its lifetime, and to test its suitability for the mass market. If the tests reveal any issues with the product, these must be resolved in order for the product to be mass market ready. By these means, Chimney Sheep™ will open the door for chimney draught exclusion to be normalised by the industry, and be adopted by energy companies when meeting their Energy Company Obligation.</p>
<p><b>CRESS</b></p> 	<p>Reading</p> <p>CRESS aims to apply its flywheel energy storage system to utilise regenerative energy in container handling cranes at shipping ports. Cranes currently waste the braking energy when a container is lowered but this can be recovered and used in raising the next container. The energy saved would reduce both the diesel used to power the cranes and lower carbon emissions. There are around 10,000 container port cranes worldwide. Market feedback shows that existing energy recovery systems do not meet port operators' requirements. In order to capture this opportunity CRESS will develop and test a pre-production prototype in both the laboratory and on a crane operated by its strategic partner Port of Felixstowe. These tests aim to prove that the CRESS system can reliably deliver attractive fuel savings and payback.</p>

<b>Cumulus</b>	Sheffield	<p>Cumulus Ltd is developing a grid-scale energy storage battery (Bi-metal battery) that will enable more Renewable Energy (RE) to be supplied to the grid. It does this by firming up the intermittency of RE supply, enabling storage of otherwise unwanted RE for release to the grid and consumers at high demand times, and by providing flexibility and competitiveness in RE supply along with other technical benefits to the grid system. The battery's modular design can be configured to provide MWh of storage delivered over a 4-6 hour period. The Bi-Metal battery is based on existing industrial chemistry and architecture already used at GWh scale in mineral processing. WPP has developed technology that allows this to be used as a re-chargeable grid-storage battery, using inexpensive, recyclable materials. The battery is designed to offer the lowest total cost of energy storage and be a long-life, fully-maintainable system.</p>
<b>Econovate</b>  <small>eco-innovation in construction</small>	Hemel Hempstead	<p>Econovate has developed an award winning sustainable low carbon building products. The vision is to take a share of the low-carbon building materials value chain by using low-grade waste paper and cardboard, diverted from landfills to create superior construction products. Their current product the "Greenblok" uniquely combines technologies from different industries to manufacture fibre-cellulose based breeze block, engineered to achieve enhanced thermal and acoustic specifications in an affordable and high performing structural block within one product. The use of low tech machinery and the benefit of enhanced product performance will show a significant reduction of energy used both at production and in end-use. The project objective is to set up a small automated manufacturing plant allowing Econovate to gain certification of the product, show the technology to potential licensees, and supply sufficient blocks for exemplar buildings to support product launch in the construction market.</p>
<b>EnMODUS Ltd</b> 	Chepstow	<p>Smart appliances, lighting and heating controls offer significant potential for untapped carbon and energy savings. Unfortunately, the development of smart appliances and controls that can realise these savings is currently limited by high cost and technical constraints in available smart appliance connectivity technologies. The goal of the Wattwave Embeddable Module is to remove these barriers and thus accelerate the penetration of mainstream markets by smart appliances, lighting and heating controls. EnMODUS have already demonstrated (using a shoe box sized prototype) that Wattwave, a two-way, low bit rate powerline communications protocol doesn't suffer from the key technical issues of connectivity range and stability suffered by some existing home and local area network communications. The challenging OEM cost targets for mainstream appliances will be met through the design of a purpose-designed embeddable module comprising an off-the-shelf microprocessor running the Wattwave firmware and an analog ASIC.</p>
<b>Fault Current</b> 	Cardiff	<p>FaultCurrent Ltd are developing a series of magnetic fault current limiter (mFCL) protection products for installation within electricity distribution networks to facilitate the connection of more distributed and renewable generation on existing network assets. The innovation is a unique mFCL based on intellectual property developed over a number of years within the specialist Wolfson Centre for Magnetics at Cardiff University in the UK. This technology results in a completely passive low cost ferrite permanent magnet device. The primary advantages are: there is no requirement for a back-feed scheme (there will be a short interruption in power only whilst the mFCL is connected): saving between £250k and £500k per installation and potentially avoiding network upgrade costs in some situations. The cost of a</p>

