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NET ZERO APPG MYTH BUSTING REPORT 23 for '23



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IT'S TIME TO DE-BUNK MYTHS IF WE ARE TO GET TO NET ZERO BY 2050 - OR SOONER

Whether you are in the pub, at work, on the train, or just chatting to friends and family, there are a lot of myths bandied about when it comes to Net Zero.



To decarbonise our everyday lives and get to Net Zero by 2050, we know that behaviour change is imperative - but too often, the pros and cons of Net Zero transition become embedded as fact and get in the way of progress. As set out in our Net Zero APPG Road to Net Zero Report and 10 Point Action Plan behaviour change needs to accelerate and not be slowed.

If we look at climate change in context with the challenges presented by the cost of living and energy crises, we can only conclude that the UK needs to go further and faster to reach Net Zero. As we navigate the road to Net Zero, it is vital policymakers, industry leaders and citizens are equipped with accurate information and a shared understanding of the future path.

This Net Zero Myth Busting report will serve as a valuable resource to provide clarity on the complexities of the agenda, empowering influencers to make informed decisions and contribute to collective solutions. Our Net Zero APPG Myth Busting Report aims to dispel some of the popular myths and debunk some of the inaccuracies and outright misinformation about what we need to do to get to Net Zero. We have endeavoured to separate some facts from fiction, as well as highlight grey areas that require further clarification.

To unlock Net Zero, the UK Government needs to better educate and communicate with consumers on the right interventions they can make to ensure everyone is incentivised and mobilised to do their bit to tackle the climate emergency.

It is clear that it's time for UK business, industry, consumers, and political leaders (of all parties) to drive the Net Zero agenda and bring about the policy changes needed to scale up and unlock investment, innovation, and the policy incentives needed to accelerate and embed Net Zero 2050.

Ultimately, we want a clear communications strategy on Net Zero policy that drives real behaviour change, encourages innovation and drives green growth. The narrative needs to change to provide a consistent and cohesive action plan, and the myths around Net Zero need to be busted.

A handwritten signature in black ink that reads "Alex Sobel". The signature is fluid and cursive.

Alex Sobel MP
Chair of the Net Zero All Party
Parliamentary Group

WHY THE NARRATIVE NEEDS TO CHANGE

The science of climate change is very clear, but its communication is often hopeless. Being right and being understood are not the same thing, and I'm very keen that we explain these huge issues in a way which everyone can understand.



It is always sobering for the Climate Change Committee, and our remarkable support team, to discover that words like 'retrofit', 'modelling', and 'sequestration' are simply not understood. Even terms like 'kilowatt-hour' mean nothing because you can't feel it, or touch it, or see it - so it doesn't get through. However, if you talk about people's bills, they begin to relate to the topic. Retrofit sounds like your home needs fixing and seems complex, expensive, and suitable for someone else. If you talk about making improvements to ensure your home saves you money and cuts your energy bills - then people want to know more.

Words and phrases that people don't immediately understand can lead to the proliferation of myths around climate change, and this report seeks to bust those myths.

A common misunderstanding is around the temperature rise we will see in the future, and how different increases in temperature have an impact on us. "Keeping 1.5°C alive" is an often stated but hard to understand phrase. What does it really mean to keep a temperature alive? And the difference between 1.5°C and 2.0°C doesn't sound like much?

We have to turn the numbers into the experience of our audience. So we might remind them that the witheringly hot weather last summer was the result of just over 1°C warming - add half as much again, and you can imagine just how great an effect so seemingly small a figure can have. The amount of warming we have had since 1960 means that, on average, Spring now comes 17 days earlier. Just imagine the effect of doubling that when already the blossoms come out too early for pollinating insects.

In the past, experts have focused on science at the expense of communicating it. Yet, once we understand what is happening to the planet, it becomes very difficult to ignore.

The way we talk about climate change will make a difference to how others act, so those of us working on this topic have a responsibility to get it right. Analysis and science are only half of the battle - the language we use to explain it is just as important. There's no success in being right if we aren't being understood. This report attempts to address that imbalance.

A handwritten signature in black ink, appearing to read 'Deben', with a horizontal line underneath.

Lord Deben
Former Chair, Climate Change
Committee UK (2012-2023)

ABOUT THE NET ZERO APPG

The Net Zero APPG works to accelerate and unlock a low carbon and affordable future by generating debate, shaping, informing, and influencing future policy direction.

Our mission is to:

“Secure a low carbon and clean industrial and economic future for the UK; embed zero-carbon solutions, and accelerate the UK’s commitment to delivering Net Zero growth and innovation AND a Net Zero carbon economy.”



The Net Zero APPG was created to:

- Support the creation of cross-departmental incentive programmes and the delivery of joined-up, long-term solutions in partnership with business.
- Embed Net Zero policies across government departments
- Make Net Zero key to the delivery of the UK Government’s Industrial and Clean Growth strategies
- Accelerate Government’s commitment to adopt a whole systems approach to decarbonising UK energy infrastructure

The Net Zero APPG works to generate cross-party debate, consensus and support on how best to tackle the climate change challenge. This year’s programme is about looking to the future and going beyond current thinking to look at how we unlock the green innovation investment and incentives needed.

This Myth Busting Report seeks to change the narrative and encourage better communication, and builds on the Net Zero APPG’s 10-point Action Plan and Net Zero Roadmap.

EXECUTIVE SUMMARY

When it comes to the scale of the Net Zero challenge in the UK, we know we have to accelerate and embed behaviour change. We also know that good communication is key to achieving better understanding about what needs to change and why. Too often, the climate change narrative and message can be based on misinformation, myth or misunderstanding.

Whilst it has not always been possible to completely bust the 'myth', this Net Zero Myth Busting Report endeavours to help policy and decision makers be better informed. It is important to emphasise that there may not always be a single answer; rather, there will be a range of opinions about the "bust". The Net Zero Myth Busting Report works to identify where there is consensus, but also the grey areas which warrant greater debate and clarity from Government.

- **MB1 NET ZERO GROWTH:** Net Zero and growth can go hand in hand. Net Zero transition will work to boost cheaper and cleaner and greener energy, which in turn will scale up economic growth. With investment in clean technologies, the UK has the potential to lead the global economy to a greener and more prosperous future.
- **MB2 NET ZERO COSTS:** Net Zero is good for growth and attracts billions of capital investment into UK projects, which in turn boosts local economies across the UK; helping to tackle deprivation and improve health and living standards.
- **MB3 GREEN SKILLS:** Whilst there is significant progress being made to attract and train a highly skilled workforce to realise the UK's Net Zero ambition, the scale of the green jobs revolution is huge and employers cannot achieve it alone!
- **MB4 NET ZERO CITIES:** Cities actually have a much lower carbon footprint compared to non-urban areas and play a crucial role in the fight against climate change.
- **MB5 CARBON CAPTURE AND STORAGE:** CCS is absolutely necessary if we don't scale down energy demand. Carbon emissions are still rising, so we must scale up the geological CO2 storage to meet UK climate goals.
- **MB6 NUCLEAR POWER:** Nuclear power is one of the world's cleanest energy sources; emitting the least greenhouse gases and therefore a key part of the energy mix on the road to Net Zero.
- **MB7 RENEWABLE ENERGY:** Renewable energy is reliant on the weather, but to be more energy secure and resilient, we need to build more renewables to accelerate our transition to Net Zero. Renewable energy covers a vast amount of technologies, with low and predictable operational costs.
- **MB8 MAKING HOMES ENERGY EFFICIENT:** Making our homes energy efficient is not only possible, it is essential. The return on investment in Net Zero housing to the nation's health and wellbeing alone means that Government must take urgent action to tackle the energy and climate crises – energy efficient homes are a BIG part of getting to Net Zero.
- **MB9 RETROFITTING HOMES:** Social housing has a critical role in achieving the retrofit challenge, effectively engaging communities and communicating the financial and sustainability benefits to residents. Simply making something 'free' is not enough to drive desire for retrofit.
- **MB10 HEAT PUMPS:** Heat pumps are more efficient and can be cheaper to run than a gas boiler. They can be fitted in just about any property regardless of age and work effectively in temperatures as low as -16 °C.

- **MB11 GREEN HYDROGEN:** Green hydrogen is not the ‘silver bullet’ for decarbonising our homes and buildings. The energy system of the future will involve a range of mixes of decarbonising solutions, and hydrogen should be prioritised where it achieves the best outcomes at scale. For our homes and buildings, we should focus on utilising existing techniques and technologies associated with fabric upgrades and heat pumps, rather than waiting for a potential decarbonisation of the natural gas grid with hydrogen.
- **MB12 SUSTAINABLE TRAVEL:** Sustainable travel choices are not always accessible and need to be made affordable, fast and convenient for consumers.
- **MB13 RAIL:** Electrification is the best way to decarbonise rail. We can’t afford to not electrify the UK’s network, and in so doing we will reduce costs and save money with a rolling programme designed to generate efficiency and make electrification cheaper, more efficient and a good investment in Net Zero.
- **MB14 EV CHARGING POINTS:** It’s more important that EV charge points are the right sort, installed at the right time, in the right place and to the right specification. We need to keep pace with demand and reach the ‘sweet spot’ where we can support EV uptake and successful transition to electric motoring.
- **MB15 ROADS:** We will not reduce emissions simply by reducing road capacity – EV’s need roads too! BUT, we do also need to accelerate sustainable alternatives and access to public transport, cycling and walking.
- **MB16 BUSES:** If we are to transition to all-zero-emission buses by 2035, it is important to encourage a modal shift from cars to buses or to other public transport. We also need to make sure we are reducing emissions from non-zero emissions buses and that greener journeys can be made by bus.
- **MB17 SUSTAINABLE AVIATION:** Not all forms of Hydrogen are compatible with Net Zero in aviation. It is wrong to conclude that Hydrogen *alone* is the solution to Net Zero in aviation. The green hydrogen required to power the entire aviation sector is enormous and would require substantial technological transformation.
- **MB18 JET ZERO:** Sustainable Aviation Fuels will have to play a huge role if we are to decarbonise aviation by 2050. There is enormous economic potential and Government need to unlock the barriers to real emissions savings so that SAF can deliver in the short term.
- **MB19 RETHINKING NET ZERO TARGETS:** We need to turn the taps off! Hard to abate sectors such as shipping, aviation and intensive energy users need to scale up their transition to alternative fuels and cut their use of fuel this decade. The scale of the damage requires far more than measures to reduce the carbon intensity of fuel alone.
- **MB20 PORTS:** Ports can play a critical role in the transition to Net Zero through decarbonisation of freight and enabling the generation, storage and distribution of renewable energy and alternative fuels.
- **MB21 LAND & FARMING:** Cutting out red meat and/or dairy from your diet alone will not drastically reduce your carbon footprint.
- **MB22 CIRCULAR ECONOMY:** To get to Net Zero by 2050 the UK needs to adopt a whole system approach, accelerate transition to a “Circular Economy” and make better and more informed decisions based on data and impact.
- **MB23 RECYCLING:** Recycling has had success, but we can do better. Quite simply, we all need to rethink our relationship with ‘stuff’ and do more than just recycle. It is clear that if we are to achieve our Net Zero goal we also need to consume less, refill, repair and reuse more.

NET ZERO APPG MYTH-BUSTING REPORT

Please note: Each response represents the opinion of the author, and not the collective view of the Net Zero APPG and its supporters.



MYTH #1 “Net Zero is bad for growth and pushes up costs”

BUST: NO, IT ISN'T....

Net Zero and growth can go hand in hand. Net Zero transition will work to boost cheaper and cleaner and greener energy, which in turn will scale up economic growth. With investment in clean technologies, the UK has the potential to lead the global economy to a greener and more prosperous future.

