

Innovate UK

Results of Competition: Seeding tomorrow's vehicle technologies today - IDP12 CRD
Competition Code: 1509_CRD2_TRANS_IDP12

Total available funding for this competition was £25.71M from IDP12 and DALV

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 |
|--|---|-------------------------------|-------------------------------|
| Fusion Innovations Ltd Teqniqa Systems Ltd Randle Engineering Solutions Ltd Lyra Electronics Ltd University of Birmingham | Interjet RR - Complete Low Carbon Adaptive and Interactive Low Rolling Resistance and Aerodynamics System | £1,531,024 | £1,135,184 |
| Project description - provided by applicants | | | |
| <p>The Eco low Rolling resistance tyre or EcoRR, project is a follow on from a successful IDP8 Proof of Concept project called EcoRR. The project focus is a tyre which can adapt its profile and stiffness dynamically, allowing it to operate in a very low rolling resistance mode, or in a performance grip mode when cornering or braking/accelerating. Proof of concept work showed that with better tyre design and better traction design concluded that the technology was capable of a step change 7% CO2 reduction compared to a vehicle running on conventional pneumatic tyres, and in addition had the potential to improve cornering grip, reduce tyre manufacturing costs, NVH and provide inherent run flat capability. Future development will see ECORR become a fully integrated dynamic component of the Low Carbon Vehicle. To enable this the IDP12 project has built on the existing consortium between Fusion Innovations, UOB and Randle Engineering and added OEM support from OEM's such as Jaguar Land Rover and manufacturing support from Teqniqa and Lyra Electronics.</p> | | | |

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| Magnomatics Ltd Romax Technology Ltd Computational Modelling Cambridge Ltd University of Sheffield Changan UK R & D Centre Ltd | IMPACT - Integrated Magsplit Powertrain with Advanced Control and Testing | £2,866,621 | £1,950,640 |
| Project description - provided by applicants | | | |
| Magnomatics' innovative and proprietary magnetic CVT (MAGSPLIT) integrates a magnetic planetary gear and a highly efficient control motor/generator to enable the realisation of more efficient and compact Hybrid Electric Vehicle powertrain. A Vehicle Intent MAGSPLIT component has previously demonstrated high efficiency and robustness in a compact package, showing the potential to reduce CO2 emissions from new cars by 1.3M tonnes p.a. by 2025. For this project, a rig based full powertrain demonstrator will be delivered, with a major automotive OEM providing the vehicle specifications, packaging, prototype test engine and technical steer. Magnomatics will design, build and test the MAGSPLIT based full powertrain, Romax Technology will determine optimum HEV architecture and mechanical system, CMCL will provide engine and test analysis, University of Sheffield will lead the delivery of the powertrain controller. A powertrain capability and benefits assessment will enable the OEM to assess business case and market potential, enabling future UK and EE volume manufacturing of high value assemblies and components. | | | |

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| Jaguar Land Rover Ltd BorgWarner Ltd MAHLE Powertrain Ltd Johnson Matthey PLC Cambustion Ltd University of Oxford | HyPACE: Hybrid Petrol Advanced Combustion Engine | £3,840,763 | £2,134,544 |
| Project description - provided by applicants | | | |
| <p>An innovative research project led by Jaguar Land Rover, HyPACE (Hybrid Petrol Advanced Combustion Engine) will investigate new petrol engine technologies. The collaboration will integrate UK expertise from JLR(Combustion and Development), Borg Warner UK (Advanced Boosting Systems), Johnson Matthey UK(Emissions Control Technology), Cambustion (Emissions Development), MAHLE Powertrain UK (Engineering Consulting Services) and the University of Oxford (Advanced Optical Combustion Diagnostics). The collaborative project will target 10% engine fuel economy improvement in combination with emissions reduction and enhanced drivability. The collaborative project is part of JLR's wider strategy for lower emissions and improved engine fuel efficiency. While developing technical innovations, the partners will increase UK automotive competitiveness and skills. The project is aligned with the continued JLR investment in powertrain research as shown by the £1bn investment in the Wolverhampton Engine Manufacturing Centre.</p> | | | |

