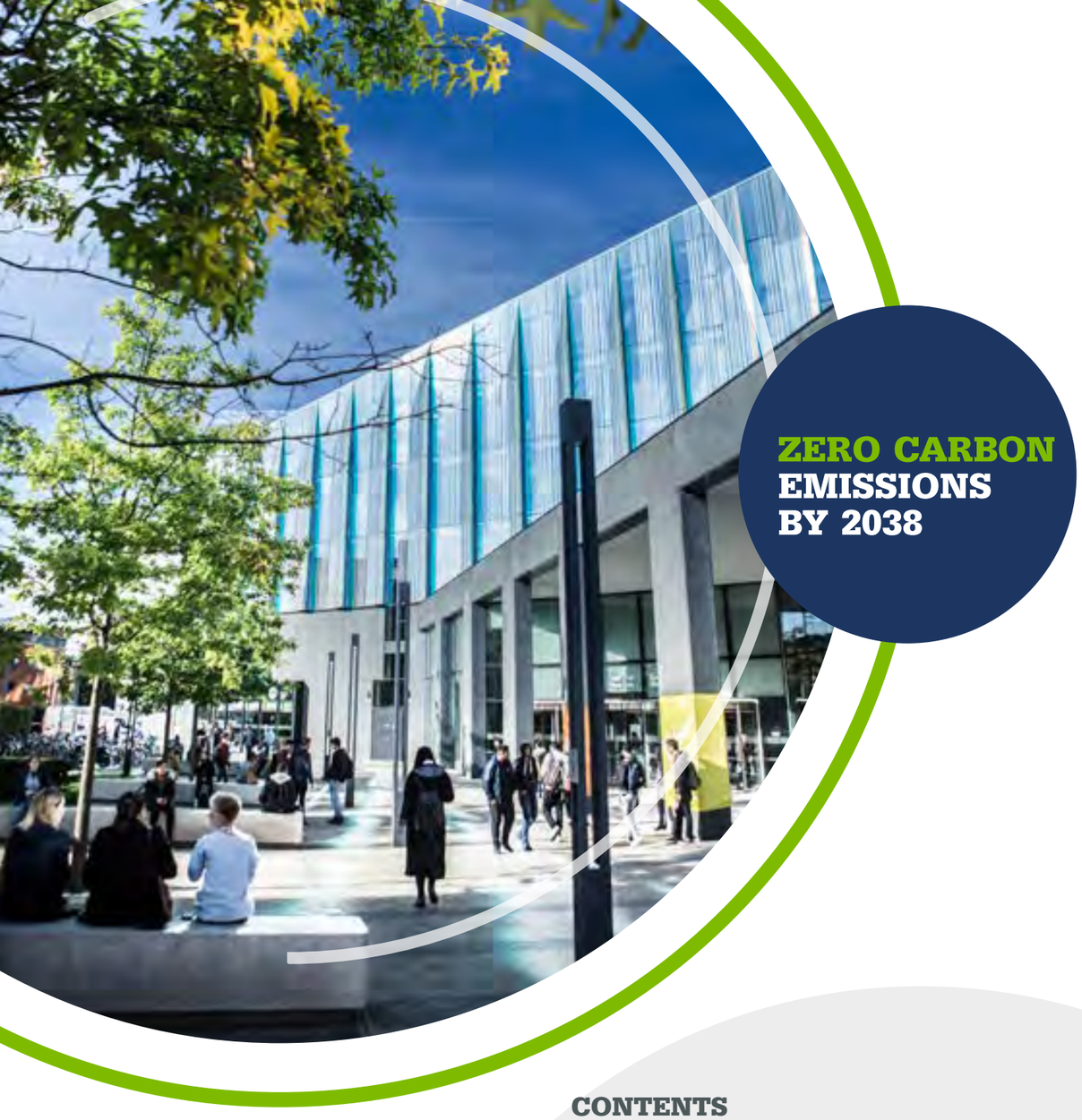
Manchester Metropolitan University

Carbon Management Plan

2020-2026

OUR ROUTE TO ZERO CARBON



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A COMMITMENT TO ZERO CARBON

Manchester Metropolitan University is a sustainable university with a demonstrable commitment to social responsibility, a strong environmental performance, related academic and research specialisms, and bold ambitions for the future.

As part of our approach to sustainability, we are determined to reduce our carbon emissions[1], and ultimately to eliminate them.

The Carbon Management Plan is a key element of the University's Sustainability Strategy to 2030 and sets out a path that will enable us to achieve zero carbon emissions by 2038 or earlier.

At the time this report was published, we had achieved a top-three ranking in the People and Planet University League for eight consecutive years, been named in the world top 100 of the Times Higher Education's Impact Rankings 2021, and taken part in a succession of award-winning initiatives.

Through our academic and research specialisms, and our sustainability initiatives and performance, we are determined to play our part in the global effort to limit climate change, reduce inequality, and to protect our planet and all that lives upon it.

An urgent and compelling case for action

Indicators of the climate crisis are all around us. Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C, and to increase yet further with global warming of 2°C[2].

As a university, we believe that we have a particular obligation to act, and to act with urgency:

- **We are uniquely positioned to make a positive contribution** – we can deliver impactful and relevant education and research that generates the skills, knowledge, and innovations required for climate change mitigation and adaptation on a global scale.
- **We can lead by example** – encouraged by the commitments made by the UK government and by Manchester City Council, we are determined to accelerate our own initiatives to limit and eradicate our direct and indirect emissions.
- **Our students and stakeholders expect action** – nine in ten students believe sustainable development is something their university or college should actively incorporate and promote, while 91% say they are fairly or very concerned about climate change[3].

A leading sustainable university in a leading sustainable city

In 2018, Manchester City Council made a series of commitments based on a proposal called 'Playing Our Full Part'[4], developed by the Manchester Climate Change Board and Agency. One was to adopt new science-based carbon reduction targets for Manchester[5] to become a zero carbon city by 2038 - 12 years ahead of the UK government's already ambitious national net zero target of 2050. In 2019, it declared a climate emergency, becoming one of the first councils to do so in the UK.

This makes Manchester one of the world's leading cities for action on climate change, bringing us full circle from the industrial revolution to a new zero carbon revolution. It will also mean creating a dynamic and resilient economy where businesses thrive, and residents have access to good, secure jobs and a high quality of life.

OUR 2038 ZERO CARBON COMMITMENT

Strongly supporting the city of Manchester's ambition, and as a key partner in the Manchester Climate Change Partnership and Partnership Board[6], in 2018 we committed to be a zero carbon University by 2038, or sooner.

