Innovate UK

Results of Competition: Faraday Challenge - Innovation - Feasibility Studies

Competition Code: 1707-9_TRANS_BATTERY_FS

Total available funding is £10M

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
INTERCAL(UK) LIMITED	Novel lithium battery management and monitoring system for automotive	£91,833	£64,283
CIA TECHNOLOGY GLOBAL LTD		£85,354	£59,748
INDRA RENEWABLE TECHNOLOGIES LIMITED		£151,626	£106,138

Project description - provided by applicants
This project is to develop highly disruptive innovative technology in the management of lithium ion batteries in power applications, with potentially global economic impact. The work follows on from completion of a proof-of-concept completed by the applicants in July 2017 (Innovate UK Reference 132250). Lithium ion batteries provide by far the most effective rechargeable energy supply for power applications, providing very good energy storage and output from a given size and weight of battery. Properly managed, they remain usable for long periods and large numbers of charging cycles. The challenge for battery and electric vehicle designers is that lithium ion cells are generally prone to fire hazard ("thermal runaway") and are also very intolerant of overcharging and over-discharging. Thermal runaway events are associated both with overcharging and with undetected cell deterioration, notably internal short-circuits, which can develop and propagate critically in a very short time. Prior art in power lithium battery management systems ("BMS") requires complex circuitry and controls for automatically balancing cells during the charge cycle. This aims to maintain battery capacity while preventing damage from over-charging or over-discharging individual cells. Predictive diagnostic capability, however, is generally poor, as demonstrated in the notorious Boeing "Dreamliner" battery fires in 2013/14\. A wholly new BMS design was developed by Intercal (UK) Ltd in laboratory trials commencing in 2012 and completed with the aid of an EU research grant. Patent protection has been sought in the USA, China and Europe. The key design innovation is the elimination of automated cell balancing and with it the associated complex wiring looms. This greatly simplifies high voltage battery pack design, assembly and maintenance, and reduces potential failure points. However the key proven benefit is that the absence of cell balancing currents allows for game-changing new capabilities in predictive fault diagnosis. Operationally, the Intercal BMS has successfully completed multiple laboratory trials including a full-scale simulation of a civil airliner's auxiliary power system as part of Innovate project 132250\. This included successful early detection of simulated faults (and one genuine fault) all in line with earlier laboratory experience. The applicants are commencing automotive field trials in September 2017 using a road-going electric quadbike, in a project funded by the Niche Vehicle Network. The current project is to further develop the hardware and software and carry out multiple vehicle trials. If the successful, potential markets globally include all transportation modes and static grid storage.

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HEATH SCIENTIFIC COMPANY LTD	The Development of an Isothermal Control Platform (ICP) for the Precise Regulation of Battery Temperatures using Multiple Zone Control	£146,909	£102,836
Imperial College London		£146,196	£146,196

Project description - provided by applicants
The characterisation of batteries is critical in the development of Li-ion battery chemistries. This influences the designs of modules and the associated thermal management systems which handle the heat generated during their use in electric vehicles. Consequently it is fundamental to understanding whether or not particular battery chemistries and constructions are capable of providing enough power in a safe manner to drive a vehicle under both normal and extreme conditions of use. The design of a cooling system which prevents batteries from overheating is a necessary requirement in every electric vehicle and impacts on both safety, battery longevity and vehicle range. It is therefore imperative that a precise understanding of battery behaviour is established to minimise shortfalls that come about as a result of inaccuracies in the design data obtained from charging and discharging experiments. It was determined recently by researchers at Imperial College (ICL) in London, that there are significant inaccuracies with data obtained from such experiments on Li-ion cells when carried out in isothermal chambers that maintain a constant temperature environment. This was noted to be a problem at lower temperatures, such as those encountered during the winter in many parts of the world. It was clear that the temperatures of the batteries under test were deviating significantly, as the main method of heat removal was through convection. This resulted in significant misinterpretations of their behaviour and performance and is of great concern as this indicates that the current methods which use isothermal chambers are flawed to a significant extent, yet are relied upon exclusively by the Li-ion battery and the electric vehicle industries. An alternative means of achieving a more constant temperature is by direct contact with the battery. This will exchange heat through conduction in a much more controlled and direct manner, avoiding the above mentioned inaccuracies altogether. Bletchley based Thermal Hazard Technology (THT - a trading arm of Heath Scientific Co. Ltd.) are considered to be World leaders in Safety Calorimetry and in particular within the Li-ion battery and electric vehicle sectors. It is considered that bringing their expertise to bear upon this problem will lead to the successful development of a much needed testing platform which will provide a means of obtaining much more reliable data for use in the design and development of batteries and electric vehicles.

