Transport Research and Innovation Grants 2023

Grant Specification

Contents

Introduction

The Transport Research Innovation Grants (TRIG) Programme 2023 will launch on the 23rd October. The Department for Transport is offering innovators grants of up to £45K to undertake early stage, high-risk research and development projects across 5 areas.

To deliver the Government's ambition to cement the UK's position as a science and technology superpower, the UK needs to continue to support grass roots innovation to help increase employment opportunities, address skills gaps, create new IP and export its products globally. Through TRIG, DfT works with innovators developing technology, products and services that aim to make the UK's transport network safer, more resilient, greener, and more accessible.

TRIG supports future leaders in transport innovation by:

- Awarding 100% funding for the development of new technology, allowing innovators to either succeed or fail fast.
- Providing a collaborative space for innovators, SMEs, large businesses and DfT's policy teams to work together on realising shared goals.

This document provides details of the scope of the funding calls within the 2023 TRIG competition. Applicants are advised to consider this specification along with the guidance document to ensure the application questions are addressed appropriately. The scope and size of TRIG competitions varies with each round of funding to remain in line with the Department's needs. The TRIG competition is formed of an open call and one or more targeted calls in specific areas.

Proposals should clearly highlight the innovative and novel aspects of their potential transport solution. The competition is designed to offer small amounts of funding via a low-burden process designed to suit time-poor SMEs and micro-companies taking their first steps. Proposals should all prove an innovative concept, taking an idea typically from TRL 2 (basic research) to TRL 4 (proof of concept/small scale prototype).

The solution could be a completely novel idea or approach. However, approaches or innovations from a part of the transport system or other area applied in a novel way to the transport system, are also of interest.

We are particularly interested in hearing from organisations (or consortia) that have a clear plan for how they will further develop their innovative solution after the end of the funded TRIG project. This could include SMEs and academics partnering with transport operators or infrastructure owners to conduct further testing and trialling, for example, in real world environments. This could also include organisations who can demonstrate that they understand the requirements of potential customers, or who have potential customers partnering with them during the TRIG project.

2023 TRIG Competition Calls

The 2023 TRIG scheme comprises of five targeted calls aligned to specific DfT priorities, as outlined below, and an open call. The open call encourages applications with innovative ideas across all areas of transport where there is the potential for benefit.

Challenge	Target number of projects	Target total funding
Open Call	3	£135,000
Connectivity, AI and Digital Twins	5	£225,000
Airport Decarbonisation	10	£450,000
Local Transport Decarbonisation	6	£270,000
The Future of Freight	8	£360,000
Maritime Decarbonisation	8	£360,000
Total	**40**	£1,800,000

All funding calls use the same application form and assessment criteria. Projects must clearly articulate what challenge or un-met need is being addressed and how the solution goes about solving that challenge of meeting that need. The solution must be innovative, either they are genuinely new or take an existing solution and use it in a new way; and have a strong science (including social science), engineering, or technology focus.

All bids should contain:

- A clear description of the challenge being addressed and how it supports DfT's priorities
- How the solution will meet the challenge and what is new and innovative
- Understanding of the potential impact – will this make journeys faster, more accessible, greener, or perhaps make freight more efficient? What in terms of jobs and growth could this idea drive?
- Delivery plans to provide confidence in the work
- Control of the costs and value for money – although TRIG can offer 100% funding, leverage is encouraged
- Next steps after the grant – how will the innovation make its way to market if the project is successful?
- A well thought out risk assessment, with clear risk mitigation measures.
- Details of the applicant organisation's approach to Equality, Diversity and Inclusion

Eligibility

TRIG provides 100% grant funding and is open to all businesses (including micro, small and medium-sized enterprises) and universities to support research, proof of concept and prototyping work. Organisations must be based in the UK but are able conduct elements of work through overseas contractors. However, projects and technologies or services must be fully delivered and deployed in the UK.