		<p>mFCL, installation and commissioning can be treated as a capital expense, there are negligible maintenance costs (it is a 'Fit &amp; Forget' system), and the technology does not require a power source so no running costs are incurred.</p>
<p><b>Fern Howard</b></p> 	Hampshire	<p>Fern Howard is an established leading UK manufacturer of lighting products and bulkhead luminaires. This project involves the development of a highly energy efficient edge-lit LED Luminaire with Homogeneous Light Output and Ray Angle Control. It aims to develop an attractive luminaire with a pleasing and uniform light output with an optimised distribution, without compromising the inherent efficiency that the LED light source provides. The luminaire features will reduce the energy requirements for lighting a given area by at least 33% when compared with the most energy efficient lighting systems currently available. The potential energy and CO2 reductions increase to 75% when compared with luminaires with opal diffusers.</p>
<p><b>Flint Engineering</b></p>	Sussex	<p>The Flint system is a roofing / cladding product concept, incorporating weather protection, thermal absorption and PV electrical generation. With the Flint system the roof is not just the water proof covering for a building but the energy plant to meet the buildings heating, cooling and hot water needs. Flint is a roofing system that can turn new and existing buildings from CO2 emitters to net energy producers and is a potential enabler for very low to zero-carbon buildings. Key components have been designed, built and lab tested and the project will develop an entire system through to demonstration on several buildings.</p>
<p><b>Frigesco Ltd</b></p> 	Exeter	<p>The aim of this project is to develop a low-carbon frozen food retail display cabinet (RDC) based on recently patented defrost technology (the Frigesco™ system). Frozen food RDCs in UK supermarkets account for 30% of total refrigeration power consumption and defrosting accounts for about 30% of that power. Supermarkets aim to maintain frozen food at below -18°C. Air is circulated around the cabinet using a fan that blows air through a cold heat exchanger (evaporator) where refrigerant boils at below -32°C. Moisture in the air freezes on the evaporator surfaces leading to loss of heat transfer efficiency and increase in product temperature. This ice has to be removed on a regular basis and in UK RDC's this is done using electrical resistance heaters. Only 20% of the heat supplied by the electrical defrost system is used to melt ice, the rest is transferred to cabinet components, the air in the cabinet and the food. This wasted heat then has to be removed after each defrost, to bring the cabinet and its contents back below -18C. The Frigesco™ defrost system is virtually energy-free and rapid with much less unwanted heat entering the cabinet; tests have shown it can reduce total refrigeration power consumption by at least 25% is possible. If all the freezers in UK supermarkets were fitted with the system the associated reduction in grid carbon is estimated at 230,000 tonnes pa.</p>
<p><b>Gaia Wind</b></p>	Glasgow	<p>The Gaia-Wind 133-11kW turbine was developed in Denmark in the 1990's. Up to the year 2000, only 100 of these turbines had been manufactured, predominantly in Denmark. Since 2007 when the company relocated to the UK, sales have rapidly accelerated and the current installed base is approaching 1000 turbines, the majority of these in the UK. The factors driving the success of this product are: the reliability of the turbine and the high annual energy yield. The</p>