Sam Hall, Conservative Environment Network (CEN), looks at the compatibility of Net Zero and economic growth.

One of the biggest myths around climate policy is that Net Zero and economic growth are not compatible.

The Mission Zero: Independent Review of Net Zero by the Rt Hon Chris Skidmore MP concluded that the transition to Net Zero will “provide the economic opportunity of the 21st century”, driving economic growth and opportunity across the UK.

However, some environmentalists argue that we must shrink the economy in order to hit our climate goals. There is also the view sparked by some Net Zero sceptics that decarbonisation is harmful to growth as it pushes up costs and offshores industry. Both positions are wrong. Net Zero and growth can go hand in hand for **two** reasons:

1 **Scaling up Net Zero is the best way to wean us off gas**, which is the major drag on growth. Wholesale gas prices are pushing up our energy bills, because of the war in Ukraine. Gas is so expensive that the Climate Change Committee UK believes that, if prices were to stay at this level, Net Zero would save 0.5% of GDP.

Our transition to Net Zero will reduce gas consumption and increase clean energy generation. The more wind farms we put up, the more heat pumps we install in people’s homes and the more schools and hospitals we insulate, the less gas we have to import from abroad and burn, and the less expensive our overall energy costs will be.

Energy sovereignty – relying on increased domestic gas production – is not realistic. The North Sea gas basin is mature and expensive, and fracking isn’t seen to be politically viable. In the most recent clean power auction, new renewable projects were 9 times cheaper than gas-fired electricity.

Net Zero is how we boost cheap energy that can fuel economic growth.

2 Net Zero requires investment, which creates new economic activity, jobs, and exports.

Net Zero is one of the greatest global growth opportunities of our age. 90% of world GDP is now covered by Net Zero targets. That's a huge potential market for clean technologies.

The UK is in a race for investment and market share. The past year has seen a raft of clean energy commitments being made by countries around the world. Through the Inflation Reduction Act, the US is targeting 950 million solar panels and 120,000 wind turbines by 2030. With its Repower EU initiative, the EU wants 600 gigawatts (GW) of solar installed by 2030, while China has a target of 1200 GW of solar by 2030.

Competition to be world leaders in making the next generation of clean technologies – whether it's green hydrogen, carbon capture, or cultured meat – is even fiercer. Slowing down on Net Zero now would be handing these lucrative future industries to our international competitors. It would be economic self-harm.

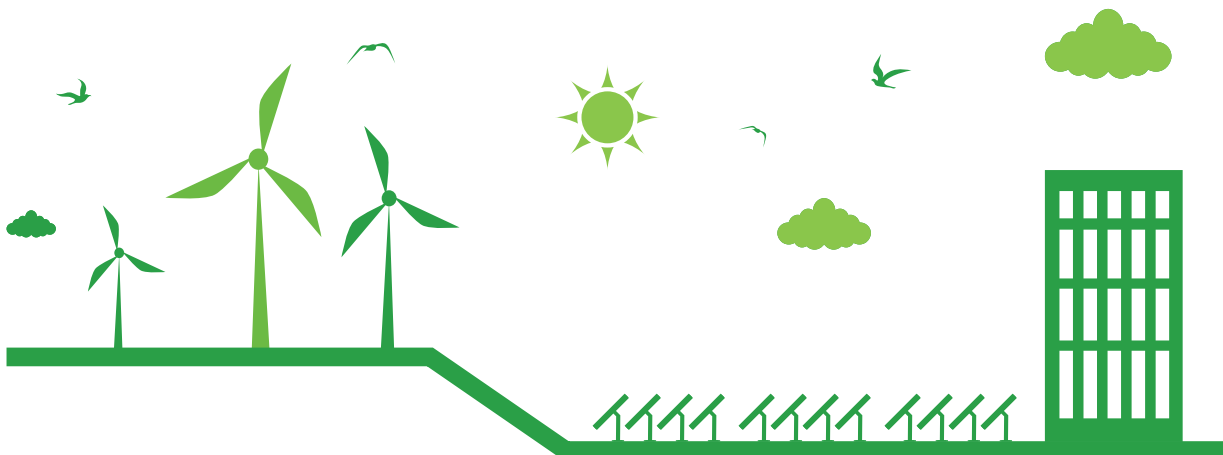
Markets are rapidly moving towards Net Zero, with 60% of global capital flows in the energy market going into clean technologies. Wind and solar dominate new power generation, making up 85% of the growth in primary energy demand in 2019. Battery electric cars and heat pumps are growing in market share each year, too. The UK can choose to either manufacture more of these clean technologies here and enjoy the economic dividend, OR wait to import them from a competitor nation, supporting jobs and investment overseas. It really is no choice at all!

The UK has already shown that clean growth is possible. Since 1990 the UK has grown our economy by 78% while cutting our emissions by 44%. We have the world's biggest offshore wind sector after China, the world's largest electrolyser factory in Sheffield and the top global green finance centre in London. With our pioneering scientists and engineers, our regulatory flexibility and deep capital markets, the UK is poised to lead the global economy towards a greener, more prosperous future.

Let's prove the Net Zero gloomsters wrong.

FACT: The Rt Hon Chris Skidmore MP's Mission Zero: Independent Review of Net Zero stated that ultimately, the benefits of Net Zero will outweigh the costs. In some estimates, the UK would see approximately 2% growth in GDP, through the benefits from new jobs, increased economic activity, reduced fossil fuel imports and cost savings (like cheaper household bills).

BUT... Wealth shouldn't be measured in GDP value alone, but also by the quality of the world we live in. The Net Zero transition needs to boost cheaper and cleaner energy which will in turn drive more sustainable economic growth, as well as renewable, regenerative and biodiverse outcomes.



BUST: NO - it's wrong to see Net Zero as a cost.

Net Zero is good for growth and attracts billions of capital investment into UK projects, which in turn boosts local economies across the UK; helping to tackle deprivation and improve health and living standards.

Steve Turner, Director at 3Ci, tells us how securing private investment is key to unlocking Net Zero growth.

We know that we need to get to Net Zero if we are to tackle the existential threat of climate change, but it also needs to be understood that getting there brings a plethora of other benefits: new and better jobs, green economic growth, improved neighbourhoods, public amenities and green spaces etc. By turning that cost into an investment opportunity for the private sector, getting to Net Zero can work as a catalyst to bring major investment into cities, towns and rural areas across the whole of the UK, helping to tackle deprivation, improve health and living standards.

3Ci (the Cities Commission for Climate Investment) has convened a unique partnership between UK local government and major private investors to help accelerate Net Zero investment. Investors have the capital but are looking for projects, local authorities have the projects but are looking for capital, but too often these projects do not meet the standards or needs of investors. Therefore, the UK needs a pipeline of innovative high-risk projects which can be brought up to a truly investable standard and which require development finance.

The UK needs to drive Net Zero and green investment, create more investable projects, and pilot new approaches to accelerate growth. It has already gathered a pipeline of 100 projects worth £60 billion, begun conversations with investors, developed technical assistance that supports local government to make deals happen, and built an investment model for Net Zero Neighbourhoods which reduces the costs to taxpayers and homeowners to achieve Net Zero. We need to get all the benefits of Net Zero flowing into local economies.

FACT: The UK Government's [Powering Up Britain Net Zero Growth Plan](#) estimates its Net Zero ambitions will help leverage around £100 billion of private investment as we develop new industries and innovative low carbon technologies.

BUT... There is a policy and communications gap which can prevent private investors from having the confidence to invest. The Net Zero pathway is not just an energy switch; it's also an urban transition. It's a capital intensive process that requires effective communication between all stakeholders across Westminster, Whitehall, local government and the private sector.

MYTH #3 “We don’t have the green skills and jobs we need to scale up and get to Net Zero”

BUST: YES AND NO.

Whilst there is significant progress being made to attract and train a highly skilled workforce to realise the UK’s Net Zero ambition, the scale of the green jobs revolution is huge and employers cannot achieve it alone!

Scott Young, Head of Skills at Renewable UK, gives his assessment on the scale of green skills we need to get to Net Zero.

We need to invest in the skills we need for the Green Industrial Revolution. A study from the Place-Based Climate Action Network (PCAN) found that one in five workers, and 6.3 million jobs in total, will be affected by the transition to a Net Zero carbon economy, with around 3 million workers requiring upskilling.

We have recognised the many employer initiatives across our sector promoting renewable skills and training, recruiting apprentices, or educating students on the exciting opportunities from a career in renewables. Other employers across the UK do equally commendable work in this space.

The Government recently promised to “work with local partners to understand how they can benefit from the economic growth opportunities generated by the transition to a low carbon economy and ensure that communities across the country can adapt to the impacts of climate change and build back greener with the skills needed for new green jobs”, alongside a plan aiming to support up to 480,000 green jobs by 2030.

For our own plan to upscale green skills, led by the Offshore Wind Industry Council, Renewables UK, and our members, we make the case that the industry needs:

- **A clear, shared plan for the workforce owned by industry and backed across government** that broadens and deepens the skills base – whether in respect of the plentiful new and emerging talent from our schools, colleges and universities or experienced professionals from other sectors like oil and gas and ex-service personnel, such as through our work with Mission Renewables.
- **To take advantage of the opportunities provided by engaging a diverse workforce** that draws on diverse talent and moves us closer towards meeting the ambitious targets we have set as an industry (40% women by 2030, 9% from ethnic minorities, 2.5% apprentices).
- **A commercial model that better recognises the wider value delivered across the supply chain**, including skills and community benefits, rather than rewarding purely the lowest cost.
- **A just transition that prioritises fair pay, terms and conditions**, ongoing career development and flexible working opportunities where possible to make a career in green industries even more attractive.

LinkedIn’s [Global Green Skills Report for 2023](#) showed that green skills, and the jobs that require them, are especially resilient during times of economic uncertainty. Offshore wind and other renewables offer a genuine opportunity to support the levelling up agenda, creating sustainable and stable jobs in some of the communities up and down the country which have historically missed out on the benefits of economic growth.



The sector estimates that offshore wind [could support 27,000 jobs](#) across the UK by 2030, covering all aspects of a wind farm; project management, construction and operations and maintenance. However, the transition to a greener economy is driving green skills growth across all industries – not just renewables – including the most carbon-intensive sectors. For example, the green talent concentration in the oil and gas industry has steadily increased since 2016, reaching 21% in 2023.

The 2021 [Green Jobs Taskforce Report](#) states that “we must focus on how we invest in the UK’s most important asset – our workforce – so that people have the right skills to deliver the Net Zero transition and thrive in the jobs it will create. We must ensure that green jobs are good quality, that they can be accessed by people of all backgrounds and in all parts of the country, and that workers in sectors and industries undergoing change can reapply their skills and expertise towards this new challenge.”

Now is the time to seize that opportunity, to work together across industry, with national, devolved and local government, and with training providers and jobseekers themselves to support people into rewarding, secure, and well-paid employment for the long term. This is the pathway to a green industrial revolution and through a just transition, one in which we can develop a highly skilled workforce that will be the backbone of the UK’s future energy security and Net Zero ambition.

FACT: LinkedIn’s [Global Green Skills Report](#) shows that the increase in demand for green skills is outpacing the increase in supply, raising the prospect of an imminent green skills shortage. Between 2022 and 2023, the share of green talent in the workforce rose by a median of 12.3% across the 48 countries, while the share of job postings requiring at least one green skill grew nearly twice as quickly – by a median of 22.4%.

BUT... We need a solid strategy to accelerate green skills, and we need it fast if we are to keep up with demand!



