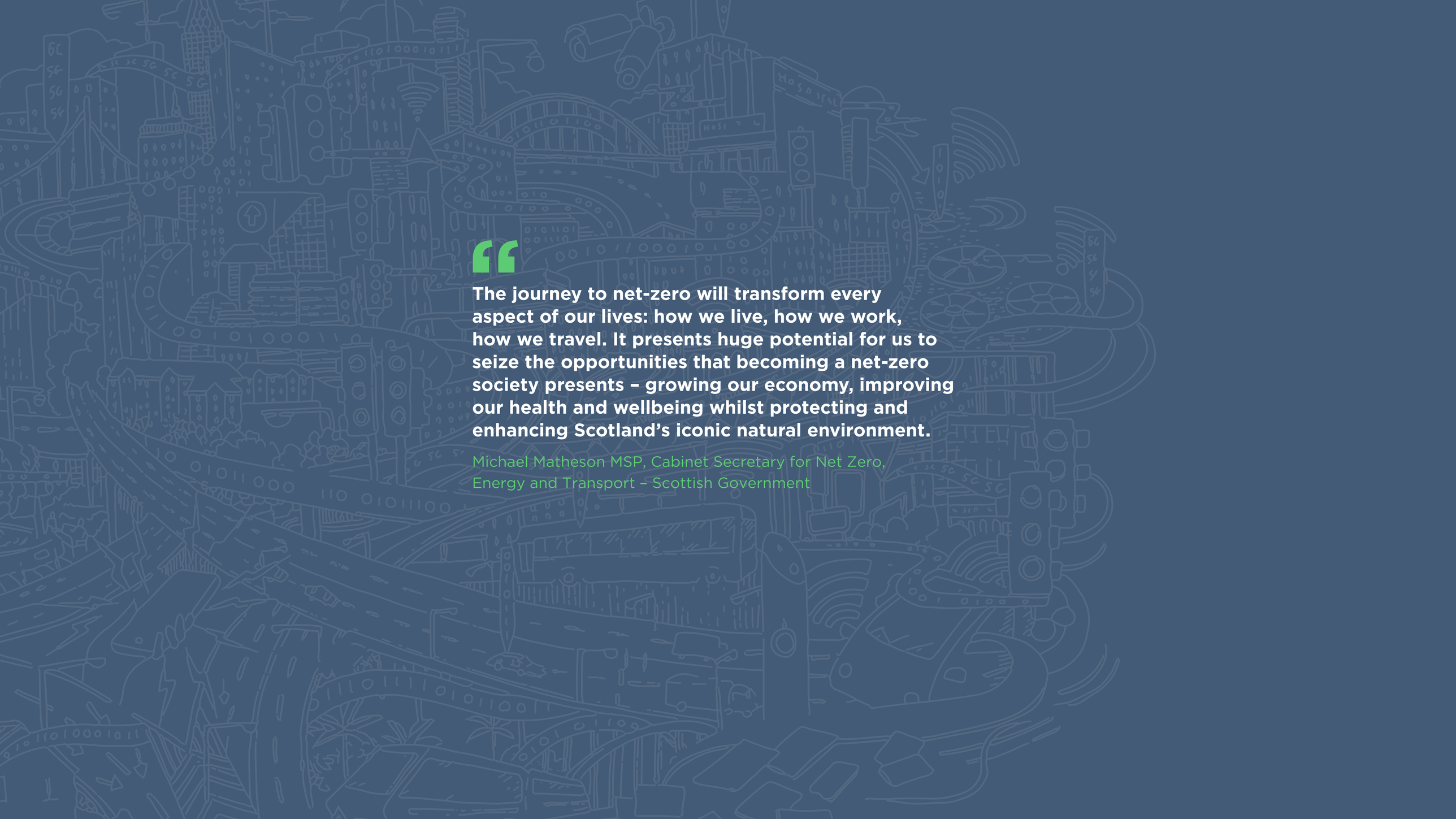
ROAD TO NET ZERO – ON TRACK?