		<p>size of the turbine, highly appropriate for use on farms and in rural communities, guarantees the electricity produced is predominantly used 'on site' and therefore competes with low volume retail electricity prices. This project will develop design, production and assembly methods for cost reduction and efficiency improvement.</p>
<p><b>Geothermal Engineering</b></p> 	<p>London</p>	<p>The project aims to show that deep (2km - 3km) "standing column wells" can be used to sustainably supply heat suitable for district heating networks (~75°C) without the need for a heat pump. The project will test and model an existing 2.4km well to prove that the heat can be sustainably mined from these depths using standing column well technology. The results from the project will inform the feasibility of deep geothermal standing column wells and their suitability to district heating networks.</p>
<p><b>Green Fuels Research</b></p>	<p>Cheltenham</p>	<p>This project applies proprietary, patented technology to the development and certification of high-performance aviation biofuels from currently-proven and future feedstocks. The patented technology is expected to address key barriers to commercial adoption of aviation biofuels, including low-temperature performance, oxidative stability, and economically-viable production cost. It will also address social challenges to sustainability of aviation biofuel via distributed, feedstock-scaled implementation.</p>
<p><b>Heatcatcher Ltd</b></p> 	<p>Brighton</p>	<p>Heatcatcher designs, installs and maintains waste heat to power (WH2P) systems for lime and cement kilns, one of the most energy-intensive sectors where 30-40% of process heat is lost. Heatcatcher allows kilns to generate electricity from their hot exhaust gases. Industry produces large amounts of waste heat and its capture to produce electricity will lead to significant savings. From Europe's 400 lime and cement plants alone, we estimate a potential CO2 emissions saving of 430 KtCO2/yr via generation from 13,000 GWh/yr of waste heat</p>
<p><b>HTIP</b></p>	<p>Cambridge</p>	<p>The project involves the demonstration of a voltage limiter that is low cost, highly efficient and compact, so it is suitable for unobtrusive installation such as in the meter box or as an energy saving module for electrical equipment and smart meters. The voltage limiter maintains stable output voltage regardless of supply fluctuations. HTIP calculates that based on savings of 10-12% and a carbon factor of 0.43kg of CO2 per unit of electricity, some 200-300 kg of carbon could be saved annually per household.</p>
<p><b>IE-CHP</b></p> 	<p>Bellshill</p>	<p>IE-CHP is a Young Innovative Enterprise with investor backing from energy utility SSE, fuel cell manufacturer Intelligent Energy, &amp; Scottish Enterprise. It is a leading expert in systems integration and is developing a dual energy system combining a 1KW fuel cell, advanced heat storage &amp; smart controls, delivering low carbon heat &amp; power to homes &amp; small businesses.</p>

<b>Industrial Phycology</b>	Bath	Industrial Phycology has designed a novel process to capture and recover excess nutrients in wastewater effluent. The process would provide final stage effluent treatment and the algal biomass produced can potentially be combusted or digested to produce renewable low carbon electricity or biogas with very little waste. The process has the potential to reduce the carbon impact of water treatment and allow wastewater operators to emit effluents that meet legal frame works for water treatment, and provide a fuel or energy feedstock all in one process.
<b>KELDA SHOWERS</b> 	Winchester	Kelda Showers is designing and developing Mixer and Digital Mixer shower products utilising Kelda's radical water and energy-saving 'Eco Power Shower' technology. Improving upon Kelda's spray acceleration 'engine' for Electric Showers, this project will develop and demonstrate prototypes to generate a high-pressure spray that results in around a 50% reduction in water flow/heating energy requirement (and carbon produced) without compromising the showering experience.
<b>Kensa</b> 	Truro	The project will feature a significant further development to Kensa's innovative Shoebox ground source heat pump, launched in 2012. The Shoebox is a unique, ultra-small model which can be conveniently installed within a kitchen cupboard to deliver space heating and domestic hot water to new build apartments and smaller houses. Whilst the standard Shoebox heat pump extracts energy from the ground, the next stage in the product's development will create a hybrid model which can also utilize energy stored in the air. This twin-source design enhances system performance and is expected to be the UK's first hybrid heat pump.
<b>Kite Power Solutions Limited</b> 	Essex	Kite Power Solutions is developing a novel high altitude wind power generating system that uses kites to capture wind energy from the stronger and more consistent winds that blow above conventional wind turbines. By generating more power, with compact, inexpensive machinery, KPS has the potential to transform the economics of wind power generation, especially in offshore environments. Aerodynamic performance has been validated during instrumented tow tests and a 10kW prototype system has already demonstrated the core principals of the technology including autonomous flight control. The company has recently commissioned a second generation 40 kW prototype system, and in this project will develop a highly capable platform to demonstrate continuous power generation for extended periods of operation. This will bring autonomous launch and landing system mast, clamping and wing control subcomponents into operation.
<b>KiWi Power</b> 	London	KiwiPower work with industry and commercial clients to provide demand response services to National Grid. This project aims to accelerate the adoption of Demand Response across a broader range of UK businesses to cut the overall cost and carbon intensity of the UK's energy supply. The focus will be on developing and implementing technologies that improve automation, create more open standards, and increase choice for potential UK customers. Businesses participate both for the green credentials of helping to avoid use of polluting power stations at peak times, and for the financial compensation provided by grid and network operators for grid balancing services.