BUST: NO THEY AREN'T.

Cities actually have a much lower carbon footprint compared to non-urban areas and play a crucial role in the fight against climate change.

Valentine Quinio, Centre for Cities, has a look at what our cities are doing to reduce their carbon footprint.

Cities are commonly perceived as places of excessive consumption, pollution and traffic congestion that do a great deal of environmental damage. But the truth is, cities play a crucial role in the fight against climate change, and urbanisation can be climate-friendly.

[Cities actually have a lower carbon footprint than non-urban areas](#): the UK's 63 largest cities and towns generate 45% of all carbon emissions, with London alone accounting for 10%. But cities are also home to nearly 55% of the population, which means that on a per capita basis, they have a much lower carbon footprint than non-urban areas. On average, a person living in a city or large town emits 2.3 tons less carbon (or 35 % less a year) than the average non-urban resident.

Firstly, high-emitting industrial activities tend to be based outside cities. That's only a small part of the explanation. The second, more important factor, is down to the way city dwellers live their lives. Both transport and domestic emissions are lower in cities than elsewhere, and this relates to the way our daily lifestyles – from how we go shopping or commute to work to the type of building we live in – is hugely influenced by the characteristics of our immediate built environment.

Density, something that is specifically unique to cities, encourages and enables greener lifestyles: in compact urban environments, low-carbon transport options are more accessible and attractive because journeys are shorter and can more easily be walked or cycled. Public transport is more viable, too, because of higher demand. And denser housing, like flats or terraced houses, are more energy-efficient, resulting in lower carbon footprints.

The same pattern applies between cities. A commonly used comparison is Barcelona versus Atlanta: both have about 5 million inhabitants, but Barcelona's denser urban form results in a much lower carbon footprint per head. Here in the UK, Oxford and Telford have similar populations, but Telford's built-up area is 61% larger than Oxford's, and its transport emissions per head are twice as high as a result.

This means that progress on meeting emission targets will not be 'place-blind'. Not all parts of the country can be expected to reach Net Zero at the same time, or decarbonise at the same pace: cities will have to lead the way, and play a disproportionate role in helping the UK hit its Net Zero target. This will be particularly important when it comes to cutting emissions in transport and housing, two areas that have seen very little progress in recent decades.

Perhaps, this will also come as a surprise, but the challenge going forward is that many **UK cities are still not dense enough**. That's in part because of the way the UK has built, over several decades, too many residential developments on the outskirts of cities, far away from jobs and isolated from public transport.

This has important implications for policymakers at the local and national level who care about Net Zero. For the UK to have a chance of meeting its 2050 target, changing this approach to development should be the starting point, because it makes many other interventions – like encouraging people out of their cars – much more effective. Cities like Paris, Barcelona or Madrid offer positive examples of ‘gentle density’ levels that UK urban areas should learn from.

There is no silver bullet when it comes to meeting the Net Zero target. But alongside other policies that help decarbonise the economy, recognising the important role cities have to play, and reaping the benefits that density offers, will take us much closer to the finish line.

FACT: In 2018, the carbon footprint of an average city resident was about 4 tonnes of carbon a year, compared to more than 6 tonnes for people living outside cities.

BUT... Cities need to improve on other sustainability measures - not just carbon emissions - such as air pollution, water quality, or biodiversity. The concept of 15-minute neighbourhoods would make life more liveable and safe for residents, by improving air quality, increasing active travel, and promoting community.



MYTH #5 “Carbon Capture and Storage (CCS) is counterproductive and unnecessary”

BUST: NO.

CCS is absolutely necessary if we don't scale down energy demand. Carbon emissions are still rising, so we must scale up the geological CO2 storage to meet UK climate goals.

Professor Myles Allen, University of Oxford sets out why carbon capture and storage IS the answer to fossil fuel emissions and calls on fossil fuel companies to capture and store the CO2 generated by the products they sell.

Carbon Capture and Storage (CCS) is a crucial answer to addressing fossil fuel emissions, and governments should place a requirement on fossil fuel companies – producers – to capture and store their emissions if we are to meet the goals of the Paris Agreement.

Around 90% of our carbon dioxide emissions comes from the geosphere, primarily from the burning of fossil fuels and industrial processes. If we are to achieve Net Zero emissions, we will require rapid reductions in fossil fuel production and use, yet because of the speed of the transition required, some fossil fuels will almost certainly still be in use by 2050 and beyond.

Governments are therefore grappling with the challenge of how to capture and store carbon dioxide as a part of their emissions reduction pathways. Despite the success of CCS technology, most large-scale CCS projects have underperformed because of failures of CCS policy; one study cites a 78% failure rate. Yet, the reasons for these failures are primarily the political, economic and legal environment being insufficiently supportive. Economic risks, low commercial returns, and inadequate carbon price mechanisms discourage companies from using CCS as a climate solution. When there are technical problems, companies generally find it cheaper to abandon projects than to resolve them. The current policy landscape also places the responsibility for carbon dioxide reduction on *emitters* rather than on producers – responsibility needs to be placed from the root cause rather than the end product.

Although some argue that CCS is unnecessary and counterproductive, as it allows for continued fossil fuel production, the only alternative is rapid and immediate reductions in global energy per capita demand for *all* forms of energy. As energy demand and emissions are still rising, scaling up geological CO2 storage is essential to meet our climate goals. Given the need for the technology, a progressive scale-up also enables the enforcement of environmental and social guardrails to ensure CO2 storage is properly monitored and does not cause other problems.

To meet the goals of the Paris Agreement, we must ensure that any fossil fuels still in use in 2050 do not cause global warming. The only way to do this is by safe and permanent disposal of all the CO2 they generate. So, the question should not be ‘Can fossil fuel companies capture and store their emissions?’, but rather ‘How can we require them to do so?’.

And that is something the UK Government can do.

FACT: The Government's 2021 Net Zero Strategy commits to establish CCUS in 2 industrial clusters by mid-2020s and aims for 4 CCUS by 2030, and sets an ambition to capture and store 20-30 megatonnes of carbon dioxide a year by 2030.

BUT... Carbon Capture and Storage has not yet been proven at scale. In 2022, a report by the Institute for Energy Economics and Financial Analysis found that some CCS projects had failed or were underperforming.

MYTH #6 “Nuclear power isn’t a clean energy source”

BUST: NO, BUT BALANCE IS REQUIRED

Nuclear power is one of the world’s cleanest energy sources; emitting the least greenhouse gases and therefore a key part of the energy mix on the road to Net Zero.

Virginia Crosbie, MP for Ynys Môn gives her views on the role nuclear power plays in carbon reduction.

People are often surprised to discover that nuclear energy is a clean energy source. But nuclear energy is produced by splitting atoms – a process which releases NO carbon dioxide (CO₂).

But being ‘green’ is about more than just how much carbon dioxide is emitted. When the [United Nations Economic Commission for Europe](#) measured how green an energy source is, they measured full lifecycle carbon intensity, land use, materials used, and impact on ecosystems and climate change mitigation. On those measures, nuclear performs the best at 5.5g/kWh for the newest plants, with the older plants comparable to wind and solar at 10g/kWh.

In fact, nuclear energy has been the UK’s biggest source of low carbon electricity, producing nearly 80% of all the UK’s clean electricity to date. Since 1956, it has helped to avoid 2.3 billion tonnes of CO₂ emissions in the UK – equivalent to a car driving 5.8 trillion miles – that’s to Mars and back 21,000 times.

In 2022, [around 14.9% of the](#) UK’s clean electricity from Major Power Producers was nuclear generated, and nuclear will continue to be a vital source of clean energy in the fight against climate change.

FACT: Great British Nuclear, a Government-backed agency set up to bring down costs and provide opportunities across the nuclear supply chain, is committed to nuclear power producing 25% of the country’s electricity by 2050.

BUT... Although the creation of nuclear energy does not release any carbon dioxide, the complex construction and decommissioning of nuclear plants does release CO₂. As with any energy source, balance is required to assess the whole life impact.



BUST: YES AND NO.

Renewable energy is reliant on the weather, but to be more energy secure and resilient, we need to build more renewables to accelerate our transition to Net Zero. Renewable energy covers a vast amount of technologies, with low and predictable operational costs.

Alexander Gray from EnergyUK talks about renewable energy and tells us why it is a resilient power source...

“All these renewables are great, but what happens when the wind stops blowing and the sun stops shining?!” – so goes the usual arguments by many renewable energy sceptics.

Fortunately, the engineers, scientists, investors and multinational developers building renewable projects across the globe and powering millions of homes with zero carbon electricity are fully aware of the issues the sceptics raise. Yes, renewable energy fuel sources can be variable, but they’re also predictable. Paired with low carbon baseload, such as nuclear, renewables are vital for our energy security.

Renewable energy doesn’t just include wind and solar, but tidal, pumped storage, biomass and many other technologies. These technologies are located on UK soil, powering UK homes.

Developers in the UK are taking advantage of the UK’s vast coastline to explore their options. The benefit of not just deploying all our assets in one location is the changing weather patterns our island experiences across just a few hundred miles. On some days, for example, the wind may not be blowing as strongly off the coast of East Anglia, however in the Celtic Sea it might be significant. It’s important that we have a technology mix, but we also need to have a mix of locations where renewables are built.

As part of an energy mix and with the right market design, renewables are a vital defence against global energy prices. Indeed, the current level of renewables in the UK is currently saving every household around £40 a year, compared to the cost of fossil fuels which has driven the increased price of bills.

Rather than importing expensive fossil fuels (something which the UK is incredibly reliant on), renewable energy makes the country more secure by diversifying the way

our energy is generated. Built at scale, the technologies reduce our reliance on imports and therefore make us less susceptible to the unpredictable market forces and geopolitics of global fossil fuel producers.

The cost of renewable energy technologies, particularly wind and solar, have also rapidly declined. Although household electricity usage is likely to increase, overall energy costs are projected to decrease with renewables. The operational costs of renewables are low and predictable and do not require input fuels.

The energy crisis has highlighted the need to rapidly have more home-grown power. Renewable energy is fast to build, clean, and cheap electricity. We don’t have to choose between energy security and renewables, rather to be more energy secure we need to build more renewables and accelerate our transition to Net Zero.

FACT: Renewable power made up 40% of the UK’s electricity in 2022 - helping to cut carbon emissions by 2.7 million tonnes - up from 35% in 2021. However, fossil fuels still make up around 42% of our power supply.

BUT... The UK does needs to scale up plans to reduce our reliance on fossil fuels and increase investment in renewable, affordable and secure energy. If we hadn’t invested in renewables over the last decade, energy bills and risk of blackouts would have been even higher.

BUST: YES IT IS.

Making our homes energy efficient is not only possible, it is essential. The return on investment in Net Zero housing to the nation’s health and wellbeing alone means that Government must take urgent action to tackle the energy and climate crises. Energy efficient homes are a BIG part of getting to Net Zero.

Julie Hirigoyen, formerly of the UKGBC, sets out the benefits and why we need to make all our homes energy efficient if we want to get to Net Zero.

The energy crisis is one of the biggest challenges facing the country. 7 million households in draughty homes were plunged into fuel poverty last winter. Heating and powering our homes is responsible for 20% of UK carbon emissions.

A nationwide mission to make homes in every community energy efficient is exactly the boost the UK needs to level up the economy and scale up all parts of the country. Yet, if you are to believe what you read in the papers, you would be forgiven for believing that potential energy efficiency regulation, heat pumps and Net Zero standards for new homes pose an even bigger challenge.

