



# RIDING SUNBEAMS



**Get on board  
here comes the sun!**

**R**iding Sunbeams is on a world leading mission to power our railways with clean, community-owned energy direct from the sun.

Over the past year, with support from the Department for Transport and Innovate UK's First of a Kind competition, we've been working with Network Rail to prove our technology solution for direct supply from solar generators to third rail DC electrified rail routes. At the end of summer 2019 we switched on our 'First Light' demonstrator unit in Aldershot - over 100 solar panels feeding renewable energy straight into the traction system.

We are now preparing to bring this innovation to market. Read on to find out more about you can work with us to make the exciting vision of solar powered public transit a reality in the UK and beyond.

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## Riding Sunbeams for community energy groups

**R**iding Sunbeams came out of the community energy movement, in response to an increasingly challenging operating environment for ordinary people trying to develop renewable energy projects in the UK. We know that community ownership means maximising the social impact of new renewable generating capacity, so supporting communities to deliver new schemes is a central part of our corporate mission.

Our unique approach means we can offer a viable route to market for new, unsubsidised community solar (and – hopefully – wind) projects. Underwriting investment in new generating capacity without the certainty of government backed revenue streams means securing a reliable counterparty to commit to buying all your power over a long time horizon. As practitioners will know, such clients can be hard to find.

Electrified public transport networks are the perfect customers, and by brokering long term power purchase agreements with transit operators we can turn your lineside site prospect into a bankable generating asset. What's more, our affordable private wire supply solutions mean circumventing grid capacity constraints altogether – meaning any promising location within a couple of kilometres of an electrified railway can now be explored for development.

We'll work with you to develop sites as part of a larger rail-connected portfolio, helping further de-risk projects and lower the cost of development and construction capital. Once built, we can help refinance your new asset through local community share issues and crowdfunded investment from rail passengers looking to green their commute.

Your new solar traction farm will make a key contribution to catalysing the decarbonisation of transport, at the same time as capturing

some of the value of powering passing trains for local community wealth building.

Riding Sunbeams will seek to retain a small equity stake in every site we help build, while the majority share is held in perpetuity by each local cooperative we work with. We even hope to be able to seed brand new community energy groups in locations where rail or tram networks would benefit from renewable supply, but no local group exists to meet this demand. Our parent companies Community Energy South and Possible have plenty of experience of breathing life into new community energy initiatives.





## Riding Sunbeams for transit network operators

**E**lectrified transit networks represent the ideal beneficiaries of new, low-cost decentralised electricity generation. Network Rail alone accounts for around 1% of all electricity demand in the UK, and this huge demand is distributed across thousands of miles of electrified routes spread across most of the country.

The plunging cost of solar modules and wind turbines combined with our highly affordable private wire supply solutions mean we can already provide electricity direct to traction systems at a discounted unit price per kWh compared to grid supplied power. Long term supply contracts mean these cost savings can be locked in over a multi-decadal time horizon, giving price certainty against a backdrop of increasingly volatile wholesale electricity prices. And as we scale our operations, the supply price we can offer our customers will only become more competitive.

But procuring traction power through Riding Sunbeams offers multiple social and environmental benefits as well as financial savings. Electricity sourced direct from solar generators is just a fraction of the carbon intensity of power supplied from the UK grid today, meaning we can help you meet vital decarbonisation goals. Moreover, our unique community-led approach maximises social impact and helps build positive relationships with lineside communities too.

We estimate that the technical maximum potential for direct supply from solar PV to meet UK traction electricity demand is around 20%, primarily due to large seasonal variation in solar irradiance because of our Northern latitude. In practice, the economically viable potential is likely to be closer to 10%, so meeting this share of UK traction demand with community energy is Riding Sunbeams' ultimate objective. We want to work with every electric traction network operator in the UK to explore the potential to

connect community owned renewable generators to your systems in a mutually beneficial partnership. We have the capability to use your traction load data to analyse your system and determine how much of which renewable technologies will be optimal to deploy, and where to connect them.

Our First Light demonstrator project has already proven our connection solution for third rail 750v DC traction systems, as found across the Southern Region, Merseyrail, London Underground and numerous tram and metro networks around the UK. Meanwhile our Green Valley Lines collaboration with Network Rail Wales and Transport for Wales, exploring the potential to integrate direct renewable supply into the South Wales Metro electrification works, is developing an equivalent connection solution for AC 25kV overhead lines. Integrating direct supply into new electrification works promises to offer even bigger cost savings, and combined with lineside storage could even lower the costs of the electrification work itself.







## Riding Sunbeams for green investors

**H**aving a great business idea in 2016 was just the start of our journey – three years of R&D work later, and we are preparing to bring our innovation to market. Following the success of our First Light demonstrator project we now have a proven and deliverable technical offer, and are embarking on the final stage of work to bring this to a fully commercialised opportunity over the next 18–24 months.

Customer interest is clear. Network Rail have been working closely with us to develop our rail standard-compliant DC network connection solution, and we are in advanced discussions about routes to market. We have completed feasibility studies for a pilot phase of six Megawatt scale community solar traction farm sites ready to connect to railways across the South of England in 2020/21.

More widely, our trailblazing work to date means we are incredibly well placed to make a key contribution to Network Rail's decarbonisation strategy through lineside renewable energy supply. Parallel workstreams are underway within Transport for London, the UK's second largest traction power consumer, and Transport for Wales, with whom we are currently developing an AC network connection option to supply the forthcoming South Wales Metro.

The UK traction electricity market in 2018/19 was worth well in excess of half a billion pounds over just the two largest consumers, Network Rail (£404m) and Transport for London (£160m). With new route electrification back on the cards and wholesale power prices on the rise, the UK traction market value is set to increase by as much as half over the coming decade. If we can succeed in our corporate mission to meet 10% of this electrical load with direct supply from renewable generators, we could be looking at a £50m+ annual turnover from power sales alone.

Britain is just the beginning. In tropical nations with poor quality electricity grids and year-round sunshine, we believe newly electrified routes could be powered exclusively with solar plus storage at a lower cost than traditional electrification and grid supply can offer. India Railways is currently meeting aggressive targets to electrify 2000km of new track every year, and has conducted its own feasibility studies that show solar traction supply could be very attractive – potentially helping to lower their ~\$2Bn USD annual traction electricity spend. India is our top target overseas market, but there are plenty of opportunities closer to home too. Our DC connection solution is suitable for national rail traction standards and high capacity metro networks across Spain and the South of France. If you're a social and environmental impact investor looking for a triple bottom line opportunity with global market potential, we may have just the ticket.



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## Riding Sunbeams to the future

**R**iding Sunbeams is one of the most exciting things to happen to either railways or renewables in Britain in years. It's a dream-come-true climate solution, matchmaking the public's favourite energy sources with the nation's biggest electricity consumers, and the local cooperative movement with the most energy-efficient public transport option going.

Whether you're a community energy group, transit network operator or green investor, we are looking forward to working with you to spread a little sunshine around our railways over the next few years.

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