Competition Scope
Open Call

Background

The purpose of the Open Call is to seek innovative ideas that have the potential to address a UK transport challenge, across all modes, challenges and technology areas. It should be noted that although the open funding call is available to solutions to all transport challenges, applicants should consider their proposals within the context of DfT's priorities and innovation needs laid out below.

Scope

The Department is specifically seeking innovations that have the potential to address the DfT strategic aims and are not suited to any of the targeted calls.

DfT's Strategic Aims are:

- Grow and level up the economy - *Improve the connectivity across the UK and grow the economy by enhancing the transport network on time and on budget*

- Improve transport for the user - *Improve transport users' experience, ensuring that the network Is safe, reliable and inclusive*

- Reduce environmental impacts - *Tackle climate change and Improve air quality by decarbonising transport*

We will consider any science or technology that could contribute to improving the transport system. For example, this could include:

- Investigating equality of access to transport services for all users
- Investigating the performance of a new low carbon fuel
- Exploring new ways of exploiting DfT and other transport datasets to improve services e.g., open bus data
- Designing new tools to increase the safety of women on public transport
- Creating tools for encouraging mode shift and active travel.

Please note this is by no means an exhaustive list and we are keen to hear from applicants developing new ideas in other areas of transport innovation. We know we do not have a monopoly on wisdom, but there are some things which we do know are important. Details of these can be found at **Annex A** to this document. This list is intended to spark ideas and will not be used as part of the bid assessment process.

Budget and Bidding

The total budget available for the open call is approximately £135,000. We are looking for up to 3 projects of up to £45k each; however, the final number of projects funded will

depend on the number of quality applications received, value-for-money, and the policy needs of DfT.

Applicants are encouraged to consider the scoring matrix in the development of their proposal to ensure the development of credible bids. Where applicants submit more than one bid, evidence should be presented as to the deliverability of both projects side by side.

Local Transport Decarbonisation

Background

Transport is the largest emitting sector of greenhouse gases across the UK economy and local transport has a key role to play in helping the UK to achieve net zero by 2050.

Considering transport decarbonisation at a local level recognises the importance of each individual city, town and village and the unique challenges faced by local areas across the UK. We want every place in the UK to be cleaner, greener and healthier, and to make places more prosperous and pleasant environments to spend time in and enjoy. Using innovative solutions to local challenges is crucial to reducing transport emissions and accelerating the transition to net zero.

This call seeks to address these challenges. It will support SMEs, industry and academia to access research and development support to progress innovative proof-of-concept projects. These will have the potential to deliver emissions reductions and other benefits including improvements to air quality and better-connected communities.

Scope

The Department is seeking innovative technologies and approaches that have the potential to accelerate the decarbonisation of local transport systems. These projects should take a place-based approach, demonstrating an understanding of the needs of local areas and communities, whilst also having the potential to be scaled-up across the UK in the future.

Projects could include utilising technologies to understand how to better connect multiple modes of transport via measures such as Mobility Hubs; supporting communities to choose greener transport choices; and tools to address the challenges faced by rural areas on transport decarbonisation. Areas of interest include but are not limited to:

- Future of transport solutions such as Mobility as a Service (MaaS)
- Supporting businesses to reduce their transport emissions
- Supporting to the uptake of lower-carbon transport modes
- Integration of transport modes such as Mobility Hubs
- Shared mobility solutions such as Demand Responsive Transport and micromobility
- Planning tools to drive transport decarbonisation
- Improving transport connectivity in rural areas
- Low-carbon travel tourism in rural areas
- Accessibility in low-carbon transport modes
- Improving journeys and user experience of low-carbon transport modes through data

The following examples are out of scope for this funding call:

- Projects which do not demonstrate the potential to be scaled up in a local area

- Projects which do not have the potential to deliver carbon reductions
- Projects which only focus on data collection

Budget and Bidding

Applicants can apply for a project grant of up to £45,000.

The budget available for the Local Transport Decarbonisation funding call is approximately £270,000. We are looking to fund up to 6 projects, however the final number of projects funded will depend on the number of quality applications received, value-for-money, and the policy needs of DfT.

