

HEATHROW'S NET ZERO PLAN

FEBRUARY 2022

Heathrow

ENTER



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Glossary

This net zero plan is one of the two leadership pillars of Heathrow's overarching sustainability strategy – Heathrow 2.0

① Foreword – our commitment to net zero

Aviation is a force for good in the world. Flying underpins the global economy, delivering trade and tourism to all corners of the globe. It supports hundreds of millions of people's livelihoods, builds understanding across cultures, connects families and friends. Restrictions on travel in the last two years have shown how much poorer the world would be without aviation.

But those benefits cannot come at any cost. **Climate is an existential threat to aviation as well as to us all personally and must be addressed.** The risk to the sector is not just opposition to airport expansion and flight shaming. It is the real impact of climate change. No one will fly to coastal cities or tropical islands that are under water. The wider impacts of dangerous global heating – extreme weather, food and water shortages – would have a huge impact on our global society and economy.

So, our goal is clear: to protect the benefits of aviation for the future, the carbon must be taken out of flying. Like every other part of the global economy, aviation needs to reach net zero emissions by 2050. That may seem like a long time, but if the substantive changes that are needed haven't been made by 2030, the industry won't be on track for its 2050 goal. **This is the decade to make a difference.**

The good news is that it is possible to take the carbon out of flying through ongoing efficiency improvements, sustainable aviation fuel (SAF), zero carbon aircraft and carbon removal projects. But this requires urgent action, by Heathrow, by the aviation sector and by the Government.

95% of Heathrow's carbon footprint is from aircraft. The remaining 5% comes from people getting to and from the airport on the ground, as well as our supply chain, airport vehicles and buildings. That percentage may be smaller, but we have more influence over those emissions and a responsibility to get our own house in order. We can get to net zero on the ground too. Again, this needs action by Heathrow but also by the Government: the national shift to electric vehicles in the UK will play the single biggest role.

Our new plan comes at an exciting time in aviation.

Already the 2020s have seen the UK aviation sector commit to net zero – a world first – when the industry coalition Sustainable Aviation published its decarbonisation roadmap at the start of the decade. In October 2021, the whole global aviation sector set the same goal and, at COP26, 21 states joined a new governmental coalition calling for a commitment to net zero by 2050 at ICAO's General Assembly in September 2022. A growing number of airlines are committing to using at least 10% sustainable aviation fuel by 2030. **There is real momentum.** The UN's specialised aviation agency, ICAO, holds its next assembly at the end of this year and has a historic opportunity to set a net zero goal for the whole aviation sector around the world.

If passengers and cargo are to fly net zero by 2050, solutions must be rolled out this decade. That's why Heathrow's plan is centred on two ambitious 2030 goals to cut absolute carbon emissions:

- Up to a 15% cut in carbon from flying (or carbon 'in the air'), with the right Government policies to scale sustainable aviation fuel (SAF).
- At least a 45% cut in carbon from surface access, supply chain, vehicles, buildings and infrastructure, (or carbon 'on the ground').

① Foreword – our commitment to net zero



Our goal is for 2019 to be the year of “peak carbon” from Heathrow, even with a third runway in future. This will rely on Heathrow, the aviation sector and the Government acting with urgency and purpose to scale-up solutions, particularly sustainable fuels.

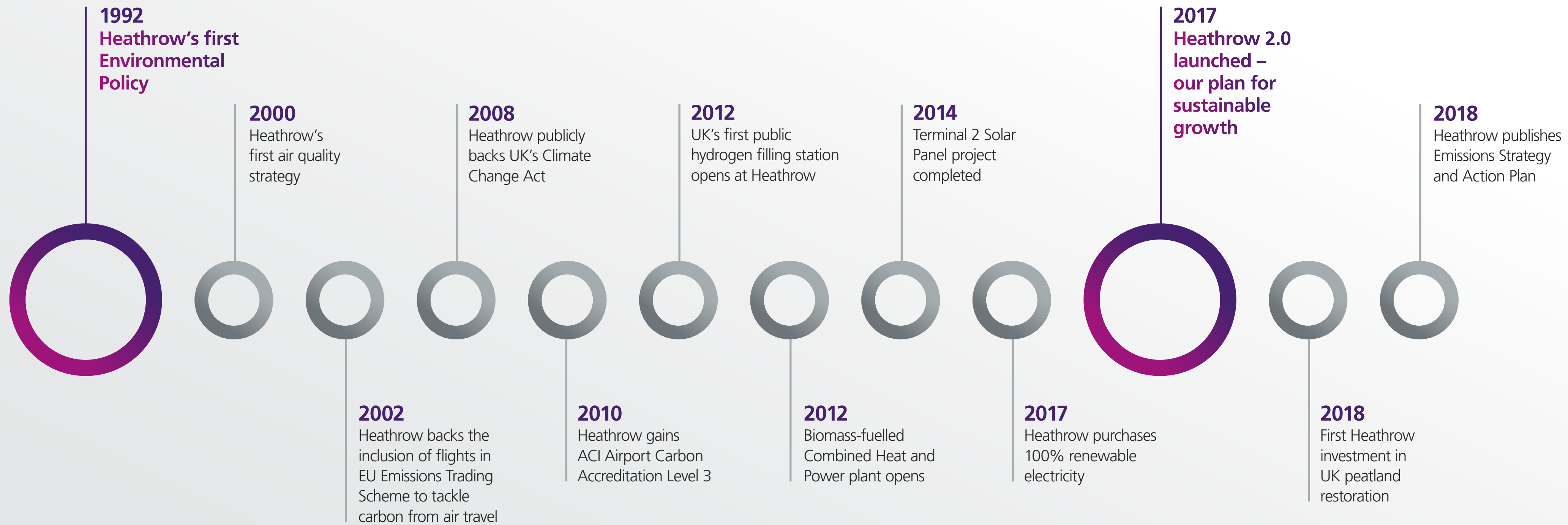
This plan sets out the actions Heathrow will take to achieve those goals. Where we do not directly control emissions, it sets out how we will work in partnership and influence others, particularly our airline customers, the many other companies that operate at the airport (“Team Heathrow”) and our passengers. Heathrow can pull different levers to influence emissions – sending the right financial signals (like our sustainable fuels incentive in landing charges), setting the right standards (like our airside vehicle ultra-low emissions zone) and offering the right products and services (like electric vehicle charging).

Where only the Government can pull the levers that will drive change – like setting a mandate for sustainable fuel use or agreeing a global net zero goal for aviation – the plan sets out what our policy asks are. We will continue to be a vocal advocate for change.

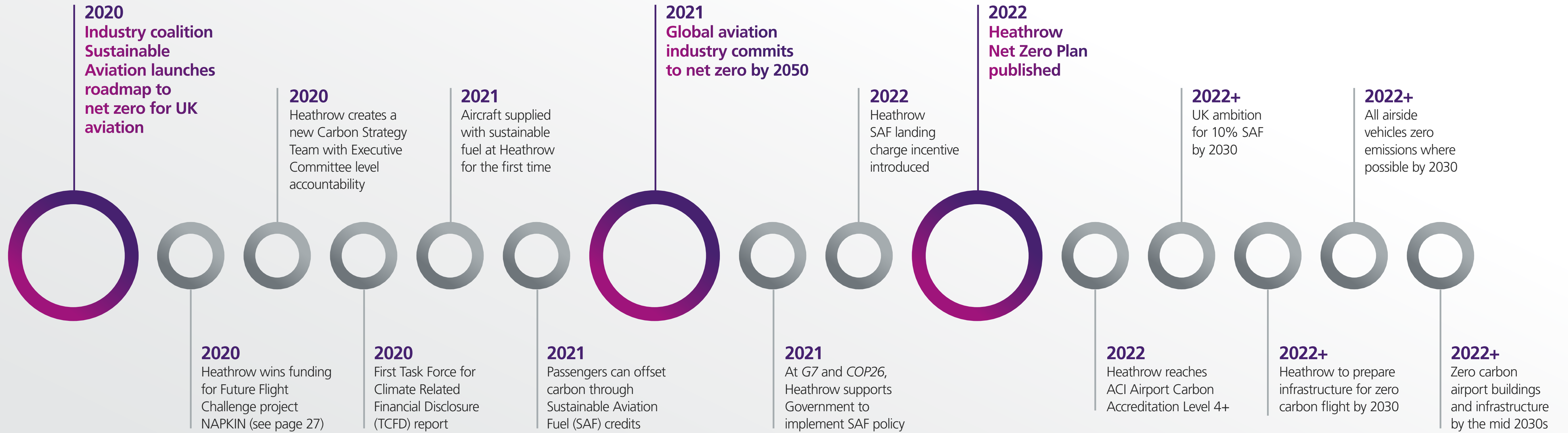
Heathrow will need to invest to deliver this plan. In our next five-year business plan that runs to 2026 (known as *H7*), we have proposed nearly £200m of capital investment in projects to cut carbon – from modernising airspace to installing EV charging points. We are economically regulated by the Civil Aviation Authority, so we need their support for this investment when they publish their final proposals for our investment in spring 2022. Tackling climate change is fundamental to protecting affordable air travel for consumers, the CAA’s primary duty, and to the CAA’s environmental duties.

The risks could not be clearer if we do not move urgently to tackle climate change. The aviation sector globally is united on where we need to get to: net zero by 2050. We have a clear roadmap to get there. We now need to translate that net zero ambition to action. This is the decade to make a difference. That’s why, as Heathrow, we’ve set goals to cut carbon from aircraft and our operations on the ground by 2030 and to make 2019 the year of peak carbon. This will require action with urgency and purpose by us and our industry partners – airlines, manufacturers, fuel producers. It will also require the same urgency and purpose from the UK Government and from states around the world at ICAO. But with the right focus and action we can take the carbon out of flying and protect the benefits of aviation for the future.

② Our journey



② Our journey



3 Net zero aviation

Net zero has become a common term. It is important to be clear what it means and how we have used it in developing our plan.

Net zero is a scientific concept established by the Intergovernmental Panel on Climate Change (IPCC). The IPCC recommends limiting global heating to 1.5°C to avoid the worst impacts on people and the environment from climate change. That means cutting emissions to as close to absolute zero as possible by 2050 and removing any residual emissions: this is net zero.

In section 5 we set out Heathrow's pathway to net zero.

Independent experts and scientists have set out three key principles for net zero:

1

Net zero is not just about where you get to by 2050, it is about the journey to get there.

To avoid the worst effects of climate change, we need to start to cut emissions from today as well as get as close as possible to zero by 2050. In the UK, the Government's advisor on net zero – the Climate Change Committee (CCC) – develops carbon budgets on a five-yearly basis. These budgets set out the volume of emissions possible across the economy for the UK to remain on track for net zero. Heathrow's net zero plan aims to align as closely as possible with the central scenario of the CCC's 6th carbon budget.

2

Emissions have to be cut in-sector as much as possible.

Emissions must be cut as deeply as technically and economically feasible before any offsetting is used. This plan focuses strongly on cutting in-sector emissions. Where investment is required by Heathrow, it focuses on projects that will deliver the best value for the carbon reduction achieved.

3

Any offsetting of residual emissions should only be done by removing carbon from the air.

It is a big challenge to reduce emissions to absolute zero. For instance, at Heathrow, our emissions include refrigerant gases used in air conditioning units. New technologies and chemicals are being developed, but it is not yet clear when a complete zero emissions replacement will be possible. Therefore, while they exist and there is no lower carbon alternative, these emissions will be offset.

Those 'residual' emissions which remain need to be offset by using genuine 'carbon removals', also known as negative emissions – literally removing greenhouse gases from the air. In section 9, we set out our approach to carbon removal in more detail.

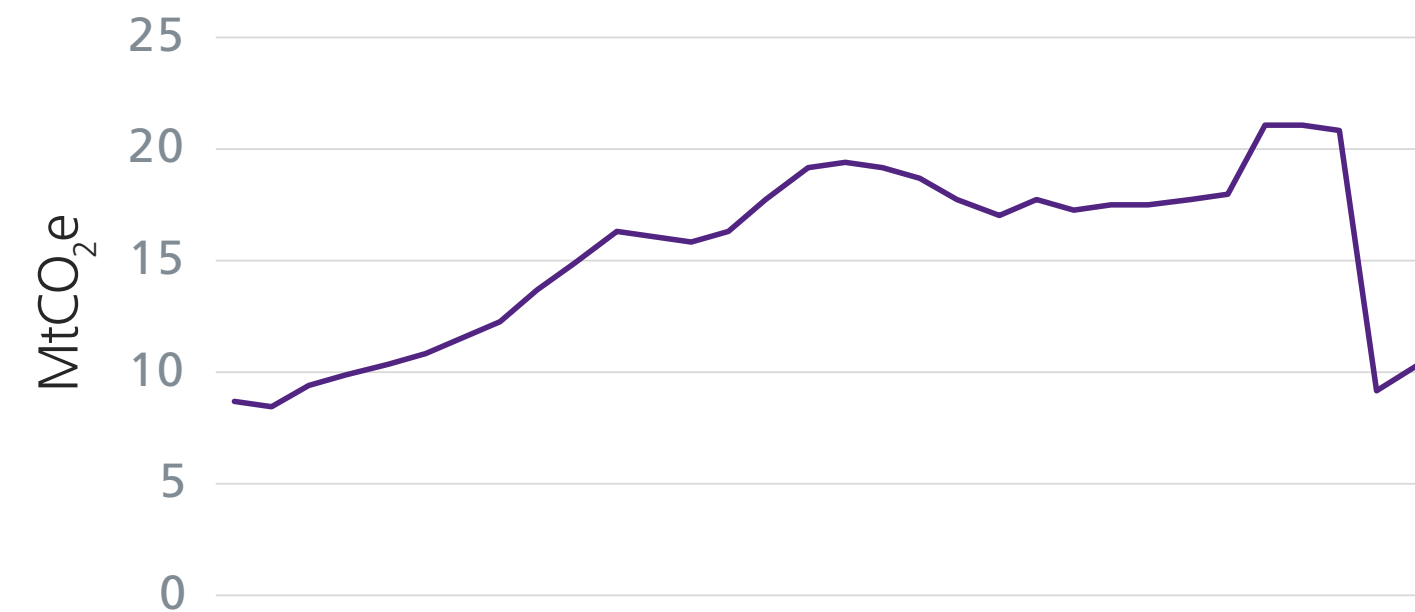
4 Heathrow's carbon footprint

In calculating Heathrow's carbon footprint, we include all the emissions linked to our business, from the operation of the airport itself. This includes all our buildings and vehicles, passenger and colleague travel to and from the airport, the flights that depart from Heathrow all the way to their destination, and more.

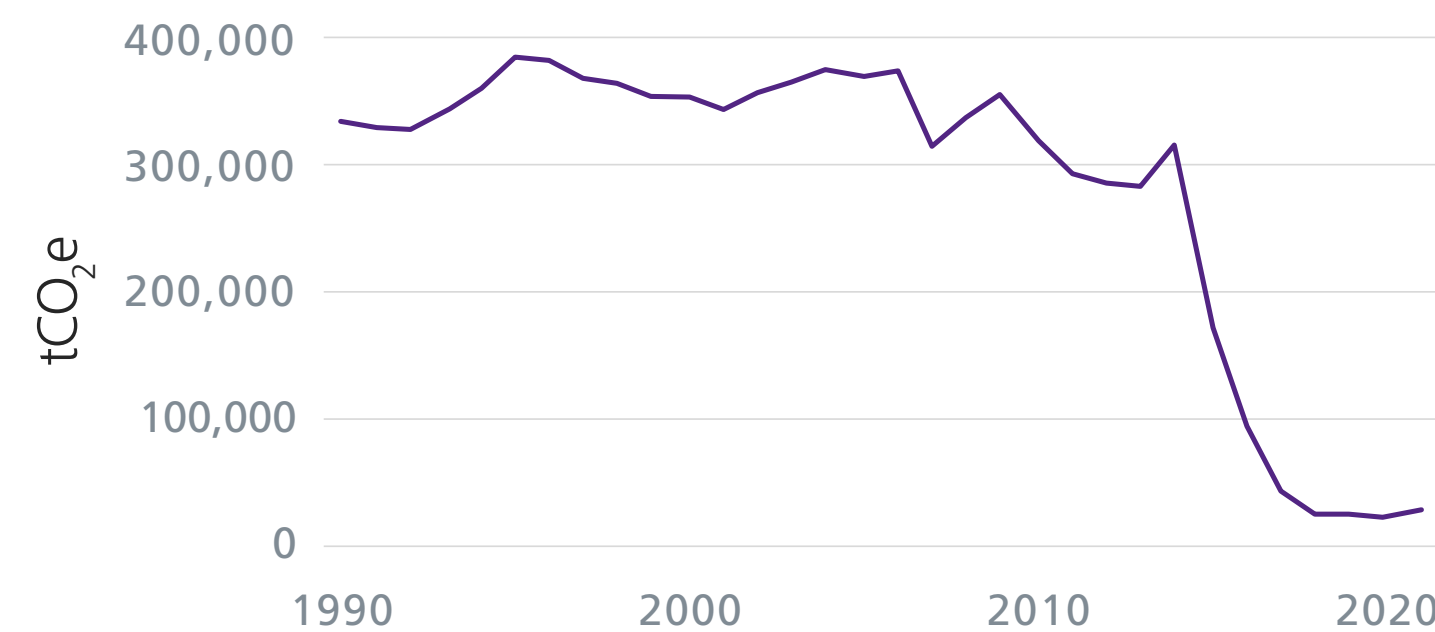
We use the leading global standard the Greenhouse Gas Protocol to categorise the different scopes of our footprint. 99.9% of Heathrow's carbon emissions are Scope 3, which means we do not directly control them. However, we can influence these emissions and we include them all in our strategy.

Given the impact of the pandemic on international air travel, emissions from flight (which represent 95% of Heathrow's footprint) have fallen significantly from 2019 levels. Our goal as we recover and in future grow, even if that includes adding a new runway, is for 2019 to be the year of "peak carbon" from Heathrow.

