



FOR PUBLICATION

DERBYSHIRE COUNTY COUNCIL

**IMPROVEMENT AND SCRUTINY COMMITTEE – CLIMATE CHANGE,
BIODIVERSITY AND CARBON REDUCTION**

13 FEBRUARY 2023

Report of the Director - Commissioning & Transformation

**Progress Report for Property Decarbonisation.
Review of Carbon Reduction targets.**

1. Purpose

Further to the Report to the Scrutiny Committee on progress to decarbonise the corporate estate, Corporate Property have been requested to review and report with regards to the targets to decarbonise the Council's estate.

This includes a review of the targets included within the Climate Change Strategy, and the subsequent development of additional or enhanced targets by Corporate Property.

<https://www.derbyshire.gov.uk/site-elements/documents/pdf/environment/climate-change/climate-change-strategy.pdf>

1.1 Summary of targets

	Corporate Targets within the Climate Change Strategy.	
	Target	Note
	To achieve a 47% reduction in carbon emissions from 2005 to 2025 for county wide emissions.	Carbon emissions associated with property achieved a 44% reduction between 2010 and 2022 See section 2.3
T2	The Council will switch its existing electricity tariff to a 100% renewable electricity tariff by 2023 with an optional buy-in for schools.	Subject to annual assessment. See section 2.5

T3	Reduce emissions from heating buildings to less than 700tCO2e by 2032	A residual energy use for heating equivalent to 700 tCO2 or 3.5 million kWh is not possible. See section 2.6
		A residual energy use for heating equivalent to that proposed in the 2019 Carbon Reduction Plan is achievable. See sections 2.7 and 2.8
T4	Quadruple existing microgeneration of renewable energy on Derbyshire County Council's estate to 200 MWh by 2032. (Equivalent to 200,000 kWh of renewable energy)	Target likely to be achieved and exceeded. The proposed capital programme 2022-23 includes 460,000 kWh of pv. See section 2.8

Corporate Property - Proposed Targets		
	Target	Note
CP01	To deliver 1 million kWh of renewable energy by local microgeneration on site.	The proposed capital programme for 2022-23 includes 460,000 kWh of pv. Target endorsed by CCEB See section 3.1
CP02	To reduce use of energy for heating by 5 million kWh	Work in progress to deliver the required outcomes across the estate. Target agreed with Climate Change Group. See section 3.2
CP03	To achieve a minimum energy efficiency rating for each asset of 85 D A 15% improvement over CIBSE benchmark	Work in progress to prioritise and deliver the required outcomes across the estate. Target endorsed by CCEB See section 3.3

A detailed review of the corporate targets follows in section 2; and of the Corporate Property targets in section 3.

2. Information and Analysis

2.1 The Council is committed to achieving Net Zero for corporate emissions by 2032 or sooner, including emissions from the corporate estate. To achieve Net Zero, the energy use - and associated carbon emissions - must be reduced and the emissions associated with residual energy use must be offset by appropriate measures - including generating energy from renewables. A Council-wide offsetting / sequestration programme is required.

2.2 The Council's Climate Change Strategy ([Climate Strategy](#)) covers the period 2021-25. It is due to be reviewed and updated fully in 2025. This sets carbon reduction targets, supports the need for commercial-scale renewables across the county, and acknowledges the need to offset residual emissions that cannot be eliminated by 2032.

2.3 This strategy references the benchmark of carbon emissions in 2005 and the target to achieve a 47% reduction in county-wide emissions by 2025.

“Since 2005, Derbyshire’s county-wide emissions have fallen by 21%. We will need to accelerate our emissions reductions if we are to achieve the 47% reduction in emissions by 2025 (against the 2005 baseline)”.

Although this is referring to county-wide emissions it is worth noting that the reduced emissions from corporate property over the period 2009-10 to 2022-23 equate to a 44% reduction in carbon emissions.

(2009-10: 15,666 tonnes CO₂; 2022-3: 8,861 tonnes CO₂)

2.4 Climate Change Strategy Targets

The Climate Change Strategy includes 32 priority targets across five key areas.

The specific targets in relation to corporate property are as follows:

- T2 The Council will switch its existing electricity tariff to a 100% renewable electricity tariff by 2023 with an optional buy-in for schools.
- T3 Reduce emissions from heating buildings to less than 700tCO₂e by 2032.
- T4 Quadruple existing microgeneration of renewable energy on Derbyshire County Council’s estate to 200 MWh by 2032.

