



Royal College of Music: Carbon Management Plan

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Abstract. In Autumn 2021, an updated carbon management plan was approved by Royal College of Music Council which set an ambitious goal for the Royal College of Music to achieve carbon net-zero by 2035. This plan was supported by a heat decarbonisation plan and energy assessment, which highlighted short and long-term projects that need to be undertaken for the Royal College of Music to make the transition to net zero. From this the Royal College of Music were able to develop a high-level cost and programme plan for the works required to implement these projects. The plan also aims to reduce emission arising from 'scope 3' of the Greenhouse Gas Protocol [1], which make up a large part of the College's total emissions.

Keyword:

Carbon Management Plan

1. Introduction

Climate change is one of the greatest threats facing the world today. Governments all over the world have pledged their commitment to tackle climate change and the UK has a legally binding target to achieve net zero by 2050. Since 2011, the Royal College of Music has pursued an interim target that align with this ambition, in line with the sector led by HEFCE [2]. There is considerable expectation for universities to take decisive action on their direct and indirect carbon emissions.

Our action on energy efficiency and carbon reduction has been managed through our Carbon Management Plan. The next phase which runs to 2027 sets out the bold level of ambition needed to play our part in tackling climate change, and will require financial and human resource to deliver it.

In the 2021 the UK Government has accepted the Climate Change Committee [3] recommendation to cut UK carbon emissions by 78% by 2035. This is a world leading

commitment, placing the UK decisively on the path to Net Zero by 2050 at the latest, with a trajectory that is consistent with the Paris Agreement [4].

Against this backdrop, The Royal College of Music has produced a Carbon Management Plan with an aim to be Carbon Neutral by 2035, with an interim target of reducing direct emissions (scopes 1 and 2) by 73% by 2027 from a 2004/05 baseline.

The Royal College of Music’s carbon management plan includes the following activities:

Scope 1: Direct emissions from the use of natural gas in boilers and for catering purposes within the buildings Royal College of Music occupies.

Scope 2: Indirect emissions from the use of electricity and water within the buildings Royal College of Music occupies.

Scope 3: Indirect emissions from:

- Purchase of goods and services
- Business travel and staff/ student commuting
- Water, waste and wastewater from buildings
- Additional emissions from home working/ study

Buildings covered and developments:

This plan covers the main teaching and administrative buildings occupied by the RCM. These are:

Table 1. Main College Buildings

Building		Built	Area m ²	Usage
Prince Consort Road	Blomfield Building*	1894	5,281	Teaching, research, performance, practice, staff student facilities and administration
	South Building	1965	2,223	Teaching, research, performance, practice, staff student facilities
	Amaryllis Fleming Concert	1901	1,731	Teaching and performance
	Britten Opera	1986	1,558	Teaching and performance
	Opera School	1992	322	Teaching
	Courtyard	2020	2,500	Performance, visitor services
	41-43 Jay	1800s	340	Research and administration
39 Jay	1884	1,734	Rehearsal and administration	

*these buildings are Grade II listed

2. Overview of carbon management strategy

There is a pressing need to take action on climate change and the case for the Royal College of Music is driven by our own values, the expectation of students and wider society, increasing legislation and stakeholder expectation, and the wide-ranging example set by other HEIs across the UK.

Through our carbon management plan, we aim to deliver on the targets that will limit

climate change to no more than an increase of 1.5 degrees Celsius in global average temperatures, in line with the Paris Climate Accord.

As a specialist higher education institution, we aim to be a centre of excellence in environmental management within higher education, and to promote environmental best practice. In all activities, the Royal College of Music will seek innovative ways to meet our environmental objectives and ensure that our values are embedded within our teaching and research, operations, supply chain, community, and our endowment.

