

Our approach to climate change
Task Force on Climate-related Financial Disclosures (TCFD)

Climate change and extreme weather events are critical to our service delivery because of our reliance on a stable climate and the natural environment. Here we report on our latest progress and plans on cutting emissions to reduce future climate change, known as climate mitigation, and how we are maintaining and improving our resilience to climate change, known as climate adaptation.

Our business, and the communities we serve, has already experienced the impacts of climate change, including several record-breaking weather events that caused impacts such as flooding, power cuts and travel disruption. Risks associated with flooding are heightened in the North West because it is the wettest region in the country, and this is projected to increase with climate change. There is overwhelming evidence that we need to prepare for more severe weather events more often, as well as gradual trends for wetter winters, hotter drier summers and rising sea levels. We integrate past and projected climate data throughout our plans to ensure an effective and evolving

response. We are committed to playing our part in securing the global goal to curb climate change to no more than 1.5°C.

In the following pages we share our greenhouse gas emissions (GHGs) and progress towards meeting our six carbon pledges and science-based targets (SBTs). We present our six most sensitive climate risks and our new adaptation report. In this section, supported with content elsewhere in this integrated report and on our website, we include disclosures consistent with the TCFD Recommended Disclosures all sector guidance.

Where to find our TCFD recommended disclosures

Table with 3 columns: Governance, Strategy, Risk management, Metrics and targets. Rows include Board's oversight of climate-related risks, Management's role in assessing and managing climate-related risks, Climate-related risks and opportunities, Impact of climate-related risks and opportunities, Resilience of our strategies, Metrics used to assess climate-related risks, and Targets used to manage climate related risks.

Table with 3 columns: Risk management, Metrics and targets. Rows include Processes for identifying and assessing climate-related risks, Processes for managing climate-related risks, How processes identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management, Metrics used to assess climate-related risks, and Targets used to manage climate related risks.

Pledge 1
Reduce scope 1 & 2 emissions
↓2.2% compared to baseline
We are making good progress towards our science-based target to reduce scope 1 and 2 emissions by 42 per cent from our baseline by 2030.
2021/22: 135,936 tCO2e
2019/20: 138,961 tCO2e (baseline year)

Pledge 2
100% of electricity used from renewable sources
We achieved this pledge from October 2021
From October 2021 the electricity we purchased was from guaranteed renewable sources. In addition, we generated a record 210 GWh of renewable energy in 2021/22, equivalent to 26 per cent of our total electricity consumption.

Pledge 3
100% green fleet by 2028
27 fully electric vehicles (EV) now deployed in our fleet with plans for 200 low carbon vehicles by 31 March 2025
We have installed advanced telematics to improve understanding of travel patterns and are trialling options for larger vehicles. We are enabling employees to shift to EV through changes to the company car policies and launch of a salary sacrifice scheme 'EVolve'.

Pledge 4
1,000 hectares of peatland restoration by 2030
Restoration activity well underway
We have restoration projects across the North West at different stages of maturity. As well as continuing our site work to completion, we aim to become an early pioneer in applying the Peatland Code at scale to independently verify the carbon benefits.

Pledge 5
Create 550 hectares of woodland by 2030
9 hectares planted and validated to the Woodland Carbon Code
Planting in 2021 was postponed due to weather and tree disease. The remaining 541 hectares have been planned and the funding identified.

Pledge 6
Set scope 3 science-based target
Targets verified by SBTi
Emissions from our value chain are the most challenging to address so we are working with our supply chain. We are exploring how to improve our calculation methods for scope 3 emissions so that we can consider and openly report the impact of our management choices.

Examples of our activities to respond to climate change
Haweswater Aqueduct Resilience Programme (HARP)
The Haweswater Aqueduct plays an important role in moving large volumes of water from the Lake District to supply Greater Manchester. The aqueduct was originally completed in 1950 and since 2005 we have been planning how to secure its continued and long-term resilience.
Following extensive planning and stakeholder engagement we are ready to start delivery of a solution designed to meet future demand whilst maintaining a gravity-fed, low carbon water supply. The proposed tunnelling solution has been assessed as having one of the lowest environmental and carbon impacts of all options considered, with further opportunities identified to recycle materials to local sites thus reducing impacts from vehicle movements.
Surface water separation – Blackpool south
We have invested over £30 million to address the combined challenges of climate change, an ageing Victorian sewer network, and increasing urbanisation in Blackpool.
The primary objective of this project was to separate surface water from the combined sewer system. New infrastructure was constructed, including a storm water interception tank, pumping stations, and a new sea outfall to provide a sustainable discharge point for surface waters. This will prevent over 800,000m³ of surface water from entering the combined sewer system during wet weather. By diverting the surface water away, the flooding risks posed by storms due to the resulting excess volume of wastewater have been significantly reduced.

Transparency and disclosures
We have a long track record of public carbon and climate change disclosures having estimated and reported our carbon footprint since 2006 and participated in CDP's Climate Change Programme for 12 years. Our reporting is fully compliant with UK Government Environmental reporting guidelines and applies international best practice such as Greenhouse Gas Protocol Corporate Accounting and Reporting Standards (2015). The Science Based Targets initiative (SBTi) assessed and verified our four science-based targets in July 2021 and commended our ambitious 1.5°C aligned scope 1 and 2 target.

We confirm that our annual report includes all climate-related financial disclosures required to be consistent with the TCFD recommendations and recommended disclosures and is in line with the current Listing Rules requirements (as referred to in Listing Rule 9.8.6R(8)). Corporate Citizenship, a leading sustainability consultancy, has reviewed this disclosure and provided an ISAE assurance against the Principles of Effective Disclosure to ensure that consistency with TCFD recommendations including the implementation guidance published in the 2021 Annex.

