

## **Supplementary written evidence from the Rail Industry Decarbonisation Taskforce (TFU0015)**

Following the meeting of the Transport Select Committee on December 9<sup>th</sup> RSSB, on behalf of the Rail Decarbonisation Taskforce, has analysed the funding and support needs of the rail industry. As part of the Trains Fit for the Future inquiry, examining how technologies such as electric, hydrogen and battery can be deployed to reduce the rail industry's reliance on diesel-only trains, RSSB offers the Committee the following observations and recommendations.

### **Research and Development Funding**

1. Railways have a key role to play in contributing to the national net zero emissions 2050 statutory target.
2. Rail can decarbonise and there are solutions available.
3. The core of any operational emissions decarbonisation programme must be electrification. This is the only low carbon technology that, at present and for the foreseeable future, is capable of long distance, high speed travel and heavy haul freight.
4. There are some 'no regrets' electrification schemes which are justified on economic grounds which can be implemented in the short to medium term.
5. On less intensively used lines, the high financial and carbon cost of installing and maintaining electrification infrastructure may mean that electrification will not be the best whole life, whole system decarbonisation option on economic and/or carbon grounds.
6. The areas where we can improve R&D for traction decarbonisation are:
  - a. More cost effective electrification.
  - b. Improving hydrogen fuel cell traction options to improve whole life, whole system carbon and economic benefits.
  - c. Improving battery traction options to improve whole life, whole system carbon and economic benefits.
  - d. Continuing to encourage research and innovation in other low carbon traction options such as hydrogen-powered steam turbines.
  - e. **Ideally, on a transitional basis only:** more carbon efficient thermal combustion, through engine efficiency improvements and possibly through the use of lower carbon fuels.
7. There needs to be an examination of levels of investment in NR, TOCs, universities and such that may be necessary to drive substantive progress as set out in point 6.
8. Considering the statutory 2050 deadline the long development lead times and the long asset lifecycles on the railway, early planning will ultimately be a lot cheaper than waiting or relying on blanket rollouts of electrification at a later date. If we start at the earliest practicable date, the annual amount of electrification needed up to 2050 is already significant in historical terms.

9. Manufacturers have highlighted that there is no need for further work on proof of concept or demonstrator hydrogen and battery trains. The relevant technology has developed to the point that there is confidence among manufacturers that new fleets will be viable from the outset. The key is to ensure any orders are large enough to amortise the development cost over a sufficient number of vehicles to make the unit cost reasonable.
10. Additional work needs to be undertaken in a range of areas. Industry consultations and further questions arising from research and feasibility studies suggest that this could usefully include, for example:
  - a. Lineside generation.
  - b. Lineside storage.
  - c. Distributed generation.
  - d. Load balancing.
  - e. Low carbon infrastructure.
  - f. Low carbon stations and depots (whether new, refurbished or retrofitted).
  - g. Last mile self-powered train options.
  - h. Low carbon freight and practical interventions for easy decarbonisation (a challenge on a mixed use railway) and technological solutions.
  - i. Route and network optimisation for carbon reduction (which may extend to include train design, driver operation, route characteristics, timetabling, capacity management, freight integration on mixed use network, last mile self-powered or alternative off-vehicle traction system development and even demand side management).
11. There is a great deal of opportunity arising from co-development of low carbon traction power, low carbon infrastructure and low carbon energy production where joint learning, cost sharing and cooperation on at least some elements will be possible between rail and other sectors.
12. However, rail decarbonisation depends on getting the right investment commitments for new fleets and electrification. This will drive the core of the industry's decarbonisation programme, around which the improvements arising from the R&D programme will be able to add real value. This will enable both private sector investment and also, depending on size, economies of scales.
13. Any public spend on R&D to support development of new rail specific products and solutions should go hand in hand with the core commitments in the preceding point to deliver value.
14. The RSSB DECARB research programme is funded by DfT on an annual basis. It has a budget of a little over £1m per annum:
  - a. This initially focused on immediate recommendations arising from the Taskforce in DECARB phase 1.

- b. It is now moving beyond these to address further research questions arising from the DECARB phase 1 projects, as well as those being produced by TDNS, TDP<sup>1</sup>, ongoing research from Network Rail work that requires an industry-wide perspective and other initiatives.
  - c. Current pipeline probably is three more years' work. A review in March/April 2021 is likely to identify further projects which could add another two years to the pipeline.
  - d. All RSSB work focused on knowledge gaps and constrained areas which involve more than one rail entity and/or impact on a whole industry basis.
  - e. There is a general shortage of decarbonisation skills and experience to deliver the full scope of work necessary for the rail industry to optimise its contribution to the UK's 2050 national net zero emissions target.
  - f. Any commitment to increase funding to accelerate the project pipeline and build industry competence faster would need to be approved by the funder.
15. RSSB's ability to accelerate delivery of its DECARB project pipeline is constrained by the resource it has available to develop, specify and manage projects in consultation with the wider rail industry:
- a. Simply increasing RSSB's resource to accelerate the DECARB project pipeline will have limited benefit unless there is some corresponding resource increase in other parts of the industry, such as NR, TOCs, FOCs and the DfT.
16. The industry-wide Rail Technical Strategy has identified where the industry sees a need and an opportunity to push innovation and R&D on a coordinated industry-wide basis:
- a. Where dependencies exist, all elements will realistically have to be proportionately funded to ensure an even progress among all innovation stakeholders.

### **Clarity of Upcoming Policy**

The National Infrastructure Strategy, published by HM Treasury on November 25<sup>th</sup> 2020, outlines a number of noteworthy upcoming policy documents, inquiries and publications that are due. Those that relate to rail and decarbonisation targets will require the input and contribution of a wide range of industry stakeholders and the Taskforce.

#### **In the next three months**

- The Integrated Rail Plan
- The Energy White Paper

#### **In the next six months**

- The Net Zero Review final report
- The National Infrastructure and Construction Pipeline
- Transforming Infrastructure Performance 2021
- A transport decarbonisation plan

### **In the next twelve months**

- An electric vehicle charging infrastructure strategy
- A hydrogen strategy
- An industrial decarbonisation strategy
- A refreshed Industrial Strategy

The Decarbonisation Taskforce and RSSB are available for further briefings on this topic.

February 2021

### **End notes**

---

<sup>1</sup> TDNS: Traction Decarbonisation Network Strategy undertaken by Network Rail to develop a network map and economic appraisal of possible low carbon traction options

TDP: Transport Decarbonisation Plan by DfT