We aim to be zero carbon for our direct carbon emissions (known as scope 1 and scope 2 emissions[7]) and have aligned the University with the approach set out in the 'Playing Our Full Part' report.

In this plan, we set out the initial path that will enable us to achieve this target.

A strong record of achievement

We are proud of our achievements. Our awards, accolades and milestones provide a measure of how far we have already come. They also feed into our ambition and provide a platform for what comes next.

Some of our highlights from 2020 – the year this plan was developed- are shown opposite.

We acknowledge that our 2019-20 performance was affected by the COVID-19 pandemic. For example, with our campus buildings closed or operating at reduced capacity for several months, many metrics were artificially low, such as our energy and water use, waste levels and carbon emissions.

GLOBAL TOP 100
Named in Times Higher Education's Impact Rankings 2021

2ND GREENEST UNIVERSITY IN THE UK[8]

WINNER
MetMUnch wins Collaborative Award for Teaching Excellence[11]

72%
of University vehicles now low or zero emission

50%
re-use and recycling rate

45.1%
reduction in total water consumption

61.7%
reduction in carbon emissions[10]

WINNER
Green Gown Award for Carbon Literacy for Students project[9]

RESPONSIBLE FUTURES
NUS accreditation received for the third time[12]

GROW
Hugely successful meat-free café launched by MetMUnch and our catering services

ISO 14001:2015
reaccreditation achieved[14]

TRANSFORMATIONAL RESEARCH
Lead partner in an £8.7m project to turn single-use plastic into 3D printable material[13]

PROVOST AND DEPUTY VICE-CHANCELLOR'S STATEMENT

Manchester Metropolitan University has a strong, demonstrable commitment to sustainability, and our environmental performance is evidence of our wider sustainability ethos.

Our progress towards reducing our carbon emissions has already been outstanding. We set a stretching goal to halve our direct emissions by 2020-21. In fact, we exceeded this target a year ahead of schedule, with a 61.7% decrease in 2019-20. We then raised our ambitions further, aiming to become zero carbon by 2038.

To achieve this commitment, we have developed this six-year Carbon Management Plan.

In our fast-changing world, it is simply not feasible to set out a definitive 18-year plan of fully costed, fully committed initiatives. Therefore, we have broken our plan down into a series of three manageable six-year timeframes – the first of which, from 2020 to 2026, is covered by this Carbon Management Plan.

In this publication, we set out how we will eliminate at least 5,051 tonnes of carbon emissions by 2026 to keep us on the right trajectory. Then, through the two subsequent six-year plans, how we intend to be a zero carbon University by 2038.

The plan forms part of a much wider sustainability story at Manchester Metropolitan University.

As demonstrated by our many related achievements and accolades, we are well regarded as a sustainable university with a range of related academic and research specialisms, as well as a strong environmental performance.

We are now looking towards 2030 and developing a new sustainability strategy that sets out our vision towards being a leading University in the field; one that contributes towards the world's agenda for sustainable development. Greater Manchester has set an ambitious target to be a zero carbon city by 2038, and we will play our part in meeting the challenging reductions required. However, this is not the only measure, and we will continue to incorporate sustainability across all areas of our work.

Professor Steve Decent
Provost and Deputy Vice-Chancellor
Chair of the Environment Strategy Group

BUILDING ON PAST SUCCESSES

At Manchester Metropolitan University, sustainability is central to everything we do. In fact, it's one of our five key strategic themes – the core principles that drive our ambitions and shape our approach.

For many years, we have set ambitious targets for meaningful change, charting a path towards global leadership in the Higher Education sector for sustainable development in both our Environmental Sustainability Policy and our Environmental Sustainability Strategy.

For example, we launched our first Carbon Management Plan in 2010, we established an Energy Investment Strategy in 2017 and, from a baseline year in 2005-2006, had been working towards a 50% reduction in direct carbon emissions by 2020-2021. In the event, we exceeded this target ahead of schedule, achieving a 61.7% reduction by 2019-2020.

Also in 2019-2020, to align our goals with those set out by Manchester City Council, we committed to becoming a zero carbon university by 2038.

The significant progress was largely due to successes in three key areas:

1. Investing in energy efficiency projects

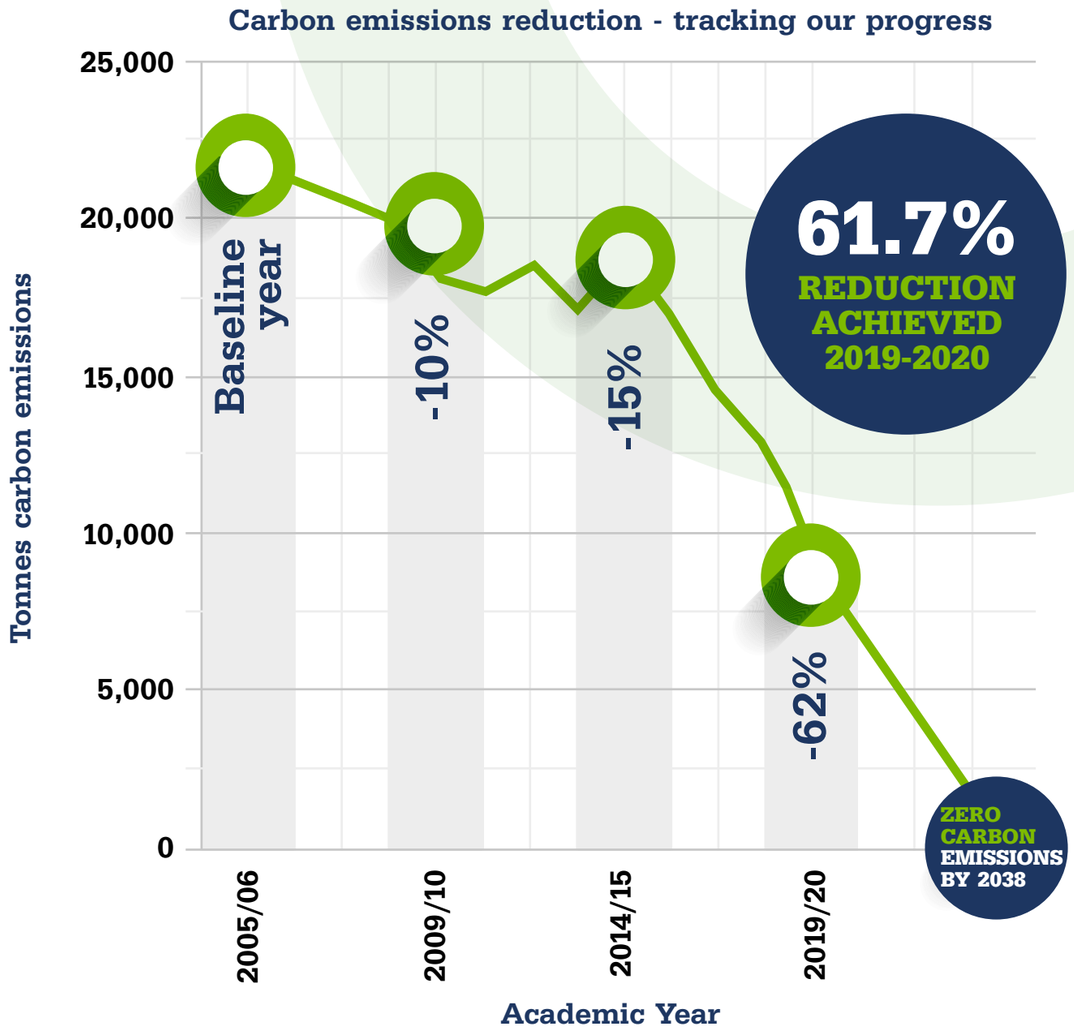
In 2010, Manchester Met established a Revolving Green Fund. Drawing on a combination of external and internal funding, this ensures that, each year, a budget is available to invest in energy efficiency projects.