Heathrow's carbon emissions since 1990 – all scopes



Heathrow's carbon emissions since 1990 – Scopes 1 and 2



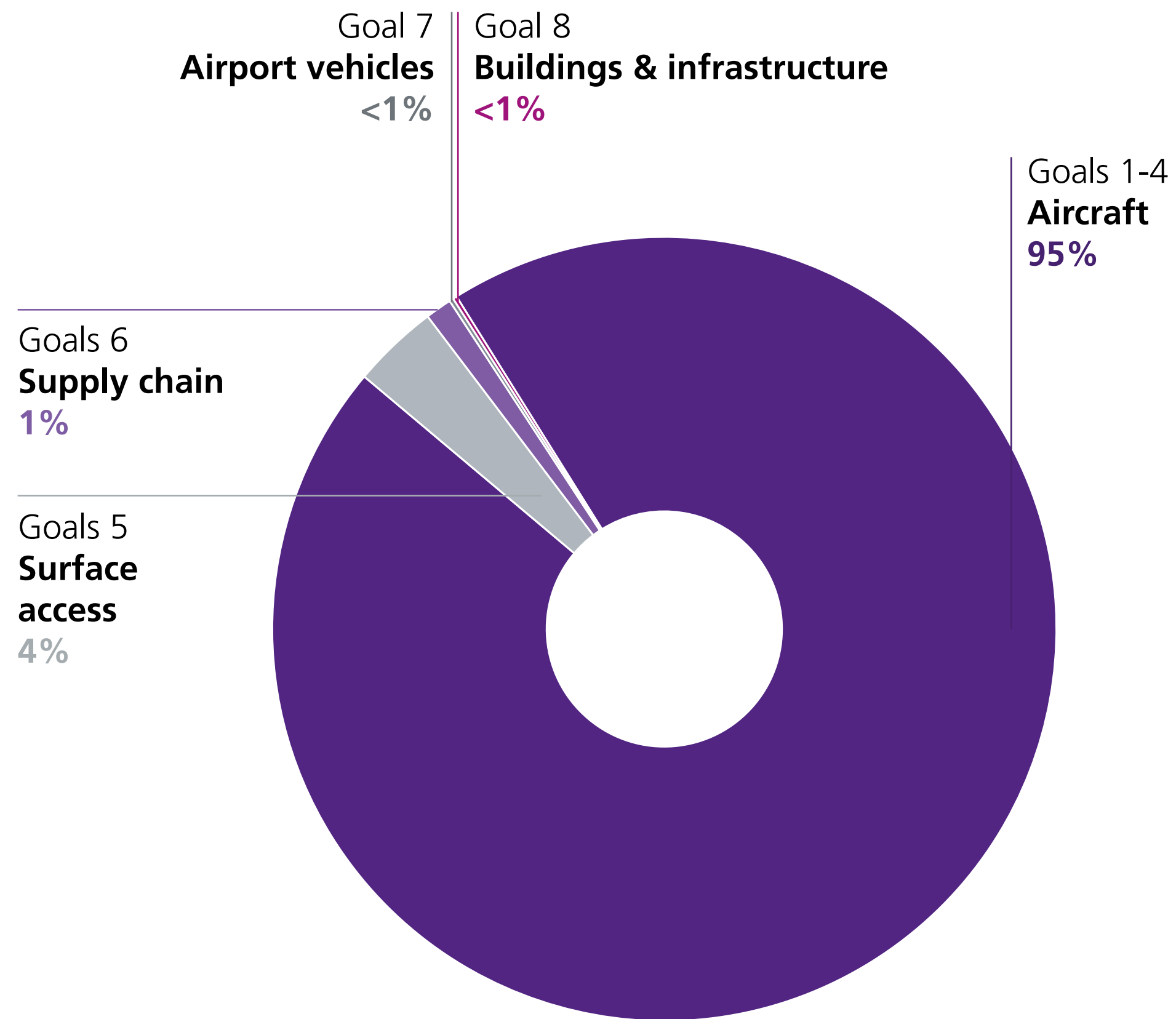
Heathrow's scope 1, 2 and 3 carbon emissions, 2019 – 2021

	tCO ₂ e*, 2019	tCO ₂ e*, 2020	tCO ₂ e*, 2021
Scope 1			
Emitted directly from sources Heathrow owns or controls	26,998 0.13%	23,208 0.26%	29,091 0.35%
Scope 2			
Emitted indirectly from purchased energy	0 0%	0 0%	0 0%
Scope 3			
All other indirect emissions upstream and downstream. This is dominated by emissions from flights	21,013,741 99.87%	9,024,428 99.74%	8,228,185 99.65%

* Tonnes of carbon dioxide equivalent - meaning all greenhouse gas emissions

④ Heathrow's carbon footprint

Heathrow's carbon footprint over time (all scopes)



Our carbon emissions (2019) by goal

Objective	Goal	Scope	tCO ₂ e	%
In the air				
	1-4	Scope 3 Aircraft	19,993,153	95%
		Landing & take-off	1,250,648	(95.02%)
		Cruise (departure flights)	18,742,505	
On the ground				
	5	Scope 3 Surface access	747,879	4%
		Passenger	632,348	(3.55%)
		Colleague	115,531	
	6	Scope 3 Supply chain	229,606	1%
				(1.09%)
	7	Scope 1 & 3 Airport vehicles	36,045	<1%
		Heathrow	1,668	(0.17%)
		Team Heathrow	33,015	
		Construction Vehicles	1,362	
	8	Scope 1, 2 & 3 Buildings & infrastructure	34,058	<1%
				(0.16%)

⑤ Our pathway to net zero

To establish how Heathrow can get to net zero, we developed a series of scenarios. For carbon 'in the air', we drew from projections by aviation industry groups and independent experts in the UK and globally.¹ For carbon 'on the ground', our main input was the Climate Change Committee's advice to the UK Government in its 6th Carbon Budget – which describes what the economy must achieve to be on track for net zero. From these inputs we developed our lead scenario: an ambitious but credible path to net zero.

By 2030, our goal is that carbon from flights falls by up to 15% from 2019 levels. This is ambitious, but achievable if there is rapid Government action to scale up sustainable aviation fuels (SAF). By 2050 our goal is a fall of at least 80%, even with a new runway, leaving around 20% of emissions to be removed from the atmosphere to reach net zero. By 2050, our goal beats the Climate Change Committee's (CCC) target for aviation: successful delivery of this plan would mean that our residual emissions by 2050 would be less than half of what the CCC projects.

The Heathrow lead scenario is based on ongoing fleet efficiency improvements, roll-out of zero carbon aircraft starting in 2035 and, most significantly, the scale-up of SAF to replace 90% of remaining kerosene by 2050 with a 90% life-cycle saving. However, the collective goal should be to achieve absolute zero by 2050 if we can. In our highest ambition scenario, we assumed that fully synthetic aviation fuels (with 100% life-cycle carbon saving) replace all remaining kerosene by 2050. In its 2018 *Mission Possible* report, the Energy Transitions Commission, chaired by the former chair of the CCC, concluded that SAF could meet 100% of aviation's fuel needs by 2050.

As more data and projections become available our scenarios will be updated and our progress periodically published.

Achieving a net zero deal at ICAO

The International Civil Aviation Authority (ICAO) is a United Nations agency. Among other things it sets out the global standards governing aviation.

It holds Assemblies of all of the world's states every three years. At the last of these in 2019, ICAO agreed to look at options for a "long-term aspirational goal". The global aviation sector wants that to be an agreement for net zero aviation by 2050. This would build on the net zero commitment made by *IATA*, representing the world's airlines, and by the whole global aviation sector (including *ACI*, which represents the world's airports) in October 2021.

A growing number of governments around the world are also backing net zero aviation. At COP26, the UK Government launched an International Aviation High Ambition Coalition which included twenty states from Africa, Latin America, Asia, North America and Europe.

¹ These included the Air Transport Action Group's *Waypoint 2050*, Airlines for Europe's *Destination 2050*, Sustainable Aviation's *CO₂ Roadmap*, the Energy Transitions Commission's *Mission Possible*, reports by the Clean Skies for Tomorrow Coalition, the UK Climate Change Committee's *Sixth Carbon Budget*

⑤ Our pathway to net zero

Third runway at Heathrow

Heathrow is the UK's only hub airport, connecting London and the UK to the world. It handles 80% of the UK's long-haul flights. As well as serving passengers, the airport sends exports to global markets: it is the UK's largest port by value for non-EU markets. Pre-pandemic, Heathrow had been at capacity for many years. In 2018, Parliament overwhelmingly supported the Government's policy, as set out in the Airports National Policy Statement, that to maintain the UK's international hub status there is a need to increase airport capacity in the south-east by constructing one new runway and that a third runway at Heathrow is the most effective and appropriate way of meeting that need. Air travel has fallen around the world during the pandemic, but it is recovering and in future there will be demand for more hub airport capacity. Adding capacity at Heathrow represents the most valuable economic use of carbon in UK aviation.

We have always been clear that there should not be a choice between economic growth and the environment. This plan shows how we can reach net zero even as we grow. In line with the Airports National Policy Statement, this plan is based on a new runway opening in 2030. This also enables the market in

SAF to become established and begin to grow before additional aircraft movements occur. Our goal, with the right Government policies, is 11% SAF use by airlines at Heathrow by 2030, contributing a carbon saving of over 7.5% by that time.

SAF use will increase again during the 2030s. Combined with other carbon savings from more efficient planes and new hydrogen technology this means that, as traffic increases, we can continue to cut emissions, making net zero possible with growth.

The Government policy that supports a new runway at Heathrow has always been clear that at the time we apply for planning permission we will need to demonstrate that the additional air traffic is compatible with the UK's plan to reach net zero.



⑤ Our pathway to net zero

Every plan A needs a plan B

With the right determination and action by industry and by the Government, we can scale up the solutions needed to take the carbon out of flying. While we are confident in our projections, any good Plan A has a Plan B. If SAF and zero carbon aircraft using hydrogen take longer to develop, we can still cut carbon through verified carbon removals, as set out in section 9.

Some stakeholders, including some environmental campaign groups and the CCC, are not as optimistic about the ability of aviation to cut carbon from flying. They advocate tougher policies to limit flying, including constraining airport capacity. However, demand management is not as simple as it sounds. In an interconnected global network like aviation, introducing constraints in one country can have the unintended consequence of exporting rather than reducing carbon, as passengers take flights to other hub airports to connect to their end destination.

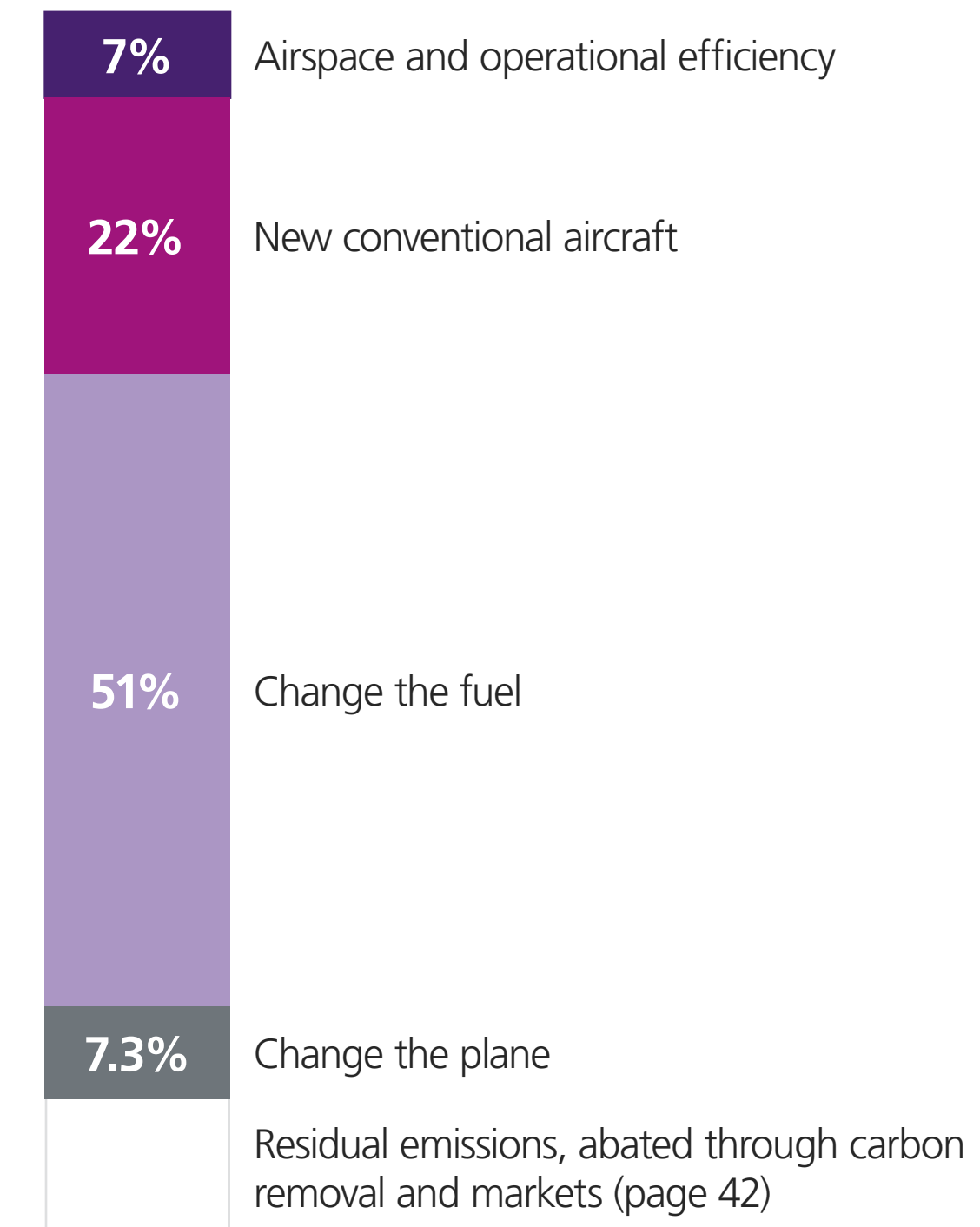
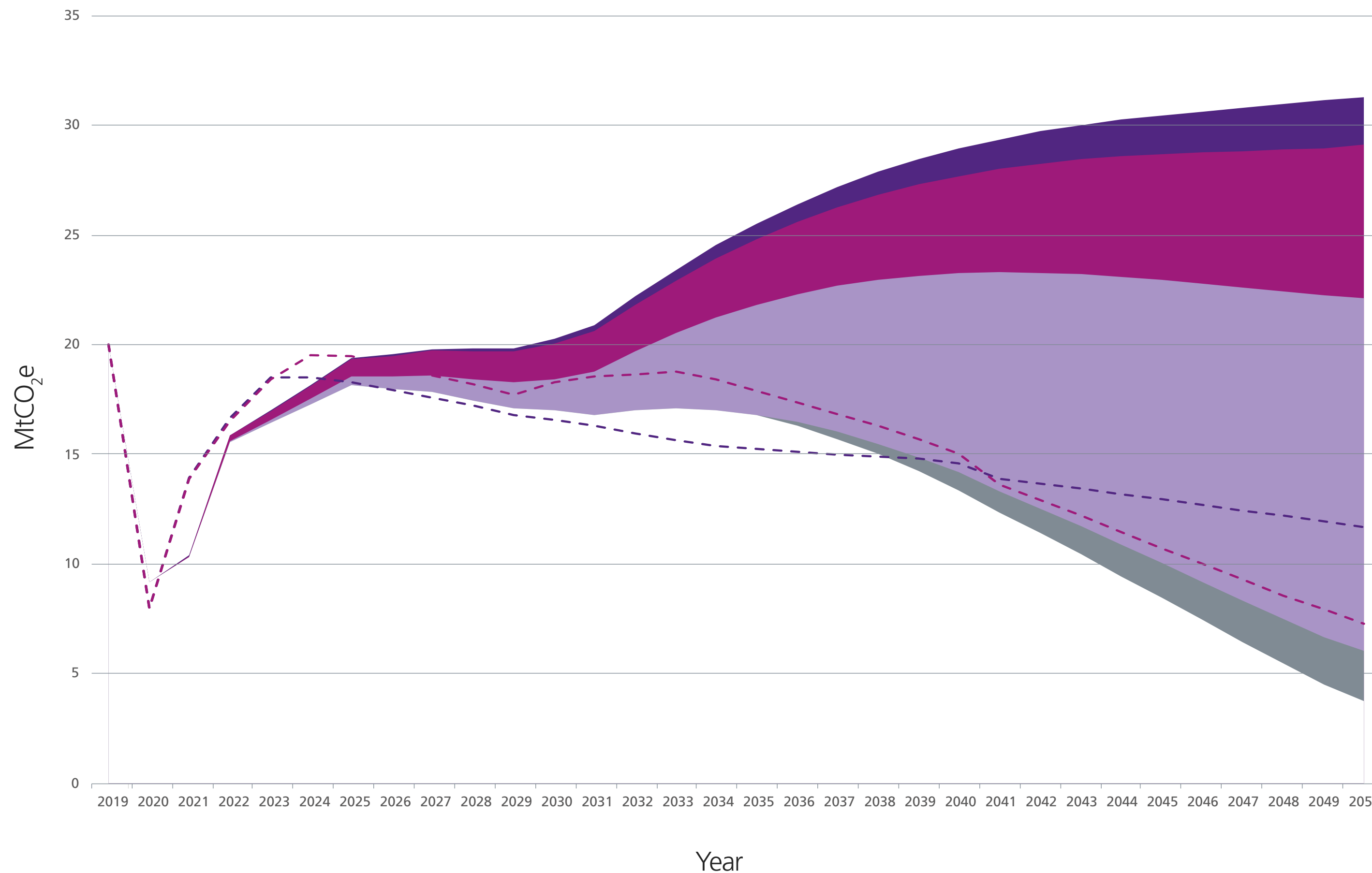
Given the benefits of global air connectivity, we view demand management as a last resort. However, we have been long-standing advocates of the polluter pays principle. Passengers should pay the carbon costs of their flights. By applying robust carbon pricing, for example by including flights in the UK Emissions Trading System, the cost of carbon will be included in air travel. This will have some impact on passenger demand but it will also provide a stronger incentive for aerospace manufacturers and airlines to innovate and invest to cut carbon.