<b>Libertine</b> 	York	<p>Libertine is developing novel power generation technology with potential to dramatically improve the efficiency and economics of waste heat recovery, combined heat &amp; power, and small scale biogas power amongst other applications. At the heart of Libertine's technology is an innovative linear expander-generator which integrates a low friction free piston mover with a high efficiency linear generator. In the first market application, this expander-generator will be incorporated into small to medium scale (10-200kWe) waste heat recovery systems in place of conventional expander technology (principally turbo-generator based) and converting 10-20% of waste heat to power.</p>
<b>LINDHURST</b> 	Nottingham	<p>Lindhurst Engineering is a mechanical and structural engineering company designing and building equipment for clients in water utility, energy, transport, construction, food production and agricultural industries. This project aims to develop and demonstrate an integrated closed loop "Microbial Fuel Cell system" that will have the capability to take multiple foods and drink industry waste streams and convert these into bio-gas that can then be utilised to produce heating, power and vehicle fuel. The deliverable from the project will be a modularised microbial fuel cell system that; has greater flexibility of operation, is more efficient, easier to transport/install and is easier to maintain than other currently available waste-to-energy technologies on the market.</p>
<b>MARINE SOUTH EAST</b> 	Southampton	<p>The SAMED project will validate novel anchoring technology for marine structures using helical screw piles. A critical element of this technology is that the subsea tooling for installation of screw piles could avoid the need for large, expensive installation vessels. To achieve this, the project brings together a consortia of subsea installation specialists and a leading helical screw pile provider, under the leadership of marine project coordinator Marine South East. Although screw piles are widely used on land, and even in very shallow water where land-based installation tools can be used, they have not yet been developed for subsea applications. Other land-based technologies, for example cable laying &amp; burial, have successfully been marinised to meet the requirement for reliable remote operation. SAMED will bring together these two areas of existing technology to validate a capability in subsea screw pile anchoring.</p>
<b>Naked Energy Limited</b> 	Guildford	<p>Naked Energy has developed an innovative hybrid solar technology providing combined heat and power. Virtu integrates standard photovoltaic cells into an evacuated tube solar thermal collector with novel heat transfer mechanism. For any given area more of the sun's energy is converted into heat and electricity than existing products enabling higher sunlight conversion per square meter of roof space and "single visit" installation. In laboratory testing 90% of the sun's 1000W/m2 has been captured and converted into heat and power. The versatile, modular design provides distributed energy generation for commercial and domestic applications regardless of climatic or geographic conditions. The key innovation is a highly efficient heat transfer mechanism that has been extensively tested and validated by Imperial College London and has wider applications beyond solar. This project will develop the next generation of trial and test prototypes for on-going environmental tests being conducted with the UK's largest utility company prior to an integrated pilot with a leading supermarket group.</p>

<b>Natural Technology Developments</b>	Newcastle Upon Tyne	<p>Natural Technology Developments Ltd (NTD) is developing a novel Hybrid Solar (PV-Thermal) concept; a higher performance and more affordable co-generation panel producing both electricity and heat. This innovation combines advanced heat sink and Photovoltaic (PV) technologies in a unique way to address performance weaknesses in current technologies. If successful this innovative product will be the first of its type and manufactured totally in the UK, with the potential to become a cost effective solution which helps to reduce carbon emissions and ensure security of supply contributing to the UK 2020/2050 low carbon targets. Our aim is to develop this new renewable solar product against a design brief that meets the needs of the energy stakeholders.</p>
		
