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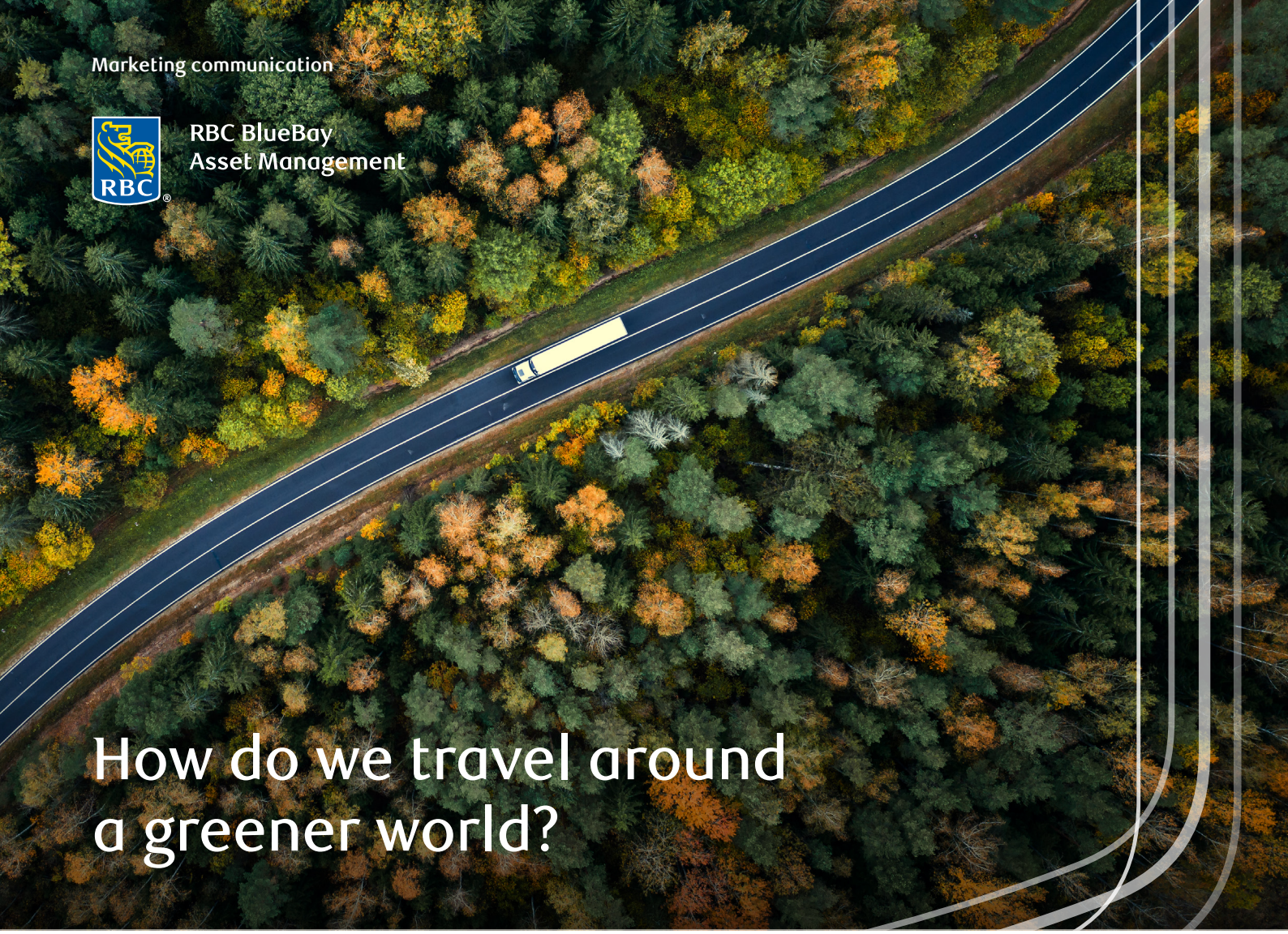


How do we travel around a greener world?

"In this fast-evolving environment, there are changes afoot in every major transportation industry, as well as the infrastructure that underpins them."

In a low-carbon environment, the way we move around has to evolve. From new mindsets about modes of travel to new fuels and power sources, mobility and its underlying infrastructure is transitioning for a greener world.