2.1. Historic energy and emissions performance

The Royal College of Music has already made great progress on reducing energy use and carbon emissions, and has begun to embed a culture of green thinking. Since 2004/05 we have reduced our scope 1 and 2 emissions (from electricity and gas use) by 60%, and performance over the last 5 years show strong reductions. The activities undertaken across the Estate have included awareness campaigns, low energy retrofits, and revised working practices; reducing our annual scope 1 and 2 emissions per annum from 1,257 tonnes CO₂e in 2004/05 to 502 tonnes CO₂e in 2019/20.

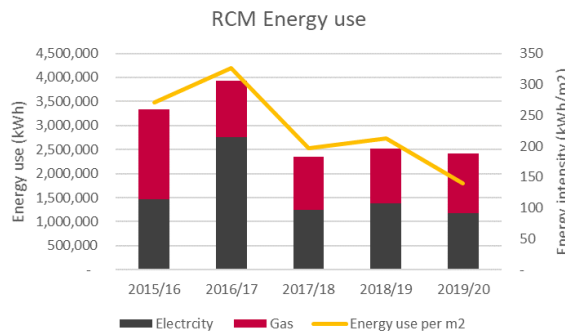


Figure 1. RCM Energy use

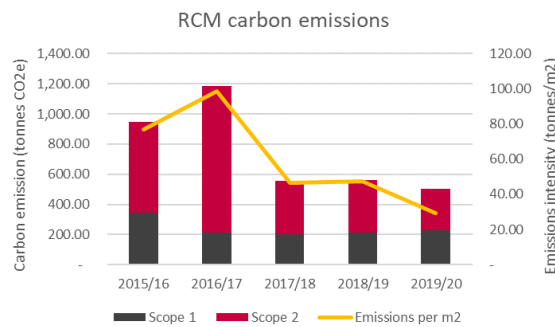


Figure 2. RCM carbon emissions

Intensity metrics for energy use and carbon emissions per m2 also show significant reductions over the last 5 years, even as the floor area of the estate has expanded.

The College’s Carbon Management Plan allows all staff and students to be involved in continual environmental improvement. This is achieved by raising awareness of the gravity of climate change amongst staff, peers and the public, as well as establishing demanding and measurable performance targets, specifically relating to our direct impacts (such as waste, energy, and water use) and those areas where we have control and influence across the life-cycle of our operations. This includes our supply chain, our partners, investments and through the impact of our music making and research.

Our strategy consists of four key objectives:

- Establish the governance structures and resources for achieving net zero carbon operations
- Consistently monitor and report our carbon impact across scopes 1, 2 and 3
- Deliver energy savings and reduce carbon emissions through our direct action and encouraging action with partners, students, staff and visitors.
- Provide an exemplar model for carbon reductions in a Conservatoire environment

2.2. Carbon strategy and governance

Royal College of Music's Council are the body responsible for setting the College's Estates Strategy and Environmental Policy. Council meets termly to review and monitor performance to ensure the College is doing all that it can to manage environment issues effectively through our ISO 14001 [5] environmental management system. Our environmental objectives are set through the Royal College of Music Environmental Action Plan, with more detailed actions set out in the Carbon Management Plan. These outline in detail the steps being taken to reduce the RCM's carbon footprint and improve upon the level of sustainability achieved. The key levers to achieve carbon reduction are:

- Maintain an effective governance structure for carbon management
- Reduce energy use and move to low carbon energy sources
- Where we have direct control and influence, take actions that reduce indirect emissions (e.g. through travel, procurement and investment decisions)
- Encourage partners, staff, students and visitors to take actions to reduce energy use and emissions

The Estates teams play a large role in this effort through developing the buildings and making systems more energy efficient, however, given the importance of emissions from procurement, IT, investments and travel, the onus to provide eco-friendly solutions pervades all aspects of the Royal College of Music's work. Environmental issues are also discussed regularly at the termly meetings with staff and students. External ISO 14001 auditors visit twice a year to evaluate our progress on environmental management and we strive to implement the advice and recommendations in their reports.