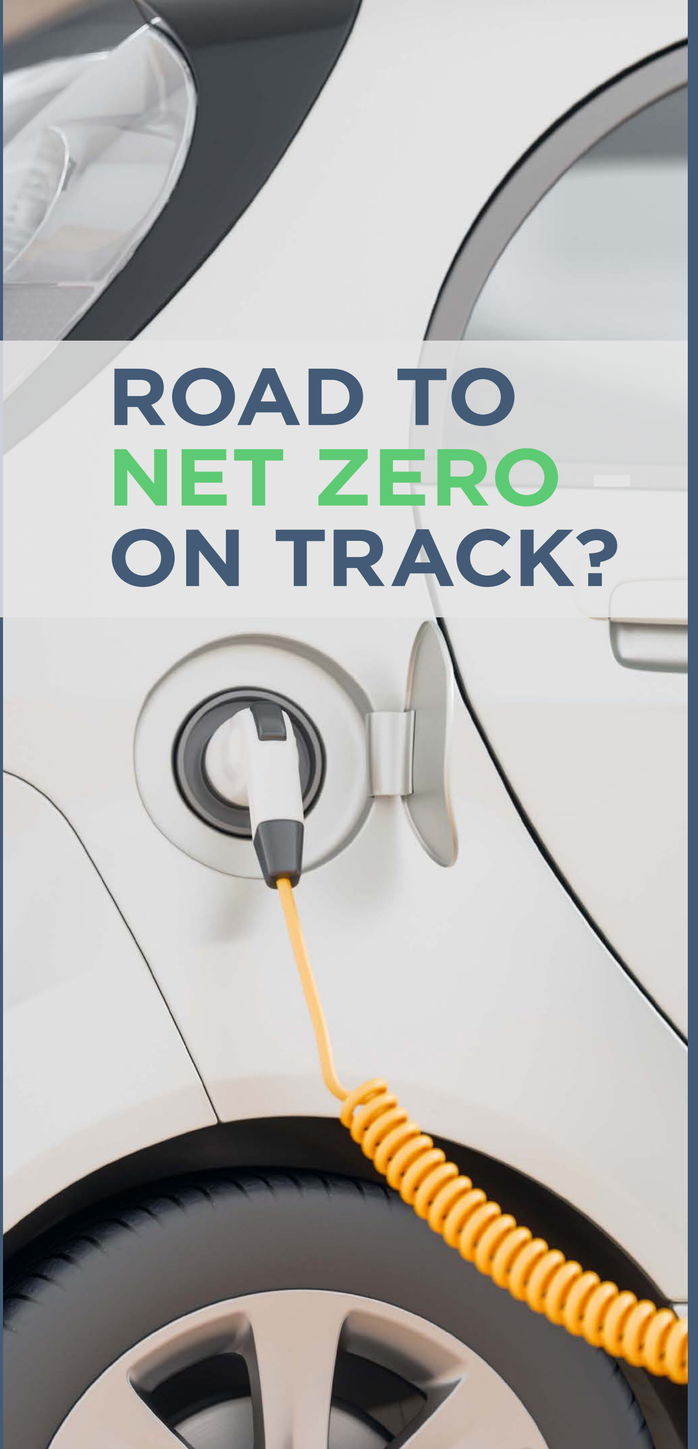
ADDLESHAW GODDARD

MORE IMAGINATION MORE IMPACT



The journey to net-zero will transform every aspect of our lives: how we live, how we work, how we travel. It presents huge potential for us to seize the opportunities that becoming a net-zero society presents – growing our economy, improving our health and wellbeing whilst protecting and enhancing Scotland's iconic natural environment.

Michael Matheson MSP, Cabinet Secretary for Net Zero, Energy and Transport – Scottish Government



ROAD TO NET ZERO ON TRACK?

INTRODUCTION

DECARBONISING TRANSPORT NETWORKS IN SCOTLAND, AND INDEED EVERYWHERE, IS A JOURNEY FRAUGHT WITH TENSIONS. THE COST OF SUPPORTING THE ECONOMY THROUGH OVER A YEAR OF PANDEMIC HAS BEEN DESCRIBED AS UNPRECEDENTED; THE COST OF GETTING THE UK TO ITS NET-ZERO CARBON EMISSIONS TARGET BY 2050 AND 2045 IN SCOTLAND WILL BE GREATER STILL.