5 Our pathway to net zero

CUTTING CARBON IN THE AIR

Projected carbon emissions in the air



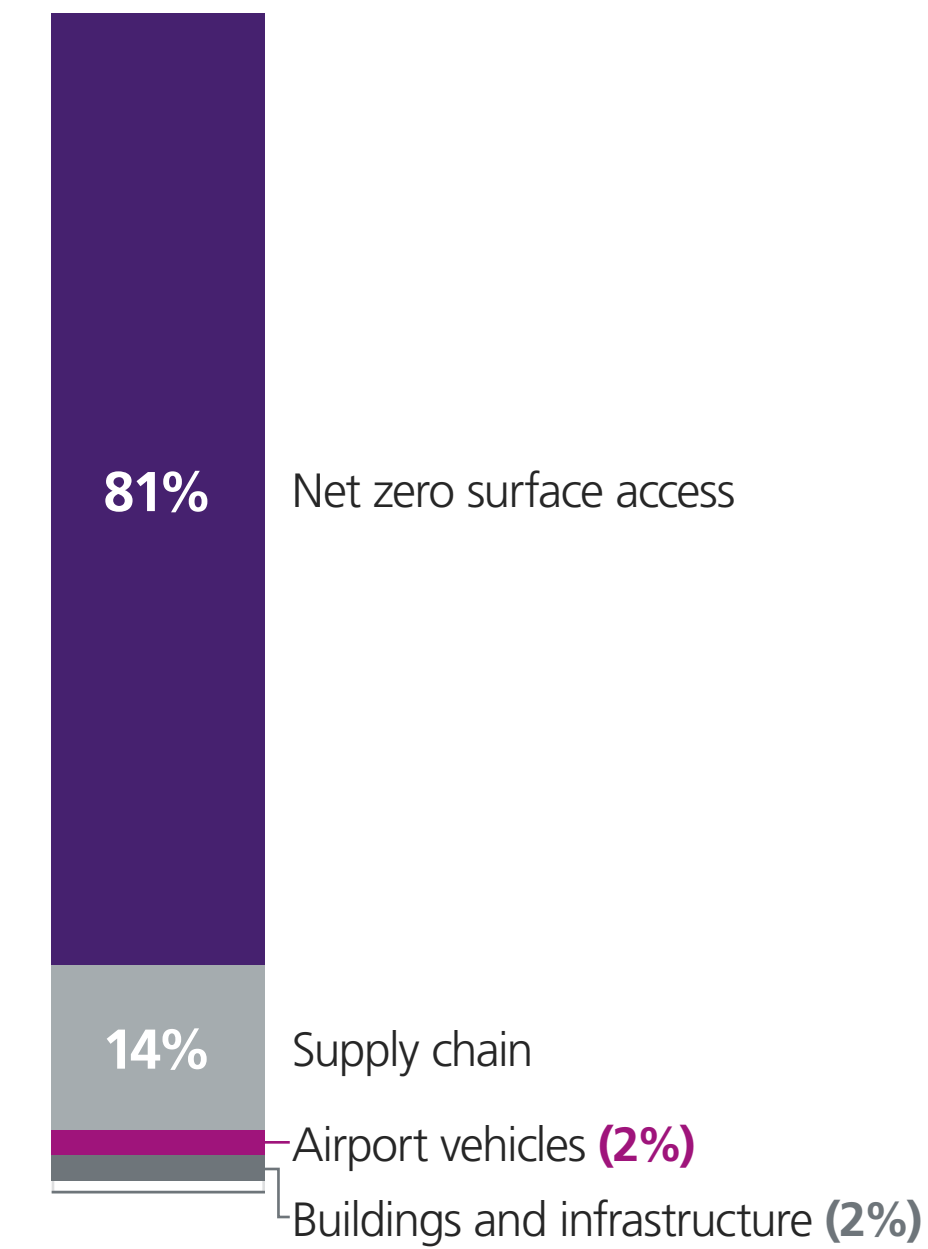
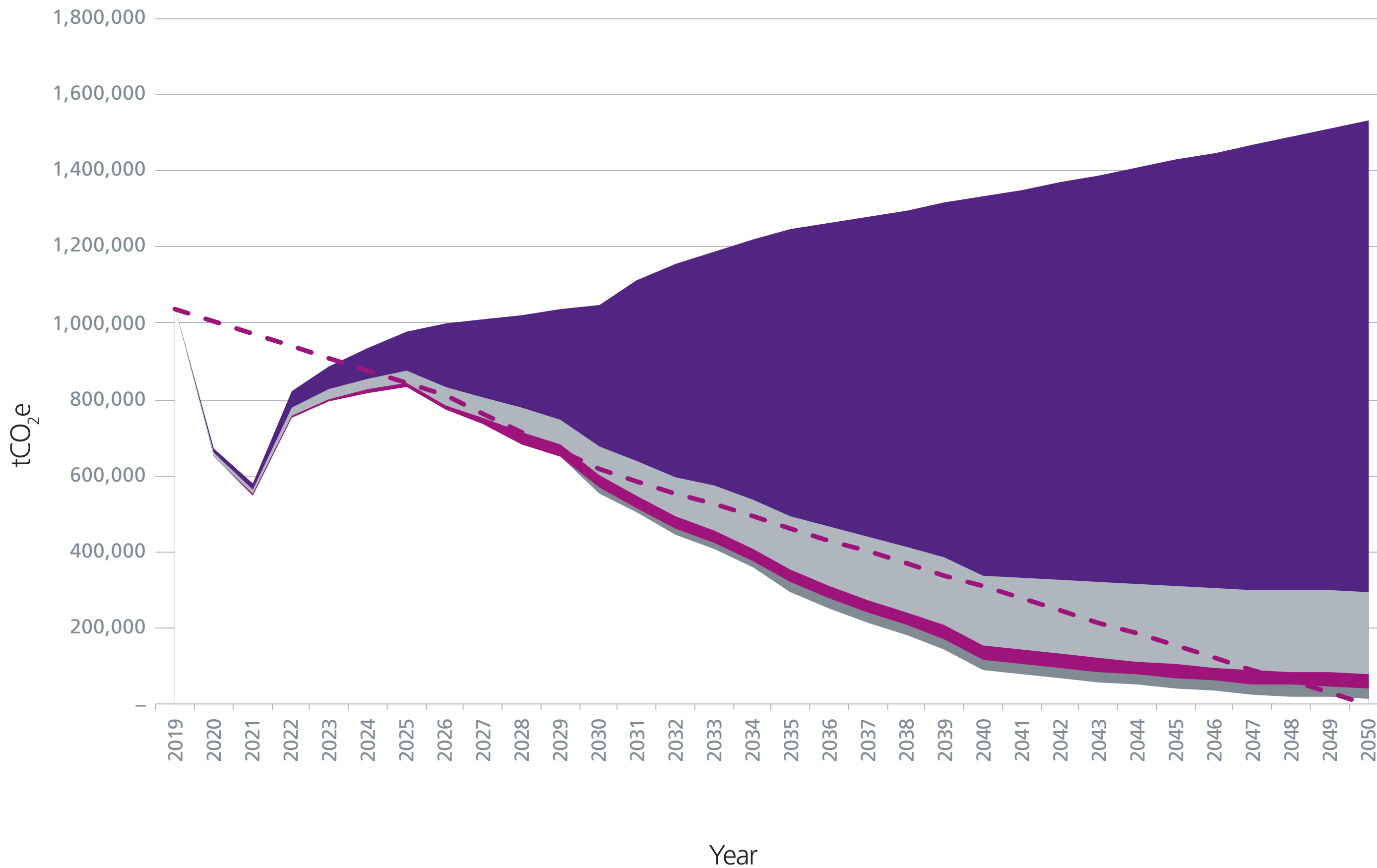
--- The dashed purple line shows the required trajectory for Heathrow to decarbonise in line with the Climate Change Committee 'Balanced Net Zero' pathway – its central scenario
--- The dashed pink line is its Widespread Innovation pathway

Footnote:
Assumes a third runway opens in 2030

5 Our pathway to net zero

CUTTING CARBON ON THE GROUND

Projected carbon emissions on the ground



— The dashed pink line shows the required trajectory for Heathrow to decarbonise in line with the Climate Change Committee 'Balanced Net Zero' pathway – its central scenario

Footnote:

The data accounts for the impact of a third runway for surface access (the largest share of emissions). Up to date forecasts of the impact of a runway are not available for the other sources of emissions, however we are confident of alignment with the CCC's Sixth Carbon Budget even as we grow given that our projections show us outperforming it.

⑥ Key actions at a glance

By 2030, our goal is to cut carbon by up to 15% in the air
(2019 baseline)

IN THE AIR – SUMMARY There are four main solutions to cutting carbon the in air

GOAL 1:
AIRSPACE AND OPERATIONAL EFFICIENCY
 Contribute up to 1% of the 2030 goal with technology delivering more efficient operations and by **investing £70m modernising airspace around Heathrow**



GOAL 2:
NEW CONVENTIONAL AIRCRAFT
 Use less fuel, contributing up to 8% of the 2030 goal, as a result of airline **fleet renewal improving conventional aircraft and engines**



GOAL 3:
CHANGE THE FUEL
 Switch to low carbon sustainable aviation fuel (SAF) pumped into today's planes, contributing up to 7% of the 2030 goal, accelerated by our **SAF landing charges incentive**



GOAL 4:
CHANGE THE PLANE
 New zero carbon aircraft entering into service will deliver further carbon reductions. We will continue **R&D to prepare the airport infrastructure for zero carbon flight**

Actions in the net zero plan will help cut local air pollution too, particularly those focused on surface access and airport vehicles

⑥ Key actions at a glance

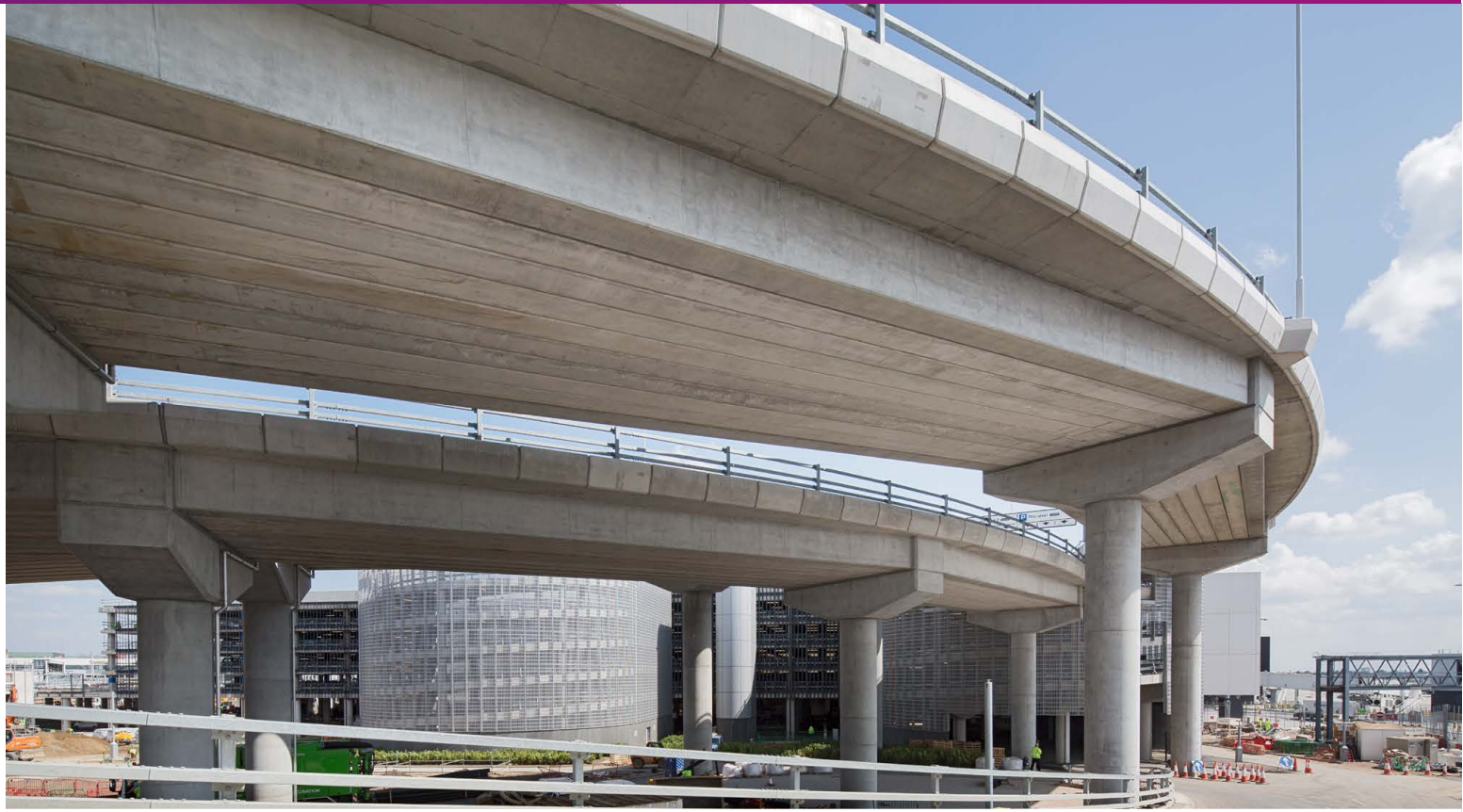
By 2030, our goal is to cut carbon by at least 45% on the ground
(2019 baseline)

ON THE GROUND – SUMMARY There are four main solutions to cut carbon on the ground

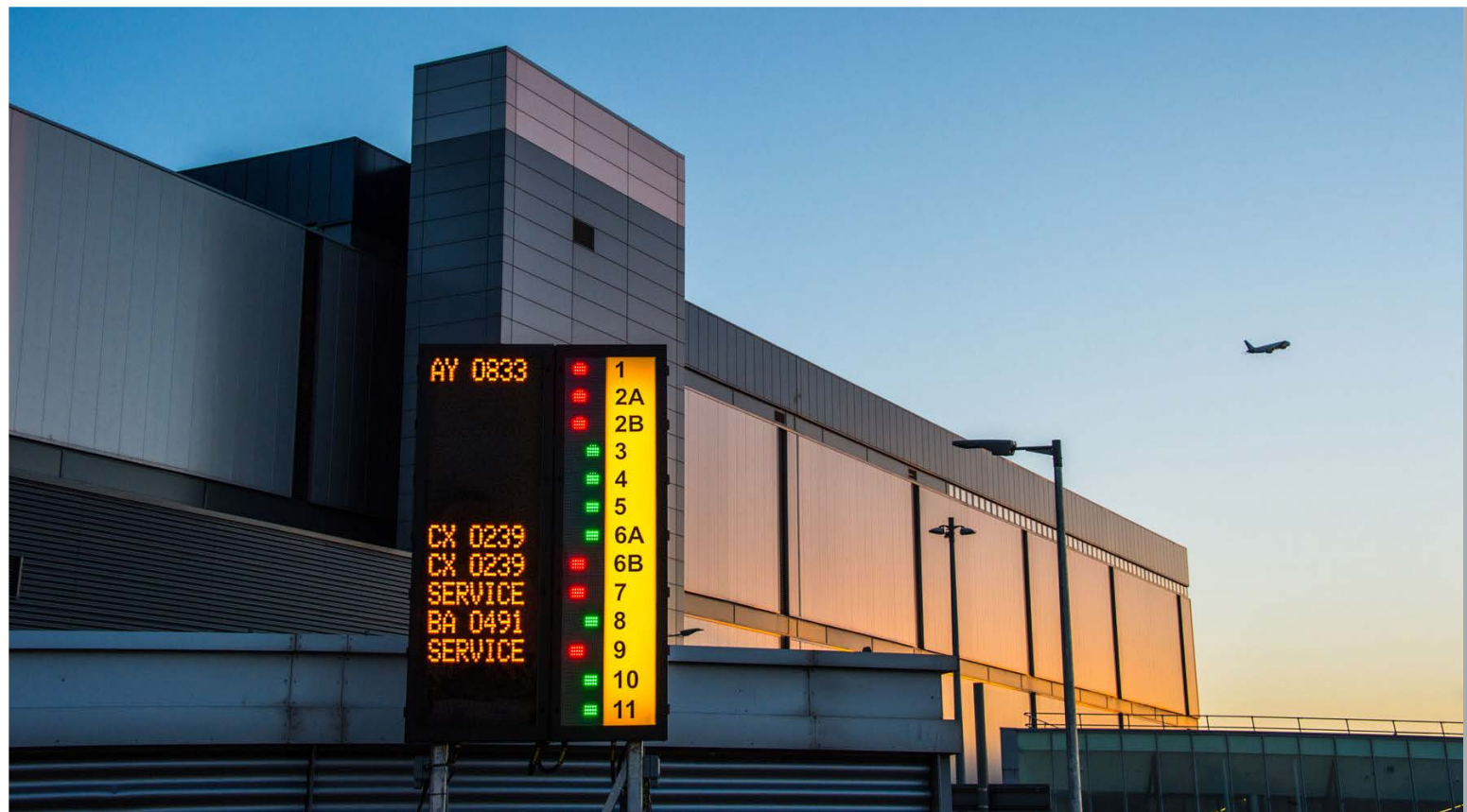
GOAL 5:
NET ZERO SURFACE ACCESS
 Changes to surface access for passengers and colleagues, cutting carbon by 49% by 2030, through the **switch to electric vehicles and new public transport links**



GOAL 6:
SUPPLY CHAIN
 Leveraging our procurement role to deliver a net zero supply chain, cutting carbon by 35% **working with suppliers to set net zero targets**



GOAL 7:
AIRPORT VEHICLES
 Shifting airport vehicles to zero emissions, cutting carbon by 87%. **By 2030, all airport vehicles will be zero emissions or use biofuels**