2.5 Review of target T2 – procurement of 100% Renewable Electricity

The procurement of green energy is subject to the current contractual and procurement measures. The Council procures energy through Crown Commercial Services and EDF Energy are the selected provider. The Council has a rolling 12-month contract for the purchase of electricity from EDF Energy, starting on 1st April each year. This contract runs to 2023. Feedback from the Energy Management team is that it is therefore not currently feasible to explore options with other suppliers due to this existing contractual commitment.

As of December 2022, the EDF electricity supply is 82% from low carbon sources (63% nuclear and 19% renewables). This is better than the UK low carbon average but lower than the UK renewable average.

The supplier can provide electricity with a higher low carbon / renewable component backed by REGO (Renewable Energy Guarantees of Origin) certificates. However, there is scepticism as to the value of these certificates, and the current recommendation from the Energy Manager is not to pursue this option.

The target to switch to 100% renewable electricity for the corporate estate by 2023 is therefore not met at this time. However, measures to reduce electricity demand by property rationalisation, energy management, and the installation of photo-voltaic panels and other retrofitting measures will reduce the base carbon footprint.

The framework for energy supply is due for renewal as noted. The Energy Manager will consider future options for the procurement of green energy during 2023 and will report accordingly.

Ultimately the procurement of green energy is an essential measure if the Council is to achieve the Net Zero objective. Procurement of green energy should not be deemed to imply any reduction in the efforts to reduce the residual energy use, including energy use associated with heating.

2.6 Review of target T3 to Reduce emissions from heating buildings to less than 700tCO₂e by 2032

In 2021 the total emissions relating to the use of gas, oil and propane for heating corporate buildings were equivalent to approximately 6500 tCO₂e.

The target to achieve 700 tCO₂e could be interpreted as a reduction of 90% in residual energy use for heating. It should be noted that it is not possible to achieve a 90% reduction in residual energy use for heating buildings.

The most energy efficient buildings that have been developed to minimise the use of fuel for heating are new build, super-insulated, sealed buildings, with mechanical ventilation and heat recovery of ventilated air. These may achieve savings on fuel for heating of 80-85% at the cost of increased electricity use, but this is not a standard that can be applied to the refurbishment of existing buildings.

Further explanation of the 700tCO₂e target may be contained within the 2019 Carbon Reduction Plan – see section 2.7. Within this plan it is apparent that the 700 tCO₂e target is an adjusted figure that includes for the procurement of green energy and other offsetting measures. The allocation of offsetting benefits is not within the remit of Corporate Property. Whilst annual targets may be set which rely on the allocation offsetting benefits, the only measure which Corporate Property can directly control is the residual energy use. Therefore, it is necessary to identify an alternative residual energy use target.

It may be assumed that the total residual energy consumption for heating as envisaged within the 2019 Carbon Reduction Plan equates to approximately 22 million kWh. (Calculated from an emissions load of 700 tCO₂e for heating plus 3894 tCO₂e associated with green gas).

22 million kWh of energy use for heating would equate to a significant reduction in energy use for heating buildings of 37% across the estate in comparison to 2021 figures, and this remains a valid potential target – see section 3.2.

2.7 Strategic Report to CMT - dated 4 October 2022

A further complication is that the 700t CO₂e emissions target (heating) from the Climate Change Strategy is now superseded by new annual emissions targets.

A new schedule for annual target emissions for corporate property was reported to CMT in October 2022 through the Climate Change Programme, as follows:

	Greenhouse Gas Emissions: Actual, target and projected (tonnes CO₂e)	
Year	Property (excl. schools)	
2021-22 (actual)	8,861	
	Target	Projection
2022-23	7,980	8,130
2023-24	7,090	7,640
2024-25	6,200	6,980
2025-26	5,320	6,420
2026-27	4,430	6,080
2027-28	3,540	5,750
2028-29	2,660	5,520
2029-30	1,770	5,310
2030-31	890	5,130
2031-32	0	4,990

These targets were approved by CMT and are now to be embedded within Council Plan.

The 2031-32 target is 0 tCO₂e.

The equivalent T3 target for emissions associated with heating is therefore also 0 tCO₂e.

To achieve zero emissions, the above targets must include an unidentified allowance for offsetting, greening of the grid, and green energy procurement etc. As previously noted, the only measure which Corporate Property can directly control is the residual energy use.