The economics of climate change presents one challenge, the politics another. The effect of policy change designed to drive modal shifts in behaviour to the benefit of the environment can have unintended social consequences, especially in a country with so diverse a landscape and disparate a population as Scotland.

That said, Scottish transport leaders have already made significant strides down the path to net zero, with many of the challenges noted in our 2020 Road to Net Zero report having been overcome in a very short space of time. Towards the close of 2019, there was contention and conflict between those representing different modes of transport with competition between road, rail, air and sea being a consistent feature of discussions. Similarly, concerns about government policy favouring electric over hydrogen-based technologies were repeated as hindering commercial commitments to upgrade transport networks. A lack of clarity on charging networks and grid capacity further worried those we interviewed almost two years ago.

Today, conflict has for the most part been replaced by collaboration. A real sense of pulling together in the same direction to achieve a goal now widely accepted as critical to our survival is pervasive across the various sectors within the wider transport economy. While this mood change is to be welcomed, care must be taken to foster this good will so that it translates to action.

Addleshaw Goddard's Transport Sector Team is proud to work alongside innovative clients to solve complex problems and there is nothing so complex as solving the issue of Decarbonising Transport. Projects such as the ones highlighted by our clients in this report put us further down the road to net zero and we would like to thank the clients here, and more widely, for their contribution to the discussion and for giving us the opportunity to work with them to achieve their goals.

Paul Hirst
Head of Transport, Addleshaw Goddard

OVERVIEW

2021 IS AN AUSPICIOUS YEAR FOR SCOTLAND, WITH THE UN CLIMATE CHANGE NEGOTIATIONS BEING HOSTED IN GLASGOW IN NOVEMBER DURING COP26. GLOBAL POLITICAL AND ENVIRONMENTAL LEADERS WILL DESCEND ON THE COUNTRY, WHICH HAS THE OPPORTUNITY TO SHINE A LIGHT ON THE SKILLS, INNOVATION AND PROGRESS BEING MADE TOWARDS DELIVERING ON NET-ZERO.

The transport sector is responsible for the biggest slice of emissions in the UK, producing 27 per cent of greenhouse gas in 2019. More than half is produced by cars, with the vast majority of the remaining 45 per cent emitted by vans and HGVs. It is also Scotland's biggest emitting sector, accounting for 35.6 per cent of emissions in 2018, according to the Scottish Government, making it a priority for net-zero planning.

While zero carbon technology in maritime, aviation and HGV modes of transport is still in its early stages, there is considerable innovation already underway across Scotland, with some areas demonstrating a strong desire to lead on change. Aberdeen City Council has declared the city a hydrogen hub and has committed to investing in the transition of the local economy from one dominated by oil and gas, to a clean energy centre.

The Highlands and Islands have been quick to adopt new methods of transport, with Ampaire, a leader in electric aviation, successfully completing the first hybrid electric flight in Scotland in August 2021, crossing the Pentland Firth from Kirkwall Airport on the Orkney Isles to regional airport Wick John O'Groats Airport in the north of mainland Scotland. Highlands and Islands Airports Limited is also testing drone applications for supplying on-demand medical supplies to health centres.

Scotland's first hydrogen-powered train, developed with Scottish Enterprise and the Hydrogen Accelerator, will be demonstrated at COP26 in November 2021 and is set to be the scene of sector discussions on how to decarbonise rail further.

The Scottish Government is clearly keen to promote these and other innovations, with a number of policy statements published this year indicating its position on how the transport sector must adapt and develop to support the country's target reduction in carbon emissions and laying out a much needed framework for industry leaders.

Member of the Scottish Parliament Michael Matheson was appointed Cabinet Secretary for Net Zero, Energy and Transport in May 2021, a step welcomed by those in the transport sector who had lacked a central point of contact with the Scottish government before this.

All those we spoke to for this report pointed to this as a game changer, allowing industry leaders to translate plans into action.