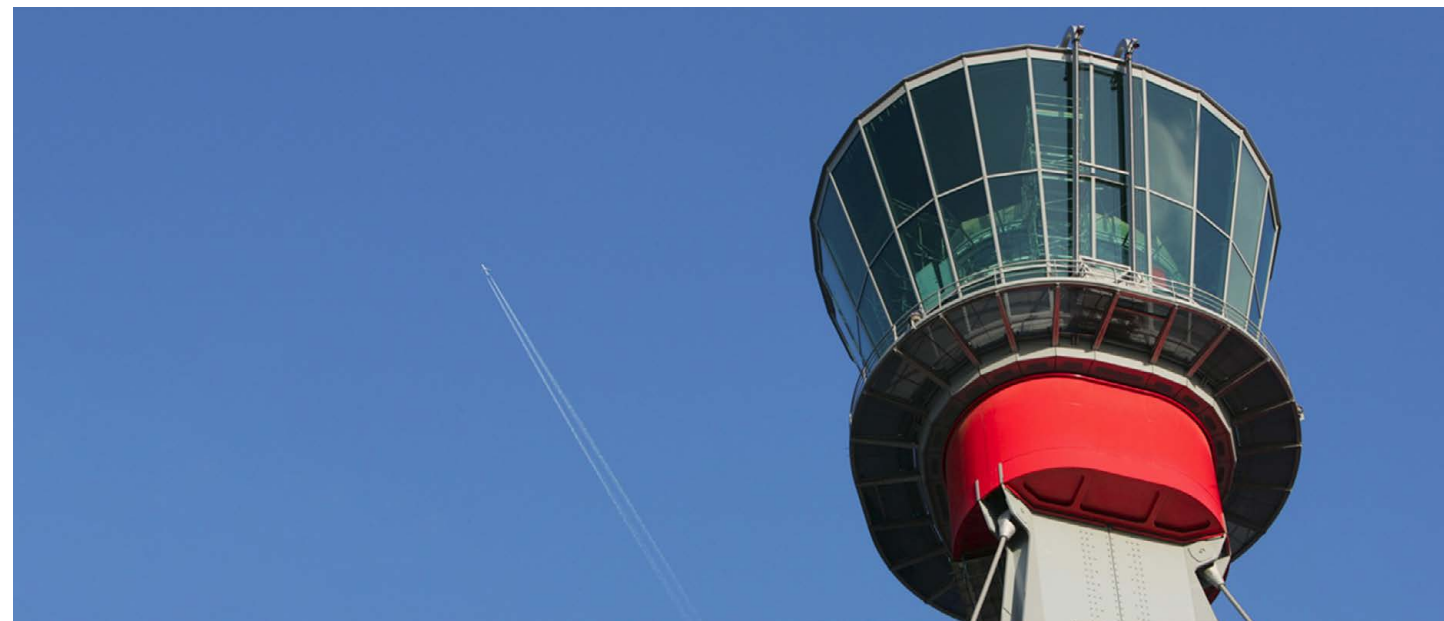


GOAL 8:
BUILDINGS AND INFRASTRUCTURE
 Energy efficiency and technology cutting carbon by 39% by 2030 from our buildings and infrastructure, including through **starting to switch off gas**

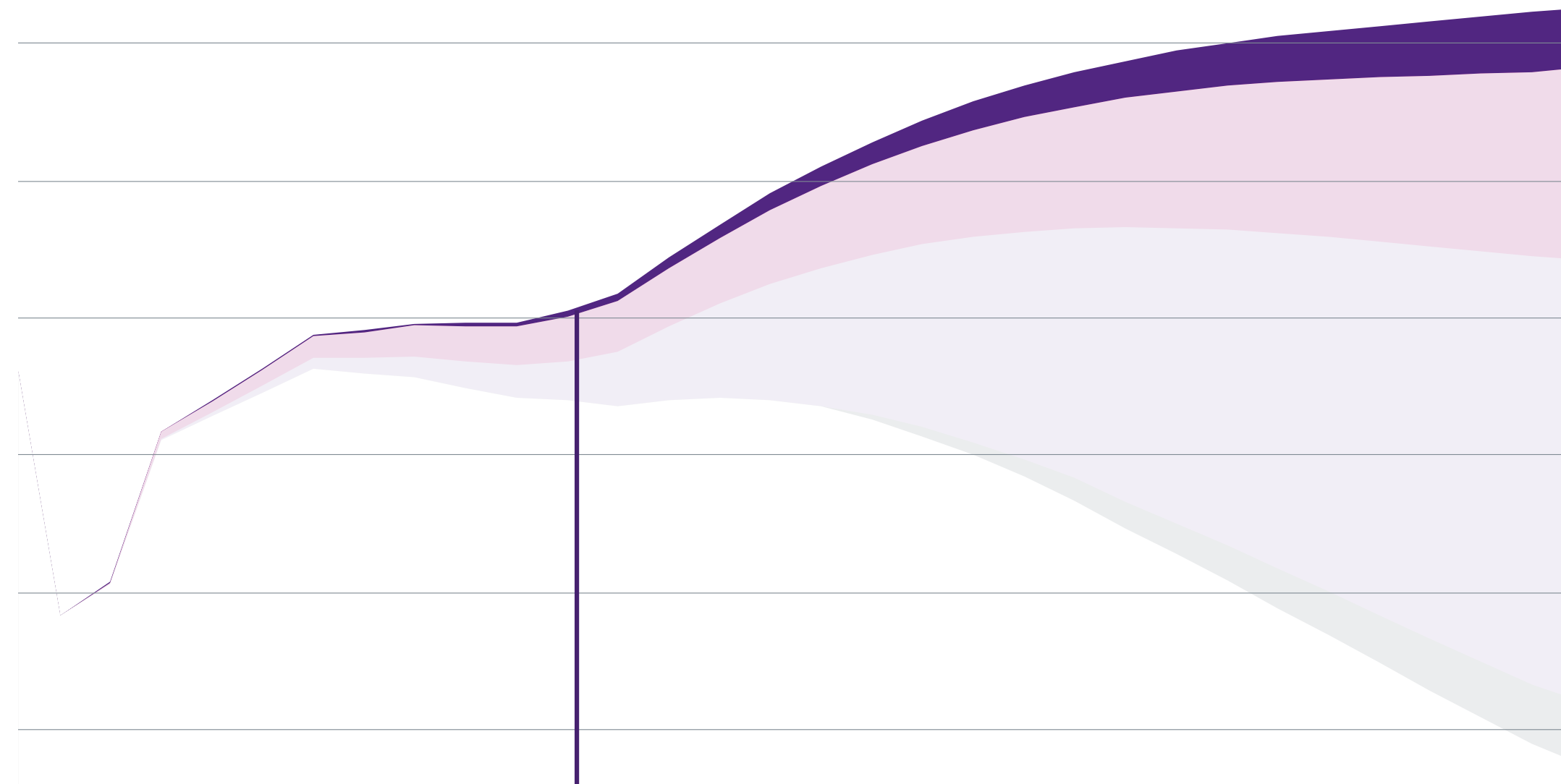
Actions in the net zero plan will help cut local air pollution too, particularly those focused on surface access and airport vehicles

7 Net zero goals in the air

GOAL 1: AIRSPACE AND OPERATIONAL EFFICIENCY



Our strategy begins with efficiency. It will not deliver net zero alone but is a vital foundation. Using less fuel for flights delivers the instant benefit of lower carbon emissions and improved air quality. It takes the pressure off other solutions – making it quicker and easier to complete the job of getting flying to net zero through SAF or other alternative fuels such as hydrogen.



Contribution in the air by 2030:
Up to 1%, 0.22Mt

Contribution in the air by 2050:
7%, 2.19Mt



Heathrow has some influence – optimising ground movements and providing the infrastructure at stands to cut aircraft carbon emissions

The figures for the 'in the air' goals represent reductions relative to the uppermost 'do nothing' curve

7 Net zero goals in the air

GOAL 1: AIRSPACE AND OPERATIONAL EFFICIENCY

CUTTING CARBON FROM EFFICIENT USE OF AIRSPACE

Airspace describes the 'motorways in the sky' above us – the invisible infrastructure of routes aircraft use as they travel between airports. Much of this airspace was designed decades ago, at a time when aircraft and navigation were much less sophisticated than today. Modern technology can deliver more efficient journeys requiring less fuel burn, for instance by cutting total distances flown.

Airspace modernisation

Airspace modernisation at Heathrow, and across the UK, is now underway with the aim of completing it by 2030. Heathrow has proposed to the CAA to invest around £70m to modernise the airspace around Heathrow. Cutting emissions is a key design principle and we expect modernisation of Heathrow's airspace to directly influence carbon savings in the airspace adjacent to it, enabling savings of up to 0.5% of our carbon footprint by 2030. Note this saving relates only to the airspace in the immediate vicinity of Heathrow. As airspace is modernised across the UK, Europe and the world, further carbon savings will be delivered.

Target: Complete airspace modernisation around Heathrow by 2030.

Investment: We have proposed to the CAA c.£70m to modernise airspace around Heathrow by 2030.

7 Net zero goals in the air

GOAL 1: AIRSPACE AND OPERATIONAL EFFICIENCY

CUTTING CARBON FROM AIRCRAFT ON THE GROUND

Before taking off, and after landing, aircraft use fuel. Although these movements on the ground are a small percentage of the total flight emissions (6%), there are solutions to cutting these emissions which also offer air quality benefits at and around the airport.

Flights are described by airports as 'air traffic movements' (ATMs). Prior to take off, every ATM involves a sequence of events each of which can be made more efficient through the application of technology.

Plug-in electric power and pre-conditioned air

While the aircraft is on its stand it still needs power, and when passengers are boarding, pilots need to switch on air conditioning to cool or warm the aircraft. To provide power and air, it is traditionally necessary to switch on a small jet engine called the auxiliary power unit. Heathrow already offers plug-in electric power on all its stands and pre-conditioned air (PCA) on many stands, enabling pilots to switch engines on later. However, both PCA technology and airline usage of it can be improved.

Targets: During regulatory period H7 (see glossary) we will work with our airline customers to trial improvements to PCA and roll-out an agreed solution to stands where PCA is currently fitted. We will also agree how to monitor the limits we set for running engines on stand so we can measure the emissions savings delivered.

Investment: We have proposed to the CAA £52m investment in PCA in H7.

Taxiing

There are several solutions to cut carbon from taxiing, which is an aircraft journeying from its position following pushback to the end of the runway ready for take-off – reducing taxi time through optimising ground movements:

- Reducing the number of engines utilised in taxiing in turn reducing fuel burn ('reduced engine taxiing').
- Reducing the time spent queuing at the runway before take-off.
- Electric taxiing alternatives. Vehicle-assisted and on-aircraft solutions are emerging.

Targets: We will continue to roll out our ground efficiency programme to optimise ground movements. We will gather robust baseline data on how many aircraft are using reduced engine taxiing and identify an improvement target. We will seek to reduce departure taxi times through investments in enhanced departure management tools and techniques. We will monitor developments in electric taxiing and explore potential solutions at Heathrow.

Investment: We have proposed to the CAA £20m of investment in ground efficiency measures in H7.

⑦ Net zero goals in the air

GOAL 1: AIRSPACE AND OPERATIONAL EFFICIENCY

GOVERNMENT POLICY SUPPORT

We welcome the funding that the Government has provided to allow the UK airspace modernisation programme to continue through the pandemic. Ongoing political support will be vital to see the programme completed, both in UK and in the EU.

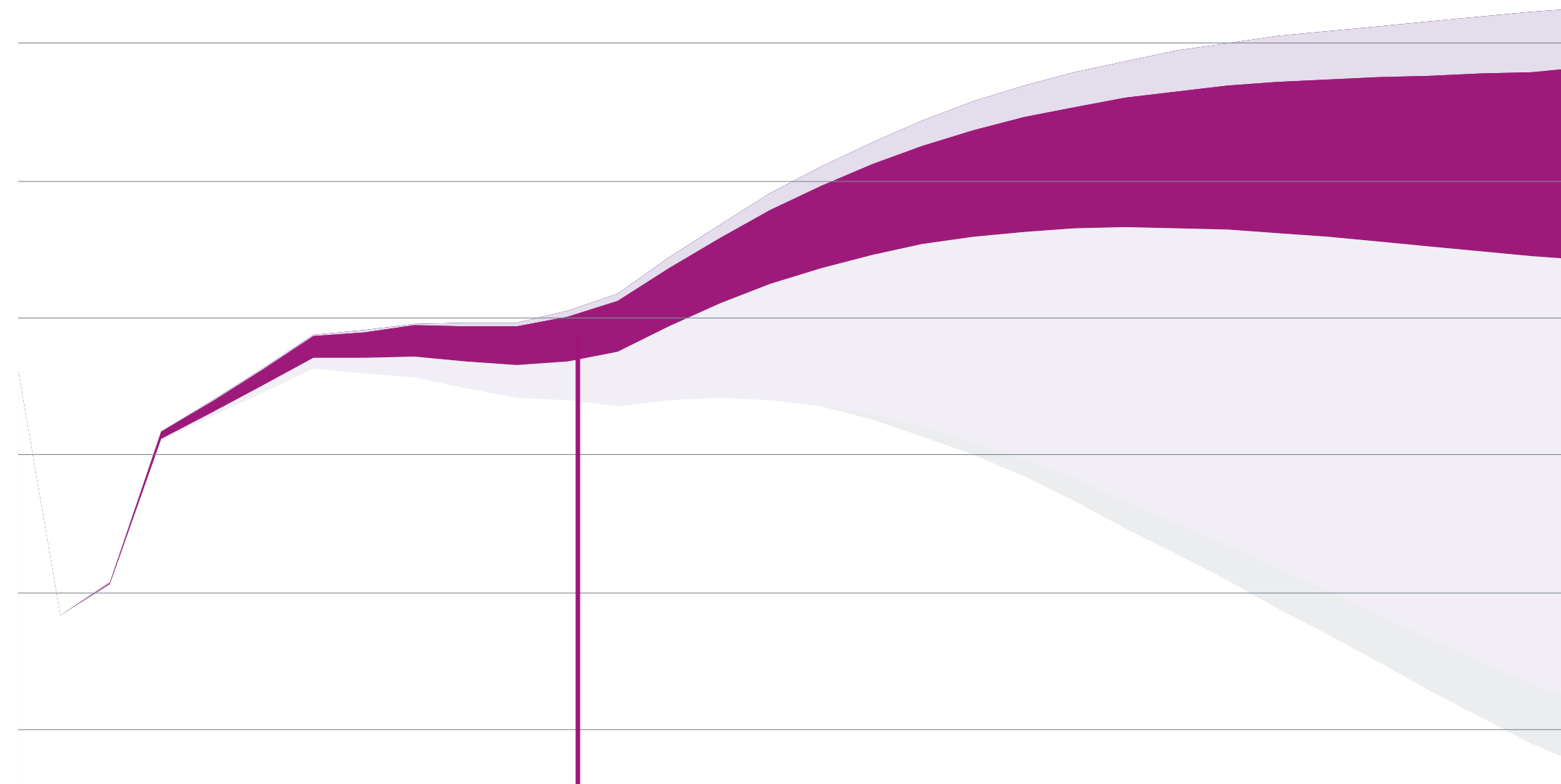


7 Net zero goals in the air

GOAL 2: NEW CONVENTIONAL AIRCRAFT



Another way to use less fuel is through the new, more modern and more efficient aircraft entering airline fleets. This will be delivered largely through aircraft and engine manufacturers continuing to design more efficient planes and through airlines continuing to buy them. Heathrow's role as an important hub means the airport tends to attract a greater proportion of newer aircraft than most other airports.



Contribution in the air by 2030:
Up to 8%, 1.6Mt

Contribution in the air by 2050:
24%, 7.0Mt



Heathrow has little influence over airline fleet selection, but does encourage the quietest and cleanest aircraft through landing charges

7 Net zero goals in the air

GOAL 2: NEW CONVENTIONAL AIRCRAFT

CUTTING CARBON THROUGH ONGOING ROLL-OUT OF A NEW AIRCRAFT FLEET

A commercial aircraft's typical service life is up to 25 years. New aircraft have historically achieved approximately a 1% fuel efficiency improvement every year through the use of lightweight composite materials, improvements in propulsion systems and other technology such as so-called "more electric" aircraft in which electrical power is used for most or all aircraft systems other than its turbines.

Industry projections show this trend continuing as airlines, aircraft designers and manufacturers have a strong incentive to continue to improve fuel efficiency, driven by customer expectations and the cost benefits of fuel reductions.

Consequently, each time an aircraft is retired and replaced, it delivers up to a 25% efficiency improvement².

Targets: 1.6 Mt by 2030

Landing charges

Through the charges airlines pay to use the airport, Heathrow incentivises the quietest aircraft and those with the lowest contribution to air pollution to come to Heathrow. These charges represent a little under 40% of the total airlines pay. These aircraft will generally also be the most fuel efficient.

Aircraft carbon standards

Similar to the energy rating consumers are familiar with in their homes, aircraft will in future be rated on the basis of their carbon emissions. The International Civil Aviation Organisation – the UN's aviation body – plans to deliver a Global Carbon Standard for all aircraft in 2028. After the introduction of this standard, it will become easier for airports and other bodies to incentivise the most carbon efficient fleet.

IN FOCUS

The focus on aircraft efficiency

Many of the latest conventional aircraft models are substantially more fuel efficient than their predecessors. Engine and aircraft design has been constantly developing to improve fuel consumption:

GOVERNMENT POLICY SUPPORT

The UK has the world's third largest aerospace sector. To maintain this huge competitive advantage, the Government should continue to fund aerospace R&D alongside the industry through the Aerospace Technology Institute (ATI). The Government has committed to extend funding for the ATI to 2031, which we welcome. With others in the sector we are calling for funding for the ATI to also be doubled to £300m p.a.

- **Reducing weight:** Use of composites in the aircraft body to reduce overall weight and optimising onboard systems to use fewer materials.
- **Reducing drag:** improving aerodynamics through aircraft design and coatings. For example, features on the ends of wings (called sharklets or winglets) are used to reduce drag and so reduce fuel burn.
- **Increasing engine efficiency:** new turbofans offer much lower fuel consumption than previous engines and have additional benefits in reducing noise.

