



Growing up quickly

Why the transport sector must rapidly improve use of data to deliver Net Zero Carbon highways

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Executive Summary

The UK transport sector is suffering a difficult adolescence in its ability to harness the power of data and digital technology to deliver decarbonisation. It has big hopes and dreams but has been plagued by confusion about how to make them a reality – and is a lot less sophisticated than it cares to admit. The sector's engineers and planners have trouble asking the right questions of its data specialists, and its data specialists struggle to talk the language of transport.

This disconnect is creating a big barrier to decarbonising our transport systems at the scale and speed that the climate crisis demands. If we do not grow up quickly, we will be letting down the people that we serve today – and generations to come.

The only way forward is to collaborate and learn from each other. We would like to see the transport sector

create an open forum that can drive forward its digital and data maturity. This issue is a wider one than net zero, but decarbonisation is the perfect starting point because it is a priority for every organisation in the sector.

The forum needs to set its own agenda, but in this paper we propose three priority areas to kick-start debate.

- Collaborate to identify what data we **really** need.
- Collaborate to work out how to use data to tackle some common problems.
- Collaborate to work out how we can get data-literate transport professionals and transport-literate data specialists.

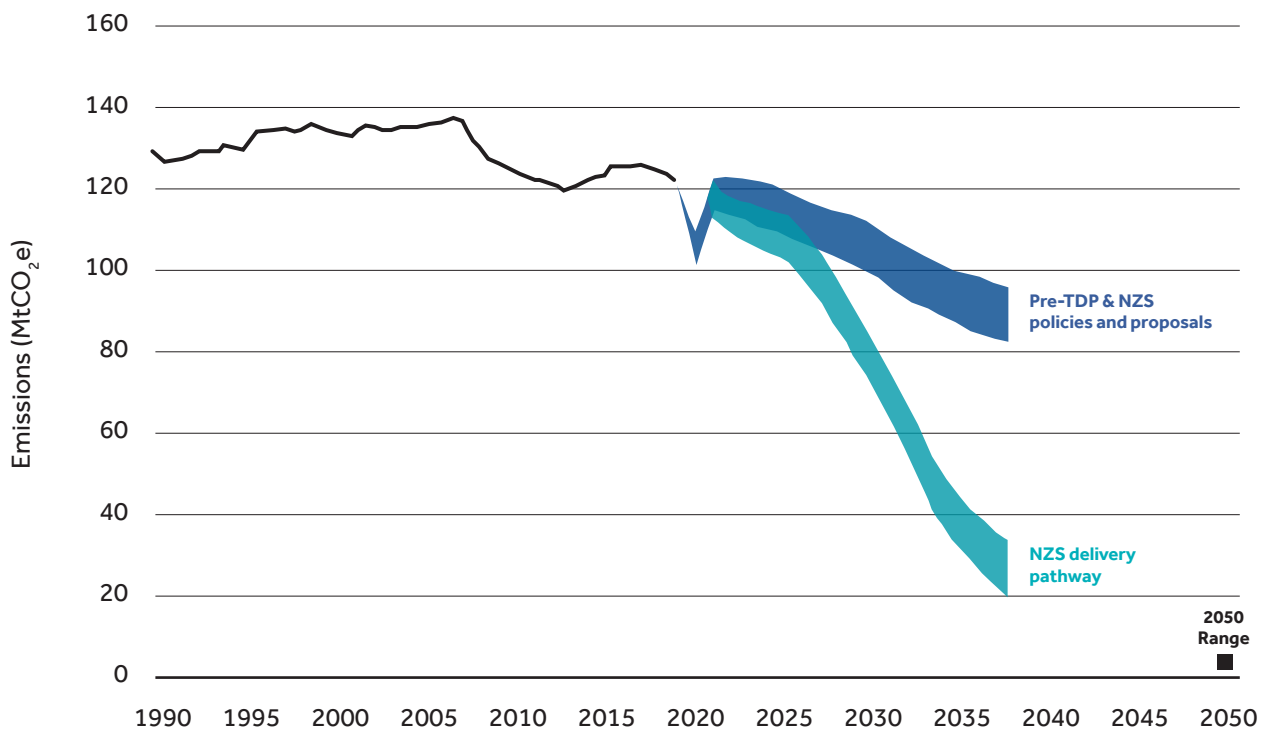
Net Zero Means Very Fast, Transformational Change

The transportation sector has been asked to deliver change on an unprecedented scale and to do it incredibly quickly. This paper is published on 10 November 2021, **Transport Day** at the COP26 summit in Glasgow. It is worth remembering that when the noise generated by the summit dies away, we will be left looking at some very hard numbers.