Applicants are encouraged to consider the scoring matrix in the development of their proposal to ensure the development of credible bids. Where applicants submit more than one bid, evidence should be presented as to the deliverability of both projects side by side

Airport Decarbonisation

Background

On 19 July 2022 DfT published the Jet Zero Strategy, setting out the Government's approach to achieving net zero 2050 (or "Jet Zero") UK aviation. The Strategy focuses on the rapid development of technologies in a way that maintains the benefits of air travel, whilst maximising the opportunities that decarbonisation brings for the UK. Some of the core Jet Zero policy measures include the development and deployment of Sustainable Aviation Fuels and Zero Emission Flight technologies, decarbonisation of airport ground operations, continued efficiencies from the aviation system, green-house gas removals and market-based measures. The Strategy also has co-benefits of improving air quality, promoting jobs and growth, and reducing noise pollution.

This call seeks to develop both the technologies and the evidence base available, to enable the delivery of two policy commitments in the Jet Zero Strategy:

- To support airports develop the ground infrastructure necessary to handle zero emission aircraft.

- Our ambition for all airport ground operations in England to be zero emission by 2040.

Scope

We are seeking to fund projects which will help us step closer to delivering on the two Jet Zero Strategy policy commitments as set out above.

We are particularly interested in projects which:

- Deliver work focussed upon the decarbonisation of airport ground operations

- Are focussed upon the Civil, Commercial air transport sector

- Can demonstrate the development of zero carbon emission technologies suitable for deployment in airside environments and/or to enable the handling of hydrogen or battery electric aircraft

- Can develop the evidence base of future hydrogen demand at UK airports

- Can enable the safe handling of hydrogen in airside environments

The intended project outcomes should include some or all of the following:

- Stimulate activity in industry and academia to develop and commercialise technologies which can support the decarbonisation of airports.

- Increase the visibility of airports as a market for companies developing low and zero carbon technologies.

- Support innovators to establish relationships with airports, energy suppliers and manufacturers in the hydrogen eco-system.

- Enable the development of technologies to facilitate innovators putting forward credible proposals for larger follow investment from private or public sector sources.

The following examples are out of scope for this funding call:
- Projects where work is undertaken outside of the UK
- Projects focussed upon aircraft manufacturing or Sustainable Aviation Fuels
- Projects where the primary focus is upon 'Future of Flight' (such as E-VTOL or Unmanned Aerial System) applications, Commercial Spaceflight and/or Military aviation unless there is clear evidence that findings may be transferable to commercial air transport.
- Aviation projects not focussed upon airport ground operations, for example airspace management, efficiencies in flight routing or aircraft emissions in flight.

Budget and Bidding

Applicants can apply for a project grant of up to £45,000.

The budget available for the Airport Decarbonisation funding call is approximately £450,000. We are looking to fund up to 10 projects, however the final number of projects funded will depend on the number of quality applications received, value-for-money, and the policy needs of DfT.

Applicants are encouraged to consider the scoring matrix in the development of their proposal to ensure the development of credible bids. Where applicants submit more than one bid, evidence should be presented as to the deliverability of both projects side by side.

The Future of Freight

Background

Ensuring our freight sector is future proofed today will yield long-term benefits for future generations. In addition to economic gains, such as increased revenue, it is crucial to consider the impact on emissions, congestion, and air quality, all of which significantly impact our country's well-being. To achieve this, the freight sector requires a collaborative effort between government and industry. As we look to build back better from the pandemic, we can create a sustainable economic future with freight at its core. The Future of Freight program is working with the freight sector to implement its long-term plan, which considers freight a system supporting all domestic and international supply chains. Freight and logistics play an integral role in all aspects of life in the UK, and the team aims to achieve the goals outlined in the 2022 Future of Freight Plan. These include establishing a National Freight Network, investigating ways to enhance freight status within the planning system, supporting the transition to net zero, and promoting innovation in the freight and logistics sector.