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LUCIDEON LIMITED	Field Enhanced Sintering of Beta Alumina for Electric Vehicle Battery Applications	£160,717	£96,430
IONOTEC LTD		£94,286	£66,000

Project description - provided by applicants

Sodium batteries are a key technology to replace current lithium-ion technology, with the world's lithium resource in limited supply and expected to be exhausted between 2025 and 2040\. This project will assess a promising new technique, Field Enhanced Sintering (FES), to manufacture beta-alumina solid electrolytes, a critical component of sodium batteries. A step change in ceramic processing would revolutionise sodium battery design by enabling lower temperature operation, reducing costs and improving safety and market acceptability for EVs. FES processing has the potential to lower sintering times and temperatures, and improve the properties of beta-alumina, a ceramic solid electrolyte used in sodium EV batteries. Lucideon has developed FES for processing structural ceramics, showing significant process benefits and enhanced product properties. These capabilities could deliver significant improvements to the electrolyte fabrication process and increase ceramic strength, allowing thickness reduction and lower resistance with benefits for sodium battery design and performance The project will be delivered by two SME's, Ionotec and Lucideon, who bring complementary expertise and capabilities plus market presence. Ionotec is a leader in solid electrolyte manufacture and sodium battery development, working with global clients. Lucideon is a leading developer of FES technology working with many ceramic manufacturers and researchers. This project aims to create a unique technology for exploitation in the UK. Sodium batteries made by this route could take significant shares of the EV battery market and lead to new manufacturing companies with associated supply chain and thus employment benefits.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
DEREGALLERA LTD University of Southampton	Feasibility research into composite carbon electrodes for Sodium-ion batteries	£286,345 £123,066	£200,442 £123,066
Project description - provided by applicants			
Batteries are key to our mobile way of life, they store electrical energy and can deliver at times when it is needed. Most high-performance batteries rely on lithium; a reactive and scarce metal. Barriers to market for alternative metal ion batteries come from their reduced level of energy storage, which reduces the ability of the battery to power devices. This is a one year project which aims to create a novel battery made with sodium-ion, rather than the current state of the art lithium-ion. It will have similar performance to lithium, but with a fraction of the raw material costs of lithium. The project will exploit prior and ongoing battery research between Deregallera's proven track record in development of novel battery technologies, and project partner University of Southampton's experience which spans over several decades.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
M-KOPA UK LIMITED	Advance Battery Life Extension (ABLE)	£226,461	£113,231
DENCHI POWER LIMITED		£78,088	£54,662
Imperial College London		£122,971	£122,971

Project description - provided by applicants
Innovate UK has the opportunity to enable UK-based electric vehicle (EV) manufacturers to avoid costly, premature disposal of used EV batteries by repacking cells into second-life packs for use in a novel generation of cheaper solar home energy systems (SHS) in sub-Saharan Africa (SSA). Specifically, support from the Faraday Challenge will catalyse the adoption of a state of the art diagnostic tool to reuse what EV auto manufacturers deem 'waste' batteries for a new product. After 8-10 years' of use, these lithium ion batteries (LIB) are no longer fit for EV performance, yet they still possess 70-80% of remaining capacity, making them valuable for a second-life application. This is critical to the industry, as the number of plug-in hybrid and EVs sold in the UK is expected to increase by 70% from 2016 to 2021 (MarketLine Industry, June 2017). However, the barrier preventing battery repurposing is a robust methodology to build reliable second-life packs with acceptable lifetime expectations. As a solution, Imperial College has developed a low-cost, innovative diagnostic tool needed to catalyse the market of second-life battery packs. To test its efficacy, Denchi Power can combine this tool with existing industry tests to build improved second-life battery packs for use in solar home systems (SHS). M-KOPA, the global leader in pay-as-you-go SHS, can then prove this concept within its 500,000 customer base in SSA. In summary, the ABLE project aims to "re-juice", reuse and recycle end of life batteries from the UK-based EV industry to extract more value from LIB cells. Specifically, ABLE will "re-juice" discarded packs by filtering useful cells using an innovative diagnostic tool developed by Imperial; reuse them in second-life applications such as M-KOPA's SHS; and ultimately recycle them once they have exhausted all useable capacity. If successful, Innovate UK will enable the UK automotive industry to dramatically reduce its environmental footprint and costs by avoiding premature disposal of LIBs, equip battery pack designers with needed tools to develop and commercialise innovative products, and support the impact of SHS providers by lowering the price of systems thus opening the market to the 1.2 billion individuals in the world without electricity.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
METEOR POWER LIMITED ACELERON LIMITED	Removable Rechargeable Rebuildable Recyclable Smart Battery System (4R SBS)	£710,447 £242,234	£497,313 £169,564