² Aircraft Technology Roadmap to 2050, International Air Transport Association, 2019

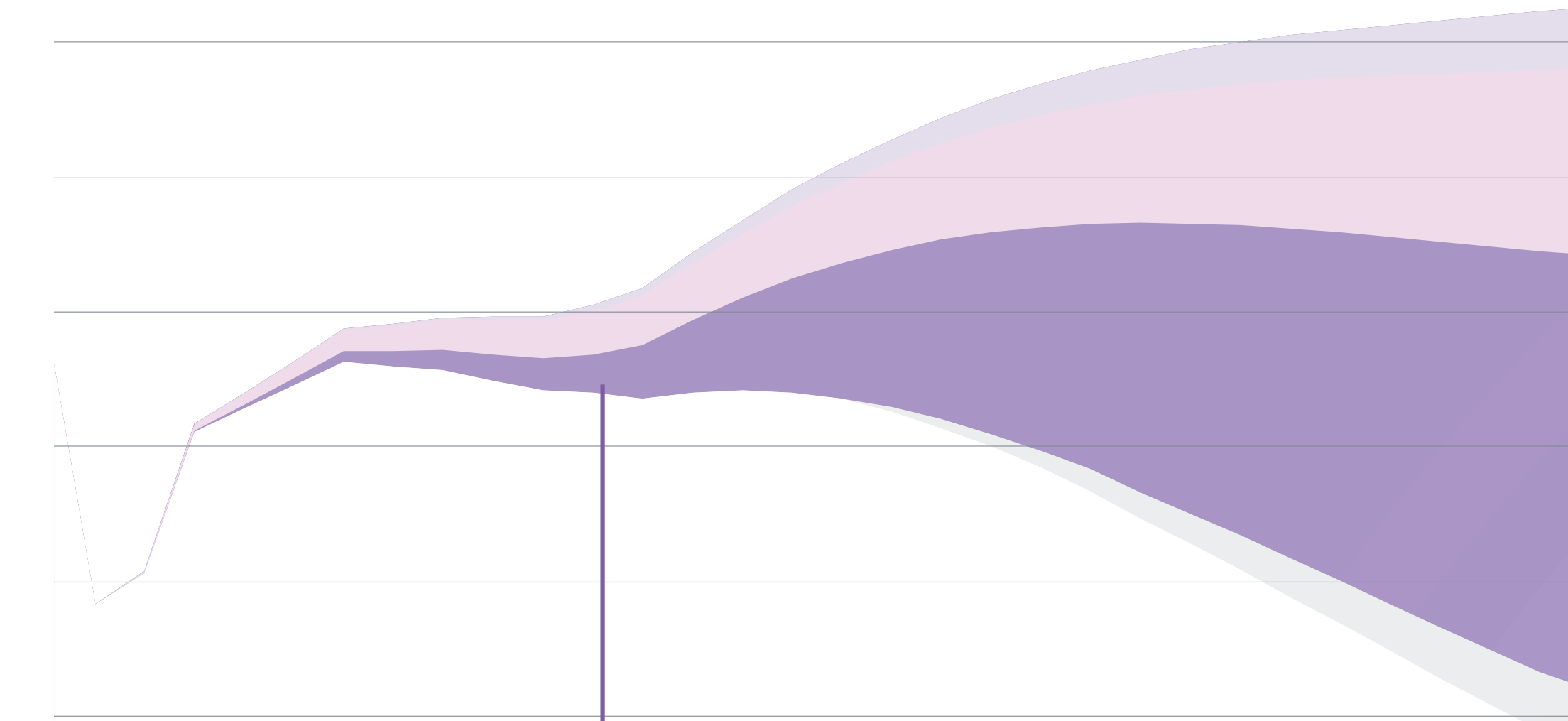
7 Net zero goals in the air

GOAL 3: CHANGE THE FUEL



Sustainable Aviation Fuel (SAF) is the most promising solution for net zero flying by 2050.

The technology is proven and can be blended with jet fuel so it can be “dropped in” to today’s aircraft and pipelines. This avoids waiting for the 25-year cycle of aircraft replacement, so meaningful change can come quicker. The faster SAF production is scaled up and the cost of SAF falls, the faster aviation can decarbonise. Government policy support for this is needed.



Contribution in the air by 2030:
Up to 7% (70% carbon lifecycle reduction on 11% of fuel), 1.4Mt

Contribution in the air by 2050:
51%, 16Mt



Heathrow has moderate influence through its advocacy work to promote SAF and initiatives to encourage its use at Heathrow and beyond

⑦ Net zero goals in the air

GOAL 3: CHANGE THE FUEL

INDUSTRY TAKING ACTION

Commitments to use SAF

A growing number of airlines are making commitments to purchasing SAF. Heathrow's biggest customer, IAG, wants at least 10% of its fuel to be SAF by 2030. The US airline industry has set a target for around 15% SAF by the same time, helped by strong US Government incentives. The Clean Skies for Tomorrow Coalition – a global group of airlines, manufacturers, airports fuel companies and users of air travel has backed an ambition of 10% SAF globally by 2030. By the end of 2021, airlines representing 66% of Heathrow's flights had made a commitment to use 10% or more of SAF by 2030.

Demonstrations of SAF use at Heathrow

In June 2021, SAF was delivered to Heathrow for the first time by fuel company Vitol. It was blended into the airport's main fuel supply and distributed through its fuel hydrant system. Consequently, SAF became a small percentage of the fuel supplied to aircraft right across the airport over a period of a few days. Since then, further deliveries have taken place in partnership between airlines and fuel companies, including during COP26 when all British Airways flights between Heathrow and Scottish airports were fuelled with a blend of SAF.

Research and development

There are already eight approved ways of making SAF including fuels derived from bio-wastes, such as from forestry and agriculture and recycled carbon fuels, such as those made from industrial waste gases. In future, fully synthetic fuels could even be produced at scale, made using carbon captured directly from the air, at which point the carbon footprint of SAF will shrink to almost zero.

At present, SAF is only certified for blends of up to 50% with conventional jet fuel, but during 2021 multiple test flights were undertaken using a 100% blend. Progress is rapid – Rolls Royce has confirmed that all of its Trent engines will be compatible using 100% SAF.

IN FOCUS

What are sustainable aviation fuels (SAF)?

SAF is a term used to describe aviation fuel not derived from fossil – either biofuels or fuels from other alternative sources. Heathrow advocates for SAF that does not compete with other land uses for its production.

Indeed, much of the SAF available today uses waste from agricultural, household, industrial, and forestry sources – and converts these wastes or by-products into fuel. These second generation fuels typically cut carbon by 70% or more and are required to meet strict sustainability standards. They avoid most of the issues with first generation biofuels, which in some cases can be linked to deforestation.

Currently at demonstration stage in The Netherlands, fully synthetic power-to-liquid fuels are particularly exciting. They can be made by combining renewably produced hydrogen with carbon captured directly from the air, at which point its carbon footprint will shrink to almost zero.

⑦ Net zero goals in the air

GOAL 3: CHANGE THE FUEL

HEATHROW TAKING ACTION

Although Heathrow is not in the value chain for SAF – we do not buy, use or supply SAF itself – there are three ways we can support this critical agenda:

Policy advocacy

The main barrier to SAF is economic not technological: it costs more than kerosene. This means that airlines struggle to sign agreements to purchase it, and investors are therefore hesitant to back new plants. Three key market signals from the UK Government can help kick-start the SAF market. The policies needed are similar around the world:

1. A mandate requiring fuel producers to make SAF.
2. A price support mechanism to make SAF an affordable alternative for airlines.
3. Capital funding / loan guarantees for first of type plants.

As the market scales up, the costs of production will fall and SAF will become more competitive with kerosene.

In the UK, we work with aviation partners to advocate these policies at all levels of government. SAF is a priority focus for the Jet Zero Council – a group of industry leaders chaired by the Government Secretaries of State for transport and business and charged with driving the right policy and business action. Heathrow's CEO, John Holland-Kaye, is a member of the Council, and our COO, Emma Gilthorpe, has been appointed to lead the Council.

Globally, we are active members of the World Economic Forum's Clean Skies for Tomorrow Coalition. The coalition has advocated at least 10% SAF globally by 2030 and, with five states from Europe, the Middle East, Asia and North America, has published a toolkit of the policies need to scale SAF.

Landing charges

From 2022, our landing charges will include a new financial incentive for airlines to help make SAF more affordable for airlines. The incentive will support 0.5% SAF purchase in its first year, climbing steadily in the following years. It is intended to complement a new Jet Zero policy the UK Government is planning to introduce.

Targets: Introduce an incentive in our landing charges in 2022 for 0.5% SAF at Heathrow, contributing 0.35% carbon reduction this year.

Offering passengers the opportunity to buy SAF

Through our offsetting partner CHOOOSE, we are offering companies and passengers the chance to buy SAF. As an alternative to the forestry projects offered on the platform, customers can select to offset their flights by paying for SAF which is used on existing scheduled flights. Once the transaction has occurred no other claim can be made for the carbon saved, helping to further stimulate SAF production.

GOVERNMENT POLICY

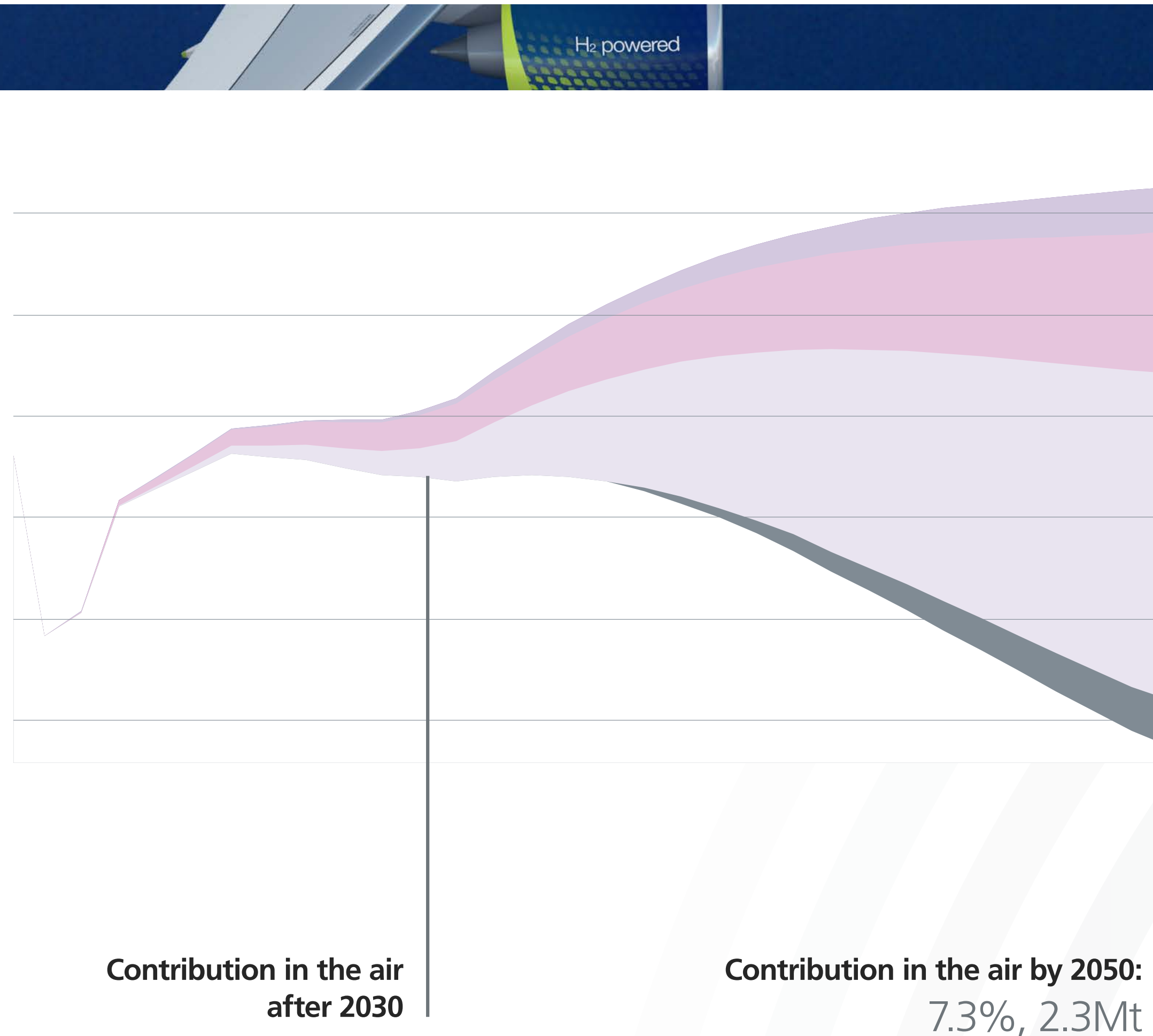
Hitting our target for 11% SAF at Heathrow by 2030 is largely reliant on the UK Government introducing the right policies – and quickly. To see the first dedicated SAF plants opening by 2025, the mandate and price supported policies will need to be legislated by the end of 2022. The Government's ambition for 10% SAF by 2030 is strong – the policies to translate the ambition to action are now needed.

7 Net zero goals in the air

GOAL 4: CHANGE THE PLANE



New aircraft powered using hydrogen – either to power a fuel cell or be burnt directly in turbines – could play an important role in getting to net zero. By 2050, they are likely still to be a solution primarily for shorter journeys – representing perhaps 30% of global carbon from flying. So, a laser focus on drop-in SAF for conventional planes is needed as the solution for the 70% of aviation’s carbon. But we also need to make sure we are not a blocker to the introduction of zero-carbon aircraft which could ramp up from the mid-2030s. We need to understand the operational requirements and get our infrastructure ready to support them.



Heathrow has some influence: airports will play an important role in providing the infrastructure to support zero carbon aircraft technology

⑦ Net zero goals in the air

GOAL 4: CHANGE THE PLANE

CASE STUDY

Project NAPKIN is a Heathrow-led collaborative project funded by Innovate UK's Future Flight programme to research what is needed to introduce zero carbon aircraft and the conditions necessary to enable them. The project will help ensure Heathrow infrastructure is ready for its introduction and ensures we are supporting an understanding of the regulatory, infrastructure and operational requirements of these aircraft. The project will publish its final report in spring 2022.



**Liquid hydrogen fuel cell
commuter-class aircraft concept**

Image supplied by GKN Aerospace

RESEARCH AND INNOVATION

In 2020, Heathrow led a consortium of aerospace companies, airlines, airports and academics that successfully bid for funding from Innovate UK's Future Flight programme to research what is needed to introduce zero carbon aircraft. Early findings from Project NAPKIN suggest that Heathrow will need to be ready to support these aircraft by the end of this decade.

Heathrow's main focus is understanding the operational and infrastructure requirements for zero carbon – most likely hydrogen powered flights – to operate so that we can build these into our long-term plans for the airport. Beyond the airport, the project will identify other requirements – what will work commercially for airlines, for example, or what regulatory requirements there may be.

Heathrow also partnered with the EVE consortium which worked with the Civil Aviation Authority to identify regulatory challenges for future air mobility. It created an early picture of potential concepts of operations, for further development.

There is a wide range of other research, innovation and demonstration projects taking place globally and in the UK. A major research programme by the Aerospace Technology Institute called Fly Zero will also report in spring 2022 setting out how the UK can accelerate zero carbon aircraft. That report will shape the future work of the Jet Zero Council, where zero carbon aircraft technology is the other priority focus alongside SAF.

Targets: By end 2022 confirm our planning assumption for zero carbon aircraft entry into service at Heathrow and likely infrastructure requirements.

Investment: We have proposed to the CAA up to £5m in H7 for infrastructure enabling works to support the first hydrogen-powered flights around the end of the decade.

⑦ Net zero goals in the air

GOAL 4: CHANGE THE PLANE

ESTABLISHING INCENTIVES

In 2018, Heathrow announced that we would waive landing charges for a year for the first regular commercial flight operated by a zero emissions aircraft, a prize worth up to £1 million.

GOVERNMENT POLICY

The aviation sector has called for a doubling of funding for the Aerospace Technology Institute, from around £150m to £300m per year. That should include continued funding of the Fly Zero programme beyond 2022 to help establish a leading UK position in new zero carbon aircraft technology.

The Government and the CAA also need to move quickly to establish the regulatory framework for hydrogen fuels and novel forms of propulsion.

Hydrogen, electric and hybrid powered flight will also rely on a significant increase in the provision of renewable electrical power. Hydrogen will also require the development of a hydrogen economy – requiring policy at an industrial strategy level.

Further policy measures such as tax incentives for operating zero carbon emissions flights may eventually be required to support and accelerate their roll-out. This is a question being posed as part of Project NAPKIN, reporting in spring 2022, and will require further analysis as these aircraft get closer to market.