Build Back Greener, the UK Government's net-zero

strategy, sets out a pathway for emissions from domestic transport to fall by around 34% to 45% by 2030 and 65% to 76% by 2035 (relative to 2019 levels). Business as usual, or even incremental change, is not a credible response to anyone in the business of planning, designing, building or operating transport systems. We must do things differently and get real momentum behind that change.

Figure 1: Indicative domestic transport emissions pathway to 2037



Source: HM Government – Net Zero Strategy: Build Back Greener

We Will Not Succeed Unless We Implement the Power of Data

During the summer of 2021, the CIHT and Bentley surveyed transportation professionals to find out if they believe that we are on track to deliver against these pathways. Respondents gave the sector a score of just two out of five. The survey also revealed some of the respondents' preferences for how to improve this score. The CIHT and several other sector players are already trying to tackle many of these issues, not least the carbon literacy of professionals.

However, the results that really grabbed our attention – and gave us the greatest cause for concern – were related to the role of data and digital technology in delivering net-zero transport.

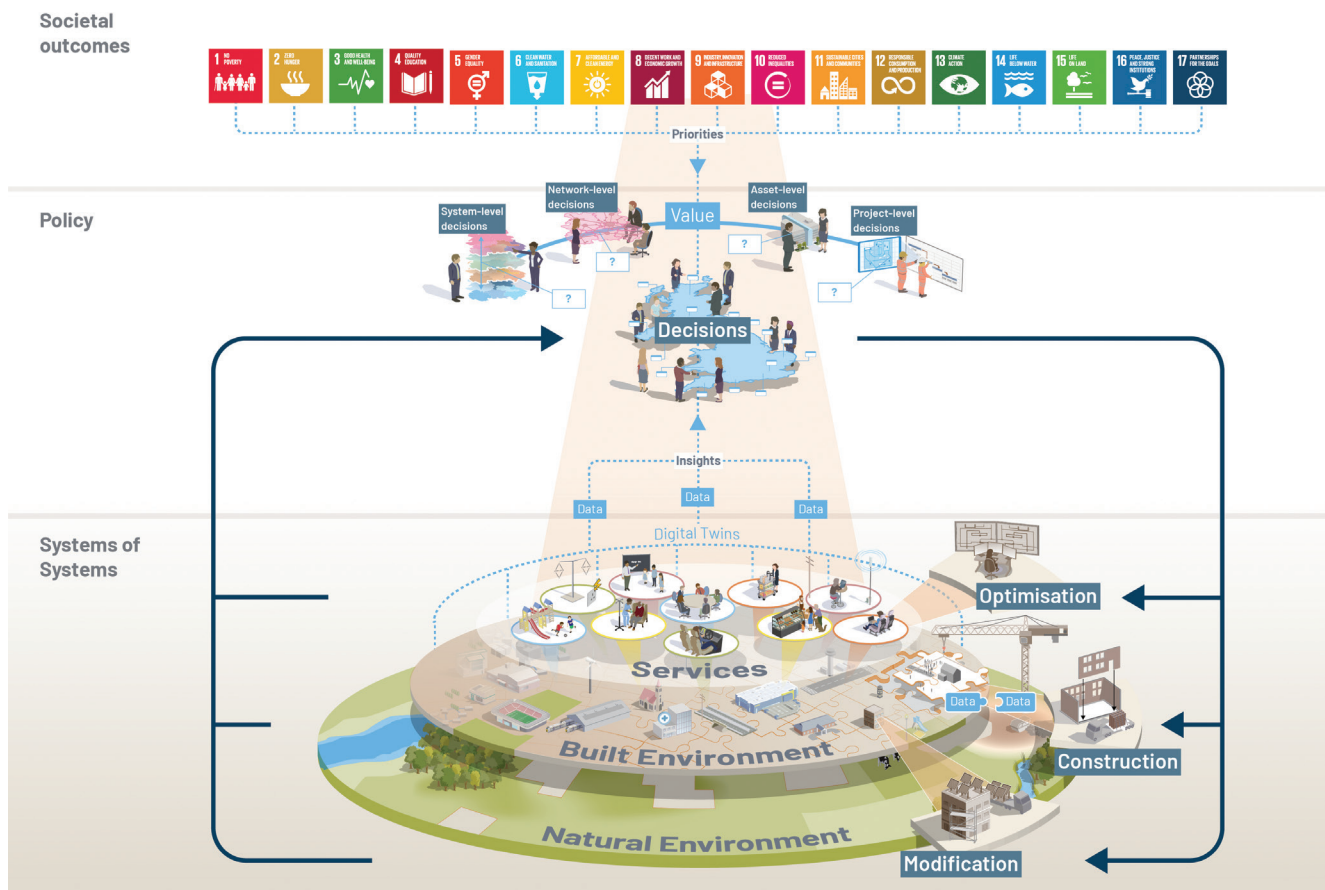
The survey revealed high support for the view that:

“Data should be pooled from multiple organisations to pursue shared goals, allowing data to be aggregated and analysed.”

However, respondents also said that:

“It is not always clear what data is of value or how it should be collected and managed.”

Figure 2



Source: Infrastructure and Projects Authority (IPA), *Transforming Infrastructure Performance: Roadmap to 2030*

Furthermore, when we probed into which technology trends were likely to have the biggest impact on achieving net-zero targets, data collection technologies such as drones and the Internet of Things scored very highly. On the other hand, technologies such as digital twins, which support the collaboration and analysis respondents had previously told us were a priority, were at the bottom of the rankings.

Our gut feeling was that we had uncovered a lack of basic awareness, knowledge and experience. It is something that stands in sharp contrast to the expectation of the UK Government's Infrastructure & Projects Authority, which says that big societal outcomes like net zero will be achieved by the expert use of data, up to and including the creation of digital twins to support efficient and zero-carbon operations (see figure 2).

In Digital Terms, We Are Awkward Teenagers

The survey gave us a good idea of the problem. But to really understand what was going on, we needed to talk to people about our concern that the potential of data and digital to support net-zero transport is being hampered by a widespread immaturity. Therefore, we interviewed a series of front-line practitioners and looked at new and emerging research.

This activity revealed some wider structural problems. Davin Crowley-Sweet, the chief data officer for National Highways, has argued that organisations need to quantify and communicate the value of their data and, ultimately, account for it as an asset on their balance sheets. (Crowley-Sweet has calculated the value of National Highways' own data at an attention-grabbing GBP 60 billion.) In his view, only then will employees feel that they are stewards and enablers of a valuable asset.¹

We also heard concerns about the technical barriers that many readers will be familiar with from previous reports on digital transformation in the infrastructure and transport world. As an example,

many organisations still need to establish a strategy for how data will be captured and structured, including creating standard naming conventions, an enterprise-wide approach to procuring software, and protocols for integrating data between these packages.

On a much broader scale, however, the interviews confirmed our view that, alongside these structural and technical challenges, there is a profound problem.

We were struggling to articulate this issue clearly until one contributor used an analogy that really caught our attention:

“When it comes to using data to tackle issues like net zero, we are a bit like adolescents: full of big hopes and dreams but also confused and a little bit frightened. Also, like many teenagers, we don't like admitting that we are a lot less sophisticated than we like to let on.”

¹ Forbes (2021) Data Valuation Paves the Road to Future for Highways England

3 Ways to Help Us Grow Up Fast

We know that we are not going to deliver decarbonisation of our transport unless we can harness the power of data, so we need to find ways to grow up fast. Three priority areas emerged from our stakeholder interviews.

Collaborate to agree what data we really need.

As our survey showed, transportation professionals do not always know what data is of value or how to use it. As a result, a common complaint is too much data and too little useful insight. The data we do have is often not shareable or comparable between organisations, further reducing its usefulness. The transport sector really needs someone to play the role of parent and set some clear expectations of what data should be provided, supporting which decisions, when and in what format.

