Met Office

Our journey to **Net Zero**

Becoming carbon neutral by 2030

A real difference to the way the Met Office operates and the impact it has on the environment.

As a leading contributor to United Nations climate research, the Met Office is committed to aligning its own activities to the clear scientific message that carbon dioxide emissions, along with other greenhouse gases, need to be reduced to help counter a 50% increase in atmospheric concentrations since the pre- industrial period.

Met Office staff are equally conscious of the need to act to mitigate the effects of climate change. Our staff very much share our organisational value of being a force for good and have taken a proactive approach to sustainability initiatives at the Met Office. The continuing support of staff and colleagues will be central to the achievement of our Net Zero targets as we strive to demonstrate what can be achieved together.

This document sets out the Met Office journey to become carbon neutral by March 2030. This is no mean feat for an organisation with significant computing power requirements, unique and extensive supply chains, frontline operational locations and customers spread around the world. There will be challenges along the way and our journey will not be set in stone. We will continue to evaluate and evolve our approach to ensure the best and most sustainable outcome for the organisation as we reduce our carbon footprint on our way to Net Zero.

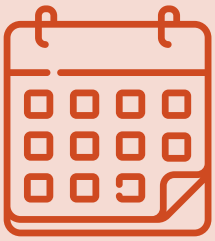
The scientific message on the impact of greenhouse gases is clear. We have taken an evidence-based approach to the calculation of our own greenhouse gas emissions and the pathway we have charted to address them. By taking a lead in tackling our own carbon footprint, we aim to highlight what can be done and to encourage others to embark on their own journey to Net Zero.

Here we set out the Met Office journey to achieve no net greenhouse gas emissions. We're committed to leading the organisation on this journey and are looking forward to making a real difference to the way the Met Office operates and the impact it has on the environment.

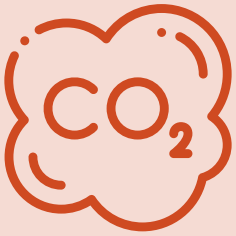
Penny Endersby
Chief Executive

Rob Woodward
Non-Executive Chair

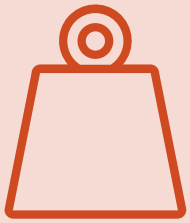
Executive summary



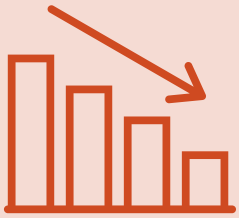
We take achieving Net Zero seriously. A major milestone is our ambitious yet realistic plan to achieve carbon neutrality – having no net greenhouse gas (CO_2e) emissions - by **2030**.



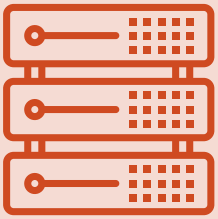
Our strategic approach is to **reduce** our operational emissions as much as possible, offsetting only where absolutely necessary.



Having moved to **100% zero carbon electricity in 2020** we're already saving around 16,000 tonnes of CO_2e emissions each year.



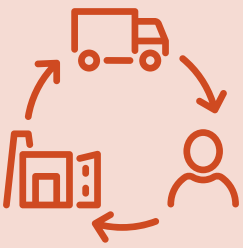
By March 2030 we aim to reduce the organisation's CO_2e emissions by **70%**.



Our new supercomputing provision will be one of the world's most environmentally sustainable supercomputing capabilities, powered by **100% renewable electricity** through direct Power Purchase Agreements (PPA).

Over 10 years we'll reduce business travel emissions by at least **40%**. We will work with staff to reduce our commuting emissions.

Sustainable offsetting will be used for the emissions which are operationally unavoidable and where current technology does not allow us to remove them.



Our supply chain now makes up more than **80%** of our emissions. We will provide thought leadership and engage with our suppliers to tackle this together.

We will have achieved carbon neutrality when our net emissions of harmful greenhouse gases from our operational activities and supply chain have either been fully removed or completely offset.