The TRIG projects aim to promote innovation, generate growth in the transport sector, establish connections between policy teams and innovators, and shape emerging technologies for more positive outcomes. The freight-focused TRIG program should also support the Freight Innovation Fund and Freight Innovation Cluster while serving as a preliminary channel for SME solutions after achieving higher technology readiness levels.

Scope

The Future of Freight call aims to support innovative ideas that have the potential to address the opportunities and challenges faced by the Freight and Logistics sector and its ancillary/supporting services, as outlined in DfT's Future of Freight plan[1]. This includes, but is not limited to, the following areas:

- Sustainability
  - decarbonisation
  - the circular economy
  - traffic congestion
  - improving air quality
  - waste management
  - freight packaging
  - sustainable energy sources
  - changing skills requirements

---

[1]
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1085917/future-of-freight-plan.pdf

- Technology and innovation

  - o testing and implementation of emerging technologies (e.g., automation)
  - o adaptation of business models to align with rapidly changing patterns of consumer behaviour.
  - o efficiency and optimisation of cross-modal freight and logistics systems
  - o management of capacity in a congested system
  - o use of data and data sharing between private actors and public and private sectors to design and optimise systems.

The following examples are out of scope for this funding call:

  - o Any areas/projects outside the early proof of concept stage –TRL 1-4
  - o Projects which are not aligned to priorities stated within the 2022 Future of Freight plan.

Budget and Bidding

Applicants can apply for a project grant of up to £45,000.

The budget available for the Future of Freight funding call is approximately £360,000. We are looking to fund up to 8 projects, however the final number of projects funded will depend on the number of quality applications received, value-for-money, and the policy needs of DfT.

Applicants are encouraged to consider the scoring matrix in the development of their proposal to ensure the development of credible bids. Where applicants submit more than one bid, evidence should be presented as to the deliverability of both projects side by sides.

Connectivity, AI and Digital Twins

Background

Recognising the immense impact innovative technologies can have throughout the transport sector, the department has established dedicated work programmes in future connectivity, artificial intelligence and digital twinning. Fast, reliable and secure connectivity underpins large parts of our economy and the transport network. Artificial intelligence (AI) is the machine-driven capability to problem solve and make decisions in a way that imitates human intelligence. Digital Twinning refers to dynamic digital models representing a system, asset or process, that utilise right-time information to drive performance and efficiencies.

The transport sector is a complex system which generates vast quantities of data from users, vehicles and infrastructure. Digital twins are therefore a rich source of opportunity for better operation of transport fleets, networks and management of infrastructure. There is huge potential to analyse, through artificial intelligence and machine learning, data gathered from a digitally connected transport network to create a digital twin that can enable safer, greener and more efficient transport.

As sensors, connectivity, data processing and decision making technologies have all made recent, rapid steps forward, the Department would like to explore how innovators could use a combination of these technologies can feed into the development of Digital Twins that could support DfT in its strategic aims to improve transport for the user, reduce environmental impacts or grow and level up the economy.

Scope

The scope for this call is not constrained to one transport mode or outcome, but projects will need to be able to exploit **at least two** and ideally three of the technologies (Artificial Intelligence, Digital Twins, and Future Telecoms & Digital Connectivity) to be considered.

We would like to see projects which display:

• Innovative use of communications networks/technologies to share data and/or:

• Feedback between digital and physical assets to improve processes and outcomes and/or:

• The use of Artificial Intelligence/machine learning to process the data and generate insight

The scope for this call is not limited to a particular transport mode or outcome, but all projects must have a transport focus and project types could include:

• R&D and Testing of new transport modes and systems, including scenario-based testing

• Operational use cases, using live data communicated to improve performance and manage incidents

• Infrastructure performance analysis to deliver outcomes such as risk reduction and timely intervention, condition monitoring, or whole life carbon assessment

• Innovative sensor networks based on emerging, wide area or low power communications protocols to provide novel situational awareness

• Establishment of federated networks of digital twins to enable data sharing and trustworthy AI applications

<u>The following examples are out of scope for this funding call:</u>

- Paper-based studies – we would like to see real data being used to drive outcomes.