Within its first decade, this fund had enabled us to invest £3m in energy efficiency projects across the University estate – leading to an annual carbon saving of 2,000 tonnes per year.

2. Investing in on-site renewable energy

A key principle has been to increase our capacity to generate, store and distribute smart renewable and low carbon energy on-site.

By 2020, for example, five buildings had been fitted with solar photovoltaic[15] (PV) panels (All Saints building, the Library, the Business School, the new Institute of Sport (formerly 99 Oxford Road), and Brooks building), with more planned for the new School of Digital Arts (SODA) and new Science and Engineering building. Meanwhile, we have also incorporated various renewable and low carbon technologies across the estate – including borehole cooling at Birley energy centre and the Business School, Combined Heat and Power (CHP) at Birley energy centre, evaporative cooling at the Benzie building, and air source heat pumps at the Students' Union.



3. Consolidating and upgrading our estate

Since 2008, we have pursued an Estates Masterplan, which enabled us to consolidate our estates and replace older energy-intensive sites with newer more energy efficient buildings. In particular, we rationalised from seven separate campus sites to just one, and sustainability was a central consideration in all of our new building and refurbishment plans.

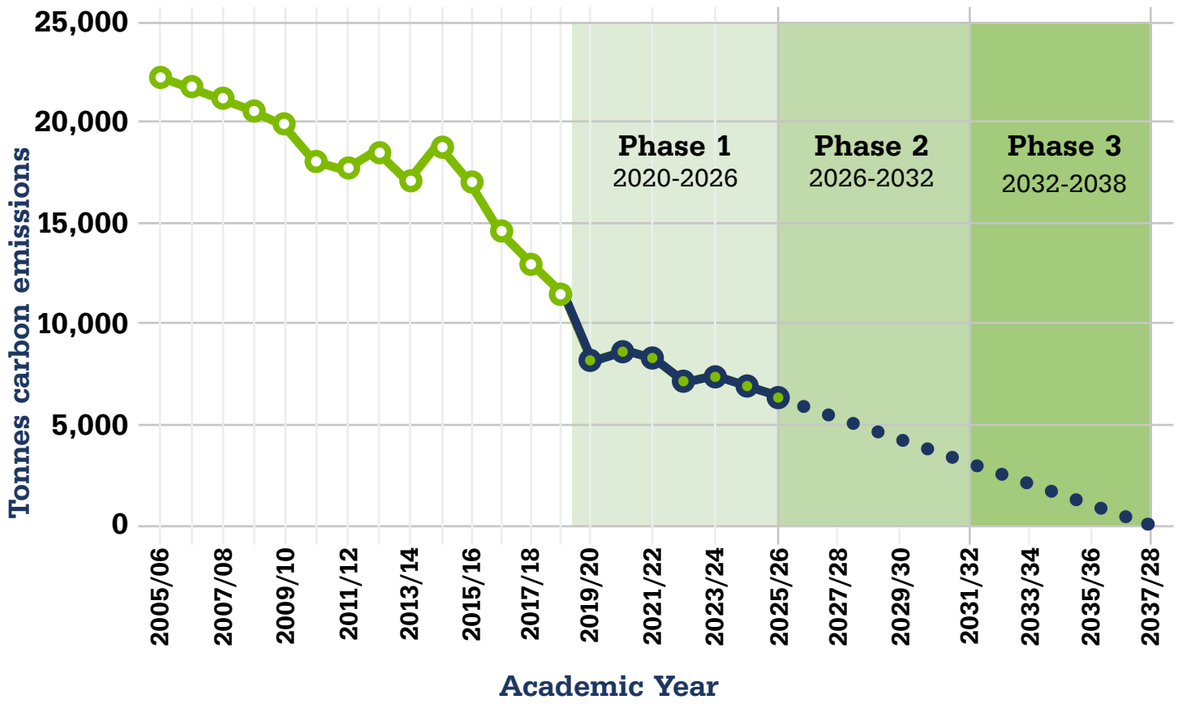
For example, new buildings such as Brooks, Benzie, the Students' Union, and the Business School all achieved a BREEAM[16] Excellent or Very Good rating. Meanwhile, our large-scale refurbishment projects, such as 6 Great Marlborough Street and the Ormond Building, all achieved an SKA[17] Silver rating.

ABOUT THIS CARBON MANAGEMENT PLAN

This Carbon Management Plan sets out the path that will enable us to become zero carbon by 2038 – aligned with the approach set out for Manchester in the 'Playing Our Full Part'[18] proposal, and committed to by Manchester City Council.

The plan comprises a six-year programme of initiatives that will take us through to 2026, setting the trajectory and paving the way for two subsequent six-year plans which will culminate in 2038.

Manchester Met's Carbon Emissions Projection (2005 – 2038)



The plan covers on-site emissions (scope 1 and scope 2) which are under our direct control, such as those from fuels and heating sources. An approach to tackling indirect emissions (scope 3) is included in the University's 2030 Sustainability Strategy[19].

Improving Manchester Metropolitan University's carbon performance requires us to work from a baseline position, from which we can develop and evaluate various options for the future. The 2018-2019 academic year was used as our baseline year, partly to align with the approach taken for the city of Manchester, and partly because it predates the COVID-19 pandemic (which impacted our 2019-2020 emissions performance).