Project description - provided by applicants

Grandview Research has suggested that the global electric scooter market will be worth $38.57B by 2024\. In addition to the global consumer market there is a strong commercial market, from couriers to food delivery companies, many of whom have different requirements and different usage requirements. Few vehicles, even amongst the established petrol sector can cope with the demand of operating twelve hours a day for several years before being sold on to the secondary market. We are working with a company that leases 2,500 petrol powered food delivery vehicles that is looking to switch to electric but is struggling to find anything that can cope with the arduous shifts and 15,000 miles per year. Their requirements focus on vehicle robustness, improved efficiency, hot swappable batteries and rapid charging coupled with battery characterisation, rebuilding and recycling in preparation for selling the vehicle on to the secondary market. By offering a powerful removable battery pack that can be recharged quickly and come with a warranty for second user sales having been stripped, tested and rebuilt the benefits to the industry should be significant. By providing a capable vehicle coupled with a range of innovations to improve robustness and efficiency we can meet these requirements and save 2800 Kg CO2 a year just from this fleet alone. The opportunity to sell this battery pack and multiple pack charging capability and infrastructure to other companies could see considerable profit and significant emissions reductions. Given most of these vehicles are used predominantly around town the impact of these savings should have an even greater impact on improving air quality in these areas.

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TALGA TECHNOLOGIES LIMITED	Safe High Voltage EV battery materials (SAFEVOLT)	£155,712	£108,998
JOHNSON MATTHEY PLC		£121,932	£60,966
TWI LIMITED		£126,270	£126,270
University of Cambridge		£124,973	£124,973

Project description - provided by applicants

In order to reduce the carbon emission and global warming, its very critical to get Electric Vehicle (EV) widely used and acceptable with equivalent or better performance. The current EV batteries technologies are facing challenges in terms of safety while efficiently operating over 4V. The safety precautions taken in EV battery packs like cooling systems and gas escape channels result is very heavy battery packs. SAFEVOLT takes a wholistic approach to solving the problems of the range anxiety of consumers by focusing on safety and improving the cell energy density simultaneously. Safer cells with higher energy density mean less cooling and controlling systems at the battery pack level, therefore reduced cost, and more energy in the battery pack. Hence more driving distance in pure electric for both EV & PHEV and more affordable and safer batteries, making EV more affordable. This fosters the EV & PHEV market in the UK and globally. The SAFEVOLT project brings together 4 leading organisations that are at the forefront of battery materials innovation - Johnson Matthey (one of UKs largest battery companies and a leading global cathode material manufacturer) Talga Technologies (a SME with extensive experience in graphene production and R&D), University of Cambridge and TWI ltd. This project aims to achieve cells with 60% improved energy density and 30% reduced weight.

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KW SPECIAL PROJECTS LIMITED	SprayCoat	£245,829	£172,080
University of Warwick		£132,240	£132,240