2021 performance
CDP is known for setting the standard for companies on their environmental leadership. In 2021 we achieved an overall B rating, with category scores of A in targets, governance and risk management. We are working to improve the other categories towards achieving an overall A list rating. We were proud to be recognized as a 2021 Supplier Engagement Leader, raising the level of climate action across our value chain.

Governance

TCFD definition

The organisation's governance around climate-related risks and opportunities.

Progress this year

- Oversight and scrutiny of climate change matters by the board and its committees, including approval of our new science-based targets, and review of the adaptation progress report and carbon commitments risk.
- Strengthened governance by expanding our director-led climate change mitigation steering group and introduced six new cross-business working groups.
- Introduced carbon measures into the executive remuneration framework.
- Expanded our internal carbon and climate change teams.
- Supplemented public disclosures through conversations with investors and participation in new climate-related indices and assessments.

Future focus

- Communication and engagement programme with all stakeholder groups.
- Deploy whole-life carbon costing using an internal carbon price aligned to government carbon values.

➔ Read more about the [governance structure of the board, its committees and management committees](#) on page 120

➔ Read more about the [board and management committees' responsibilities and activities](#) on pages 120 to 123

Introducing carbon to our executive remuneration

Four carbon measures have been agreed by the remuneration committee for the three-year period ending 31 March 2025, together forming ten per cent of the Long Term Plan (LTP) against which stretching targets have been set. These measures are:

- green fleet vehicles;
- woodland creation;
- peatland restoration; and
- supply chain engagement.

Including targets within our executive remuneration arrangements recognises the importance of our carbon commitments. We have designed these measures to reinforce delivery of our ambitious carbon pledges and science-based targets. We are working to mature these incentive measures in future years, ultimately to align with our science-based emission reduction targets for 2030 and beyond.

➔ Read our [remuneration report](#) on pages 160 to 191

Board oversight of climate-related risk and opportunities

2021 saw increased global attention on the climate change emergency culminating at the COP26 climate summit in Glasgow. As board members, our Chief Executive Officer and Chief Financial Officer both show personal leadership for the impact of climate change on our capacity and capability to deliver our services. Climate change-related matters have always been of interest to the corporate responsibility committee in its role to scrutinise environmental topics and initiatives. This year, climate change matters have also been discussed by the audit committee (review of carbon commitments risk) and remuneration committee (linking long-term incentive outcomes to the delivery of carbon pledges).

Management role

CEO Steve Mogford has ultimate responsibility for the group's preparedness for adapting to climate change and driving our mitigation strategy. CFO Phil Aspin has executive responsibility for risk management and is supported in this role by the head of audit and risk and the corporate risk manager. Along with the executive team, they are tasked with managing the risks and mitigating actions, for example by ensuring the company has the

necessary financial resources and skilled people are in place to achieve its climate-related objectives.

Our climate change mitigation strategy starts with 'vision and visibility', reflecting that consideration of climate is becoming an essential factor in both day-to-day and strategic decision-making and behaviours. All of the principal management committees have discussed climate-related matters this year. For example, our leadership team has tracked the delivery of our carbon pledges as part of the quarterly business reviews and initiated a trial of a low emission fuel HVO as a result. The capital investment committee is working to integrate climate issues into its decision-making processes including a carbon reduction incentive for capital programme delivery partners.

In 2021/22, we held two deep-dive workshops to build executive team knowledge and awareness of carbon. This resulted in a refresh of our climate change mitigation governance and the creation of new director-led working groups. These focus on maturing our decision-making and delivering reductions of all greenhouse gas (GHG) emissions while developing our future climate-related strategy and engagement.

Risk management

TCFD definition

How the organisation identifies, assesses and manages climate-related risks.

Progress this year

- Published our third adaptation report, including the outcome of a progress review of climate-related risks across the organisation.
- Greater recognition of transitional risks in our corporate risk management system, in particular the investment needed to meet our carbon commitments and the potential costs to the business if we do not.

Future focus

- Produce our PR24 business plan with full integration of carbon reduction and climate resilience priorities.
- Finalise and publish our 2022 Drought Plan.
- Improve our long-term strategic plans for water resources and drainage, integrating advanced climate change analysis to shape our investment and operational approaches in the short, medium and long term (up to 80 years).
- Embed climate change impacts into corporate decision-making tools and processes.

➔ Read more about [how we are managing the risks that are sensitive to climate change](#) on page 90, with more detail in our adaptation progress report



Our adaptation progress reports can be viewed on our website at unitedutilities.com/corporate/responsibility/environment/climate-change/climate-change-adaptation

Climate risk identification and assessment

We have a mature risk and resilience framework for the identification, assessment and mitigation of risks, as described on pages 100 to 101. This framework is used to identify and assess climate-related risks. We consider both physical risks, identified as those related to climate change impacts on our operations or assets, and transitional risks, which are those associated with the necessary transition to a low-carbon economy (e.g. changes to policies, regulation and legislation).

We use a variety of approaches to assess risks, such as risk breakdown structures and PESTLE. We use complex modelling of the physical impacts of climate change in our water resources and drainage management planning, and incorporate Met Office UK climate projections. In our assessment of materiality we recognise that some risk events may happen multiple times so we compare impacts over a long-term (40-year) horizon. This accentuates where climate change, and other demographic changes, influence the frequency of events as well as the consequences.