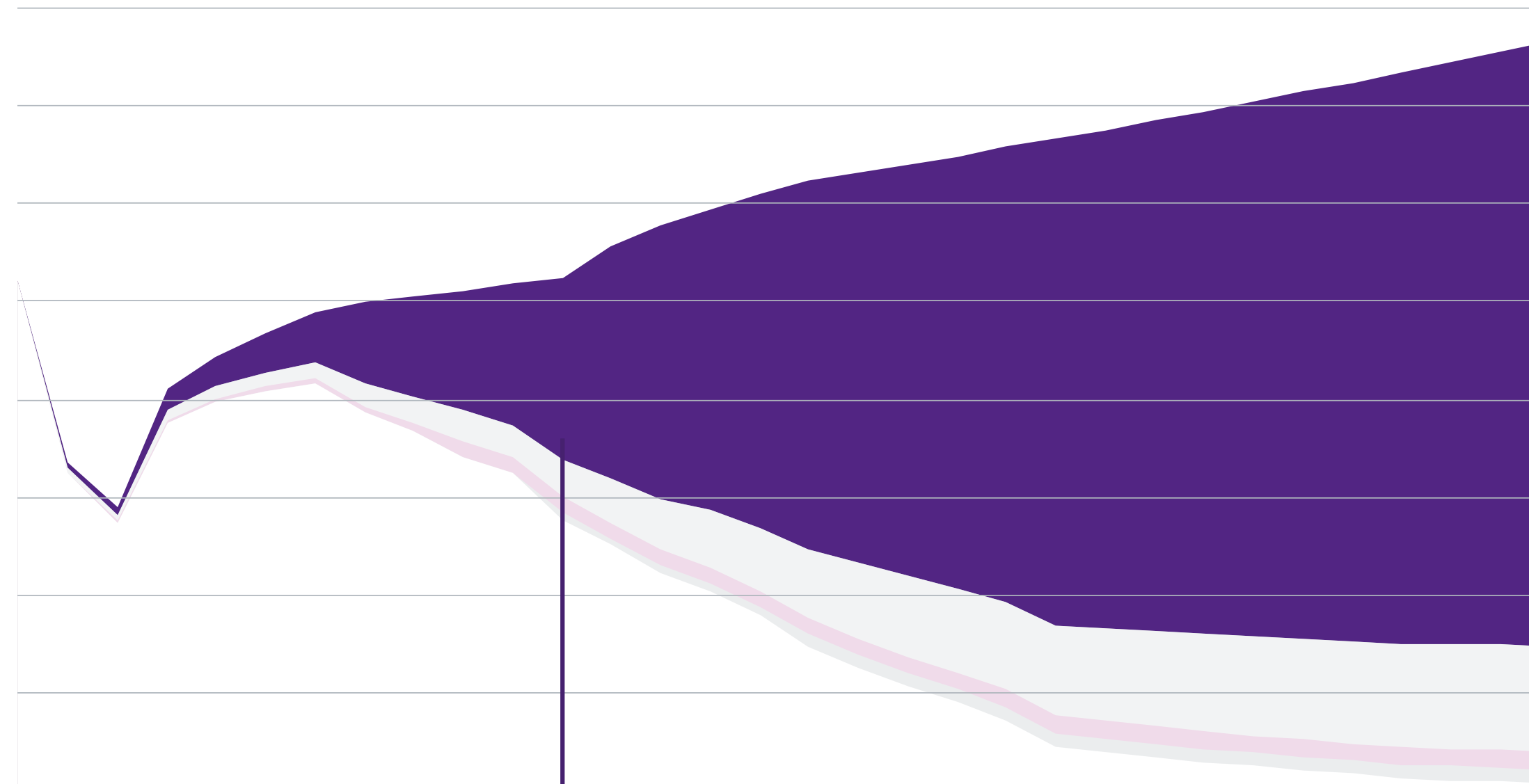
⑧ Net zero goals on the ground

GOAL 5: NET ZERO SURFACE ACCESS



Heathrow has a long track-record promoting public transport and active travel as an alternative to using cars to get to the airport.

We have invested in rail connections like the Heathrow Express and Elizabeth Line and supported long-distance coach links as well as subsidising public transport for colleagues. We will continue to encourage more of our passengers and colleagues to use public transport or active travel to get to and from Heathrow, helping to provide the right connections and to make them faster, easier, more reliable and more affordable. Where people do travel by car, we will promote efficient journeys and provide the right infrastructure and services to support zero emission vehicles.



Contribution on the ground 2030:
49% cut in surface access emissions

Contribution on the ground 2050:
The complete decarbonisation of surface access emissions



Heathrow has a good degree of influence as a major stakeholder in public transport infrastructure at Heathrow and local travel initiatives

The figures for 'on the ground' goals represent reductions relative to a 2019 baseline year

⑧ Net zero goals on the ground

GOAL 5: NET ZERO SURFACE ACCESS

REDUCE THE NUMBER OF VEHICLES COMING TO HEATHROW

We will shortly be publishing an updated surface access strategy. It includes two main goals to be achieved by 2026, the end of our next regulatory period.

- For 45% of passengers to use public transport to access Heathrow. In 2019 the figure was 40%. That fell during the pandemic to as low as 18% as people were concerned about sharing transport but is rising again. By the end of 2021 it has recovered to 36.8%.
- For no more than 57% of colleagues at Heathrow to be travelling on their own in a car (in 2017 this was 62%).

We will continue to work to improve public transport connectivity. The full opening of the Elizabeth Line in 2022/2023 will make a real difference, providing direct train services to Heathrow from central London, the City, the Docklands financial district and beyond.

In 2022 we will also launch a new Sustainable Travel Zone, improving active travel and public transport connectivity and introducing financial support on key commuting routes for colleagues. We will also improve the provision of travel information and ticketing products.

30% of Heathrow colleagues live within 10 kilometres of the airport, a good distance for cycling, so we will also invest in improvements to cycle lanes to encourage people to commute by bike.

Targets: By 2026, 45% of passengers to use public transport and no more than 57% of colleagues to travel in single occupancy cars.

Investment: We have proposed to the CAA £13m in the next regulatory period in improvements in active travel and public transport, including cycle improvements and wayfinding for the Elizabeth Line. This is in addition to significant operating expenditure by Heathrow to improve public transport and make other sustainable travel improvements, including just under £5m during 2022.

⑧ Net zero goals on the ground

GOAL 5: NET ZERO SURFACE ACCESS

DECARBONISE ALL VEHICLES COMING TO HEATHROW

The Government has announced that, from 2030, no new petrol or diesel cars can be sold. A major shift to electric vehicles (EVs) is already underway: in 2021, more EVs were sold than in the previous five years combined, and Tesla's model 3 was the second best-selling new car of any type – fossil fuelled or electric. The shift to zero emissions vehicles (ZEVs) will make the single biggest contribution to cutting carbon from surface access.

We want to play our role in helping to enable that shift, by making sure the right infrastructure is available at Heathrow. It is not just about charging – some larger vehicles are likely to switch to hydrogen.

There are many different users of zero emissions vehicles from passengers and colleagues to black cabs and private hire to buses and coaches to freight and logistics companies. Each of these will have different needs as they shift to ZEVs. In some cases, it may make sense for Heathrow to invest direct in providing the right infrastructure, but more likely we will be partnering with commercial providers who are better placed than us to provide the right services to customers.

Targets: By mid 2022 we will finalise our five-year plan for provision of EV charging.

Investment: In the business plan we have submitted to the CAA, we have proposed £37m investment during the next regulatory period in EV charging.

GOVERNMENT POLICY

As Heathrow's second largest catchment area, the West of England is currently underserved by direct transport links. A Western Rail link was being progressed by the Department for Transport and Network Rail, but the impact of Covid-19, the pause on expansion and a change in Government priorities means Government funding is now uncertain. The project remains justifiable based on a two-runway airport. We will continue to work with Government and other stakeholders to progress it. A new Southern Rail link is also required to provide a fast, easy and reliable public transport option from the south. Government needs to set out a way forward for this project including a combination of public and private investment. Additionally, a connection between Heathrow and HS2 at Old Oak Common is necessary to establish greater direct connectivity with the Midlands and north of England.

The Government is already playing a strong role in enabling this goal. Having banned internal combustion engine vehicle sales from 2030 and hybrids from 2035, the shift to ZEVs over the next decade is accelerating.

Continued supportive Government strategy and investment is vital – in charging infrastructure and research support for battery technology developments, to increase range and decrease charging time.

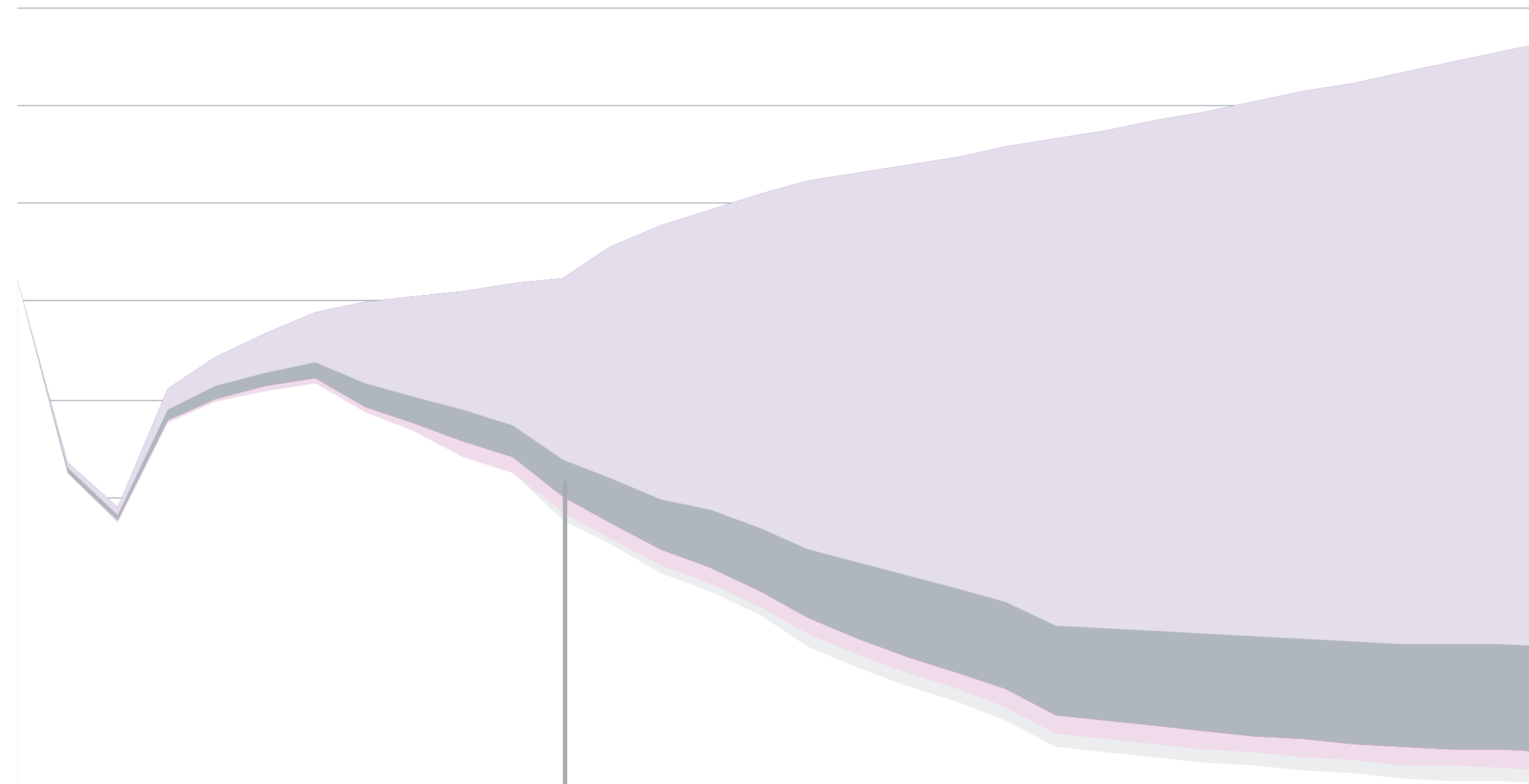
As the national grid continues to decarbonise, so ZEV and rail emission reductions will continue to fall towards zero by 2050.

⑧ Net zero goals on the ground

GOAL 6: SUPPLY CHAIN



As a large buyer of goods and services, Heathrow can have a significant impact delivering carbon reduction in our supply chain. Construction is the biggest source of carbon in our supply chain – representing 70% of emissions in 2019. We will engage with our supply chain to set and deliver net zero targets and will focus on developing alternatives to high-carbon materials like concrete.



Contribution on the ground 2030:
35% cut in emissions from supply chain

Contribution on the ground 2050:
96% cut in emissions from supply chain



Heathrow has a strong role in influencing the net zero outcomes in its supply chain, working in partnership with supplier organisations

⑧ Net zero goals on the ground

GOAL 6: SUPPLY CHAIN

SUPPLIER ENGAGEMENT

Work with our suppliers to set net zero targets

Our suppliers are actively engaged in cutting carbon, with 70% of our strategic suppliers already having set their own net zero targets. Contractual supplier obligations will cut carbon from the goods and services provided to Heathrow in line with our targets and we will continue to partner with companies that share our climate ambitions.

Through our balanced scorecard approach we proactively seek to collaborate with suppliers sharing new ideas, experience and solutions to carbon reduction so that they can make a positive difference at Heathrow.

Targets: 70% of carbon emissions in our supply chain aligned with Heathrow carbon targets by the end of 2026.

CASE STUDY

Low carbon concrete

Airports require a large amount of concrete to build and maintain vital infrastructure – from runways and tunnels to kerbs and paving.

The most carbon intensive element of concrete is the production of cement, so we are examining innovative cement replacement materials that can cut the carbon footprint of concrete mixes. Many current cement replacements are by-products from other carbon intensive industries which may become less available as we transition to a net zero economy.

Partnering with the University of Surrey and Jacobs, we are casting the net wide, researching various options that will play a role in the transition to sustainable construction. We are carrying out testing on the airport as a step towards the introduction of innovative alternatives.

SUPPLIER SELECTION AND REWARDING NET ZERO INNOVATION

Heathrow has implemented a Responsible Procurement Policy and we continue to incentivise and recognise action through our supplier awards.

We encourage carbon innovation, including embedding circular economy principles into projects and minimising our use of virgin materials. Additionally, the use of hydrogen and alternative fuels for hard to convert vehicles and applications, such as generators in construction compounds, aligns with the wider requirements across the plan.

Over our next five-year regulatory period, H7, we will select new construction suppliers with carbon as a key consideration in supplier selection. This ensures we are working with companies able to deliver our supply chain goals.

⑧ Net zero goals on the ground

GOAL 6: SUPPLY CHAIN

ACCOUNTING FOR EMISSIONS FROM WATER

Heathrow can make some carbon emissions savings by continuing to find new ways to use resources more efficiently. That means using potable water more efficiently and minimising waste, including by following circular economy principles which aim to keep materials in use for as long as possible. We will work with our whole supply chain to cut emissions from our use of resources as part of delivering our net zero supply chain goal.

GOVERNMENT POLICY

The Government will continue to apply carbon budgets through the UK Climate Change Act, driving decarbonisation across all sectors. Heathrow will continue to advocate for appropriate supply chain decarbonisation policies to enable net zero procurement despite growth at the airport.

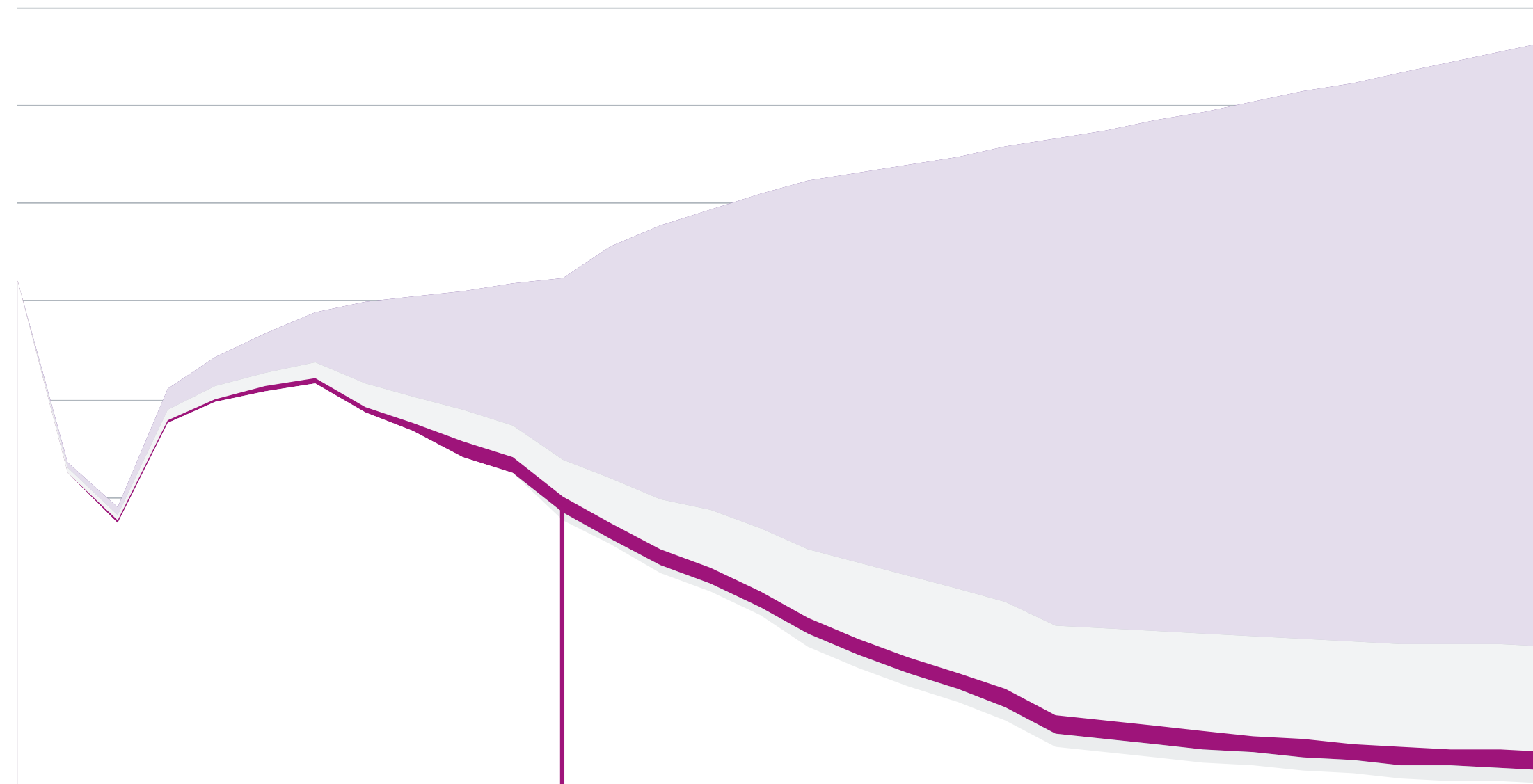


8 Net zero goals on the ground

GOAL 7: AIRPORT VEHICLES



Up to 8000 vehicles have licences to operate airside at Heathrow. Around 300 of these are owned by Heathrow – including our snow-clearing fleet. The rest are operated by airlines, ground-handlers and other companies. We have already announced plans for an ultra-low emissions zone for airside vehicles from 2025. Our goal by 2030 is for all vehicles airside to be zero emission. Some of the more specialist vehicles may not have alternatives available by then. For them, we will promote biodiesel as an interim measure.