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| Ceres Power Ltd Nissan Motor Manufacturing UK Ltd M-Solv Ltd | High power density SOFC stack module for light commercial electric vehicle range extender | £1,353,508 | £772,291 |
| Project description - provided by applicants | | | |
| This collaborative industrial R&D project with Nissan UK, Ceres Power and M-Solv aims to demonstrate a compact, high power density, low emission SOFC battery charger for range extension of light commercial electrical vehicles (LCEV) such as the Nissan eNV200. This will involve the design, build, test and demonstration of a compact, robust, fast-response SOFC power module. This project aims to advance the key enabling technologies for a low emission SOFC/EV range extender system suitable for operation with a variety of high efficiency fuel types (including biofuels) applicable to the automotive sector. Success could lead to an APC bid, which would look to raise the market attractiveness of EV by enabling LCEVs to operate for long periods without the restrictions of electrical recharge from the grid. This highly disruptive approach supports the UK's move towards greater use of electric vehicles, supports Nissan UK's leading position in commercial EV development, opens up the 1.4 million annual EU sales of light commercial vehicles and makes significant progress towards the UK's 2030-50 low carbon energy targets. | | | |

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| Sunamp Ltd Paneltex Ltd Route Monkey Ltd Low Carbon Vehicle Partnership | Range extended- refrigerated BEVs for CO2 abatement in fleets | £1,843,624 | £1,145,912 |
| Project description - provided by applicants | | | |
| <p>Nowadays, the number of electric vehicles used in fleets to deliver chilled and frozen goods is low due to limited daily mileage as compared to internal combustion engine (ICE) vehicles. In fact, the electrical batteries need to provide energy for traction, cabin conditioning, and refrigeration of the container. With this project, Sunamp, Paneltex, Route Monkey and LowCVP aim to significantly increase the adoption of electric chilled and refrigerated vehicles for short delivery of frozen goods, by: 1) the integration of compact thermal stores to decouple the energy required for traction from that required for thermal loads; 2) the integration of real time measurements into software to optimise the route of each vehicle of the fleet, to maximise the benefits for the distributor. Major benefits are: 1) to achieve daily range comparable to diesel vehicles; 2) drastic reduction of local CO2 and other pollutants emissions by removing thousands of commercial ICE vehicles in cities; 3) increase of night deliveries because of low noise of these vehicles; 4) access for the distributor to ULEZ in cities; 5) improved comfort for drivers.</p> | | | |

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| Johnson Matthey PLC Johnson Matthey Battery Systems Ltd Hyster-Yale UK Ltd Imperial College London University of Oxford University of Warwick - WMG BAE Systems (Operations) Ltd Delta Motorsport Ltd | Advanced Lithium Ion Capacitors and Electrodes (ALICE) | £1,897,409 | £1,248,084 |

Project description - provided by applicants

The Advanced Lithium Ion Capacitors and Electrodes (ALICE) project will develop lithium ion capacitors (LICs) and validate these in a 48V module for use in three market sectors - automotive, e-bus and materials handling equipment. LICs combine the benefits of lithium ion and supercapacitor electrode materials and structures, providing enhancing energy density vs supercapacitors and better power density than batteries. Advanced materials will be developed and scaled (Johnson Matthey) and novel coating techniques (Oxford) used to provide electrode structures optimised for high rate capability. Roll to roll coating and A5 pouch cell manufacture (Warwick Manufacturing Group) will be followed by 48V module build and testing (Johnson Matthey Battery Systems (JMBS)) based on end user defined requirements (Nacco Materials Handling, BAE systems, JMBS and Delta Motorsport) and accelerated test protocols. Development of a physics based cell model (Imperial) will interlink with sophisticated layer structure characterisation (tomography, TEM) & cell performance results, evolving a rational design approach for specific end use scenarios.

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| Faradion Ltd AGM Batteries Ltd University of Warwick - WMG | Sodium-ion batteries for electric vehicles | £1,753,996 | £1,334,563 |
| Project description - provided by applicants | | | |
| A consortium of three businesses, Faradion Ltd. , AGM Batteries Ltd. and Renault together with WarwickUniversity have come together to demonstrate that battery packs based on sodium-ion technology can bemanufactured successfully on a commercial scale. The technology has been developed in the laboratory byFaradion Ltd who will be joining forces with Warwick University and AGM Batteries Ltd to transfer the technologyto AGM's battery manufacturing plant. Renault contributes to the setting of priorities for the programme byproviding information on market requirements. | | | |

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| Antich & Sons (Huddersfield) Ltd 313M Technology Ltd Jaguar Cars Ltd | MELComp2 - Mutiplex Energy Laser Consolidation of Continuous Fibre Aluminium Matrix Composites 2 | £2,604,302 | £1,656,590 |
| Project description - provided by applicants | | | |
| <p>Aluminium Matrix Composites (AMCs) offer the strength and stiffness of steel, but with the density of aluminium, making them an exciting candidate for reducing the weight of ground and air vehicles to help improve efficiency and reduce CO2 emissions. Advantages over carbon fibre reinforced plastic composites include higher temperature resistance, better toughness, recyclability and no corrosion in contact with aluminium structures. However the drawbacks are the current high cost of the alumina reinforcements and difficulty in applying existing techniques to high volume manufacture. This project aims to further develop and demonstrate a novel multiplex energy laser consolidation (MELC) process in combination with advanced 3D weaving to produce AMC components in a rapid, low energy, low waste process which is anticipated to enable the tough cost targets of the automotive industry to be met whilst reducing CO2 emissions in both the manufacturing and use phase of the components.</p> | | | |

