Electric Railway Charter *Update*: February 2019

– for a railway sustainable in terms of the local and global environment, physical resources and efficient, economic operation; an attractive alternative to future road transport, promoting good growth, and a "green sparks effect" with fully electric trains.
– for a rolling programme of electrification across the North, based on recommendations of the "Northern Sparks" task force report to Government (March 2015), with the Calder Valley Line as top-ranked scheme.

No excuses – we want electric trains!

THE ELECTRIC Railway Charter campaign is for modern, reliable trains, supporting a healthy environment, action against climate change, and good growth. The Charter declaration is reproduced on the fourth page of this update. A clean, energy efficient high-performance electric railway will encourage modal shift from congested roads in a "green sparks effect". Wiring costs are predicted to fall significantly, strengthening the case for full rather than gapped electrification of strategic routes, one of which the Calder Valley Line (Leeds to Manchester/Preston via Bradford/Brighouse) was top recommendation of the 2015 task force.

The aim must be a zero-carbon railway with fully electric trains.

Ideal for our line

Electric train performance is ideal for routes such the Calder Valley over Pennine gradients with frequent station stops:

- Fast acceleration and hill-climbing are major advantages of electric traction
- Modern electric trains are able to recover energy through electric braking making them even more "eco-friendly".

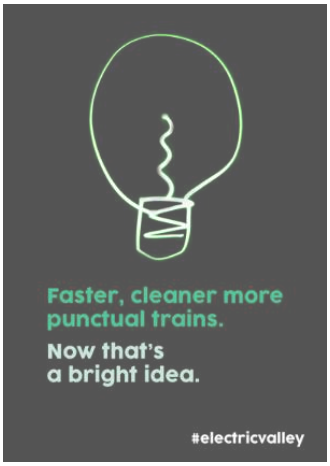
#electricvalley – *please sign!*

Calderdale Council agreed to support the Charter last September and now the council has launched a petition on Change.org: "Full electrification of the line would improve journey times; make train services more reliable and cheaper to run; help cut congestion on the roads; and reduce impacts on the environment through better air quality and fewer carbon dioxide emissions. Major employers including Lloyds Banking Group and RSA main hubs are located in Calderdale, while Nestle International, Covea Insurance and SSP have global headquarters in Halifax. The rail service is essential for these businesses and their workforce. And many companies based in Leeds and Manchester depend upon employees living in Calderdale who commute by train. We deserve a 21st century rail service."
You can find the petition using #electricvalley or google Calderdale electric valley. ***Please sign!***

Rolling programme, gaining skills, cutting costs

We call for a rolling programme of electrification across the North, based on the Northern Electrification Task Force (NETF) recommendations in the March 2015 Northern Sparks report. Based on business, economic and environmental criteria NETF ranked the Calder Valley Line (Leeds-Bradford/Brighouse-Hebden Bridge-Manchester/Preston) as top scheme heading list of 12 lines in initial 5-year programme).

A rolling programme with effective project management will reduce costs and disruption as skills are regained gained and improved. New technology, innovative methods can help solve problems. Overhead line



equipment (OLE) does not have to be over-engineered. It is true that recent electrification schemes suffered cost and time over-runs. Mistakes were made because a period of little or no new electrification had allowed established concentrations of engineering skill to dissipate. The Great Western electrification cost about £3.5M per single-track kilometre (s-t km). In comparison recent North West England and Scottish schemes were about £1.25M to £2.0M/s-t km, and the European norm is about €1M (£800,000)/s-t km. Modern Railways magazine columnist Roger Ford discusses these figures from the McNaughton review of electrification cost (commissioned last year by the DfT). There is strong optimism that electrification costs can be brought down through a rolling programme supported by a national centre of engineering excellence giving a specific cost of significantly under £1M per track kilometre. (FORD, Roger, in MODERN RAILWAYS, March 2019: INFORMED SOURCES e-Preview: http://live.ezezine.com/ezine/archives/759/759-2019.02.18.03.45.archive.txt). Good planning with teams moving on from project to project will also reduce disruption during the work to put up the wires.

Sustainability: zero-emissions, zero-carbon railway – the green "sparks effect"!

The Autumn 2018 special report by the Intergovernmental Panel on Climate Change said global society can tackle climate change, but needs to take significant action in the next 10 years. Earlier this year a Swedish teenager Greta Thunberg put powerful grown-ups to shame with her 32-hour train trip to Davos to address the great and good of global economics. Let us all be inspired. Environmentalism must take hold and those of us in the most developed countries must surely take the lead. Rail is already a relatively low-pollution, low-carbon transport mode but must keep up as road transport decarbonises. We want to attract people onto train travel and off congested, air-damaging roads. As electricity generation decarbonises so will electric railways.