<b>Oxford Photovoltaics Ltd</b>	Oxford	<p>Oxford PV has pioneered the development of Perovskite thin-film solar cells, which can be printed directly onto architectural glass to produce a transparent, coloured coating. Once integrated into the glazing units of a glass-fronted building, the technology is capable of providing a significant percentage of the building's electrical energy requirements directly from solar power. By employing well known and understood printing processes focussed on inexpensive and abundant raw materials, Oxford PV has developed a highly cost-effective technology that it will license to glass manufacturers and processors.</p>
		
<b>Oxsensis</b>	Oxford	<p>PINCER (Power generation Instrumentation for Carbon Emissions Reduction) is a collaborative development programme which will reduce the environmental impact of gas turbine (GT) systems. Deployment of TRL7 high temperature optical pressure measurement instrumentation and control systems on medium sized industrial GTs, and achieving long life, high fidelity data measurement will enable better control of lean burn gas fuelled combustion systems on 3.9-7MWe GTs. PINCER will accelerate adoption of this low emissions technology in large GTs used for grid powergen and in aero engines.</p>
		
<b>PASSIV SYSTEMS</b>	Newbury	<p>Passiv Systems provides home energy monitoring and energy management solutions. This project is to integrate in-home technologies (e.g. storage heaters, heat pumps) with the Passiv platform and backend systems, in an internet-connected solution, and demonstrate that energy use in homes could be managed an aggregated level in response to various energy tariffs and demand side incentives from grid and network operators. Offering aggregated services to manage grid variability needs compelling consumer propositions that integrate tariffs and technology into consumer propositions, and apply knowledge of building performance, current and forecast weather, and likely energy demand.</p>
		
<b>PHOTONSTAR</b>	Romsey	<p>PhotonStar is an award winning supplier of high quality LED lights to commercial and domestic clients. The company is developing next generation intelligent low-energy LED light engines which provide tuneable white light spectra. The project will develop and trial prototype products incorporating Photonstar's high colour quality tunable ChromaWhite technology together with a novel low cost embedded wireless lighting and energy management control system. The ChromaWhite technology tracks the efficiency improvement curves of LED light sources and currently enables energy</p>
		

		<p>saving of 90% over halogen sources and 40% over compact fluorescent sources. The next generation products will offer the added benefit of high colour quality tuneable white light emulating daylight, and a low cost wireless control system to improve functionality, reduce installation costs, and enable further energy savings.</p>
<p><b>Proair</b></p> 	Galway	<p>The ProAir Advanced Indoor Climate Control System (PAICCS) is an innovative, high performance, energy efficient system which heats, cools, controls humidity and always delivers fresh air to create a healthy indoor environment with high indoor air quality. The small, modular, prefabricated wall unit (approx. 1m sq) will be used mainly in housing but will also have applications in offices, shops, restaurants and any indoor space up to 250m<sup>2</sup> / unit. Led by Proair, the project will assemble the skills of 3 leading UK companies, CARDIFF University and the Building Research Establishment (BRE) to develop a refined design with control software which optimizes system performance. Five pre-production prototypes will be laboratory tested and monitored in occupied dwellings for twelve months providing the data for an 'ex-post facto' report on their performance.</p>
<p><b>Q-BOT</b></p> 	London,	<p>Q-Bot is developing an innovative system to enable "hard to access" suspended floors to be insulated from beneath using a remotely controlled robotic device. The device will be inserted under the floor from locations that avoid disruption to the household. Using this system, installation of under-floor insulation can be undertaken by one skilled operative in a day. With the cost of insulation material below £600 per house, but hard to access floors often left un-insulated because of installation costs the system is estimated to install cost savings of approximately £6,000 per dwelling, as well as shortening of Whole House Retrofit duration by up to two weeks and minimising disruption.</p>
<p><b>Radfan / Heatwave UK</b></p> 	Newcastle Upon Tyne	<p>The Radfan is an innovative fan unit that affixes by magnets to the top of any central heating radiator and redirects flow of warm air horizontally into the room. The company have conducted in-house testing that shows the Radfan can make up to 2degC temperature improvement at seated height i the average UK living room. This testing has been independently peer reviewed by the Resource Centre for Innovation and Design at Newcastle University. The main findings agree the Radfan can have a positive effect on the temperature of an average living room and warrants further testing. The scope of the project is to conduct 3 separate verification tests to quantify the energy savings that Radfan could provide. These tests would be conducted by independent bodies such as BRE or BSRIA.</p>
<p><b>Recycling Technologies Ltd</b></p> 	Swindon	<p>Recycling Technologies has developed a novel technology, the Warwick FBRTM to recycle the Mixed Plastic Waste [MPW] normally landfilled, incinerated or exported as RDF, into a low sulphur Heavy Fuel Oil [HFO]. A fluidised bed reactor thermally cracks unsorted films &amp; rigid plastics by pyrolysis into HFO. The process can be economically deployed to process as little as 2500t p.a. enabling even small sources of MPW to be converted to a high value product.</p>