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| Meteor Power Ltd Westfield Sportscars Ltd University of Bath | High Performance Low Emission Hybrid Power Train For Motorcycles And Lightweight Sports Cars | £2,995,421 | £2,188,145 |
| Project description - provided by applicants | | | |
| Meteor Power specialises in the development of cutting edge technology for electric vehicles alongside a range of exclusive high performance electric motorcycles due to enter the market in late 2016. This project will see the development of a compact hybrid power train for use in two and four wheel applications and other sectors. The development of the hybrid power train will see Meteor Power develop the first hybrid motorcycle available anywhere in the world whilst also making significant inroads in to reducing emissions in hybrid sports cars without sacrificing weight or performance. The hybrid power train, like our electric motor, controller and fast charging system, will be available for sale or license to OEMs and Tier 1 suppliers and will be the first engine in any motorcycle to be both Euro 4 and Euro 5 compliant. | | | |

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| Advanced Design Technology Ltd Valeo Air Management UK Ltd Jaguar Land Rover Ltd University College London (UCL) | High Pressure EGR Generator (HiPERGen) | £1,423,892 | £812,165 |
| Project description - provided by applicants | | | |
| <p>The High Pressure Exhaust Gas Recirculation Generator (HiPERGen) project will develop a novel recovery system that will be integrated into the high pressure exhaust gas recirculation (EGR) loop to utilise the un-used throttling energy for electricity generation using a turbine coupled with a high speed generator and achieving up to 3 % WLTP CO2 reduction. Valeo's experience in developing and validating a similar technology in a laboratory environment provides the background IP and knowledge consistent with an early TRL4. JLR will provide the operational conditions for the EGR recovery system and, together with Valeo, will specify the performance targets for the different components of the subsystem. An innovative turbine designed by ADT to withstand and perform under challenging operating conditions will be coupled with the novel e-machined designed by Valeo, and these two components will be embedded into the HP EGR loop. The performance of the optimised subsystem will be validated by simulations and experimental results in a gas stand test performed at UCL and in a vehicle demonstration performed by JLR and hence, reaching TRL6.</p> | | | |

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| Clean Air Power Ltd Criterion Catalyst Company Ltd MAHLE Powertrain Ltd Brunel University Loughborough University | Heavy Duty Dual Fuel Demonstrator Engine Achieving Future EU Emissions Compliance with 23% Carbon Reduction | £2,998,318 | £2,181,013 |
| Project description - provided by applicants | | | |
| <p>The aim is to develop new Heavy Duty Dual-Fuel (DF) combustion and after-treatment technologies to achieve future European emissions compliance with reduced carbon footprint at acceptable cost. The main deliverable will be a demonstration of 23% source-to-wheel carbon reduction relative to current diesel truck operation. The technical approach will involve the development and application of novel and innovative technology in three key areas: 1. Dual-Fuel Combustion Systems: New Premixed Micropilot Combustion (PMPC) systems and optimised engine component geometry will be developed to achieve significantly reduced methane emissions 2. Exhaust Aftertreatment: Innovative exhaust aftertreatment will be developed to enable the low-temperature oxidation of methane for compliance with future legislative testing procedures. 3. Integration of Control Systems: Innovative development of the Engine Management System (EMS) will be undertaken to ensure future emissions compliance with novel gas quality sensing capability.</p> | | | |

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| Johnson Matthey PLC G-volution PLC HiETA Technologies Ltd University of Manchester | Plasma Removal of Methane from Natural Gas Dual-Fuel Engines (PROMENADE) | £1,789,950 | £1,267,863 |
| Project description - provided by applicants | | | |
| The PROMENADE (Plasma Removal of Methane from Natural Gas Dual-Fuel Engines) project will demonstrate the use of non-thermal plasma, advanced combustion and control techniques and Additive Manufacturing to allow dual-fuel (Diesel-Natural Gas) to meet Euro Stage VI emissions standard while delivering considerable fuel economy benefits over conventional diesel engines. Johnson Matthey, G-volution Ltd and HiETA Technologies along with the University of Manchester and Queen's University Belfast, working with MAN Truck and Bus AG will provide a full scale engine bench demonstration of these combined technologies. | | | |