Contribution on the ground 2030:
87% cut in emissions from airport vehicles



Heathrow has a key role in decarbonising airport vehicles by providing the infrastructure and incentives necessary to enable the switch to ZEVs

⑧ Net zero goals on the ground

GOAL 7: AIRPORT VEHICLES

MAKING JOURNEYS AND VEHICLES MORE EFFICIENT

Our starting point is efficiency. This can be achieved by minimising vehicle journeys and improving routing as well as proactive maintenance and good eco-driving behaviours.

Using telematics to enable efficient routes and driving behaviour

The majority of vehicles at Heathrow are now fitted with telematics which let us track vehicle usage and make improvements.

ENABLING AND ACCELERATING THE TRANSITION TO A FULLY ZEV FLEET

The shift away from the internal combustion engine to zero emissions vehicles (ZEVs) is an exciting and crucial step to decarbonising the UK and Heathrow and we are seeing real momentum. Heathrow remains in the vanguard of this change for its own fleet.

Transitioning the Heathrow fleet and supporting Team Heathrow

27% of Heathrow Airport's own fleet of around 200 vehicles is now electric, with a further 20% Hybrid. In 2022, we will begin to transition the buses that connect our terminals and colleague car parks to electric too.

The Team Heathrow companies that operate the other vehicles at the airport are also investing in electric vehicles. 15% of the total Team Heathrow airside vehicle fleet is already electric. During this decade all vehicle types will need to transition to ZEV. To further support the shift, we have made the case to the CAA, our economic regulator, for restructuring the way we charge for electricity so that the cost users pay is lower. This will help to further incentivise the switch to ZEVs alongside continued roll-out of charging infrastructure.

We are likely to need to upgrade parts of the electricity distribution network around the airport to make sure we can provide charging where it is needed.

Targets: By mid 2022 we will work with Team Heathrow companies to confirm where charging infrastructure is needed during H7.

Investment: In H7 we have proposed to the CAA £37m of investment in EV charging across Heathrow.

Setting standards

We are also placing higher expectations on airport business users, incentivising the modernisation of fleets through our Operational Safety Instructions and initiatives such as our airside ultra-low emission zone which come into effect in 2025.

Pushback tugs

In 2017, IAG Cargo introduced the first electric pushback tug – a vehicle which pushes aircraft from their stand. BA now uses the Mototok electric push-back tug for all of its short-haul flights at Heathrow. This has also reduced pushback delays by over 50%, helping to further cut aircraft engine running times. This equipment is not operated by Heathrow itself – our role is to ensure the electrical supply is available to support these innovations. Other ground handlers have also begun to introduce this technology.

⑧ Net zero goals on the ground

GOAL 7: AIRPORT VEHICLES

INCREASE THE BIOFUEL BLEND IN THE AIRPORT FUEL SUPPLY

For those vehicles not yet converted to ZEV, we are able to cut carbon emissions by increasing the percentage blend of biofuel (hydrotreated vegetable oil, commonly referred to simply as HVO) in the airport vehicle fuel supply. From 2022, we are aiming to replace all Heathrow's remaining diesel fuel requirements with HVO while also making the same alternative fuel offering available for companies operating at Heathrow.

Targets: Biofuel (HVO) to be used by all Heathrow Airport Ltd vehicles and offered to Team Heathrow from April 2022 as a back-up where other ZEV options are not yet in place.

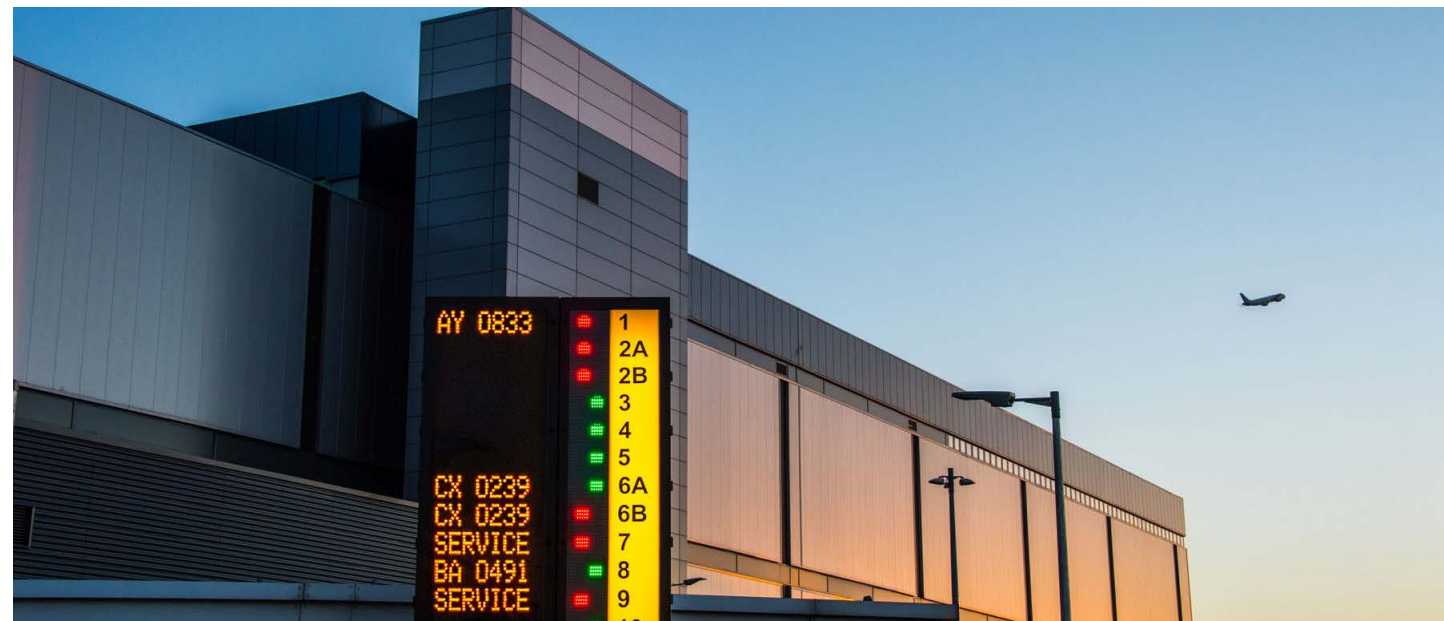
GOVERNMENT POLICY

The Government ban by 2030 on sales of cars and light duty vehicles with internal combustion engines is significant. We expect to see the same transition for airport vehicles as we are seeing for surface access, with more ZEV choices available and the costs falling.

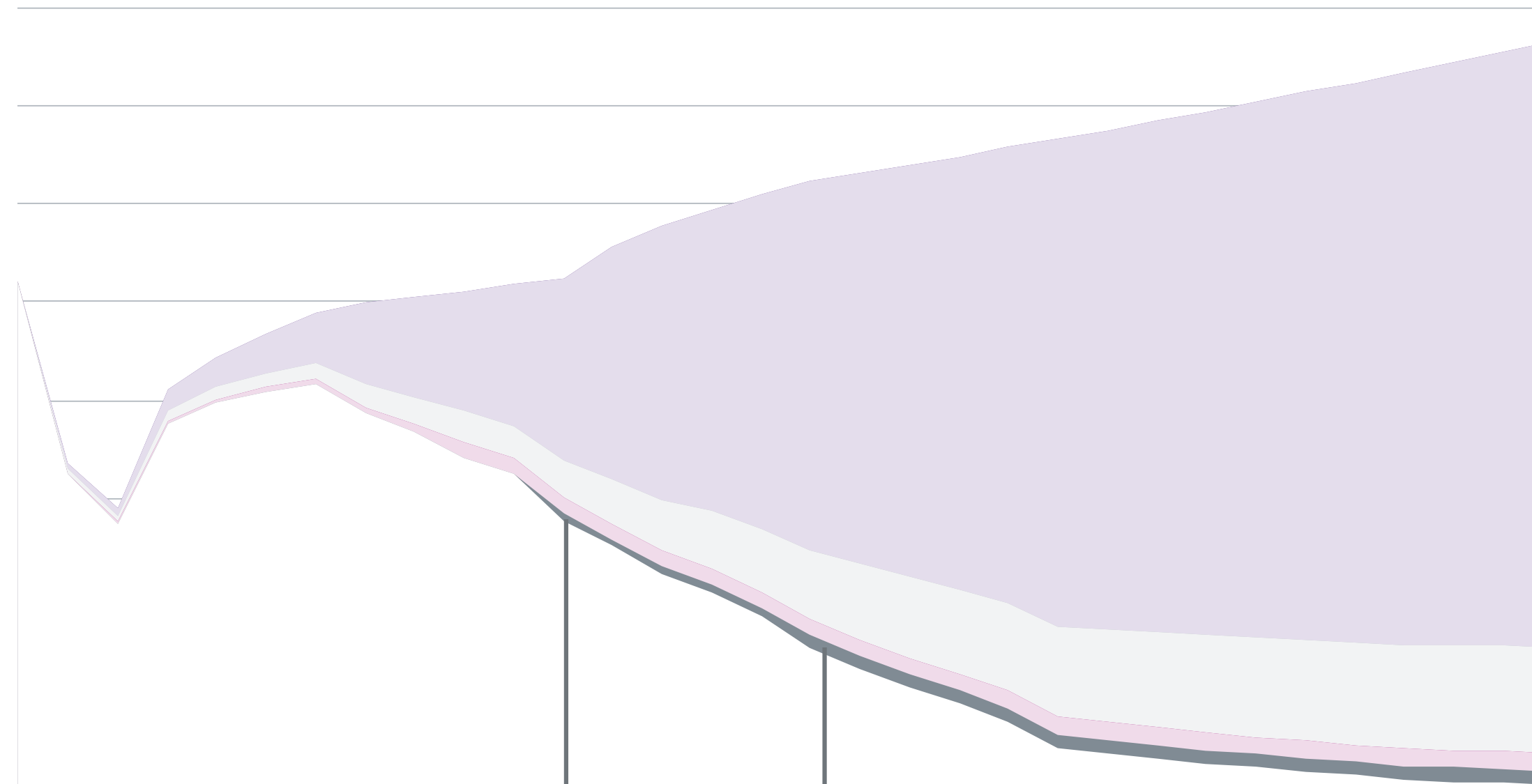


⑧ Net zero goals on the ground

GOAL 8: BUILDINGS AND INFRASTRUCTURE



The biggest source of carbon that we directly control is the gas we burn to heat Heathrow's buildings. Our proposed solution is based on electrification of space and hot water heating with recovery of surplus heat in summer and storage for use in winter months. This will be a major investment and a complex project which will take us ten to 15 years to complete: we are targeting net zero carbon buildings by the mid 2030s. To hit our goal, we will also need alternatives to the refrigerants used in our air-conditioning and Government regulation will be important here.



Contribution on the ground 2030:
39% cut in emissions from buildings and infrastructure

net zero by the mid 2030s



Heathrow is entirely responsible for its own buildings and infrastructure

⑧ Net zero goals on the ground

GOAL 8: BUILDINGS AND INFRASTRUCTURE

UPGRADING OUR ELECTRICAL NETWORK TO ENABLE MANY OF THE SOLUTIONS IN THIS PLAN

By delivering efficiencies, switching off gas and seeking alternative solutions we can make the greatest carbon savings. Underpinning most of the solutions is a switch to renewable electricity – on which there are growing demands. As we switch to renewable electricity, our airport distribution network will need to evolve to meet the demand and distribute power to where it is needed to charge vehicles and deliver heat and support the needs of the airport.

Therefore, a key aspect of our plan is to upgrade the electrical distribution network which underpins the solutions we need.

Targets: Detailed scheme design complete for decarbonising heating supply and upgrading our electrical distribution network by 2026.

Investment: We have proposed to the CAA £23m to design network upgrades and a heat solution and begin to implement these. Further investment is planned subsequently to complete these upgrades and implement the chosen heat solution.

Solar power

We will also be progressing viable local opportunities to build new solar photovoltaic (PV) generation capacity. We have installed solar PV on the roof of Terminal 2 and we are exploring more extensive locations around the perimeter of the airport.



⑧ Net zero goals on the ground

GOAL 8: BUILDINGS AND INFRASTRUCTURE

INTRODUCING NEW SOLUTIONS

We are building carbon into asset strategies to deliver our carbon goals and we will make the case for investment in our asset base to cut carbon, taking us further into exciting areas of innovation.

The following solutions will be considered as part of Heathrow's ongoing asset replacement cycle. We will look at low carbon or renewable alternatives wherever possible.

Refrigeration (F-gases)

We are tracking ultra-low global warming potential F-gases with similar properties to current products in order to make the changes as solutions become available. We will select the lowest global warming potential gases available at the time of replacement within the constraints of current asset standards and local conditions.

Fire training

Albeit a small contribution to our carbon footprint, the opportunity exists to switch to renewable fuels for fire training – a shift which if adopted more widely, will contribute to cutting fire service emissions nationally.

Stand-by power generation

Stand-by generators currently operate using diesel as they need an independent power source to maintain resilient operations. They are used predominantly as back-up power for airfield ground lighting. We are investigating renewable-based alternatives that can still meet the stringent performance criteria for such a safety critical airport asset.

GOVERNMENT POLICY

Like all sectors, decarbonisation in the built environment is being driving by Government policy and tied to the UK Climate Change Act, which must deliver net zero by 2050. Important areas Heathrow is tracking include refrigerant regulations and continued strengthening of wider standards.

⑨ Removing carbon from the atmosphere

Even with strong action now, it will take time to fully scale up SAF and introduce zero carbon aircraft. So, paying for emissions cuts out of sector will be an important part of aviation's transition to net zero.

Paying for emissions cuts of our sector like this is known as carbon trading or carbon offsetting. It typically falls into three categories:

- Funding projects that **avoid** emissions being caused in the first place – such as avoided deforestation.
- **Reducing emissions** – such as by replacing a carbon emitting activity with one that does not.
- Directly **removing** emissions from the atmosphere, achieved either through nature-based projects or engineered removals which involve technology to take carbon out of the air.

To be sure of having a genuine impact, projects must be additional to what would have happened anyway, for which reason there are standards to govern them, and these continue to develop.

Carbon trading

Flying in Europe has been part of the EU's Emissions Trading System since 2012. Since Brexit, the UK has established a similar UK trading system. Under this system, the Government sets an overall cap on the total carbon that can be produced by companies in the scheme – as well as airlines this includes many other industries representing about half of the continent's emissions. Companies can then trade emissions within the cap: so an airline may find it cheaper to pay for a renewable energy project in another part of the economy rather than invest immediately in a new aircraft. That is fine – our collective is to get carbon out of the system in the quickest and cheapest way and this kind of system helps do that. Since 2012, airlines have offset approximately 17 million tonnes of carbon this way. Heathrow was one of the first companies in the sector to publicly back this idea.

The UN has set up a global scheme for aviation called CORSIA – the Carbon Offset and Reduction Scheme for International Aviation. In its first phase it offsets the growth in global aviation emissions from 2020.

Sustainable Aviation calculates that, in addition to cuts in-sector, net emissions from UK flying fall by a further 27% by 2050 as a result of these schemes.

⑨ Removing carbon from the atmosphere

Carbon removals

Both the EU ETS and CORSIA invest in avoiding and reducing emissions. In the years ahead, as the whole global economy makes the deep cuts needed to reach net zero, these kinds of reductions will become scarcer and more expensive. Over time, aviation will need to start investing in removals (or 'negative emissions').

Nature-based removals (like tree planting and restoring peatlands) deliver the benefit of also tackling the nature emergency (the rapid loss of biodiversity globally) and are relatively low cost. Engineered removals have the benefit of providing potentially 'long-lived' storage, measured in centuries rather than decades, but are currently costly.

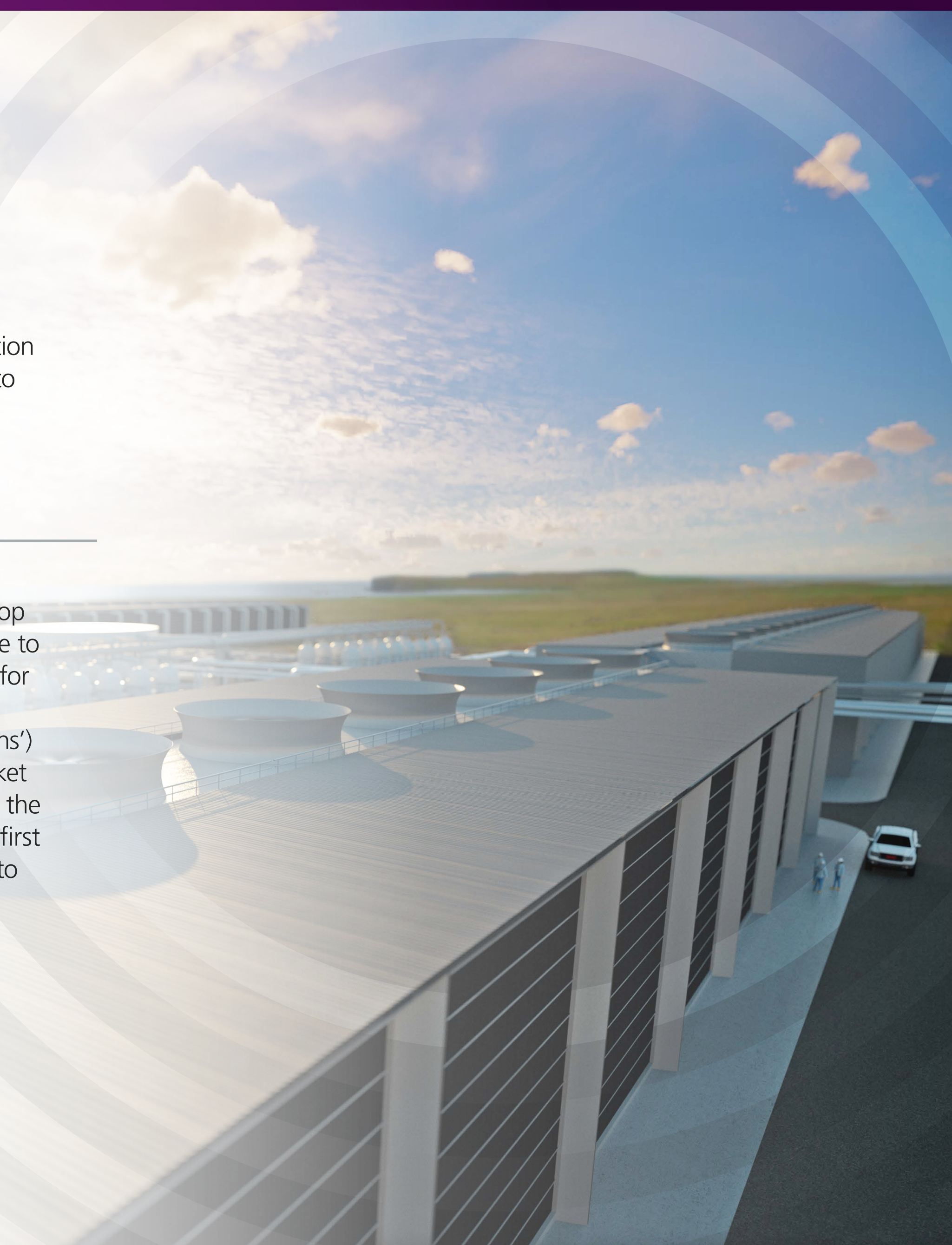
Heathrow is taking action

Since 2017, Heathrow has aimed to play a pathfinder role. We co-funded a peatland restoration project near Manchester with partners to learn more about the potential carbon benefits it can bring and to help develop clear measurement and verification standards that can be applied in other projects. Since then, Heathrow has invested in woodland creation projects in areas of Wales and Scotland under the Woodland Carbon Code, and provided funding to a further peatland restoration project in Wales, and an innovative farmland soil carbon pilot near Dundee.