We simply must act now. [Every year](#), cold homes cost the lives of 6,300 people and cost the NHS more than £2.5 billion. We know what policies are needed to scale up energy efficient existing and new homes. We also know that energy costs will fall with the right policies in place.

The Government announced a new 15% energy saving target for buildings and industry by 2035. The UKGBC is going further by [calling for a national strategy](#) to upgrade the country’s 19 million poorly insulated homes over the coming decade, with a clear timetable and long-term committed grant funding for those unable to pay. The Government needs to go further, too, and should look at introducing market incentives – such as an energy saving stamp duty, minimum energy performance standards for the private rented and owner-occupier sectors – and affordable loans for energy efficient improvements, paid back over time.

Upgrading homes to the basic EPC-C standard will lower energy bills by £8.1 billion every year. It would reduce gas imports by 15% supporting energy security and the UK’s balance of payments. It would also act as a powerful economic stimulus, with £2 returning to the economy for every £1 invested. 40,000 jobs could be created in insulation alone over the next two years, and [150,000 by 2030](#).

The homes we build must work to scale up Net Zero. The Future Homes and Buildings Standard provides the opportunity to go further and faster not only to make our homes energy efficient, but also to ensure our homes are cleaner, greener and healthier. We need to act now to ensure today’s and future generations of householders are not saddled with high energy bills and retrofit costs.

The electric car industry shows that once you set an end date, things can move very quickly. Renewable energy and batteries too have surged in sales and plummeted in cost as technology rapidly improved. Today’s upfront capital costs for retrofit and Net Zero new-build will drop quickly too if there are clear, consistent long-term policy signals that give the supply chain confidence to innovate and invest. The payback for many home energy efficiency upgrades is now [less than 10 years](#). The return on investment and wellbeing benefits are much higher for the worst performing homes, so it is sensible to prioritise these.

With the window on 1.5 degrees rapidly closing, the cost of inaction now vastly overshadows the cost of action. We must upgrade our housing to tackle the energy and climate crises. The longer we leave it, the more expensive it becomes.

FACT: Upgrading homes to the basic EPC-C standard will lower energy bills by £8.1 billion every year. Almost half (48%) of socially rented homes now have an Energy Performance Certificate (EPC) rating of A to C, which compares to 26% in the private rented sector and 24% of owner-occupied homes.

BUT: There is some way to go on the road to energy efficient housing. Homeowners, housing providers and private and social landlords need greater Government support and incentives to accelerate and prioritise retrofit and energy efficiency and bring the costs down as shown in a study by [Cornerstone Tax](#).

BUST: NO, WE NEED TO PULL DIFFERENT LEVERS

Social housing has a critical role in achieving the retrofit challenge, effectively engaging communities and communicating the financial and sustainability benefits to residents. Simply making something ‘free’ is not enough to drive desire for retrofit.

Pippa Palmer, London South Bank University – Net Zero Building Centre, talks about what we need to do to retrofit existing homes in the social rented sector.

No, they don’t. Just because something is being offered for free, it doesn’t mean people will jump at it. This is certainly the case with social housing tenants, who aren’t naturally inclined to welcome the opportunity to make their homes greener. On the contrary, when it comes to free retrofit, residents are often surprisingly resistant.

Scaling up retrofit of the UK’s homes is widely acknowledged as a big challenge on the road to Net Zero. Government forecasts suggest current rates of renovation in England need to increase 9-fold. On this basis, the social housing sector needs to pull other levers to incentivise residents to get on board. So, what needs to change?

Firstly, many social housing landlords align their retrofit offer to their own climate goals, whereas research suggests many within the social housing demographic are likely to be more hostile to climate change messages. The lexicon around retrofit is seen as negative and interventionist – if it is understood at all. Those with busy lives are more likely to reject retrofit, which is messy and intrusive. Add in vulnerabilities such as hoarding, mental health, and care responsibilities, and it’s no surprise many residents don’t have the bandwidth to engage.

Sometimes, barriers are sociocultural. If people have to change how they cook, heat, and occupy their space, they will struggle to adapt to new technology unless it fits their existing patterns. For example, telling a UK householder they can no longer cook on gas or open their windows for fresh air will cause resistance.

There’s also a resilience dimension. Those with fragile incomes tend to be more risk-averse, aware things can unravel catastrophically if the unexpected happens. Whilst retrofit should mean lower energy bills, that isn’t a certainty. Given the variables of individual consumption patterns and fluctuations in energy costs, the retrofit

proposition is unlikely to be unequivocal in ‘before and after’ cost comparisons. Landlords often position it that bills might go down, but they will rarely promise that they won’t go up. If the unknowns are risky, or the future trajectory too difficult to calculate, residents will leave the deal on the table – even if it is free.

We know that the way retrofit is proffered to social housing tenants is critical to take up. If social housing landlords get this first approach wrong, the door is jammed shut – then it’s hard to win residents round, making the scaling up of programmes all but impossible. The root of the problem is that retrofit is generally approached as a technical challenge – whereas ‘demand creation’ (getting people on board) is a science – and generally not on the project team’s radar. Articulating and communicating the proposition and generating interest and desire for retrofit involves soft skills like network building, relationship nurturing and the sort of slick marketing and communication techniques more familiar to big brands.

Given the scale of the challenge, we need to pull different levers to create demand. Get it right, and it will be incredibly powerful.

FACT: The UK Government are committed to upgrading social homes and buildings via the £1.8 billion Social Housing Decarbonisation Fund, Home Upgrade Grant and Public Sector Decarbonisation Scheme AND an additional £1.1 billion in match funding for social housing provided by local authorities, providers of social housing and charities to upgrade social and private homes in England.

BUT... Progress is being made in the ways we communicate with and engage local communities, but is it enough to accelerate the behaviour change needed to drive demand for retrofit?

MYTH #10 “Heat pumps are too expensive and don’t work in old properties or in cold temperatures”

BUST: THAT’S A MYTH.

Heat pumps are more efficient and can be cheaper to run than a gas boiler. They can be fitted in just about any property regardless of age and work effectively in temperatures as low as -16 °C.

Rebecca Pickavance of the Energy Saving Trust talks-up heat pumps and why they can work.

A properly installed heat pump fitted in an efficient home is likely to be cheaper to run than a gas boiler. Heat pumps are around 3–4 times more efficient than boilers because they give out more heat than the electricity used to run them. Although electricity is sometimes more expensive than gas or oil, higher efficiency means that the running costs are often comparable. *And*, by replacing an old and inefficient system, a consumer’s bills could go down dramatically.

The running costs of a heat pump will depend on how your heat pump is designed and operated. We at the EST estimate that based on October 2022 fuel prices, replacing an old (G-rated) gas boiler with an air source heat pump could save you up to £590 a year on your heating. To keep heating costs low with a heat pump, it’s important that customers work with installers to design a radiator system that allows them to run the radiators on a cooler setting control. In the British Energy Security Strategy published in 2022 the Government announced the rebalancing of costs placed on energy bills away from electricity which will further increase heat pump savings.

There is an abundance of evidence to discredit the myth that heat pumps don’t work in old properties. Heat pumps can be fitted into just about any property type and can be an effective retrofit option for older buildings that are traditionally considered harder to heat, as was demonstrated by the BEIS-funded Electrification of Heat project. Each building will have specific requirements and installers may suggest insulation upgrades, changes to radiators and pipework, or a particular type of heat pump set-up, to make sure they achieve an effective, efficient, and low carbon heating system.

There are no shortage of examples to contradict the notion that heat pumps are unsuitable for old buildings:

- The National Trust stately home [Speke Hall](#), a 500-year-old Tudor mansion in Liverpool, which has replaced its traditional heating system with the installation of a ground source heat pump.
- A ground source heat pump installed at [Croome Worcestershire](#) (built in the 1750s) provides around 4.5 units of heat for every unit of electricity used by the system.
- St Egelwin the Martyr in Salford, a Grade II-listed mediaeval church of 495 m2 has successfully installed two air source heat pumps after another heating option failed.

Heat pumps do work in cold temperatures. There is plenty of evidence to de-bunk this common myth. In Sweden and Norway, which have much colder winters than the UK, heat pumps have already been rolled out at scale, and are a popular home heating system choice. The coldest month of the year in Ostersistad, in Sweden, sees a temperature average of -4 °C to -9 °C. In Inverness in Scotland, we can expect temperatures to reach 0 °C on average. Tests show that heat pumps can continue to work effectively in temperatures as low as -16 °C, so heat pumps are definitely suitable for locations with a colder climate. This includes Air Source Heat Pumps, which are the most dominant type in most European nations, including Norway and Sweden.

So – it's time to correct the doubters. Heat pumps are cost-effective, proven to be successful in old properties, and will survive in colder temperatures than we have in the UK.

FACT: The Government's 10 Point Plan for a Green Industrial Revolution aims to have 600,000 heat pumps a year installed by 2028, up from around just 35,000 in 2021, launching the Boiler Upgrade Scheme and Heat Pump Ready Programme to accelerate uptake. The Heat and Buildings Strategy sets out how the UK will decarbonise its homes and buildings by 2050.

BUT... We are a long way off decarbonising existing homes, with gas boilers still being the preferred choice for UK homeowners. Heat pump installation can be expensive and disruptive despite low running costs, and there is a shortage of skills when it comes to providing engineers to fit and maintain them. According to the European Heat Pump Association, the UK is lagging behind the rest of Europe at second to last when it comes to heat pumps!



BUST: NO, IT IS NOT THE SILVER BULLET

Green hydrogen is not the ‘silver bullet’ for decarbonising our homes and buildings. The energy system of the future will involve a range of mixes of decarbonising solutions, and hydrogen should be prioritised where it achieves the best outcomes at scale. For our homes and buildings, we should focus on utilising existing techniques and technologies associated with fabric upgrades and heat pumps, rather than waiting for a potential decarbonisation of the natural gas grid with hydrogen.

David Leversha, Net Zero Lead at WSP, sets out why green hydrogen isn’t the catch-all solution to carbon reduction in our homes and buildings.

With nearly a [quarter of UK emissions](#) emanating from our buildings, the need for action on decarbonising our built environment is urgent.

There is little doubt that hydrogen will play an important role in our future energy systems, both within the built environment and in wider industry, including the decarbonisation of our industrial clusters. But whilst hydrogen is a significant tool within a range of solutions to deliver a decarbonised grid, prioritising hydrogen for home-heating at this point is missing the point about deploying resources where they can deliver maximum decarbonisation impact.

Rather, it makes most sense to utilise hydrogen to enable systems-level progress in those hard to decarbonise industries where electrification solutions don’t exist. Good examples are steel manufacturing, or other sectors such as aviation and maritime, which are almost impossible to electrify due to limitations on battery capacity. Also, to replace fossil fuels in high-temperature industrial processes where hydrogen is a natural replacement for hydrocarbons, and for long-term energy storage for electricity production. In these areas, there is real potential for scalable solutions to embrace transitional challenges and drive economic growth.

That’s not to say hydrogen won’t play a part in future home-heating solutions

Whilst we await clarity from Government (promised by 2026) on the role that hydrogen will play in domestic heating systems of the future, the situation currently remains complicated due to cost, availability and deployability. With the right levels of R&D, investment and scale-up, hydrogen is capable of being transported through our existing gas networks and could be introduced more widely into the UK’s gas supply to help lower its carbon intensity.

But for now, low-carbon hydrogen remains in short supply, and there are debates around deliverability. So, in the short term, the focus for hydrogen should be on industry and clusters, with the conversion of property heating to hydrogen a much longer term proposition.

