Public Document Pack

Community & Children's Services Committee

APPENDICES

Date: THURSDAY, 4 JULY 2024

Time: 12.00 pm

Venue: COMMITTEE ROOMS, WEST WING, GUILDHALL

8. **HOUSING NET ZERO DELIVERY PLAN**

For Decision
(Pages 3 - 168)

11. **CARE LEAVER OFFER**

For Decision
(Pages 169 - 202)

17. **ADULT SOCIAL CARE SELF-ASSESSMENT ***

For Information
(Pages 203 - 232)

Ian Thomas CBE
Town Clerk and Chief Executive

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City of London Corporation

City of London Corporation Housing NZ Action Plan

August 2021 | Rev J

Contents

Executive Summary

The Climate Action Strategy and Housing

The City of London Corporation (CoL) owns 5,028 residential units, across 82 different buildings, across 14 estates. These 14 estates are currently responsible for 11.2 $ktCO_2/yr$ (both landlord and tenant emissions).

The Corporation's Climate Action Strategy (CAS) commits to being net zero carbon by 2027 for the all Scope 1 and 2 emissions within the Corporation's control. For the housing stock, this encompasses all emissions associated with communal heating, lighting, lifts and any other landlord controlled energy. Currently, Scope 1 and 2 emissions from housing amount to 5 $ktCO_2/yr$.

The CAS also commits the Corporation to being net zero carbon by 2040 for all emissions, including Scope 3 emissions. For the housing stock, this encompasses all landlord emissions (Scope 1 and 2) plus emissions associated with energy that tenants and leaseholders consume in their properties. Scope 3 emissions from CoL's housing stock amount to 6.2 $ktCO_2/yr$.

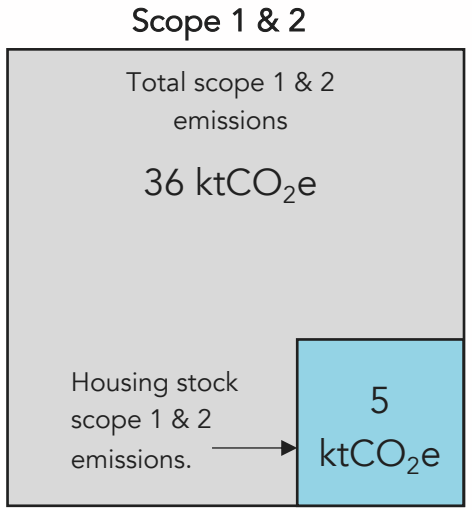
Achieving net zero carbon

Achieving the Corporation's net zero carbon targets will require large reductions in CO_2 emissions from its homes. The target does not require individual homes to be net zero carbon, rather the Corporation as a whole.

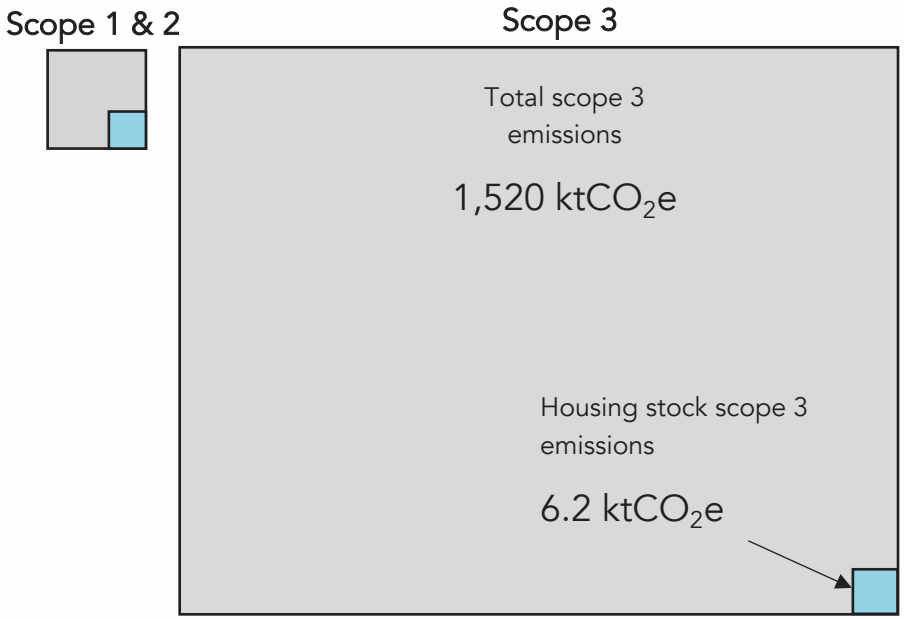
The Corporation owns land based assets which sequester 16 $ktCO_2/yr$ (assessed by the University of Surrey) and wants to utilise this to balance emissions for the purposes of the Climate Action Plan targets.

In the scenarios discussed on the following pages, we have applied a proportional fraction of this sequestration to housing - 2.4 tCO_2/yr as at 2027. The Corporation could choose to apply more or less than this.

Due to these direct Greenhouse Gas Removals, the Climate Action Strategy (CAS) target can be met through a 59.2% reduction in CO_2 emissions from the baseline. This study seeks to understand the potential of housing to be consistent with this reduction.



Current scope 1 & 2 emissions for the City of London Corporation, showing proportion attributed to housing stock in blue.



Current scope 3 emissions for the City of London Corporation, showing proportion attributed to housing stock in blue. Scope 1 and 2 emissions shown for scale.

Executive Summary

Achieving the 2027 target for Scope 1 and 2 emissions

The key priorities for reducing scope 1 and 2 emissions (emissions associated with energy controlled by the Corporation) will be:

- Stop using gas for communal heating as soon as possible
- Install roof insulation early
- Install as many photovoltaics on the roofs as possible (at the same time, or after, roof insulation).
- Make communal lighting more efficient – upgrade to LED lighting and review lighting controls for each estate.
- Review controls of energy systems – is there scope to improve controls of communal heating systems?
- Review, and replace if necessary, insulation on pipework of communal heating systems.

We have modelled the impact of the above retrofit actions on energy and CO_2 emissions in two scenarios:

Scenario 1: As above apart from the new gas communal heating at Middlesex Street Estate and York Way Estate, which would remain in operation in 2027.

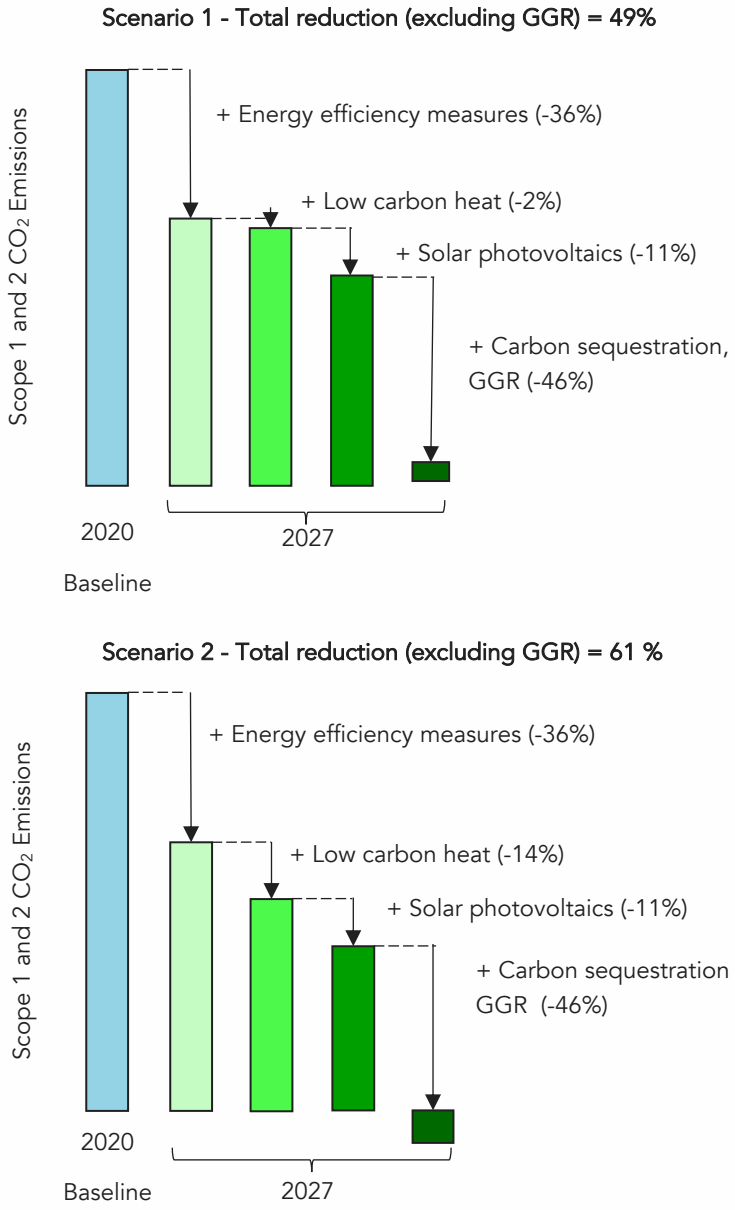
In this scenario, at 2027, a 49% reduction in emissions is achieved from the 2020 baseline, (including a 11% reduction attributable to the installation of solar photovoltaic panels on housing stock).

Scenario 2: As above – all gas communal heating replaced with communal Air Source Heat Pumps.

In this scenario, at 2027 a 61% reduction in emissions is achieved from the 2020 baseline, (including a 11% reduction attributable to the installation of solar photovoltaic panels on housing stock).

All remaining emissions are associated with imported grid electricity.

If we apply the direct greenhouse gas removals (GGR) from the Corporation's land based assets to scenario 2, the total emissions reduction is **107%** = carbon negative.



Scope 1 and 2 CO_2 emissions reduction strategies to 2027. Figures suggest emissions are carbon negative by 2027 only if all gas communal heating is changed to Air Source Heat Pumps by 2027.

Executive Summary

Achieving the 2040 target for Scope 1, 2 and 3 emissions

The key priorities for reducing Scope 3 emissions (from energy controlled by tenants, leaseholders and the Corporation) will build on the actions taken for Scope 1 and 2 emissions (landlord), and will be:

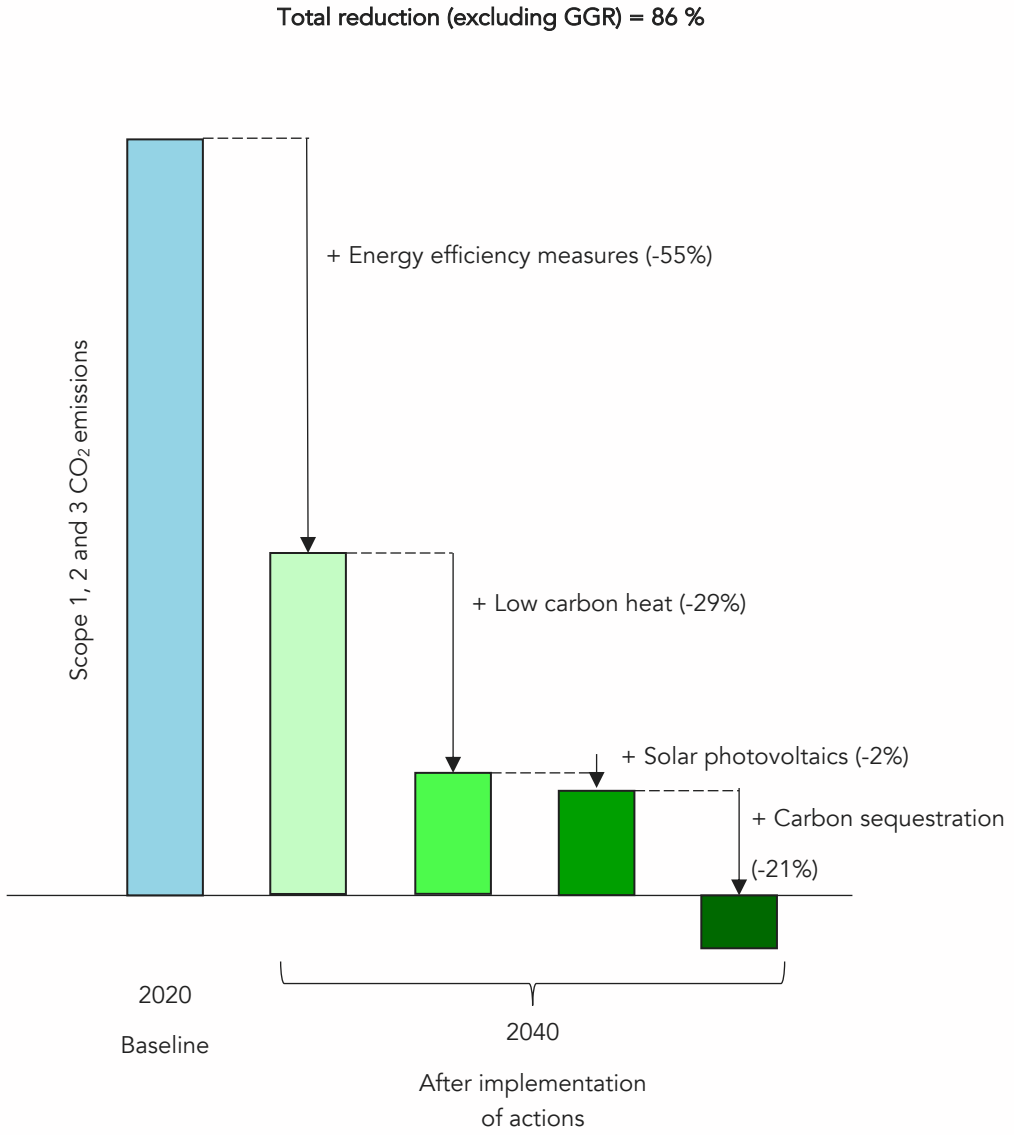
- Remove individual gas boilers in all properties and replace with low carbon heating alternatives.
- Improve the energy efficiency of the fabric of the buildings through:
  - Replacing windows with triple glazing,
  - Installing wall insulation where possible (the type will be dependant on the building),
  - Install roof insulation (where not already undertaken for 2027 target),
  - Improve air-tightness of homes to avoid unnecessary heat loss through leaky buildings,
  - Install floor insulation,
  - Improve ventilation – preferably through whole dwelling mechanical ventilation with heat recovery,
  - Install waste water heat recovery to showers and baths.

These measures apply both to existing and new build dwellings.

We have modelled the impact of the above retrofit actions, plus the actions to tackle Scope 1 and 2 emissions, on energy and CO_2 emissions. This includes future emissions from known new-build dwellings. Assuming all measures are undertaken, at 2040 14% of emissions remain (from the 2020 baseline). All remaining emissions are associated with imported grid electricity.

If we apply the direct greenhouse gas removals from the Corporation's land based assets, the net zero carbon target is achieved, with 107% emissions reduction – slightly carbon negative.

Should the Corporation target lower emissions reductions, we would recommend that land based sequestration isn't used to balance emissions from gas consumption.



Scope 1, 2 and 3 CO_2 emissions reduction strategy to 2040. Provisional figures suggest emissions are practicably carbon negative by 2040 (figures to be checked and verified).

Note: solar photovoltaics have an apparently small impact due to the low carbon intensity of the grid electricity they are offsetting. However, they do provide a vital contribution of renewable electricity to the grid upon which the total reductions rely.

Executive Summary

Actions for helping achieve the 2027 target for Scope 1 and 2 emissions

Action	By	Priority buildings / estates	Rationale
Stop using gas for heating as soon as possible  LOW CARBON HEAT	2026	All buildings – especially large estates: Middlesex Street Estate York Way Estate	It is acknowledged that the UK (and the rest of the world) needs to make a complete transition away from gas. If the Middlesex Street and York Way Estates remain on communal gas boilers, the Corporation's 2027 net zero carbon target will need to rely on increased emissions reductions from others sectors. **Co-benefits**: Large reduction in carbon emissions by 2027, benefitting the overall aim of the Climate Action Strategy.
Install hot water storage in individual units where heating systems are changed  DEMAND FLEXIBILITY	2026	All where heating is changed to low carbon heat sources	Hot water storage can be used to reduce peaks in heat system demand or to store energy by heating hot water when the grid has an oversupply to use later. This is particularly useful for dwellings using direct electric heating methods, to reduce heating bills and the peak load on the electricity network but is also useful where Heat Pumps are used. **Co-benefits**: Hot water storage allows the occupant to take advantage of cheap electricity if using a flexible tariff.
Install roof insulation early ENERGY EFFICIENCY	2026	Avondale Square Estate Holloway Estate York Way Estate Middlesex Street Estate	Roof insulation is an important (and often relatively simple) retrofit measure. It should be installed before, or at the same time as, photovoltaic panels. Some buildings have greater capacity for renewable energy generation. These should be prioritised and are listed here (left). **Co-benefits**: Reduced energy bills. Less risk of damp and mould, which can cause health problems for occupants.
Install as many photovoltaics on the roofs as possible (at the same time, or after, roof insulation).  RENEWABLE ENERGY	2026	Avondale Square Estate Holloway Estate York Way Estate Middlesex Street Estate	Photovoltaic panels produce renewable energy that displaces grid electricity and contributes to reducing its carbon intensity. Priority estates have been selected for their optimal roof space and consequently their significant renewable energy generation potential. **Benefits:** Can generate income and potentially reduce bills.

Actions for helping achieve the 2027 target for Scope 1 and 2 emissions (continued)

Action	By	Priority buildings / estates	Rationale
Make communal lighting more efficient – upgrade to LED lighting and review lighting controls for each estate. ENERGY EFFICIENCY	2026	Barbican Estate CoL Almshouses Gresham Almshouses	Some estates have large landlord electricity consumption relative to others (see left). **Co-benefits:** Reduced energy bills. Can be passed onto occupants.
Review controls of energy systems – is there scope to improve controls of communal heating systems.  ENERGY EFFICIENCY	2026	Middlesex Street Estate York Way Estate Isleden House Estate	All communally heated estates (except Frobisher Crescent on the Barbican Estate) use approximately double the gas per dwelling compared with comparable homes on other estates which have individual heating systems. This indicates significant energy may be being lost in the distribution networks and poor controls, e.g. too high flow temperature or residents leaving heating on either when they are not on the premises or when they are but they open the windows rather than turn heating down/off. A number of residents right across the stock, and particularly at the Middlesex Street Estate, reported having to open their windows in winter to avoid overheating. Despite having triple glazing, the Middlesex Street Estate uses the most gas per dwelling of all communally heated estates, suggesting it has poor controls or high distribution heat loss or both. Large estate – 281 dwellings. York Way Estate is a large estate with 278 dwellings. 30-year old double glazing should also be changed as a priority. **Co-benefits**: Reduced energy bills. Improved occupant health and comfort through reduction in overheating.
Review, and replace if necessary, insulation on pipework of communal heating systems. ENERGY EFFICIENCY	2026	Middlesex Street Estate York Way Estate Isleden House Estate	

Actions for helping achieve the 2040 target for Scope 3 emissions

Action	By	Priority buildings / estates	Rationale
Continue to remove individual gas boilers in all properties and replace with low carbon heating alternatives and install hot water storage where there is none  LOW CARBON HEAT  DEMAND FLEXIBILITY	2032	All	All gas heating should be replaced by low carbon heating in all properties, as evidenced by the Housing London Retrofit Action Plan. Cumulative carbon emissions must be limited to stay within carbon budgets, therefore planning must start immediately to make all properties low carbon heat ready. Replacements should happen as soon as possible and should always include the installation of hot water storage wherever possible. **Co-benefits**: Improved local air quality. Improved health and safety through removal of gas connection and associated risks.
Replacing windows with triple glazing  ENERGY EFFICIENCY	2032	All properties with single glazing or older, poor double glazing	Improved glazing has a big impact on heat loss and comfort. Cold, draughty windows were one of the biggest complaints from the resident engagement. The surface temperature of triple glazing remains warmer than single glazing, therefore the perceived temperature is higher and the internal air temperature can be lower to achieve the same 'comfort' perception, saving more on heating energy than the simple uplift in insulation achieves. **Co-benefits**: Improved comfort, lower energy bills. Reduces risk of damp and mould an associated health problems. Better acoustic performance.
Improve air-tightness of homes to avoid unnecessary heat loss through leaky buildings (infiltration) ENERGY EFFICIENCY	2032	All properties.	Consider not only around windows and window frames, but also doors, letterboxes, fire escapes, ventilation ducts and pipework entering the dwelling and also the main building envelope junctions especially roof eaves. Heat lost through air leakage can be very significant. **Co-benefits:** Improved comfort, lower energy bills and in combination with the introduction of improved mechanical ventilation (see next point), improved indoor air quality
Improve ventilation – preferably through whole dwelling mechanical ventilation with heat recovery (MVHR) ENERGY EFFICIENCY	2032	Any property that undergoes window upgrades.	Ventilation is important for air quality and removal of moisture build up in the air. Uncontrolled infiltration as described in the point above, can give the impression that a room is ventilated, but the quality of the air and the distribution of it is usually poor. Whole dwelling MVHR provides essential ventilation without the heat loss experienced through opening windows or "leaky" buildings. Windows can still be opened in the summer. **Co-benefits**: Improved comfort, improved indoor air quality, lower energy bills.

Actions for helping achieve the 2040 target for Scope 3 emissions (continued)

Action	By	Priority buildings / estates	Rationale
Installing wall insulation where possible (type dependant on building). ENERGY EFFICIENCY	2032	Properties with high ratio of external wall to internal area.	To achieve low levels of space heating demand, wall insulation may be necessary, especially on blocks with high external surface area relative to the internal floor area, such as top floor and ground floor flats, end flats and end of terrace houses and blocks with external 'deck' access. **Co-benefits:** Lower energy consumption (and bills), reduced risk of mould and damp and associated health problems.
Install roof insulation (where not already undertaken for 2027 target).  ENERGY EFFICIENCY	2032	All	Uninsulated roofs can present comfort and heat loss problems, especially for top floor units. **Co-benefits:** Improved comfort. Reduced energy consumption (and bills) less risk of damp and mould and associated health problems.
Install floor insulation  ENERGY EFFICIENCY	2038	All	Uninsulated floors can present comfort and heat loss problems, especially in ground floor units. **Co-benefits:** Improved comfort, less risk of damp and mould.
Install waste water heat recovery to showers and baths. ENERGY EFFICIENCY	2038	All	Hot water is often a substantial energy use in homes, and it becomes more significant as the fabric performance is improved. Measures to reduce hot water usage are difficult to introduce, especially in existing buildings. Recovering heat from the water going into the drains and using it to pre-heat cold water feeding hot water storage cylinders can have a useful impact on this hard-to-treat energy consumption. **Co-benefits:** Lower energy bills. Reduction in peak electricity demand.
Improved appliances ENERGY EFFICIENCY	2038	All	One of the key energy users in the Scope 3 emissions is the kitchen appliances that tenants use. A policy to encourage the selection of better performing appliances as and when old ones are replaced will help to reduce electricity consumption across the estate. **Co-benefits:** Lower energy bills. Reduction in peak electricity demand.

1.0 Achieving Net Zero

Why and how?

This section provides and overview of the context in which this net zero carbon action plan sits. It includes:

- Its relationship with the City of London Corporation's Climate Action Strategy and the London Retrofit Action Plan commissioned by London Councils.
- Core principles of low carbon retrofit
- The types of retrofit measures that might be required for the housing stock.
- Where our energy will come from in the future.

Why a net zero carbon action plan for housing?

This report presents an action plan for the retrofit of the City of London Corporation's (CoL) housing stock, in response to its net zero carbon targets outlined in the Climate Action Strategy.

The Corporation has committed to four overarching targets:

- Net zero by 2027 for the City Corporation's operations
- Net zero by 2040 for the City Corporation's full value chain
- Net zero by 2040 in the Square Mile.
- Climate resilience in its buildings, public spaces and infrastructure.