We have found that horizon scanning for industry research and emerging legal and regulatory changes are particularly useful when considering transitional risks. In our revision of the carbon commitments risk, we incorporated the updated carbon values provided by the department for Business, Energy and Industrial strategy (BEIS). Applying these values resulted in an escalation of the risk to the executive team and board who re-evaluated our response to ensure we continue to effectively manage the risk. Incorporating longer-term climate change impacts explicitly in our corporate risk framework has raised the profile of climate change, allowing the board to consider our appetite and capacity to mitigate and control the risks from within existing risk management processes and with the same thresholds for materiality.

Managing climate-related risks

By recognising the causes and consequences, and assessing the likelihood and the severity of impact (both financial and reputational) should the event occur, we are able to prioritise climate-related risks and take proactive and early action to reduce the frequency and severity.

As climate change is a common causal factor for our principal risks (see pages 104 to 105), a review of all event-based risks in our business risk profile was undertaken to assess their sensitivity to climate change. The most sensitive risks are outlined on page 90 and more details, including discussion and examples of activities to mitigate and control for these risks, can be found in our latest adaptation progress report.

Organisational resilience to climate change

In preparing each of our three adaptation progress reports, we assessed the organisation's resilience to specific outcomes of climate change, such as hotter, drier summers and more extreme weather events. We identified over 90 risks that could impact a single business area, for instance wastewater, but we also noted business-wide risks, interdependencies and transitional risks. The outcome of the latest assessment was 79 new or existing mitigating actions listed in our adaptation report along with an update on what has been done to manage the risk to date.

We are maturing our understanding of risk and uncertainty to build and maintain long-term resilience across the corporate, financial and operational structures of the group. Looking ahead, we will explore how innovation can help us to learn more about the profile of risk events, their causes and consequences, and to identify opportunities to improve our capacity and capability. This will help us to identify where climate risks remain uncertain or where existing controls might be inadequate to manage the risk in the long term. This will help us to be better prepared by prioritising issues.

Our risks most sensitive to climate change

Last year, we presented the outcome of a special risk assessment on the sensitivity of all our event-based risks to climate change. We have updated this assessment through our corporate risk process and the results are shown below. Likelihood and impact are based on the Met Office climate projections using the most likely global emissions scenario known as RCP 6.0, in which emissions peak around 2080 and average temperatures will have risen to between 3 and 3.5°C by 2100.

Risk categorisation

- Chronic physical risk – changing trends in weather patterns, such as rising temperatures, sea level and rainfall.
- Acute physical risk – chance of severe weather events, such as storms, heat waves and floods.

* One of the most significant event-based group risks (see pages 106 to 107).

Control effectiveness

Controls are the activities we undertake to reduce risk or realise an opportunity.

- Largely insufficient to mitigate risk
- Somewhat sufficient
- Mostly sufficient

Water sufficiency event

Prolonged dry periods can cause supply challenges. Warmer temperatures intensify these pressures because of increased water usage and evapo-transpiration.

Controls

- Reduce leakage.
- Support customers to use less water.
- Install more meters in domestic properties.
- Develop new sources of water, particularly boreholes.
- Long-term water resources management planning.
- Facilitate water trading between the North West and other regions of the UK.

Likelihood (%) Impact (NPV £m)

2022	£174m
2050	£232m
2100	£464m

Failure of wastewater network (sewer flooding)*

More frequent and intense storms can overload the wastewater network and lead to severe sewer flooding. Urbanisation makes this worse due to quick run-off from hard surfaces.

Controls

- Implement and encourage 'slow the flow' and sustainable drainage solutions.
- Support customers to use sewers responsibly.
- Increase sewer capacity and build storm water holding tanks.
- Use technology to monitor and better control flows in the sewer system.
- Install flood protection devices to at-risk properties.

Likelihood (%) Impact (NPV £m)

2022	£198m
2050	£262m
2100	£381m

Land management*

Deterioration in land quality due to climate change has both direct and indirect impacts. Hotter, drier summers lead to fire, flood, subsidence and landslip events which in turn have associated health, safety and environmental impacts.

Controls

- Catchment Systems Thinking and proactive land management, including nature-based solutions.
- Deliver net gain in biodiversity from our construction projects.
- Directly restore peatland and woodland.
- Work in partnership with farmers, regulators and others to improve upland watercourses.

Likelihood (%) Impact (NPV £m)

2022	£31m
2050	£76m
2100	£153m

Failure to adequately treat wastewater

Extremely heavy rainfall, which is projected to happen more often, can exceed our wastewater treatment works capacity and result in use of overflows to prevent flooding of assets, streets and homes.

Controls

- Investment to meet legislated environment and treatment capacity requirements.
- Inclusion of climate change growth parameters in long-term adaptive plans.
- Controls for failure of wastewater network will support this risk.

Likelihood (%) Impact (NPV £m)

2022	£60m
2050	£84m
2100	£96m

Failure of above-ground water and wastewater assets (flooding)

Average winter rainfall is projected to rise, increasing the frequency of extreme events where operational sites are flooded from sea, river or surface water sources.

Controls

- Install permanent flood defences at most flood-prone sites.
- Improve flood forecasting capabilities.
- Build better network connectivity to maintain water supplies during floods.
- Invest in quick recovery once flooding subsides.

Likelihood (%) Impact (NPV £m)

2022	£16m
2050	£24m
2100	£30m

Recycling biosolids to agriculture*

Water logging resulting from more persistent rainfall will limit options for recycling biosolids to land for a greater part of the year. Uncovered sludge stores and stockpiles will be more vulnerable in persistent wet, winter weather, increasing the risk of environmental pollution from run-off.

We are currently updating our assessment of this risk following recently proposed legislative changes included within the Farming Rules for Water. We expect this will significantly restrict the window of permitted recycling of biosolids to agriculture, and therefore exceed the climate change impact we have previously assessed.