Pursuing a rigorous approach, informed by energy experts

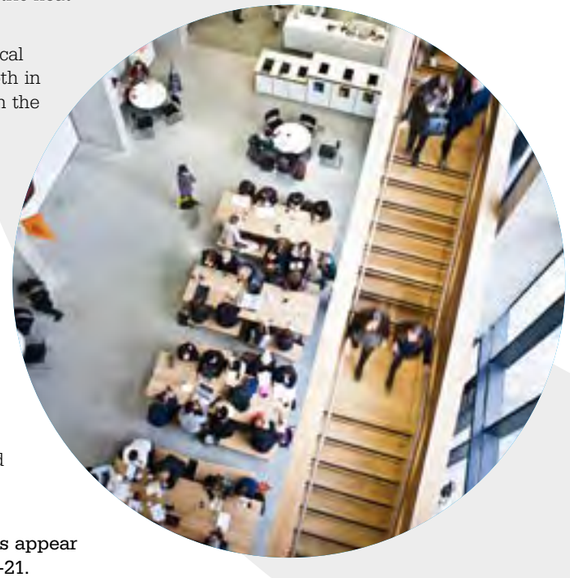
In developing the plan, we worked with specialist environment consultants Arup to select the six-year programme of investments and initiatives. An important part of the process was to evaluate several different scenarios to meet our on-site energy demands and determine their respective merits. To do this this, we developed a modelling tool to enable us to forecast future energy and carbon savings.

Evaluating five main scenarios – and selecting the most promising

In formulating the plan, we focused on the potential for on-site energy generation. In addition to the installation of more solar photovoltaic (PV) panels and undertaking energy efficiency improvements, we investigated five main scenarios to meet our on-site heating and hot water needs.

These scenarios enabled us to analyse the impact of a mix of low-carbon technologies – namely, combinations of biofuel, natural gas, hydrogen fuel cells and electric heat pumps.

Each was evaluated according to its cost, technical feasibility, and potential for carbon reduction, both in the short and long-term. For more information on the scenarios and our analysis, see page 15.



Acknowledging the potential implications of the COVID-19 pandemic

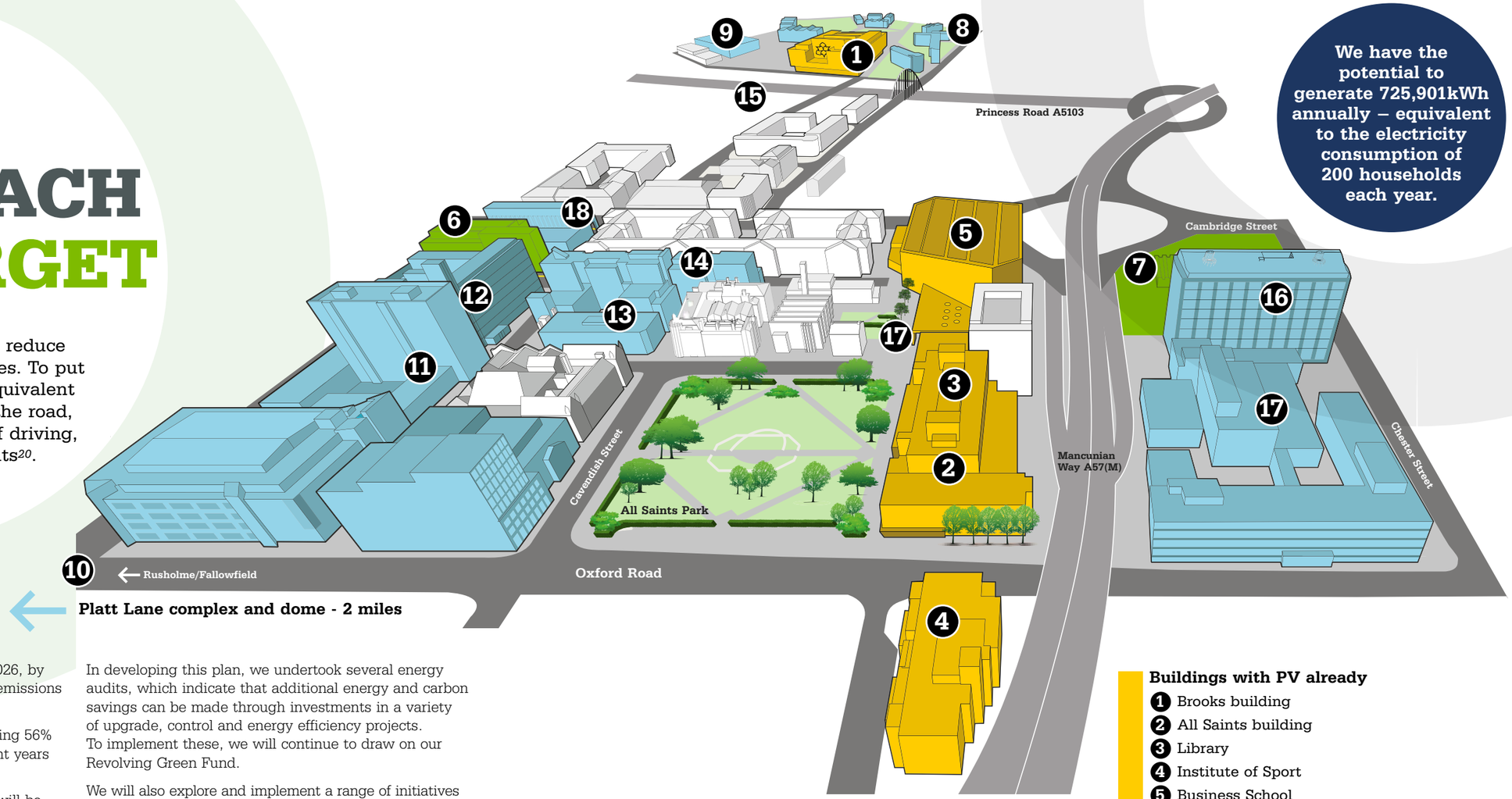
The plan was formulated during the height of the COVID-19 pandemic. At the time, our working assumption was that, once restrictions eased, the University would return to business as usual.

However, if there are longer-term implications for the way Manchester Metropolitan University functions, there could be an impact on the implementation of this plan. We will monitor and review this as part of the annual review cycle.

Further details of the plan, its underlying assumptions, and the decision-making process appear in the about our plan section, from pages 20-21.

