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Locating value in sector coupling: Powering railways with renewable energy

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9th Conference on the Regulation of Infrastructures:
Sector Coupling. How to regulate convergence?





Powering trains with renewable energy

Riding Sunbeams

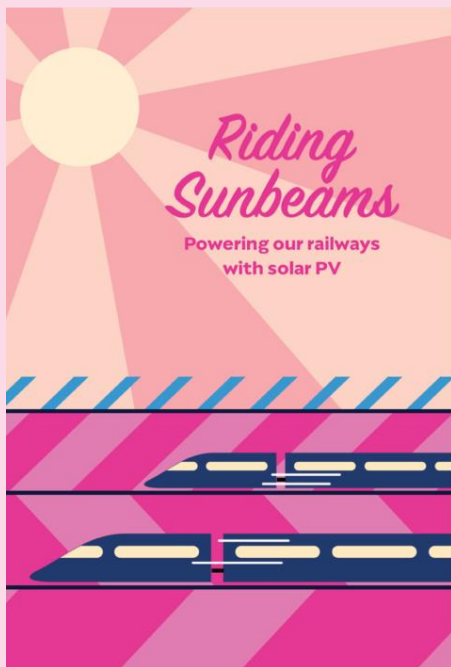
- Recipient of R&D funding from Department for Transport and Innovate UK to demonstrate the possibility of powering trains with solar power
- Co-owned by non-profit entities We are Possible (a climate change advocacy) and Community Energy South (a regional community energy hub)
- Seeking commuter and community co-ownership of railway direct-wire electricity supply assets

Network Rail

- Regulated public enterprise controlling system critical railway infrastructure
- Collaboration with low-carbon innovators encouraged through R&D funding
- Focus on safety and continuity minimises institutional risk-taking
- Increasingly subject to environmental and social regulation

Methodology

- Embedded research within Riding Sunbeams' First Light project throughout its Small Business Research Initiative: First of a Kind Round 2 funding
- Eight workshops, roundtables, focus groups and meetings - three of which were recorded - involving community energy representatives, Riding Sunbeams representatives, Network Rail representatives, legal experts, business model experts, technical expert and social and environmental impact experts



Theoretical framework

Public procurement of innovation targets entrepreneurship and specific outcomes as opposed to specifications of relevant goods and services. It allows differentiation according to:

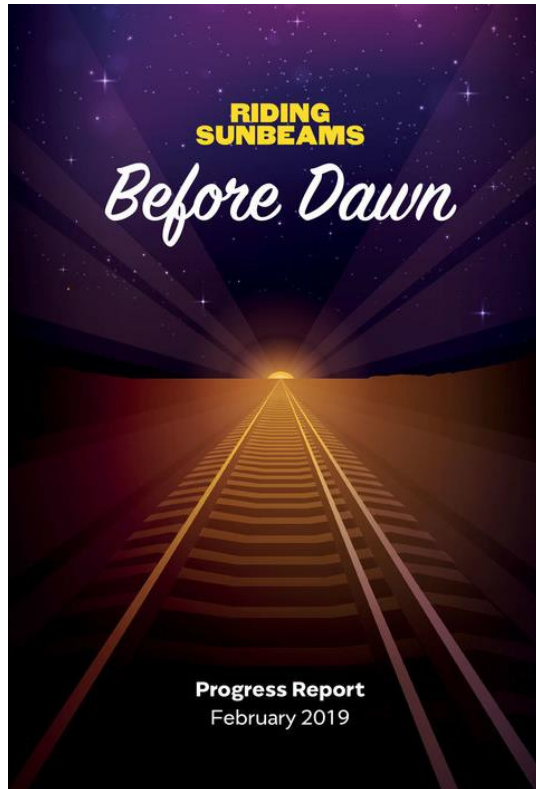
- Direct/catalytic PPI
- Adaptive/developmental PPI
- Simplification/cooperation

Business model frameworks facilitate the evaluation and identification of convergence potential. They allow differentiation according to:

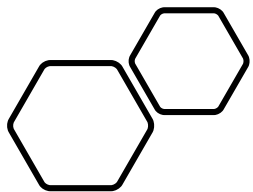
- Value proposition
- Supply chain
- Customer interface
- Financial model
- Business model governance

Funding for the Riding Sunbeams' R&D project can be conceptualized as an example of *catalytic development* pre-commercial procurement by:

- Focusing on outcomes rather than technological inputs
- Catalyzing radical technical innovation for the end user of the technology
- Facilitating business model innovation and alignment to lower risk and transaction costs of *direct adaptive* procurement of innovation from non-traditional suppliers



	Network Rail	Riding Sunbeams
Value proposition	Critical system providing safe and reliable mobility service; increasingly taking decarbonization targets and social aspects into account	Powering trains with direct-wire renewable energy supply; community and commuter co-ownership of supply technology
Supply chain	Contractual arrangements with railway supply companies, ranging from sleepers to energy	Engagement in renewable energy deployment to the point of investment-readiness
Customer interface	Interface with passenger train operating companies and freight services and the public directly through 20 managed stations as well as maintenance, interruption and safety	Potential interface with Network Rail through direct-wire electricity supply PPAs and the public through share offers, investment and community benefit funds
Financial model	Charging passenger train operating companies and freight services and massive funding from government through direct grants and borrowing; investment is limited through a hard debt ceiling of £30.3bn	Supplying electricity through a PPA which covers the cost of installation plus a return on investment to attract investors; facilitate community and commuter co-ownership and provide a community benefit fund
Business model governance	Originally composed of over 100 public and industry members reflecting stakeholder interests in rail; now wholly public enterprise regulated by the Office of Road and Rail through periodic reviews determining delivery targets and funding	Limited company majority owned by two non-profit organizations Community Energy South and Possible, governed by board of directors; aim to shift from grant dependency towards sustainable income streams



Thank you for paying attention!

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Facilitating sector convergence between grid-edge, direct-wire renewable energy suppliers such as Riding Sunbeams and huge energy procurers such as Network Rail requires:

- Agreement on procurable societal value in support of targets and ambitions
- Agreement on how such value can be procured through *direct adaptive* Public Procurement of Innovation
- Cooperation through business model alignment to lower risk and transaction costs
- Mission-orientated governance along the entire innovation and diffusion change through institutional supervision to create a route to market