Strategy

TCFD definition

How climate-related risks and opportunities impact the organisation's businesses, strategy and financial planning.

Progress this year

- Built relationships with key suppliers to reduce environmental impact by sharing best practice and collaborating on how to reduce GHGs.
- Further developed our multi-capital approach to enhance decision-making processes, integrating both GHG impact and attributes of climate resilience.
- Implemented climate change resilience plans (both physical and transitional) across AMP7, incorporating natural capital solutions.

Future focus

- Further develop our mitigation and adaptation strategies and delivery plans.
- Include low carbon and climate adjustable approaches in our PR24 business plan.
- Assess and limit the carbon impact of our PR24 business plan.

Read more about how our climate-related risks, opportunities and commitments are shaping our strategy and financial planning on pages 91 to 93



Our climate change mitigation strategy

Planning horizons

Our assets typically have long, even very long, lifespans so we are vulnerable to physical climate risks over the long term, and we are already experiencing the impacts of climate change in the North West. We undertake planning for long (25+ years), medium (5–10 years), and short-term (one year) horizons, enabling us to account for external drivers including climate change, while continuing to fulfil our purpose in a resilient and adaptable way. Our planning horizons are further described on pages 48 to 49.

Short-term climate issues

Extreme weather events such as periods of hot and dry weather, cold snaps and heavy rain events impact our ability to deliver our services. Climate change is already increasing the frequency of these events (see page 93), exacerbating the impact of existing risks such as sewer flooding, asset flooding and asset deterioration as can be seen in the current top ten event-based risks shown on pages 106 to 107.

The North West has felt the significant damage caused by numerous extreme storms over recent years. The region has 28 per cent more rainfall than the average for England and Wales and climate change will further increase the likelihood and severity of intense storms. There is also a significantly higher proportion of combined sewers so, together, this means more pressure on sewerage and treatment infrastructure, and relatively more risk from sewer flooding and/or pollution from storm overflows. Managing the risk of flooding is a priority for us and other agencies in the North West.

Medium and long-term impact of climate change

Predicting the effects of climate change is complex, with greater uncertainty about how our infrastructure will respond to the challenges presented by both climate and demographic changes. We considered the implications of climate change to our business risk profile to ascertain which risks were sensitive to climate change in that climate change would increase their likelihood or severity. To quantify the risk we used the highly respected and relevant Met Office UK Climate Projections 2018 (UKCP18) for

weather in the North West. There are four main pathways used for climate modelling and research, each describing climate futures related to the volume of greenhouse gases emitted. For our climate sensitivity assessment we chose the Met Office climate projections for the representative concentration pathway, RCP 6.0, which has an emissions peak occurring in 2080 and an expected 3.0–3.5°C increase in global mean temperatures from pre-industrial levels.

Impact of climate-related risks and opportunities on our business strategy and planning

We have taken a twin track approach to addressing climate change in our business strategy and planning (see page 93). We account for the costs and benefits, of both mitigation and adaptation and in this way manage both physical and transitional climate risks as we deliver our services in a sustainable and resilient way.

Adapting to physical risks

All six of the risks most sensitive to climate change are physical risks, meaning they are disruptive or destructive to our operations or assets. This means there are tangible controls that can be put in place to improve our resistance to weather events, enhance our response and recovery preparations and realise opportunities.

We are applying a systems thinking approach which recognises the complex interdependencies within our business functions and externally across society. This means that interventions to address one risk have multiple benefits. For instance, sustainable drainage systems (SuDS) to slow down or divert rainwater run-off both reduce the risk of sewer flooding and optimise wastewater treatment capacity. Green infrastructure solutions such as SuDS provide an opportunity to deliver wider social value in the community and local environment.

Our approach to climate change
Task Force on Climate-related Financial Disclosures

Strategies for a changing climate
Alongside our focus to address the climate-related risks to our service delivery, we recognise the critical need to secure a stable climate and minimise the need for adaptation over the long term.

In response, our climate change mitigation strategy has four pillars (see page 91). Our focus this year has been to consolidate our ambition and commitments and to enhance the visibility and understanding of climate impacts both within the organisation and to our external stakeholders.

Climate change was a topic in our CEO graduate challenge. A team of graduates focused on helping mature plans towards a net zero future by developing a tool to estimate process emissions on a site-by-site basis, promoting our carbon pledges to employees through a social media campaign, and compiling a database of over 200 potential emission reduction opportunities that we are now exploring as part of our mitigation delivery plans.

Resilience of our strategies
Weather is fundamental to how our water, wastewater and bioresources operations function so it is critical we make our assets, systems and strategies climate-ready. More frequent extreme weather events increase the risk of cascade impacts.

Our public Water Resources Management Plan (WRMP) and Drainage and Wastewater Management Plan (DWMP) are examples of where adaptive planning, incorporating climate change scenarios and advanced modelling, are used to shape our plans for the long term (25+ years) whilst staying aligned with our short-term needs.