Heat pumps

At present, the electrification of heat in buildings through ground or air source heat pumps is widely recognised as a sensible solution for decarbonising home heating, and a preferred solution to green hydrogen scale-up right now. Although the installation costs of heat pumps remain higher than for conventional boilers, and with the costs of hydrogen appliances still evolving, they are a much-favoured solution to fossil-fuel based home heating using existing technology.

However, whilst heat pumps are a huge step forward for home-heating of the future, they too are not a one-size fits all solution for homes. There are a number of challenges around retrofitting heat pumps to certain types of building and in general they generate lower delivery temperatures, having a smaller peak power output compared to conventional boilers.

Fabric first approach

In reality, the energy transition will need us to reduce our energy demand whilst embracing an energy mix in the future. And that energy mix will require us to think differently about the way we store, utilise and preserve our energy resources. Therefore, driving the demand of our energy down starts with applying a 'fabric-first approach'.

This approach, which can be deployed in both new builds and existing homes, entails maximising the energy-saving performance of buildings as opposed to considering it as an afterthought. It means prioritising repairs, insulation, draught-proofing and ventilation ahead of 'add-ons' such as solar panels. By improving the performance of the building fabric first, energy consumption is minimised and the overall energy efficiency of the building is improved. This in turn results in lower energy bills and carbon emissions.

Change of behaviour

At no time has the need to preserve our energy supplies been more necessary than right now, with the current cost of living crisis and a devastating conflict in Ukraine, which is threatening global energy security and supply. It's high time for government and industry alike to put aside myths about 'silver bullets' and reinforce to homeowners the benefits associated with home improvements and heat pumps. We simply must communicate the importance and scale of this challenge, alongside driving behavioural change in our approach to energy consumption.

FACT: The UK Hydrogen Strategy estimates 20-35% of the UK's energy consumption could be hydrogen-based – and that it is critical to reach Net Zero emissions – by 2050 and cutting emissions by 78% by 2035.

BUT... We need greater clarity from Government on the cost benefits of green hydrogen to consumers, and their plans to decarbonise our homes and buildings. Government is working with industry and regulators to deliver a range of research, development and testing projects to assess the feasibility, costs and benefits of using hydrogen for heating to enable government to make strategic decisions in 2026 on its role in heat decarbonisation.



BUST: NO, THEY WON'T

Sustainable travel choices are not always accessible and need to be made affordable, fast and convenient for consumers.

Anthony Smith, CEO of Transport Focus, talks about sustainable travel and what needs to be done.

When it comes to delivering Net Zero transport, we can't always rely on users to make more sustainable travel choices. This isn't to say that the public does not care about sustainability, merely that the decision is not that simple. Other factors play a much more important role in choosing how we travel – mainly cost, speed, and convenience. It is these elements that require focus if we want to change travel behaviour.

People recognise that transport is a major cause of carbon emissions, but it is not top of mind when it comes to the actions they could be taking. For many, more environmentally friendly forms of travel are either not available, not practical, or not affordable. People often feel that their choices will make little impact overall and therefore don't provide enough justification to change.

Sustainability simply isn't a primary need or driver of transport decisions. Cost, convenience, safety and speed all rank above sustainability when people make decisions about travel. People are generally not prepared to make significant sacrifices to travel more sustainably – whether in terms of time, cost, or convenience.

Rail is an especially important piece of the Net Zero transport puzzle.

It is therefore crucial that the needs of users and potential users are at the forefront of thinking about how to decarbonise the railway – and indeed any element of planning and delivering rail services. To make rail a viable option and to encourage its use, it needs to meet the needs of its users/potential users and be accessible to all.

First and foremost, the industry needs to get the basics right. Recently, we asked over 15,000 passengers from around Great Britain to tell us what matters most to them when it comes to rail travel. Passengers told us that value for money, reliability and punctuality and sufficiently frequent trains were the three most important factors. Passengers want the railway to be

affordable and offer a service that can be relied on to get you where you want when you want. If it's not those things, it doesn't matter how carbon friendly it is – people will find another way.

Improving access to the railway will also be key in making it a sustainable travel option for as many people as possible. It is predicted by 2050 that one in four people in the UK will be aged 65 years and over – an increase from approximately one in five in 2019. Population changes will have an impact on the design and accessibility of services. It's no help having a decarbonised railway with steps you can't manage.

People's lives have changed significantly in recent years, which has had a major impact on travel behaviour. While many are travelling less by rail due to flexible working and travel cost, there are still opportunities to attract more customers. Travelling less because you can work from home isn't an issue from a sustainability perspective, in fact, this reduces someone's carbon footprint. The problem arises when people choose less sustainable options over rail, which the industry must address by making rail more attractive and more affordable.

FACT: Government has pledged to support decarbonisation of transport investing more than £12 billion in local systems: enabling local authorities to invest in local priorities including sustainability, congestion reduction, and improving air quality.

BUT... The scale of the sustainable transport challenge is huge. If we want to reduce our carbon footprint and accelerate modal shift to public and active transport - AND upscale efforts to decarbonise our roads and railways - we need investment which delivers affordable and accessible sustainable travel choices to the consumer.

BUST: NO, BECAUSE WE SIMPLY CAN’T AFFORD NOT TO.

Electrification is the best way to decarbonise rail. We can’t afford not to electrify the UK’s network, and in so doing we will reduce costs and save money with a rolling programme designed to generate efficiency and make electrification cheaper, more efficient and a good investment in Net Zero.

Milda Manomaityte of Railway Industry Association looks at why we need to decarbonise our railways.

To electrify efficiently, we need a steady rolling programme, delivered by experienced teams that are continuously improving and not being dismantled after a single project for the foreseeable future. And while we are investing in track infrastructure, we need to start ordering new trains or convert diesel trains into low emission vehicles. For each tonne of carbon emissions we save now, we will save nearly 28 tonnes by 2050.

Rail is a small part of the problem, but a big part of the solution. In 2019, rail made up 9.5% of all passenger km across all transport modes, but only 1.4% of the UK transport’s Co2 emissions, and only 0.5% of all UK emissions. This means that shifting towards rail, both in terms of expanding the rail network and maximising the efficiency of the existing network, creates enormous potential for reducing emissions. Rail electrification, as well as hydrogen and battery rolling stock, are solutions to low-carbon transport.

The first step towards decarbonising rail is commissioning fleet orders of low carbon rolling stock. This includes self-powered battery and hydrogen trains, as well as hybrid models, for both passengers and freight. These solutions can be done quickly, as they already exist. Trains being ordered today and in the next few years will still be operating in 2050, so it is important we roll out low-carbon solutions now. These solutions are mostly relevant for parts of the network where electrification will not be cost-effective. More specifically, this will be for less intensively, more regionally, used parts of the network.

Electrification is the main solution for decarbonising rail. It is the only mode suitable for intensive, long distance, and high speed services. A rolling programme of electrification is the most efficient way to deliver this. RIA’s, ‘Why Rail Electrification?’ report sets out how to electrify the UK’s network and makes the case for electrification as both a future-proof technology and a good investment.

A rolling programme of electrification is a steady volume of activity over the long term. This allows for the most cost-effective delivery of electrification and retains the specialist skills needed for overhead line work. An efficient delivery team sits at the core of the rolling programme. The team is fed with work and stays continuously active – continuously learning, improving productivity, and delivering efficiencies. A rolling programme could reduce costs by up to 50% compared to some past problem projects, as shown by RIA’s ‘Electrification Cost Challenge’ report.

In practice, RIA recommends a rolling programme of electrification enough to keep two or three delivery teams consistently in action, each delivering 75-100 single track kilometres per annum, for at least 10 years, across the UK.

Electrification in the past has been delivered in peaks and troughs of work, providing the industry with a significant amount of work over a few years, followed by a cliff-edge in activity. This has the opposite effect of a rolling programme – leading to higher costs as the sector is unable to retain the skills and expertise needed. This was the case with the cost increases on the Great Western Electrification Programme. A rolling programme would make rail electrification cheaper, more efficient, and a good investment in the rail sector’s part to deliver Net Zero.

FACT: Statistics from the Office of Rail and Road show that in 2021-2022, only 2 km more track was electrified. 71% of all passenger train operator rolling stock were electric. 7 of the 24 passenger operators had a fully electric fleet.

BUT... We need a rolling programme with a Government commitment to make rail electrification cheaper and more efficient if we are to get to Net Zero by 2050 - or sooner.

BUST: YES WE DO, BUT...

It's more important that EV charge points are the right sort, installed at the right time, in the right place and to the right specification. We need to keep pace with demand and reach the 'sweet spot' where we can support EV uptake and successful transition to electric motoring.

Andy Eastlake of ZEMO talks EV charging points and the challenge ahead.

Yes, we're certainly going to need more charge points as EV numbers increase; but this is only one part of the EV puzzle.

As at February 2023, there were nearly 39,000 public electric vehicle (EV) charging points across the UK at over 23,000 locations.

There are close to [810,000 battery electric cars](#) registered to UK drivers as of June 2023 – that's around 2.4% of the total number of cars registered to drive on UK roads. Even allowing for the fact that EVs are mostly new and, on average, drive further, only about 3% of all the car miles driven in the UK are now electric miles.

There are always calls for more public charge point targets – sometimes stretching into millions. Even the Government announced a 'target' to install 300,000 public EV charge points by 2030.

It's far too easy to get hung up on the number of charge points we need. A charging installation with inappropriate power or in the wrong location is of little use to anyone, while one of the right power and capacity, well-managed, maintained and in the right location can service the needs of many more users.

It may be an obvious statement, but all public charge points are not the same: one 5kW lamppost charger may service two vehicles a day providing, say, 100 kWh or 350 miles of EV driving. Meanwhile, a single 150 kW ultra-rapid charger in a prime location can support 50 or more vehicles per day and deliver energy for thousands of miles of EV driving.

The great majority of charging is currently done by EV drivers from their own homes (over 375,000 domestic chargers have been funded to date). While this proportion may fall as the market grows, most electricity for EVs is still expected to be delivered to cars from peoples' houses. (With peer-to-peer sharing initiatives, like Co Charger and BookMyCharge, these private charge points can also support provision through the public network.)

Where people can't charge on their own premises, local rapid-hub charging is likely to provide a key part of the charging mix. Meanwhile, en route rapid charging along the strategic road network will be needed to support drivers on longer-distance journeys.

The Electric Vehicle Energy Taskforce, which was convened by Zemo Partnership, involving stakeholders from right across the energy and motor industries, found that there is a 'sweet spot' in terms of charge point installation, supporting EV uptake and enabling an efficient and successful transition to electric motoring.

To reach this 'sweet spot' we need co-ordinated action from the energy, infrastructure and automotive sectors as well as the ongoing engagement of EV users.

The Taskforce did give an indication of the number of public charge points the UK will need by 2035, but it gave a very wide margin (253,000 to 661,000) being very conscious that setting targets for anything can send the wrong signals and lead to poor outcomes. Target-driven authorities can easily make the wrong decisions, too focused on achieving the numerical target rather than the real objective of enabling zero emission miles for all.

So, yes, we do need many more charge points, but it's even more important that they are the right sort, installed at the right time, in the right place and to the right specification. It's a mistake to get too hung up on the actual numbers of public charge points the UK is going to need - we just need to keep pace with the growth in demand for EVs.

FACT: There are close to 810,000 battery electric cars registered to UK drivers – around 2.4% of the total number of cars registered to drive on UK roads. Even allowing for the fact that EVs are mostly new and, on average, drive further - only about 3% of all the car miles driven in the UK are now electric miles.

BUT... More than 265,000 battery-electric cars were registered in 2022, a growth of 40% on 2021. Which is good news, but the UK needs to keep pace with demand! We will need more EV charging points - but it's important that they are with the right power and capacity, well-managed, maintained and in the right location to service the needs of as many EV users as possible.