Table 2. carbon footprint of the RCM

Scope	Emissions sources	2019/20 Emissions (Tonnes CO ₂ e)
Scope 1	Natural gas	227.2
Scope 2	Electricity	274.6
Scope 3	All other sources	6,651.90
Total		7,153.61

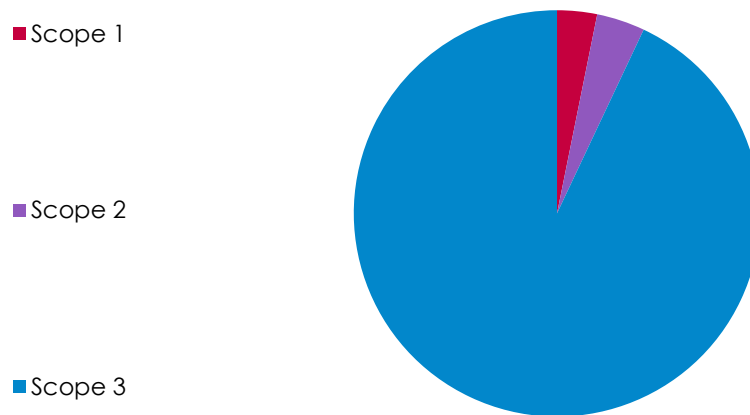


Figure 4. RCM Carbon footprint

Some 93% of our total footprint comes from scope 3 emissions sources, which includes emissions from procurement, water use, waste, waste water, business travel, and staff and student commuting. Procurement is the largest, contributing over 80% of all emissions.

Table 3. RCM total footprint

Scope	Emissions sources	Emissions (tonnes CO ₂ e)
Scope 1	Gas use	227.16
Scope 2	Purchased electricity	274.55
Scope 3	Total scope 3	6,651.90
	Procurement	Total
		5,876.30
		Construction
		2,995.86
		Business services
		1,859.18
		IT services
		770.18
		Manufactured products
		166.58

Scope	Emissions sources	Emissions (tonnes CO2e)
	Food and catering	47.65
	Other procurement	36.85
	Student and staff commuting	522.77
	Business travel	218.96
	Student accommodation - PCV	29.40
	Waste water	2.78
	Water	1.35
	Waste	0.34
Total		7,153.61

2.4. Plan to reduce emissions

There are three key areas where we will be able to take action to reduce our emissions. They focus on emissions avoidance through efficiency initiatives and changes to fuel sources, supported by policies and supplier partnerships.

- Scope 1: Gas use. We have developed a heat decarbonisation strategy, which aims to reduce our gas usage by designing out losses (e.g. from pipes) and moving to more lower carbon heat sources including heat pumps and point of use water heaters.
- Scope 2: Electricity use We have developed an electrical efficiency programme which includes voltage optimisation, air conditioning system rationalisation, lighting replacement and IT infrastructure efficiencies. We will also benefit from the UK national grid becoming less carbon intensive, providing additional emissions reductions.
- Scope 3: Indirect emissions: Our scope 3 emissions are dominated by our supply chain (principally construction and purchased goods and services). Our business travel (especially air travel) also makes up a considerable part too. We will take direct action where we have influence (including procurement decisions, investments, waste arising, water use, and staff, student and business travel) and work with our suppliers to build shared commitment to achieving net zero.

Scope 1: reducing emissions from natural gas

Earlier this year we undertook a detailed energy audit of our operations at the Prince Consort Road site incorporating the Blomfield Building, South Building and Courtyard Building and the buildings on Jay Mews. The Royal College of Music partnered with Brite Green [7], an environmental consultancy with which the Royal College of Music Estates team has worked extensively with on the College's ISO 14001:2015 Environmental Management System. As a result, Brite Green has a strong contextual understanding of the RCM and the Estate.

The focus of the audit was to identify heat decarbonisation opportunities and support making external capital funding bids. Supporting the audit, a heat decarbonisation plan was also generated to support carbon management plan (attached in appendix 1).

Working with the Brite Green, we identified the opportunities to decarbonise the heat sources within the Royal College of Music’s estate. This included two tranches: opportunities that fall within the 4 categories of eligible technologies within the Salix Low Carbon Skills Fund [8] as well as low or no cost options, and longer-term opportunities to reduce emissions.