Project description - provided by applicants

With all vehicles becoming electrified in some way by 2040, and considerable change occurring across all social, environmental and economic domains for energy storage and management, there is an ever-increasing resultant demand requiring Li-ion and other battery chemistries and technologies. To answer this critical need, we must to ensure the creation of effective production processes for battery manufacture, and a connected supply chain to support the future for the UK in this sector. This project seeks to generate a feasibility study and prototype demonstrator of a new technology in electrode coating process, which is a critical part of the manufacturing process of a battery and has the potential to dramatically improve cost efficiencies, and assist the adoption of the electrification. This novel technology will lead to significant efficiencies overall in the manufacturing lifecycle and consequently the value chain. It will assist to reduce cost, improve performance together with battery understanding, and reduce wastage of both valuable raw materials and scrap. Electrodes form part of the battery cell and it is essential to ensure that these electrodes are uniformly and consistently coated with material, as this considerably affects productivity yields and performance, and also dramatically affects cost. This project will look at how to create a hardware platform that will digitally print electrodes more accurately, using suitable material formulations, and with greater speed, which will develop advanced and cost effective manufacturing techniques, and bring battery manufacture increasingly in line with digital industry advances. This will ultimately assist to advance the UK's competitive position in battery cell technologies and production, and importantly, the transition to a low-carbon economy.

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ROLLS-ROYCE PLC	ATTESTS (Automotive Technology Transfer of Energy Storage Thermal Strategies)	£164,764	£82,382
Imperial College London		£163,655	£163,655

Project description - provided by applicants
The Automotive Technology Transfer of Energy Storage Thermal Strategies (ATTESTS) project is bringing together industry and academic experts to assess the feasibility of developing competitive high C rate battery modules through advanced thermal management, extending battery lifetime and power density. Imperial College London's in-depth understanding of the varied degradation mechanisms that shorten the life of battery cells has enabled them to pioneer novel cooling strategies. These cooling solutions can be implemented at modular level and the principles have been demonstrated through laboratory testing (TRL3). One of the key features takes into account the layered structure of lithium ion batteries and uses a homogenous cooling strategy that reduces degradation in hotter layers. Rolls-Royce (R-R) has been working with Imperial to investigate the benefit of Imperial's solution for high C marine applications. R-R supplies the complete marine electrical propulsion system including the battery package. APC targets for automotive also highlight high C as an important requirement for Automotive EV drive cycles. R-R and Imperial are submitting this proposal to attest the feasibility of Imperial's solutions for high C applications and to assess the suitability for automotive applications. The project proposes to support this assessment through a specific 12-month testing programme. This programme will test commercially available automotive battery cells that are specifically targeted at high C automotive and marine applications with and without Imperial's thermal management solutions (TRL 4). R-R and Imperial have worked in collaboration before and their unique blend of skills across battery cell, module, packaging and application know-how will enable a robust feasibility into more effective and reliable battery systems supporting both marine and automotive applications. To support the future exploitation plan the work will be disseminated and further supported by visits to the UK automotive industry.

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OXIS ENERGY LIMITED CENTRE FOR PROCESS INNOVATION LIMITED	Lithium Innovations for Future Electric vehicles (LIFE)	£316,624 £308,613	£189,974 £308,613

Project description - provided by applicants
The adoption of high energy density batteries is necessary to extend the range of electric vehicles, reduce range anxiety, and increase consumer acceptance. Batteries using lithium-metal as the anode material have significantly higher energy densities than conventional Li-ion batteries; a two fold increase in gravimetric energy can be achieved using lithium metal as opposed to graphite anodes. However, they suffer from short cycle lives due to the high reactivity of lithium. Current state-of-the-art lithium-sulfur and lithium-ion cells with lithium-metal anodes have cycle lives of approximately 100 cycles. To address this problem, OXIS have developed protective coatings on lithium metal foil at the lab scale, which lead to extended cycle life of lithium-sulfur cells. A high-throughput lithium-coating process is necessary to improve the cycle life of lithium-metal batteries at the volumes required for the automotive market. The Lithium Innovations for Future Electric vehicles (LIFE) project will assess the feasibility of scaling up these coatings on lithium metal foil. Led by OXIS Energy, leaders in the development of next-generation lithium-sulfur batteries, and joined by the Centre for Process Innovation (CPI), experts in coating technologies, this study will investigate four key areas in the scale-up of lithium-metal coatings: the materials properties of lithium foils received from suppliers; pre-processing lithium foils prior to coating; depositing protective coatings onto lithium foil; and post-processing and integration of coated lithium into lithium-sulfur cells. Multiple pre-processing, coating, and post-processing techniques will be explored to assess the feasibility of integrating each into a single pilot line. And at each stage of this project, the focus will be on identifying potential challenges with the scaling of lithium-metal protection in order to mitigate the risks involved in building a high-volume coating line. A scalable process for coating lithium foil is essential for manufacturing next-generation lithium-metal batteries for electric vehicles. Upon completion of this study, a detailed customer requirement document for a high-throughput pilot line for coating lithium foil will be produced. This can then be taken to manufacturers of high-volume processing equipment for the construction of a lithium foil coating line, which will allow for the rapid scale-up of protected lithium anodes, with the goal of having a pilot line installed and commissioned after completion of this project.