How the Net Zero by 2027 target relates to housing

Scope 1 emissions are all emissions associated with fossil fuels combusted by the Corporation (e.g. gas, petrol and diesel).

Scope 2 emissions are all emissions associated with electricity used directly by the Corporation.

Total Scope 1 and 2 emissions were assessed by ARUP to be 36 $ktCO_2e$ in 2018.

In the context of CoL's **housing** portfolio, scope 1 and 2 emissions include:

- Communal heating and hot water provided to homes
- Heating of community centres, estate offices, or other ancillary functions of the housing estates.
- Emissions associated with shared spaces such as lighting and lifts.
- We estimate Scope 1 and 2 emissions from **housing** to be **5 $ktCO_2e$** in 2020, representing 14% of the Corporation's total Scope 1 and 2 emissions.

Scope 1

Net zero carbon by 2027

Landlord controlled **gas**:

- Communal gas heating
- Gas heating of other estate premises

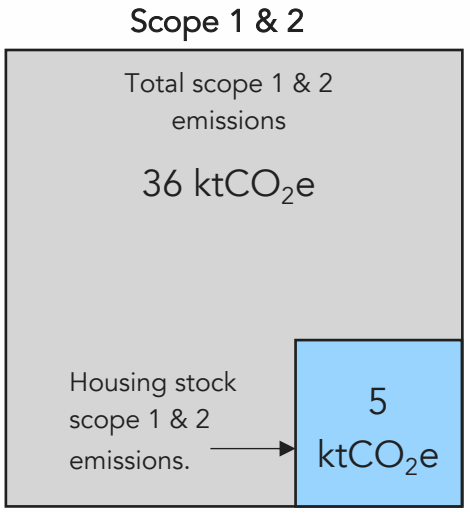
Scope 2

Net zero carbon by 2027

Landlord controlled **electricity**:

- Communal lighting
- Communal electric heating
- Lifts
- Other communal electricity

Scope 1 & 2 emissions in the context of this Housing Net Zero Action Plan



Current scope 1 & 2 emissions for the City of London Corporation, showing proportion attributed to housing stock in orange.

How the net zero by 2040 target affects housing

City of London Corporation also has a target of achieving net zero carbon for all its Scope 3 emissions by 2040.

Scope 3 emissions are all other emissions associated with the Corporation's activities or assets - e.g. purchased goods and services, business travel, commuting, waste, leased buildings (emissions from tenants or leaseholders fuel consumption) and financial investments.

Total Scope 3 emissions were assessed by ARUP to be 1,520 $ktCO_2e$ in 2018.

In the context of CoL's **housing** portfolio, scope 3 emissions include:

- Resident purchased energy for heating, hot water, lighting, appliances or any other energy used in the home (including both tenants and leaseholders).

We estimate Scope 3 emissions from **housing** to be **6.2 $ktCO_2e$** in 2020, representing 0.5% of total scope 3 emissions.

Carbon accounting for the 2040 target

The Science Based Targets Initiative (SBTi) require only two thirds of Scope 3 emissions need be included in the net zero target committed to by the City of London Corporation. Emissions stated on this page do not include this reduction.

Our estimates of Scope 3 CO_2 emissions only include this reduction when explicitly stated for projected emissions in 2040.

Carbon sequestration

The City of London Corporation own land based assets that have been separately assessed* to sequester 16 $ktCO_2$ from the atmosphere every year. The Climate Action Strategy targets allow a proportion of this sequestration to be used as an offset to total operational Scope 1 and Scope 2 emissions.

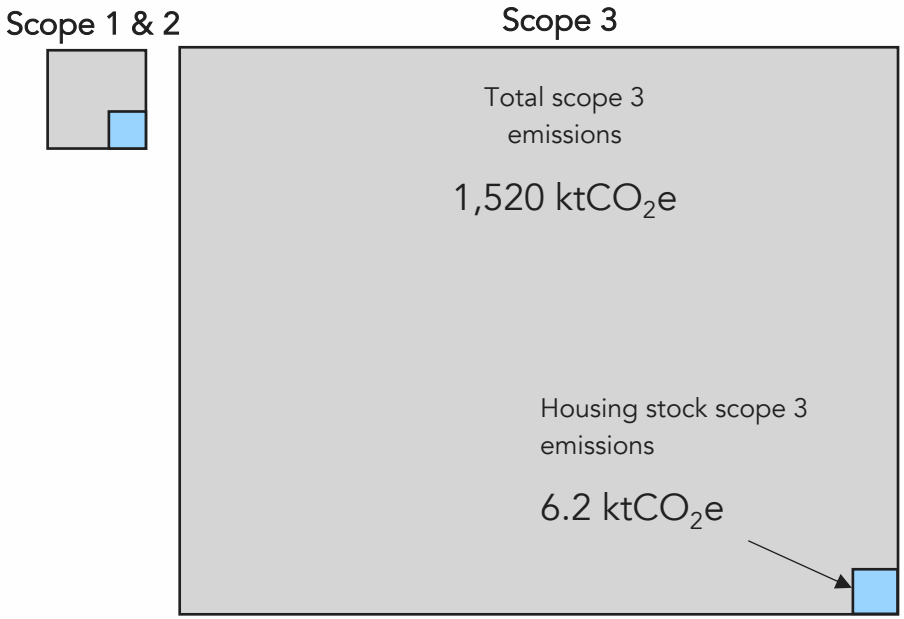
*Final Report WG5A - Sequestration Potential of the City of London's Open Spaces, 24 July 2020.

Scope 3 – Housing Zero carbon by 2040

Resident purchased **energy**:

- Gas or electric heating
- Lighting
- Appliances
- Cooking

Scope 3 emissions in the context of this Housing Net Zero Action Plan



Current scope 3 emissions for the City of London Corporation, showing proportion attributed to housing stock in orange. Scope 1 and 2 emissions shown for scale.

Link with the London Retrofit Housing Action Plan

The Retrofit London Housing Action Plan

The Retrofit London Housing Action Plan is a project funded by a combination of London Councils, the London Housing Directors' Group, Greater London Authority and LEDNet. It considers all housing in London, not just the housing stock managed by respective councils. It recommends nineteen actions and activities across four different themes:

- Technical: retrofit measures, packages and plans
- Delivery models, skills and supply chain
- Costs, finance and funding
- Engagement and communication

The Retrofit London Housing Action Plan provides information on current best practice in London and beyond and sets a number of principles which should underpin any retrofit action plan.

The two Action Plans are complementary

This Action Plan, specific to the City of London Corporation's housing stock, builds upon the technical recommendations within the Retrofit London Housing Action Plan. It is intended to be complementary to that report, and to be read alongside it.

The City of London Corporation is actively involved with the Retrofit London Housing Action Plan, therefore we have signposted its recommendations instead of repeating the relevant information. We recommend referring to it for wider context and higher level recommended actions.

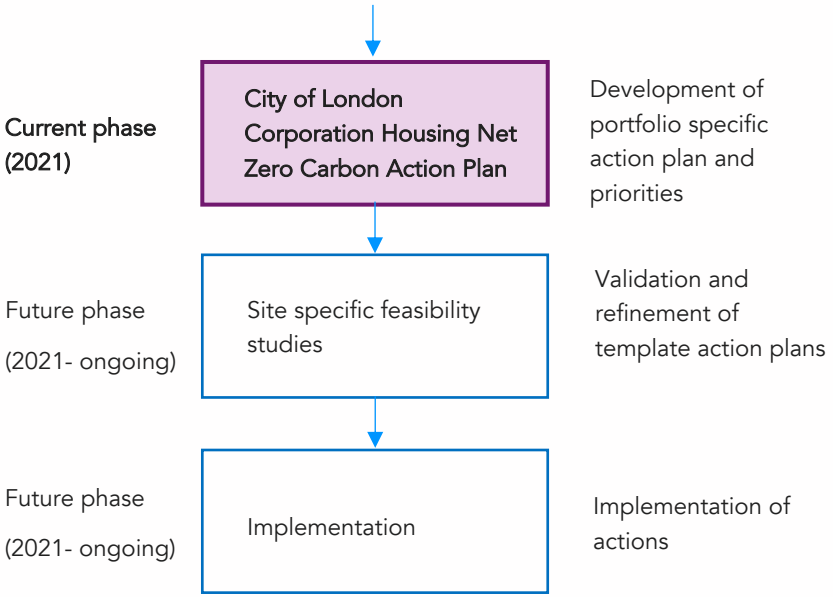
The wider context

The City of London Housing Net Zero Action Plan offers retrofit templates, or starting points, for six different archetypes which typify CoL's housing stock. These "template" action plans can be used as a starting point from which to build site specific feasibility studies and refined, detailed implementation plans.

Retrofit London Housing Action Plan

Draft completed (2021)

The Retrofit London Housing Action Plan is a 70-page report. It has been led by London Councils with input from the 32 London boroughs and the City of London.



The City of London Corporation Housing Net Zero Carbon Action Plan is an important step in the journey to zero carbon housing stock.

Link with the London Housing Retrofit Action Plan

Actions from the Retrofit London Housing Action Plan

This Housing Net Zero Action Plan for the City of London Corporation directly addresses nine of the nineteen actions recommended by the London Housing Retrofit Action Plan.

This Action Plan addresses, in part, all of the technical recommendations outlined in section 1 of the London Housing Retrofit Action Plan.

We have identified packages of energy efficiency measures, including ventilation strategies, and identified priority blocks and buildings to tackle. Specifications are suggested, but detailed feasibility studies and design packages will need to be created at a later stage.

Low carbon heat strategies applicable to archetypes are identified. Solar photovoltaic generation potential has been quantified.

Current maintenance and replacement programmes have been identified, and recommendations made to capitalise on these planned measures, some of which are already funded.

An approximate cost of retrofit for the housing portfolio has been identified, together with potential funding. The gap between funding and anticipated costs has been estimated.

The other ten actions from the London Housing Retrofit Action Plan are all very important to facilitate effective retrofit, and we recommend that the Corporation progresses all actions within it where possible.

	Retrofitting measures, packages and plans	
1	Improve the envelope of London's inefficient homes	☑
2	Develop a plan for retrofitting ventilation systems to improve health and air quality	☑
3	Electrify heat	☑
4	Deliver smart meters and demand flexibility (controls, storage) in retrofitted homes	☑
5	Increase solar energy generation on London homes	☑
6	Map out each building's journey towards lower energy costs and Net Zero	☑
	Delivery models, skills and supply chain	
7	Review current maintenance programmes and identify retrofit opportunities	☑
8	Facilitate procurement of materials and services at a larger scale	
9	Enable planning to facilitate low carbon retrofit, including in conservation areas	
10	Develop retrofit skills actively across London	
11	Set up a clear and consistent system to report and monitor progress (and success)	
	Costs, funding and finance	
12	Establish cost of retrofit, business case and funding gap for the different tenures	☑
13	Maximise capital finance for council owned stock (and eligible homes)	☑
14	Create a 'Finance for retrofit' taskforce with finance experts	
15	Support the owner occupier and PRS sectors to leverage private investment	
	Engagement and take-up	
16	Social housing: engage with tenants, leaseholders and other registered providers	
17	Engage with owner occupiers and the Private Rented Sector	
18	Lobby Central Government for more support, guidance and funding	
19	Continually develop and implement the Action Plan together	

Core principles of low carbon retrofit

Energy efficiency

Buildings use energy for heating, hot water, ventilation, lighting, cooking and appliances. The efficient use of energy reduces running costs and carbon emissions. It also reduces a building's impact on the wider energy supply network, which is also an important consideration. Improving energy efficiency relies on the replacement of windows with more efficient ones, a better level of insulation and airtightness for the building fabric and also controlled ventilation, ideally with heat recovery, to ensure air quality and avoid condensation issues.

Low carbon heating

Low carbon sources of heat are an essential feature of Net Zero carbon buildings. Existing buildings need to start to undergo a transition away from gas. The most likely solutions will use electrical heating systems, such as heat pump systems, electric radiators or storage heaters.

Renewable energy generation

The roofs of buildings should be utilised as far as possible for photovoltaic panels which will generate renewable electricity.

Other key considerations

- **Demand flexibility:** with electricity being used more and more to meet heating demand and with more renewable electricity being generated locally, the ability of a dwelling to manage demand with more flexibility is becoming important.
- **Avoiding carbon offsets:** a sustainable Net Zero carbon strategy should not use carbon offsets to allow continued greenhouse gas emissions. The Climate Change Committee is clear that offsets should be reserved to 'hard-to-decarbonise' sectors such as aviation and agriculture. Offsets should therefore be avoided or considered only as a stepping stone. The Climate Action Strategy does not support the use of offsetting mechanisms other than including its own land based assets carbon sequestration potential.

Category	Measure
Energy efficiency	Double or triple-glazed windows
	Insulation (wall, roof, floor)
	Airtightness
	Ventilation (e.g. MVHR)
Low carbon heat and no more fossil fuels	Individual heat pumps
	Communal heat pumps
	Direct electric
Demand flexibility	Energy storage
	Smart energy controls
Renewable energy generation	Solar PVs

Summary of key retrofitting measures which the London Home Retrofit Action Plan should seek to deliver

Moving away from gas boilers is critical

Carbon budgets and cumulative carbon

The Climate Change Committee (CCC) have been very clear that the use of fossil fuels has to be eliminated in virtually all buildings by 2050.

A carbon budgets approach helps us to understand the impacts of the pace of change between now and 2050 and is imperative if we are to meet our obligations under the Paris Agreement in limiting global temperature rises to no more than 2C.

Carbon budgets take into account the effect of cumulative CO_2 emissions in the atmosphere. Cumulative emissions are proportional to global temperature rises. The Tyndall Centre for Climate Change has taken a Paris aligned global carbon budget and used it to derive a carbon budget for the UK and all the Local Authorities within it.

According to this analysis, London's remaining carbon budget is 204 $MtCO_2$. Meeting the budget must not rely on carbon offsets.

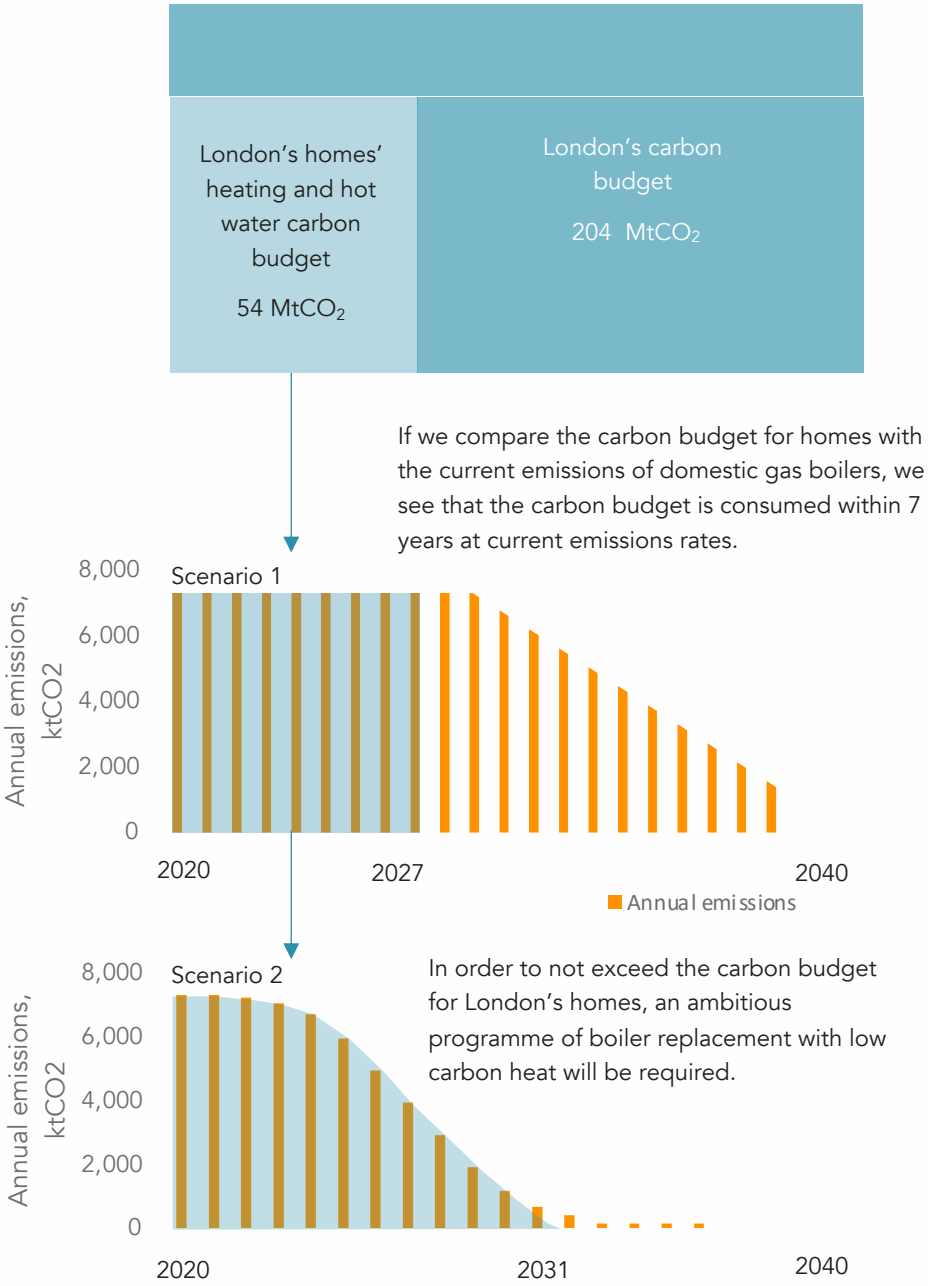
IEA – No new gas boilers from 2025

The International Energy Agency Net Zero report (2020) also states that all buildings must be zero carbon and that there should be no new gas boilers sold after 2025. This is an important message and signals clearly that the City of London Corporation should be preparing to enable all of their properties to switch to low carbon heat imminently.

What this means for CoL's housing stock

Net zero carbon for the City of London Corporation's own emissions by 2027 is the right target. This target will require CoL to replace all communal gas fired boilers with low carbon heat alternatives, such as heat pumps or other electric heating systems as soon as possible.

Concurrently, CoL should prepare their housing stock in order that each estate is ready for low carbon heat (e.g. through improving energy efficiency) and tenants and leaseholders should be provided with the information they need to make informed choices about when and how to make the swap.



The electricity revolution and infrastructure

Towards a decarbonised and smarter electricity system

The carbon content of electricity has fallen over the last few years. It is now three times less than 10 years ago and already lower than natural gas. It is forecasted to continue to reduce even further in the next 20-30 years. This underpins the current energy revolution and is why **electrification of transport and heat** is now seen as the best strategy to move away from fossil fuels.

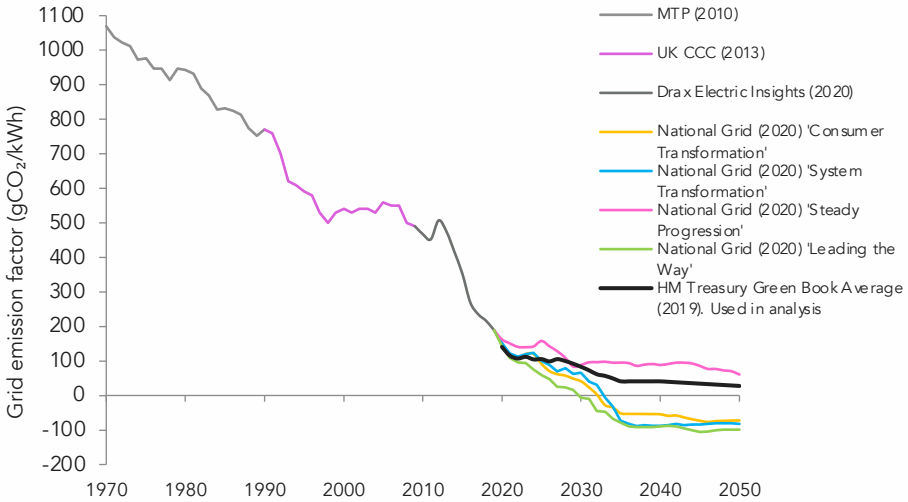
Infrastructure Upgrades are Required

In order for this revolution to be successful and as cost effective as possible, it is very important to reduce energy use, so that energy demand is not more than renewable and nuclear energy can generate in 2050. The power network locally also needs to be adapted to be able to accommodate both more load and also local generation from roof mounted PV arrays. UKPN, the local District Network Operator, are investing in the infrastructure to make it more suited to the developing needs, but they have to have a clear policy basis to demonstrate to Ofgem, the regulator, that the investments they make are supported by demand. Especially for the large sites, a clear statement of timescales and objectives will allow UKPN to plan the work necessary to make it possible.

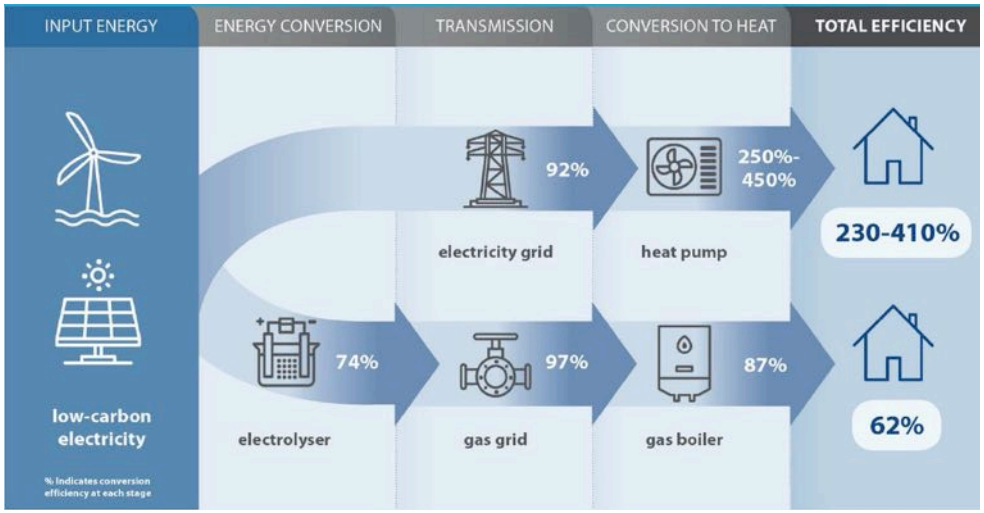
Demand also needs to be flexible, so that energy is used at times of high renewable energy generation. Energy storage (e.g. hot water tanks) and management (e.g. smart controls) as well as smart meters for Time of Use (ToU) variable electricity tariffs are therefore all likely to become increasingly important.

Hydrogen is unlikely to be a solution for heating homes

Hydrogen is not expected to be widely available at the domestic scale, certainly before 2030 and possibly not before 2050. There are remaining uncertainties about how it will be produced and stored, and the impact of these choices on overall energy use, carbon emissions and crucially, what the costs will be for consumers.



Long-term variations in emission factor of grid electricity show the rapid historical reduction in emission factors. © Etude based on data from Market Transformation Programme, UK Committee on Climate Change, Drax, National Grid and HM Treasury.



Relative heating efficiency – heat pumps vs electrolytic hydrogen boiler. From Committee on Climate Change Report, "Hydrogen in a Low Carbon Economy", 2018

Controls, smart meters and electricity demand flexibility

A sustainable electricity supply network.

The steep reduction in the carbon intensity of electricity in the UK has been achieved by significantly increasing the renewable energy contribution, especially from off-shore wind and solar. These intermittent, weather dependent sources have displaced high carbon, steady output coal fired power stations. For this process to continue and to be sustainable, it is necessary for the demand to be managed to match the supply in a way that wasn't previously necessary.

Energy prices fluctuate rapidly every day as supply goes up and demand goes down and vice versa. Time of Use tariffs have been commercially available for some years and are now becoming available to domestic customers. These tariffs track the energy price on an hourly or half hourly basis. If customers are able to reduce their use when prices are high (demand is outstripping supply) and increase it when they are low (oversupply on the grid), then customers can pay substantially less for their energy, on average.