The key principles within the Heat Decarbonisation Plan comprise:

- Data collection (on existing heating and hot water usage)
- Reduce heat load (POU hot water, insulation, BMS optimisation)
- Decentralise heating systems
- Convert core heating system to heat pumps
- Implement smart controls
- Monitor and review

The value of projects identified total c. £2.3M over the period 2021 to 2035.

The plan has the additional benefit of providing a comprehensive long-term cyclical plan for heating and ventilation plant replacement.

Table 4. Initial Projects

Scheme	Description	CO₂ Saving (tne/yr)	Capital Estimate (£k)	Notes
Energy Metering	Connecting up PCR site electrical sub-meters to BMS and updating software to provide Monitoring and Targeting system		26.6	The BMS currently has the courtyard sub-meters connected and the main supply panel for the site has a number of meters that can be linked up.
Optimise BMS	Modify control settings to make better use of the thermal response of the building.	66.6	165.6	The costs are based on an optimisation system called ‘Ecopilot’ plus estimates for connecting up the stand-alone VRF systems to the BMS.
Point of use hot water	Removing the long pipework runs to the toilet and small servery sinks and replacing with under sink electric unit	0.9	11.3	The capital cost assumes RCM maintenance staff will provide the spur units for connection
Heat pump for courtyard DHWS	Providing heat to large thermal store from heat pump unit	2.2	17.6	The capital cost is based on budget estimate using wholesale equipment cost and unit rates for installation

Scheme	Description	CO₂ Saving (tne/yr)	Capital Estimate (£k)	Notes
Concert Hall Lighting	Changing the main lighting rig to LED	38.1	85.2	Supplier budget estimate plus contingency.
Plant room insulation	Insulating valves and flanges within main plantroom	2.3	1.8	Average cost of £50 per valve/flange
Smart radiator valves	Installation of 50 smart radiator valves to provide local room control of heating	3.9	9.4	Allowance of £50 per valve plus controller every 10 valves.
Total		114.0	317.5	

Table 5. Future decarbonisation projects

Scheme	Description	CO₂ Saving* (tne/yr)	Capital Budget (£k)
Insulation Upgrades to PCR	Additional secondary glazing, programme of detecting air infiltration paths and insulation to hot spots detected by InfraRed surveys	18.1	300
Phased decentralisation of PCR heating	Working from ends of central boiler heating system (Blomfield), replace radiators with heat pumps or direct electric heaters. Target reducing heat load by 40%	66.9	250
Provide heat pumps for ventilation	Heat pumps to provide heating to coils to in ventilation plant for Britten Theatre and Concert Hall	16.7	60
Courtyard heat pumps	Provide Heat Pump system to replace courtyard heating	49.1	250
Point of use hot water	Replace all remaining hot water taps with point of use systems	6.6	30
Replace central boilers	Core heating system after above works to be provided from heat pump	100.3	400
Jay Mews Heat Pumps	Provide Heat Pump system for heating/hot water	66.8	250
Smart rooms	Link heating, lighting and IT availability within intermittently used rooms to booking system and/or occupancy sensors	14.4	120

Scope 2: reducing emissions from electricity use

A range of electricity efficiency opportunities have been identified, but have not yet been analysed to the same level of detail of the heat-decarbonisation projects. The projects include:

- Lighting upgrades
- Voltage optimisation
- On-site IT infrastructure efficiency initiatives, including review of server/switch loading and power settings
- BMS optimisations
- AC equipment replacement
- Fridge replacement

The capital cost for the projects identified to date is £311k between 2021 and 2035. The detailed breakdown is attached as an appendix.

We will focus on establishing more detail on the potential carbon reductions associated with these projects and identifying further projects that will reduce electricity costs and emissions.

Scope 3: reducing indirect emissions

Scope 3 emissions make up some 93% of our total carbon footprint. They fall within two main categories:

- Those where we exert close control: such as business travel, water use, waste and procurement decisions.
- Those where we can influence: such as staff and student travel, investments, supplier emissions, and student accommodation.