In this report, we look at the broad theme of green mobility through these key questions:

- How has the pandemic changed transportation?
- How is rail, road and air transportation transitioning to be more sustainable?
- What are the barriers to investment in green mobility and infrastructure?

With governments and companies introducing targets to achieve net-zero by 2050, it's clear that the way we travel, both in our cities and across the globe, has to change.

This is a hugely complex challenge, requiring not only new ideas about how we fuel our transportation, but a shift in the way we use transport, and sweeping infrastructure changes to support new initiatives and technology.

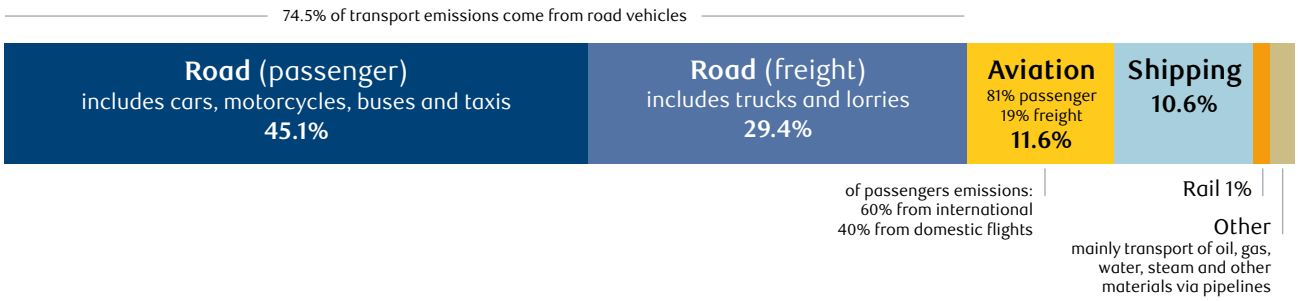
The anticipated increase in the world's population in the coming decades has heightened the need for change, although the pace of global population growth is expected to be be uneven across different countries and regions. At the same time, urbanisation is rapidly continuing with cities expanding and residents increasingly concentrated in urban areas. While the global pandemic gave a glimpse of a world with significantly reduced air pollution in cities and fewer emissions from transport, road traffic is already rising close to 2019 levels[1], and air traffic is predicted to return to pre-pandemic levels by 2024[2].

According to the International Energy Agency (IEA)[3], transport has the highest reliance on fossil fuels of any sector and accounts for 37% of CO_2 emissions from end-use sectors. Tackling this reliance will take a combination of alternative fuels and alternative modes of transport, a change in mindset that embraces multimodal transportation and ridesharing, and new infrastructure that's developed with both green and social considerations in mind.

In this fast-evolving environment, there are changes afoot in every major transportation industry, as well as the infrastructure that underpins them.

Global CO_2 emissions from transport

This is based on global transport emissions in 2018, which totalled 8 billion tonnes CO_2
Transport accounted for 24% of CO_2 emissions from energy



Source: Our World in Data, 2020

Electric vehicles (EVs) and charging networks

According to the IEA's Global EV Outlook 2021, there's continued strong momentum in the electric vehicle market. There were 10 million electric cars on the world's roads at the end of 2020[4], following a decade of rapid growth. Despite the pandemic, which saw global car sales drop by 16%, electric car registrations increased by 41% in 2020[5]. Around 3 million electric cars were sold globally (a 4.6% sales share), and Europe overtook China as the world's largest EV market for the first time[6]. Electric bus and truck registrations also expanded in major markets, reaching global stocks of 600,000 and 31,000 respectively.[7]

These impressive statistics are down to key drivers for the sector. There's significant government support for EVs, with more than 15 countries announcing upcoming bans on new internal combustion engine (ICE) cars[8]. This support also takes the form of purchasing incentives for consumers, including subsidies and tax breaks, to take the sting out of the greater upfront cost of a new EV.

Most importantly, battery costs are continuing to fall and auto-maker investment in EV development is paying off, with a greater range of newer, improved models coming off the production lines. Ford has committed to an all-electric future in Europe by 2035, kickstarted by three new passenger and four new commercial vehicles by 2024[9]. General Motors is aiming to go all-electric worldwide by 2035 and is rapidly expanding its line-up under top brands like Chevy, Cadillac and GMC. Volkswagen is striving to be all-electric by 2026, and Toyota is aiming for 2024.