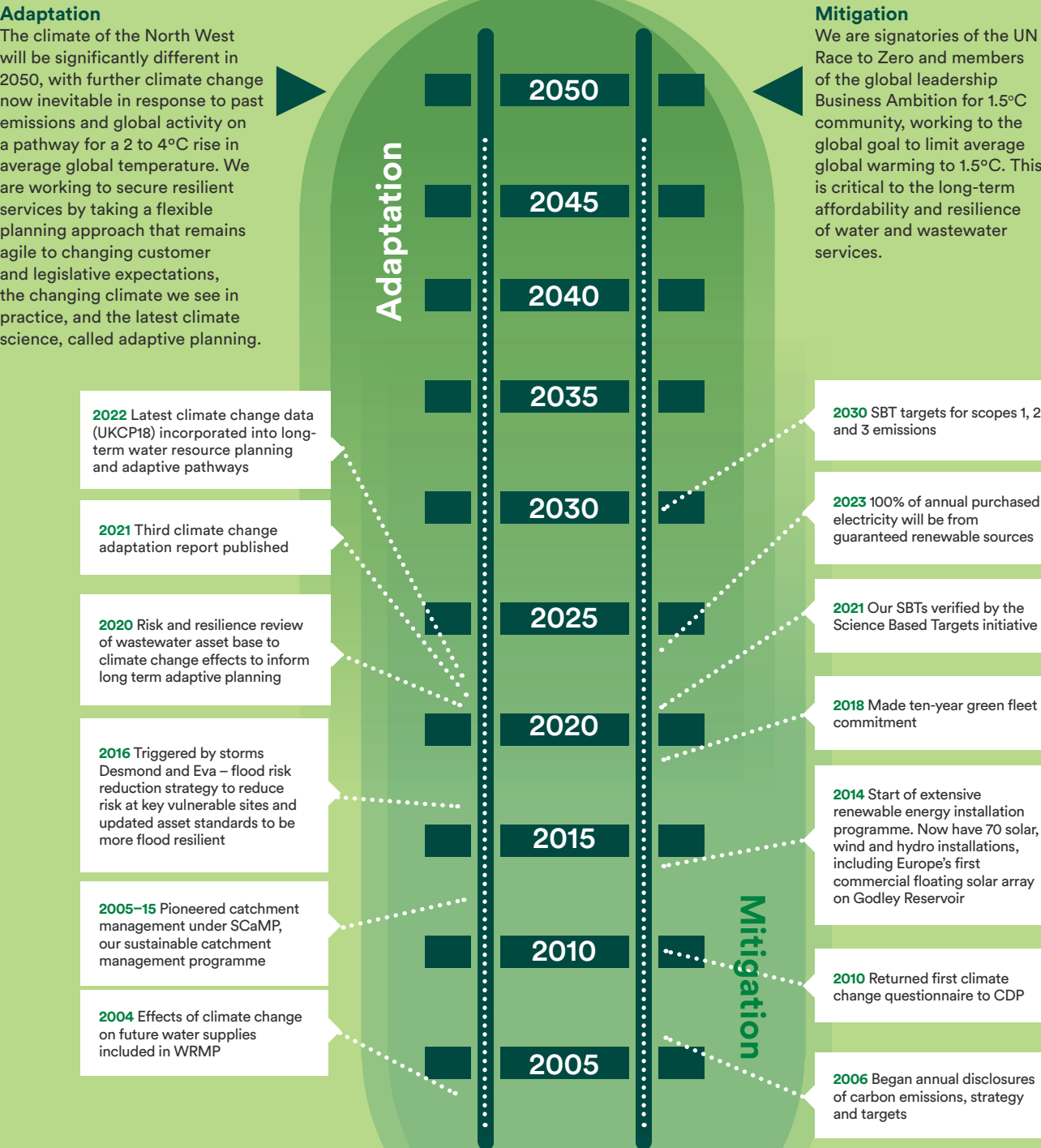
As well as targeted scenario analysis in WRMP and DWMP, we have developed three company-wide alternative scenarios for 2050, incorporating combinations of key factors that are both highly relevant and uncertain. These scenarios, named 'climate chaos', 'green guardianship' and 'public purpose', have associated metrics to define possible futures for water and wastewater services in the North West.

Note: The forward-looking scenario analyses above reflect uncertainties about the timing and magnitude of climate change in specific contexts and efforts to mitigate and adapt to climate change, which are without historical precedent. Scenarios are hypothetical constructs and are not intended or designed to represent a full description of the future or deliver precise outcomes; they are not forecasts or predictions, nor are they sensitivity analyses.

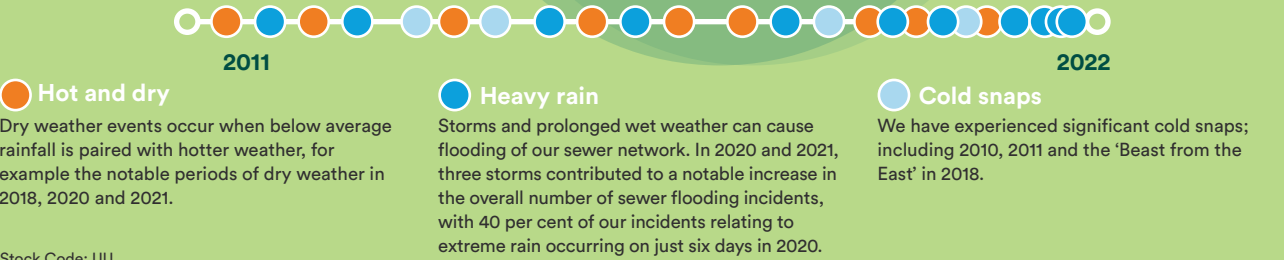


Twin track approach to climate change

We have been managing adaptation and mitigation for many years, aligning our approach to become more efficient and effective in our response. Our twin track approach to climate change is central to our purpose to provide great water and more for the North West.



Extreme weather events



Metrics and targets

TCFD definition

The metrics and targets used to assess and manage climate-related risks and opportunities.

Progress this year

- The first UK water company to have targets verified by the SBTi, including for scope 3 emissions. Achieved our pledge 6.
- Delivered pledge 2: 100 per cent of electricity purchased has been renewable since October 2021.
- Reduced scope 1 and 2 emissions by 2.2 per cent (gross) and 3.5 per cent (net) compared to our baseline year 2019/20.
- Improved data collection and tracking of fuel use enabling targeted interventions.