Our approach to managing scope 3 emissions is currently in development, but the levers available to us are well understood.

The Estates team have direct control over around 1/3rd of the scope 3 emissions, through construction, water use, waste and waste water. We will focus on efficiency initiatives for water and waste through the EMS targets, and establish closer carbon management and reporting by contractors on construction and refurbishment projects.

Policies will help deliver reductions in other areas we have close control or influence, including business travel, investments and procurement decisions.

We will also need to exert influence to align suppliers, partners, staff, students and visitors with our ambitions. Additional data collection will help, including conducting travel surveys and asking for carbon data from key suppliers, but our approach will aim to encourage others to take action to reduce their emissions too.

Carbon Reduction Targets

In line with the Government's climate change targets, in the next stage of the RCM CMP we aim to achieve net zero carbon by 2035. This means:

- Continuing from our 2004/05 baseline, we will reduce our scope 1 and 2 emissions (from electricity and gas use) by 73% by 2027 and 100% by 2035.
- We will meet annual and cumulative emissions budgets that align with these targets, through emissions reductions.

To achieve net zero carbon, we also need to reduce other indirect (scope 3) emissions, including those procurement, investment and staff and student travel. We will reduce our

scope 3 emissions to zero by 2035, by taking action where we have direct control and encouraging partners to reduce emissions.

2019/20 is the first year we have scope 3 emissions data for, and so the same reduction pathway set above from 2019/20 is as follows:

- We will reduce emissions from Scopes 1, 2 and 3 by 100% by 2034/5 and 43% by 2026/7. Interim targets for 2026/7 will be a 33% reduction for scopes 1 and 2 and 43% for scope 3 emissions, from a 2019/20 baseline.

Actions to date

Over the last 5 years, we have delivered consistent reductions in energy use and carbon emissions through the carbon management plan.

Some highlights include:

- Reducing scope 1 and 2 emissions by 60% since 2004/05 baseline
- Implementation of various energy demand and carbon reduction measures, including low energy lighting and heating upgrades
- Installation of double glazing throughout RCM to reduce heat loss
- Review our building management system and upgrading our software and hardware to improve efficiencies
- Delivery of a campus wide LED replacement programme: more than 1,000 LEDs helped us save 160,000 kWh a year
- New waste contract was implemented which guarantees all our waste is not sent to landfill
- Drive towards sustainable catering operations including a reward initiative such as introducing a discount when a drink was purchased using a reusable mug
- Our catering outlets sold more than 19,000 hot drink purchases using a reusable mug with 50% of hot drink purchases made using reusable mugs
- All single-use plastic cutlery has been replaced with metal reusable cutlery
- New waterless urinals installation which helped us save 270,00 litres of water per year
- Encouragement of sustainable practices such as recycling demolished brickwork for reuse on site whilst successfully managing the impact of noise from the construction

The Royal College of Music's new More Music facilities were recently assessed by BREEAM [9], the world's leading environmental sustainability assessment method for building projects. We were awarded 'Very Good', which is an excellent achievement for the College and demonstrates our ongoing commitment to protecting the environment.

We have also maintained our ISO 14001:2015 accreditation for environmental management, recognised internationally as a mark of high environmental standard. Most recent surveillance audit results confirmed RCM's commitment and dedication to systematically manage our environmental responsibilities. Having been ISO14001: 2015 accredited for several years, we continue to achieve efficiencies across our campus and place importance on reducing our environmental impact going forward.

Large and small projects continue to be implemented to help us reduce our energy usage.

- Re-lagging of pipework within the main boiler house

- New radiator valves – which automatic closed when the room is at the right temperature
- Invertors installed on Heating Pumps to reduce electrical consumption
- Installation of new control panels for Air Handling Units to reduce energy consumption
- Timeclocks installed on all Air Handling Units to ensure that they are only on when needed

CARBON MANAGEMENT PLAN

The Royal College of Music acknowledges that our planet faces a climate emergency and, like all organisations, we need to take significant action to reduce environmental impacts.