STATISTICS

50%

GLOBAL EMISSIONS MUST DROP BY HALF BY 2030 TO PREVENT THE WORST IMPACTS OF CLIMATE CHANGE

$7.9T

CLIMATE IMPACTS ARE PROJECTED TO COST THE WORLD ECONOMY $7.9 TRILLION BY 2050

120.7 MT CO^2E

(0.25% OF GLOBAL GREENHOUSE GAS EMISSIONS)

UNITED KINGDOM TRANSPORTATION EMISSIONS

$26T

CLIMATE ACTION CAN BRING $26+ TRILLION IN ECONOMIC BENEFITS BY 2030

65M

NEW LOW-CARBON JOBS COULD BE CREATED IN 2030

Source: World Resources Institute

1. COLLABORATION

IN EARLY 2020, THOSE WORKING IN TRANSPORT BEMOANED THE LACK OF COLLABORATION BETWEEN ITS DIFFERENT MODES AND UNPRODUCTIVE LIAISON BETWEEN INDUSTRY AND THE SCOTTISH GOVERNMENT. THERE WAS LITTLE TO NO JOINED UP APPROACH TO UNDERSTANDING HOW TO PROVIDE AN IMPROVED TRANSPORT NETWORK ACROSS SCOTLAND WHICH DELIVERED AGAINST SOCIAL AND ECONOMIC NEEDS AND ACHIEVED A NET ZERO CARBON OUTPUT.

How this has shifted is perhaps the most notable difference between our first transport report and today's. The Scottish government has been clear in its desire to drive a modal shift in transport choices, with the most desirable being active travel, walking and cycling. The move away from petrol and diesel fuelled cars to electric vehicles, electrified railways, hydrogen-powered buses and cutting the "last mile" between transferring freight from vessels to rail have all accelerated at speed over the past 18 months.

This has been made possible by a number of changes implemented over the past year. Kevin Hobbs, CEO of Caledonian Maritime Assets Limited (**CMAL**) noted perhaps the most helpful move by the Scottish government was to instil more long-term stability into its infrastructure planning with the traditional one-year public funding budgets "finally" replaced with a five-year plan and £586million of funding confirmed.

"It means for the first time we can actually allocate resource and investment to projects that will take, inevitably, longer than 12 months to deliver," he said.

The extension of the railway at Grangemouth demonstrates what can be achieved through different transport sectors working together on net zero targets, in this case rail and sea. Completed in March this year, the Port of Grangemouth opened a multimillion-pound rail freight hub with the arrival DRS's Aberdeen freight train service. The new dual rail siding of 775 metres can now handle the longest freight trains on the UK network, the first of its kind, and provide enhanced container and domestic intermodal options - of particular benefit for customers in the food, drink and perishables sectors across the Scottish freight community. It cuts out the need for surface vehicles to bring containers from ship to train, improving cost efficiencies as well as carbon reduction.

> **"For the first time we can actually allocate resource and investment to projects that will take, inevitably, longer than 12 months to deliver.**
>
> Kevin Hobbs, CEO - CMAL

Working with the energy sector to deliver infrastructure to support vehicular changes has also been a key feature of the past 18 months. The Small Vessel Replacement Programme was approved in late 2020 by Transport Scotland and has already led to a major programme to replace up to seven small 'Loch Class' vessels serving the Clyde and Hebrides Ferry Services network following a partnership between CMAL and CalMac.

New low emissions vessels with the latest proven battery and onshore charging technologies will replace old diesel ferries, with further replacements planned for additional island routes. In our 2020 report, progress on this was hampered by concerns that onshore charging infrastructure simply wouldn't be sufficient to support this move. However, constructive collaboration between Scottish and Southern Energy and CMAL has made it possible to begin to plan for a charging infrastructure in the islands to support the increasing number of fully electric vessels doing short inter-island hops.