It therefore remains necessary to identify an alternative residual energy use target for heating and the analysis and evaluation given in section 2.6 remains valid.

See section 3.2.

2.8 Review of the T4 target from the Climate Change Strategy for Microgeneration of energy from renewable sources on corporate buildings.

To Quadruple existing microgeneration of renewable energy on Derbyshire County Council's estate to 200 MWh by 2032.

The target is likely to be achieved and exceeded.

The proposed capital programme 2022-23 includes measures to generate approximately 460,000 kWh via roof mounted photo-voltaic installations.

Corporate Property propose a more ambitious target of 1 million kWh to be achieved by microgeneration on site – see section 3.1.

3.0 Corporate Property Proposed Targets

Corporate Property have interpreted the various corporate targets and have developed a detailed plan to reduce energy consumption and carbon emissions.

However, achieving Net Zero will also be dependent upon achieving the necessary offsetting measures to match residual energy use.

Corporate Property have proposed SMART targets for microgeneration and other measures which will reduce energy use. These targets are specific, measurable targets which apply across the estate to specific target buildings.

Carbon emissions reduction and energy savings will be achieved by a combination of property rationalisation, energy management, local microgeneration, and retrofitting measures to improve the energy efficiency and thermal performance of buildings. The strategy continues to include the purchase of renewable or green energy and offsetting by large-scale renewable energy generation in accordance with previously approved plans.

3.1 CP01 To deliver 1 million kWh of renewable energy by local microgeneration

Whilst microgeneration does not reduce energy use as such, it generates electricity on site which reduces the demand on the grid. This results in an improved energy efficiency rating.

The Climate Change strategy / corporate target of 200,000 kWh stands as the corporate target for microgeneration however Corporate Property has increased the target for microgeneration by a factor of 5 to 1million kWh.

Corporate Property has assessed the potential for roof mounted photo-voltaic installations on buildings to be retained. There may also be some opportunity to develop ground mounted mini-solar farms adjacent to selected assets which could provide further opportunities for decarbonisation.

It is therefore proposed to increase the target capacity for local microgeneration to 1 million kWh per annum.

This is a 500% increase on the target stated with the Climate Change Strategy.

This proposal has been endorsed by the Climate Change and Environment Board.

It is recognised that installation is constrained by the condition of the existing fabric, by fire risk and by the available structural loading capacity.

The proposed capital programme 2022-23 includes measures to install solar panels and to generate approximately 460,000 kWh via roof mounted photo-voltaic installations.

3.2 CP02 To reduce use of residual energy for heating by 5 million kWh

The energy use for heating has been reduced in recent years as shown:

2019-20	36.2 million kWh
2020-21	34.7 million kWh
2021-22	33.4 million kWh
2019 Plan	22 million kWh

It is proposed to retain and adopt the residual energy use target for heating which underlies the 2019 Carbon Reduction Plan.

As previously noted, this equates to 22 million kWh and equates to a significant reduction in energy use for heating buildings of 37% across the estate in comparison to 2021

This establishes a target to reduce energy use for heating by 11.4 million kWh per annum.

It is assessed that by 2032 plans for property rationalisation could deliver energy savings (heating) of 6.4 million kWh.

The proposed Corporate Property target (CP02) is to achieve a further 5 million kWh of savings for heating.

This is to be achieved via the combined measures of energy management and upgrades to retained buildings which will enhance the energy efficiency of buildings.

This target has been assessed by calculating the improvement required to upgrade all corporate buildings to achieve a voluntary minimum energy performance standard which exceeds the CIBSE benchmark – see 3.3.

The target to save 5 million kWh of energy use for heating has been agreed with Climate Change Group.

3.3 CP03 To adopt a minimum performance requirement for the energy efficiency of all corporate buildings

The energy efficiency of all existing corporate buildings has been assessed based on energy consumption in 2021. Buildings are allocated a rating from A-G.

The energy efficiency rating is calculated with reference to the CIBSE benchmark target. A building with a rating of 100 D matches the benchmark target. Buildings rated A-C are more efficient than the benchmark target. Buildings rated E-G are progressively less efficient and require priority improvement measures. The CIBSE benchmark establishes a reasonable baseline for operational energy use.

It is proposed to target a minimum performance standard that will achieve a 15% improvement over the CIBSE energy performance benchmark.