60%

We reduced our carbon emissions by 60% between 2005 and 2020

2035

We have an ambitious plan to be carbon net zero by 2035

In order to reach our goal we will:



Work with our energy suppliers to achieve 100% renewable electricity



Move away from natural gas for heating and hot water



Improve insulation of our historic buildings



De-centralise the heating system to improve efficiency



Implement sustainable Air Source Heat Pump technology

Figure 5. Carbon Management Plan

3. Key recommendations

The Director of Estates is responsible for implementation of this plan, supported by the Estates team. The College also has an environmental working group with membership from across the Royal College of Music. The key recommendations to deliver the next phase of the carbon management plan are as follows:

- Agree and communicate the carbon reduction targets, and assign responsibility for all key functions with a significant carbon footprint,
- Implement energy reduction projects,
- Establish funding for carbon reduction projects and carbon offsets, making use of existing capital and operational budgets, external funding from grants, donors and trusts.
- Source electricity from low/zero carbon energy suppliers
- Embed carbon considerations into policies and decision making processes that have a material impact on the Royal College of Music's carbon footprint, including procurement, construction, travel, and investment management.
- Monitor and report on our carbon emissions annually both within the RCM and externally.

Policy

The Royal College of Music has a target of being carbon neutral by 2035. The calculation methodology and scope of this target needs to be identified and published. The target should be broken down by building/activity and linked to committed investment/timescales.

Responsibility

All stakeholders have a role in reducing emissions and the carbon management plan should aim to review how each one make a contribution and be supported in doing so. The senior leadership team needs to identify how it will track progress.

Performance Measuring

More detailed analysis and expansion of metering information will be needed in order to set more specific metrics and to aid the communication process. A base year should be chosen and the carbon emissions from each building/activity need to be calculated monthly and compared to variables such as weather and occupation undertaken. Targets can then be set in line with the overall target and related to what is achievable.

Training

In order to maximise the role of stakeholders, they must be empowered to take action and this will require dedicated training in line with their role and responsibilities.

Communication

All stakeholders should be regularly informed about progress against targets. There should also be regular awareness raising programmes and opportunities to gather suggestions as to where improvements can be made.

Capital Projects

Capital investments need to be considered specifically for carbon reduction and any future projects should have carbon reduction as the key component of design decisions.

3.1. Challenges, Risks and Opportunities

Challenges and risks

The key challenges to decarbonisation are as follows:

- 60% of the building stock is over 100 years old and listed, which may limit our ability to act in some cases and adds additional costs in others
- Buildings are mainly heated by gas-fired boilers which would have to be replaced
- The majority of heating distribution is over 30 years old and its design and specification have inherent inefficiencies
- There is limited space for additional plant and for the introduction of renewable energy sources
- Room occupation is variable
- Switching to electrical heating will be limited by local supply infrastructure
- Significant recent expenditure and the impact from COVID has reduced the funds available to implement projects

Opportunities

- There has been significant grant funding made available by central government for public sector decarbonisation, including the Public Sector Decarbonisation Scheme.
- The carbon management plan offers an opportunity to engage with new donors and provide a clear focus for fundraising.

3.2. Monitoring, Reporting and Assurances

The RCM's carbon emissions will be measured and reported annually. As part of our external reporting, we will compile our emissions in line:

- **ISO 14064-1:2018 Greenhouse Gases Standard [10]** provides a specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals;
- the **Greenhouse Gas Protocol Corporate Standard**; and the
- **Department for Environment, Food and Rural Affairs (Defra) Environmental Reporting Guidelines [12]**
- **PAS 2060: 2014 [12] specification for the demonstration of carbon neutrality**

We will consider the most appropriate assurance process for carbon emissions. As there is a change the Universities may be added to the statutory climate reporting, it may be appropriate to include carbon emissions within the financial audit process along with other pertinent non-financial data.

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