2. REIMAGINING FREIGHT AND LOGISTICS

THE SECOND HALF OF 2021 HAS BEEN DOGGED BY GLOBAL SUPPLY CHAIN ISSUES, A NATIONAL SHORTAGE OF HGV DRIVERS IN BRITAIN AND HIGH GAS AND OIL PRICES. THE COLLECTIVE EFFECT OF ALL THESE FACTORS HAS PUT IMMENSE PRESSURE ON LOGISTICS, WITH FAST MOVING CONSUMER GOODS FIRMS HIT PARTICULARLY HARD. BUT DEEPER ROOTED CHANGE IN HOW GOODS ARE DISTRIBUTED NATIONALLY MAY TAKE THESE PRESSURES OFF LOGISTICS IN FUTURE. HGV ELECTRIFICATION IS STILL DISTANT WITH BATTERY TECHNOLOGY NOT YET ABLE TO SUPPORT LONG DISTANCE HAULAGE.

More than one contributor to this report noted that FMCG and just-in-time management suppliers are now pushing for more regional distribution hubs and heavier reliance of sea, rail and EV logistics. This has led already to the extension of the rail track at Grangemouth and also to major investment in the port at Leith.

In May, Forth Ports confirmed plans to create Scotland's largest renewable energy hub on a 175 acre site at the Port of Leith with £40m private investment funding a bespoke, riverside marine berth capable of accommodating the world's largest offshore wind installation vessels. The facility will feature a heavy lift capability of up to 100 tonnes per square metre (t/m2), backed up by 35 acres of adjacent land for logistics and marshalling. This will be supplemented by the upgrading of a 140 acre cargo handling site to accommodate lay down; assembly; supply chain and manufacturing opportunities. Forth Ports aims to work with both the UK and Scottish Governments on the development of the Freeport / Greenport policy in Scotland. Forth Ports believe that the proposed policies would play a major role in Scotland's recovery from Covid-19, accelerating the country's transition to meeting net zero targets and facilitating the development of a green industrial employment hub.

This demonstrates two things: the changing use of ports to support the energy sector, manufacturing wind turbines onsite to reduce transport emissions and speed up delivery; and, the gradual shift from road haulage to rail freight options facilitated by direct connectivity between rail and maritime modes of transport.

Investment in rail is fundamental to this changing behaviour, noted one report contributor. The Office of Rail and Road's latest rail emissions report estimates that 76 per cent of passenger and 45 per cent of freight journeys in Scotland run on electric traction, with several projects currently underway to electrify further railways.

Scottish government has announced the reinstatement of the railway between Leven and Thornton North Junction on the Dundee to Edinburgh main line. Meanwhile the twin East Kilbride and Barrhead schemes are the next in line for electrification, with the East Kilbride line set to be electrified alongside a range of enhancements including double tracking between East Kilbride and Busby.

"One freight train carries the equivalent of 76 HGVs on average," noted Alex Hynes. "Switching to electric trains would also improve service reliability. Typically diesel trains travel 15,000 miles between breakdowns; electric trains increase this distance to 100,000 miles."

One contributor highlighted another marked change in logistics strategies. Containers, historically packed with one type of good are increasingly being packed with the destination in mind. Rather than have an HGV drive to a central distribution centre for a supermarket chain carrying a container filled with tinned food, that container could be taken directly from port to shop, packed with all the diverse goods required by that particular store. This cuts the embedded carbon by taking out the need to redistribute to stores from the centralised distribution centre.

The aviation sector's approach to maintaining crucial connectivity between islands and the mainland on a lower carbon footprint has also been interesting. From postal delivery to the provision of medical supplies, unmanned aerial vehicles – more often referred to as drones – are increasingly being used. In December 2020 Royal Mail partnered with DronePrep, Skyports and what3words to become the first nationwide UK parcel carrier to deliver a parcel for recipients using a drone.

The first delivery took place to a remote lighthouse on the Isle of Mull, while this year the consortium is consulting with islanders on the use of drones to deliver to rural communities on the Isle of Mull.

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Alex Hynes, MD of Scotland's Railway

3. NEXT STEPS

THE ROAD TO NET ZERO IS A JOURNEY. ALL PARTICIPANTS AGREED THAT TRANSITIONARY MEASURES WILL NEED TO BE ADOPTED AT FIRST, WITH COMPROMISES LIKELY IN ALL SECTORS WITHIN TRANSPORT.

