

# Putting the railways on track to a direct connection between renewable energy generators and electrified rail networks

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World-leading solar rail pioneers Riding Sunbeams are accelerating ahead with their vision to develop a first of a kind direct connection between renewable energy generators and electrified rail networks.

Last year the greentech start-up successfully demonstrated a direct connection between solar panels and the direct current (DC) third rail traction system in Aldershot.

Now, thanks to £400,000 of innovation funding from the Department for Transport and InnovateUK's First Of A Kind 2020 programme, the challenge is to develop a direct connection between renewables and AC rail networks.

Ivan Stone, Chief Executive of Riding Sunbeams, has spoken to railbusinessdaily.com about how its world-first 'Daybreak' will not just transform the UK railways, but those all over the world.

"It is a really exciting time not just for everyone involved with Riding Sunbeams, but the industry on the

whole," he said.

"With support from InnovateUK we are building on what we achieved last year – demonstrating that we could safely and effectively make a direct wire connection from a solar array into the DC traction network.

"With the funding this year we are taking that up a step and demonstrating the feasibility of doing exactly the same thing for the AC network.

"This will require us to develop new technology and software, as well as repurposing existing equipment.

"Achieving this would be hugely significant in meeting our ambition to decarbonise the rail traction network with competitively priced, unsubsidised electricity whilst creating benefit to local communities that host the new generating infrastructure."

Two-thirds of the UK's existing electrified routes – and all plans for new rail electrification in the UK – use AC overhead lines to power trains, and most of the electrified train lines around the world use this technology.

The £400,000 grant will enable the team to procure the required equipment and modify it over the next nine months. A solar array with line-side storage will then be installed at Quinton Rail Technology Centre at Long Marston – where it is hoped an entire train engine will be powered directly with clean, green electricity for the first time.

Ivan, who for the last 30 years has been involved in the delivery of UK and international infrastructure, said: "We are all very confident that it can be done. The challenges are about ironing out the detailed challenges that go with connecting directly to the rail network.

"These are issues that will determine how straightforward it is to do from a practical point of view, and the risks and costs involved in delivering it to scale".

"But we are confident that we can deliver on all those aspects based on the experience we have to date. This is literally about being able to produce power trackside that powers a train directly through an overhead gantry – in essence it is as straightforward as that."

With the sun being quite an important factor in its success, the Riding Sunbeams teams has big ambitions for the international market.

Ivan said "There are other countries that have significant rail traction networks and major challenges in terms of decarbonisation, and have the benefits of more sunshine than we do in the UK. Whilst we always felt the UK was the right place to do this, the international potential for this UK know-how is enormous.

"There is an astonishing level of international interest as our approach could be transformational on a global scale, but we've had a lot of support in the UK – it really seems to have captured the imagination of the industry.

“The UK is the ideal place to do this kind of research and development. Technical and safety standards are high, and with the infrastructure and complex system operating under high demand, getting it to work here should mean we’re be pretty good to go anywhere.”

Riding Sunbeams have formed a consortium with Network Rail, Angel Trains, Turbo Power Systems, the Birmingham Centre for Railway Research and Education and Ricardo Power and Environment to deliver the project.

Ivan said: “The point about our approach is that we are driven by the ambition to promote community energy and industry scale decarbonisation. The original challenge was to demonstrate and open up this market. With the support for InnovateUK funding, it has become clear that to fulfil that ambition we also need to take a lead and really step into the developer role as well. With the combination of the technical backing and the commercial support to act as a developer, it has given us a unique position in the market.

“We think that in another year to 18 months we have both the technical and commercial model to enable the likes of Network Rail and other transport network operators like TfL and Transport for Wales to be able to go out to a competitive market and procure direct wire renewable energy on the basis that we are trying to demonstrate at scale.”

*Ivan Stone, Chief Executive of Riding Sunbeams, [www.ridingsunbeams.org/](http://www.ridingsunbeams.org/)*

*Photo credit: Riding Sunbeams*