HOW WE WILL REACH OUR TARGET

To meet our 2038 target, we need to reduce our carbon emissions by 11,479 tonnes. To put that into context, 11,479 tonnes is equivalent to removing almost 2,500 cars from the road, eliminating 29 million miles worth of driving, or avoiding 34,000 transatlantic flights[20].



We have the potential to generate 725,901kWh annually – equivalent to the electricity consumption of 200 households each year.

Buildings with PV already

1. Brooks building
2. All Saints building
3. Library
4. Institute of Sport
5. Business School

Buildings with PV planned (confirmed)

6. SODA
7. Science and Engineering building (new development)

Feasibility studied commissioned

8. Birley student accommodation
9. Birley multi storey car park
10. Platt Lane complex and dome
11. Chatham
12. Benzie
13. Righton
14. Cavendish
15. Birchall Way
16. John Dalton Tower
17. John Dalton Central
18. Students' Union

This Carbon Management Plan takes us up to 2026, by which time we aim to have reduced our carbon emissions by a minimum of 44% – or 5,051 tonnes.

We will then be on track to eliminate the remaining 56% of emissions over the course of the 12 subsequent years to 2038.

The emission reductions addressed in this plan will be achieved through four main areas of activity:

1. Through the energy efficiency of our new buildings

As part of the Manchester Metropolitan University Estates Masterplan, several new and refurbished buildings are due to for completion during the course of this Carbon Management Plan (including the new School of Digital Arts, the Institute of Sport, our new student accommodation, Archway Halls in 2021, and the Science and Engineering building in 2023).

We have taken full account of the carbon emissions associated with these new buildings. A new design guide will ensure that any building projects completed after the close of this Carbon Management Plan in 2026 are planned and built to a net zero carbon standard.

2. Through additional energy efficiency and energy saving initiatives

Our University estate includes buildings of varying ages and conditions. We recognise that we need to make improvements to some to reach our zero carbon target.

In developing this plan, we undertook several energy audits, which indicate that additional energy and carbon savings can be made through investments in a variety of upgrade, control and energy efficiency projects. To implement these, we will continue to draw on our Revolving Green Fund.

We will also explore and implement a range of initiatives to reduce energy demand. For example, by building on the success of past campaigns, we see the potential to work more closely with students living in our student accommodation to better understand their energy needs and realise savings. Approaches could include:

- increasing carbon and energy literacy across the University
- incentivising and rewarding energy efficiency
- developing communication campaigns to raise awareness of the need to reduce energy use.

3. Through a significant increase in on-site energy generation and storage

On-site energy generation is an integral part of our journey towards zero carbon and focuses on two key areas - roof-top solar photovoltaics and on-campus energy centres. We will also consider the storage of PV generated energy, giving flexibility and efficiency of energy deployment throughout our peak demand periods.

3.1 Roof-top solar power

Manchester Metropolitan University already benefits from an extensive array of solar PV panels across five of our buildings. We aim to adopt this approach across all suitable roof spaces, and a pre-feasibility assessment has revealed the extent of this opportunity.

We have the potential to generate an additional 467,000kWh across our campus. Combined with the PV panels already installed, this would bring our total annual generating capacity to around 725,901kWh – which is equivalent to some 3% of the University's total electricity demand, or the electricity consumption of 200[21] households each year.

Subject to the necessary structural surveys, planning and business case approval, the new panels are scheduled for installation from 2022 to 2023.

3.2 On-campus energy centres

A focus of our decarbonisation plans is the use of on-site energy generation through a series of low carbon on-campus energy centres, which generate heat in a central location and distribute it via a network of underground pipes to surrounding buildings.

By centralising our heat plants in this way, we can increase our efficiencies and maximise the impact of our investments in low carbon energy, while also meeting the heating and hot water needs of our buildings.

Birley energy centre

Buildings served by the Birley energy centre

Brooks building

Birley Halls student accommodation

Science and Engineering energy centre

Buildings served by the Science and Engineering energy centre

John Dalton Tower

New Science and Engineering building

John Dalton Central

Scenario 1 – Biofuel and gas

Biofuel powered Combined Heat and Power (CHP) at Birley energy centre, supplemented by gas boilers.

Advantages of Biofuel: Minimal changes to existing facilities and infrastructure, is tried and tested technology, lower carbon emissions than gas equivalents.

Disadvantages: Requires fuel storage facilities, potential air quality impacts, does not allow for complete decarbonisation.

42% reduction

Scenario 2 – Hydrogen fuel cells

Hydrogen-powered CHP supplemented by gas boilers.

Advantages of hydrogen: Highly efficient, synergies with fuell-cell expertise, potential for significant carbon emissions reduction.

Disadvantages: Emerging technology risks, high implementation costs, reliant on gas in the short-term.

26% reduction

Scenario 3 – Heat pumps and gas boilers

Heat pumps and gas boilers, each meeting 50% of future heat demand.

Advantages Ease of implementation, minimal changes to existing facilities and infrastructure, low running costs.

Disadvantages Resulting carbon emissions due to 50% of heating demand being met by gas.

39% reduction

Scenario 4 – Heat pumps and electric boilers

Heat pumps to meet 80% of the demand, with new electric boilers used to top-up the heat as required.

Advantages of heat pumps Provides the the highest level of long-term carbon emissions savings and the potential to completely decarbonise energy use.

Disadvantages High implementation and ongoing running costs.

44% reduction

Scenario 5 – Biofuel and gas

Biofuel powered Combined Heat and Power (CHP) at Birley and Science and Engineering energy centres, supplemented by gas boilers.

Advantages Minimal changes to existing facilities and infrastructure, highest level of short-term carbon savings, lower carbon emissions than gas equivalents.

Disadvantages: Requires fuel storage facilities, potential air quality impact, does not allow for complete decarbonisation.

46% reduction

Carbon emissions reduction by 2026
(Forecast savings relative to the 2018/19 baseline and using BEIS 2016 projected carbon factors)

A core consideration was to select the optimum technology to use within these energy centres. We, therefore, evaluated five scenarios, based on combinations of biofuel, natural gas, hydrogen fuel cells, electric heat pumps and electric back-up boilers. For each, we factored in the plans set-out in our existing Estates Strategy and the wider energy efficiency projects that had already been agreed.

Based on carbon emissions, cost and feasibility, we have opted to pursue an all-electric approach (scenario 4), comprising of:

- **electric heat pumps** – to act as our primary energy source for heating and hot water.
- **on-site electricity energy generation and storage** – generating as much electricity on-site as possible, through the use of solar panels. Creating smart energy storage hubs to allow the most efficient deployment of generated energy throughout peak electricity demand periods.
- **off-site electricity** – sourcing the remainder of our electricity demand from an off-site renewable energy installation.