These are just some of the commitments from automakers, while consumers are likely to be further persuaded by the rising costs of fossil fuels. However, funding this transition is not going to be easy. As our case study on the next page of Germany shows, ICE cars are still making money and in many geographies EVs remain uncompetitive.

[1] The changing shape of inner-city traffic: How COVID-19 changed the way we move in 2021, TomTom, February 2022
[2] Back to the future? Airline sector poised for change post-COVID-19, McKinsey & Company, April 2021
[3] Improving the sustainability of passenger and freight transport, IEA, April 2021
[4, 5, 6, 7] Global EV Outlook 2021, IEA, April 2021
[8] Update on government targets for phasing out new sales of ICE passenger cars, ICCT, June 2021
[9] Ford in Europe: Nine All-Electric vehicles by 2024, Ford, March 2022

Challenges in funding the EV transition

Germany, one of the world's leading industrial hubs for auto manufacturing, provides an interesting case study.

The German government wants consumers to buy 'green' cars, and subsidies and sales targets are used to promote this behaviour. However, consumers have yet to fully embrace EVs and, up until now, the upfront cost of an EV has been a major deterrent. Customers, particularly for personal vehicles, need to keep the car for a long period to recoup the extra cost of the car against the reduced spend on fuel. As battery costs have fallen that cost has been somewhat reduced, but EVs remain a significant investment. This could be one reason behind their better success as fleet or freight vehicles, over passenger cars, where high rates of mileage more quickly recoup that investment.

Undoubtedly, the transition from ICE to EV is a necessary process, but there appears to be a significant disconnect in this when it comes to automotives since car manufacturers have yet to create a truly competitive EV that can hamper the existing consumer preferences for ICE vehicles. As it stands, fossil-fuel powered vehicles remain the status quo.

This preference is clearly illustrated by 2019 EV sales in Germany which make up only some 4% of total cars sold. While there are incentive schemes, and this percentage has been increasing, it is nowhere near sufficient to make EVs profitable and have a positive impact on manufacturers' bottom-lines.

Manufacturers are being asked to cannibalise their profitable ICE vehicles with less profitable EVs at a time when they do not have a product that's popular with consumers. But that is starting to change.

> **"The cost of fossil fuels is rising and battery costs are falling, making EVs more attractive to consumers."**

In the last five years alone, German manufacturers have increased their new technology spend massively. This has been possible thanks to sound profitability levels and there are now factors at work in the economy that will both push and pull consumers in the EV market. For manufacturers, the economic outlook is more difficult as profits are declining and the government is discouraging consumers from buying the fossil-fuel products that have been funding these investments in transition technologies. This could reduce investment in new vehicles.

Simultaneously, the cost of fossil fuels is rising and battery costs are falling, making EVs more attractive to consumers. If governments continue to help to subsidise the switch, their EV targets could be well within their grasp.

Many countries also lack the infrastructure to support the strong push for EVs. While there are strong commitments on sales of EVs, these will need to be matched with investment in charging networks, increased interoperability of EV charging, more R&D into more efficient batteries, and battery reuse and recycling. This is particularly important when it comes to winning over consumers. Despite fuel price increases and environmental concerns, the lack of charging infrastructure and short-lasting batteries acts as a significant deterrant in the purchase of EVs over ICE vehicles.

Railways: the sustainable alternative?

Trains have a central role to play in decarbonising the transport industry. They are already the cleanest form of high-volume transport, representing 8% of global passenger and freight transport, but only 2% of transport sector emissions. As railways are electrified, this will fall further and faster, increasing the attractiveness of the railways as a green transport system.

However, revitalising the railways as a major transportation mode today faces a number of challenges. Trains are a clear substitute for high-emission air travel, particularly short-haul flights in mainland Europe or the US, but their comparative cost and the convenience of alternative, faster transport has always impeded greater uptake. The result is that many railways have fallen into disuse, impairing the density of networks. There are fewer sleeper services to make long journeys more palatable and a general lack of investment in railways has resulted in a poor reputation for comfort and convenience.