BUST: YES AND NO

We will not reduce emissions simply by reducing road capacity – EVs need roads too! BUT, we do also need to accelerate sustainable alternatives and access to public transport, cycling and walking.

Emeritus Professor Stephen Glaister CBE FICE FCGI, Transport and Infrastructure Imperial College London talks about our roads in the context of reaching Net Zero.

It’s a myth to think we will reach Net Zero much sooner if we don’t build new road capacity. Promoting public transport, cycling and walking will not help much either without policy change which works to accelerate the required scale and speed of change needed in personal behaviours.

We know that fossil fuels burned by motor vehicles must be reduced, but it remains unclear how much national traffic will be reduced as the transition to electric vehicles takes place: EVs need roads too.

For decades, the provision of road capacity has fallen far behind growth in demand. Most road schemes reflect local circumstances and even if national traffic has to be reduced some road improvement schemes remain justified as catch-up. Endless traffic jams are not good for carbon. And local traffic will need to grow in some places to serve local social and economic change.

We should continue to appraise each road scheme on its merits, with an honest assessment of all the costs and likely future demand (recognising that policy can change demand). These costs should include the standard, official social cost of carbon.

Proposals for public transport improvements must be scrupulously appraised. One should not just assume that a new rail or bus service will be good in carbon terms: sufficient transfer from a private car or lorry is not always easy to achieve, and buses and trains need decent loads to be effective. Experience has demonstrated just how unwilling the taxpayer is, in practice, to see resources shifted into public transport. In most places, it is not practical to provide public services that would compete on the scale that is necessary.

Similarly, irrespective of the merits of increased cycling, it is not going to make much of a dent on the carbon problem. In London, where densities are high and policy towards cycling favourable, the proportion of trips by bike has increased from 1.3% of all trips in 2000 to only 2.6% in 2019 (before the pandemic). That is an increase of 0.4 million trips per day, but Londoners were still making 13.7 million mechanised trips a day by road—and those trips are typically longer than cycle trips.

It is worth reminding ourselves that petrol and diesel-powered vehicles will remain on the road for decades, and they continue to dominate current new sales. We are still driving faster, more aggressively, and buying heavier, less fossil-fuel efficient vehicles than necessary. Quite simply, we have to persuade – or incentivise – the general population to use fossil fuelled vehicles more frugally, but also we need to make fewer journeys, drive more efficiently and use the least fossil fuel-efficient vehicles less.

Reform of road taxation, now generally recognised to be inevitable because of electric vehicles. In 2000, fuel duty was 58 pence per litre, and it is now 53 pence: a halving compared to general consumer prices and an even bigger fall relative to average household incomes. Fuel duty is a direct tax on carbon, so this has been a move in the wrong direction. Now that people have had to adapt to higher petrol and energy costs, governments need to consider the opportunity for increased taxation on fossil fuels (rather than on vehicle ownership) – should the cost of fuel continue to reduce towards pre-Ukraine levels – and pay-as-you-go charges on congested roads. This will generate considerable new revenue. In turn, both carbon emissions and overall traffic demand will be reduced.

Clearly, we will then need to review how much new road capacity and public transport provision is justified. To attempt to reduce emissions by failing to provide road capacity and aspiring to improvements in public transport without doing anything else is to put the cart before the horse, and if we are to meet Net Zero targets, we simply do not have the time.

FACT: Transport produced 24% of the UK's total emissions in 2020, and remains the largest emitting sector in the UK.

BUT... The sale of vehicles reliant on fossil fuels is targeted to end in 2030. A study by the ONS showed that over half the motorists aged 16-49 say they are likely to switch to fully electric vehicles within the next decade. 41% of those likely to switch to EV are expected to do so within the next 5 years. There needs to be greater incentives and infrastructure which work to reduce emissions on our roads and decarbonise transport.



MYTH #16**“All buses must be Net Zero emission if we are going to reach our decarbonisation target”****BUST: YES AND NO****If we are to transition to all-zero-emission buses by 2035 it is important to encourage a modal shift from cars to buses or to other public transport. We also need to make sure we are reducing emissions from non-zero emissions buses and that greener journeys can be made by bus.****Greg Thompson of GoAhead talks about the importance of buses to reaching Net Zero targets.**

There is much more we can do to achieve decarbonisation targets now as we transition towards zero-emission bus fleets. In terms of modal shift, the more people we take out of cars and on to public transport – whether that be a bus or other public transport – the better. One fully loaded double-decker bus can take up to 75 cars off the road, which will reduce emissions.

We can also grow patronage on bus by increasing the efficiency of buses, implementing priority measures in cities and towns across the country to support critical transport routes and help secure a modal shift from the private car. For zero-emission buses to be commercially viable, they must not be standing still in traffic, there must be priority bus lanes and priority traffic light systems in place. Park and ride schemes are another way that buses can help to decarbonise the highways network, they reduce delays and increase capacity, as well as improving bus journey times.

While the long-term aim is to have a zero-emission bus fleet by 2035, we know that we can improve emissions in the short-term by updating our fleet to Euro 6 buses. Whilst they are still diesel, they deliver a 67% reduction in Nitrogen oxides. Their reduced emissions are achieved by elements that are all electrically operated, whereas the older fleet relies on fuel only.

The reduction of air pollution is another way we can go greener through our current fleet – Go South Coast, one of Go-Ahead’s eight regional UK bus operators, launched the country’s first air filtering bus to tackle air pollution. The filtration system atop the vehicle cleans air as it moves around the city. The filter removes ultra-fine particles from the air and trap them as the bus moves, the filter then allows the bus to distribute more pure air so that the air behind it is cleaner than that in front of it. Brighton and Hove Buses upgraded parts of their fleet in 2021, including exhausts with newer parts, so to clamp down on the risks of continued pollution.

Our buses (non-zero-emission fleet) emit 38% less carbon emission per passenger kilometre than the average car and currently – only 4% of UK roadside emissions come from buses. We will be rolling out a further 104 new zero-emission buses in Oxford from Autumn 2023 and continue to work towards the target of an entire zero-emission fleet by 2035, but in the meantime, all bus operators can continue to make buses greener in other ways.

FACT: Buses are one of the least carbon intensive forms of road vehicle transport per passenger, per mile in the UK. Combined with coaches, they represent only 3% of UK transport emissions and 1% of total mileage (2019). They remain the most popular form of public transport, accounting for around 50% of all journeys on public transport.

BUT... There is much more to do to transition to Net Zero buses. In 2022, the Government launched its consultation on ending sales of new, non-zero emission buses from 2025 to 2032. Only around 2% of England’s local operator bus fleet is zero emission today – so it is vital that we go further and faster to decarbonise our bus journeys.

BUST: NO – NOT UNLESS WE ACCELERATE AND PRIORITISE TECHNOLOGICAL TRANSITION

Not all forms of Hydrogen are compatible with Net Zero in aviation. It is wrong to conclude that Hydrogen *alone* is the solution to Net Zero in aviation. The green hydrogen required to power the entire aviation sector is enormous and would require substantial technological transformation.

Professor Silvestre Pinho, at the Department of Aeronautics, Imperial College London asks whether hydrogen powered aircraft can deliver Net Zero aviation.

Decarbonising aviation is key to our Net Zero targets: on current technology, nearly 40% of the carbon emissions in the UK by 2050 would come from aviation.

However, aviation is a hard sector to decarbonise. Unlike most other sectors, where electrification is technically viable, hydrogen is the most realistic fuel source for medium and large aircraft that is compatible with reaching a Net Zero target. Designing efficient hydrogen-powered aircraft represents a monumental engineering challenge that will require a corresponding investment in Research and Development. Despite this, it is a myth that all forms of hydrogen are compatible with Net Zero in aviation, and wrong to conclude that hydrogen alone is the solution to Net Zero in aviation.

Almost 99% of Hydrogen produced currently is made from natural gas or methane without Carbon Capture and Storage (grey hydrogen) and this is certainly not compatible with Net Zero.

Even with CCS (blue hydrogen), methane leaks in the natural gas supply chain and the inefficiencies of CCS make blue hydrogen also incompatible with Net Zero. Hydrogen obtained from renewables such as Wind or Solar Energy (green hydrogen) is the most compatible with aviation. However, to have a positive effect on Net Zero overall, it is important that what is used in aviation is spare green hydrogen made from spare renewable energy.

Secondly, the green hydrogen required to power the entire aviation sector is enormous – the energy required would be more than the total wind energy currently produced worldwide. To decarbonise aviation therefore requires other elements, some of them at least during the transition to Net Zero, including:

- Sustainable Aviation Fuels (SAF), made from renewable biomass or waste with lower life-cycle carbon intensity than Kerosene, and synthetic fuels (e-SAF), made from green hydrogen and carbon captured from the atmosphere.
- Direct Air Capture (DAC) combined with carbon storage. DAC is an emerging technology which uses chemical reactions to remove Carbon from the ambient air.
- Equitable demand management. Most short-haul flights can be replaced by land travel, such as rail, which is easier to decarbonise. Many long-haul flights can be equitably discouraged, for instance with a frequent-flyer levy.

The transition to Net Zero in aviation is a formidable challenge requiring a substantial technological transformation, but it also represents a unique economic growth opportunity. We are at the start of “an international race for capital, skills, and the industries of the future”.

FACT: In 2020 international aviation made up 12% of the UK’s transport emissions. On current technology, nearly 40% of the carbon emissions in the UK by 2050 would come from aviation if other sectors decarbonise.

BUT... The UK Government must lead the way and invest in the technological transformation needed. The Government is supporting Airbus to develop and launch a zero-emission large commercial aircraft powered by hydrogen propulsion by 2035, as well as similar projects through the Aerospace Technology Institute programme. Government can unlock and accelerate innovation and invest in a pathway to sustainable aviation.

BUST: NOT WITHOUT POLICY AND REGULATORY CHANGE

Sustainable Aviation Fuels will have to play a huge role if we are to decarbonise aviation by 2050. There is enormous economic potential and Government need to unlock the barriers to real emissions savings so that SAF can deliver in the short term.

Jacob Hayes, Alex Roy and Adam Freeman from Manchester Airports Group discuss sustainable aviation fuels and delivering Net Zero by 2050.

The aviation industry is committed to delivering Net Zero by 2050 and has detailed plans for the UK sector set out in Sustainable Aviation’s Decarbonisation Road-Map.

Today’s Sustainable Aviation Fuels (SAFs), made from waste materials, can reduce lifecycle carbon emissions by up to 80% and already meet the certification standards of traditional fossil-based aviation fuel. This means SAF is ready to be used in conventional jet engines without any further modification. SAF does not require significant changes to the infrastructure required to store, transport, or dispense aviation fuel.

SAF are vital in achieving our 2050 Net Zero target and by delivering substantial reductions in 32% of carbon emissions by the end of this decade.

SAF presents a huge opportunity for the UK aviation industry to decarbonise and also offers an exciting opportunity to provide economic benefit to the UK economy. By 2035, the development of a domestic industry for the production of sustainable fuels could generate a Gross Value Added (GVA) of up to £750m annually and support up to 5,200 UK jobs. A further 13,600 jobs could be generated from the growing market for sustainable aviation fuels through global exports.

Leading countries such as the USA, Germany, Sweden and the Netherlands have shown that a more supportive policy framework can deliver the tangible benefits that domestic SAF production can deliver. The UK also has the opportunity to build a world-leading SAF industry with the right Government support in the form of a price stability mechanism for SAF.