Future focus

- Data improvements for scope 3 emissions with more supplier and product-based estimates, rather than spend-based.
- Work to validate our long-term net zero ambition to the new SBTi Net Zero Standard.
- Use BEIS carbon values as an internal carbon price in our planning for medium and long-term investments, including PR24 (e.g. for 2030 we use the low case value of £140/tCO2e).

- Read more about delivery of our six carbon pledges on pages 86 to 87
- Read more about 2021/22 greenhouse gas emissions and performance against our SBTs on pages 96 to 97
- Read more about our 2021/22 operational performance on pages 52 to 75 and also in our annual performance report on our website

Metrics to assess climate-related risks

Our vulnerability to climate-related risks is determined by two factors: the physical and transitional impacts we experience and the control measures we have put in place to manage the risks and realise opportunities. To manage our physical risks effectively we must track and understand patterns of weather, and weather events, and learn how they can affect us operationally. To do this we have been working with the Met Office to use both their short-term forecasts and longer-term projections, planning for up to a 4°C change in global temperature. We monitor factors relating to transitional risks, including energy pricing (of both fossil fuels and low carbon alternatives), carbon pricing (through purchasable credits, offsets and certificates), and the marketplace for the availability and cost of alternative fuelled vehicles, batteries and for emerging technologies to reduce process and fugitive emissions.

Metrics to manage climate-related risks

We manage our climate-related risks by putting in place controls such as those as set out on page 90 and in Appendix A.3 of the climate change adaptation report. The effectiveness of these controls is seen in our operational performance metrics. The following metrics are recognised as key to our resilience to a changing climate and are reported in the annual performance report:

- External flooding incidents;
- Hydraulic external flood risk resilience;
- Hydraulic internal flood risk resilience;
- Internal sewer flooding;
- Leakage;
- Per capita consumption;
- Raising customer awareness to reduce the risk of flooding;
- Areas of low water pressure;
- Risk of severe restrictions in a drought;
- Risk of sewer flooding in a storm;
- Sewer collapses;
- Unplanned outages;
- Water service resilience; and
- Water supply interruptions.

Science-based targets

We have a strong track record of playing our part to mitigate climate change and have reduced scope 1 and 2 emissions by over 70 per cent since 2005/06, largely through our substantial investment in renewable power generation and green energy procurement. Our ambition and commitments are based on international guidance and climate science and we were delighted in July 2021 that our four near-term science-based targets were verified by the Science Based Targets initiative (SBTi). In October, the remainder of our purchased electricity switched to a renewable tariff backed by Renewable Energy Guarantees of Origin certificates, meaning that in the future 100 per cent of our purchased electricity will be from renewable sources enabling us to deliver on our carbon pledge and our SBT. The SBTi Net Zero Standard was launched in late 2021 and we have committed to validate our 2050 ambition to this standard when we revise and revalidate our near-term targets in advance of 2025.

As well as our company-specific science-based targets, we share the UK water sector ambition for key operational emissions to be net zero from 2030. Note that this target has a smaller scope than SBTi and allows use of purchased credits, using agreed offsetting principles.

Energy and carbon report

The Companies Act 2006 (Strategic Report and Directors' Reports) Regulations require us to publish this energy and carbon report applying the 2019 UK Government Environmental Reporting Guidelines, including the Streamlined Energy and Carbon Reporting Guidance (SECR).

We use the financial control approach so our energy and carbon accounting is aligned with the consolidated financial statements for United Utilities Group PLC for 1 April 2021 to 31 March 2022. This includes subsidiaries listed in section A8 on page 260.

Energy strategy

Our energy management strategy has four objectives:

- Efficient use of energy;
- Maximising self-generation and direct supply opportunities;
- Reducing costs (through time of use); and
- Supply resilience to ensure we can deliver our services.

In 2021/22, we set a record for renewable energy generation of 210 GWh through focus on end-to-end performance of our bioresources operations, which produce electricity, heat and biomethane. We completed more solar installations during the year.

Each year we serve a growing population, driving increased energy use as we strive to achieve environmental performance targets. We seek to mitigate this through our energy management programme and in recent years have maintained consistent energy use in the face of these considerable upward pressures.

Energy efficiency actions taken

Our approach to energy efficiency is based on continuous improvement of:

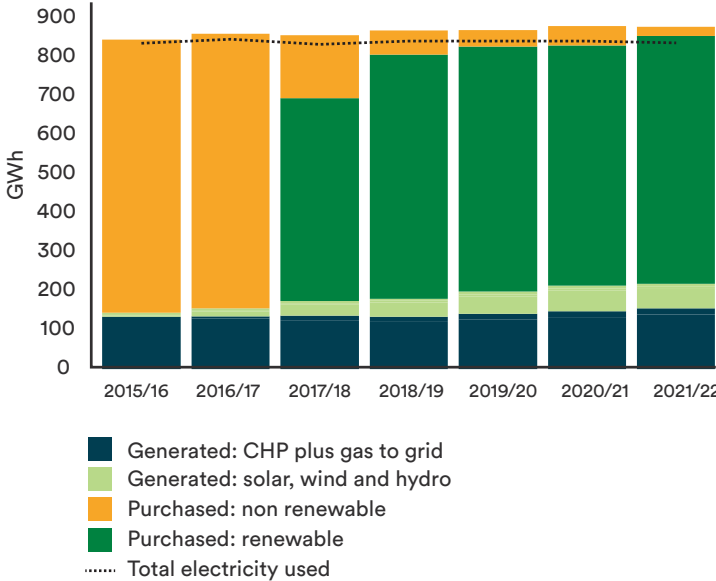
- people – optimising ways of working;
- systems – improving visibility of use and analysis of data systems; and
- technology – targeted investment to remove technological inefficiencies.