Investment will be required to make rail travel cheaper and longer services more comfortable. At the same time, trains will need to continue their own net-zero journey to electrification.

The future of flight

Air travel is often the most-maligned form of transport in terms of emissions, even though aviation is responsible for only 12% of total CO_2 transportation emissions, compared to 74% produced by road transport[10]. However, it is among the fastest-growing sources of emissions as, over the years, costs have fallen to bring yearly or even more frequent flights within the reach of the most people.

Amid calls for people to fly less or even give up flying entirely, the shift to hybrid working has allowed for remote meetings and conferences – reducing business travel - and the aviation industry is looking towards a future of ever-shifting demand. However, a number of emerging technologies could help to turn the sector's fortunes.

> **"Like cars and trains, companies are looking to electricity to power future aircrafts, albeit initially on very short journeys."**

Companies are experimenting with biofuels, although these will only be sustainable if they're taken from sources such as used cooking oil, rather than from crops that could otherwise be turned into food. Like cars and trains, companies are looking to electricity to power future aircrafts, albeit initially on very short journeys. Alternatively, hydrogen engines are also touted by many as the future of long-haul flights.

Modern helium blimps, such as those from Hybrid Air Vehicles (HAV), are powered by a combination of combustion and electric engines. In comparison to aircraft, the hybrid electric-powered vehicle offers a 90% carbon emission reduction[11]. However, many companies are working to design fully electric airships by 2030 which would offer zero-emissions flights. Time will tell whether these become a feasible form of mass transportation.

Electricity everywhere

Many of the solutions to more sustainable transportation have the same thing in common – electricity. But, of course, the production of that electricity in itself has to be sustainable to provide net-zero transportation. Investing in the future of green mobility doesn't just mean airships, EVs and sleeper trains, it's also about creating the infrastructure behind it. Electricity networks need to shift to new sources of power and more efficient processes to ensure that this electrification of transport achieves its aims.

[10] Facts & Figures, Air Transport Action Group, September 2020
[11] Airships for city hops could cut flying's CO2 emissions by 90%, The Guardian, May 2021

The impact of the pandemic

The restrictions put in place to limit the spread of COVID-19 across the world had an enormous impact on transportation. Aeroplanes were grounded, rail and buses were operating with skeleton crews and social distancing, and there was a complete shift in where people needed, wanted and could go to.

For commercial transportation, the impacts were more complicated. Global supply chains suffered from both supply and demand issues and a lack of available drivers. At the same time, there was a continuous requirement to keep up the supply of essential goods.

As a result, global road transport activity dropped to almost 50% below the 2019 average by the end of March 2020[12], commercial flight activity to almost 75% below 2019 levels by mid-April 2020[13], and worldwide air freight traffic declined by around 9%[14].

As the recovery continues much of that traffic will resume, but there are other longer-lasting impacts, such as hybrid working. The jury is out on whether hybrid working will have strong environmental impacts. A recent study, for example, found that some remote workers actually travelled further overall than their commuting counterparts because they had reloacated to live further from their office, making their infrequent commutes much longer[15]. Those that live further outside of city centres are also more likely to have to travel by car than by public transport or bicycle. However, as the frequency of these trips is likely to be less, all factors need to be considered, to see the overall impact on emissions.

> **"As the recovery continues much of that traffic will resume, but there are other longer-lasting impacts, such as hybrid working."**

These changing patterns are happening at a time when consumer demands are also shifting. Consumers are more aware of their own emissions and sustainability than ever before and are increasingly willing to do more, or spend more, to support green products. Governments and companies are also committing to do more to reduce emissions, which may make some firms consider fully remote options for employees.

Investing in a net-zero future

The current pace of decarbonisation is still slow and there are a number of barriers to embracing green mobility. Chief among them is the chicken-and-egg problem – who will invest in infrastructure without the demand for the products and vice versa? Take EVs for example – who will invest in EVs without the charging network to support them, but who will invest in the charging networks if nobody owns the vehicles yet?

There are answers to this conundrum, however. A report from McKinsey and the World Economic Forum[16] points out six sustainable mobility investment cases that can be made right now, many of which look at the problem of transportation in terms of fleets. Whether it's fleets of electric buses for passengers, electric trucks for road haulage or electric cars for a corporate fleet, looking at large use cases is a great place to start.