The situation cannot mean spending years on creating detailed standards, but rather identifying those data-driven value processes and moving these to an open platform. The sector and supply chain would quickly innovate and expand on the focused data model to include additional data-driven value processes.

Collaborate to work out how to use data to tackle some common problems.

Our interviews suggested a kind of confused paralysis, with many people knowing that they need to act but not knowing where to start. One person told us that for many of her colleagues, the change seemed so big as to be out of reach. Others said that tools like digital twins can seem *Star Trek-y*. We also heard that time-poor professionals cannot relate the rhetoric of digital transformation to their daily life. We think that the solution is to acknowledge that though the change we need to drive is very big, we can make progress by starting small and building up. Groups of local authorities and their supply chains could pool resources to build digital resources to help them tackle common problems, such as implementing low-traffic neighbourhoods or delivering low-carbon highway maintenance. Industry bodies like CIHT and Association of Directors of Environment, Economy, Planning & Transport (ADEPT) can help make sure that this learning is rapidly industrialised.

Collaborate to work out how we can get data-literate transport professionals and transport-literate data specialists.

We heard repeatedly that it was no surprise that digital twins were not perceived as a big driver of decarbonisation. Interviewees described a widespread lack of basic understanding of all things data and digital. This does not mean that every engineer or transport planner needs to become a data scientist – but they do need to have enough knowledge and awareness to collaborate with data specialists as part of the same professional team. This challenge is what a recent study from the Warwick Manufacturing Group calls **universal data literacy** or, in their shorthand, a need for **awareness not analysts**.² But dialogue is a two-way street. We heard concerns that data specialists can be too focused on trying to force organisations to adapt to them rather than working out how to adapt their discipline to meet transport sector needs. Davin Crowley-Sweet at National Highways also spoke of the need for data professionals to **speak business**. At National Highways, it involved many subtle shifts of language, such as adopting the road operator-friendly term “data condition” in place of “data quality”. Elsewhere, a senior civil servant expressed their frustration that **data people** struggle to tie their insights to key decision points – or the sources of pleasure and pain driving ministers. We also heard that one of the big four city advisory businesses had decided to invest more in its capabilities to generate visualisations and tell stories with data rather than compete directly with specialists in its collection and management.

One quick way forward could be for transport and data specialists to collaborate to create a maturity model for public and private transport sector organisations, who are struggling to create a data strategy and structure that meets their needs. Another could be to co-create standard working processes for tying high-quality data to specific transport sector decisions. This solution would be a practical, outcomes-focused way to help data specialists educate transport professionals and vice versa.

² Warwick Manufacturing Group (2021) *(R)evolution – Barriers and Enabler of Project Data Analytics in Infrastructure Projects*

Collaborate, Collaborate, Collaborate

We started this exercise trying to understand if the transport sector felt it was on track to deliver net zero. We have ended it with real concerns about whether we have the capacity and capability to use some of the key tools that we will need to master if we are to make progress at the speed and scale that the climate crisis demands.

So what should we do? The short answer is collaborate.

We recognise that this is not always easy. One senior academic told us that they feared that the infrastructure world is still bedevilled by a perception that “if I collaborate, my competitors will gain an advantage”, though added that “in a world of increasing complexity and interdependency, it’s failing to collaborate that creates more risk”.

We believe our colleague is right. We would like to see transport sector players create an open forum that can drive forward its digital and data maturity. To generate momentum, the forum needs to be focused on a small number of shared problems that have real traction across the industry. In this paper, we have argued that net zero is the ideal candidate because it is a high priority for every organisation operating in UK transport. The forum priorities need to be defined by its participants, but we think the issues identified in this paper are a great starting point.

CIHT and Bentley stand ready to help convene this forum. We do not pretend to have a monopoly of wisdom or visibility of everything that is going on across the sector. So, we need your help to join forces and instigate the collaborations that will help us exploit data and digital technology in the service of delivering a net-zero transportation system.

Over the coming months, we hope to explore this idea with practitioners at all levels of our industry. Please don’t wait, though; if you want to help, we would be delighted to hear from you.

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