Our Energy Management Programme is now firmly established and working well after activities were restricted during COVID-19. The programme carries out site-based workshops and develops ways of working to optimise operations at sites and local area and is underpinned by e-learning packages and a comprehensive energy performance reporting and analysis capability.

To support reporting and analysis, we have invested over recent years to capture data from our fiscal meters and have installed thousands of sub-meters. The resulting data is used to identify opportunities, assess impacts and benefits of trials and maintain good performance. We are piloting analytics to support pump optimisation interventions.

We have a dedicated investment programme to implement targeted energy saving opportunities for existing operations and we focus on ensuring efficient outcomes from our capital programme. Examples of invest-to-save projects include pump optimisation, time-of-use actions and improved control of wastewater treatment.

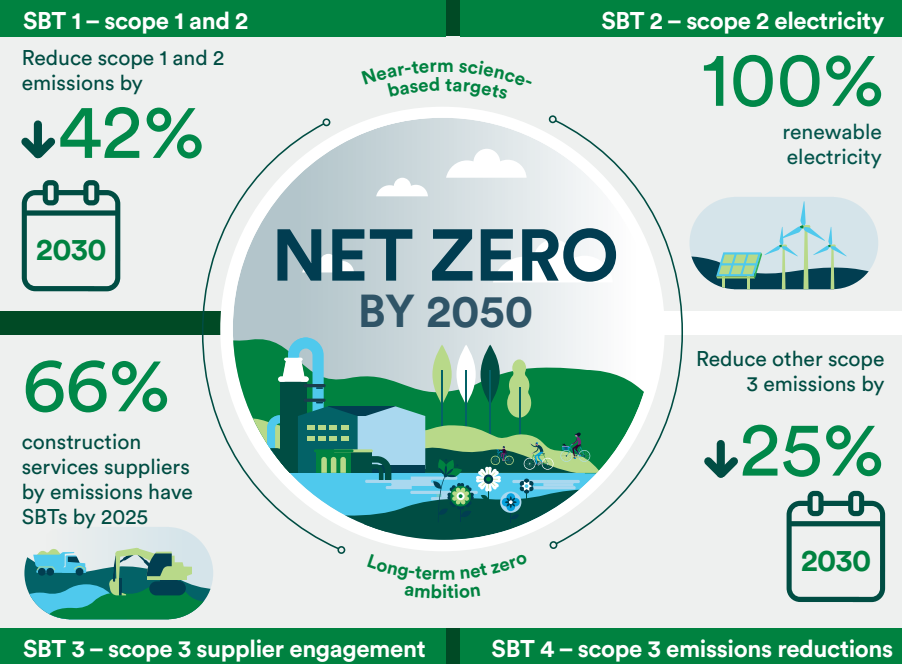
Electricity use, purchase and self generation(1)



(1) Electricity purchased plus self generated is in excess of that used. The difference is what was exported to the grid.

	2021/22 GWh	2020/21 GWh	2019/20 GWh
Energy use			
Electricity	803.3	807.3	802.3
Natural gas	33.8	40.0	38.3
Other fuels(1)	123.1	104.0	116.3
Total energy use	960.2	951.3	956.9
Electricity purchased			
Renewable tariff – half hourly(2)	589.4	591.4	602.9
Standard tariff – non-half hourly(3)	22.3	47.8	40.8
Renewable tariff – non-half hourly(3)	21.6	–	–
Total electricity purchased	633.3	639.2	643.7
Renewable energy generated			
CHP	133.8	127.6	121.5
Solar	47.8	50.7	42.6
Wind	4.8	5.3	5.7
Hydro	7.2	6.9	6.8
Biomethane(4)	15.9	14.8	14.2
Total renewable energy generated	209.5	205.3	190.8
Renewable energy exported			
Electricity(5)	23.5	22.4	18.1
Biomethane(4)	15.9	14.8	14.2
Total renewable energy exported	39.4	37.2	32.3

- (1) Other fuels includes liquid fuel purchased for processing and transport plus business mileage in private vehicles converted to GWh using 2021 UK Government GHG Conversion Factors for Company Reporting.
- (2) Half hourly supply has been on a renewable tariff with 0g CO2e/kWh emissions since June 2017.
- (3) Non half hourly metered supplies were on a standard tariff up to the end of September 2021. The emissions were 289g CO2e/kWh in 2019/20, 178g CO2e/kWh in 2020/21 and 188g CO2e/kWh in 2020/21. Non half hourly supplies moved to a new supplier on a 0g CO2e/kWh renewable tariff on 1 October 2021.
- (4) Biomethane generated and exported to grid is expressed as an electricity equivalent.
- (5) Electricity exported was generated by solar, wind and hydro.

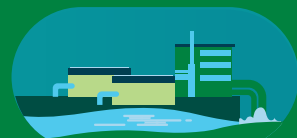


Our approach to climate change

Greenhouse gas emissions

Our carbon footprint is calculated by estimating the individual greenhouse gases that result from all United Utilities' activities, converted into a carbon dioxide equivalent (tCO₂e). We report scope 1, 2 and all relevant scope 3 emissions. Emissions have been estimated using the UK water industry Carbon Accounting Workbook v16 (CAW v16), the 2021 UK Government GHG conversion factors for company reporting and CEDA (Comprehensive Environmental Data Archive) factors. Our greenhouse gas inventory has been independently verified and certified by Toitū carbonreduce programme, as aligned to the GHG Protocol Corporate Accounting and Reporting Standard (2015) and the international carbon reporting standard ISO 14064, Part 1:2018.