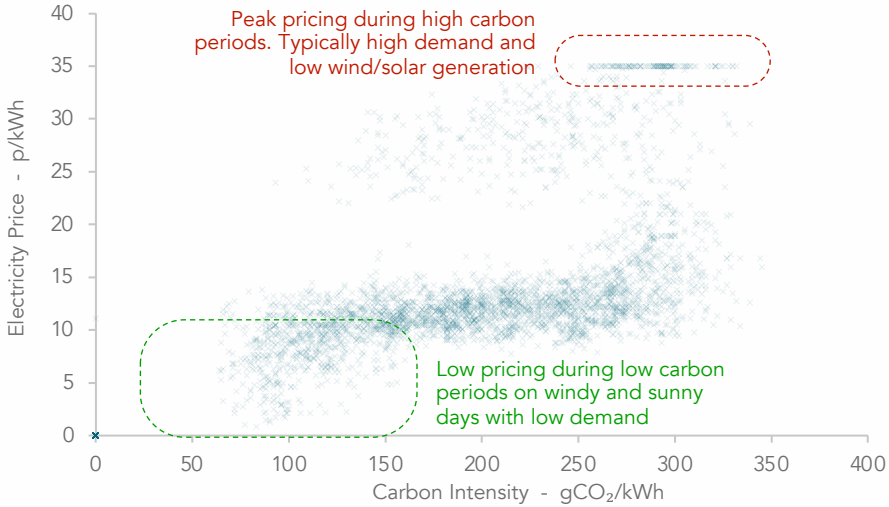
Thermal stability & smart controls

Reducing the rate of heat loss from homes reduces the annual cost of heating and also makes it possible for the residents to utilise more effective 'Time of Use' fuel tariffs, such as Economy 7, by ensuring that when the heating is switched off, the home retains warmth for longer. Better controls and smart thermostats are essential (see image on the right), alongside clear information on how to use the new heating systems to achieve the best energy efficiency and lowest running costs.

The benefits of hot water storage

The facility to store energy, most simply as heat in domestic hot water cylinders, is also a crucial part of demand management strategies.

Batteries can also form part of demand management, and can be charged from the grid at times electricity is cheap, but the capital costs are relatively high, per unit of energy stored.



Electricity costs: The carbon intensity and price of electricity vary depending on the balance between supply and demand. Chart shows price vs carbon intensity in London, at half hour intervals over 3 years from 2018 to 2021. Source www.energy-stats.uk/download-historical-pricing-data

Smart Buildings: Smart meters and smart thermostats are a way of unlocking the power of "agile" tariffs and demand side management to provide affordable low carbon heating. Used in combination with services such as If This Then That (IFTTT) they empower users to access cheap low carbon electricity, while helping the National Grid to balance the network.

2.0 Understanding the buildings and choosing the right measures

This section looks at what we have learned about the City of London Corporation's housing stock. It also looks at how we have used this understanding to develop "archetypes" for the application of retrofit of energy efficiency measures, how we have determined the low carbon heating strategy, and our approach to determining renewable energy potential.

Simple overview of the City of London Corporation's housing stock

Number of units

The City of London Corporation is responsible for 5,028 homes across 82 buildings and 14 different estates, spread over a wide geographical area of London.

Building height

There are a wide variety of different buildings - 39 low rise (1-4 storeys), 19 mid rise (5-9 storeys), and 24 high rise (10+ storeys) of which there are 7 towers of 19+ storeys.

Building age

9 blocks are pre-1920, 7 are 1921-1945, 41 are 1945-1970, 22 are 1971-1991 and 2 are post 1991.

Special status

727 dwellings are within Grade II or II* listed buildings – predominantly across the Barbican and Golden Lane Estates, but also on the Sydenham Hill estate.

Leasehold and social rented

The units are a mixture of social rented, leasehold and a small proportion of freehold.

The majority of residents are tenants across the estates, with 20-50% of units owned by leaseholders. The Barbican Estate is almost entirely occupied by leaseholders.

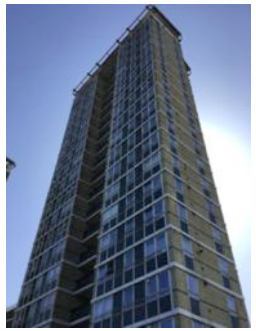
City of London Almshouses

Otto close

Lammas Green, Sydenham Hill Estate

Hatfield House, Golden Lane

Frobisher Crescent, Barbican Estate



Centre Points, Avondale Square Estate

The housing stock's carbon footprint

Total carbon emissions

We have utilised domestic gas and electricity data meter data from BEIS (aggregated by postcode for anonymity). Utilising this together with housing stock information we are able to estimate relative energy efficiency of different blocks. It also enables us to estimate Scope 3 CO_2 emissions, which are estimated to have been 6.2 $ktCO_2$ in 2020.

Space heating demands

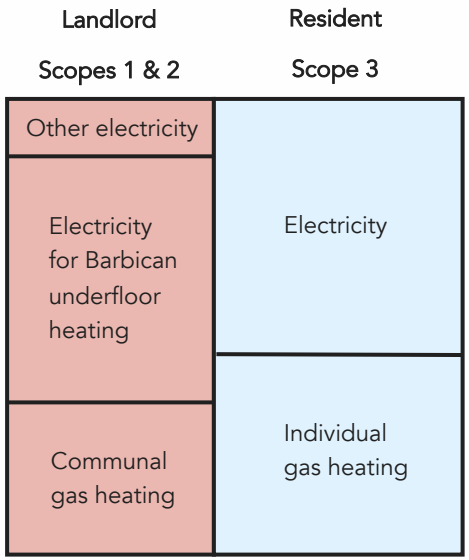
We have also used the above data to understand the average space heating demands of each home in each block. These are useful as they allow us to understand what decarbonisation measures will be suitable for each block. They also allow us to plot each block on the "The Retrofit Map" explained at the end of this section.

Landlord's emissions only

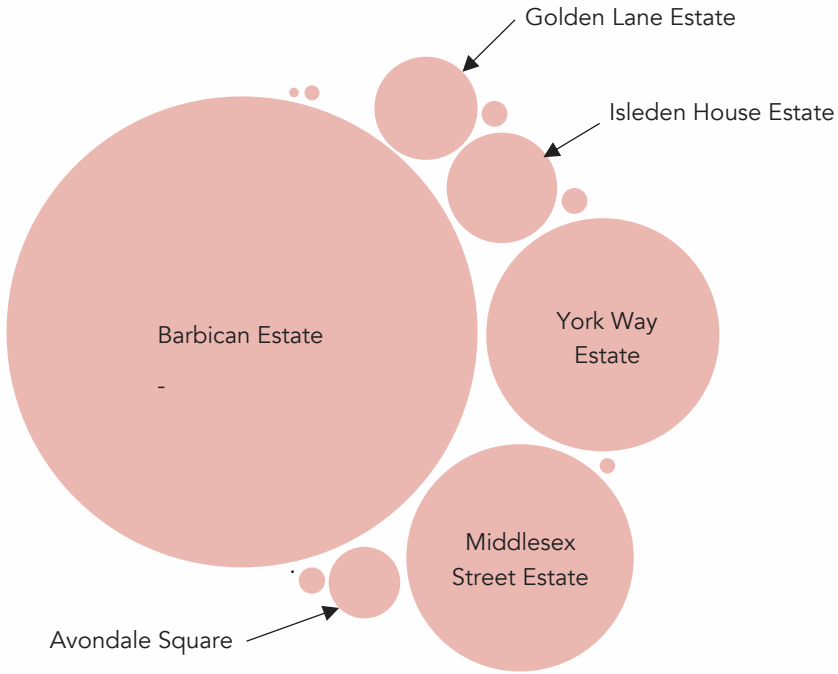
Utilising metered energy data given to us by the City of London Corporation for each estate for 2020, we could determine the following:

- Energy consumption of the Barbican's underfloor heating system for each block.
- Energy consumption of communally heated blocks, including Frobisher Crescent, York Way, Middlesex Street Estate and Isleden House (note that energy consumption data was not available for Horace Jones House or Twelve Acres House).
- Other electrical energy consumption including lighting of corridors and stairwells, lifts, pumps etc (note it was not possible to accurately disaggregate electrical energy consumption for different uses as labelling of meters was inconsistent).

We have determined the total Scope 1 and Scope 2 emissions in 2020 to be 5$ktCO_2$ (excluding non-residential energy uses on estates) and 5.3$ktCO_2$ including non-residential energy uses on estates.



Total stock emissions – scopes 1, 2 and 3.



Relative size of Scope 1 and 2 emissions for each estate, 2020. The largest Scope 1 and 2 emitters are communally heated estates and Golden Lane Estate (including leisure centre emissions).

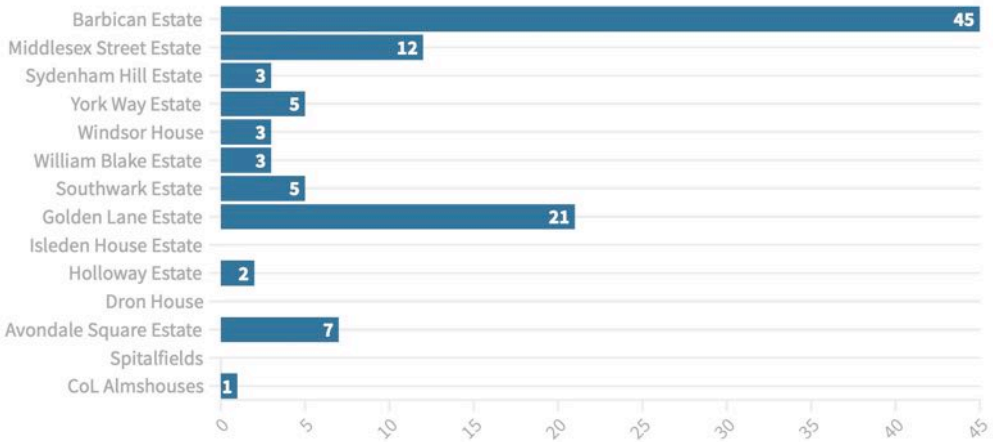
Listening to residents

Understanding the buildings through the residents eyes

In May 2021 we engaged with residents' to gain insights into the energy and comfort performance of the homes they live in.

Firstly, a questionnaire was circulated to all residents, in which people told us a bit about their building through carefully structured questions. Opportunities were also given for residents to write freely anything they wished to communicate (questionnaire outputs in the Appendices).

Subsequent to the questionnaire, we held workshops for residents with the same purpose of listening to residents to understand their buildings. Small group discussions took place centred around the themes of heating, energy efficiency, ventilation and renewable energy. A total of 23 people attended the workshops – 15 from the Barbican Estate and 8 from HRA estates.



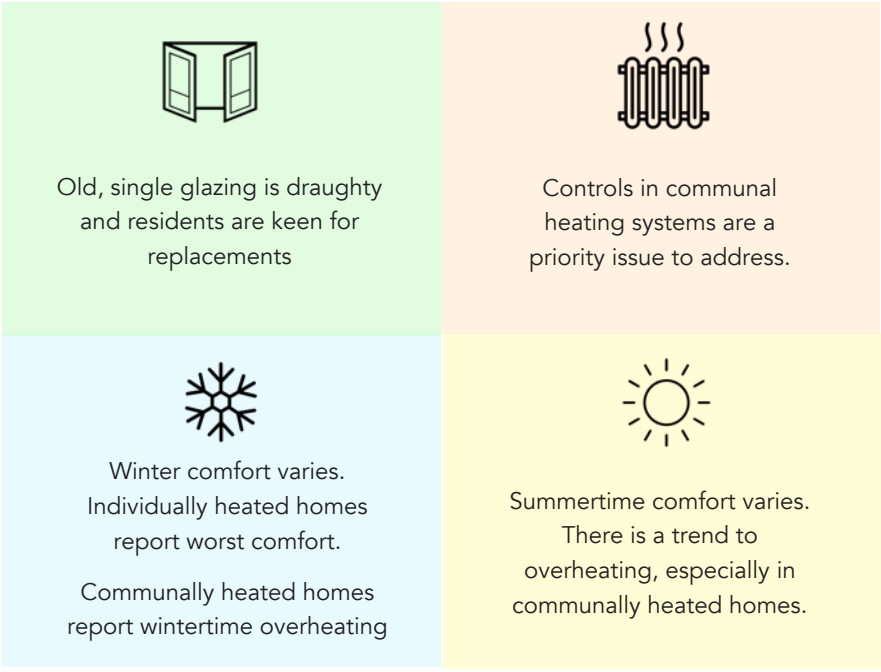
Number of responses to the energy and carbon questionnaire, by estate

Key insights from residents

There was a strong interest from residents in moving away from gas to low carbon heating.

- Communally heated blocks appear to be getting enough heat, possibly too much. Most people said their homes were on the warm side and many open their windows in the winter to cool them down.
- Communally heated blocks most commonly complained of summertime overheating.
- Those blocks with individual heating tended to say it gets too cold in the winter, but it's comfortable in the summer.
- draughty, single glazed windows were unpopular with residents.
- Many residents also complained of doors being draughty.
- Homes with double or triple glazing performed better in winter.
- Ventilation is primarily through windows and trickle vents.

A more detailed write up of the engagement outputs can be found in the Appendices.



Key insights from residents

Simplifying the challenge: identifying archetypes

Archetypes based on construction type

When considering grouping blocks into archetypes, it was clear that there are numerous ways in which this could be done.

We opted for an archetype system based on how a building is constructed, which roughly corresponds to how it looks, and also corresponds with appropriate fabric retrofit measures.

Low carbon heating and renewables retrofit measures should be decided independent of the archetype on a case by case basis. We have detailed the decision process for these on the following pages.

Archetype Code

A short code for the archetypes has been used, with the following format:

[Elevation – Wall insulation location – roof insulation location]

Elevation

Trad - Traditional – Mostly solid or cavity wall, with discrete windows that can be replaced individually.

Mix - Combined / Mixed – Mostly composite wall/window elevations. Requires whole wall/window element to be replaced at the same time.

Wall insulation location

EWI - External wall insulation – Post 1920s buildings, non listed. Either on a traditional wall build up as rendered external insulation (Trad type), or as re-cladding with integrated windows (Mix type).

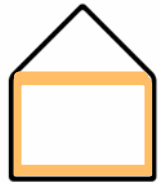
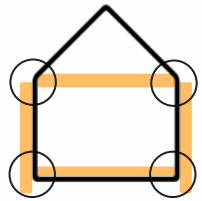
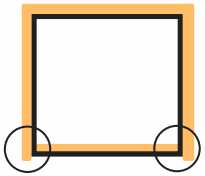
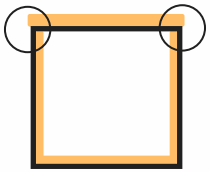
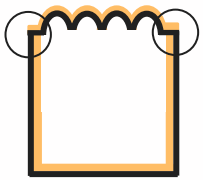
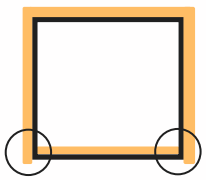
IWI - Internal wall insulation - Pre 1920s buildings or listed buildings.

Roof insulation

Loft – For pitched roofs with lofts. Most likely internal.

Flat – For flat roofs. Most likely external.

Barrel – For barrel roofs commonly found on the Barbican and Golden Lane Estates. External insulation if possible.

Archetype code	Example	Location of insulation
1. Trad – IWI - loft		
2. Trad – EWI – loft		
3. Trad – EWI - flat		
4. Mix – IWI - flat		
5. Mix – IWI – barrel		
6. Mix – EWI – flat		

The six archetypes. Circles indicate where insulation is discontinuous and attention needs to be paid to junctions between insulation and building fabric.

Fabric

Building fabric measures are important for both saving energy and carbon but also making buildings more resilient to future climate change.

Windows

The replacement of all single glazing to good double or, preferably to triple glazing (or a u-value less than 1.0 W/m2K), is a relatively easy first step for most home retrofit plans. Importantly, this measure can also deliver potentially significant CO_2 savings and may be sufficient to enable many homes to be 'heat pump ready', through energy savings and peak heat demand reduction.

Airtightness

Very good airtightness (target 2m^3/h/m^2 at 50Pa) can achieve a substantial improvement in overall space heating demand through minimising heat loss. Limiting draughts and the uncontrolled ingress of pollutants and noise from the outside improves indoor air quality and comfort.

Insulation

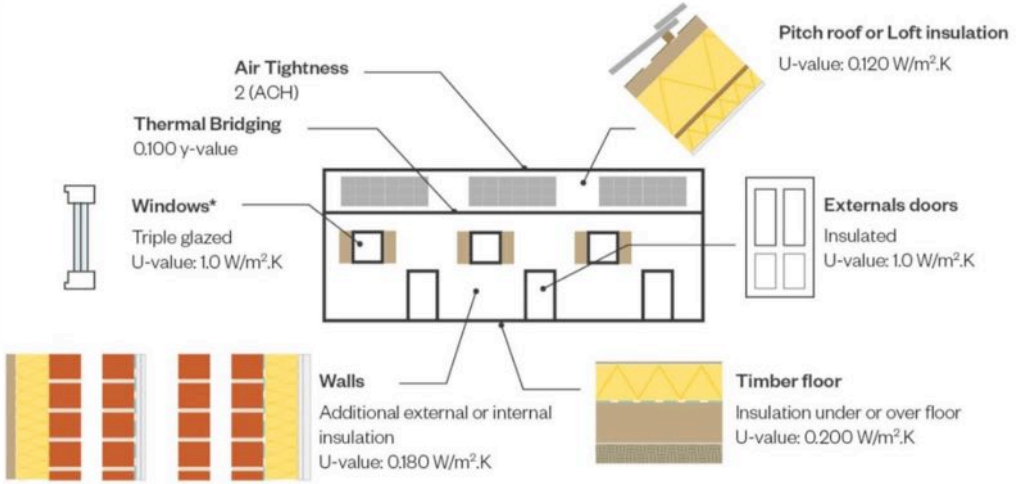
The simplest insulation upgrade is often at roof level, either increasing loft insulation or as part of routine roof maintenance work. Poor quality External Wall Insulation (EWI) installations across the UK, both technically and aesthetically, have seriously undermined confidence in this approach to improving the thermal performance of buildings but it is a vital element of retrofit work. Internal Wall Insulation (IWI) has less visual impact, so lower planning risk, than EWI but the impact on usable space and the degree of disruption required to tenants is far greater. Cavity wall insulation is possible where cavities exist.

EWI has to be designed with great care in relation to fire standards and building safety as well as moisture but there are many successful examples.

Ventilation

Concurrent with window replacement and air-tightness measures, ventilation should be upgraded to an energy efficient system with heat recovery. See the next page for more details on potential systems that could be used.

Replacement of windows is a key fabric efficiency measure. Single glazing should be replaced with double or triple glazing in every home.
Measures to improve air tightness and reduce draughts require attention to the details when fabric works are undertaken.



Fabric specifications recommended for refurbishment.

Ventilation

Ventilation

Changing the thermal performance of the fabric of a building needs to be carried out in conjunction with improvements in ventilation. This is because the "leakiness" of a building may be purging moist and stale air - albeit with uncontrolled heat loss and possible comfort issues. The risk of implementing air-tightness measures without additional ventilation is the creation of damp and mould. Proper ventilation maintains air quality, manages heat loss and reduces the risk of condensation and mould.

MVHR

In every case, Mechanical Ventilation with Heat Recovery (MVHR) should be the first choice to provide ventilation. This is a central system for each home, which extracts air from kitchens and bathrooms and supplies fresh air into living rooms and bedrooms. This system reduces draughts, and provides clean, fresh air to every room, without wasting valuable heat. It also is a key enabling technology for low carbon heating systems, because it reduces the peak heating loads and slows heat loss.

MEV

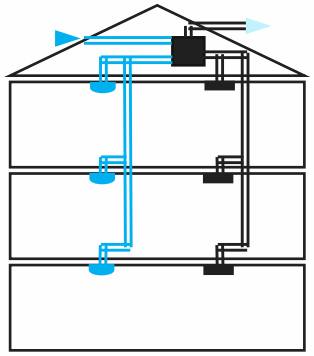
Where MVHR cannot be considered, for example if ceiling heights are particularly constrained and ductwork routes cannot be found, central mechanical extract ventilation (MEV) may be an alternative. This system is also an individual unit for each home which extracts air from kitchens and bathrooms. The supply air comes from trickle vents, usually within window frames, located in living rooms and bedrooms. This system is less energy efficient and more prone to draughts than MVHR, but does provide reasonable background ventilation to suppress condensation, etc.

Centralised Ventilation

Where there is no space and/or no route to outside air for ventilation within each home, particularly in high density housing with heritage status constraints that limit façade penetrations, a centralised system for the whole block can provide extract and potentially supply air from central fans located on the building roof.

MVHR units can be ceiling mounted, usually above bathroom or hallway ceilings, or wall mounted in utility cupboards or kitchen units.

MEV units have a single extract fan with multiple connections to extract air from each 'wet' room in a home with a single exhaust to outside. The units are a little smaller than MVHR with fewer duct connections so may fit where MVHR doesn't.



Centralised ventilation can provide either extract only or supply and extract with heat recovery.
There is a risk of 'cross talk' noise from one flat to the next so the acoustic design is critical.

Note: The introduction of any of the following mechanical ventilation strategies will not replace the need for opening windows to provide summer ventilation to control overheating – this would also be required in all cases. If opening windows are prohibited by external noise or air quality concerns, supplementary ventilation and cooling may be necessary

Choosing fabric and ventilation improvements

A holistic approach

Fabric and ventilation improvements should be considered together and executed simultaneously in order to reduce some of the risks associated with reduced ventilation, such as condensation and mould.

Whole house retrofits where multiple energy efficiency measures are installed as opposed to implementing individual measures have been found to be more effective in reducing energy consumption.

Windows

Replacing windows can bring multiple benefits. All single glazed and old double glazed windows should be replaced for all buildings, to improve energy efficiency and air tightness, reduce condensation and damp and reduce overheating risks.

Windows in some blocks have been replaced relatively recently, and do not need to be replaced again. Window replacements for a further nine blocks are programmed. The proposed specification should be reviewed to ensure the best possible performance is achieved in each case.

Wall insulation

For buildings constructed before 1920, Internal Wall Insulation is likely to be the best option to increase the energy efficiency of the building facade. This is because the facades are often complex, making high quality installation difficult, or architecturally interesting.

For more modern buildings, External Wall Insulation (EWI) may be possible, dependent on heritage status & the complexity of the façade.

Different strategies for EWI can be adopted, depending on the type of existing façade and the building's structural frame.

Air tightness

Better air-tightness is an important aspect of replacement window installation and should always be a key design consideration when this type of work is undertaken. Doors, letterboxes and other air-paths in the building fabric should also be assessed and addressed.

The decision process for fabric improvements

Windows

- ❑ Single glazed or old double glazed? → Replace.
- ❑ New double or triple glazing? → Spot check performance and air-tightness

Wall insulation

- ❑ Pre-1920s? → Internal wall insulation
- ❑ Complex façade? → Internal wall insulation
- ❑ Listed or conservation area? → Internal wall insulation.
- ❑ Simple external form? → External wall insulation
- ❑ Post-1920s → External wall insulation.

Air tightness

- ❑ draught proof all doors, letterboxes and leaky windows.

Ventilation

- ❑ Install mechanical ventilation with heat recovery (MVHR) in all dwellings where possible.
- ❑ Limited potential for intakes and extracts on façade? → consider centralised MVHR

Low Carbon Heating

System Choices

The replacement of gas boilers with other forms of heating which have a lower carbon intensity is a fundamental part of the net zero carbon objective. Electricity has a lower carbon intensity than natural gas, so is seen as the principal alternative energy source to replace gas boilers.

Heat Pumps

The most energy efficient electric heating systems utilise heat pumps. They can be employed for both individual and communal systems.