<b>Samad Power Ltd</b> 	Milton Keynes	<p>Samad Power Ltd has designed and developed a secondary power source utilising the regular gas supply within a typical household. The company has developed a compact combined heat and power generation system for domestic users, which is capable of producing up to 2KW of electricity whilst simultaneously providing hot water and space heating for household (approximately 10 kW). Micro CHP boilers already exist, but the fundamental challenge to high volume deployment of micro CHP boilers is the cost to the end users (currently the average cost of micro CHP boilers is £7000.00). Samad Power is resolving this problem by developing a gas turbine version of micro CHP that has less than half of the parts used in other CHP technologies, one moving components and utilising 70 years of deployment in other industries. This allows the company to provide its micro CHP boiler at a significantly lower price (expected to be at least 50% of the cost of other technologies).</p>
<b>SASIE Ltd</b> 	Nottingham	<p>MonoEnergy was developed with Loughborough University, supported by TSB funding. The system generates renewable heat and power, utilizing unused heat from summertime in a ground store to provide a more efficient system of heating in the winter. Similar small-scale prototypes, on single dwellings, are already operational (five in the UK and one in Italy), combining solar PV, thermal and heat pumps with sophisticated storage systems and intelligent controllers. The project will develop aspects of MonoEnergy, such as a system for taking heat from behind wall-mounted solar PV panels (SASIE's Voltair product), as well as providing a useful demonstrator of the benefits for tenants, many of whom live in fuel poverty. The system will also provide energy metering and monitoring, developing an improved user interface. SASIE has previously helped to write guidance materials for assisted living and the project will further develop MonoEnergy's capability of providing alerts and alarms linked to energy use for vulnerable people. MonoEnergy offers a complete system of sustainable energy – heat and power generation, storage, control and feedback – as a single solution for community energy needs</p>
<b>SEAB ENERGY</b> 	Southampton	<p>MUCKBUSTER® is a fully automated micro-AD system developed to proof of concept demonstration form in a standard 40' shipping container, enabling low-cost delivery and installation, and ease of operation. It provides PAS110 pasteurisation so that certain digestates can be sold as fertiliser or mulch. With a Combined Heat and Power (CHP) unit, and income from UK feed-in-tariffs (FIT) and renewable heat incentives (RHI), the modelled payback is under 3 years using 1.6 tonnes per day of high yielding biowaste such as bakery residue. The project develops a new modular front end feedstock handling system for the MUCKBUSTER® to open up more market opportunities. The project will test the system using a variety of bio-waste feed stocks over a 12 month demonstration period.</p>
<b>Sharp Labs of Europe Ltd</b>	Oxford	<p>This project aims to field trial the lowest carbon domestic space and hot water heating solution currently available. The system is based around an array of photo-voltaic-thermal (PVT) panels which would be placed on the roof of a property. Conventional PV panels only use 15% of the energy incident on them, with the remaining energy being absorbed as heat. This heat is extracted using a heat transfer fluid, and upgraded to a usable temperature via a heat pump. The thermal energy is stored in the house and used to power a conventional central heating system to provide hot water and space heating. Electricity from the PV is used to provide 60% of the heat pump's annual power requirement. In colder months of the year, heat is also abstracted from the surrounding air as well as solar radiation, in a similar manner to an air source heat pump. A research prototype has been installed and tested in an occupied home and has</p>