"This is more than one-dimensional," said Kevin Hobbs. "Vessels, vehicles and rolling stock must be looking to switch to using sustainable fuels or renewable power but also on the ground infrastructure must be there to underpin that and cut carbon on a smaller scale too."

Interim measures will be critical to balance the environmental and economic pressures faced. Sustainable Aviation Fuel (SAF) – made from animal waste – is likely to provide a lower carbon alternative to diesel for air travel in the medium term, noted one interviewee. Currently SAF is between two and five times as expensive as diesel, with refuelling stations very limited.

That said, major investment into improving the infrastructure needed to transition more of Britain's flights to SAF is already underway. Air BP is investing in a number of SAF projects across the UK, with British Airways' first SAF-fuelled flight taking place in September 2021 from London Heathrow to Glasgow. CO2 emissions were 62 per cent lower than a so-called "perfect flight" using diesel fuel.

Inverness and the BP World Fuel Service have also said they will make SAF available by mid-2023, said one report contributor.

This calls for both Scottish and UK governments to review fuel taxation and incentives to drive corporate behaviour change. One respondent said: "Government must answer an important question, do we invest in SAF infrastructure as an interim to bridge the gap to fully hydrogen or battery powered planes? Or should industry be incentivised to invest that money in battery research?"

A much contended point is the use of offsetting carbon credits. Any airline can buy offset credits and use diesel, simply taking credit for an SAF-fuelled flight elsewhere. "How reliant do we want to be on this model," he questioned.

Same goes in shipping – in July the EU published proposals to tax the shipping sector for its pollution and fossil fuels, encouraging the use of cleaner maritime fuels. However, the world's first green fuel mandate for the sector would boost the use of liquefied natural gas (LNG) according to environmental group Transport & Environment. Shipping companies will have to buy carbon credits on voyages within Europe and for 50 per cent of their emissions when travelling between EU and non-EU ports or in the opposite direction. T&E analysis suggests this could actually boost the shipping industry's reliance on LNG, a fossil fuel, and biofuels. If cutting greenhouse gas emissions is the aim of this legislation, T&E warn, if will fail because LNG offers minimal carbon reduction and also releases methane, a gas 36 times more damaging for the environment than carbon dioxide.

THE BRITISH PICTURE

The UK government has also published a number of papers clarifying the potential role of both electricity and hydrogen fuels in the future transport network.

The Decarbonising Transport plan, announced in July, is targeting having only zero-emissions vehicles on the UK's roads - a world first. No new fossil fuelled vehicles will be sold after 2040, with sales of smaller diesel trucks proposed to be banned from 2035, and larger ones by 2040. It follows a previously announced phase-out of new fossil-fuel cars and vans in 2035.

It also confirms the UK government's intention to phase out the sale of new diesel and petrol heavy goods vehicles (HGVs) by 2040, subject to consultation.

ABERDEEN'S HYDROGEN HUB PLANS

CASE STUDY

Aberdeen is a city historically synonymous with the oil and gas industry, which has provided so many of its residents with employment and contributed to its prosperous economy. Not just a centre of excellence for the energy sector in Scotland, the city is recognised internationally as a place with a huge amount of industrial and engineering expertise. As the UK transitions to net zero over the next three decades, Aberdeen's local economy will also need to transform.

Realising this opportunity very early on, Aberdeen City Council has been one of Scotland's most proactive in investing and developing new energy expertise and options to support local jobs and maintain the city's international reputation for being at the forefront of energy. Aberdeen has a vision to be a world leading hydrogen city and develop Scotland's first commercially scalable, investable hydrogen production and distribution facility, making use of the region's renewable resources to provide a truly 'green' fuel supply. To date, Aberdeen City Council has invested £38.4million in the creation of the city's hydrogen hub and in decarbonising the public transport fleet.

The Aberdeen Hydrogen Strategy was published in 2015 and outlines key actions required over a 10-year period to ensure Aberdeen is a world class energy hub leading a low carbon economy and, in particular, is at the forefront of hydrogen technology. More recent H2 Aberdeen investment has been focused on reskilling and deploying the transferable oil and gas expertise into low carbon alternatives including wind, solar and hydrogen.