This strategy enables the council to identify specific buildings where improvement measures are required and to set an energy budget for every building. There is a target energy use for every building.

This proposal has been endorsed by the Climate Change and Environment Board.

It is proposed to achieve this by a combination of energy management and retrofit action.

3.4 Property Rationalisation

There is no fixed target for carbon reduction savings by property rationalisation.

There is an objective to review each service and to rationalise the estate to suit the needs of the service. The outcome is that the disposals programme is greater than was envisaged in 2019.

The estimated value of projected property rationalisation equates to:

A total projected energy saving of 8.4 million kWh including a projected energy saving on heating of 6.4 million kWh

In 2021 this is equivalent to a saving of 1693 tCO₂e.

This saving significantly exceeds the estimate of 645 tCO₂e as referenced in the 2019 Carbon Reduction Plan.

A significant proportion of the estate is currently under review and therefore it is only possible to estimate the value of further future disposals.

3.5 Energy Management and Retrofitting Measures

It is proposed to make energy savings and reduce carbon emissions by active energy management. Remote sensors are to be installed in buildings and an energy management system will be developed.

The value of the saving by active energy management can only be estimated until we have a pilot project of approximately 30 buildings as proposed in the 2022 capital programme bid.

This is no specific target for carbon reduction by active energy management alone. The relevant target is to achieve a 5 million kWh reduction in energy use for heating by a combination of energy management and retrofit improvements.

A phase 3b Public Sector De-Carbonisation Scheme grant bid has been submitted for a flag-ship project at Alice's View Children's Centre.

The proposal is to replace the existing gas boilers with an Air Source Heat Pump and to maximise the roof mounted photo-voltaic installation.

This may achieve the first Net Zero refurbishment project and eliminate the reliance on mains gas and electricity.

3.6 Results

After discounting energy savings by:

- property rationalisation
- microgeneration
- savings on energy use and fuel for heating by a combination of energy management and retrofit action

and adding back an additional allowance (for new buildings, possible EV charging and the increase in electricity use associated with switching from gas), the total projected residual energy use for property in 2031-32 is currently 30 million kWh.

This is a 33% reduction against the 2021 benchmark.

The carbon emissions associated with the residual energy use may be further reduced by the procurement of green energy and by offsetting the value of large-scale renewables as envisaged in the 2019 Carbon Reduction Plan.

3.7 The procurement of Green Energy

The council remains dependent on the procurement of green energy to achieve Net Zero.

The use of solid fuel has already been eliminated.

The use of oil and propane is only 2% of the fuel use for heating. It is proposed to eliminate this use of fossil fuel as soon as possible.

The use of gas in cooking needs to be phased out with a programme of conversion to fully electric kitchens.

98% of heating for corporate buildings is by gas. There is currently no national strategy towards developing an alternative fuel.

The potential contribution from biomass will also be assessed, however this is no longer the preferred option for Public Sector Decarbonisation schemes.

There are perceived risks to air quality and there is limited sustainable supply of biomass fuel. Applicants for PSDS grant funding are expected to illustrate why biomass is a more suitable option than other low carbon alternatives and must explain how it is proposed to mitigate any potential impacts on air quality.

3.8 Solar Farms

Four priority sites have been identified for potential development as solar farms.

The potential output from these four sites is estimated as 12.2 million kWh.

There is a proposal to develop the first site at Williamthorpe (plot 2) which will generate 3.2 million kWh. The current limiting factor is the availability of connection to the National grid.

The value of large-scale renewables may be used to offset carbon emissions from all Council operations, but there is no strategy at present for the allocation of offsetting benefits.

There may be opportunities for ground based solar (with private wire supply into adjacent corporate buildings) but this potential use will frequently conflict with the simultaneous requirement to generate capital receipts via disposals.

3.9 The refurbishment challenge

Corporate Property is currently procuring surveys and feasibility assessments to identify opportunities to enhance the energy efficiency of occupied buildings.

However, achieving significant improvement will often require a full building refurbishment of vacated buildings. The existing heating, lighting, and power distribution systems etc would have to be stripped out and replaced. There will be an additional cost in locating to another temporary location. The pay back periods for significant interventions of this nature are over 100 years. This will be the appropriate strategy for some buildings, but it cannot be the strategy to be applied across the estate. The estimated cost to fully refurbish the worst performing buildings is circa £250 million.