		<p>met all space and hot water needs of the occupants during winter. The lifetime cost of ownership and carbon intensity is the lowest of any commonly used heating system. The aim of this project is to run trials of a second generation system in a number of residences of different demographics to verify predicted performance and energy, cost and CO2 savings</p>
<p><b>SolaQuaGen</b></p> 	Aylesbury	<p>The project leverages the experience and knowledge gained by SolaQuaGen™ (SQG) during a highly successful TSB supported project during 2012. This developed a new technology for desalination using waste heat and this project extends the application to the treatment of waste or dirty water. The project is based at a SITA UK landfill site in north west of England where the company plan initially to treat leachate outflows and demonstrate the commercial viability of the technology. Initial analysis has indicated potential returns on investment to landfill operators that create a financial incentive to adopt the technology in addition to its environmental benefits.</p>
<p><b>Sustainable Marine Technologies</b></p> 	Isle Wight	<p>Sustainable Marine Technologies is developing an innovative deployment platform, PLAT-O, to address two key challenges faced by the tidal energy industry:</p> <ul style="list-style-type: none"> <li>- Reducing the installation cost and maintenance access costs for tidal arrays</li> <li>- Accessing deeper water tidal zones, where over 2/3 of the UK resource is located</li> </ul> <p>The PLAT-O platform will be capable of supporting and deploying any leading horizontal-axis tidal energy converter. The purpose of the project is to deliver a fully-functional prototype of the PLAT-O system which will be deployed and tested at-sea. It will demonstrate the potential that PLAT-O can deliver to the industry.</p>
<p><b>Teva Motors Limited</b></p> 	London	<p>Teva Motors is developing a range-extended electric truck for the urban delivery market that will deliver the operational performance of a diesel vehicle, but with lower emissions and a lower lifetime cost. Teva's truck will be competitive without the need for purchase or operating subsidies, allowing mass adoption by major fleet operators (e.g. courier companies). This project is the first step: to create a working prototype of the Teva's innovative powertrain by integrating this into an existing truck chassis. The prototype will demonstrate the technology and show that it meets the requirements of major fleet operators: be cheaper than diesel, and have more than acceptable range. Teva is working closely with major fleet operators to ensure that its truck meets their needs.</p>
<p><b>Vantage Power Ltd</b></p> 	London	<p>The problem is that hybrid buses are 70-100% more expensive than normal buses, and uptake has been slow. With a legacy fleet 47,000 strong, it is unreasonable to expect new hybrids to replace many existing buses any time soon. Vantage Power (VP) has overcome this dilemma by developing a hybrid system that can be retrofitted into existing buses. For this to appeal to the industry, the system has to fit within a normal engine bay without modifications to the bus chassis, however the battery pack has traditionally been too large to do so, and is typically placed on the roof instead. This is costly and not possible as a retrofit solution. VP's innovation is a direct liquid cooling system that allows the battery pack to be made small enough to fit within the engine bay while reducing cost and improving lifetime and safety. VP has already developed a battery pack 50% smaller than the nearest competitor – this project will take</p>