Air Source Heat Pumps usually have an external unit or units. Where there is space around a building, a Ground Source Heat Pump system could be utilised, using a communal group of boreholes and small heat pumps located inside each home. In buildings with a communal heating system, the gas boilers can be replaced with large central heat pumps.

In buildings where the heat demand is very high and difficult to reduce within the necessary timeframe, a hybrid arrangement where heat pumps are installed alongside existing gas boilers may provide an interim step to reduce carbon emissions with less impact on residents' energy bills. Correct controls are a crucial part of this type of system, to ensure emissions are reduced effectively.

Direct electric heating

The simplest form of electric heating is 'direct', which uses heated elements in storage heaters, panel radiators and convectors, electric underfloor heating or electric boilers. In every case, this type of heating will use at least 2 or 3 times as much electricity as a comparable heat pump. Where fabric improvements are possible to reduce the heating demand to a point where direct electric heating is affordable for residents, it may be a good choice.

Heat Networks

District and communal heating systems currently generally use fossil fuel based heat sources - Combined Heat & Power (CHP) or gas boilers. In future, these systems should swap to low carbon heat sources.

An Air Source Heat Pump (left) with an external unit, gathering heat from the surrounding air. A Ground Source Heat Pump (right) gathers heat from the ground via boreholes.

Left: A centralised heat pump system on the roof of a building. Right: Direct electric heating can use wall mounted radiators, panels or underfloor heating

Criteria	Heat Pump Type	Standard	Best Practice
Space Heating CoP	ASHP	2.50	3.50
	Closed GSHP		4.50
	Open GSHP		5.50
Domestic Hot Water CoP	ASHP	2.0	2.50
	Closed GSHP		2.50
	Open GSHP		3.00

Standard and best practice Coefficient of Performance (CoP) efficiencies for different heat pumps.

Choosing the heat decarbonisation strategy

Consider the alternatives, in a logical order

If an existing boiler needs to be replaced, heating alternatives which use electricity should be considered, as set out in the adjacent process. The specific type of heat pump to be used should be considered in a logical sequence, starting from the ones which are most efficient, as follows:

- ❑ Individual heat pump with dedicated external unit
- ❑ Individual ground source heat pump system
- ❑ Individual heat pump connected to a communal heat pump system
- ❑ Individual heat interface unit connected to a communal heat pump system
- ❑ Exhaust air source heat pump
- ❑ Hot Water Heat Pump / Direct Electric

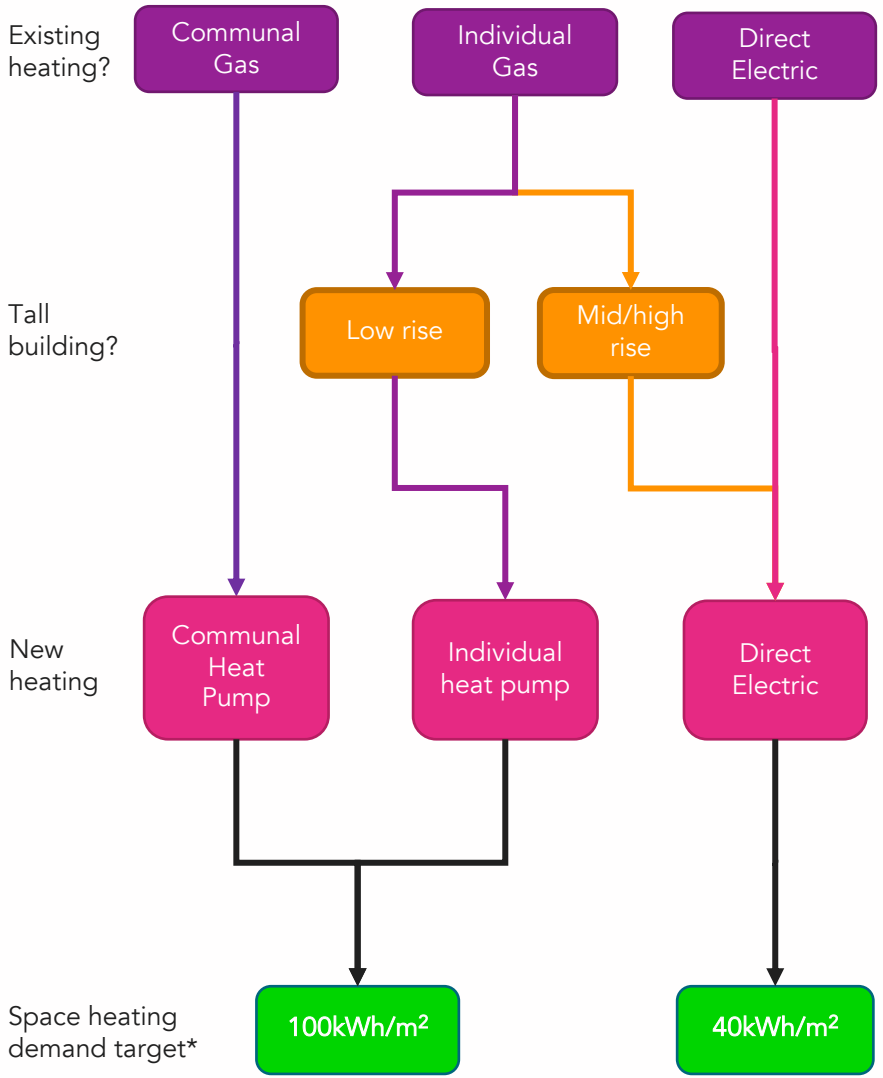
Enabling low carbon heat – set an appropriate space heating demand target

Simply swapping a heat pump to replace an existing gas boiler is generally seen as problematic for both economic and practical reasons. Principally:

- Heat pumps, to be efficient, operate at lower heating water temperatures than gas boilers. In order to enable an early switch to low carbon heat sources, reductions in energy demand may be required, sufficient to enable the home to be switched to a low carbon heat source without major works to the installed heating system.
- Electricity is, on average, more expensive than gas so a like for like replacement may lead to higher fuel bills. Energy efficiency improvements are important to enable the home to be switched to electricity-based heating without incurring additional annual heating costs for the residents. We therefore recommend minimum space heating demands of 100 kWh/m^2 for homes heated by a heat pump system, and 40 kWh/m^2 for homes heated directly by electricity.

Hot Water Storage

Hot water storage should always be part of all low carbon heat systems, if possible, to provide low cost, effective energy storage.



*Where space heating targets are unachievable in the short term, an interim step may be to use a hybrid heat pump while fabric improvement works are undertaken

Solar generation

Assess the potential extent of solar panels on site

Achieving a net zero energy balance in high density developments will rely upon finding space for as much renewable energy generation as possible.

Where fabric upgrades to roofs are required, these should be completed before PV panels are installed or, ideally, concurrently so the PV can be installed while access scaffolding etc is in place for the roof repair work.

Optimise the panel layout

Having established which sites have potential for PV to be installed, the best possible panel layout should be used to maximise the power generated. In many cases and especially where there are flat roofs, this may not be a traditional south facing array, but may be an east-west array installed in a concertina fashion, as explained in the figures on the right.

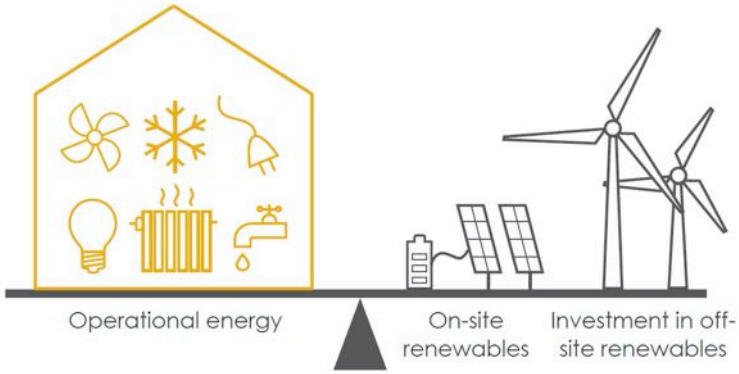
Use the best available technology

- Specify high efficiency monocrystalline silicon solar panels from a reputable manufacturer (min 360W)
- Choose a panel with a linear power output warranty
- Specify microinverters or DC optimisers

High efficiency monocrystalline silicon solar panels can deliver excellent levels of efficiency while maintaining their performance over several decades. The advances in the technology are progressing rapidly and power outputs from commercially available panels are steadily increasing.

The power output warranty for a solar panel provides an indication of how it will perform over time. Higher performing solar panels have 'linear' warranties that guarantee higher levels of power production throughout the lifetime of the panel.

Module Level Power Electronics (MLPE) refer to technologies that manage power production individually for each solar panel. These can ensure each solar panel operates at its peak power output. There are two main MLPE options: microinverters or DC optimisers.

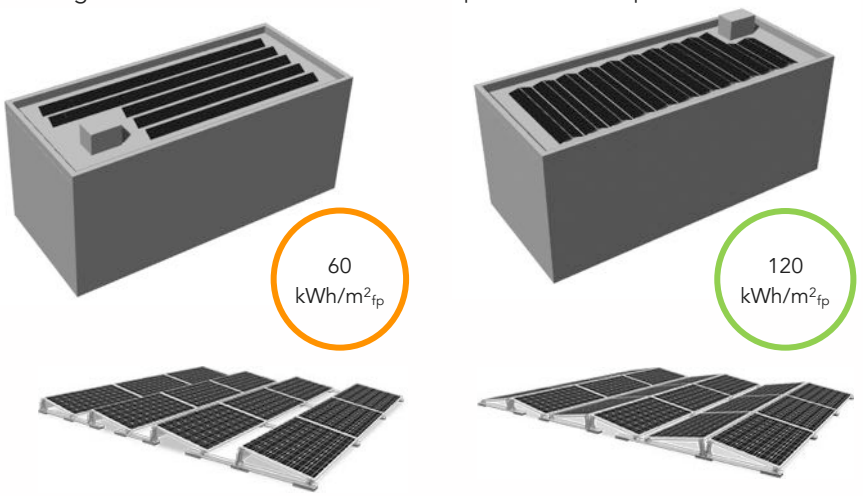


Net zero operational balance

© LETI Climate Emergency Design Guide

South facing array – panels need to be spaced apart to avoid inter-shading

East/west array – panels can be closer together so, overall, the array produces more power



The layout of PV panels has a significant impact on the power generated within a given roof space, especially on a flat roof

Determining the solar generation strategy

PV installations are relatively easy to plan for

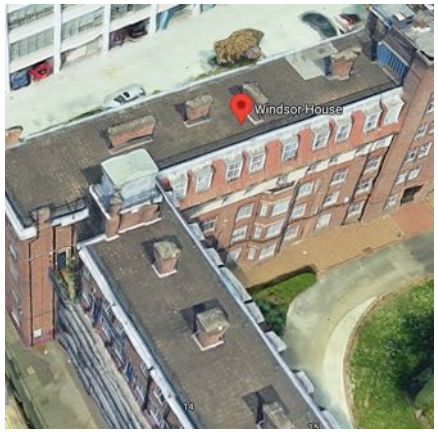
Photovoltaic panels are a versatile technology that can fit in a variety of locations, provided:

- ❑ the roof space is not overshaded
- ❑ Pitch roofs are oriented south, east or west.
- ❑ Roofs do not have lots of chimneys or roof plant obstructing clear area and casting shadows.

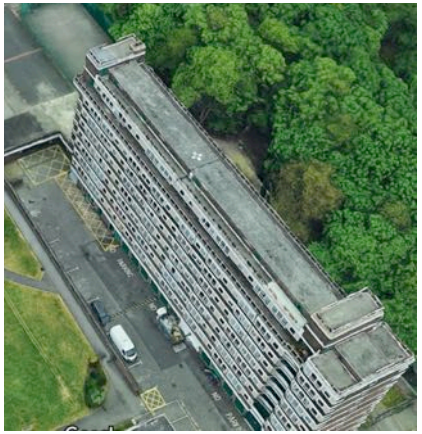
In our calculations for estimating potential output from photovoltaic panels, we have used a combination of: i) total area of roof, ii) % of roof area suitable for PV installation and iii) orientation.

Further analysis will be required by City of London Corporation to determine the suitability of particular roofs for PV installation:

- ❑ The roof can withstand the additional weight of a solar photovoltaic panel installation.
- ❑ A details overshading analysis should be completed.
- ❑ A detailed PV layout and output study should be undertaken.



Shading from chimneys may reduce output. Check.



Roof appears to be unobstructed and unshaded. Flat roof means PV can be oriented optimally.

Barrel roofs and listed status of these blocks at the Barbican estate mean PV is unlikely.

South facing portion of pitch roof is suitable for PV. Check overshading (Harman Close, Avondale Square Estate).

Appliances, white goods and lighting

Energy efficient appliances & lighting

Appliances and white goods can use significant amounts of energy in a building. While these items are mostly an individual choice for residents, where new build or major works are taking place some items can be designed in, and in other cases appropriate information and encouragement can be provided to residents.

High efficiency appliances are recommended to limit total energy consumption and minimise overheating risk from waste energy given off as heat (i.e. A++ or A+++). Provision of clothes drying lines can help to avoid the use of tumble dryers. Generally, free-standing appliances can achieve better performance than integrated devices and their use is encouraged wherever this is possible although their compliance with the overall design needs also to be considered. Lighting efficacy is also a key way to reduce energy in individual homes. Light fittings should be as low energy as possible, e.g. LEDs and occupancy sensors and daylight dimming should be specified in communal areas where appropriate.

Retractable clothes drying lines – could be located in the bathroom or a designated drying cupboard fitted with an extract

High-rated (A+++) washing machine

Waste water heat recovery

A well-designed wastewater heat recovery (WWHR) system can typically extract between 20% and 55% of the heat from outgoing waste water, using it to pre-heat incoming cold water. They are primarily applicable to showers, which create a simultaneous balanced flow of warm waste water and incoming cold water, permitting heat exchange to occur. For dwellings where showers are the main form of bathing, they are likely to account for around 70-80% of hot water use.

For very low energy buildings, hot water can exceed demand for space heating and therefore WWHR represents a significant opportunity to reduce overall energy consumption.

Waste water heat recovery examples from left to right: Horizontal – underneath bath or shower tray; Vertical – typically 2400mm long and mounts between floors; Compact – mounts below shower tray, lower efficiency.

The Retrofit Map

Each building is different

- Their current condition in terms of energy efficiency and heating system will be different.
- What can be done to improve them will vary and may be constrained by heritage and technical considerations.

We have used the adjacent Retrofit Map, developed for the Retrofit London Housing Action Plan, to enable the journey of buildings towards Net Zero to be summarised and understood. The Retrofit Map focuses on how to increase the level of energy efficiency with improvements to the fabric and ventilation system and how to decarbonise heat.

Ultimately, it is recommended that by 2040 (or earlier) all homes are moved to one of the green squares. The buildings which should be most urgently retrofitted will be in the red squares as they will be consuming most of the carbon budgets. However, we appreciate that other factors (e.g. maintenance schedules, replacement opportunities, fairness to residents) may influence the prioritisation.

Use of fossil fuels
Not compatible with Net Zero.
The heating system must be changed.

Low carbon heat but risk of high energy costs
A change of heating system may not be required but fabric, ventilation and system should be improved

Low carbon heat and sufficient level of energy efficiency
Compatible with Net Zero

High carbon → HEAT DECARBONISATION → Low carbon

FABRIC AND VENTILATION	High carbon heat network	Individual gas boiler	Direct electrical heating	Low carbon heat network[1]	Heat pump system[2]
Heating demand <40 kWh/m^2.yr					
Heating demand <100 kWh/m^2.yr					
Heating demand <150 kWh/m^2.yr					
Heating demand >150 kWh/m^2.yr					

Low energy ↑ High energy

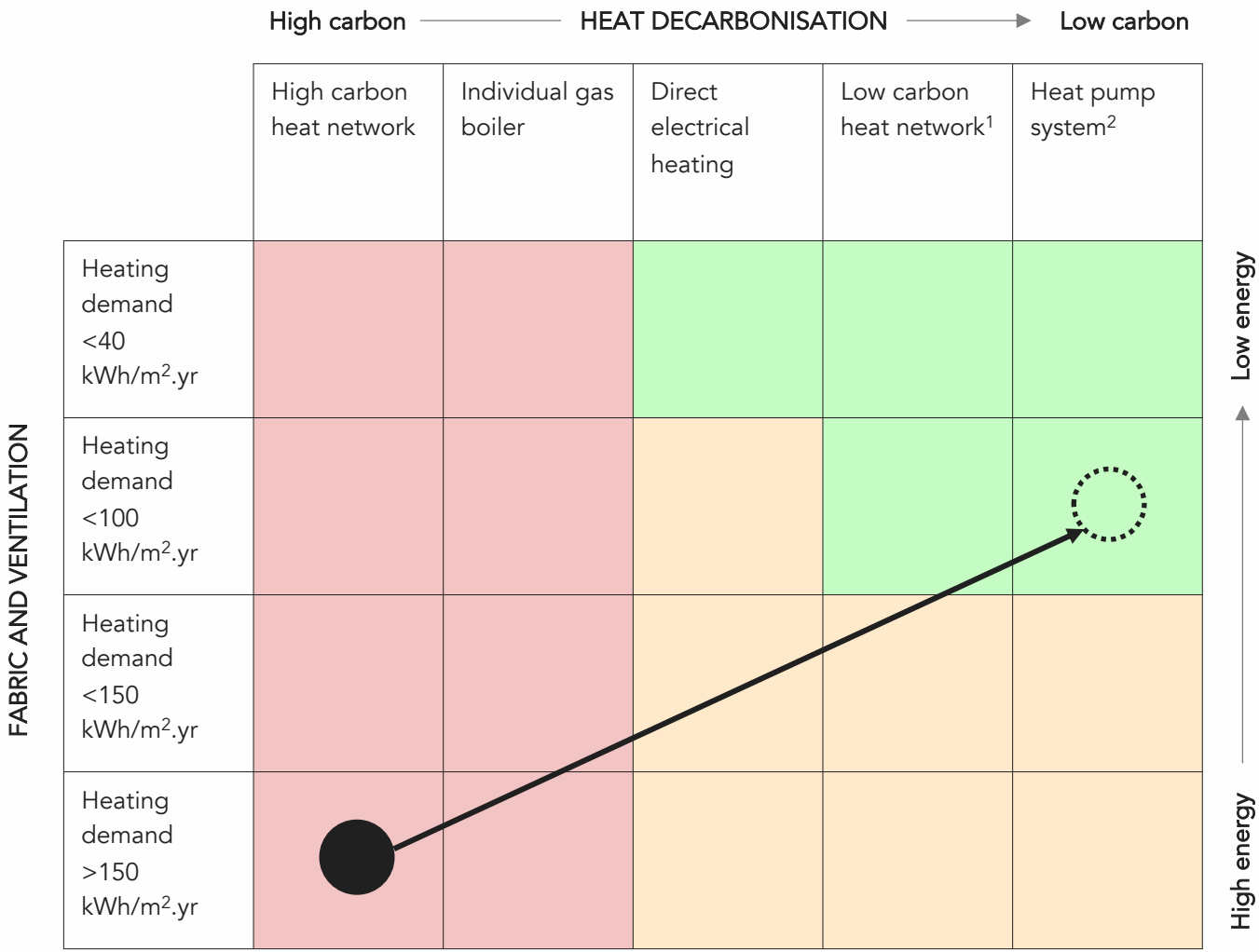
[1] A heat network would qualify as 'low carbon heat network' for the purpose of this Retrofit Map only if it would have a lower carbon content of heat (per kWh delivered) than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

The Retrofit Map

Example 1

- Current situation: this building is very inefficient and is heated by a high carbon heat network.
- Changes required: it should be improved with works on building fabric and ventilation and a new communal heat pump system.



[1] A heat network would qualify as 'low carbon heat network' for the purpose of this matrix only if it would have a carbon content of heat (per kWh delivered) lower than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

Use of fossil fuels
Not compatible with Net Zero.
The heating system must be changed.

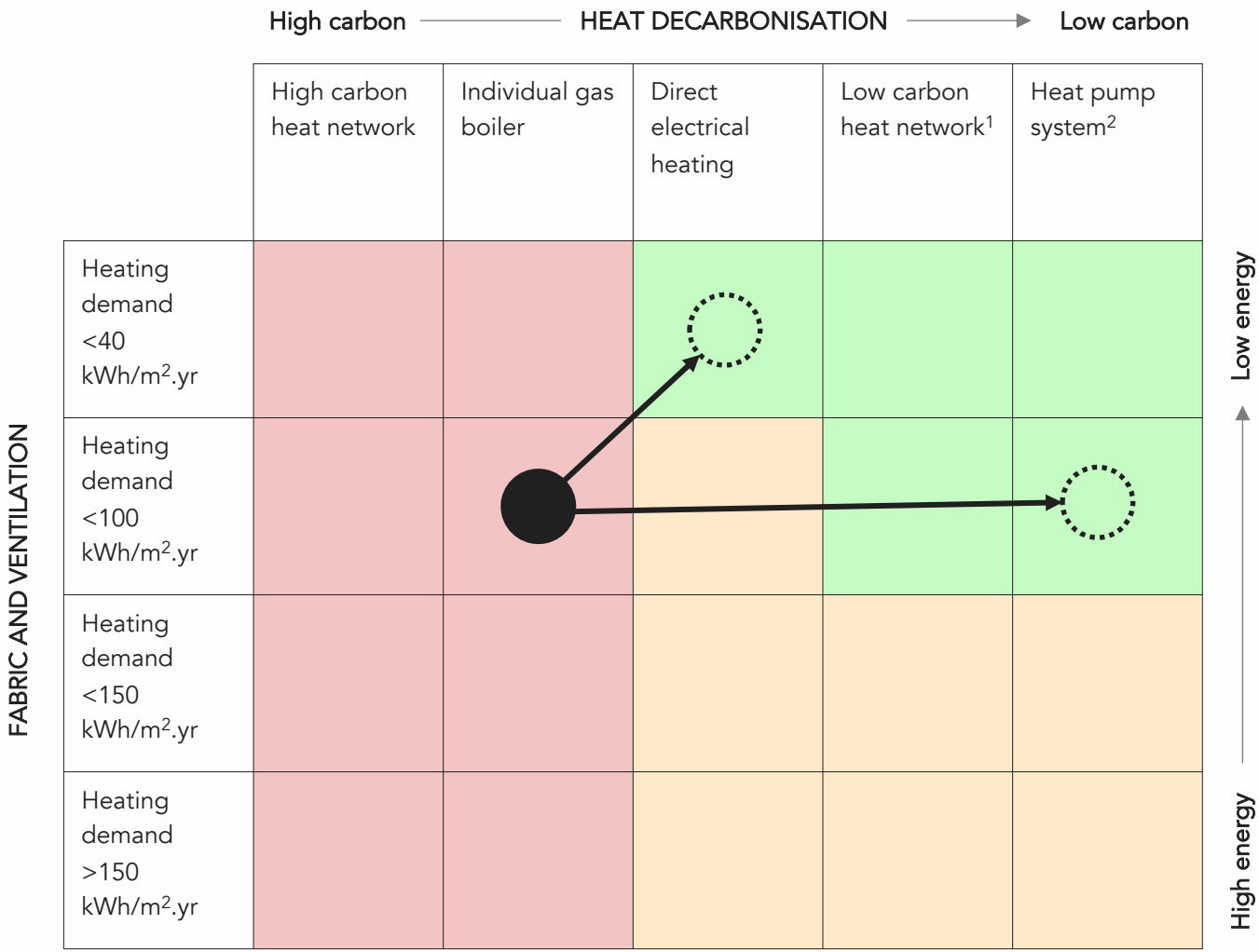
Low carbon heat but risk of high energy costs
A change of heating system may not be required but fabric, ventilation and system should be improved

Low carbon heat and sufficient level of energy efficiency
Compatible with Net Zero

The Retrofit Map

Example 2

- Current situation: this building is relatively efficient and is heated by individual gas boilers.
- Changes required: if a heat pump system is feasible, it is possible that the change of heating system would be sufficient and would not lead to an increase in energy costs even with no fabric and ventilation improvements. However, if a heat pump system is not feasible and direct electric is the selected heating system, improvements to the building fabric and ventilation are recommended.