The last of these is a solution to many of the big issues today: hydrogen can be used in industry, energy, heating and transport to reduce greenhouse gases and air pollution. It can also be used as a storage vehicle for renewables like solar and wind, which can act as a buffer to the grid system ensuring that demand and supply more readily meet. Aberdeen City Council is using its current hydrogen deployment activity to promote nearer term growth opportunities in the region such as working with public, private and third sector organisations to maximise local benefits, whilst having an eye on a long-term goal of industry diversification, and the potential export of surplus hydrogen in the future.

With funding and support from Interreg Europe Smart HyAware, Opportunity North East and Scottish Enterprise, Aberdeen City Council is working with public and private sector organisations to develop fleet procurement strategies and infrastructure plans. These plans identify how hydrogen could help decarbonise transport and utility vehicles for organisations including Aberdeenshire Council, Angus Council, Highland Council, Moray Council, NatureScot, North East Scotland College, NHS Grampian, Robert Gordon University, Royal Mail, Scottish Water and Scottish Environmental Protection Agency.

Cenex was appointed to undertake a fleet review to establish operational requirements for replacement of diesel vehicles and assess possible demand for hydrogen across the region. The analysis of the combined vehicle fleet of over 4,000 vehicles shows that 89 per cent of the fleet is compatible with zero emission solutions (EV and hydrogen solutions considered).

While this analysis established that battery EVs could look to address 57 per cent of the fleet, it revealed that hydrogen solutions could be used for the entire fleet, with a subset of 32 per cent that could only be addressed through hydrogen. This would result in an annual demand for hydrogen of 745 tonnes, 92 per cent of which would come from heavy duty vehicles. This further demonstrates the opportunity that the Aberdeen Hydrogen Hub offers the region for collating demand to kickstart a hydrogen economy.

To deliver its vision for the Aberdeen Hydrogen Hub, Aberdeen City Council is procuring a strategic joint venture partner that will work with the Council over the next 20 years to stimulate both the supply and demand for green hydrogen in the region. A positive response to the recent invitation to tender shows investor confidence from the private sector is high and collaborative approaches to meet net zero targets are sought after. This approach demonstrates the important role of local authorities in the development of low carbon economies in Scotland.

The analysis of the combined vehicle fleet of over 4,000 vehicles shows that 89 per cent of the fleet is compatible with zero emission solutions (EV and hydrogen solutions considered).

CONCLUSION

WHILE ACKNOWLEDGING HUGE IMPROVEMENTS OVER THE PAST 18 TO 24 MONTHS, ALL THOSE INTERVIEWED FOR THIS REPORT AGREED THAT EVEN BETTER COLLABORATION IS STILL NEEDED.

“The sheer number of people involved means it is very hard to be joined up in the conversations being had about where money should be spent, what research to fund first and where governments should be investing,” noted one respondent. “It is still so fragmented.”

Others said governments were lacking in the ambition shown by some private sector companies, promising to cut fossil fuel use by 40 per cent by 2030.

Added to the challenges posed by getting sectors to work together, the private sector to work with the public sector and co-ordinating energy infrastructure investment with wider transport transformation strategies, are complex political tensions both within Scottish government and between Scotland’s devolved administration and Westminster.

The coallition of the Scottish National Party with the Scottish Greens in Holyrood triggered speculation about the slated upgrades to the A9 and A96 given the Greens’ stated position which contests all new road investment. In a statement confirming the partnership, the SNP committed to increasing investment in active travel and public transport, “with the aim of providing a realistic and affordable alternatives to car use”.