Our emissions are measured in tonnes of carbon dioxide (CO_2), the most common greenhouse gas, or an equivalent (CO_2e) amount of other greenhouse gases such as methane, nitrous oxide or hydrofluorocarbons.

Our total CO_2e emissions are often referred to as our carbon footprint.

Overview of where we are as an organisation

To enable an informed and robust move to Net Zero, it's important to understand where you're starting from. While the Met Office was well regarded for its progress on waste management, biodiversity and other sustainability efforts, a detailed examination of all sources of emissions had not been previously undertaken.

To understand our carbon emissions fully, a comprehensive baseline assessment was conducted of the Met Office CO_2e emissions for the 2019/20 financial year. This provided a representative, pre-COVID, starting point from which to take action and set initial targets.

We recognised that there were some aspects of our indirect emissions that we could not measure realistically at that point in time. Therefore, over the last year we have completed a full reassessment of our overall baseline, or carbon footprint, to fill these gaps. We have also learned from ours and our partners' experience over the last three years and enhanced our calculation methodologies.

We have now included the emissions impact of the supply of satellite data, which is crucial to weather and climate forecasting, as well as the impact of the full supercomputing infrastructure that Microsoft are building for us. Now that hybrid working patterns have settled down following the pandemic, we have been able to incorporate commuting and working from home emissions for the first time.

This remains a fast-evolving area and we know that further refinement will be required. For now, we have good confidence that we have captured a comprehensive assessment of the sources of our emissions, providing a sound basis to plan our actions and work, together with our suppliers, over the next few years.

The baseline assessment divided emissions into four broad components:

Building management

Electricity and gas usage, including powering and cooling our supercomputing infrastructure.

Supply chain

This includes the supply of research and data-intensive information from partners as well as the purchase of manufactured items from suppliers.

Scientific data collection / critical infrastructure

This refers largely to emissions from collecting meteorological observations and scientific research flights along with other services critical to the Met Office's operations and customer services.

Business travel and commuting

Staff travel that supports the Met Office's core activities plus commuting and working from home emissions.

Met Office baseline

Function	Percentage of CO_2e emissions 2019/20	Baseline CO_2e emissions tonnes (2019/20)
Building management	35%	20,538
Supply chain	50%	29,845
Scientific data collection / critical infrastructure	3%	1,970
Business travel and commuting	12%	6,829
Total emissions		**59,182**

Standard calculation methodologies for carbon emissions data are continuing to evolve. While we have high confidence in some data such as electricity usage and business travel, there is lower confidence in the data quality of other emissions, particularly in the supply chain. Our methodology therefore recognises data quality will improve over time, but still allows us to track progress in underlying emissions reductions and target carbon neutrality in 2030.

Existing success

Even before the Met Office started its formal journey to Net Zero, significant achievements had already been made. In 2020 the electricity supply to the main operational locations was switched to 100% zero carbon electricity. As this included our current supercomputing capability located in Exeter, this has already resulted in a notable reduction of around 16,000 tonnes to the organisation's CO_2e emissions.

We recognise that supercomputing uses a great deal of energy, so energy efficiency was a key part of the procurement process for our new supercomputing capability. Our next generation of supercomputing provision will be one of the most environmentally sustainable supercomputing capabilities in the world, powered by 100% renewable electricity and delivered through our supplier Microsoft's market leading energy efficiency with whole life sustainability considered. By using 100% renewable energy, procured through direct Power Purchase Agreements (PPAs) a saving of 7,400 tonnes CO_2e is expected in the first full year of operational service alone.

Renewable electricity

The electricity from the national grid, that all consumers use, depends on the mix of generation sources operating at the time. The proportion from fossil fuels has been falling and now predominantly comes from gas. The balance includes renewable energy such as wind and solar generation, as well as nuclear energy which is classified as zero carbon.

Since switching away from fossil fuels, all the energy we have used at the Met Office has been zero carbon, having contracted to buy a mix of renewable generation and nuclear energy.