A supportive policy framework can deliver market regulation and encourage uptake. With swift action, the UK can realise the potential of a thriving, commercialised domestic SAF industry. Government support to ensure that the initial SAF businesses in the UK can achieve long-term investment viability by giving the industry the stability it needs to pursue the development of further sites. Policymakers have a real opportunity to support this development by putting an appropriate regulatory framework in place that can support the delivery of the real emissions savings that SAF can make in the short term.

FACT: By 2030, the ambition is to have at least 10% sustainable aviation fuels in the UK jet fuel mix and to have at least 5 commercial-scale SAF plants under construction in the UK by 2025.

BUT... A sustainable aviation revolution won’t be triggered by a single innovation; rather a complex range of technologies. Several challenges facing the industry must be overcome to help increase the adoption and production of SAF and a long-term regulatory and policy framework is required to support industry and help overcome the key barriers to investment.



MYTH #19 “Focusing on reaching Net Zero by 2050 is enough to tackle the climate emergency”

BUST: NO, IT'S NOT

We need to turn the taps off! Hard to abate sectors such as shipping, aviation and intensive energy users need to scale up their transition to alternative fuels and cut their use of fuel this decade. The scale of the damage requires far more than measures to reduce the carbon intensity of fuel alone.

Dr. Simon Bullock and Prof Alice Larkin, Tyndall Centre, University of Manchester look at reaching Net Zero with a focus on the shipping sector.

It is a myth to say that getting to Net Zero by 2050 is sufficient to tackle the UK's climate emergency. The pathway to zero is also crucial, particularly what happens this decade. There are two connected problems to be considered:

First, climate change damage is proportional to cumulative emissions over time, not just a 2050 end-point. Think of climate change as an overflowing bathtub. The taps are on full, water is spilling onto the floor. Yes, the goal is ultimately to turn off the taps fully. But the damage we get depends on how quickly we start turning the taps off. A focus on 2050 distracts us away from the pivotal issue of deep decarbonisation this decade.

Second, the amount of damage is dependent on the amount of carbon in the fuels we burn, but also the amount of fuels used. The focus on “zero” leads policymakers to look predominantly at measures to reduce the carbon intensity of fuels to zero (e.g. changing fuel), rather than also reducing the amount of fuel we use (e.g. being more efficient). But both are pivotal to keeping cumulative emissions to levels compatible with the Paris climate goals.

In UK shipping policy, these problems lead to a dominance in thinking about scaling up new zero-carbon fuels (with ammonia the lead-contender) for wide scale deployment from the 2030s. This is, of course, essential, but it is not enough. The turnover of the existing fleet of ships is so slow, that a sole focus on new fuels would mean the shipping sector cannot play its fair part in meeting the Paris Agreement goals – as shown in [Tyndall research](#). However, if much stronger measures are introduced to improve the energy efficiency of the existing fleet – as well as new fuels – then Paris objectives [remain achievable](#).

The International Maritime Organisation (IMO) is developing a package of energy efficiency measures. The UK intends to refresh its Clean Maritime Plan this year, and has consulted on a Course to Zero for domestic shipping, both of which include measures to cut shipping energy use. However, it is the scale of the ambition of these measures that is the problem. Both the IMO and the UK's Course to Zero assume that emissions are not reduced at all in the 2020s (the bath taps are still on full). It is only in the 2030s, when alternative fuels are running at scale, that emissions would fall.

This is not fast enough. Climate change is a matter of extreme urgency. To return to the bathtub, it is not just that the damage gets worse so long as the taps are left on full blast. The more water that hits the floor, the greater the risk of the whole tub falling through the ceiling. This refers to the growing risks of passing global climate “tipping points”, where climate impacts jump-shift into a new and usually irreversible state. [Six of these tipping points become “likely” above 1.5 °C heating](#).

Whilst the focus on new fuels is important, it is just as critical to cut our use of fuel this decade. 50% by 2030 should be the priority goal for UK shipping policy, not solely 100% by 2050.

FACT: Paris-compliant targets for international shipping require a 34% reduction in emissions by 2030, with zero emissions before 2050. Existing targets imply no absolute reduction in emissions by 2030, and only a 50% reduction by 2050.

BUT... It is critical that we go further and faster to tackle hard to abate sectors before 2050. Reducing the amount of carbon in the fuels we burn, as well as the amount of fuels used is pivotal to keeping cumulative emissions to levels compatible with the Paris climate goals.

BUST: NO, BUT GREATER SUPPORT IS NEEDED

Ports can play a critical role in the transition to Net Zero through decarbonisation of freight and enabling the generation, storage and distribution of renewable energy and alternative fuels.

Matthew Grigor of Associated British Ports looks at what our major ports are doing to reduce carbon emissions and support the growth of renewable energy.

The freight and logistics sector is the lifeblood of the UK economy. By facilitating the movement of goods and connecting businesses and consumers to international markets, the sector helps drive economic growth and employs thousands of people across Britain. The scale and nature of the sector also means it is a major contributor to UK carbon emissions, and one of the hardest sectors to abate. As a maritime nation, our ports are at the heart of our most important supply chains and form a critical part of the solution.

Ports are a critical enabler of international trade. It is imperative that all ports take a lead in reducing emissions from their operations. Great strides are being made. ABP has already made great progress, reducing Scope 1 and 2 emissions by 38% between 2014 and 2022, but the industry recognises the need to go further and faster. To that end, ABP recently launched its first comprehensive sustainability strategy, [Ready for Tomorrow](#), which commits to producing Net Zero greenhouse gas emissions by 2040 – 10 years ahead of the UK’s legal commitment to achieve Net Zero by 2050. The strategy sets out ABP’s plans to replace assets with zero-carbon alternatives, as well as plans for purchasing and generating renewable energy for port operations.

The UK’s ports are well-placed to support customers and other port users in their efforts to eliminate supply chain emissions. In April 2022, the Port of Southampton celebrated a major milestone with the successful commissioning and use of its shore-power facility for cruise ships. Shore power-enabled ships can now plug in at the port’s Horizon and Mayflower Cruise Terminals and achieve zero emissions at berth. Ports are also key enablers of modal shift to less carbon intensive modes, such as rail freight and coastal shipping.

The decarbonisation of rail, road and maritime transport remains a major challenge, but the solutions are starting to take shape. Ports are again key to delivering this transition, serving as essential hubs for the generation, storage and distribution of renewable energy alternative fuels. Major projects underway on the Humber will enable the generation of green hydrogen for transport and industrial scale carbon capture and storage. In South Wales, port master planning is helping to pave the way for the industrialisation of the region driven by floating offshore wind, hydrogen production and low-carbon manufacturing.

The decarbonisation of freight, and the energy transition more broadly, represents a generational opportunity to drive innovation and growth in regions around the UK. The nation’s ports will play a critical role in delivering this change.

FACT: The UK’s domestic maritime vessels represent around 5% of the UK’s domestic transport greenhouse gas emissions (2020) - more than domestic rail and bus emissions combined.

BUT... More needs to be done to see new technologies come to fruition. Ports need to scale up and to increase the pace of transition if they are to enable significant fleet-wide emissions reductions in the 2030s. Shipping can achieve Net Zero through a transition to alternative fuel powered vessels using energy from low or zero emission sources or highly efficient batteries, as well as integration of ports into our decarbonised energy network.

MYTH #21**“The UK will need to import plant-based alternatives to replace its meat and dairy products to reach Net Zero”****BUST: NO****Cutting out red meat and/or dairy from your diet alone will not drastically reduce your carbon footprint.****Scott Pepe, National Farmers Union from NFU talks about land decarbonisation and sustainable farming.**

British red meat and dairy has a great story to tell. But that story often gets drowned out because of the tendency to portray all farming all over the world as the same, even though it isn't.

In Britain, most livestock are grazed in extensive grass-based systems. Grass is one of the most important environmental differences between livestock farming in the UK and the rest of the world.

Around 65% of farmland in the UK is best suited to growing grass rather than other crops. Grass tends to grow well in areas that are rainy, with poorer soils and/or hilly. These areas are not suited to growing crops for humans, but livestock can thrive there. If we did not graze livestock in these areas, we could not use it to produce food, increasing our reliance on imported food, which creates a carbon footprint.

Actively managed grass pasture, grazed by livestock, is a carbon sink. Carbon dioxide is captured by the grass and stored as carbon in the soil. Hedgerows that separate fields also make an important contribution to storing carbon, as well as creating biodiversity and habitats for wildlife. If this land was put to other uses, there is a risk that much of that carbon would be lost to the atmosphere as carbon dioxide.

The UK climate is ideal for growing grass for animals to eat. Around 87% of a typical British beef cattle herd's diet is grass, with the remainder made up of by-products and grains from crops which would have never been used in the human food supply chain. It is estimated beef and sheep contribute a biodiversity value of £121 million in England alone.

Grazing livestock on this grassland allows us to turn inedible grass into high quality, nutrient-rich beef, lamb, and dairy. The UK's climate and ample rainfall also means our livestock are not wholly reliant on the water supply, when producing a kg of beef and lamb only 0.4% and 0.1% of the water is from mains water supply.

This is all why, according to the Government's Climate Change Committee, greenhouse gas emissions from UK

beef are about half the global average and greenhouse gas emissions from UK milk production have fallen by 24% since 1990.

Not all red meat production is the same. A key consideration must be where the livestock was farmed and the environmental and welfare standards of where it was produced. And this is where British livestock has a great story to tell.

At COP27, governments across the world agreed that 'sustainably managed livestock systems have high adaptive capacity and resilience to climate change while playing broad roles in safeguarding food and nutrition security, livelihoods, sustainability, nutrient cycling and carbon management'.

Plant-based products do not necessarily have a lower impact on the environment. It all depends on where and how the ingredients have been produced, the environmental pressures involved in its production, the environmental management associated with that country's agricultural system and the environmental resources available.

FACT: Despite accounting for only 1.7% of carbon dioxide emissions, agriculture is a major source of both nitrous oxide and methane emissions in the UK, accounting for 69% of total nitrous oxide emissions and 48% of all methane emissions in 2020. From 1990 to 2020, emissions intensity from cattle, dairy and pigs have decreased (2022 Agri-climate Report) and for sheep, emissions have remained the same.

BUT... Not all farming is the same, and not all plant based products have a lower carbon impact. UK farmers must be encouraged to scale up their sustainably managed livestock systems, increase their adaptive capacity, and resilience to climate change. They can play a much broader role on the road to Net Zero; safeguarding food and nutrition security, livelihoods, sustainability, nutrient cycling and carbon management.

BUST: NO, it's not *just* about reducing carbon.

To get to Net Zero by 2050 the UK needs to adopt a whole system approach, accelerate transition to a “Circular Economy” and make better and more informed decisions based on data and impact.

Professor Deborah Andrews, London South Bank University, looks at the circular economy.

Data clearly shows the parallel between the increase in CO₂ and other greenhouse emissions, human activity, and climate change. If we are to deliver real sustainability, we need to ask if our mission to reduce carbon emissions is enough to save the planet – OR is it more accurate to say that in our quest to get to Net Zero, we are creating other kinds of short and long term environmental, social and economic problems?

For example, in the 1990s the British public were encouraged to drive diesel vehicles because they were more fuel efficient, and emitted less carbon per km driven, than petrol vehicles. Subsequently, we know that diesel combustion produces particulates which adversely affect air quality and human health, the effect of which is particularly bad in urban areas and the attempt to address one problem worsened others.

Carbon counting was initially based on operational energy consumption, which is relatively easy to measure. But results can be misleading because they do not account for embodied energy and carbon emissions associated with materials and manufacture: how can we decide whether a product with low operational energy and high embodied impacts is better or worse than a product with high operational energy inputs and low embodied impacts?