In 2021, we became a founding member of the Coalition for Negative Emissions which brings sectors together to advocate for a joined-up approach to carbon removal and the right policy support.

GOVERNMENT POLICY SUPPORT

To reach net zero, the Government needs to drive decarbonisation of the economy and in tandem develop a market in carbon removals. There is not enough time to do one after the other. The Government should push for carbon removals to be included in state carbon plans around the world ('Nationally Determined Contributions') and should support the establishment of a viable market through capital support for first-of-a-kind projects. As the world's governments review CORSIA at the end of its first phase (2035), it should be enhanced as a mechanism to deliver net zero in aviation.



10 Galvanising action

Achieving these goals will rely on the right policies by Government, particularly to scale SAF, along with ongoing R&D investment by Government and industry, investment by airlines in new technology, and action and investment by Heathrow.

Heathrow can play an important role, using its scale and influence to advocate change in the UK and globally to take the carbon out of flying. In the UK, we were instrumental in the aviation sector's world-leading commitment to net zero and called for the Jet Zero Council to be established, which Heathrow's Chief Operating Officer now leads.

Globally, we play a leading role in the Clean Skies Coalition and the Sustainable Markets Initiative which are calling for a net zero deal at ICAO's 2022 Assembly. Where we can take action on flight emissions ourselves, we will. We are planning to invest around £70m in airspace modernisation by 2030 and have introduced a SAF incentive in our landing charges from 2022.

As demand recovers from the pandemic, the need for additional capacity at Heathrow in future remains. With the right policy action by the Government, particularly to scale up SAF – allied to a supportive stance from the CAA – growth is compatible with the UK's net zero target.



10 Galvanising action

PRIORITIES FOR GOVERNMENT AND INDUSTRY ACTION

Airspace modernisation (part of Goal 1)

The UK Government should continue to champion airspace modernisation in the UK and work with global partners to make changes globally. This will ensure the carbon reduction potential is realised in tandem with delivery of airspace change at Heathrow to be implemented by 2030.

New conventional aircraft (Goal 2)

Airlines continue to modernise fleets for which there is already a clear business case. Government can help through continued support for Aerospace Technology Institute investment in research and innovation.

Change the fuel (Goal 3)

The Government can help accelerate the production and use of sustainable aviation fuel (SAF) through the implementation of two policies: a mandate on SAF production for fuel companies; and a price support mechanism, such as a Contract for Difference that helps further close the price gap to fossil kerosene.

Change the plane (Goal 4)

The introduction of zero carbon aircraft relies on continued innovation, supported by Government funding to de-risk projects. Government can also carefully consider how to support aviation and enable the sector's adoption of hydrogen technology as part of the UK Hydrogen Strategy.

Surface access (Goal 5)

Continued Government support for new rail delivery will be essential. At Heathrow, this will enable Western Rail and an Old Oak Common interchange with High Speed 2. A new Southern Rail link is also required to provide a fast, easy and reliable public transport option from the south.

Supply chain (Goal 6)

Successful delivery of the UK's sixth carbon budget will enable Heathrow's highest emitting carbon suppliers to decarbonise – particularly the construction industry which is making good progress based on strong industry commitments.

Airport vehicles (Goal 7)

The Government's policy preventing sales of the internal combustion engine from 2030, and hybrids from 2035, provides the perfect platform for the shift to zero emissions vehicles. Further policy and industry innovation is required to ensure the supporting infrastructure exists and solutions are developed for hard-to-convert vehicles.

Buildings and infrastructure (Goal 8)

The continued decarbonisation of the UK's energy grid allied to the progressive electrification of Heathrow underpins decarbonisation of buildings and infrastructure, with Heathrow's supply chain playing a key role, and potentially also hydrogen and biomass in instances where gas remains essential.

11 Further reading and resources

Heathrow 2.0

Read our latest Sustainability Strategy in full.



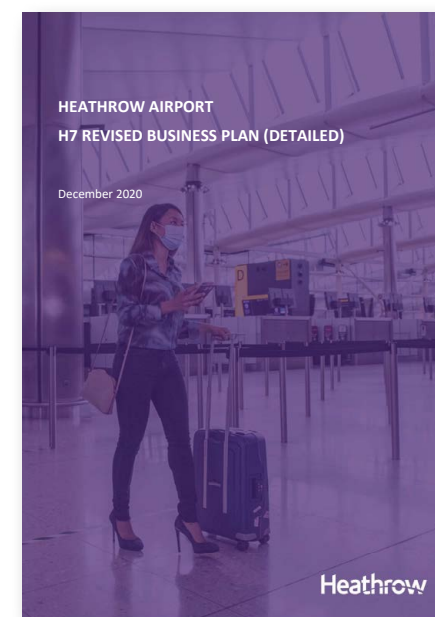
Heathrow Airwatch

View the latest air quality information in the Heathrow area.



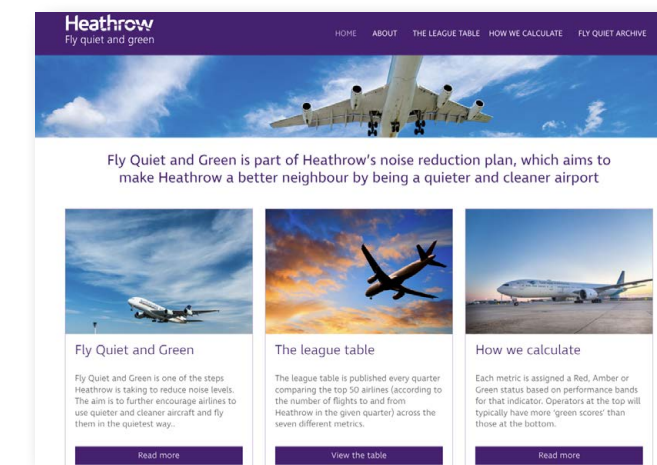
Heathrow Revised Business Plan

Read our business plan in full for the next regulatory period.



Heathrow Fly Quiet and Green Programme

Explore how we are communicating airline performance on noise and emissions.

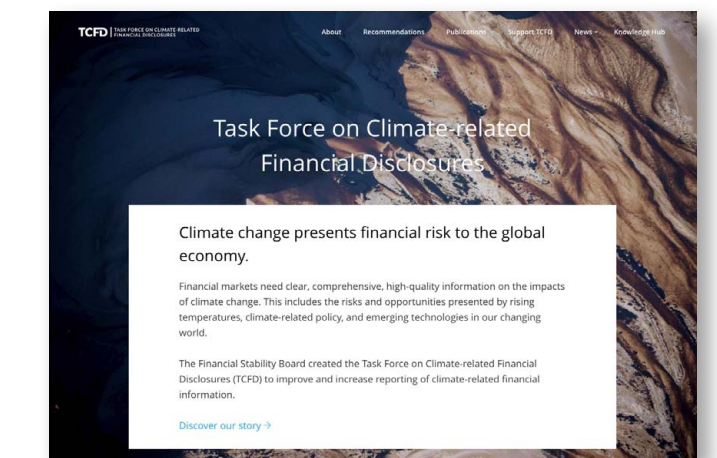


Heathrow Climate Change Adaptation Report

We regularly review the risks climate change poses to the airport and publish our progress and actions in our Adaptation Reports. View the latest CCAR here.



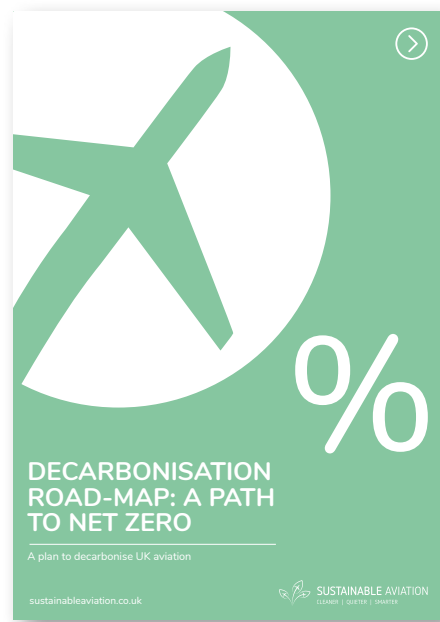
Task Force on Climate-Related Financial Disclosure (TCFD)



11 Further reading and resources

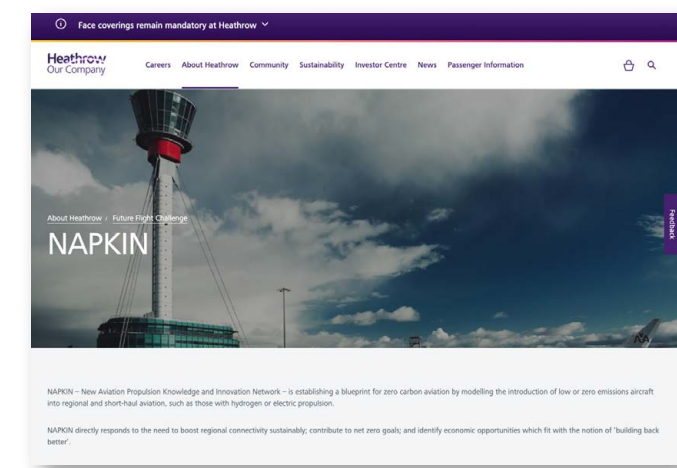
UK Aviation Industry Net Zero Plan

In 2020, airlines, airports and aircraft manufacturers set the goal of achieving net zero by 2050. Read Sustainable Aviation's *Decarbonisation Road-Map: A Path to Net Zero* in full here.



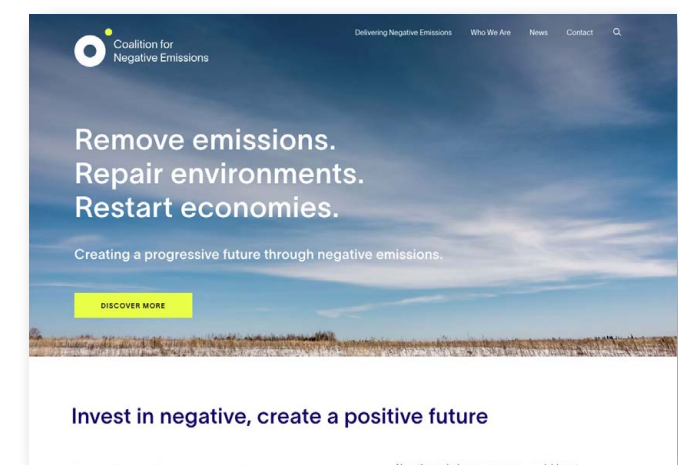
New Aviation Propulsion Knowledge and Innovation Network (NAPKIN)

Heathrow has led this Innovate UK funded project to explore the introduction of zero carbon flight. Read the project reports here.



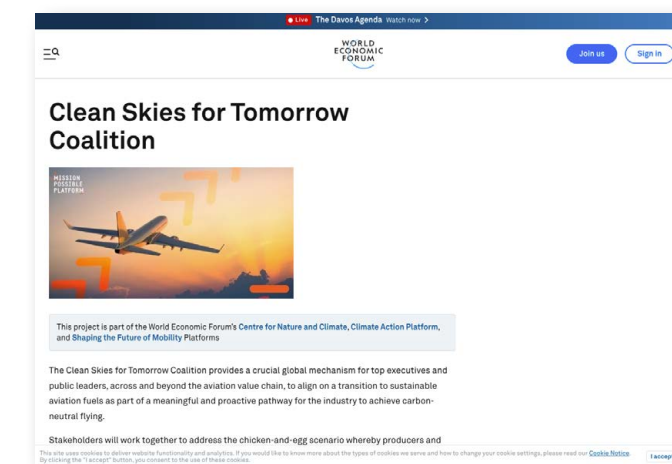
Coalition for Negative Emissions

We are a founding member of this coalition exploring the business models and policies required to deliver carbon removals at scale.



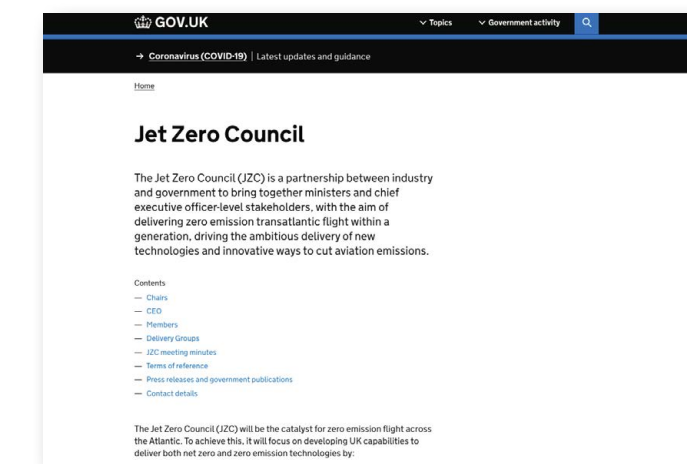
World Economic Forum's Clean Skies for Tomorrow Coalition

We are an active member of this global coalition which has set an ambition for 10% SAF by 2030 and analysed the policies and investments necessary to deliver that. Read the CST's latest reports here.



Jet Zero Council

The Council was launched in 2020 and is chaired by the Secretaries of State for Transport and Business. It brings together key industry leaders to deliver the goal of flight across the Atlantic without harm to the environment within a generation.



Glossary

CAA

Civil Aviation Authority, overseeing and regulating civil aviation in the UK.

Carbon

Carbon is used as shorthand for carbon dioxide equivalent (CO₂e) – meaning all greenhouse gases.

Circular economy

moving from a linear model of how we consume resources (take, make, waste) to a more circular model based on reuse, refurbishment, recycling, sharing of resources, and finding novel uses for waste streams. Aiming for a circular economy ensures resources are put to best use, for the longest possible time, with waste avoided where possible.

Climate Change Committee 6th Carbon Budget

The UK Government's independent advisor on Climate Change, the Climate Change Committee (CCC) set out its recommendations ahead of each carbon budget period, setting out the UK's trajectory to achieving net zero emissions by 2050 across the whole economy.

Balanced Net Zero Pathway

A pathway that seeks to reduce emissions to 78% below 1990 levels by 2035. This is the principal pathway referred to in the 6th Carbon Budget. The scenario it sets out is one of "progress through the 2020s" but setting a middle-ground between the most and least ambitious CCC pathways.

Widespread Innovation Pathway

Another pathway set out by the CCC. This one assumes low carbon technologies are more impactful through a reduction in costs, opening the door for significant electrification and efficiency gains across sectors of the economy.

CORSIA

Carbon Offsetting and Reduction Scheme for International Aviation, is a global offsetting scheme for airlines established through ICAO. Under CORSIA, airlines will offset any growth in carbon emissions above 2020 levels to achieve carbon neutral growth.

EV

Electric vehicles (fully battery electric or hybrids).

F-gases

Fluorinated gases or f-gases are released through various human activities and often have a high global warming potential and residency time in the atmosphere. They are commonly used as refrigerants.

The Greenhouse Gas (GHG) Protocol

The global standard on corporate greenhouse gas emission reporting created by WRI and WBCSD. The protocol sets out how best to report on carbon emissions through three scopes based on ownership or control.

HVO

Hydrotreated vegetable oils (HVO) or simply biodiesel, is a renewable diesel produce using oils and fats as opposed to fossil fuels, significantly reducing emissions compared to conventional diesel.

H7

Heathrow is regulated by the Civil Aviation Authority. The five regulatory periods are each given a code. The current period from 2022 to the end of 2026 is called H7.

ICAO

The International Civil Aviation Organisation, a specialised agency of the United Nations.

LTO

Landing and take-off cycle – this term describes the four modes of aircraft operations in the vicinity of, or at, the airport. It includes: approach, taxiing, take-off and climb (usually up to 3000ft).

NAPKIN

Heathrow has led this Innovate UK funded collaboration exploring the introduction of zero carbon flight. Read more here.

Sustainable Aviation

A UK coalition of airlines, airports, manufacturers, air navigation service providers and others, that sets out the collective approach of UK aviation to tackling the challenge of ensuring a cleaner, quieter, smarter future for the industry.

Team Heathrow

All of our partners, working collaboratively and in partnership, to ensure the day-to-day running of the airport. Team Heathrow is made up of hundreds of organisations and thousands of people.

Sustainable aviation fuels (SAFs)

SAFs include any alternative aviation fuels that provide net carbon lifecycle savings (typically over 70%) when compared with fossil equivalents and also meet stringent sustainability criteria. SAFs can be derived from wastes but can also be derived from other sustainable sources including direct carbon capture (synfuels).

ZEV

Zero emission vehicles, vehicles with zero or very low tailpipe emissions using battery electric or hydrogen technology.

Heathrow