Nuclear generation is self-certified by the Met Office's supplier, but to ensure the amount of fully renewable electricity purchased is matched by an equivalent level of generation, renewable certificates are independently verified by the Carbon Trust, in line with international greenhouse gas protocols. The certificates are 'retired' so they cannot then be traded or re-used, effectively ensuring the renewable electricity generated is properly assigned.

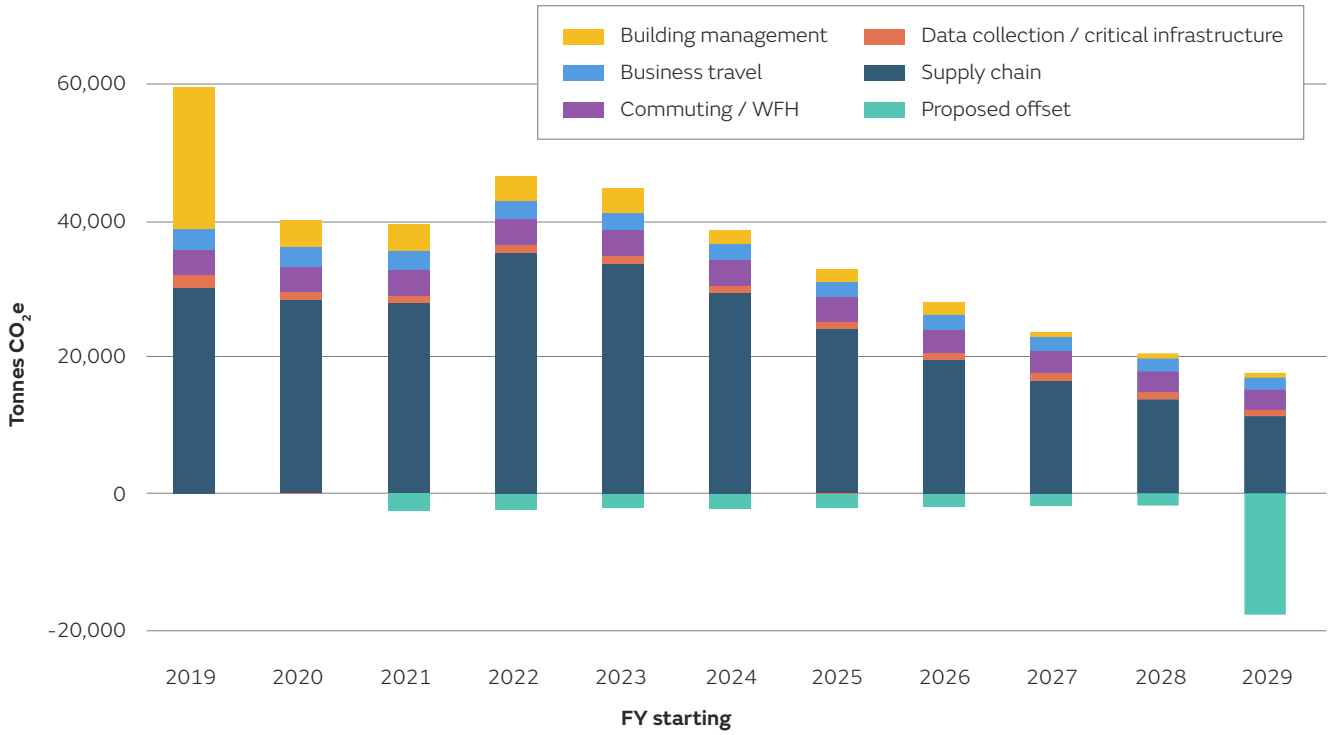
Very large electricity users can agree direct Power Purchase Agreements (PPAs) with suppliers, which our new supercomputing supplier Microsoft is intending to do.

Both approaches help signal market demand for renewable energy to the industry whilst the PPAs will also ensure our future supercomputing investment is solely targeted at renewable electricity.