[1] A heat network would qualify as 'low carbon heat network' for the purpose of this matrix only if it would have a lower carbon content of heat (per kWh delivered) than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

Use of fossil fuels
Not compatible with Net Zero.
The heating system must be changed.

Low carbon heat but risk of high energy costs
A change of heating system may not be required but fabric, ventilation and system should be improved

Low carbon heat and sufficient level of energy efficiency
Compatible with Net Zero

3.0 Housing Net Zero Action Plan templates

Page 37

This section presents the retrofit action plan templates for the 6 different archetypes defined in Section 2.0.

The Net Zero Matrix: our assessment of each building

The diagram to the right describes the structure of the Net Zero Matrix, the tool we use to recommend measures for every building.

Archetyping

Firstly, metadata for buildings are assessed to sort the buildings into six archetypes according to features of the building fabric and potential for improvement.

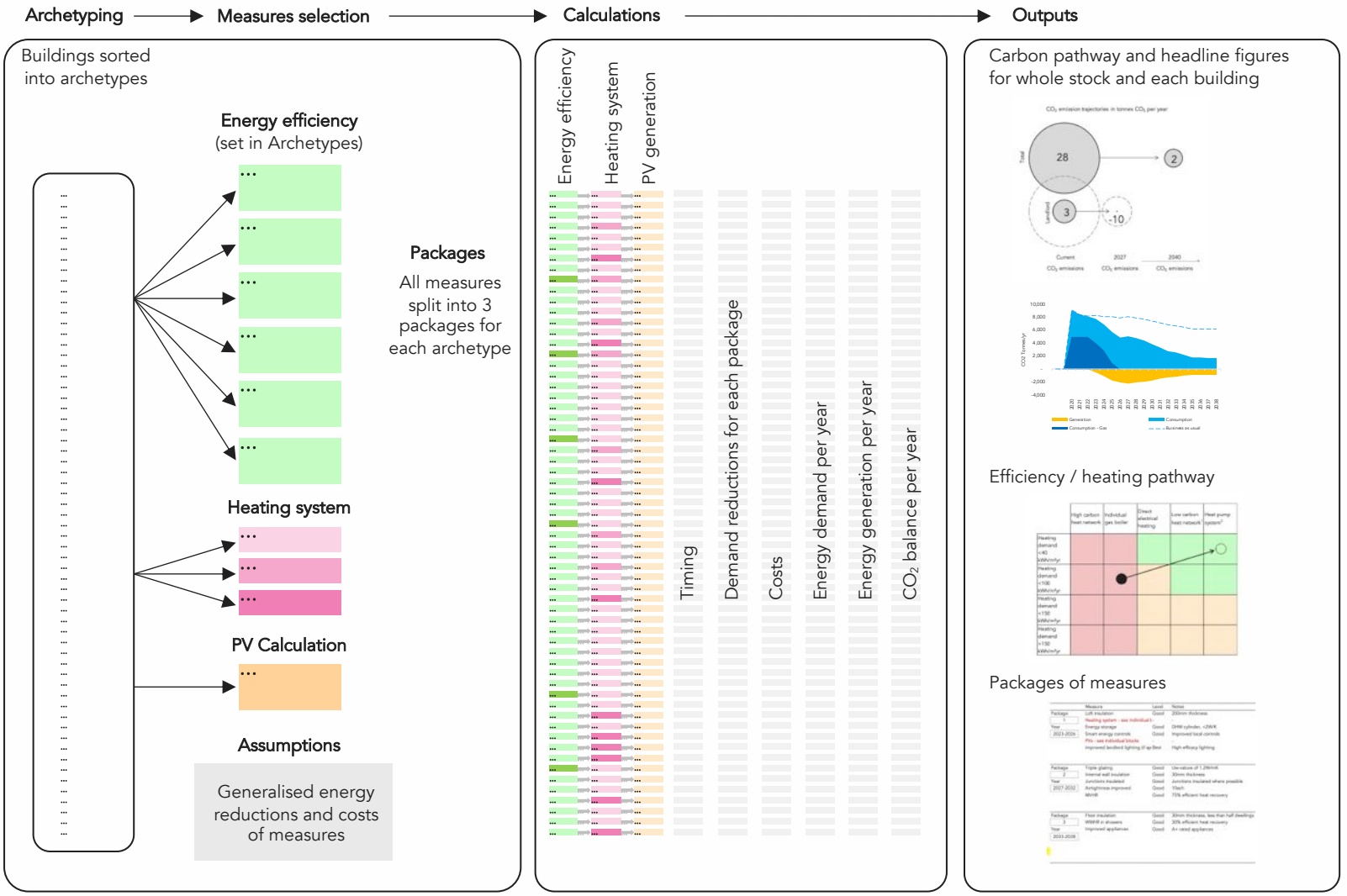
Measures selection & packages

Energy efficiency measures are selected for each Archetype. The most appropriate heating system is then determined by using the heating system decision tree. Next PV assessment for each building gives approximate generation potential for each building.

The energy efficiency, heating and PV measures are then split into 3 packages for each archetype.

Calculations

During the calculation stage, dates are set for each of the 3 packages in each building. The percentage reduction in energy consumption is then predicted, which gives an energy and carbon trajectory to 2040 for scope 1-3 emissions, as well as a trajectory to 2027 for scope 1 & 2 emissions.



Net Zero Matrix structure (graphics reproduced at larger scale on following pages).

Simplifying the challenge: introducing the 6 archetypes

ARCHETYPE 1: Trad-IWI-Loft

e.g. City of London Almshouses

ARCHETYPE 2: Trad-EWI-Loft

e.g. Barnersbury House, Holloway Estate

ARCHETYPE 3: Trad-EWI-Flat

e.g. Collinson Court, Southwark Estate.

ARCHETYPE 4: Mix-IWI-Flat

e.g. Basterfield House

ARCHETYPE 5: Mix-IWI-Barrel

e.g. Bunyan Court, Barbican Estate

ARCHETYPE 6: Mix-EWI-Flat

e.g. Kinefold House, York Way

Considerations for each archetype

Risk factors and concurrent works

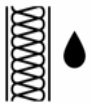
With any retrofit it's important to consider how works are designed, planned and executed in order not to incur unwanted unintended consequences such as the creation of mould and damp and the degradation of building fabric.

The figures to the right illustrate the main detailing considerations for each archetype, which are further described in the box below.

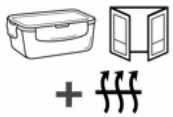
The key principles are to keep insulation lines continuous, ventilate properly, and consider moisture risk with internal insulation.

Insulation should be continuous. Pay attention to areas where there are breaks in insulation (see circles at junctions). These are risk areas for damp and mould.

Loft insulation: ensure adequate ventilation to loft / rafters

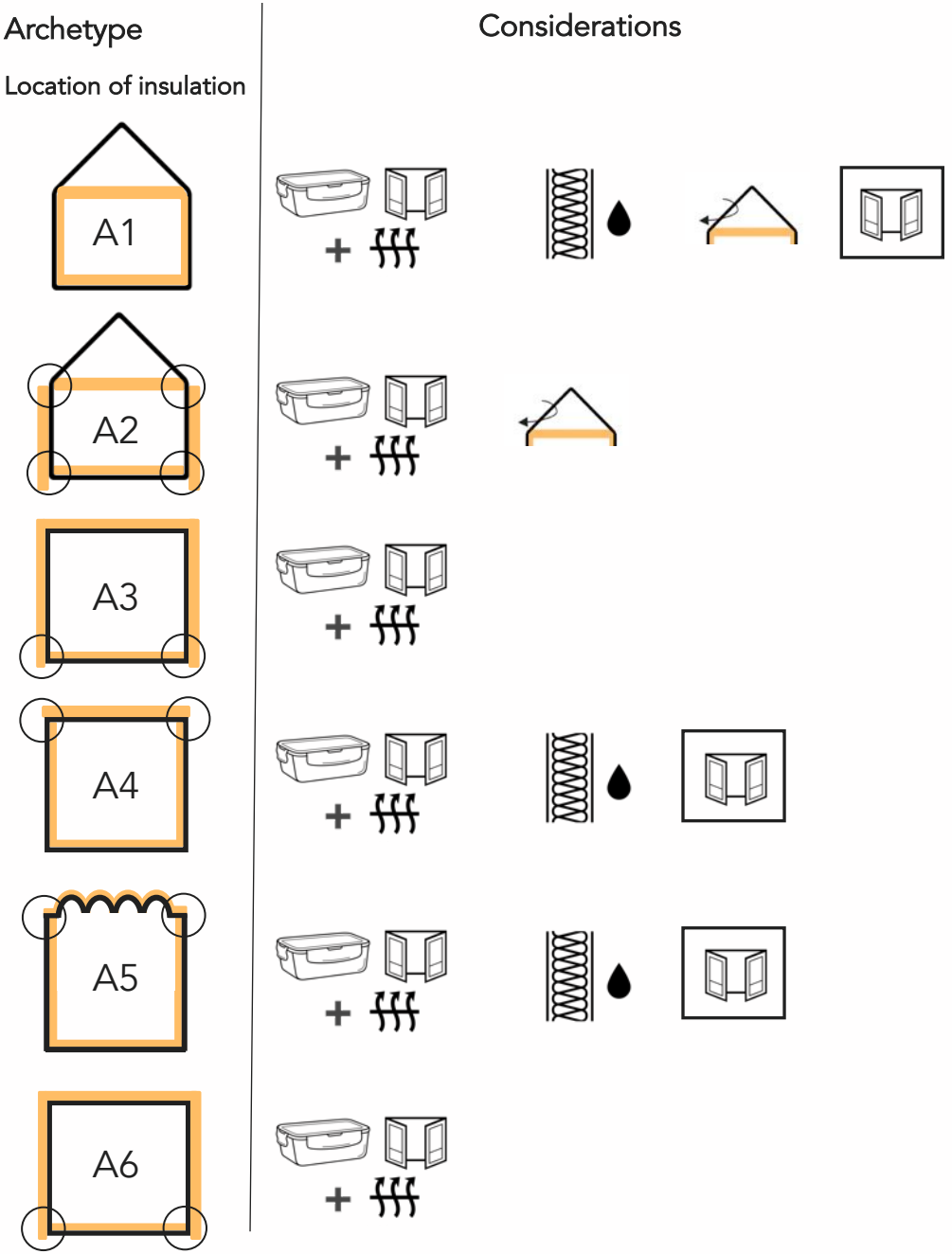


Internal wall insulation: assess moisture risk, use vapour open insulation and keep U-value high (>0.35W/m2K)



Windows / airtightness: ensure ventilation system assessed at same time or before

Specialist windows / heritage considerations



Archetype 1 (Trad-IWI-loft) | Characteristics and list of buildings

Key characteristics

Traditional façade, external wall insulation not likely to be possible.

Typically brick, heritage or complex façade.

Generally low-rise, two are 5 stories.

All have individual gas boilers. Eight have the potential for heat pumps, two are likely to require direct electric heating in the future.

All of the buildings (except Spitalfields) have a small amount of landlord energy.

List of buildings

- City of London Almshouses, Ferndale Road[1]
- Gresham Almshouses, Ferndale Road
- Lammas Green, Sydenham Hill Estate
- Commercial Street, Spitalfields
- Brushfield Street, Spitalfields
- Lamb Street, Spitalfields
- Lynton Mansions, William Blake Estate
- McAuley Close, William Blake Estate
- St James Mansions, William Blake Estate
- York House, William Blake Estate

Retrofit plan to Net Zero

1) Prioritise loft insulation, heating and DHW storage, energy controls, solar PV, any landlord lighting
2) Glazing, internal wall insulation, junctions, airtightness and MVHR
3) WWHR, improved appliances, floor insulation

[1] *Detailed on next page*


City of London Almshouses


Gresham Almshouses


Lammas Green


Commercial street


McAuley Close


Lynton Mansions

Images of some of the buildings

Archetype 1 (Trad-IWI-loft) | Example: proposed retrofit plan and carbon pathway

City of London Almshouses

Archetype A1

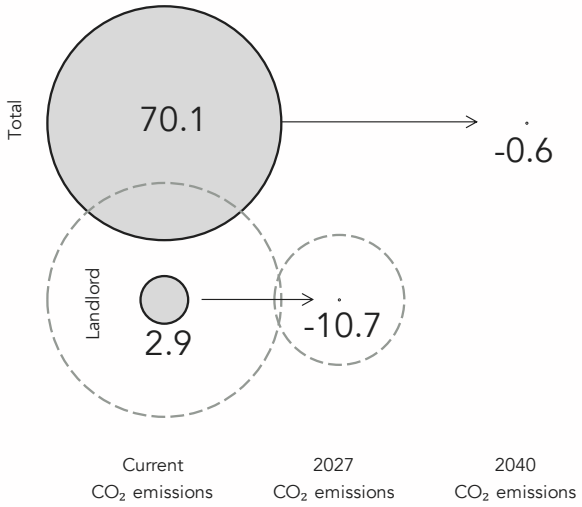
These buildings were built in 1884 and are in a conservation area, therefore the only option for insulating the walls will be internal wall insulation. We have assumed triple glazed heritage style windows (to be agreed with planning) and loft insulation.

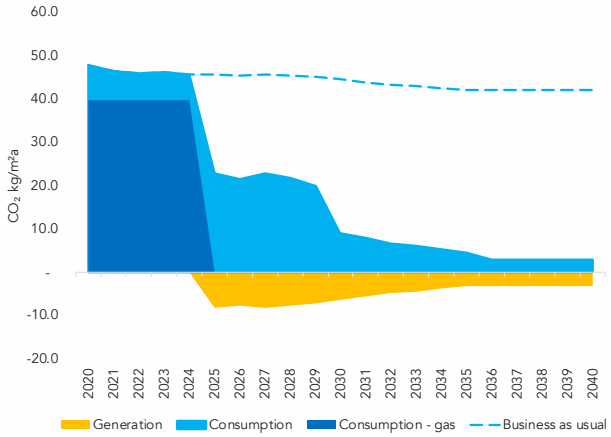
They are currently heated by individual gas boilers and we assume that heat pumps will be possible. Although the buildings are in a conservation area it may be possible to install solar PV on the Southwest facing roofs. We have also assumed small MVHR units can be installed in these dwelling.

There is a small amount of landlord energy from lighting which could be made more efficient and offset by the solar PV. These buildings could be net zero carbon by 2040 for scope 1,2 and 3 emissions.

Photograph of City of London Almshouses

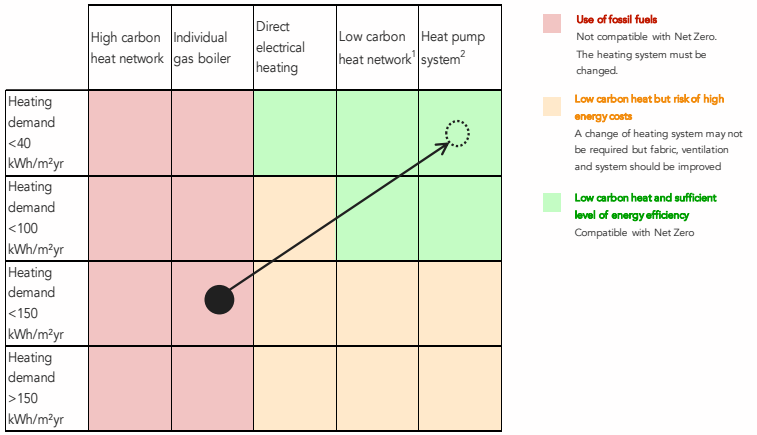
CO_2 emission trajectories in tonnes CO_2 per year





Carbon balance for City of London Almshouses

Current and projected heating demand and system



[1] A heat network would qualify as 'low carbon heat network' for the purpose of this matrix only if it would have a lower carbon content of heat (per kWh delivered) than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

	Measure	Level	Notes
Package 1	Loft insulation	Best	400mm thickness
	Individual HP	Best	SFP of 3+, Suitable if Heating demand <100kWh/m2a
Year 2023-2026	DHW tank	Best	DHW cylinder, <1W/K
	Smart energy controls	Best	Whole dwelling controls with zoning
	Solar PVs	Best	360Wp panels with microinverters
£842k	Improved com. lighting (if appl.)	Best	High efficacy lighting
	Improved lift (if appl.)	Best	N/A
Package 2	Triple glazing	Good	Uw-valuve of 1.2W/mK
	Internal wall insulation	Best	100mm thickness
Year 2027-2032	Junctions insulated	Best	Good connections possible: floor-wall and/or wall-roof
	Airtightness improved	Best	2ach
£1243k	MVHR	Best	90% efficient heat recovery
Package 3	Floor insulation	Good	30mm thickness, <half dwellings
	WWHR in showers	Best	50% efficient heat recovery
Year 2033-2038	Improved appliances	Best	A+++ rated appliances
£205k			

Breakdown of measures per package for City of London Almshouses

Extract of Matrix

Archetype 2 (Trad-EWI-loft) | Characteristics and list of buildings

Key characteristics

Simple façade, mostly brick and distinct windows, some older buildings included. Pitched roofs. All low rise (2-4 stories).

List of buildings

- Avondale House, Avondale Square Estate
- Harman Close, Avondale Square Estate
- Tevatree House, Avondale Square Estate
- Barnersbury House, Holloway Estate
- Bunning House, Holloway Estate
- Crayford House, Holloway Estate
- Fairweather House, Holloway Estate
- Hilton House, Holloway Estate
- McMoran House, Holloway Estate
- Whitby Court, Holloway Estate
- Isleden House, Prebend Street
- Great Suffolk Street, Southwark Estate
- Pakeman House, Southwark Estate
- **Otto Close,** Sydenham Hill Estate[1]

Retrofit plan to Net Zero

1) Prioritise loft insulation, external wall insulation and window replacements, MVHR, heating and DHW storage, solar PV, any landlord lighting
2) Floor insulation, junctions and airtightness
3) WWHR, improved appliances, energy controls

Images of some of the buildings

[1] *Detailed on next page*

Archetype 2 (Trad-EWI-loft) | Example: proposed retrofit plan and carbon pathway

Otto Close

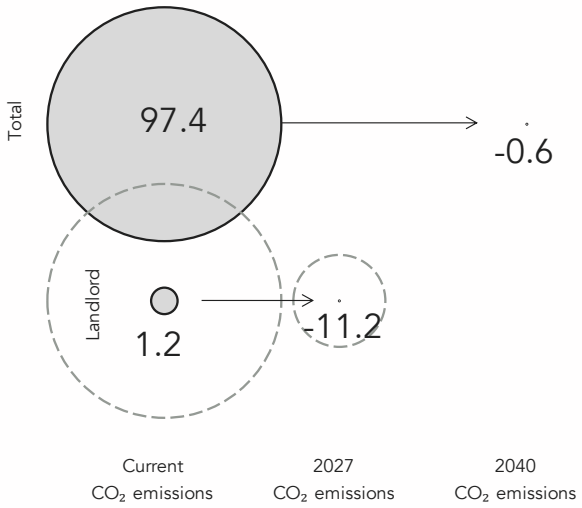
Archetype A2

These two story buildings were built in 1976 and are fairly simple brick construction. They would be suitable for external wall insulation, triple glazed windows and loft insulation.

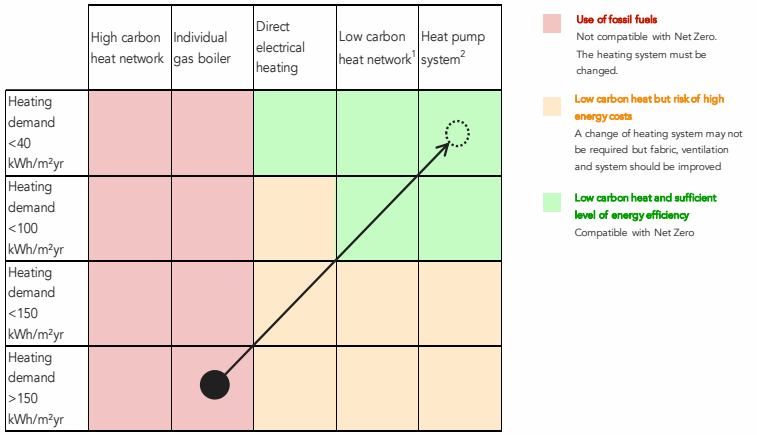
They are currently heated by individual gas boilers and we assume that heat pumps will be possible. It should also be possible to install MVHR units, as well as solar PV on the Southeast facing roofs.

There is a small amount of landlord energy from lighting, which could be made more efficient and offset by the solar PV. These buildings could offset approximately 60% of emissions from onsite renewable energy generation by 2040.

CO_2 emission trajectories in tonnes CO_2 per year



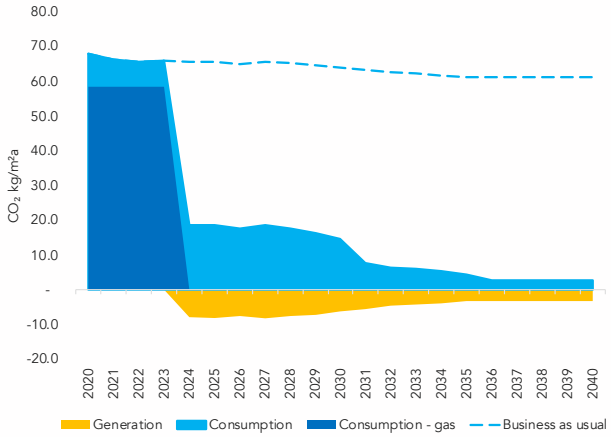
Current and projected heating demand and system



[1] A heat network would qualify as 'low carbon heat network' for the purpose of this matrix only if it would have a lower carbon content of heat (per kWh delivered) than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

Photograph of Otto Close



Carbon balance for Otto Close

	Measure	Level	Notes
Package 1	Triple glazing	Good	Uw-valuve of 1.2W/mK
	External wall insulation	Best	200mm thickness
Year 2023-2026	Loft insulation	Best	400mm thickness
	MVHR	Best	90% efficient heat recovery
	Individual HP	Best	SFP of 3+, Suitable if Heating demand <100kWh/m2a
£1322k	DHW tank	Best	DHW cylinder, <1W/K
	Solar PVs	Best	360Wp panels with microinverters
	Improved com. lighting (if appl.)	Best	High efficacy lighting
Package 2	Floor insulation	Good	30mm thickness, <half dwellings
	Junctions insulated	Good	Junctions insulated where possible
Year 2027-2032	Airtightness improved	Best	2ach
£233k			
Package 3	WWHR in showers	Best	50% efficient heat recovery
	Improved appliances	Best	A+++ rated appliances
Year 2033-2038	Smart energy controls	Best	Whole dwelling controls with zoning
£45k			

Breakdown of measures per package for Otto Close

Extract of Matrix

Archetype 3 (Trad-EWI-flat) | Characteristics and list of buildings

Key characteristics

Simple façade, mostly brick and distinct windows, some older buildings included. Flat roof. 3-8 storeys.