The emerging asset strategy therefore often identifies a preference for disposal of an asset within 5 years and the relocation of a service to an alternative location. The risk with this strategy is that alternative buildings are acquired with limited time to achieve the necessary decarbonisation measures prior to 2032.

3.10 Risks to Project delivery

Some of the more obvious risks pertain to:

- Obtaining the necessary project funding.
- Achieving a consensus. There is competition with alternative uses e.g. tree planting versus solar farms.
- There is a conflict between the options for disposal versus development of ground based solar.
- There is no national strategy for the replacement of natural gas.
- Issues regarding procurement of green energy
- Agreement over the strategy for offsetting.

4 Consultation

- 4.1 The above proposals have been reviewed with stakeholders including the Climate Change group. The Council's Climate Change and Environment Programme Board (CCEPB) in July 2022 approved the commissioning of external specialist support to review the Council's Corporate Property carbon reduction strategy and verify the plans to decarbonise the Corporate Estate.

5 Alternative Options Considered

- 5.1 Do nothing: this is not an option if the council's objective of achieving Net Zero within the proposed timescales are to be realised.

6 Implications

Appendix 1 sets out the relevant implications considered in the preparation of the report.

7 Background Papers

Progress Report to Scrutiny Committee dated October 2022

8 Appendices

8.1 Appendix 1 – Implications

8.2 Appendix 2 – review of the 2019 Carbon Reduction Plan

9. Recommendation(s)

That the Improvement and Scrutiny Committee:

a) endorses the proposed targets

b) supports the proposed strategy for the decarbonisation of corporate property.

10. Reasons for Recommendation(s)

10.1 To establish agreed targets

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Implications

Financial

1.1 There are no direct financial implications in relation to this report, however, funding will be required for capital schemes which come forward for progression. Individual schemes will be financially assessed for affordability, costs and benefits as part of Business Cases which will be completed for projects after initial feasibility works have been carried out.

Legal

2.1 The Director of Legal and Democratic Services will provide advice as necessary on a project specific basis.

Human Resources

3.1 HR will provide input regarding any proposed building closures and any impact on human resources.

Information Technology

4.1 no issues

Equalities Impact

5.1 no issues

Corporate objectives and priorities for change

6.1 The corporate policy is to achieve Net Zero for the corporate buildings by 2032 or sooner, and to achieve Net Zero for the whole of Derbyshire by 2050.

Other (for example, Health and Safety, Environmental, Sustainability, Property and Asset Management, Risk Management and Safeguarding)

7.1 The Climate Change and Environment Board has reviewed and endorsed the proposals as noted..

2019 Carbon Reduction Plan reviewed

The Climate Change Strategy references the 2019 Carbon Reduction Plan.

Within the 2019 Carbon Reduction plan there are various projections for carbon emissions and reductions associated with property.

Emissions from property will be reduced through a combination of property rationalisation, behaviour change, energy efficiency measures, generation of renewable electricity on Council property and purchasing renewable energy generated elsewhere.

The estimated reduction in emissions from these actions are summarised at key milestone dates in the following table. The dates shown coincide with the end of the UK carbon budget periods set by the government. Some reduction in emissions from the Council estate will occur due to external factors.

Source of emissions	Key Action	Emissions (tonnes CO ₂ e)				total	%
		Actual emissions (2018/19)	Projected milestone emissions (2021/22)	Projected milestone emissions (2026/27)	Projected emissions (2031/32)		
Property	Property rationalisation		-157	-488		645	6%
	Behaviour change		-638			638	6%
	Low-cost energy efficiency			-950		950	9%
	Deep retrofit			-1,640		1640	16%
	Microgeneration			-42		42	0.4%
	Large scale renewables			-1,545		1545	15%
	Purchase renewable electricity				-137	137	1%
	Purchase renewable gas				-3,894	3894	38%
	Residual energy use					664	6.5%
Sub-total (with greening of the grid)		10,023	9,800	4,703	664	10,155	100%

From this table it appears that the 700 tCO₂e target in the Climate Change Strategy may be rounded up from the 664 tCO₂e total in the final column. However, 664 tCO₂e is the total value of residual energy use, not just the energy use associated with heating and any value greater than nil does not achieve Net Zero.

Summary: From the above it may be deduced that:

- the target for the residual energy use associated with property in 2031-2 is @6,240 tonnes CO₂e (664+3894+137+1545)

This is equivalent to approximately 30 million kWh.