Met Office journey to Net Zero

Given the success of switching our electricity supply for the existing supercomputing capability and main sites over to zero carbon energy, our current targets already include a marked drop of around 22% from the baseline.

Met Office journey to become carbon neutral by 2030



This pathway will entail a reduction of 70% in the Met Office's baseline annual emissions, which were c. 59,000 tonnes of CO_2e in FY2019/20. Certified offsetting can be used to negate the residual c. 17,600 CO_2e, or 30% of emissions, by 2030. This is the first time the Met Office has set a target date to achieve carbon neutrality or no net emissions.

The rise in emissions in the 2022/23 and 2023/24 financial years is due to the build and implementation of our new supercomputer infrastructure and, to a lesser extent, a bounce back in some activity after the COVID pandemic. We will work with our suppliers to reduce these increases over the rest of the decade.

Looking beyond 2030

As we continue our journey towards Net Zero we will need to sustain our progress in reducing emissions beyond 2030. We will work with our supply chain to remove those emissions that proved intractable prior to 2030, which will reduce the need for further offsetting at the same level beyond that date. We may also potentially consider a transition to become carbon negative. We are yet to map our emissions profile beyond 2030 in detail as we anticipate having a significantly better understanding of potential technological advances in key areas such as aviation and carbon capture that will better inform a further round of planning in the late 2020s.

Building management

A large proportion of the emissions (35% of baseline) from our estate came from electricity usage, particularly powering and cooling our supercomputing capability, which is currently located at our Exeter HQ. This was switched to zero carbon electricity from April 2020, resulting in a dramatic fall in our emissions in FY2020/21.

Going forward, despite our new supercomputing provision being offsite, we have ensured its electricity usage will continue to be emission free via 100% renewable power procured through direct PPAs.

Many aspects of building management emissions have already been pared back through efficiency measures and careful waste and water management. We have recently refurbished our gas boilers to make them more efficient, but are starting to look at alternative technologies to eliminate the need to use gas altogether.

> “Our new supercomputing provision ensures its electricity usage will continue to be emission free.”

Supply chain

Our supply chain now forms the largest component of our baseline. It includes organisations which process huge amounts of data, such as from meteorological satellites and other international weather forecasters, through to the purchase of manufactured items such as IT hardware and office furniture. Since the organisation's electricity supply was moved to a zero carbon tariff, our supply chain now accounts for around 80% of the Met Office's overall emissions of CO_2e.

Carbon footprint data provision from suppliers is a challenging field. However, the nature of our suppliers with many having emissions dominated by electricity usage like the Met Office, provides confidence that the reduction target in the region of 70% over 10 years can be met. Working with suppliers and establishing monitoring processes, as well as with government procurement frameworks, will be a priority of the implementation plan over the next two years.

> Over the next 10 years we aim to reduce our supply chain emissions by 70%.

Scientific data collection and critical infrastructure

This component refers largely to emissions from scientific research flights and other services critical to the Met Office's operations and customer services and are intrinsic to our work.

Its emissions proportion is dominated by 'dedicated' aircraft emissions, particularly the 'Facility for Airborne Atmospheric Measurements' (FAAM) and travel on Ministry of Defence (MOD) flights when operational meteorologists travel to military locations. While we will have the opportunity to work with the MOD to understand these emissions better and support it on its own journey to Net Zero, our options to reduce emissions in this area are anticipated to be more limited over the next decade.

Reductions will be possible in some areas, for example electrifying part of the vehicle fleet used by the observations team.

> "We will work with other organisations to reduce emissions and limit our impact."

Business travel and commuting

Travel is a major component of our emissions; however, it's also a key part of how we support the many relationships we have around the world, keep plugged in to scientific research and deliver programmes to our customers. Air travel is a major part of these emissions, but we will also consider train journeys and our approach to road travel in the UK. Our progress in this area has benefited from positive behavioural change from a great many staff.

We have agreed to target a 10-year business travel emissions reduction of at least 40%.