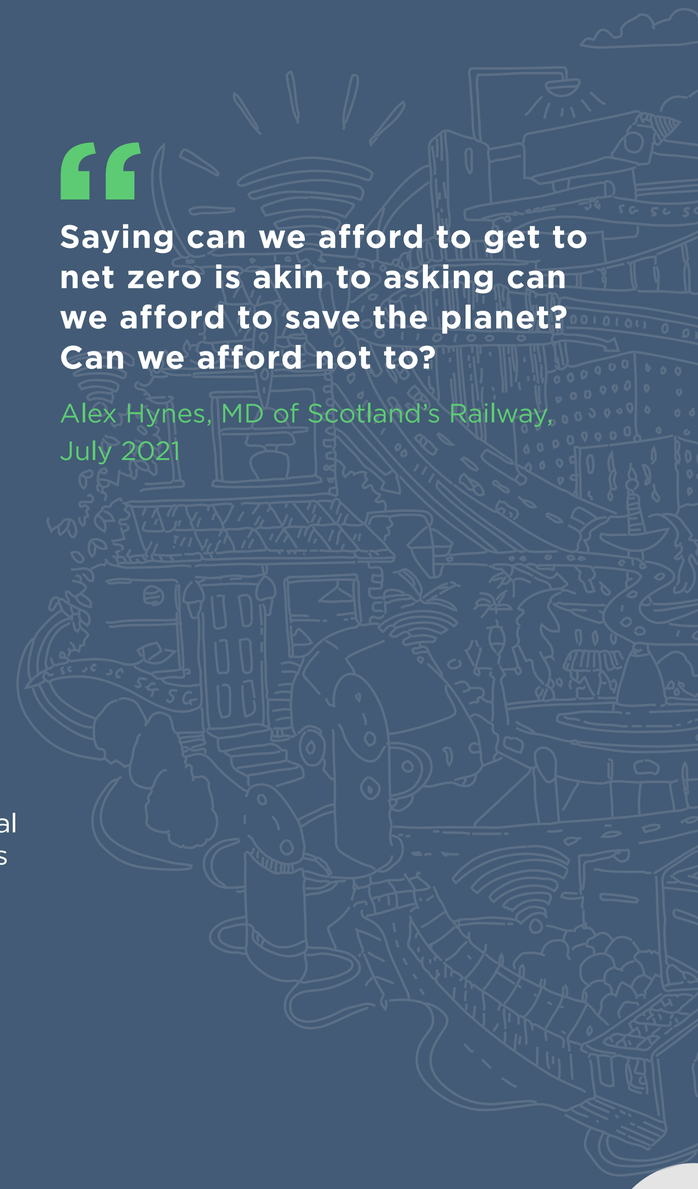
The British government’s Budget 2021 announcement of investment into eight new free ports around the English coastline preceded talks with the Scottish government to identify at least one and possibly two free port locations in Scotland. A clash between government officials was reported to have ended these talks, with Scottish business minister Ivan McKee stating in mid-September that the Scottish Government will establish its own green port with different minimum wage measures and net zero commitments from its English counterparts.

However the particulars are worked out, the aim of free ports is to create economic zones with beneficial customs rules and lower import taxes to encourage global shipping and aviation distribution networks to rely on British infrastructure, boosting economic growth across the UK.

Ultimately, devolved governments must work more strategically together. As Alex Hynes noted: “A good way to reduce Scotland’s rail freight carbon footprint would be to electrify parts of England’s railway”.

This observation gets to the heart of the matter: political and environmental ambitions are proving mutually exclusive in some cases. And yet, passengers, businesses and individuals rely on national and international transportation networks that cross borders. We must all work together if net zero is to become reality.

> **“Saying can we afford to get to net zero is akin to asking can we afford to save the planet? Can we afford not to?**
>
> Alex Hynes, MD of Scotland’s Railway, July 2021



MEET THE AG SCOTTISH TRANSPORT TEAM

ADDLESHAW GODDARD'S TRANSPORT TEAM IS RECOGNISED AS ONE OF THE MOST EXPERIENCED IN THE SECTOR, WITH TECHNICAL EXPERTISE ACROSS A RANGE OF LOCAL, NATIONAL AND INTERNATIONAL TRANSPORT PROJECTS.

We partner with dynamic clients to solve complex problems through in-depth knowledge of the transport sector from both a regulatory and operational perspective. With a specific focus on: rail, urban transit, ports, freight and logistics and transport hubs, the wealth of experience held by our dedicated team of transport experts ensures our clients are carefully guided through every stage of their project to achieve their goals.

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