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| Far-UK Ltd Jaguar Land Rover Ltd HPL Prototypes Ltd University of Leicester TWI Ltd | HALO Hybrid Automotive Lightweight Optimisation | £1,910,104 | £1,410,375 |
| Project description - provided by applicants | | | |
| <p>The is a great pressure on the UK vehicle manufacturers to reduce fuel consumption and lower CO2 emissions. Great improvements in these requirements have taken place over recent years mostly by the development of highly fuel efficient engines. This trend of improved engines will not be sufficient to meet impending legislative requirements on carbon emissions. Therefore weight reduction of vehicles is vitally important. This must be done cost competitively, consumers would not pay much more for vehicles so cost effective solutions must be found. This programme seeks to find new ways of producing optimised structures using the approach of applying different materials where they are needed. This novel part of this technology is to develop the modelling techniques that allow the efficient use of these multiple materials. By doing this, both weight optimised and cost optimised structures can be produced.</p> | | | |

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| SGL Carbon Fibers Ltd Surface Generation Ltd Nifco UK Ltd Engenuity Ltd Jaguar Land Rover Ltd LMAT Ltd University of Nottingham University of Sheffield - AMRC | Thermoplastic Overmoulding for Structural Composite Automotive Applications (TOSCAA) | £2,879,707 | £2,063,875 |
| Project description - provided by applicants | | | |
| The TOSCAA project brings together a number of collaborating organisations to integrate a range of innovative, lightweight material and process technologies, enabling the development of a unique TP overmoulded structural automotive component for Automotive vehicle application. The project aims to demonstrate how TOSCAA technology offers the opportunity for this technology deployment in other applications on the vehicle and of interest in other sectors with lightweighting demands such as rail and aero. | | | |

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| Caterpillar UK Ltd Michelin Tyre Company Ltd FlowGuard Ltd | Motion Resistance Optimisation System | £1,387,954 | £800,128 |
| Project description - provided by applicants | | | |
| The Motion Resistance Optimisation System (MROS) is a modular, scalable, retrofitable and low cost tyrepressure modulation system that allows motion resistance of the vehicle it is installed to be optimised as a function of its operating environment. It will increase machine efficiency by minimising losses associated with tyre-ground interface. Implementation of the MROS is projected to enable at least 4% CO2 reduction for Heavy Goods Vehicles (HGV), 15% CO2 reduction for Agricultural tractors (Ag) and will provide measurable CO2 reduction benefits across all other vehicles to which it is applied. Furthermore, the implementation of MROS technology will provide significant benefits to fuel efficiency, will contribute to lowering the vehicle owning and operating costs, will extend tyre life and will also improve vehicle safety. | | | |

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| HiETA Technologies Ltd University of Nottingham Alcon Components Ltd Renishaw PLC Added Scientific Ltd University of Liverpool Moog Controls Ltd | Functional Lattices for Automotive Components (FLAC) | £2,475,191 | £1,742,742 |
| Project description - provided by applicants | | | |
| Vehicle efficiency, regardless of the powertrain type, can be increased through several strategies, including reducing weight, aerodynamic drag, reduction in rolling resistance and powertrain efficiency. Out of all, weight reduction is considered to have the greatest potential to increase vehicle efficiency and thus to reduce the CO2 emissions. The objective of the FLAC project is to progressively develop and demonstrate a portfolio of lightweight automotive components with increased efficiency and functionality utilising an integrated SLM design methodology, a novel class of lattices, new aluminium alloys for SLM and demonstrate the viability of selective laser melting as a manufacturing route. | | | |

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| Controlled Power Technologies Ltd Tata Motors European Technical Centre PLC Ricardo UK Ltd Provector Ltd | FEVER (Forty Eight Volt Electrified Rear Axle) | £3,357,009 | £1,835,584 |
| Project description - provided by applicants | | | |
| <p>The FEVER project will apply 48V electrification to the rear drive-line of a B-segment city car to enable advanced hybrid electric drive functionality at a reduced cost to that of a high voltage PHEV or EV. The objective is to realize a 10%-15% on-cycle benefit based on a Tata Bolt demonstrator with significant real world improvement over a typical city drive cycle. This will require a high level of innovation in the following areas: Development of a next generation oil cooled, 4 quadrant, Switched Reluctance hybrid motor Light-weight, low cost electric rear axle module with integrated 48V electric motor and hybrid battery Package efficient scalable suspension concept with focus on enabling late configurations of vehicle and body structure to optimise for cost and volume implications IP generation around the development of low voltage advanced motor control and electric driving control strategies The project will culminate with the delivery of 2 through-the-road hybrid demonstration vehicles</p> | | | |

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