

GCRE outline plans for innovation push with Innovate UK

November 4, 2022



On Wednesday, guests were invited to hear about how they could get involved with working with the project, and its construction. On Thursday, the team, joined by Kelvin Davies, rail lead at Innovate UK, welcomed guests to an event to hear a little more about how Innovate UK, part of UK Research and Innovation, and the Department for Business, Energy and Industrial Strategy (BEIS) will be working with GCRE to invest up to £7.44 million in projects delivering and demonstrating innovation in railway construction.

Since 2007, Innovate UK has delivered investment of £2.5 billion, with industry match taking the total value of projects up to £4.3 billion. The 11,000 projects delivered have added an estimated whopping £18.3 billion to the economy, the equivalent of 36 for every £1 invested – not a bad return.

With 8,500 organisations involved in the works, over 70,000 jobs have been created through the projects delivered, with an average of nine jobs per organisation. Getting involved with the organisation can be pretty good for business.

Innovate UK and GCRE

In order to deliver GCRE, Innovate UK is offering organisations the opportunity to showcase their ground-breaking innovative systems and products, to make the site a true showcase for cutting-edge rail technology. There is a huge push to ensure that GCRE is as the front line of products, delivering the very latest railway can offer, the organisation is reaching out to organisations to come forward with options to address a series of requirements at GCRE.

Davies explained how Innovate UK is offering initial grants of up to £25,000 of matched funding to help fund feasibility studies, with a total of £575,00 allocated this phase of the competition. The potential phase two competition has up to £6.865 million allocated to deliver and demonstrate the best innovations from the phase one feasibility studies, a hefty whack to really help get projects off (or into) the ground.

Phase two will fund up to 12 projects to deliver demonstrations, with a total grant funding request of up to £570,000, for up to 12 months in duration.

All organisations are encouraged to get involved with submitting a phase one feasibility study, as long as they are UK-registered, their project is carried out in the UK, and they exploit the results from or in the UK. The project length can be no more than three months, and cost no more than £40,000 in total.

Davies explains: "Phase one is the stepping-stone to phase two. It provides us with the opportunity to do some filtering before we commit the bulk of the funding.

"Only about 10% of the funding is available in phase one – if you like this is an extended interview. An extended opportunity to show what you can deliver.

"Only phase one applicants will be able to apply to phase two, so there's a much higher probability of successful funding once you're through the first round."

The timeline

Davies outlined a competition which supports initial feasibility studies, explaining how organisations would deliver a demonstration of innovation in railway construction to the GCRE site.

The competition opened on 21 October, with a submission deadline of 12pm on the 14 December (so there's not a huge amount of time to get plans together)! Davies stressed firmly that anything submitted after the deadline on the deadline day would absolutely not be considered, so make sure you set your alarms.

"Please don't do it at the last minute," said Davies. "At one minute past the submission time the phone calls always come in asking us to reopen submission and with regret, no we can't because all the other teams have managed to submit their applications. Procurement is not a pleasant place to work when you have done 99% of your application but not clicked the submit button...I'll emphasise this point, submit by the deadline, there are no exceptions."

What is being considered?

There are nine major these being addressed by the competition, which may seem familiar to many organisations working in the sector. And there's a good reason for that.

Davies said: "We've ratified and reviewed all of those with our colleagues at network rail and the challenges have been whittled away from almost an infinite list.

"These are the challenges that are relevant to the GCRE site now, at this current stage of construction, but they are also relevant to the major stakeholders of the railway industry.

"If you have developed something that meets one of the challenges in our scope there's an immediate market for you on the GCRE site but there's also a market for you out there in the wider railway market in the UK. And beyond."