About heat pumps – how they work, and the benefits they bring

A focus of this Carbon Management Plan is the use of heat pumps – which will become our primary energy source for our heating and hot water.

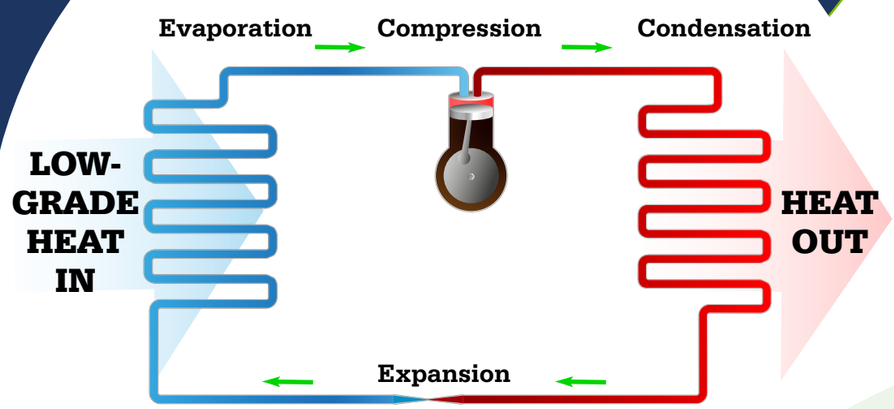
Heat pumps extract low grade[22] heat from outside air and water, boost it to a higher temperature using a compressor, then transfer it to the University's heating system. They work a bit like refrigerators or air conditioners in reverse.

- The heat pumps absorb heat from the outside air or water into a liquid refrigerant at a low temperature.
- Using electricity, the pump compresses the liquid to increase its temperature. It then condenses back into a liquid to release its stored heat.
- The heat is then sent to the heating systems or hot water cylinders.

Although the pumps use electricity to run, they use far less electrical energy than the heat they produce – which makes them very energy efficient.

Also, the heat pumps continue to work even when the weather is cold. In fact, they can continue to produce heat at temperatures as low as -15°C. This is because air at any temperature above absolute zero contains some energy that can be absorbed.

How does a heat pump work?



Within the timeframe of this plan, where feasible, we aim to replace 100% of the gas-fed heating with electric equivalents at both the Birley and the Science and Engineering energy centres. This is the only scenario which provides a clear pathway to becoming entirely zero carbon. Also, from an air quality perspective, it means that no local emissions are released into the atmosphere.

This approach also benefits from the ongoing decarbonisation of the electricity grid and, if combined with a green Power Purchase Agreement[23] (see point 4 below), offers the potential for true zero carbon energy.

Ultimately, we plan to develop three all-electric on-site energy centres, located at Birley, the new Science and Engineering, and All Saints buildings. The first two (Birley and the Science and Engineering energy centres) will come online during the course of this plan, with the third (at All Saints) forecast for completion in the next Carbon Management Plan (2026-2032).

4. Through off-site renewable electricity generation

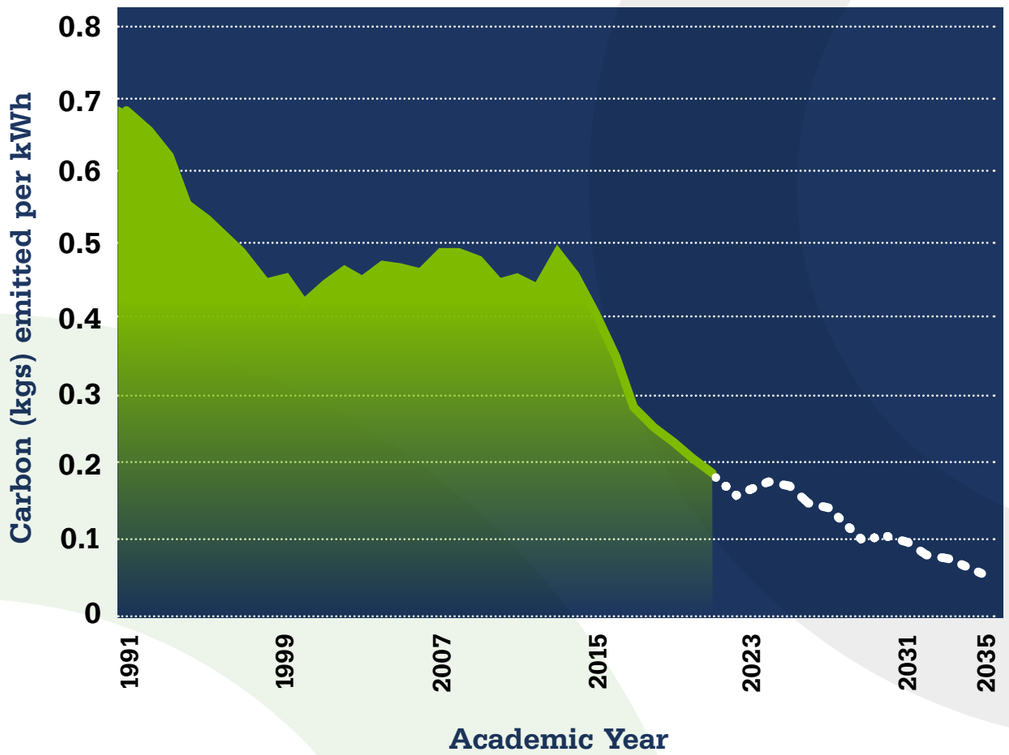
As part of this plan, we are also investigating the potential for Manchester Metropolitan University to buy zero carbon electricity from an off-site renewable power installation – such as wind turbines or solar Photovoltaics.

By investing directly in renewable power through a Power Purchase Agreement, we have the potential to meet 100% of the University's electricity demand from an exclusively and unequivocally carbon-free source.

This would enable us to accelerate our zero carbon plans and achieve a carbon reduction of 80% by 2026 (as opposed to the 44% minimum reduction that is otherwise targeted).

In mid-2021, the University issued an invitation to tender for this Purchase Power Agreement. If successful, this could potentially come into effect from April 2023.

Decarbonisation of the electricity grid



The decarbonisation of the power sector is necessary to achieve carbon (green house gas) emissions targets set by the UK for emissions to reach 'net zero' by 2050. The graph above demonstrates how the electricity grid has decarbonised over a number of years - due to a substantial reduction in coal-fired generation and a corresponding increase in the share of renewables in the energy mix, and secondly because the improved energy efficiency of products has reduced demand for power.