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FGV CAMBRIDGE NANOSYSTEMS LIMITED	LiBattene: Lithium BATTeries ENhanced by graphene for improving performance of Electrical vehicles	£162,120	£81,060
PV3 TECHNOLOGIES LTD		£137,513	£96,259
University of Cambridge		£104,153	£104,153

Project description - provided by applicants
LiBattene (Lithium BATTeries ENhanced by graphene for improving performance of Electrical vehicles) is a feasibility project focusing on the industrial-scale improvement of lithium ion batteries with the addition of ultra-high-quality graphene in order to achieve enhanced battery life cycle, charging rate and capacity. This project aims to contribute to achieving the UK's government agenda concerned with terminating the sale of petrol and diesel cars from 2040 to meet a 2050 reduction target requiring to bring down transport related CO2 emissions by at least 80%. The focus of this project concerns the electric vehicles given that the transport sector currently accounts for about 23% of global energy-related greenhouse gas emissions. Graphene is set to play an important role in improving lithium ion batteries in the automotive industry due to its superb flexibility, high electrical conductivity, good mechanical strength and chemical stability. When used as part of the electrode material, graphene can effectively prevent agglomeration of nanoparticles, reduce the size of the active material, improve electron and ion transmission capacity and enhance its mechanical stability. As a result, graphene-containing electrode materials have improved capacity and rate performance. The results of this feasibility project will allow to very clearly map out the advantages of industrial graphene compared to standard carbon additives and will provide clear cost-benefit metrics for this material in automotive lithium-ion applications. The project is planned to make graphene-based material formulations commercially available for use in lithium ion batteries of electric vehicles, in the first instance personal cars and motor bikes and later the whole spectrum of electric vehicles. The project partners include: FGV Cambridge Nanosystems (the project leader), PV3 (industrial partner) and University of Cambridge's Institute for Manufacturing (academic partner). This collaboration will help to create strong links between the nanotechnology / graphene production industry and the academic researchers, which will be beneficial long term in the UK's agenda to reduce the CO2 emissions to almost zero by 2050\.

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ARCOLA ENERGY LIMITED	IMproving Power bAttery Cooling Technologies (IMPACT)	£154,521	£108,165
Brunel University London		£84,711	£84,711
FLINT ENGINEERING LTD		£116,114	£81,280
Imperial College London		£129,049	£129,049
REACTION ENGINES LIMITED		£109,894	£65,936

Project description - provided by applicants

The IMPACT project will address the need for power-dense batteries for low and zero emission hybrid powertrains. Lead partner Arcola Energy is developing zero emission powertrains for buses and commercial vehicles . The project will explore the feasibility of integrating innovative thermal management technologies. Partners Reaction Engines and Flint Engineering have developed heat exchange technologies for aerospace and built environment that offer benefits to battery cooling, and Imperial College London have demonstrated a novel cooling approach. The IMPACT project will assess the technical and commercial feasibility of these technologies applied to module and pack designs. Drawing on leading academic expertise from Imperial College and Brunel University the partners will explore the technical requirements and cooling approaches and test in the lab. The project team will carry out a cost benefit analysis of the technologies to assess the business case for implementation in power battery modules and packs and will plan the next stage of development and commercialisation.