The themes are:

Trackwork challenges:

- stability under loading and speed
- use of modern sustainable materials or low-carbon sleeper design
- reduction of moving components in switches and crossings
- noise barriers with long life resilience to the passage of high-speed trains and high wind speeds.
- slab to ballasted track transitions
- slab track renewals from the perspective of carbon and whole life cost
- low carbon, recyclable or reclaimed ballast
- automated installation of trackwork, including robotics and efficiency in installation
- acoustic performance of the track

Overhead line electrification (OLE) challenges:

- lightweight OLE structures and foundations, the use of modern sustainable materials and alternative materials for OLE and the use of composites in OLE
- stability of OLE to accommodate multiple pantograph vehicles, damping of OLE and the OLE-pantograph interface
- innovation in foundation design and masts (lighter, shallower piles), or integration of OLE with the track without requiring separate piling

OLE and trackwork delivered as integrated elements, for example where OLE is a component of the track and not a separate element

Earthworks and structures, including bridges and underpasses:

- grade-separated crossings, the use of innovative materials to deliver low carbon and reduced cost in bridge and underpass construction, and innovation to reduce the need for cut and cover underpass construction
- retaining structures that deliver reduced construction costs, a lower carbon footprint, reduced through life costs, improved resilience, and enhanced safety
- use of innovative materials to deliver low carbon and reduced cost noise barriers, and the innovative design of noise barriers, for example, smaller, lower or less obtrusive

Power supply infrastructure, including alternative power supply technologies:

- the use of renewables, delivering a net zero operation of the GCRE site, including traction power,
- power supply considerations during the construction phase, for example, greener supply of energy, offsetting between contractors or trading greener energy solutions
- a railway capable system for energy storage, with suitable power and response time requirements for a railway
- energy storage systems for supply of traction power
- a feed of regenerative braking energy and on-site power generation back to the grid
- miniaturisation of power supply hardware, for example approaches to removing large oil-filled transformers
- using the OLE as a distribution network for non-traction power
- low cost solutions to convert 25kV to lower voltages

Telecommunications for railway based, 5G and line of route communications to operate the railway:

- 5G, Future *Railway* Mobile Communication System (*FRMCS*) and migration solutions for the railways
- immunisation of systems for Electromagnetic Compatibility (EMC)
- reduction of a requirement for line of sight for telecoms technology
- reduction in power distribution requirements for the telecoms equipment

Security for perimeters, rail-side, physical and cyber security:

- remote sensory system, anti-trespass systems, unattended monitoring for trespass
- innovation in perimeter protection and monitoring technology to address planning or aesthetic considerations, and to reduce security costs of physical infrastructure, including the use of non-barrier technology
- access control systems to optimise access and safety requirements

Monitoring and maintenance, digital twin, instrumentation of structures or monitoring of infrastructure:

- effective application and integration of sensor technologies for monitoring and maintenance
- predictive digital twin capability and integration of data to help plan for foreseen and unforeseen events

Please note: all solutions in this theme need to be integral to the GCRE construction.

Railway operation and automated systems:

- innovation to cost effectively automate train control during testing and provision of a safer operating environment
- innovation to remotely operate and monitor trains during testing

Ecology and habitat creation:

- innovation to effectively protect wildlife on the GCRE site during construction works
- innovation to allow wildlife to cohabit with the operational railway
- innovation to increase the positive environmental impact of the GCRE facilities
- innovation in building materials to reduce construction costs, design costs and environmental impact.

Can I get involved?

There is plenty of promise for the organisations present, but there are a few requirements to meet before they can jump in with both feet. Projects must propose to deliver as many of the following enhancements as possible:

- A reduction in construction costs
- A lower carbon footprint and environmental benefits
- Reduced through life costs
- Improved resilience
- Enhanced safety
- Reduced timescales
- Efficiencies in materials handling or efficient use of resources

These points are key to what Innovate UK strive to achieve. Their objective is to make UK industry more competitive, and to reduce capital costs for railway construction at both GCRE, and globally.

Projects that do not meet the above criteria will not pass phase one of the feasibility study. Additionally, Innovate UK will not fund projects that:

- Are not likely to be successfully exploited by the rail industry to deliver benefits in railway construction
- Do not create significant change in levels of innovation available in the industry
- Do not have low technical risk
- Will not be able to efficiently deliver a demonstration in a railway construction environment at GCRE in south Wales
- Do not feature a demonstration phase, offering potential customers a chance to use the innovation and give feedback
- Do not include an evaluation phase, and a plan to collect information to inform a cost/benefit analysis
- do not plan to retain delivered phase 3 demonstrations on the GCRE site after project completion as part of an extended test and demo exercise
- have total eligible costs or project terms outside of the eligibility guidance
- would directly duplicate other UK government or EU funded initiatives
- are covered by existing commercial agreements to deliver the proposed solutions

You can learn more about the criteria, and apply for phase one [here](#).