Measuring both operational and embodied carbon allows for slightly more accurate comparison of products or services, but the assessment of carbon and equivalents excludes thousands of inputs and outputs, which can give misleading impressions about their real impact. Take batteries, for example: nickel cadmium batteries were widely sold and are still in circulation. Many batteries are still disposed of in household waste that is either incinerated or sent to landfill, and as the batteries break down in landfill sites, the carbon dioxide seeps into and poisons soil and water which enters the food chain and eventually people. This is only one example of an impact that is omitted from carbon assessment, and there are thousands more per product.

Carbon only assessment becomes even more problematic when we consider the Circular Economy: this system mimics natural systems where resources are circulated in loops and ‘dead’ material from one generation becomes a nutrient for the next. The current level of demand on resources means that we urgently need to increase resource efficiency and to extend product life in the short term and ultimately recycle materials at end-of-life. The economic, social and environmental benefits can be vast.



Carbon only assessment fails to show these benefits. Another example which makes the point is electronic equipment which includes gold, one of only four metals in electronics that is currently recycled and reused. Gold mining includes toxic chemicals such as cyanides, sulphides and chlorides that pollute surface water, groundwater and rivers; furthermore, when the waste dries they also release toxic gases, all of which cause long term environmental damage. Recycling can reduce demand for virgin materials and, as long as the process is carried out in formal, regulated facilities, it also reduces many diverse negative environmental and social impacts and is economically advantageous. Carbon only assessment underestimates and misrepresents the impact of materials and at best provides indicative results.

To fully understand and compare the negative and positive impacts of human activity, we need to take a whole system approach and carry out comprehensive Life Cycle Assessments and identify and quantify as many inputs and outputs as possible. Accurate data and results will help to accelerate transition to a Circular Economy and ensure that, in the quest for Net Zero, better informed decisions are made so that future problems can be minimised (at least) and ideally avoided (at best).

FACT: Carbon Dioxide (CO₂) accounts for approximately 85% of all UK greenhouse gas emissions with methane (CH₄) being the next largest contributor.

BUT... We need to move away from carbon only assessment of Net Zero and accelerate to a “Circular Economy” using data more effectively to measure the long term impact on our environment and scale up sustainable behaviour.



BUST: NO, WE NEED TO RETHINK

Recycling has had success, but we can do better. Quite simply, we all need to rethink our relationship with ‘stuff’ and do more than just recycle. It is clear that if we are to achieve our Net Zero goal we also need to consume less, refill, repair and reuse more.

Dr Adam Read from SUEZ Recycling & Recovery UK sets out why we need to do more than recycle.

Over the decades, recycling has grown from something quite niche to something which households up and down the country actively engage in. We have gone from circa 12% of our household waste in England being recycled to 44% in 2021. Behind this, significant achievement lies billions of pounds of investment in sorting infrastructure, trucks and containers, supported by years of campaigns urging people to recycle. So we shouldn't be surprised that when you ask people what they can do to combat climate change and reduce their impact on the environment, their first answer is often to say, ‘we recycle’.

However, recycling does not address the fundamental issue that we are consuming the Earth's resources at an alarming and unsustainable rate – currently we use three planets' worth of resources! Even if 90% of people, recycle 90% of the time with 90% accuracy and then our sorting and recycling systems operate at 90% efficiency, recycling can only capture just under 60% of materials to be put back into use.

If we are to meet our Net Zero goal, we must go well beyond recycling. We need to consume less, but this doesn't mean going without, rather we need to rethink our relationship with ‘stuff’. For example, service models for tools and appliances that are used occasionally in most households, so perhaps 50 households lease a hedge trimmer or sander, rather than each owning their own?

We have become accustomed to common household items such as kettles and toasters being thrown away and replaced when they break, but we should expect that they were designed with repair in mind, allowing the parts that commonly fail, such as the element, to be easily repaired.

Reuse and repair is a growing part of our business at SUEZ, but it's not a new phenomenon. People have always handed down clothes their children have

outgrown and sought out vintage finds in antiques shops. There is huge potential in so many items we throw away, and as people become more conscious of their impact on the environment at the same time as managing their household budgets, the market for pre-loved items in our reuse shops is booming.

Product and packaging designers can play their part too, we need products and packaging to be designed with end of life in mind to minimise waste. And there is scope to expand refill schemes, which are currently few and far between, but for certain products, well-designed containers and convenient to use refill points could make this an attractive option.

Moving beyond recycling is a journey and in the future we see our role as helping to manage that transition by handling materials, putting them back into use, stopping them from becoming waste in the first instance. Recycling has been a success, we need to keep doing it, do it more and do it well, but to achieve our Net Zero goal we also need to use less, and refill, repair and reuse more.

FACT: In 2021 recycling rate for waste from homes increased in all UK countries except Northern Ireland. The recycling rate for England was 44.1%, 48.4% in Northern Ireland, 41.7% in Scotland, and 56.7% in Wales.

BUT... We need to go beyond recycling and address over-consumption of goods. We need products and packing to be designed with end of life in mind, and everyone needs to rethink their relationship with ‘stuff’ and reuse and repair where possible. Government and local governments have an important role to play in communicating the narrative.

SUMMARY AND RECOMMENDATIONS

There was a consistent theme from nearly all our contributors about the need for better information, use of data, and communication. If we are to shift the narrative on Net Zero and accelerate behaviour change, there is much that needs to be done. The Net Zero APPG works to accelerate and embed Net Zero policy, and we hope that our Myth Busting Report generates debate and discussion about what needs to change to make faster progress across key sectors.

- 1** Wealth shouldn't be measured in GDP value alone, but also by the quality of the world we live in. The Net Zero transition needs to boost cheaper and cleaner energy which will in turn drive more sustainable economic growth, as well as renewable, regenerative and biodiverse outcomes.
- 2** There is a policy and communications gap which can prevent private investors from having the confidence to invest. The Net Zero pathway is not just an energy switch; it's also an urban transition. It's a capital intensive process that requires effective communication between all stakeholders across Westminster, Whitehall, local government and the private sector.
- 3** We need a solid strategy to accelerate green skills and we need it fast if we are to keep up with demand!
- 4** Cities need to improve on other sustainability measures - not just carbon emissions - such as air pollution, water quality, or biodiversity. The concept of 15-minute neighbourhoods would make life more liveable and safe for residents, by improving air quality, increasing active travel, and promoting community.
- 5** CCS is absolutely necessary if we don't scale down energy demand, increase low carbon alternatives and the use of fossil fuel in energy intensive industries. Government must recognise the scale of the challenge and go further and faster on CCS. Whilst Carbon Capture and Storage has not yet been proven at scale, it is time to accelerate innovation if we are to reach Net Zero by 2050 or sooner.
- 6** As we transition to cleaner, greener and more renewable energy and reduce our reliance on fossil fuels - we need to ensure our energy supply and security is robust and resilient and that the UK gets the right balance in its energy mix. There needs to be better awareness of what's in the mix and a whole life assessment on the impact of all energy sources.
- 7** The UK needs to scale up plans to reduce our reliance on fossil fuels and increase investment in renewable, affordable and secure energy. It is clear that if we hadn't invested in renewables over the last decade, energy bills and risk of blackouts would have been even higher.
- 8** There is some way to go on the road to energy efficient Net Zero housing. Homeowners, housing providers and private and social landlords need greater Government support and incentives to accelerate and prioritise retrofit and energy efficiency and bring the costs down as evidenced here [Cornerstone Tax](#).
- 9** Progress is being made in the ways we communicate with and engage local communities, but is it enough to accelerate the behaviour change needed to drive demand for retrofit? Government needs to provide greater incentives to encourage consumers to adapt and adopt new low carbon technologies.

- 10** We are a long way off decarbonising existing homes, with gas boilers still being the preferred choice for UK homeowners. Heat pump installation can be expensive and disruptive despite low running costs, and there is a shortage of skills when it comes to providing engineers to fit and maintain them. According to the European Heat Pump Association, the UK is lagging behind the rest of Europe at second to last when it comes to heat pumps! We need to invest in the skills today and ensure that we can quickly transition to the skills we need for tomorrow.
- 11** We need greater clarity from Government on the cost benefits of green hydrogen to consumers, and their plans to decarbonise our homes and buildings. Government is working with industry and regulators to deliver a range of research, development and testing projects to assess the feasibility, costs and benefits of using 100% hydrogen for heating to enable government to make strategic decisions in 2026 on its role in heat decarbonisation.
- 12** The scale of the sustainable transport challenge is huge. If we want to reduce our carbon footprint and accelerate modal shift to public and active transport - AND upscale efforts to decarbonise our roads and railways - we need investment which delivers affordable and accessible sustainable travel choices to the consumer.
- 13** More than 265,000 battery-electric cars were registered in 2022, a growth of 40% on 2021. Which is good news, but the UK needs to keep pace with demand! We will need more EV charging points - but it's important that they are with the right power and capacity, well-managed, maintained and in the right location to service the needs of as many EV users as possible.
- 14** The sale of vehicles reliant on fossil fuels is targeted to end in 2030. A study by the ONS showed that over half the motorists aged 16-49 say they are likely to switch to fully electric vehicles within the next decade. 41% of those likely to switch to EV are expected to do so within the next 5 years. There needs to be greater incentives and infrastructure which works to reduce emissions and decarbonise transport.
- 15** We need a rolling programme with a Government commitment to make rail electrification cheaper and more efficient if we are to get to Net Zero by 2050 - or sooner.
- 16** There is much more to do to transition to Net Zero buses. In 2022, the Government launched its consultation on ending sales of new, non-zero emission buses from 2025 to 2032. Only around 2% of England's local operator bus fleet is zero emission today - so it is vital that we go further and faster to decarbonise our bus journeys.
- 17** The UK Government must lead the way and invest in the technological transformation needed. The Government is supporting Airbus to develop and launch a zero-emission large commercial aircraft powered by hydrogen propulsion by 2035, as well as similar projects through the Aerospace Technology Institute programme. The Government can do more to unlock and accelerate innovation and invest in a pathway to sustainable aviation.
- 18** A sustainable aviation revolution won't be triggered by a single innovation; rather a complex range of technologies. Several challenges facing the industry must be overcome to help increase the adoption and production of SAF and a long-term regulatory and policy framework is required to support industry and help overcome the key barriers to investment.

19 It is critical that we go further and faster to tackle hard to abate sectors before 2050. Reducing the amount of carbon in the fuels we burn, as well as the amount of fuels used is pivotal to keeping cumulative emissions to levels compatible with the Paris climate goals.

20 Ports need to scale up and to increase the pace of transition if they are to enable significant reductions in fleet-wide emissions in the 2030s. Shipping can achieve Net Zero through a transition to alternative fuel powered vessels using energy from low or zero emission sources or highly efficient batteries, as well as integration of ports into our decarbonised energy network. More needs to be done to see new low carbon technologies come to fruition.

21 Not all farming is the same, and not all plant based products have a lower carbon impact. UK farmers must be encouraged to scale up their sustainably managed livestock systems and increase their adaptive capacity and resilience to climate change. They can play a much broader role on the road to Net Zero; safeguarding food and nutrition security, livelihoods, sustainability, nutrient cycling and carbon management.

22 We need to move away from carbon only assessment of Net Zero and accelerate to a “Circular Economy” using data more effectively to measure the long term impact on our environment and scale up sustainable behaviour.

23 We need to go beyond recycling and address over-consumption of goods. We need products and packing to be designed with end of life in mind, rethink our relationship with ‘stuff’, and reuse and repair where possible. Government and local governments have an important role to play in communicating the narrative.



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