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VANTAGE POWER LIMITED	Conceptual Feasibility of a Heat Pipe as a Structural and Thermal Member in an Automotive Battery Pack Design	£282,328	£197,630
Brunel University London		£106,695	£106,695
FLINT ENGINEERING LTD		£116,114	£81,280

Project description - provided by applicants

This project titled: "Conceptual Feasibility of a Heat Pipe as a Structural and Thermal Member in an Automotive Battery Pack Design" will answer questions about the suitability of using a sealed heat pipe as a structural member in an automotive lithium-ion battery pack. Partners Vantage Power, Flint Engineering and Brunel will combine to bring the best research and innovation in two-phase passive heat transfer to the application of automotive lithium-ion battery packs. By improving heat transfer from the cells within a battery, packs with higher overall specific energy and power densities can be built whilst opening up applications in hot ambient environments where active cooling is a necessity. Thermal management in large battery packs currently requires either heavy, solid conductive paths or large amounts of coolant which both contribute adversely to the overall mass and complexity. Heat pipes have the potential to reduce this significantly making the integration of cells into large battery packs more affordable while guaranteeing through life performance and improving safety.

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PLASMA APP LTD.	Novel Carbon Allotrope for Lithium Ion Batteries (CALIB)	£249,243	£174,470
JOHNSON MATTHEY PLC		£120,848	£60,424
University of Cambridge		£136,052	£136,052

Project description - provided by applicants

The project goal is to develop a new type of Li-ion battery anode based on a totally new form of carbon material -Carbon Allotrope for Lithium Ion Batteries (CALIB). CALIB was discovered in a joint collaborative project between Plasma App Ltd and Cambridge University within funding from an Innovate UK project. CALIB was prepared in a form of thin film with Plasma App Ltd proprietary deposition technology Virtual Cathode Deposition, VCD. Cambridge University research group of Dr R Vasant Kumar characterized the structure and other physical properties of the material and fabricated Li-ion type of coin cells. On testing the material as an active anode material they demonstrated the battery capacity to be higher four-fold and cycle life stability longer than industrial state-of-the-art graphite based anode. Plasma App, Cambridge University and Johnson Matthey PLC are going to explore the new material with the goal to develop the functional electrode to be integrated within the standard Li-ion battery manufacturing process. Replacing standard graphite electrode with CALIB potentially will allow increase in the specific energy density of the Li-ion battery, increase in battery cycle-life, and improve safety especially under stressed high-power operation conditions.

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FERGUSSON'S ADVANCED COMPOSITE TECHNOLOGY LIMITED	CoRuBa	£256,873	£179,811
Imperial College London		£121,710	£121,710
Project description - provided by applicants			
The recent uptake of hybrid and electric vehicles has led to the development of batteries with ever greater capacity. These batteries generate substantial amounts of heat during use. Thermal management is therefore a major challenge. Furthermore, batteries also undergo strucural changes during use, they get larger or smaller depending on the state of charge in the battery, while also becoming incrementally larger over time. Our project makes use of advanced nanomaterials combined with a novel materials processing technology to manufacture a lightweight, highly thermally conductive adhesive to fasten batteries in place in an automotive vehicle battery pack.			

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Total available funding is £10M

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
BRILL POWER LIMITED E-CAR CLUB LTD	BABE: Battery management control system for Advanced Battery Engineering	£151,541 £60,052	£106,079 £30,026

Project description - provided by applicants

This project presents a unique opportunity for a young British start-up, Brill Power, to prove the business case for its pioneering battery management control system technology, through partnering with E-Car, the UK's leading electric vehicle (EV) sharing club. Currently EV batteries degrade at an unnecessarily quick rate (which will be worsened by the introduction of rapid charging) and under EV leasing models it is the manufacturer's responsibility to replace the battery. Furthermore, EV drivers often experience range anxiety, whereby drivers are unsure of the vehicle's ability to cover certain distances due to charge levels and limited charge infrastructure. Brill Power's revolutionary battery management control system addresses these factors, specifically by increasing the life of the battery by up to 60% and increasing the range of vehicles, whereby a vehicle that started with a 200km range will still be at 180km with the Brill Power battery management control system, when a conventional system would only be at 150km. This project seeks to confirm the predicted impact of Brill Power's technology on EVs, through comparing its performance to previously unobtainable data from E-Car's 140 EV fleet. This analysis will then underpin proposition testing, to be undertaken with the key EV fleet manufacturers Nissan and Renault (Brill Power's target market), shaping the commercial and technological development of Brill Power. Overall, the project will generate significant insight into the potential role of Brill Power's intelligent BMCS in EV battery manufacture and performance.

Note: you can see all Innovate UK-funded projects here
https://www.gov.uk/government/publications/innovate-uk-funded-projects Use the Competition Code given above to search for this competition's results