OUR TIMELINE – TO 2026 AND BEYOND

This plan covers the six-year period from 2020 to 2026. Over this time, our target is to reduce carbon emissions by a minimum of 44% – or 5,051 tonnes a year.

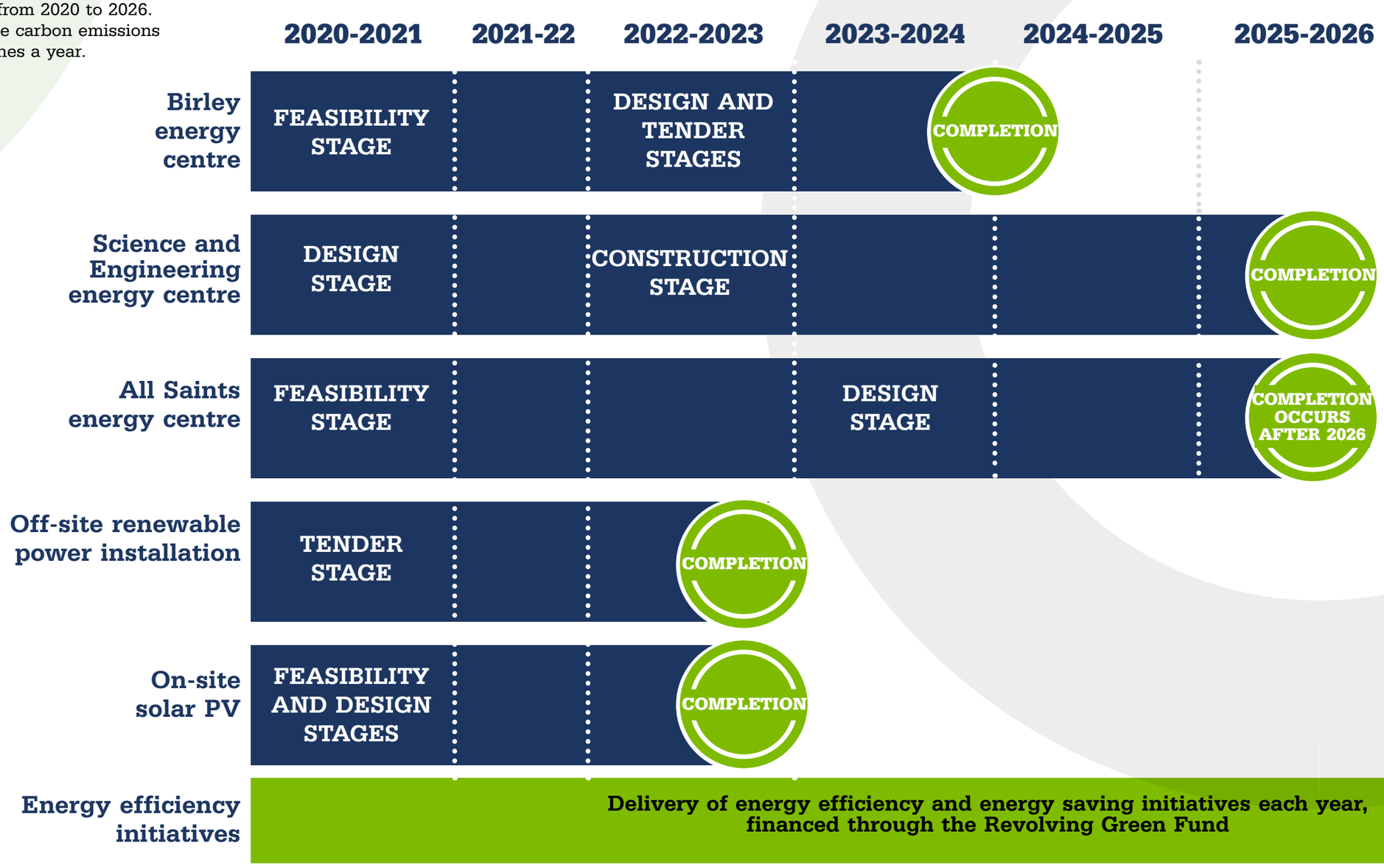
This represents a considerable improvement on our baseline performance, while also setting the trajectory and paving the way for two subsequent six-year plans taking us up to 2038 when we aim to be a zero carbon university.

2020-2026 REDUCE CARBON EMISSIONS BY 44%

The initiatives in the two subsequent six-year plans are likely to include:

- benefiting from the decarbonisation of the electricity grid
- making ongoing investments in energy efficiency projects
- benefiting from new zero carbon new buildings
- implementing a zero or low carbon solution at the All Saints energy centre
- developing a zero carbon off-site renewable power installation
- investigating hydrogen solutions as the technology advances
- implementing long-term behavioural programmes.

To meet our zero carbon commitment, we will aim to deliver on everything outlined in this plan. When the plan concludes, we will also have formulated a programme of initiatives for the subsequent six years (taking us through to 2032) and have a good sense of the type of initiatives that will enable us to meet – or exceed – our 2038 zero carbon target.



ABOUT OUR PLAN

This publication has been created from the University's full Carbon Management Plan (2020-2026) which was approved by the Board of Governors' Finance and Resources Committee in November 2020. This publication was subsequently created in 2021.

Development approach

As well as working in partnership with specialist environmental consultants to develop a three-phase Carbon Management Plan, an extensive range of activities were undertaken to ensure our approach aligns with local and regional zero carbon strategy and targets, and to ascertain an ambitious yet realistic route to zero carbon by 2038.

Stakeholder engagement

As part of the development process for the plan, we engaged directly with academic and professional colleagues, to understand how the University could best realise its zero carbon ambition by 2038 or sooner.

We will continue to engage students and staff in the ongoing oversight, review and development of the Carbon Management Plans. This will include:

- co-opted Environment Strategy Group membership positions for staff and students[24].
- actively providing learning opportunities related to the projects outlined in the plan, including student placement opportunities and research projects.
- consulting with our academic and professional community.

Scope

The plan covers on-site carbon emissions (scope 1 and scope 2) which are under our direct control, such as from fuels and heating sources. We will not use any form of carbon offsetting scheme to reduce our direct carbon emissions. Our approach to tackling indirect emissions (scope 3) is included in the University's 2030 Sustainability Strategy, due for release in 2021.

Leadership and Governance

A range of University boards and committees are responsible for the oversight, implementation and review of the Carbon Management Plan. They will ensure effective leadership and communication to progress the implementation of the plan.