List of buildings

- Eric Wilkins House, Avondale Square Estate
- George Elliston House, Avondale Square Estate
- Twelve Acres House, Avondale Square Estate
- Dron House
- Bazeley House, Southwark Estate
- **Collinson Court**, Southwark Estate[1]
- Horace Jones House, Southwark Estate
- Markstone House, Southwark Estate
- Stopher House, Southwark Estate
- Sumner Buildings, Southwark Estate
- Blake House, William Blake Estate
- Donnelly House, William Blake Estate
- Windsor House, Windsor House
- Petticoat Square, Middlesex Street Estate

Retrofit plan to Net Zero

1) Prioritise flat roof insulation, MVHR, heating and DHW storage, solar PV, any landlord lighting
2) Floor insulation, external wall insulation and window replacements, junctions and airtightness
3) WWHR, improved appliances, energy controls

Images of some of the buildings

[1] *Detailed on next page*

Archetype 3 (Trad-EWI-flat) | Example: proposed retrofit plan and carbon pathway

Collinson Court

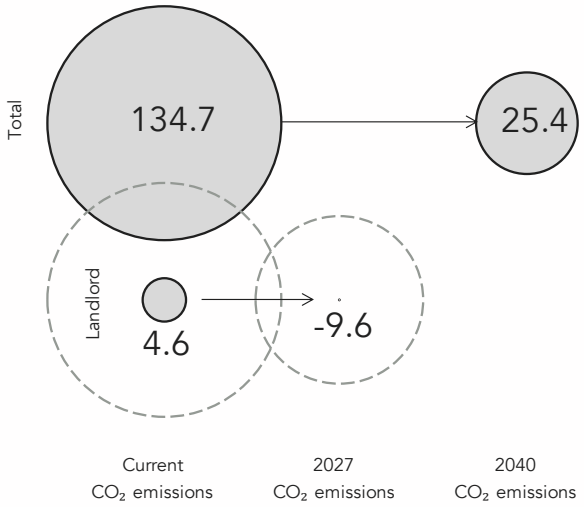
Archetype A3

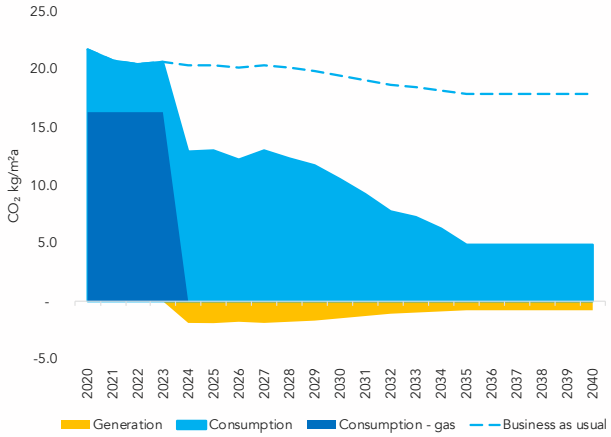
This block was built in 1957 and is fairly simple brick construction. It would be suitable for external wall insulation, triple glazed windows and flat roof insulation. It is currently heated by individual gas boilers. We recommend that these be replaced by direct electric during package 2, when the heating demand has been reduced by fabric improvement measures. It should also be possible to install MVHR units, as well as solar PV on some of the flat roof.

There is a small amount of landlord energy from lighting, which could be made more efficient and offset by the solar PV. This building could offset approximately 21% of emissions due to consumption from onsite renewable energy generation by 2040.

Photographs of Collinson Court

CO_2 emission trajectories in tonnes CO_2 per year





Carbon balance for Collinson Court

Current and projected heating demand and system

	High carbon heat network	Individual gas boiler	Direct electrical heating	Low carbon heat network[1]	Heat pump system[2]
Heating demand <40 kWh/m²yr					
Heating demand <100 kWh/m²yr					
Heating demand <150 kWh/m²yr					
Heating demand >150 kWh/m²yr					

Use of fossil fuels
Not compatible with Net Zero. The heating system must be changed.

Low carbon heat but risk of high energy costs
A change of heating system may not be required but fabric, ventilation and system should be improved

Low carbon heat and sufficient level of energy efficiency
Compatible with Net Zero

[1] A heat network would qualify as 'low carbon heat network' for the purpose of this matrix only if it would have a lower carbon content of heat (per kWh delivered) than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

	Measure	Level	Notes
Package 1	Flat roof insulation	Best	250mm thickness
	MVHR	Best	90% efficient heat recovery
Year 2023-2026	Direct electric	Best	Suitable if Heating demand <40kWh/m2a
	DHW tank	Best	DHW cylinder, <1W/K
	Solar PVs	Best	360Wp panels with microinverters
£1182k	Improved com. lighting (if appl.)	Best	High efficacy lighting
	Improved lift (if appl.)	Best	High efficiency lift
Package 2	Triple glazing	Best	Uw-value of 0.8W/m2K
	Internal wall insulation	Best	100mm thickness
Year 2027-2032	Floor insulation	Good	30mm thickness, <half dwellings
	Junctions insulated	Best	Good connections possible: floor-wall and/or wall-roof
£2493k	Airtightness improved	Best	2ach
Package 3	WWHR in showers	Best	50% efficient heat recovery
	Improved appliances	Best	A+++ rated appliances
Year 2033-2038	Smart energy controls	Best	Whole dwelling controls with zoning
£108k			

Breakdown of measures per package for Collinson Court

Extract of Matrix

Archetype 4 (Mix-IWI-flat) | Characteristics and list of buildings

Key characteristics

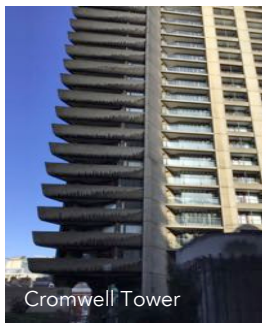
Complex façade, mixture of windows and panels, some brick/clad wall. Flat roof. Golden Lane and Barbican. Includes 3 towers. Typically listed or in a conservation area. Limited wall space for internal wall insulation.

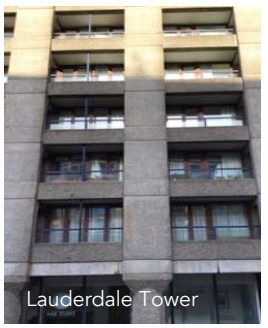
List of buildings

- **Basterfield House**, Golden Lane Estate[1]
- Bayer House, Golden Lane Estate
- Bowater House, Golden Lane Estate
- Cullum Welch House, Golden Lane Estate
- Cuthbert Harrowing House, Golden Lane Estate
- Great Arthur House, Golden Lane Estate (Tower, curtain wall)
- Hatfield House, Golden Lane Estate
- Stanley Cohen House, Golden Lane Estate
- Cromwell Tower, Barbican Estate (Tower)
- Lauderdale Tower, Barbican Estate (Tower)
- Mountjoy House, Barbican Estate
- Shakespeare Tower, Barbican Estate (Tower)
- The Postern, Barbican Estate
- Wallside, Barbican Estate

Retrofit plan to Net Zero

1) Prioritise flat roof insulation, energy controls, heating and DHW storage, solar PV, any landlord lighting
2) Floor insulation, internal wall insulation (where possible) and window replacements (where possible – redesign of panelised systems may be appropriate in some cases), junctions and airtightness, MVHR
3) WWHR, improved appliances





Images of some of the buildings

[1] *Detailed on next page*

Archetype 4 (Mix-IWI-flat) | Example: Proposed retrofit plan and carbon pathway

Basterfield House

Archetype A4

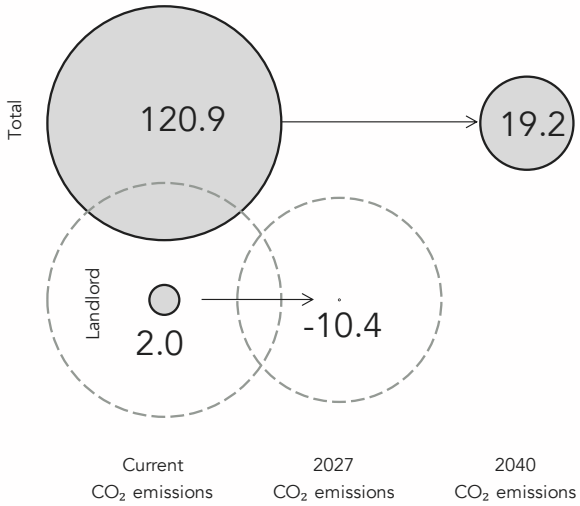
This four story block was built in 1957 and is Grade II Listed, making internal wall insulation necessary on areas of clear wall. The façades are fairly complex with a mixture of windows and panels on the main facade, the replacement strategy would need careful consideration but in principle triple glazed windows are possible. The roof is flat, which is suitable for insulating with PV panels on top.

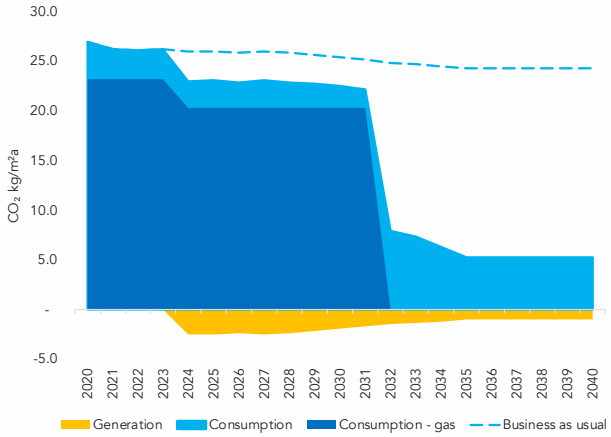
Heat pumps may be possible for this block but would need detailed assessment. Otherwise we recommend that the boilers are replaced by direct electric during package 2, when the heating demand has been reduced by fabric improvement measures. It should also be possible to install MVHR units.

There is a small amount of landlord energy from lighting, which could be made more efficient and offset by the solar PV. This building could offset approximately 23% of emissions due to consumption from onsite renewable energy generation by 2040.

Photograph of Basterfield House

CO_2 emission trajectories in tonnes CO_2 per year





Carbon balance for Basterfield House

Current and projected heating demand and system

	High carbon heat network	Individual gas boiler	Direct electrical heating	Low carbon heat network[1]	Heat pump system[2]
Heating demand <40 kWh/m²yr					
Heating demand <100 kWh/m²yr					
Heating demand <150 kWh/m²yr					
Heating demand >150 kWh/m²yr					

Use of fossil fuels
Not compatible with Net Zero. The heating system must be changed.

Low carbon heat but risk of high energy costs
A change of heating system may not be required but fabric, ventilation and system should be improved

Low carbon heat and sufficient level of energy efficiency
Compatible with Net Zero

[1] A heat network would qualify as 'low carbon heat network' for the purpose of this matrix only if it would have a lower carbon content of heat (per kWh delivered) than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

Extract of Matrix

	Measure	Level	Notes
Package 1	Flat roof insulation	Best	250mm thickness
	Smart energy controls	Best	Whole dwelling controls with zoning
Year 2023-2026	Solar PVs	Best	360Wp panels with microinverters
	Improved com. lighting (if appl.)	Best	High efficacy lighting
£661k	Improved lift (if appl.)	Best	N/A
Package 2	Triple glazing	Good	Uw-valuve of 1.2W/mK
	Internal wall insulation	Good	30mm thickness
Year 2027-2032	Floor insulation	Good	30mm thickness, <half dwellings
	Junctions insulated	Good	Junctions insulated where possible
£1517k	Airtightness improved	Best	2ach
	Direct electric	Best	90% efficient heat recovery
Package 3	WWHR in showers	Best	50% efficient heat recovery
	Improved appliances	Good	A+ rated appliances
Year 2033-2038			
£108k			

Breakdown of measures per package for Basterfield House

Archetype 5 (Mix-IWI-barrel) | Characteristics and list of buildings

Key characteristics

Barbican Estate or Golden Lane Estate (Crescent House), complex façade, mostly more than 10 storeys, mixture of windows and panels, potentially some clear wall but likely to need to be internally insulated for heritage reasons. These buildings all have a barrel roof, partial roof insulation is possible.

List of buildings

- Andrews House, Barbican Estate
- Ben Jonson House, Barbican Estate
- Brandon Mews, Barbican Estate
- Breton House, Barbican Estate
- Bryer Court, Barbican Estate
- Bunyan Court, Barbican Estate
- **Crescent House**, Golden Lane Estate[1]
- Defoe House, Barbican Estate
- Frobisher Crescent, Barbican Estate
- Gilbert House, Barbican Estate
- John Trundle Court, Barbican Estate
- Lambert Jones Mews, Barbican Estate
- Seddon House, Barbican Estate
- Speed House, Barbican Estate
- Thomas More House, Barbican Estate
- Willoughby House, Barbican Estate

Images of some of the buildings

Retrofit plan to Net Zero

1) Prioritise barrel and flat roof insulation where possible, energy controls, heating and DHW storage, landlord lighting, PV if possible (less likely)
2) Floor insulation, IWI (small areas where possible), window replacements (where possible – redesign of panelised systems may be appropriate in some cases), junctions and airtightness, MVHR
3) WWHR, improved appliances

[1] *Detailed on next page*

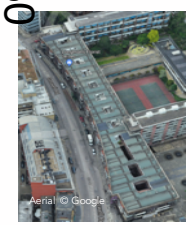
Archetype 5 (Mix-IWI-barrel) | Example: Proposed retrofit plan and carbon pathway

Crescent House

Archetype A5

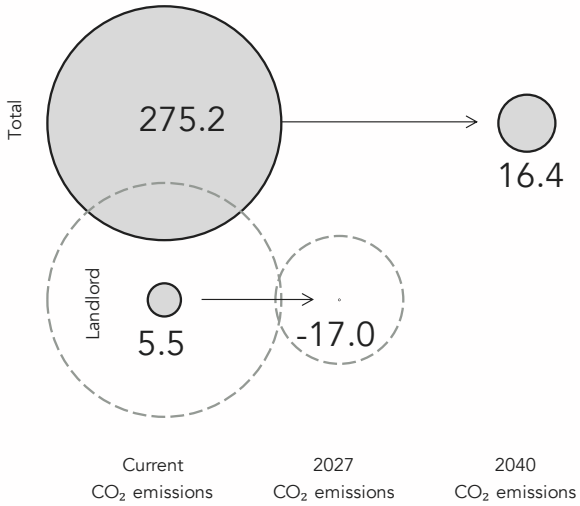
This four story block was built in 1962 and is Grade II Listed, making internal wall insulation necessary on areas of clear wall. The façades are very complex with a mixture of windows and panels on the main facade, the replacement strategy would need careful consideration, triple glazed windows or equivalent may be possible. The roof is a low barrel profile which may be partially suitable for PV panels on the south facing portions. It should be possible to insulate this on top.

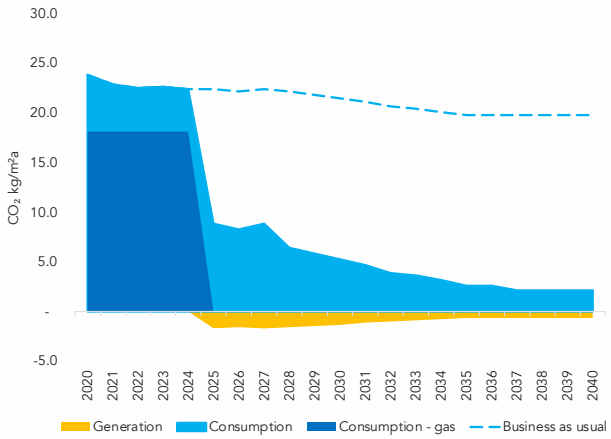
Heat pumps may be possible for this block but would need detailed assessment. It should also be possible to install MVHR units. There is a small amount of landlord energy from lighting, which could be made more efficient and offset by the solar PV. This building could offset approximately 23% of emissions due to consumption from onsite renewable energy generation by 2040.



Photographs of Crescent House

CO_2 emission trajectories in tonnes CO_2 per year





Carbon balance for Crescent House

Current and projected heating demand and system

	High carbon heat network	Individual gas boiler	Direct electrical heating	Low carbon heat network[1]	Heat pump system[2]
Heating demand <40 kWh/m²yr					
Heating demand <100 kWh/m²yr					
Heating demand <150 kWh/m²yr					
Heating demand >150 kWh/m²yr					

Use of fossil fuels
Not compatible with Net Zero. The heating system must be changed.

Low carbon heat but risk of high energy costs
A change of heating system may not be required but fabric, ventilation and system should be improved

Low carbon heat and sufficient level of energy efficiency
Compatible with Net Zero

[1] A heat network would qualify as 'low carbon heat network' for the purpose of this matrix only if it would have a lower carbon content of heat (per kWh delivered) than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

	Measure	Level	Notes
Package 1	Flat roof insulation	Good	100mm thickness
	Individual HP	Best	SFP of 3+, Suitable if Heating demand <100kWh/m2a
Year 2023-2026	DHW tank	Best	DHW cylinder, <1W/K
	Smart energy controls	Best	Whole dwelling controls with zoning
	Solar PVs	Best	360Wp panels with microinverters
£3457k	Improved com. lighting (if appl.)	Best	High efficacy lighting
	Improved lift (if appl.)	Best	N/A
Package 2	Triple glazing	Good	Uw-valuve of 1.2W/mK
	Junctions insulated	Good	Junctions insulated where possible
Year 2027-2032	Airtightness improved	Good	5ach
	MVHR	Best	90% efficient heat recovery
£1992k			
Package 3	WWHR in showers	Best	50% efficient heat recovery
	Improved appliances	Best	A+++ rated appliances
Year 2033-2038			
£453k			

Breakdown of measures per package for Crescent House

Extract of Matrix

Archetype 6 (Mix-EWI-flat) | Characteristics and list of buildings

Key characteristics

Complex façade, mixture of windows and panels, potentially some clear wall. These blocks have flat roofs and some potential for external wall insulation (EWI).

List of buildings

- Brettinghurst house, Avondale Square Estate
- Centre Point, Avondale Square Estate (Tower)
- East Point, Avondale Square Estate (Tower)
- West Point, Avondale Square Estate (Tower)
- Colechurch House, Avondale Square Estate (Tower)
- Proctor House, Avondale Square Estate (Tower)
- Tovy House, Avondale Square Estate (Tower)
- **Petticoat Tower**, Middlesex Street Estate (Tower)[1]
- Longland Court, Avondale Square Estate
- Kinefold House, York Way Estate
- Lambfold House, York Way Estate
- Penfields House, York Way Estate
- Shepherd House, York Way Estate

Retrofit plan to Net Zero

1) Prioritise flat roof insulation, heating and DHW storage, solar PV, any landlord lighting, energy controls
2) External wall insulation and window replacements (where possible – redesign of panelised systems in some cases), junctions, airtightness and MVHR
3) Floor insulation, WWHR, improved appliances


Longland Court

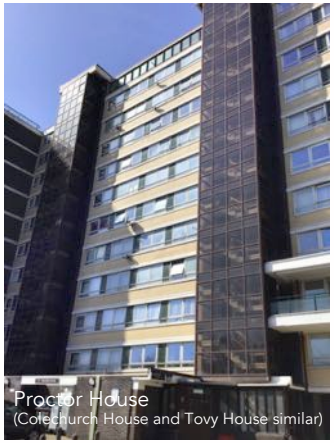

Brettinghurst house


West point / Centre point / East point © google


Kinefold House


West point
(East point and centre point identical)


Petticoat Tower


Proctor House
(Colechurch House and Tovy House similar)

Images of some of the buildings

[1] *Detailed on next page*

Archetype 6 (Mix-EWI-flat) | Example: Proposed retrofit plan and carbon pathway

Petticoat Tower

Archetype A6

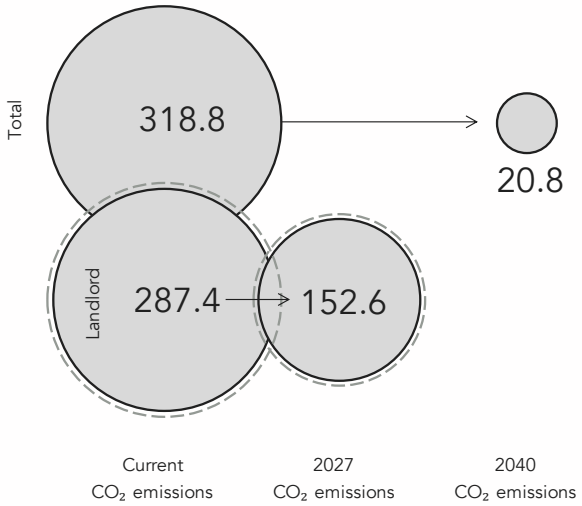
This 23 storey tower was built in 1972. The windows have been replaced with triple glazing. The tower would be suitable for external wall insulation - particular attention should be paid to junctions with windows and the concrete panels surrounding the windows. Flat roof insulation is also recommended.

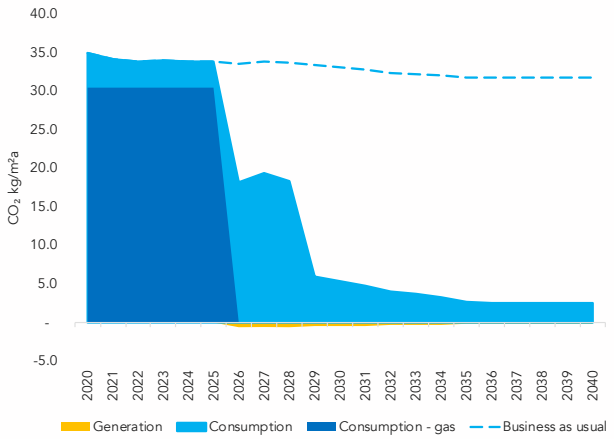
The block is currently heated by a communal gas boiler. We would recommend replacing this with a communal heat pump system as soon as possible. It should also be possible to install MVHR units, as well as a small amount of solar PV on the flat roof.

The landlord emissions include the communal boiler, lighting and lifts, which can be reduced significantly by a change in heating system by 2027.

Photograph of Petticoat Tower

CO_2 emission trajectories in tonnes CO_2 per year





Carbon balance for Petticoat Tower

Current and projected heating demand and system

	High carbon heat network	Individual gas boiler	Direct electrical heating	Low carbon heat network[1]	Heat pump system[2]
Heating demand <40 kWh/m²yr					
Heating demand <100 kWh/m²yr					
Heating demand <150 kWh/m²yr					
Heating demand >150 kWh/m²yr					

Use of fossil fuels
Not compatible with Net Zero. The heating system must be changed.

Low carbon heat but risk of high energy costs
A change of heating system may not be required but fabric, ventilation and system should be improved

Low carbon heat and sufficient level of energy efficiency
Compatible with Net Zero

[1] A heat network would qualify as 'low carbon heat network' for the purpose of this matrix only if it would have a lower carbon content of heat (per kWh delivered) than direct electric heating. Any system using fossil fuels and/or with high distribution losses is unlikely to qualify.

[2] Could be an individual or building level heat pump with low distribution losses.

	Measure	Level	Notes
Package 1	Flat roof insulation	Best	250mm thickness
	Communal heat pumps	Best	Using existing communal heat infrastructure
Year 2023-2026	DHW tank	Best	DHW cylinder, <1W/K
	Smart energy controls	Best	Whole dwelling controls with zoning
£1932k	Solar PVs	Best	360Wp panels with microinverters
	Improved com. lighting (if appl.)	Best	High efficacy lighting
	Improved lift (if appl.)	Best	High efficiency lift
Package 2	Triple glazing	Good	Uw-valuve of 1.2W/mK
	External wall insulation	Best	200mm thickness
Year 2027-2032	Junctions insulated	Best	Good connections possible: floor-wall and/or wall-roof
	Airtightness improved	Good	5ach
£2473k	MVHR	Best	90% efficient heat recovery
Package 3	Floor insulation	Good	30mm thickness, <half dwellings
	WWHR in showers	Best	50% efficient heat recovery
Year 2033-2038	Improved appliances	Best	A+++ rated appliances
£419k			

Breakdown of measures per package for Petticoat Tower

Extract of Matrix

4.0 Relating the action plan to the Climate Action Strategy

This section relates the retrofit plans and new build housing plans back to the Climate Action Strategy

Relating retrofit plans and new build strategy to the climate action strategy

Retrofit of housing

The bulk of this report relates to the 5,028 existing dwellings the City of London Corporation owns. The retrofit plans presented in the previous chapter map out carbon reduction strategies for six representative archetypes identified.

