GREENGAUGE21

Rail investment priorities need a re-think

Climate change is upon us and we now have a Government Department with Net Zero in its title. The facts show we are doing reasonably well on de-carbonising power generation. But transport remains the UK's problem sector, the biggest carbon generator, with little change in emission levels over the last 30 years.

So let's consider again the best way to develop the national transport system, as of 2023, and help the new government department with adaptations to our transport system to help the country to meets its de-carbonisation target.

One approach would be to continue on a 'business as usual' basis. In other words, planning incremental improvements where the business case looks good, following the house rules set out in HM Treasury's Green Book, in pursuit of well-known objectives, which for rail, centre on more capacity and better connectivity.

But in January, the Climate Change Committee (CCC) published a new report – *Investment for a well-adapted UK*.[1] It says that:

> 'Network Rail is now developing estimates of additional investment needed for a climate-resilient rail network. Long-term adaptation pathways and investment strategies are expected to be developed for all regions in Great Britain by 2029.'[2]

So that's a new set of demanding priorities coming down the track at a time when DfT, just like other Government departments, is cutting investment budgets across all modes. The costs of adaptation have recently been estimated at £10 billion/year.[3] But the 'pathways and 'strategies' are yet to appear.

No doubt 'tough choices' will have to be made in the meantime on rail capital programmes. Business cases will be scrutinised even more carefully. But now, surely, it is time to place climate change response measures centre-stage in bringing forward projects and in decision making.

Current guidance on how to take account of climate change assumes it will be the *same old* policies and projects under appraisal:

> 'with climate resilient appraisal, an assessment of the potential climate *risks* is also considered. Once any *risks* have been identified, options can be improved and revised to include adaptation measures at the design stage' (emphasis added).[4]

---

[1] https://www.theccc.org.uk/publication/investment-for-a-well-adapted-uk/

[2] See also: *Tomorrow's Railway and Climate Change Adaptation: Executive Report,* Rail Safety and Standards Board (2016).

[3] See https://www.theccc.org.uk/publication/the-costs-of-adaptation-and-the-economic-costs-and-benefits-of-adaptation-in-the-uk-paul-watkiss/ which states that: "it would seem plausible that the costs of adaptation this decade could be £10 billion/year or even more, if this includes proactive adaptation."

[4] Accounting for the Effects of Climate Change Supplementary Green Book Guidance, DEFRA, November 2020

A more fundamental change is needed to generate the investment plans for the railway. It's one thing to refine business case appraisals to take account of potential climate 'risks', but what's needed is reconsideration of the *type* of rail capital investments that should come forward for appraisal.

A Call to Action

The nation's rail network ought to be a key part of the Climate Change Committee's 'well-adapted UK'. And the time to re-state the 'case for rail' is now, since, as the Committee states in its January 2023 report:

> 'Currently there is no agreed and well-defined vision for what a well-adapted UK looks like set out by Government, and there are no associated targets or goals for desired resilience standards at a national, local or sectoral level.'

And the time to address this deficiency is now:

> 'The next National Adaptation Programme (NAP3), due in summer 2023 [is] a key opportunity to set out the vision for what adaptation in the UK should achieve and a framework of associated goals and metrics.'

The National Adaptation Programme (NAP3) has to reconcile the net zero carbon target with the adaptation measures needed to ensure a UK resilient to climate change. If rail can win a larger share of the travel market, it will contribute to de-carbonisation. But it will also have to be resilient in the face of climate change to take on an expanded role.

Adjacent Infrastructure Networks

The CCC recognises that investment in climate-proofing of transport systems will:

> 'likely require increased levels of public funding over time due to increasing pressures of climate change hazards, including the need for more regular maintenance and repair. Public investment to deliver weather and climate resilience will also need to recognise the increasing interconnectedness of infrastructure systems. It may sometimes be the case that the most cost-effective way to protect against future climate hazards may be through *investment in other adjacent infrastructure networks*'[5] (emphasis added).

Along with recognising the 'inter-connectedness' of infrastructure systems, would it be too much to ask for an approach that looks across the alternatives available in the transport sector, which is to say, a cross-modal approach? Can we persuade the sometimes modally-blinkered Department for Transport (DfT) to see that it would be wise for the highway sector, for example, to regard rail as an 'adjacent' infrastructure network? We think it could help the Department dig itself out of a hole.