Budget and Bidding

Applicants can apply for a project grant of up to £45,000.

The budget available for the Emerging Technologies and Digital Twins funding call is approximately £225,000. We are looking to fund up to 5 projects, however the final number of projects funded will depend on the number of quality applications received, value-for-money, and the policy needs of DfT.

Applicants are encouraged to consider the scoring matrix in the development of their proposal to ensure the development of credible bids. Where applicants submit more than one bid, evidence should be presented as to the deliverability of both projects side by side

Maritime Decarbonisation

Background

Within transport, maritime emissions are significant: UK domestic shipping alone emits more greenhouse gases than buses and rail combined, and without intervention, domestic shipping emissions will continue to rise. The UK has a legislative target of Net Zero by 2050, but the lifespan of vessels is approximately 25-30 years, so intervention is needed now.

In March 2022, the Government allocated £206m research and development funding to the UK Shipping Office for Reducing Emissions programme (UK SHORE) in the DfT to accelerate the technology necessary to decarbonise our domestic maritime sector.

Through the UK SHORE programme, the Government is tackling the technical barriers that shipbuilders, their supply chains, and ship operators face in adopting clean propulsion technologies. This will help to bridge the gap between these and conventional technologies, driving the UK towards our domestic Net Zero targets. The UK SHORE programme will also help industry to capitalise on the emergence of new markets, placing the UK at the forefront of the design and manufacture of zero emission vessels.

UK SHORE interventions are aimed at addressing different barriers to maritime decarbonisation over a range of technology-readiness levels (TRL). The successful TRIG projects will feed a pipeline of innovation, enabling the development of clean maritime technologies towards commercialisation and deployment. This will decarbonise maritime transport and develop the UK's competitive edge in clean technologies. As a result, it will allow us to meet the DfT strategic aim of growing and levelling up the economy – contributing to the UK's wider global impact.

Scope

Given the breadth and scale of UK SHORE interventions that are being delivered up to 2025, the DfT is using TRIG to support innovators conduct early-stage proof of concept of clean maritime solutions.

Projects must be focussed on clean maritime solutions that reduce greenhouse gas emissions by the UK's maritime sector, as set out in the [Clean Maritime Plan](#), and support the transition to Net Zero by 2050.

Projects **must have an innovative aspect**, although this does include products being used in innovative ways, outside of their original intended use.

Projects could focus on:
- Low and zero-emission fuels, energy sources and vessel technologies.
- Land side infrastructure to facilitate the update of low and zero-emission fuels, energy sources and vessel technologies.

- Energy efficiency measures to facilitate the uptake of low and zero-emission fuels, energy sources and vessel technologies.
- Smart shipping technologies, automation and artificial intelligence that delivers indirect emissions savings for any size of vessel.

The following examples are **out of scope** for this funding call:
- Projects derived from bids that were unsuccessful in securing funding via other UK SHORE competitions, including the Clean Maritime Demonstration Competition and the Zero Emission Vessels and Infrastructure Competition.
- Capability demonstrations of currently marketed or existing technology.
- Projects that focus only on increasing the efficiency of current conventional fossil fuels and powertrains of maritime vessels.
- Projects involving aqua culture.
- Projects focused on marine conservation and ecology, such as mapping the sea floor.
- Capital investment only projects.
- Projects investigating the feasibility of financial products, including green finance.
- Projects focused on biofuels, except for projects strictly focused on inland waterway vessels and Non-Road Mobile Machinery (NRMM), which includes port-side machinery.
- Projects dependent on export performance - for example giving a subsidy to a baker on the condition that they export a certain quantity of bread to another country.
- Projects dependent on domestic inputs usage - for example if they insisted that a baker use 50% UK flour in their product.

Budget and Bidding

Applicants can apply for a project grant of up to £45,000.

The budget available for the UK SHORE funding call is approximately £360,000. We are looking to fund up to 8 projects, however the final number of projects funded will depend on the number of quality applications received, value-for-money, and the policy needs of the DfT.