The following pages map out the expected combined carbon pathway of the Corporation's housing portfolio, against both the 2027 and 2040 Climate Action Strategy targets.

For the 2027 target we have mapped two scenarios:

Scenario 1) All actions in the retrofit plans take place but Middlesex Street Estate and York Way Estate remain on gas fired communal heating.

Scenario 2) All actions in the retrofit plans take place, including replacement of all communal gas boilers with low carbon heat alternatives.

New build

The City of London Corporation are adding to their housing portfolio through the construction of new housing estates.

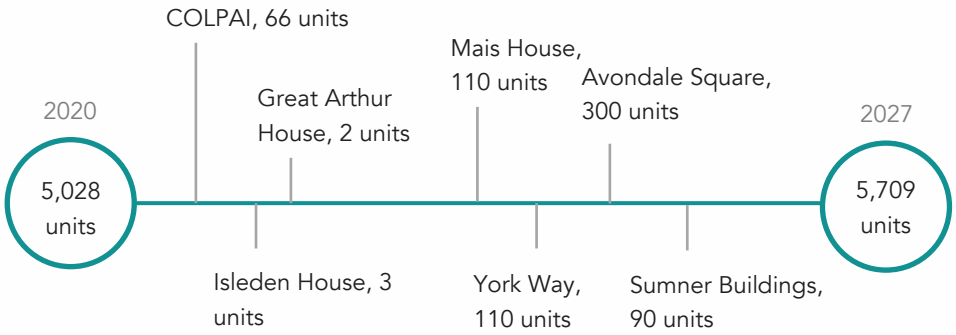
The estimated future carbon emissions of these new housing estates are included in our 2027 calculations, the first of which will be operational from 2022. As at 2027, the new build dwellings are expected to represent 12% of the stock (591 units) and 5% of the carbon emissions.

See the Appendices for information on the known new build housing, what was included in the calculations, and the assumptions made.

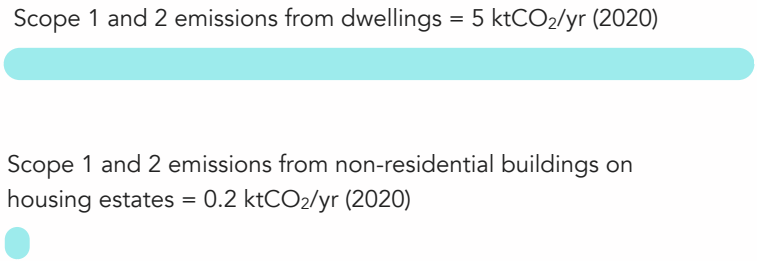
Non-domestic buildings on housing estates

Some of the estate have buildings with non-domestic uses, for example, estate offices, community centres, a leisure centre and library. The carbon emissions of these buildings are not included in our calculations as they are not housing.

For context, we have calculated the Scope 1 and 2 emissions from these buildings and compared them as a proportion of the estate's overall carbon emissions, see diagram on the right.



Timeline of known new-build programme for the City of London Housing portfolio



Scope 1 and 2 emissions from dwellings on residential estates and non-domestic buildings on residential estates, owned or managed by the City of London Corporation.

Summary of carbon emissions reduction potential by 2027

Achieving the 2027 target for Scope 1 and 2 emissions

We have modelled two scenarios to assess the carbon emissions reduction potential by 2027, of the Corporation's housing stock.

Approximately 1/3 of current Scope 1 and 2 emissions are from communal can heating of Middlesex Street Estate, York Way Estate, Isleden House and Frobisher Crescent.

While the ideal scenario would be to replace these communal gas boilers with low carbon alternatives, the two largest estates (Middlesex Street Estate and York Way Estate) are both in the process of having their communal heating systems replaced with new gas boilers. Therefore, we understand the Corporation may not be able to invest in replacement with low carbon heat alternatives.

We this in mind, we have tested two scenarios:

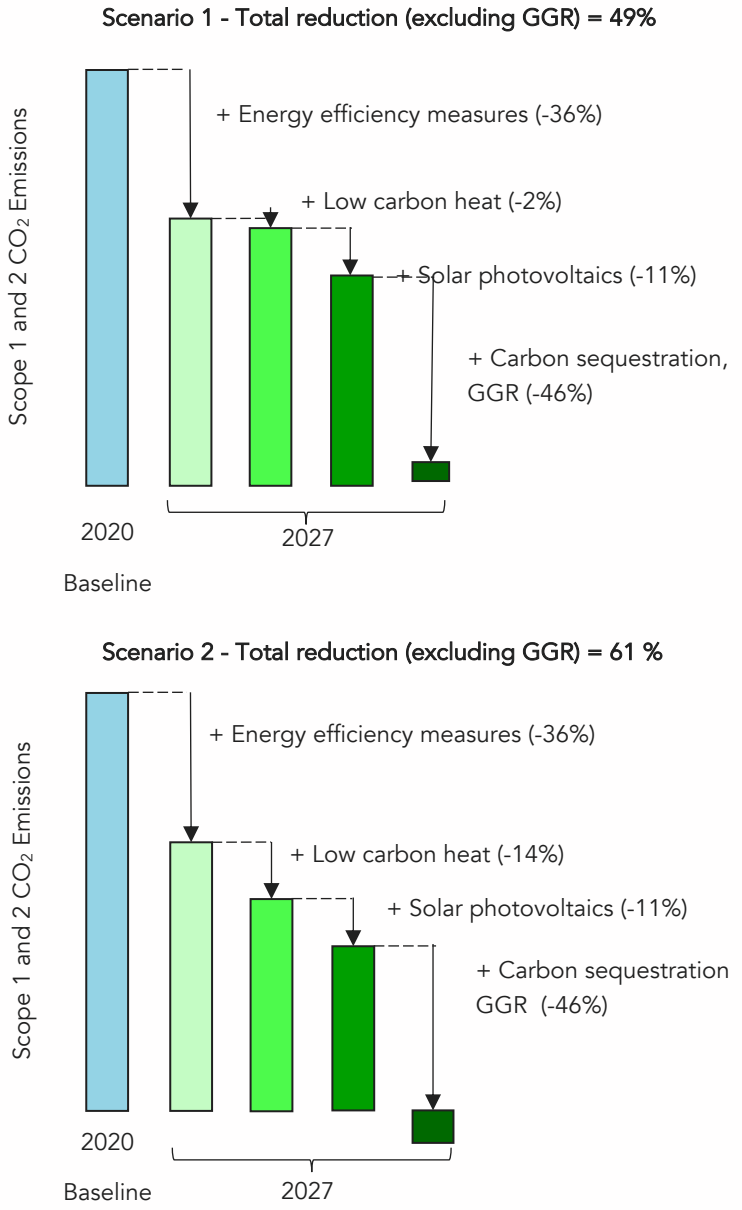
Scenario 1: As per retrofit plans, but gas communal heating remains for Middlesex Street Estate and York Way Estate

In this scenario, at 2027 a 49% reduction in emissions is achieved from the 2020 baseline. This is achieved through use of energy efficiency measures, replacement of communal gas boilers with low carbon heat (at Isleden House and Frobisher Crescent only), and the installation of photovoltaic panels on the roofs of all buildings across the estate (where roof area and shape permits).

Scenario 2: As per retrofit plans – all gas communal heating replaced with large scale Air Source Heat Pumps.

In this scenario, at 2027 a 61% reduction in emissions is achieved from the 2020 baseline. This is achieved through the same measures as scenario one, with the exception that all communal gas boilers are replaced with low carbon alternatives across all estates.

If we apply the proportionate direct greenhouse gas removals (GGR) from the Corporation's land based assets (described on page 13), a further 46% reduction may be applied to each scenario.



Scope 1 and 2 CO_2 emissions reduction strategies to 2027. Figures suggest emissions are carbon negative by 2027 only if all gas communal heating is changed to Air Source Heat Pumps by 2027.

Carbon pathway to 2027 for scope 1 and 2 emissions | Scenario 1

Scenario 1 achieves a 33% reduction from the CO_2 baseline

The graph to the right shows the carbon pathway for Scenario 1 for scope 1 and scope 2 emissions to 2027. The blue band represents emissions related to electricity consumption every year and the dark blue within it represents the emissions due to gas use. The yellow band below zero represents the emissions offset by generating renewable energy onsite.

Net emissions reductions from 2020 = 49% (i.e. 51% of emissions, or 2,554 tCO_2/yr, remain in 2027, due to emissions associated with grid electricity).

Key strategies

Key priorities for reducing scope 1 & 2 emissions in this Scenario will be:

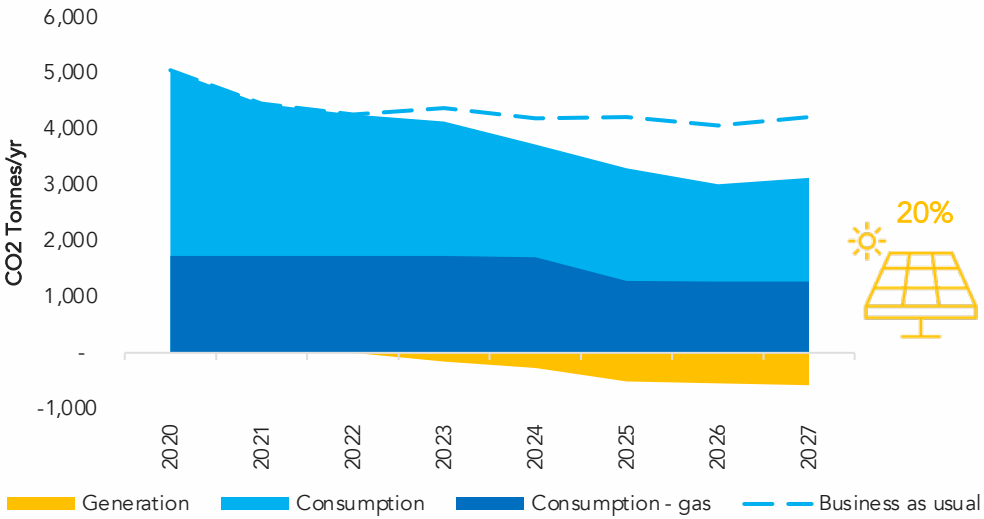
- Stop using gas for communal heating as soon as possible (this Scenario assumes Middlesex Street and York Way Estate remain on gas communal heating.

  Install roof insulation early

  Install as much photovoltaics on the roofs as possible (at the same time, or after, roof insulation).
- Make communal lighting more efficient – upgrade to LED lighting and review lighting controls for each estate.
- Review controls of energy systems – is there scope to improve controls of communal heating systems?
- Review, and replace if necessary, insulation on pipework of communal heating systems.

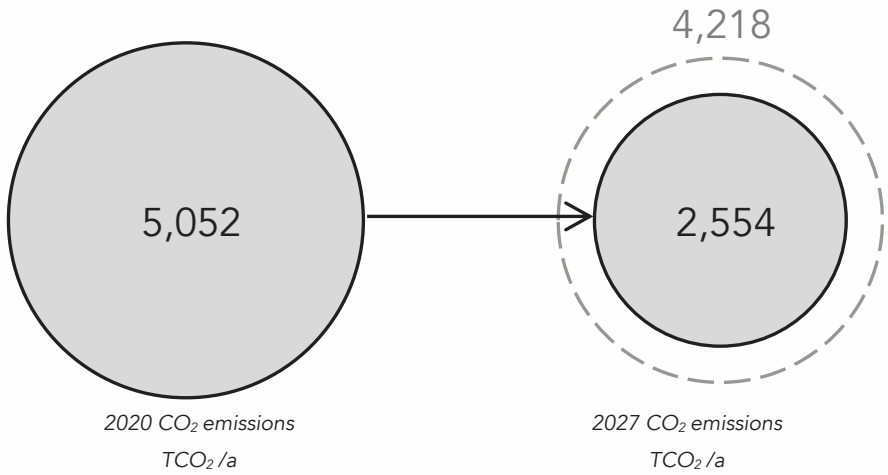
What happens if we carry on as usual?

The bubbles to the right show whole housing stock emissions in 2020 and potential emissions in 2027, including the offset from the solar generation on site. The dotted circle shows that expected emissions in a "Business As Usual" scenario (i.e. no improvements to the building fabric, heating systems and no solar PV installed on the roofs. The reduction in emissions in this case are attributed to grid electricity becoming less carbon intensive in future years.



Annual CO_2 emissions balance: Scope 1 & 2 emissions.

The icon to the right shows percentage emissions offset compared to emissions from consumption



Total scope 1 & 2 CO_2 emissions current and 2027. The combination of fabric measures, removal of gas and solar generation results in emissions reductions of 51% compared with 2020. The dotted line indicates 2027 emissions in a 'Business as usual' scenario where no retrofit action is taken.

Carbon pathway to 2027 for scope 1 and 2 emissions | Scenario 2

Scenario 2 achieves a 62% reduction from the CO_2 baseline

The graph to the right shows the carbon pathway for Scenario 2 for scope 1 and scope 2 emissions to 2027. The blue band represents emissions related to electricity consumption every year and the dark blue within it represents the emissions due to gas use. The yellow band below zero represents the emissions offset by generating renewable energy onsite.

Net emissions reductions from 2020 = 62% (i.e. 38% of emissions, or 1,986 tCO_2/yr, remain in 2027, due to emissions associated with grid electricity).

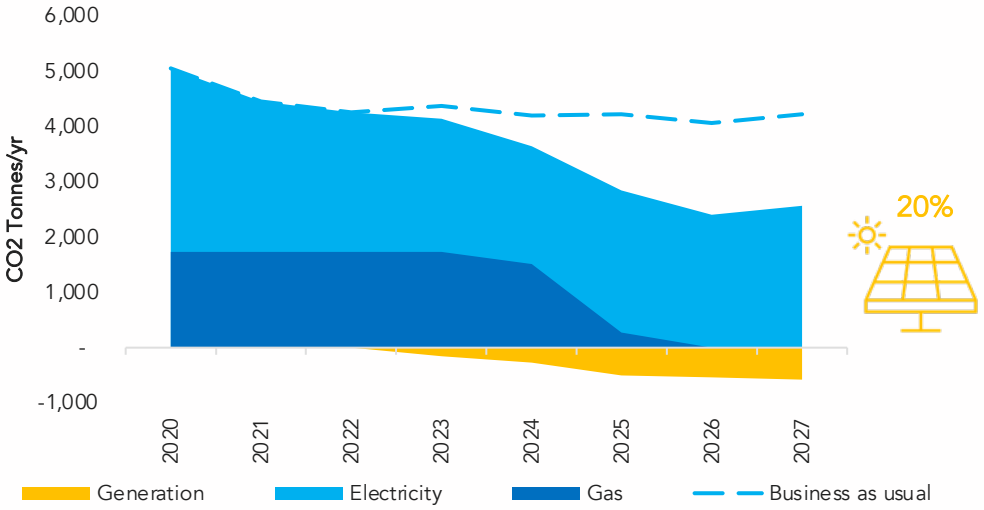
Key strategies

Key priorities for reducing scope 1 & 2 emissions in this Scenario will be:

- Stop using gas for communal heating on all estates as soon as possible
- Install roof insulation early
- Install as much photovoltaics on the roofs as possible (at the same time, or after, roof insulation).
- Make communal lighting more efficient – upgrade to LED lighting and review lighting controls for each estate.
- Review controls of energy systems – is there scope to improve controls of communal heating systems?
- Review, and replace if necessary, insulation on pipework of communal heating systems.

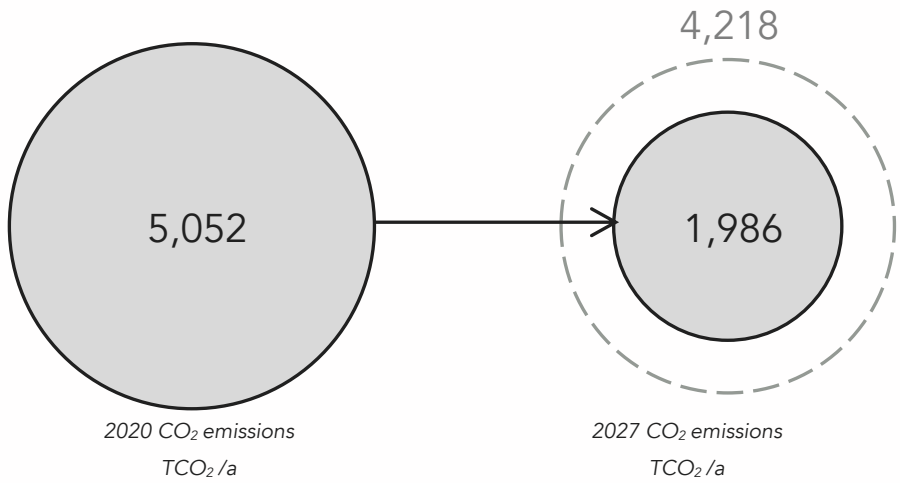
What happens if we carry on as usual?

The bubbles to the right show whole housing stock emissions in 2020 and potential emissions in 2027, including the offset from the solar generation on site. The dotted circle shows that expected emissions in a "Business As Usual" scenario (i.e. no improvements to the building fabric, heating systems and no solar PV installed on the roofs. The reduction in emissions in this case are attributed to grid electricity becoming less carbon intensive in future years.



Annual CO_2 emissions balance: Scope 1 & 2 emissions.

The icon to the right shows percentage emissions offset compared to emissions from consumption



Total scope 1 & 2 CO_2 emissions current and 2027. The combination of fabric measures, removal of gas and solar generation results in emissions reductions of 86% compared with 2020. The dotted line indicates 2027 emissions in a 'Business as usual' scenario where no retrofit action is taken.

Summary of carbon emissions reduction potential by 2040

Achieving the 2040 target for Scope 1, 2 and 3 emissions

Collectively, the measures outlined in the retrofit plans could achieve emissions reductions of approximately 86% from the 2020 baseline by 2040. This includes Scope 1, 2 & 3 emissions (from energy controlled by both the Corporation and by both tenants and leaseholders).

Key strategies modelled

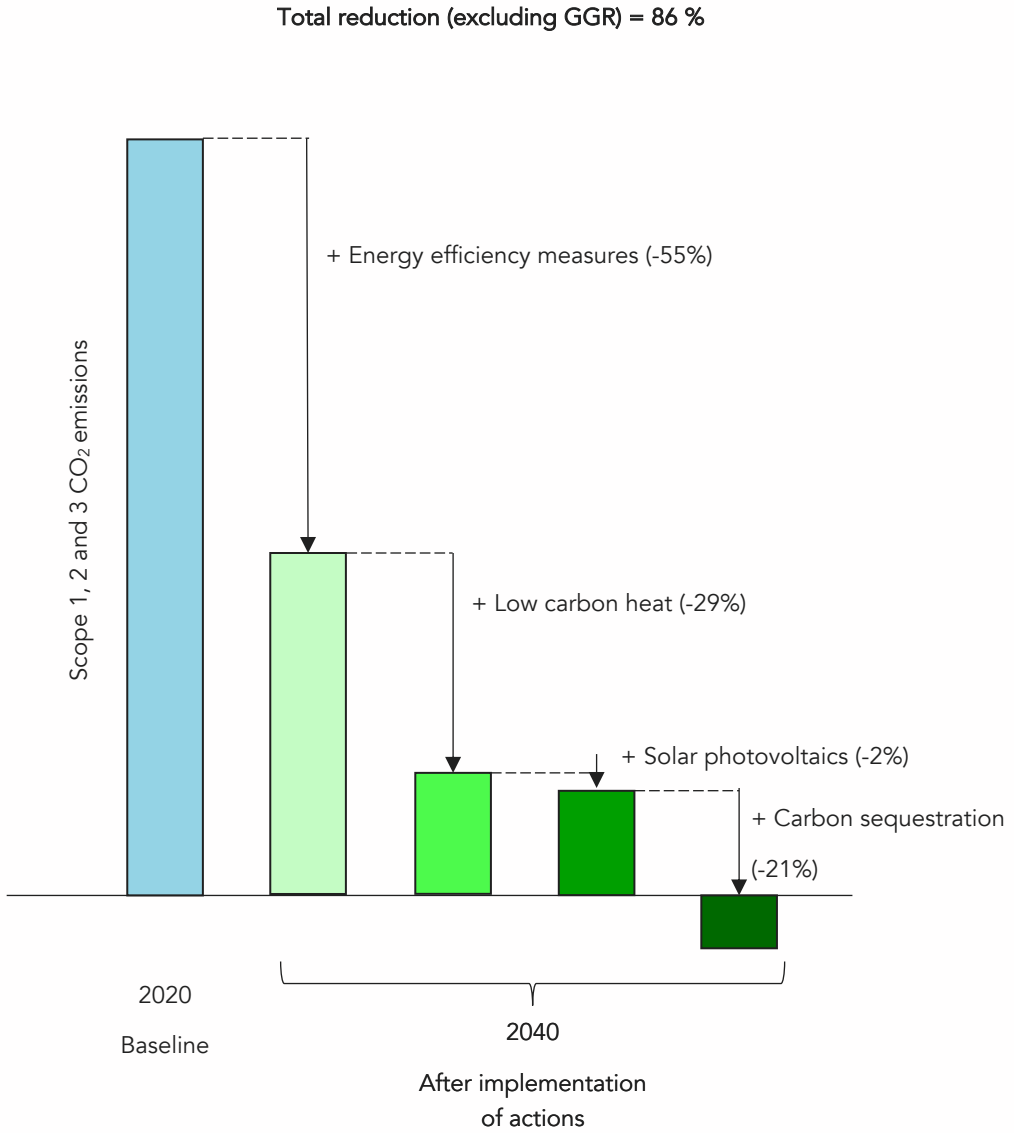
The key priorities for reducing scope 3 emissions (some of these will also reduce scope 1 and 2 emissions in communally heated blocks) will be:

- Remove individual gas boilers in all properties and replace with low carbon heating alternatives.
- Improve the energy efficiency of the fabric of the buildings through:
  - Replacing windows with triple glazing,
  - Installing wall insulation where possible
  - Install roof insulation (where not already undertaken)
  - Improve air-tightness of homes
  - Installation of floor insulation,
- Improve ventilation – preferably through whole dwelling mechanical ventilation with heat recovery,
- Install waste water heat recovery to showers and baths.

The approximate emissions reductions that could be achieved through utilising the above measures are illustrated in the graph on the right.

How far to go?

There is scope, within the carbon accounting protocol of the Climate Action Strategy, to choose not to go as far as the carbon emissions reductions suggested here. However, it is important to consider that a future of low carbon heat (a likely non-negotiable by 2040) will likely rely on energy efficiency to make it feasible. This should be factored into decisions relating to targets and ambition.



Scope 1, 2 and 3 CO_2 emissions reduction strategy to 2040. Provisional figures suggest emissions are practicably carbon negative by 2040 (figures to be checked and verified).

Note: solar photovoltaics have an apparently small impact due to the low carbon intensity of the grid electricity they are offsetting. However, the provide a vital contribution of renewable electricity to the grid.