Example investment opportunity of fleet transport

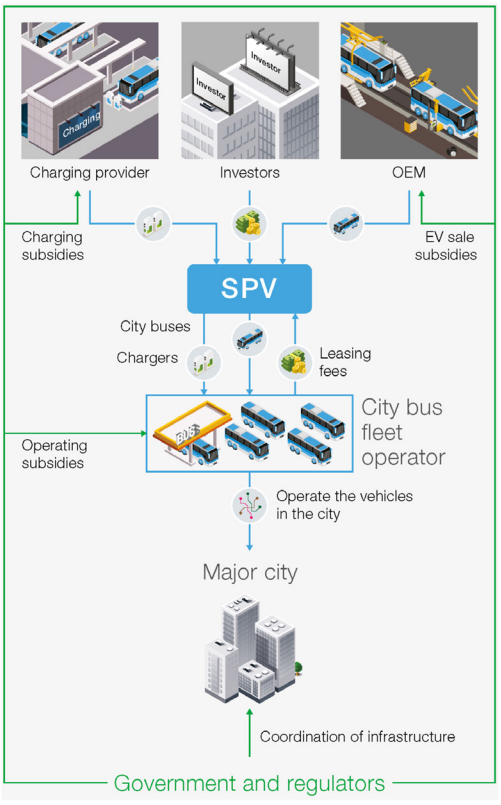


Illustration of the potential structure of the investment opportunity as well as interactions by individual stakeholder groups using the example of city buses. SPV – special purpose vehicle. OEM – original equipment manufacturer. Image: The World Economic Forum in collaboration with McKinsey & Company: Unlocking Large-Scale, Long-Term Capital for Sustainable Mobility: Introducing Key Mobility Investment Archetypes, September 2021

[12] Global Energy Review 2020, IEA, April 2020
[13] Scraping along the bottom: April air traffic statistics, FlightRader24, April 2020
[14] Air cargo traffic, Statistica, January 2022
[15] New research casts doubt on environmental benefits of hybrid working, University of Sussex, April 2022
[16] How to scale-up investment in sustainable mobility, World Economic Forum, September 2021

As fleets have much higher mileage than personal use vehicles, they are more cost-effective when the upfront investment is larger. Once taxis, buses, car clubs and even corporate fleets in a given city are running on electricity, that could provide a tipping point for the city to invest in better EV networks. Manufacturers will be able to reinvest their profits from fleet sales and upkeep into bringing the costs of EVs down, until they become more attractive to individual buyers. Fleets also tend to be changed and upgraded relatively regularly, which will bring large volumes to secondhand sales of EVs, reducing the upfront cost for those willing to buy secondhand.

It's clear that there's no one answer to sustainable mobility. Consumers, manufacturers and local and national governments all have a part to pay. Significant funding is needed to reach global climate targets and public investment or incentives won't be enough. Collaboration between public and private funding, with equity investments, green bonds and joint ventures all on the table, will be what drives the change in transportation to greener mobility supported by sustainable infrastructures.

It's a time of flux for the transportation industry, where new business models, new infrastructures and new modes of transport will need to be embraced. We may need to move through the world more slowly, although perhaps more luxuriously, aboard airships or high-speed trains. We may need to shift to a multi-modal mindset that mixes EV car club use with public transport and ebikes, for example.

> **"Significant funding is needed to reach global climate targets and public investment, or incentives won't be enough."**

Every investment, whether in new fuels, new types of vehicle or new infrastructure, brings sustainable mobility a step closer.

Author

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Lucy has been at BlueBay since July 2018, joining initially as an ESG Analyst, becoming a Senior ESG Analyst in January 2020. Her responsibilities are to support the integration of ESG analysis across the firm, working closely with the investment teams. She also assists in our ESG engagement efforts. Prior to this, Lucy was an Assistant Sustainability Manager at KPMG where she worked with companies across a range of sectors and geographies, as well as investors, on their sustainability strategies and reporting and assurance activities. Previous to that she was a waste management and environmental consultant. Lucy has an MSc in Environmental Technology and an MSci in Environmental Geoscience, both from Imperial College London.

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