University group or role	Responsibility
Board of Governors' Finance and Resources Committee	• Receive reports and information relating to the implementation of the Carbon Management Plan. • Scrutinise requests and as appropriate recommend approval of projects with a value of above £5m to the Board of Governors.
University Executive Group (Led by the Vice-Chancellor)	• Receive reports, information and projects relating to the implementation of the plan. • Approve the Carbon Management Plan. • Approve future revisions to the Carbon Management Plan. • Scrutinise requests and as appropriate recommend approval of projects (up to the value of £5m) to the Finance and Resources Committee.
Environment Strategy Group (Chaired by the Provost and Deputy Vice-Chancellor)	• Receive reports, information and projects relating to the implementation and review of the plan. • Advise the University Executive Group on the progress towards its implementation and achievement of the associated carbon targets.
Estate Strategy Group (Chaired by the Chief Operating Officer)	• Scrutinise requests and as appropriate recommend approval of building projects relating to the Carbon Management Plan (up to the value of £1m).
Director of Estates, Facilities and Capital Development	• Strategic oversight and to ensure implementation of the Carbon Management Plan. • Review progress and propose amendments should they be required·

Reviewing and reporting our progress

The University will review and report the progress towards the implementation of the Carbon Management Plan annually.

We will publicly report our progress through a range of communications including the University's Annual Report and Financial Statement, and the Annual Sustainability Statement.

Resourcing this plan

It is imperative that we support our ambitious Carbon Management Plan with appropriate levels of financial investment. Many of the projects outlined in the plan are large-scale, and require funding on a business-case basis, in stages. This often means that feasibility studies will be commissioned as a starting point, before committing further investment.

An overview of financial investment allocated to progress this plan to date is provided in Table 1 on page 23.

Data, information and assumptions

Unless otherwise stated, data and information provided within this report relate to the University's academic year, which runs from 1 August to 31 July.

The baseline year used to calculate the carbon emission reduction was academic year 2018-2019.

Forecasts for future energy consumption figures were based on the University's planned capital projects, that were outlined in the Estates Masterplan at the time the Carbon Management Plan was developed in summer 2020.

Carbon emissions projections for electricity and gas were based on conservative estimates from the Department for Business, Energy and Industrial Strategy (BEIS) 2014 Energy and Emission Projections.

Approved date (Full Carbon Management Plan)	3 November 2020
Approved by	Finance and Resources Committee

GLOSSARY OF TERMS

BREEAM
The Building Research Establishment Environmental Assessment Method (BREEAM) is the world's longest established method of assessing, rating, and certifying the sustainability of buildings. BREEAM works to raise awareness amongst owners, occupiers, designers and operators of the benefits of taking a sustainability approach[25].

Carbon emissions
When we refer to our carbon emissions and emissions this includes carbon dioxide and carbon dioxide equivalent(s).

Low-grade heat
There are various types of low-grade heat sources that can be utilised for supplying thermal energy. These utilise heat from waste industrial heat, solar energy and geothermal waste heat.

Photovoltaic
Photovoltaic cells are the main component that makes up a solar panel.

Power Purchase Agreement
A contract between an energy generator and an energy buyer or 'end-user'. Power purchase agreements (PPA) can provide a fixed price for energy generated over the duration of the contract, removing exposure to energy price volatility and allowing for accurate and predictable cost planning[26].

Scope emissions
Greenhouse gas emissions are categorised into three groups or 'scopes' by the most widely-used international accounting tool, the Greenhouse Gas (GHG) Protocol. While scope 1 and 2 cover direct emissions sources (e.g., fuel used in company vehicles and purchased electricity), scope 3 emissions cover all indirect emissions due to the activities of an organisation[27].

SKA
An environmental assessment method, benchmark and standard for non-domestic refurbishment projects.

Zero carbon
Causing or resulting in no net release of carbon dioxide into the atmosphere[28].

ZERO CARBON EMISSIONS BY 2038

APPENDICES

Appendices

Table 1: Financial investment allocated to progress the Carbon Management Plan up to 2020-21.

Carbon reduction activity	
Carbon Management Plan - development	
Power Purchase Agreement (PPA) - consultancy support	
Power Purchase Agreement (PPA) - legal support	
Solar Photo voltaic - feasibility and design	
Science and Engineering heat pump - feasibility	
Science and Engineering heat pump - design	
Power Purchase Agreement (PPA) - tender stage	
Birley Energy Centre remedial works	
Birley Energy Centre heat pump feasibility	
Green Revolving Fund (Salix) projects – energy efficiency projects	
Total budget allocated	**£716,100**

FOOTNOTES

1 *A definition of this term is provided in the glossary, page 22.*

2 *IPCC Special Report for Policy Makers: Global warming of 1.5 °C.*

3 *2020 NUS Skills Survey.*

4 *'Playing Our Full Part' sets four proposals to Manchester to limit the impacts of climate change.*

5 *The reduction targets and definitions of zero carbon were based on independent analysis and recommendations by the Tyndall Centre at the University of Manchester.*

6 *Manchester Metropolitan University is a member of the Manchester Climate Change Partnership and Partnership Board – working to take urgent action to achieve zero carbon targets, and to support others in the wider Manchester community and economy to take urgent action.*

7 *A definition of this term is provided in the glossary, page 22.*

8 *Ranked in second place in the People and Planet University League (2019).*

9 *Winner in the Green Gown Awards 2019, Tomorrow's Employee category.*

10 *From 2005-2006.*

11 *Winner in the Advance HE 2020 Teaching Excellence Awards for Higher Education.*

12 *Based on a two-day, student-led audit, facilitated by Students Organising for Sustainability (SOS-UK).*

13 *Backed by the European Regional Development Fund (ERDF), £8.7m TRANSFORM-CE project draws on our knowhow in Industry 4.0, next-generation materials, 3D printing, and sustainability.*

14 *Following an audit by the certification body NQA.*

15, 16, 17 *A definition of this term is provided in the glossary, page 22.*

18 *Aligned with the Tyndall Centre's targets and definition of the term zero carbon for Manchester ('Playing our Full Part').*

19 *The Sustainability Strategy 2030 is due for publication in late-2021.*

20, 21 *Calculated using Carbon Independent's carbon emisisons calculator.*

22, 23 *A definition of this term is provided in the glossary, page 22.*

24 *In 2021, the University's Environment Strategy Group made the decision to include university staff and students as co-opted members of its committee. There are three co-opted member positions from academia, professional services, and the student community.*

25, 27, 28 *Definition sourced from Edie jargon buster.*

Manchester Metropolitan University

If you would like more information or have any question about this publication, please get in touch.

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