

(Lord Deben)
July 2023

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.

MYTH #18 "Jet Zero won't happen and can't be delivered by 2050"

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 #17 "Hydrogen planes will deliver Net Zero aviation"

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.