Scope 1 Emissions from activities we own or control, e.g. burning fossil fuels, wastewater and sludge processing.



Scope 2 Emissions from purchased electricity.



Scope 3 Emissions from our value chain, e.g. sludge disposal, business travel and products and services.



		2021/22 tCO ₂ e	2020/21 tCO ₂ e	SBT baseline 2019/20 tCO ₂ e
SCOPE 1 & 2 GREENHOUSE GAS EMISSIONS				
Scope 1 Direct emissions				
Direct emissions from burning of fossil fuels		19,207	17,371	15,247
Process and fugitive emissions from our treatment works – including refrigerants		96,020	98,569	96,186
Transport: company-owned or leased vehicles		16,507	16,634	15,739
Total scope 1		131,735	132,574	127,172
Scope 2 Energy indirect emissions				
Grid electricity purchased	Market-based ⁽¹⁾	4,201	8,507	11,789
	Location-based ⁽²⁾	134,492	149,030	164,521
Total scope 2		4,201	8,507	11,789
	Market-based	4,201	8,507	11,789
	Location-based	134,492	149,030	164,521
TOTAL SCOPE 1 & 2 (GROSS)	Market-based	135,936	141,082	138,961
	Location-based	266,226	281,604	291,693
Avoided emissions				
Renewable electricity exported		-4,317	-4,184	-3,979
Biomethane exported	Market-based ⁽³⁾	0	0	0
	Location-based	-10,283	-9,725	-9,302
Green tariff electricity purchased	Market-based	n/a	n/a	n/a
	Location-based	-128,604	-154,095	-136,644
Total avoided emissions		-14,600	-13,909	-13,281
TOTAL SCOPE 1 & 2 (NET)	Market-based ⁽³⁾	131,619	136,897	134,982
	Location-based	118,429	129,680	114,202

- (1) Market-based figures use emission factors specific to the actual electricity purchased. If electricity is on a standard grid tariff they are calculated using factors from suppliers' public fuel mix disclosures, as shown in energy use table on page 95.
- (2) Location-based figures use average grid emissions to calculate electricity emissions and are shown in blue.
- (3) Exported biomethane sold with green gas certificates so has zero avoided emissions in market based accounts. Note in 2022 we have improved disclosure to report both location and market-based methods so the net totals for 2019/20 and 2020/21 have been restated.

		2021/22 tCO ₂ e	2020/21 tCO ₂ e	SBT baseline 2019/20 tCO ₂ e
SCOPE 3 GREENHOUSE GAS EMISSIONS				
Scope 3 Other indirect emissions				
Category 1: Purchased goods and services ⁽¹⁾		292,946	271,871	213,442
Category 2: Capital goods ⁽¹⁾		112,498	95,968	128,286
Category 3: Fuel and energy-related emissions		58,948	42,599	45,262
Category 4: Upstream transportation and distribution (sludge transport)		103	1,119	3,374
Category 5: Waste generated in operations (including sludge disposal to land)		25,458	26,333	27,936
Category 6: Business travel (public transport, private vehicles and hotel accommodation)		1,138	1,226	3,508
Category 7: Employee commuting and home working		4,066	4,108	4,231
TOTAL SCOPE 3		495,145	443,224	426,039
Scope 3 SBT measure (excluding category 2)		382,647	347,256	297,753

- (1) For Category 1 and 2 we use CEDA (an EEIO (environmentally-extended input-output) inventory) to estimate emissions. Other categories use actual activity records and UK government conversion factors.

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United Utilities' greenhouse gas emissions intensity

As in previous years, we state our emissions as tonnes CO₂ equivalent per £million revenue. We include scope 1 and 2 (market-based) emissions only in this measure. We also report the regulated emissions kilograms CO₂ equivalent per megalitre treated (using the location-based method as calculated in the CAW v16), as these are common metrics for our industry.

Regulated emissions per megalitre water treated			Regulated emissions per megalitre sewage treated		
2021/22	106.91		2021/22	144.21	
2020/21	118.51		2020/21	152.26	
2019/20	131.98		2019/20	168.51	
Scope 1 and 2 emissions (gross) per £m revenue			Scope 1 and 2 emissions (net) per £m revenue		
2021/22	73.0		2021/22	70.7	
2020/21	78.0		2020/21	75.7	
2019/20	74.7		2019/20	72.6	

Scope 1 emissions

Wastewater and sludge processes cause 73 per cent of our scope 1 emissions as the gases released, nitrous oxide (N₂O) and methane (CH₄) have much greater global warming potentials than carbon dioxide (CO₂).

Our process emissions are currently estimated as a direct function of the amount of wastewater we treat. We are undertaking research with other UK water companies to better quantify these emissions from measured values and to find ways to reduce or capture those emissions for beneficial use.

We are investigating and trialling ways to reduce our use of fossil fuels, including for transport, through both efficiencies and use of alternative fuels.

Scope 2 emissions

Our market-based scope 2 emissions have halved this year because we switched our remaining non-renewable purchased electricity to a renewable tariff in October 2021. Next year these emissions will be negligible.

Scope 3 emissions

Like most organisations, most of our scope 3 emissions are in GHG Protocol category 1 (products and services) and category 2 (capital goods); the latter being those provided by our construction services suppliers. We currently calculate category 1 and 2 emissions using records of the amount we have spent. This provides an indicative estimate but does not show the GHG impact of management choices, instead fluctuating with the scale of our investment programme. This can be seen in our increase in reported emissions this year compared to last. We are working internally and with supply chain partners to enhance relevant data and systems so that we can calculate these emissions based on types and quantities of materials used, thereby showing the full impact of our management choices.