Travellers will increasingly make green consumer choices. Modern trains that protect the health of people and planet are simply more attractive. This is the green "sparks effect". And it only really works with electric trains.

So the Charter rejects the idea of continuing use of diesels or other trains using carbon-derived energy to bridge gaps left by incomplete electrification of strategic routes such as the Calder Valley Line. "Diesels" include diesel bimodes that still pollute and are even less efficient, carrying the mass of both diesel engines and electric collection equipment and transformers. We do not want trains that still damage air quality in stations. Polluted stations like Manchester Victoria need to be made fume-free.

And we should beware false prophets preaching excuses for not getting on with electrification. Alternatives such as hydrogen trains (carrying hydrogen fuel as compressed gas which is used to generate electricity through fuel cells or through combustion and turbine) may have some application on rail. But the latest thinking is that this is likely to be limited to relatively lightly used branch lines. In a recent report ***The Future for Hydrogen Trains in the UK,*** the Institute of Mechanical Engineers (IMechE) warns against hydrogen being seen as a substitute for electrification. Whilst supporting hydrogen development, the IMechE's first recommendation reads: "***That the UK Government rethinks the cancellation of electrification programmes and moves forward with a more innovative, and long-term approach, electrification rolling programme, that can create skills and careers, develop supply chains, and work with existing rail networks to manage projects.***" (http://www.imeche.org/policy-and-press/reports/detail/the-future-for-hydrogen-trains-in-the-uk). See also our panel on next page.

We should beware also claims of "zero emissions" omitting "at point of use". Hydrogen as currently produced is effectively little lower carbon than diesel. And storing energy from electricity in hydrogen (by electrolysing water) and then returning the energy to electricity through fuels has a lower "round-trip efficiency" than storage in batteries.

TRU challenge

Network Rail's "CP6" control period starts this April. That means the TransPennine Route Upgrade is due to start on the Huddersfield Line. Information about the scope of TRU has continued to emerge. It seems there will be some serious capacity work on the Huddersfield-Mirfield corridor that will also help Calderdale services through Brighouse. Manchester to York will be electrified but the DfT plan and budget is for this to be significantly gapped. Our understanding is that the intention is to leave Guide Bridge/Stalybridge to Huddersfield unwired and much of Leeds-

York. However, with costs coming down it seems Network Rail has been set a challenge to see if it can electrify the complete TP route within the DfT's partial electrification budget. This would of course strengthen the case for a wider programme following TRU. ***Our strategic Calder Valley Line should be next on the list – the complete route.***

- More information and references in our expanded ***Arguments for Electrification*** paper (February 2019).

This update by J Stephen Waring,
Chair, HADRAG: The Halifax & District Rail Action Group.
To get in touch please use contact page on
www.electriccharter.wordpress.com or www.HADRAG.com .

Hydrogen dream should be treated with caution

Government and train builders seem keen to bring hydrogen trains to rail. The gas is stored compressed in tanks on the train. To power traction motors, the hydrogen is combined with oxygen from the air in fuel cells. Or the hydrogen can be burnt to drive a turbo-generator. In either case the exhaust is steam or water.

So that's zero-carbon, right? Wrong. Most current hydrogen production is by steam-reforming of methane. Natural gas is reacted catalytically with water to give, over a two-stage process, the hydrogen you want, and – you guessed it! – carbon dioxide, the greenhouse gas that you definitely don't want. Hydrogen can be zero-carbon, if generated from renewably-sourced electricity by electrolysis of water (H_2O). Like electric railways electrolytic hydrogen will approach zero-carbon as electricity production is decarbonised. Other possibilities still to be proven commercially include carbon-neutral biochemical methods. Thermochemical production of hydrogen from water might become commercially feasible. But, again, where the energy comes from must be a concern. ***So any claim that hydrogen trains are zero-emission that should be challenged.*** Other questions or concerns include:

- **Safety**. The high flammability of hydrogen rarely gets a mention. Is this really not a worry? Should we not be asking questions about trains with large tanks filled with compressed, easily ignited gas? What if there were a leak in a tunnel or some of our more enclosed stations?
- **Distribution** of hydrogen to fuelling points. (Or could hydrogen be generated locally at train depots using water and renewable electricity?)
- **Storage on trains and train performance.** The world's first hydrogen train, the Alstom Coradia iLint, in service in Germany, has hydrogen tanks on the roof. Alstom's proposed "Breeze" prototype for the UK takes a former electric train, and reduces it from 4 carriages to 3 with a third of one carriage used for the large fuel tanks that don't sit so easily on the roof within the UK loading gauge. Like the iLint, the trains will have batteries enabling energy recovery from braking. Maximum speed 140km/hr (87mph) will be less than the 100mph capability of the 321 as an electric – but yes, more than adequate for minor branches.
- **Energy efficiency of H_2 storage compared with batteries.** It seems the Oxenholme-Windermere "Lakes Line" will get battery-powered trains in the early 2020s. Battery storage is notably more energy-efficient than using electricity to produce hydrogen, storing it in tanks, and then getting the electricity back using fuel cells. Batteries are heavy, but battery technology will move ahead rapidly driven by demand from renewables development and (ironically) electrified road vehicles. Battery bi-modes on the Lakes Line could charge during layovers at Oxenholme on the West Coast Main Line and in service on trips to/from Manchester. This would reduce the required battery capacity. Of course, Lakes Line electrification might have been completed by now, had it not been cancelled.

Hydrogen trains may have a future on some routes; it is right to go ahead with trials. But there are a lot of unknowns. ***Key routes need full electrification and the unproven promise of hydrogen should not be an excuse not to get on with the job.*** **– JSW**

Campaigning rail user groups on the Calder Valley Line in the North of England

Electric Railway Charter

Modern, reliable, electric trains. For a good environment and good growth.

Launched in May 2018, this is declaration of support for a growing, sustainable railway that will promote good growth whilst protecting and enhancing the local and global environment. The Charter is both a call for rail businesses and local regional and central government bodies to act, and a commitment by its authors to continue to campaign in pursuit of railway electrification. The Charter is founded by four campaigning rail users' groups along the Calder Valley Line in the North of England.

We invite business, environmental, political, workplace and community groups to declare their support for our aims.

We declare our belief, as explained more fully in our supporting document *Arguments for Electrification*, that:

- Rail transport is and must continue to be developed as an attractive alternative to travel on congested roads, providing economic and environmental benefits.
- Road transport will move towards zero-emission, zero-carbon traction over coming decades; so too must rail.
- Diesel traction, including diesel "bi-mode" trains, and other forms depending on the combustion of fossil fuels must be phased out over a timescale which is short enough to make a real environmental impact.
- Electrified railways have a powerful business advantage through lower operational, maintenance and energy costs, and user-benefits leading to the well-established "sparks effect". The cost of electrification is recouped through operational savings later.
- Electrified railways have powerful environmental advantages – including the improvement of air quality, and the combatting of climate change by elimination of CO_2 emissions. As electricity generation moves towards zero carbon, so will electric railways. We must aim for a zero-carbon future for transport.
- The report "Northern Sparks" produced by the Northern Electrification Task Force (NETF) in March 2015, remains a strong statement attracting broad political support, in favour of electrification of main and secondary routes across the North of England.
- Gaps in electrification, for example due to tunnels or difficult bridges might be overcome by on-train energy storage that uses modern batteries. Genuinely sustainable alternative fuels may be considered for more lightly used routes. Enduring use of diesel or other fossil-derived fuels should be rejected.

We call on the rail industry, ***and on*** government at all levels:

- To reassert the need for a programme of railway electrification covering main and secondary routes.
- To initiate without delay a programme of railway electrification across the North of England, with a dedicated planning team and workforce, building on lessons learnt from recent schemes elsewhere.
- Specifically, to plan for early implementation of the NETF electrification schemes starting with the full Calder Valley Line (CVL), extending from Leeds via Bradford and Brighouse through Rochdale to Manchester and through Burnley to Preston, as top-ranked NETF recommendation. The CVL scheme would follow naturally upon completion of the TransPennine Route Upgrade which is focussed on the route through Huddersfield.

***Northern Sparks* report March 2015 – NETF Tier 1 schemes**
Scores on economic and operational/environmental criteria

- **Calder Valley "full"**: Leeds to Manchester and Preston via Bradford and Brighouse ***84***
- **Manchester-Warrington C-Liverpool: *80***
- **Southport/Kirkby-Salford Cr: *79***
- **Chester-Stockport: *75***
- **Northallerton-Middlesbrough: *73***
- **Leeds-Harrogate-York: *70***
- **Selby-Hull: *70***
- **Sheffield-Barnsley/Castleford-Leeds** and connections**: *68***
- **Bolton-Clitheroe: *67***
- **Sheffield-Doncaster/Wakefield** (Dearne Valley)**: *67***
- **Hazel Grove-Buxton: *66***
- **Warrington-Chester: *64***

STORM: Support the Oldham, Rochdale Manchester rail line	**HADRAG:** The Halifax & District Rail Action Group	**Upper Calder Valley Sustainable Transport Group**	**Bradford Rail Users' Group**

supported by North West and Yorkshire branches of Railfuture

railfuture the independent campaign for a better passenger and freight rail network