Our commuting and working from home emissions are actually greater than business travel. While we have seen a 18% drop as a result of the greater adoption of hybrid working post pandemic, we will continue to work with staff to reduce these further. We have excellent rates of staff cycling (winning national awards) and have contributed to local authority commuting plans. We have invested in electric car charging points at the Exeter HQ and a number of our frontline sites around the country.

> We will reduce business travel emissions by at least 40% over 10 years.

Offsetting

The proposed reductions in the four categories still leave residual emissions of some 17,600 CO_2e in FY2029/30. These will need to be offset to achieve carbon neutrality. Although any offset is not as desirable as completely removing the emissions in the first place, some emissions such as our supply chain are not entirely in the Met Office's control. This means an element of offset is required to reach carbon neutrality by 2030.

Our investigations have confirmed that there are a number of robust, independently verified carbon offsetting schemes available. It is also an area the Government is investigating. Having taken external advice and engaged with our staff, we have offset our budgeted business travel emissions since FY2021/22. We continue to explore options in this area.

Support for other businesses and organisations on their journey to Net Zero

Our substantial increase in supercomputing capability will lead to improvements in weather forecasts and climate change predictions. As the national deadline to reach Net Zero by 2050 looms, the new supercomputing capability will play a central role in understanding how carbon budgets and mitigation scenarios will avoid the most dangerous impacts of global climate change.

The Met Office is already working with leading businesses and organisations to increase energy efficiency and improve resilience with the long-term goal of reducing carbon emissions. Detailed forecasts are being used to optimise energy usage, improve efficiency of renewable energy sources and even reduce the carbon footprint of air travel, thanks to detailed wind forecasting helping to plan flight paths.

COP26 brought increased focus on the importance of climate services to help organisations challenge the difficulties of Net Zero. The Met Office is actively looking at ways to use our expertise to support Government and business.

Years 1-2		
Net Zero target and strategy agreed	Main site and supercomputer electricity supply moved to zero carbon	Business travel targets set, and travel emissions offset

Complete

Years 2-5 (current phase)			
New supercomputing capability comes online with 100% renewable electricity	Supply chain CO_2e emissions start being progressively addressed for a 70% reduction by 2030	Monitoring of commuting and working from home / home-working emissions incorporated into targets	Year on year reductions in business travel related emissions continue to achieve at least a 40% reduction by 2030

By 2030			
Residual emissions from operationally critical work and remaining supply chain emissions offset	Carbon neutrality achieved by 2030	Overall Met Office CO_2e emissions reduced by 70% by March 2030	Building management emissions further reduced including removal of main gas heating systems

Next steps

In order to achieve our ambitious target of Net Zero, we will work closely with our staff, partners, customers, supply chain and stakeholders in government and the wider meteorological community. Together we can make real changes and adapt the way we work while still providing safety critical meteorological services and world-renowned climate science. A dedicated Net Zero strategic action and project team was in place until March 2023. Our Net Zero approach has now been embedded into everything we do and is becoming part of our business as usual way of working.

Over the next year, we will engage further with the major components of our supply chain and start to see the outputs from the work they have been undertaking in the last few years. We will investigate how best to provide information to our own customers on our emissions reduction plans and progress. We will look further at our own adaptation to climate change risks and we will continue to engage with staff, assessing how best to provide them with the information they want and need to support our work.

The Met Office journey to Net Zero and achieving carbon neutrality by 2030 will continue to be re-evaluated and adapted over the course of the 2020s as more technologies become available, with detailed action plans put in place for each step of our journey as we learn and evolve.

We're a force for good.

Our organisational values are about what we do, what we stand for, why we come to work and what we want to achieve. They're a unique expression of our Met Office personality.

Our planet matters. We need to act now, and we want to make a difference. That's why we take our environmental and social impact seriously.

The journey to Net Zero will not be easy. It will require vision and leadership, enthusiasm and flexibility from all our staff and positive engagement with our partners and stakeholders. Together we can ensure the Met Office is carbon neutral by 2030. Together we can make the planet a better place to live.