		<p>another 25% off to ensure that retrofitting hybrid technology becomes the fastest and most cost-effective method of cutting fuel consumption and emissions from the nation's bus fleets.</p>
<p><b>Ventive</b></p> 	London	<p>As existing buildings are retrofitted and new buildings are built to higher energy standards, they become more airtight, and natural ventilation sources are removed. Based on an innovative and retrofit specific Passive Ventilation with Heat Recovery unit (initially developed with the help of TSB funded feasibility study and utilising passive stack effect and wind assistance), Ventive have designed a reliable ventilation system for all areas, including wet rooms which incorporates a number of inventions around passive extraction boost, extraction period extension, moisture withdrawal and simplified installation. The Ventive PVHR system is designed to overcome a number of challenges of wet room installation and makes the product usable in summer months and warmer climates, greatly increasing its export potential. The project will develop the technology to provide a "Green Deal and Energy Company Obligation ready" full house system, a proposition supported by both BRE and LABC.</p>
<p><b>WILLIAMS GRAND PRIX ENGINEERING</b></p>  <p>WILLIAMS F1</p>	Oxford	<p>The project will demonstrate the performance, reliability and robustness of Williams Advanced Engineering's stationary flywheel energy storage technology in an intermittent renewable energy environment. The magnetically loaded composite (MLC) flywheel system will be installed at the UK's National Renewable Energy Centre (Narec) and subjected to 'real world' power profiles typically seen in distributed/islanded weak grids comprising a mix of fossil based and intermittent renewable energy sources. The pilot demonstration programme, in collaboration with the University of Sheffield, will quantify improvements in frequency control and power stabilisation by using flywheel energy storage to smooth irregular and unpredictable power output from renewable sources such as wind turbines. Additionally the test programme will investigate the potential to substitute flywheel energy storage to replace, for example, diesel generation and/or reduce diesel generation capacity and utilisation thereby reducing carbon emission production.</p>
<p><b>Xsilon Ltd</b></p> 	Reading	<p>The project will deliver a robust communications solution for the smart metering HAN (Home Area Network), suitable for connecting in-home displays, smartplugs and appliances to a smart meter or home energy management system. It will work in all types of home, and everywhere within those homes. The data capacity and network structure will closely match that available from ZigBee wireless products but will provide a solution for linking smart meters to in home devices in the 30% of homes that cannot use ZigBee for this link. Xsilon's Hanadu technology, uses a home's existing electrical wiring to deliver data ("powerline comms" or "PLC") and is designed specifically for the needs of a smart meter HAN. Unlike other solutions, it reaches around the whole home from one end to the other, yet delivering high speeds and consuming very low levels of power. This ability to offer reliable "whole home" coverage overcomes the range limits of other options such as ZigBee without increasing the cost.</p>
<b>X-Windpower</b>	Kent	<p>X--Windpower is aiming to reduce the carbon footprint of electrified railways by up to 70% using wind energy generators distributed adjacent to the tracks and depots. The project will take advantage of Network Rail's land assets to validate X--Wind innovative vertical axis wind turbine technology for performance, economics and safety, specifically</p>

		<p>when operating in narrow corridors and in proximity to trains. The 2-year project consists of the design and development of an 80kW wind turbine based on a recently validated 6kW small-scale generator design. The project includes structural integrity evaluations and extensive field-testing of prototypes at a relevant site. Successful completion will lead to regional trials on Network Rail land before moving to a comprehensive rollout which could lead to the generation of 2,200 GWh of carbon--free electricity annually to part-supply the railway power system.</p>
<p><b>Yorkshire Water &amp; Intervate</b></p>  	<p>Bradford</p>	<p>The project will be run by the partnership of Intervate Ltd and Yorkshire Water Services Ltd with the specific objective of building a commercial scale Close Coupled Configuration Gasification module that will be designed to provide an innovative treatment template for the processing of both primary and secondary sewage sludge and other waste water treatment works' residues such as screenings, fats, oils and greases. The facility will process blends of sewage sludge with other waste feed-stocks, such as low grade waste wood and refuse derived fuels to produce renewable electricity and renewable heat. The renewable electricity generated will be used to power the process and export to the grid, whereas the renewable heat generated will be used in a closed loop system to dry sewage sludge to a level at which it can be blended to create a homogeneous gasification feedstock of the required physical characteristics</p>
<p><b>Zagres Limited</b></p> 	<p>Cambridge</p>	<p>Zagres, spun out from Cambridge University Engineering Department, has developed a patented brushless induction motor technology for use in industrial variable speed drive (VSD) applications, such as pumps and fans. Its unique electromagnetic design and control operation enables substantial cost reductions, projected as high as 25% as compared to existing VSD products by utilising a partially rated AC/AC power electronics converter. It hence opens up new opportunities, in a market projected to be £85b in 2020, by enabling a far greater proportion of motor applications to benefit from the energy efficiency and improved environmental impacts.</p>