It is not unprecedented for the highway authority and the rail sector to look at a corridor level challenge together. A recent joint look-forward centred on the A34 Southampton-West Midlands

[5] *Op cit* CCC, p86

corridor, and this yielded a cross-modal freight strategy that is designed to reduce HGV flows and increase rail freight market share.[6]

In the roads sector, discrepancies between DfT's transport sector decarbonisation plan (which places a heavy reliance in take-up of electric vehicles) and forecasts of traffic growth used in highway sector investment appraisals have become apparent. Post-Covid road traffic trends are:

> 'trending towards the upper decarbonisation trajectory, which is not consistent with the pace of change required by the 6th Carbon Budget…. We don't yet have a realistic pathway for surface transport which is in line with the sixth carbon budget…. It is clear that even current committed policies are not going to get us close to where we need to be.'[7]

Professor Greg Marsden of ITS at the University of Leeds has suggested that a reduction of at least 30% in vehicle kilometres would be required by 2035 to achieve the carbon reduction trajectory needed to hit net zero based on the assumptions currently in the DfT's WebTAG scheme appraisal toolkit.[8]

But traffic reduction on any scale is a tough political challenge. A good part of the reduction needed could be through a transfer of longer distance car journeys to rail. The additional rail network capacity and even more advantageous journey times that HS2 will create can help make this possible. And the timing looks good too, if 2035 is the target. HS2 is 'adjacent' to key national motorway corridors: M1/M40/M42/M6/M74.

Of course this may be regarded by some as a post-rationalisation of the decision to proceed with HS2 which, true to best business case practice, assumed 'all else equal'. But that is no reason to miss the opportunity it will offer to help reach the decarbonisation trajectory to which the country is in effect committed. We would say it's policy coherence in practice.

And it ties in with climate change adaptation neatly too. HS2 has been designed for resilience against today's climate and the next one hundred years' climate. The same (sadly) cannot be said for the inherited 19th century rail network.

Adaptation needs and opportunities: the existing rail network

So what further can and should be done to develop a 'well-adapted plan' in climate change terms for rail?

First, let's get the terminology clear. Adaptation and resilience are different, although the latest CCC report[9] acknowledges there is an overlap. But climate change *adaptation* is 'the process of *adjustment* to actual or expected climate and its effects', whereas *resilience* is 'the *capacity… to cope* with a hazardous event, trend or disturbance, responding or reorganising in ways that maintain their

[6] https://www.networkrailmediacentre.co.uk/news/network-rail-and-highways-england-publish-first-phase-of-the-solent-to-the-midlands-multimodal-freight-strategy

[7] Local Transport Today,861 January 2023

[8] *Ibid*

[9] Intergovernmental Panel on Climate Change Sixth Assessment Report, 2022.

essential function…''. Clearly both courses of action will be needed to respond to climate change. And each will demand investment from the private and public sectors.

Recognising the increasing interconnection of mitigation and adaptation, in its January 2023 report, CCC says it has:

> 'set ourselves a further challenge from 2023 onwards: to integrate our analysis of our twin responsibilities, reducing emissions and adapting to climate change.'

Coastal Defences – three examples

Climate change has many adverse impacts but one of them is to damage coastal defences. Three examples of places where climate change has prompted consideration of both resilience and adaptation measures are shown below. These are very different cases, but there is a common pattern of looking first to building resilience, and if that doesn't work, moving on to adaptive measures.

Examples of adaptation and resilience measures for UK coastlines

Fairbourne, a small town on the Welsh coast is *not* going to be protected from sea level rises. Instead its population will have to leave, in the absence of *resilience* measures that would strengthen sea defences against high tides/storm damage. Fairbourne citizens are expected to adapt instead by moving elsewhere. Their town is being de-commissioned. The railway – on the landward side of the town – will remain.

Photo: Gwynedd Council

The **A379** at Slapton sands, in South Devon lies atop a shingle bank, washed away in 2018. South Hams District Council in 2019 appointed an *adaptation manager* who will "work closely with the community" to "ease traffic issues and create positive changes to prepare for the future loss of the [road]". Now rebuilt, it is not expected to be resilient, but there has so far been a reluctance to invest in the *adaptive* measure that would be needed, which is widening the very narrow patchwork of lanes that could provide an inland alternative route to reach the villages of Torcross and Slapton.

Photo: Devon Live

Great Western Main Line, Dawlish. Here the line was knocked out of use for 2 months by storm damage in 2014 and Network Rail has been progressing a *resilience* programme ever since. But would an *adaptation* response make good sense too? Greengauge 21 believes it would, as discussed below.

