

Climate Impact Assessment, Appendix 4, Council Operational Building Decarbonisation Programme -Delivery Year 2025-26 (PSDS Ph4)

Will the decision/proposal impact...	Impact	If an impact or potential impacts are identified:			
		Describe impacts or potential impacts on emissions from the Council and its contractors.	Describe impact or potential impacts on emissions across the Borough as a whole.	Describe any measures to mitigate emission impacts	Outline any monitoring of emission impacts that will be carried out
Emissions from non-domestic buildings?	Decrease	Installation of air source heating will significantly cut carbon emissions from buildings, with an estimated direct carbon saving of 29.71 tonnes CO <sub>2</sub> e per annum from low carbon heating systems and energy efficiency measures, averaged over an assumed twenty-year lifetime of these assets.	N/A	N/A	The council monitors its greenhouse gas emissions from its estate and publishes updates on its Net Zero by 2030 target annually.
Emissions from transport?	Increase	A minor increase is expected during the course of the works due to council officers and installers travelling between sites.	N/A	Council officers to minimise travel by private vehicles or car share where appropriate.	Officer travel is included within the council's annual greenhouse gas emissions reporting and is included within the council's Net Zero by 2030 target.
Emissions from waste, or the quantity of waste itself?	Increase	A minor increase is expected during the course of the works due to the decommissioning of redundant fossil fuel heating system infrastructure. Three of the sites are considered to have 'end-of-life'	N/A	Contractors to manage waste in accordance with the waste hierarchy.	Consider monitoring waste management as part of the contract.

		heating systems, meaning much of the waste would be generated anyway when the systems require replacing.			
Emissions from housing and domestic buildings?	None	N/A	N/A	N/A	N/A
Emissions from construction and/or development?	Increase	An increase in emissions from construction is expected during the course of the works from the materials and equipment used; transport and waste. Three of the sites are currently considered to have 'end-of-life' heating systems, meaning they are due for replacement – a scenario in which the heating systems are replaced with a like-for-like fossil fuel system would also result in embodied emissions, as well as higher ongoing operational emissions.	N/A	Depending on suitability for the building, there may be opportunities to consider recycled materials for the cavity wall insulation material.	Measuring and reporting on the council's scope 3 emissions is an ongoing area of work and is complicated to calculate accurately. Monitoring the embodied carbon impacts of retrofits on a project specific basis is an emerging field which is still the subject of research. Therefore, it is not considered feasible to monitor the embodied carbon of this project due to the relatively small scale of the buildings involved relative to the cost and effort of obtaining this information.
Carbon capture (e.g. through trees)?	None	N/A	N/A	N/A	N/A

Identify any emissions impacts associated with this decision which have not been covered by the above fields:

Air source heat pumps are charged with refrigerant gases, which exchange heat between a building's interior and its exterior environment, on the same principle as air conditioning and refrigeration. Many refrigerants, including those used in air source heating, have global warming potentials many times greater than carbon dioxide (CO<sub>2</sub>). R-410A is a blend of fluorinated gases (F-gases) commonly used in air source heat pumps. R-410A has a global warming potential 1,924 times greater than the same amount of CO<sub>2</sub>, over a 100-year period. However, the total amount of refrigerant contained in air source heating units is tiny compared with the amount of CO<sub>2</sub> emitted from a gas boiler; moreover, the refrigerant charge is contained within the unit, whereas CO<sub>2</sub> is produced from the boiler as an exhaust gas. Any emissions of F-gases from air source heating will be as 'fugitive emissions' i.e., as accidental leaks, which are mitigated by appropriate servicing, inspection and protection from vandalism. The Climate Change Committee is clear in its advice to government, that any impact from accidental emissions of F-gases from the take up of air source heating will be orders of magnitude less than the fossil fuel heating systems they are intended to replace. Fugitive emissions from air conditioning and heat pump plant are estimated from annual maintenance reports as part of the Council's NZ30 emissions inventory. To achieve the Council's Net Zero by 2030 climate change target, fugitive emissions of F-gases will need to be offset against e.g., carbon sequestered by the Council's tree planting programme.

Will the proposal affect Council services' resilience to climate change, or the capacity of people living in the Borough to adapt to climate change?

Yes – the project will contribute to the resilience of council services by helping to maintain a moderate temperature within council buildings. This will be through the following measures:

- The planned installation of cavity wall insulation in two buildings should help to keep the buildings cooler during hot weather.
- The inclusion of building energy management systems in three buildings should manage the heating and cooling in the buildings automatically, reducing the risk of extremely hot or cold temperatures for occupants.

Provide a summary of all impacts and mitigation/monitoring measures:

The project will affect greenhouse gas emissions in the following ways:

- Reduced operational emissions of council buildings;
- The construction work required to retrofit the measures will result in temporary increases in emissions from waste and transport, as well as other embodied carbon emissions. The project team can ask contractors to manage waste appropriately; minimise travel where possible; and consider recycled materials, if appropriate.

Supporting information:	
Climate Impact Assessment Author	Katie Rockett Climate Change Officer Property and Facilities Services Finance and Customer Services
Please outline any research, data or information used to complete this Climate Impact Assessment.	<ul style="list-style-type: none"> <li>Climate Change Committee. 2020. <i>The Sixth Carbon Budget: F-gases</i>. [Online]. [Accessed 10 April 2025]. Available from: <a href="https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-F-gases.pdf">https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-F-gases.pdf</a></li> <li>Department for Energy Security and Net Zero. 2024. <i>Greenhouse gas reporting: conversion factors 2024</i>. [Online]. [Accessed 10 April 2025]. <a href="https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024">https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024</a></li> <li>Department for Energy Security and Net Zero &amp; Salix Finance. 2025. <i>Phase 4 Public Sector Decarbonisation Scheme: Application Form</i>.</li> <li>Rotherham Metropolitan Borough Council. <i>Heat Decarbonisation Plan</i>.</li> </ul>
If quantities of emissions are relevant to and have been used in this form please identify which conversion factors have been used to quantify impacts.	<p>An estimated 29.71 tCO<sub>2</sub>e per annum carbon saving is cited from the Phase 4 PSDS application form. Compared with the 2024 conversion factor for organisations reporting carbon emissions from natural gas (0.18290 kgCO<sub>2</sub>e per kWh, gross calorific value) this would imply an average carbon intensity of electricity of 0.00171 kgCO<sub>2</sub>e per kWh, over the assumed twenty-year lifetime of the electric boiler and air source heat pumps. This is a reasonable conversion factor, since solar PV will supply renewable electricity at all three buildings, as an integral part of the scheme design.</p> <p>A global warming potential of 1,924 kgCO<sub>2</sub>e per kg of R-410A over a 100-year period is cited from government conversion factors for carbon accounting.</p> <p>“Analysis for the Government in 2014 showed that for every additional 1 tCO<sub>2</sub>e of additional HFC emissions [<i>R-410A is a blend of HFCs</i>] from refrigerant leakage in heat pumps, there are 161 tCO<sub>2</sub>e of CO<sub>2</sub> savings due to avoided emissions from gas boilers and efficiency improvements.” (Climate Change Committee, 2020).</p>
Validation	Tracking Reference: CIA 445  Arthur King Principal Climate Change Officer