Applicants are encouraged to consider the scoring matrix in the development of their proposal to ensure the development of credible bids. Where applicants submit more than one bid, evidence should be presented as to the deliverability of both projects side by side.

Annex A: Broad Innovation Needs for the Open Call

This is primarily aimed at applicants to the Open Call to spark ideas for innovative projects, it is not an exclusive list. Other ideas which can improve the transport system will be given equal weighting during the bid assessment process under the Open Call.

Although the scope for the Open Call is broad, there are some technologies which we are keen to see being utilised and considered:

- Carbon Capture, Utilisation and Storage technology
- Advanced Materials
- Additive Manufacturing
- Nanotechnology
- Engineering Biology
- Novel Energy Vectors and Propulsions
- Sensor Technology
- Biometric Technology
- Sustainable Technology

Below is a summary from DfT's Areas of Research Interest (ARIs). The latest DfT ARI was published in April 2023. It is by no means an exhaustive list but rather it should spark ideas and inspire projects which will make up the Open Call.

Sections are organised under the headings of:

- Reducing the Environmental Impacts of Transport
- Improving Transport for the User
- Growing and Levelling up the Economy

Reducing the Environmental Impacts of Transport:
Tackle climate change and improve air quality by decarbonising transport, mitigating wider environmental impacts, and ensuring the transport system is resilient to climate-related change

Context

Transport is the largest emitting sector of greenhouse gases (GHG) in the UK, contributing 27% of domestic emissions in 2019. Our transport system must change to deliver the Government's Net Zero ambition and DfT will drive forwards that change through our longer-term green transport agenda. Sustainability will be at the heart of levelling-up. People everywhere will feel the benefits - villages, towns, cities and countryside will be cleaner, greener, healthier and more prosperous and pleasant environments in which to live and work.

Key areas of focus are:

- Decarbonising all forms of transport
- Decarbonisation of more difficult modes of transport e.g., HGVs
- Maximising the benefits of sustainable low carbon fuels
- Future transport – better choices and more choice
- New technologies to ensure the removal of embodied carbon in transport infrastructure
- Resilience to climate change, built into the transport system

Improving Transport for the User:

Build confidence in the transport network and improve transport users' experience, ensuring that the network is safe, reliable, and inclusive.

Context

We must put the needs and expectations of current and potential users at the heart of the operation of the transport system, considering end-to-end journeys rather than focusing solely on individual transport modes. Ensuring that our infrastructure and the services which use it meet the varied needs of businesses and the public, are attractive, affordable, sustainable and resilient is a crucial goal for the department.

Key areas of focus are:

- Measuring and understanding user experience and accessibility
- Designing transport systems to work for users in different areas – urban, peri-urban and rural
- Improving the journey end-to-end for the user
- Preparing the transport system to both benefit from new technologies and be resilient to the risks associated
- Improving safety of vulnerable passengers on transport systems
- Improving accessibility in transport
- Improving safety for operators of vehicles
- Ensuring transfer between different modes of transport are smoother and ensuring it caters to user accessibility needs
- Encouraging active travel and finding ways to make it safer

Growing and Levelling up the Economy :

Improve connectivity across the United Kingdom and grow the economy by enhancing the transport network on time and on budget

Context

Government is committed to Levelling Up across the UK so that every corner of the country can benefit and share in future prosperity. Transport connectivity is an essential input into the efficient functioning of markets, reducing the costs of doing business and supporting linkages between key sectors of the economy. More efficient and faster delivery of major projects are fundamental to job creation and so a key lever for economic growth. We are

therefore enhancing the national strategic transport network, shifting the focus
of DfT investment towards major projects that link the towns, cities and left behind places
outside of London and the South East.

Key areas of focus are:
- Transport interventions in both disadvantaged and left-behind places
- Impact of transport on local skills and jobs
- Stimulating and supporting innovation
- Impact of transport on wellbeing
- Driving mode shift towards public transport use
- Impact of emerging technologies on demand for public transport
- Inward investment into UK transport innovation
- Utilising R&D in the transport sector to be facilitated to be a facilitator of international engagement and trade