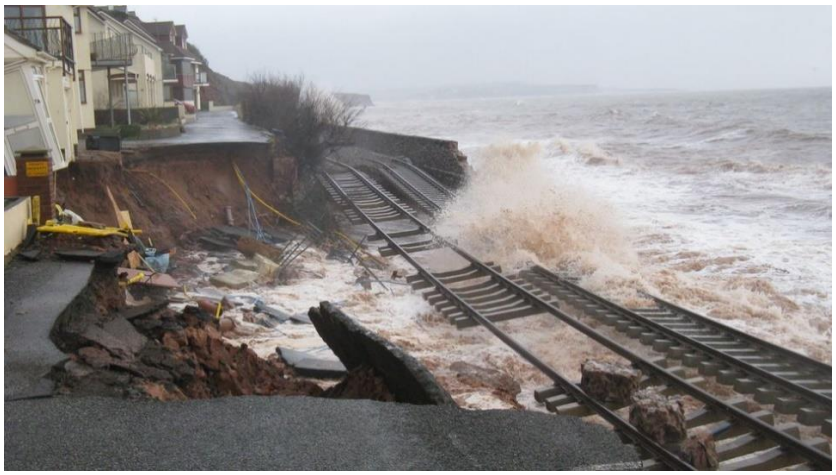

Photo: BBC

Dawlish, Teignmouth, the coast and the Exe and Teign estuaries

Nine years after the storm that closed the only railway linking Plymouth, Torbay and the whole of Cornwall to the rest of the national rail network, resilience work on the railway continues. Breaches such as the 2014 storm event become more likely year by year, as sea levels rise (and major storms become more common).[10] The Network Rail programme has to address the awkward fact that here there are more than twelve miles of main line, waterside, railway in need of resilience measures of one sort or another. The work programme stretches into the 2070s, and there is a Network Rail

[10] Journal of Transport Geography Volume 51, February 2016, Pages 97-109
Sea-level rise impacts on transport infrastructure: The notorious case of the coastal railway line at Dawlish, England, David Dawson, Jon Shaw, W. Roland Gehrels.

commitment to see it through, even though what measures will ultimately be needed are not fully known.

While the resilience response is undoubtedly necessary, this is a case where looking at an adaptation response was also considered. But it was considered only as an alternative (and not potentially a complement) to the programme to try to ensure the coast line *via* Dawlish was made (more) resilient, and with a higher front end capital cost, it was ruled out.

It consisted of the so-called northern route, an inland line re-establishing a closed second main line between Exeter and Plymouth via Okehampton and Tavistock. This route has now been partially re-opened (Exeter-Okehampton) and the remaining stages are being considered sequentially (Plymouth-Tavistock and finally Tavistock-Okehampton). But this drawn out process leaves two problems:

1. in the meantime, the coastal route will not deliver high levels of resilience for multiple decades, with repeated service closures (and the risk of periodic line closures) recurring at intervals over the years ahead
2. with most sections of the route lacking in road access, insufficient time can be made available for engineering access to the line such that remedial work can be carried out cost-efficiently.

Here is a case where a significant part of the country cannot rely on continuity of rail access, damaging the prospects for railfreight and having unknown consequences for key parts of the West of England's economy, especially non-car based tourism. It is a good example of where resilience and adaptation measures should be considered together so that wider benefits can be considered and an overarching plan devised. This is indeed an example, as the Climate Change Committee would have it, of where the 'most cost-effective way to protect against future climate hazards may be through investment in other adjacent infrastructure networks'.

Conclusion

The rail network has an important function to fulfil in enabling the UK to reach its committed carbon reduction target of net zero. It holds one of the keys to tackling the problem of the hard-to-shift emissions arising in the problem transport sector.

We have shown how rail investments already committed (HS2), with more to come (through the Integrated Rail Plan) can be seen to represent an effective way to bring road-based carbon emissions back on the track to net zero. Both examples serve to underline the important points the Committee has made that sometimes the best solutions will lie in what it has termed 'adjacent infrastructure'.

We have also made use of the Climate Change Committee's useful distinction between resilience and adaptation measures to deal with the effects of the trend towards global heating.

In February 2023, Government launched a new research hub to develop innovative measures to decarbonise and improve transport, due to open in September. The 'Net Zero Transport for a Resilient Future Research Hub' will be a joint programme between UK Research and Innovation (UKRI) and DfT. It will focus on climate adaptation and mitigation solutions for the UK transport system, and help meet the challenges of climate adaption, including to changes to weather and sea levels.

It would be a step too far, perhaps to call this 'integrated planning' which we suspect will remain elusive. But we can claim this could at least bring *coherence,* in place of thinking conducted in silos.

Business cases remain to be prepared. But the transport response for the Climate Change Committee's overall National Adaptation Programme (NAP3) in summer 2023 needs to be identified. These responses can act both as a means to reduce carbon *and* to form adaptations as well as resilience measures and shift the basis on which policy and projects come forward. And this will help ensure the nation has a workable and dependable transport system for the decades ahead.

Jim Steer

February 2023

We actively encourage people to use our work, and simply request that the use of any of our material is credited to Greengauge 21 in the following way: Greengauge 21, Title, Date.