



What role can rail play in achieving COP26's objectives?

Of the four goals set for COP26, the primary objective is to limit the planet's temperature increase to 1.5 degrees Celsius and secure global net zero - i.e. ensure that countries produce less carbon than what is removed from the atmosphere - by 2050. To deliver this, COP26 explicitly identifies the need for countries to, among other things, encourage investment in renewables and speed up the switch to electric vehicles on the basis that road transportation currently accounts for 10% of global emissions and this is rising year on year. The explicit focus on cars, buses, trucks and lorries, while much needed and offering long term benefits to the planet, risks making a mistake by omitting any mention of rail transport which is probably one of the simplest ways of delivering a lower carbon economy.

COP26 rightly touts the transition to electric vehicles as creating new jobs, bringing cleaner air to cities and - somewhat optimistically - cutting the costs of car ownership. However, drivers still face congested roads, the costs associated with a scarcity of parking and, increasingly, municipal authorities introducing charges to discourage vehicle journeys within their boundaries. Switching to electric buses will make urban commuting cleaner in terms of greenhouse gas emissions, but there are also benefits to encouraging passenger and freight rail operators to switch from diesel engines, which would also enable cleaner, greener long-range travel. For industrialised countries within Europe, for example, there is plenty of scope for countries to include rail within their net zero targets given that 15 of the EU/EEA's member states operate railways that are more than 50% diesel powered.

Through its role as President of COP26, the UK Government has a real opportunity to lead international collaboration in this area, especially given that it has publicly announced plans to decrease the UK's existing rail infrastructure reliance on diesel traction from its current level of 60%. In

his foreword to "COP26 Explained", COP President-Designate Alok Sharma highlights the UK's leadership in pledging to end the sale of new petrol and diesel road vehicles by 2030 but he could equally stress how the Government has also made clear that the rail industry is a key plank for the country in reducing its greenhouse gas emissions.

Indeed, the May 2021 Williams-Shapps Plan for Rail - setting out a radical programme of rail industry reform - states that rail "is the only form of transport capable of moving both people and heavy goods in a zero carbon way" and makes clear that zero carbon trains are a critical plank in offering a modern and improved experience for both passenger and freight rail users.

Rail electrification and beyond?

The UK has already taken significant steps in decarbonising its railway through the introduction of electrification on existing lines. Unfortunately, electrification is expensive and the Government remains mindful of cost over-runs of £800 million on the electrification of the Great Western Main Line, which led to the electrification programme being scaled back. The UK's Department for Transport is currently considering a number of electrification infill projects for England under which relatively short stretches of track are electrified to remove diesel services from longer distances. In Scotland, where transport policy is a devolved matter, Transport Scotland plans to adopt a rolling electrification programme as part of its Rail Services Decarbonisation Plan.

The Williams-Shapps Plan proposes increasing the amount of renewable power generation on the rail estate as one means of countering the expense associated with electrification. With COVID-19 having disrupted the global economy and the UK Treasury anxious to keep a tight rein on the public purse, there may well be scope for energy providers to fund the installation of electrification works as part of wider projects to construct solar or wind

power energy facilities on the rail estate. Energy providers could well be encouraged to invest by tax breaks to offset the investment and agreeing a favourable price for selling excess capacity to the National Grid. Capacity could also be used to serve electric road vehicle charging points in station car parks, encouraging road vehicle users to let the train take the strain on longer journeys and helping to reduce road congestion and air pollution caused by tyre erosion.

Indeed, such investment could also help the UK Government as increasing generation capacity may alleviate public concerns over the security of the UK's energy grid following disruption to gas supplies and the damage of a key cable that imports electricity from France. This is all while helping the Government meet its commitments of reducing greenhouse gas emissions.

Hydrogen trains and infrastructure

Hydrogen power has received a lot of buzz within the rail industry over recent years as an alternative to electrification. Its proponents have argued that it may be a better solution for freight trains, which require more traction power than passenger trains to deal with their loads and also for offering a more cost-effective solution in areas where electrification is simply not cost effective. The UK Prime Minister Boris Johnson is very much a fan, promising that the UK would become "the Qatar of hydrogen" in August 2021 when setting out the nation's ten-point plan to achieving net zero targets.

However just as there are significant costs associated with electrification infrastructure, the costs in setting up hydrogen storage, refuelling infrastructure and depot storage are also considerable. Part of the problem here is that a much larger volume of hydrogen is required to generate the same amount of energy as diesel, which can make it difficult to formulate a business case to draw in investment. Again though, such infrastructure could equally be made available to hydrogen powered road vehicles, which could draw investment and encourage road vehicle innovation and take up. As with rail freight, this would potentially benefit and incentivise manufacturers of heavy goods vehicles to invest more in hydrogen engines given concerns on whether electrical engines have sufficient traction power.

Hydrogen power also suffers from a perception of being hazardous due to its combustibility, although proponents rightly point out that petrochemicals have the same issue. Here the UK's Rail Safety and Standards Board (RSSB) has been working on

appropriate standards and frameworks for hydrogen-powered train units, depots, supply and trackside battery systems. Given the importance of having common standards to encourage international take up, there is scope here for the UK to use COP26 to open discussions on getting agreement on the same as it will reduce much of the redundancy and retrofitting risk that can deter initial entry.

Despite these issues, the UK is an international pioneer in hydrogen technology, with Tees Valley recently being named as the nation's first hydrogen transport hub and a number of pathfinder projects already underway. The support of rolling stock companies has been vital here for funding research and development with Alstom's Coradia iLint unit developing new hydrogen powered rolling stock. Porterbrook and the University of Birmingham's Centre for Railway Research and Education are demonstrating the viability of retrofitting existing passenger rolling stock with hydrogen fuel cells through its HydroFLEX train, which was expected to be displayed in Glasgow.

Batteries and diesel filters – an interim solution

Given the time it takes to install electrification and hydrogen infrastructure and the potential for it to not be cost efficient in certain areas, battery power represents an interim solution to electrification and hydrogen power for countries seeking to reduce greenhouse gas emissions. Here again, the UK has an opportunity to show leadership and encourage knowledge sharing, given that UK rolling stock companies are already engaged in retrofit programmes for their diesel units, through turning them into bi-mode diesel/battery units. Where it is not possible to retrofit diesel trains into bi-mode units, the rolling stock companies are seeking to install filters designed to reduce the emissions and so make them "cleaner".

These schemes have drawn the interest of financial institutions keen to demonstrate their green credentials by investing in the same. Again, the knowledge gained within the UK market could be shared with developing nations seeking to adapt their existing diesel rail networks while simultaneously encouraging inward investment and the UK Government could lead discussions on potential tax and subsidy incentives for doing so.

Conclusion

It would be a mistake to omit rail from attempts to encourage countries to switch to electric vehicles and the UK is well-placed to use its Presidency of COP26 to ensure that rail transport is included within measures. Indeed, the Budget announcement on 27 October 2021 evidenced the UK's commitment to the rail sector with £46 billion being ear marked to improve journey times between cities as compared with £21 billion for roads and is a good opportunity for the UK to demonstrate that it is practicing what it preaches. The infrastructure improvements needed to transform rail towards being a net zero form of transport could potentially offer simultaneous benefits for road vehicles in terms of improving charging and refuelling for electric or hydrogen vehicles, thus making them more attractive for manufacturers and owners, including haulage firms. This symbiosis represents a potential win-win for countries and, potentially, the planet as well.

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