Carbon pathway to 2040 for scope 1, 2 & 3 emissions

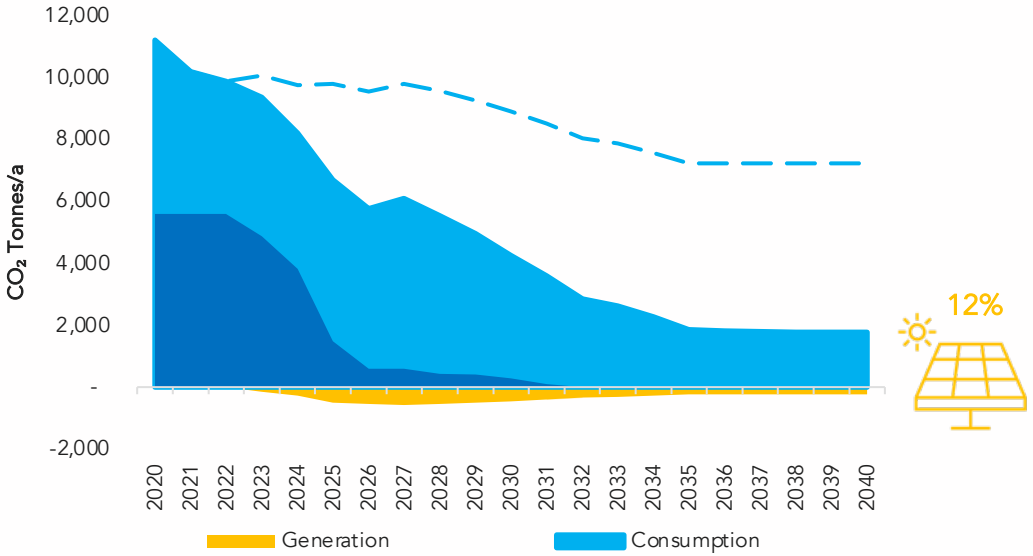
This pathway achieved an 86.5% reduction by 20240

The graph to the right shows the carbon pathway for the scope 1, 2 and 3 emissions to 2040. The blue band represents emissions related to electricity consumption and the dark blue within it represents the emissions due to gas use. The yellow band below zero represents the emissions offset by generating renewable energy onsite. This is enough to offset approximately 12% of the emissions due to consumption in 2040.

Our study shows that emissions we could achieve emissions reduction of 86.5% by 2040 (i.e. 13.5% of 2020 emissions including the offset from the solar generation on site). Remaining emissions are due to emissions from grid electricity – with electrical demand being greater than the maximum possible renewable energy generation onsite.

We have not factored in the potential carbon sequestration that the Corporation may wish to use from their land based assets. If this were to be applied in a proportional way to this pathway, net zero carbon for the housing portfolio would be achieved.

Our analysis is based on the best measures that we consider technically feasible for each estate. Different blocks present different challenges and opportunities, and each will require further site specific, detailed feasibility studies before determining the optimum approach.

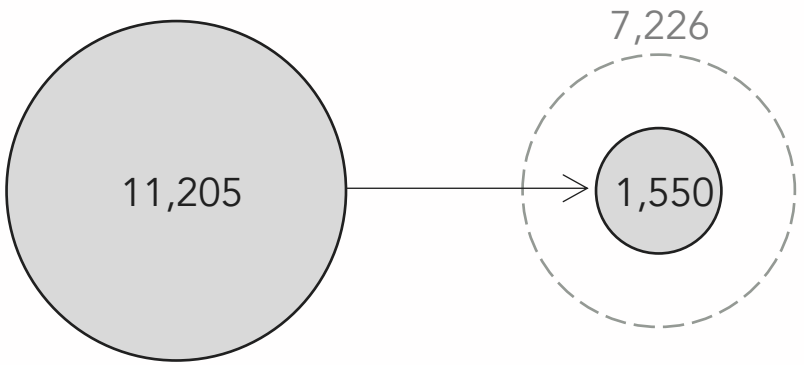


Annual CO_2 emissions balance: Scope 1, 2 and 3 emissions.

The icon to the right shows percentage emissions offset compared to emissions from consumption

What happens if we carry on as usual?

The bubbles to the right show the baseline emissions in 2020 and potential emissions in 2040. The dotted circle represents BAU emissions (i.e. no improvements to the building fabric, heating systems and no solar PV installed on the roofs). In this case, emissions in 2040 would be 64% of 2020 emissions. The reductions would be due to expected reduction in the carbon intensity of grid electricity.



Total Scope 1, 2 and 3 CO_2 emissions current and 2040. The combination of fabric measures, removal of gas and solar generation results in emissions reductions of 86.5% compared with 2020. The dotted line indicates 2040 emissions in a 'Business as usual' scenario where no retrofit action is taken (improvements are due to reduction in grid CO_2 emissions only.

5.0 Costs, funding and Finance

This section presents the results of the cost analysis undertaken. It also discusses opportunities within the current replacement and maintenance programme for undertaking retrofit works. Potential sources of funding are presented.

Costs per unit for net zero by 2027 (scope 1 and 2) and path to net zero 2040 (all emissions)

Costs per unit

The cost estimates below indicate the estimated cost of retrofitting existing housing to support the Corporation's net zero carbon targets for 2027 (scopes 1 & 2) and for 2040 (scope 3):

- 2027 – Average cost of £9,100 per property, with a range of £1,000 to £43,900 for labour and materials. (For communally heated properties this is an average cost of £15,200 per property, with a range of £9,700 to £41,900).

- 2040 – Average cost of £44,000 per property for labour and materials (with a range of £27,400 to £64,900).

Methodology

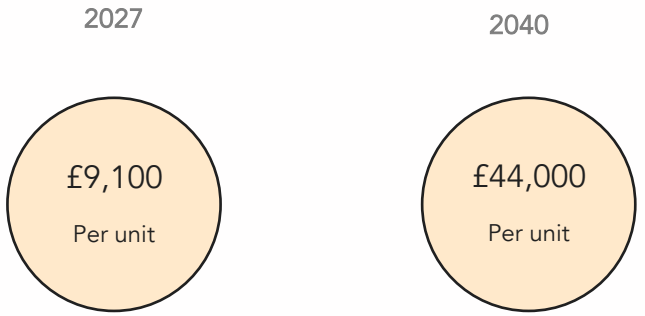
We have applied a cost per measure per unit figure to all measures applicable to each property, for both the "good" and the "best" versions of the technology/measure.

Cost per measure per unit figures are largely based on estimates from the work Parity Projects have produced for the London Retrofit Action Plan, which reference a mixture of unit sizes and conditions. Costs are based on labour and materials only and exclude for example, design fees, prelims, overheads and profit, enabling works, ancillaries etc). Currently cost estimates do not reflect cost uplifts that may be associated with listed buildings such as the Barbican or the Golden Lane Estate. This would likely affect cost of replacement windows and ventilation system costs.

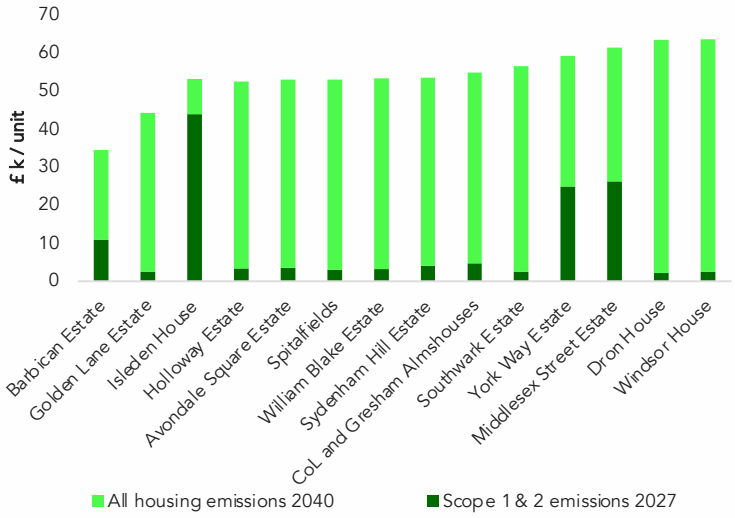
Cross checking with London Retrofit Action Plan

The Parity Projects analysis for the London Retrofit Action Plan gave two estimates (again, costs are based on labour and materials only):

- Interim target (EPC B): average cost per home £13,000, and
- Net zero target: average cost per home of £25,900 (with a range of £13,000 - £352,000).



Average cost of implementing net zero carbon action plans for housing, for 2027 and 2040.



Projected cost per unit, by estate

Note - Costs are based on sources that reference a mixture of unit sizes and conditions. Cost figures are budget costs, and need to be reviewed and adjusted for measures already installed, and for listed buildings.

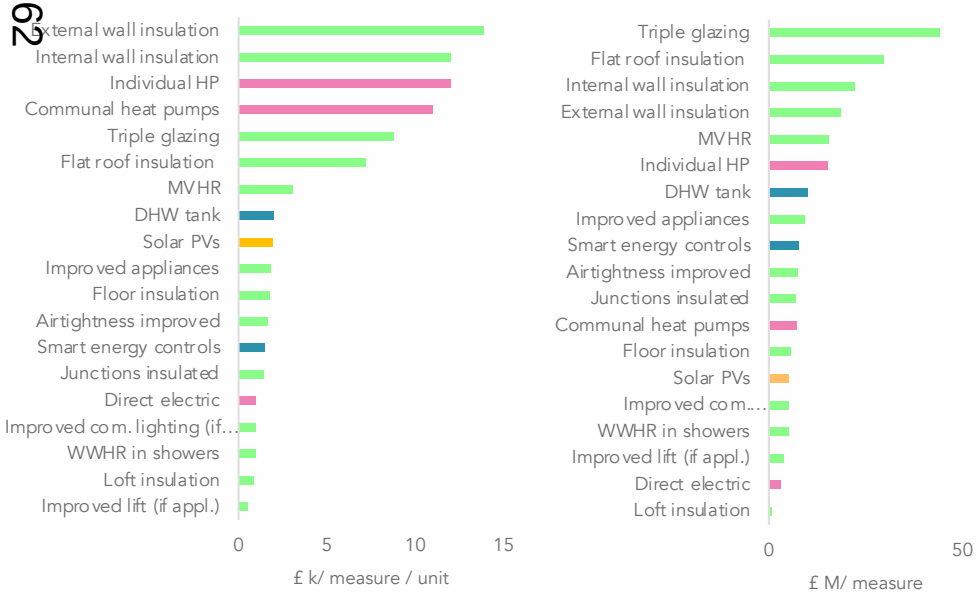
Costs breakdowns for the path to net zero 2040 (all emissions)

Costs per package and per measure type

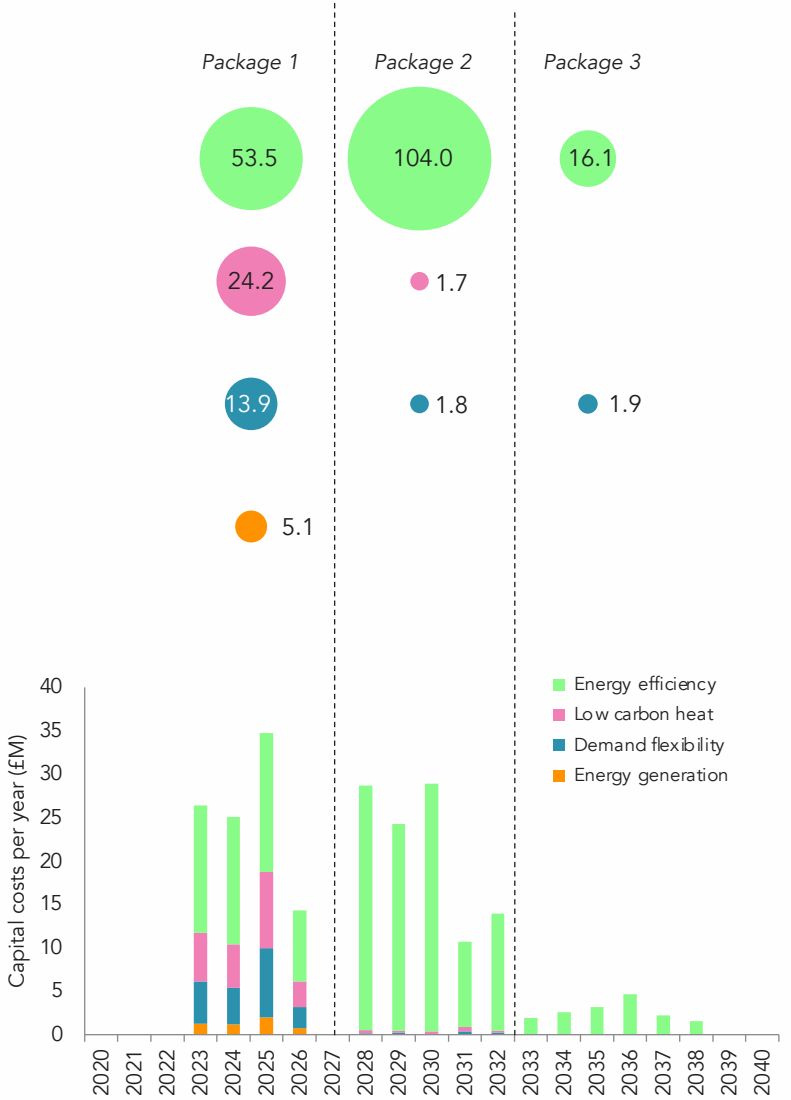
The figure to the right shows the cost breakdown over time. Top right shows the breakdown per package of works, and the years shown underneath give indicative amounts per year. This shows that most of the low carbon heat and demand flexibility and all of the energy generation measures are recommended to be installed before 2027, in package 1 (note package 1 impacts scope 1, 2 and 3 emissions due to the inclusion of fabric efficiency measures). Costs for measures that just include Scope 1 and 2 are detailed on page 65).

Costs per measure per unit

The figure below left indicates the cost per measure per unit (of units where the measure has been installed), and on the right total costs per measure to 2040. This indicates that wall insulation is the most expensive per unit but the glazing will be the most expensive overall. Low carbon heat measures are expensive per unit, but the total cost ranks lower as not all units are affected.



Projected costs by i) per measure per unit, and ii) per measure total across portfolio.



Projected costs per package and per measure type. Years within each package are indicative, and may be adjusted to match priorities and funding streams. Measured that should be tackled concurrently are noted in section 2.

Note - Costs are based on sources that reference a mixture of unit sizes and conditions. Cost figures are budget costs for labour and materials, and need to be reviewed and adjusted for measures already installed, and for listed buildings.

Cost benefits

Cost benefits

The retrofit measures recommended as part of this action plan are help reduce carbon emissions. Some measures cost more per tonne of carbon saved than others, but using a £/tonne CO_2 saved metric alone is not sufficient to decide which measures to prioritise over others.

We have not broken down energy efficiency into separate measures, since most measures should not be carried out in isolation (e.g. window replacement should always be carried out with improved ventilation). The goal is a whole house retrofit, a better means of prioritisation would be logical sequencing.

Energy efficiency and demand flexibility measures

Our calculations estimate that for every £1,000 spent on energy efficiency and demand flexibility, 40.5 kg of CO_2 will be saved.

Energy efficiency and demand flexibility deliver other benefits, including improved comfort, healthier indoor environment, reduced energy bills and greater resilience to climate change.

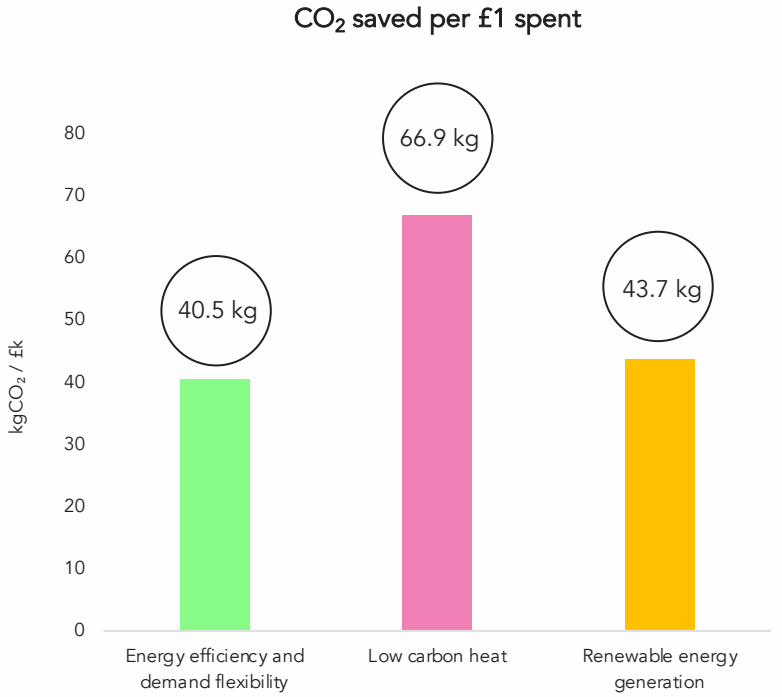
Removal of gas

Our calculations estimate that for every £1,000 spent on replacement of gas heating, 66.9 kg of CO_2 will be saved.

Renewable energy generation

Our calculations estimate that for every £1,000 spent on renewable energy, 43.7 kg of CO_2 will be saved.

Assessing the cost benefit of renewable energy in a £/tonneCO_2 metric is problematic. This is because the amount of CO_2 it offsets is directly related to the carbon intensity of electricity in the grid. With each year, the national grid's energy mix becomes less reliant on fossil fuels and the carbon intensity of electricity reduces. This is why the graph on page 54 shows a reduction in CO_2 savings from PV towards 2040. Local renewable energy generation is a necessary part of our future energy mix.



Projected kgCO_2 saved / offset for every £k spent on measures. The transition to low carbon heat is the most cost effective means of reducing carbon.

Energy efficiency and demand flexibility	Low carbon heat	Renewable energy generation
• Improved comfort • Improved indoor air quality • Reduced damp and mould • Better acoustic performance • Reduced energy bills • Greater resilience to climate change	• Improved local air quality • No gas safety issues	• Source of income / reduced energy bills • Contribution of local renewable electricity grid.

Co-benefits of energy efficiency, low carbon heat and renewable energy generation.

Current City of London Corporation climate change funding

A budget of £6m has been identified for the period 2021-2027 to contribute to the funding of low carbon retrofits outlined in this Action Plan.

Synergy with maintenance and replacement programme

The City of London Corporation is invests in their buildings through scheduled maintenance and replacement of building elements due for renewal, through ad-hoc replacement when elements fail, and through bringing homes up to the Decent Homes standard.

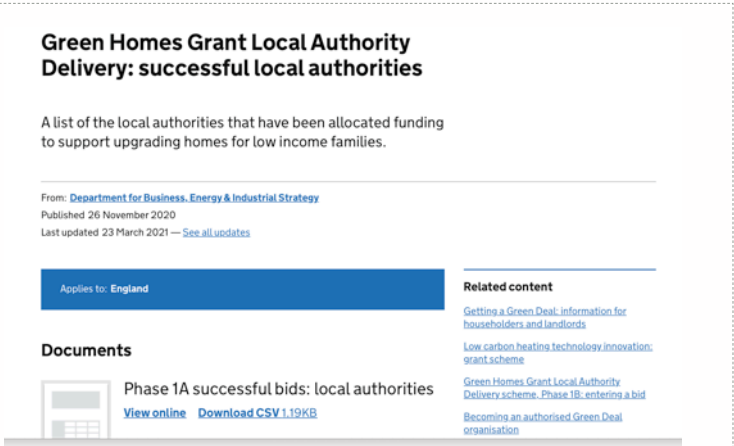
The funding for these works generally comes from rent collected from tenants and contributions from leaseholders.

There is lot of overlap between the measures that are recommended as part of this Retrofit Action Plan and measures carried out as part of standard maintenance and replacement works – e.g. replacement of windows and heating systems. If planned replacements are carried out with components of the right type and specification, cost efficiencies can be found and monies spent on planned maintenance and replacement will partially fund the Retrofit Action Plan.

Additionally, planned maintenance and replacement might present opportunities for applying energy efficiency measures at the same time as carrying out other works, and thereby share some of the fixed costs. For example, re-rendering a wall would be an ideal time to apply external insulation. The extra costs are just the insulation material and labour to secure the insulation to the wall.

Carbon offset fund

The City of London Corporation has access to monies collected through the City of London's carbon offset fund. It is estimated that £3.6 million will be available to spend on existing housing over the next 2-5 years. Since this fund is made up largely of developer contributions paid at the point of completion of new developments, estimating future funding from this source is difficult.



The Green Homes Grant Local Authority Delivery (LAD) scheme and the Social Housing Decarbonisation Fund currently provide financial assistance for retrofit and are both relevant for the City of London Corporation.

All buildings (example above of Eric Wilkins House) require regular maintenance and periodic replacement. Synergy between this programme and the Housing Net Zero Retrofit Action plan should be sought.

Opportunities in the current replacement and maintenance programme

Using allocated funds efficiently to 2027

The City of London Corporation currently has planned maintenance and replacement works planned that impact energy efficiency and energy supply. The works are funded across different estates for the period up to 2022 and are being planned for the period to 2027.

Funded works for the period to 2022 are listed in the table on the right – totalling a spend of approximately £46,040,000 over 2-4 years. Note – these figures are not directly comparable with our cost estimates as they represent total costs, and our estimates are based on labour and materials only). Also, the Corporation's spending on maintenance and replacement varies year on year.

We recommend that monies spent contribute efficiently to the zero carbon retrofit agenda. Specifically:

- that maintenance and replacement works carried out are consistent with a zero carbon specification (rather than a building regulations specification).
- For projects in design stage, planning stage, or tender stage, where there is scope, thermal performance specifications should brought in line with what we recommend in the action plan.

George Elliston and Eric Wilkins House

A sum of money has been allocated for the refurbishment of George Elliston House and Eric Wilkins House (£3,000,000). This is a great opportunity to retrofit these blocks for zero carbon, starting with the retrofit plan for Archetype 3. Our model predicts a cost of approximately £3,400,000 for the package of works (labour and materials) identified in the Action Plan.

Decent Homes

An additional £5.8 million has been identified for bringing homes up to the Decent Homes standard. Efficiencies could be found here – for example installing internal wall insulation when kitchens are replaced.

Current funding allocated through capital works programme

	Measure	Estate	Amount allocated
	Communal lighting	Avondale Square Estate - complete	£340,000
	Heating replacement and new communal heating	Golden Lane Estate	£14,000,000
	Window replacements	- Southwark Estate (Pakeman, Stopher and Sumner buildings) - William Blake Estate - Holloway Estate - Dron House (complete) - Windsor House - Sydenham Hill Estate - Golden Lane Estate (allocated funding unknown)	£21,000,000
	Roof repairs	(various estates)	£7,700,000
	Major refurbishment	George Elliston House Eric Wilkins House (both Avondale Square Estate)	£3,000,000
		Total	£46,040,000

Funding already allocated for works taking place 2020-2022 for replacement and maintenance measures directly related to energy performance.

Government funding

There are currently two Government grant schemes which could be used to help fund this Housing Retrofit Net Zero Action Plan.

- The **Green Homes Grant Local Authority Delivery Scheme (LAD)** is for Local Authorities to apply and is aimed at helping households with an income under £30,000. Parts 1A and 1B are now closed but Parts 2 is now open, and Part 3 is due to open soon.
- The **Social Housing Decarbonisation Fund** is for social landlords including Local Authorities. It is very significant, i.e. £3.8bn.
- Heat Networks Investment Project (HNIP) is a government funding programme aiming to increase the number of heat networks being built.
- **Sustainable Warmth Fund** will be available, but the majority of funds (90%) will go to privately owned and rented homes.

The **Green Homes Grant LAD** scheme and the **Social Housing Decarbonisation Fund** are both active and fairly recent Government schemes which the City of London Corporation could seek to benefit from in the near future. Although additional grant funding should be made available in the future, there is no certainty at this moment in time that it will be the case. **The Green Heat Network Fund (GHNF) Transition Scheme** supports the commercialisation of low-carbon heat network projects and is open to applications in July 2021. **The Sustainable Warmth competition** will be open to Local Authorities to help them improve the efficiency of low-income households.

Leveraging private finance

Under the 'Catalysing Green Finance' initiative the London Sustainable Development Commission are working with the Green Finance Institute to set up the London Future Finance Facility.

Community energy schemes may offer opportunities for private funding of measures such as renewables, that can offer a return on investment.

The Green Finance Institute's Coalition for the Energy Efficiency of Buildings and UKGBC's Accelerator Cities programme publishes Retrofit funding propositions earlier this year. The report also includes very useful references on page 13.

The Energiesprong approach (above the Nottingham scheme by Melius Homes) provides comfort improvements as well as energy cost savings for the residents. They use these benefits to fund the improvements over the long term.

Bringing it all together - headlines costs for Net Zero by 2027

Total cost for 2027 target – £46,000,000 (labour and materials)

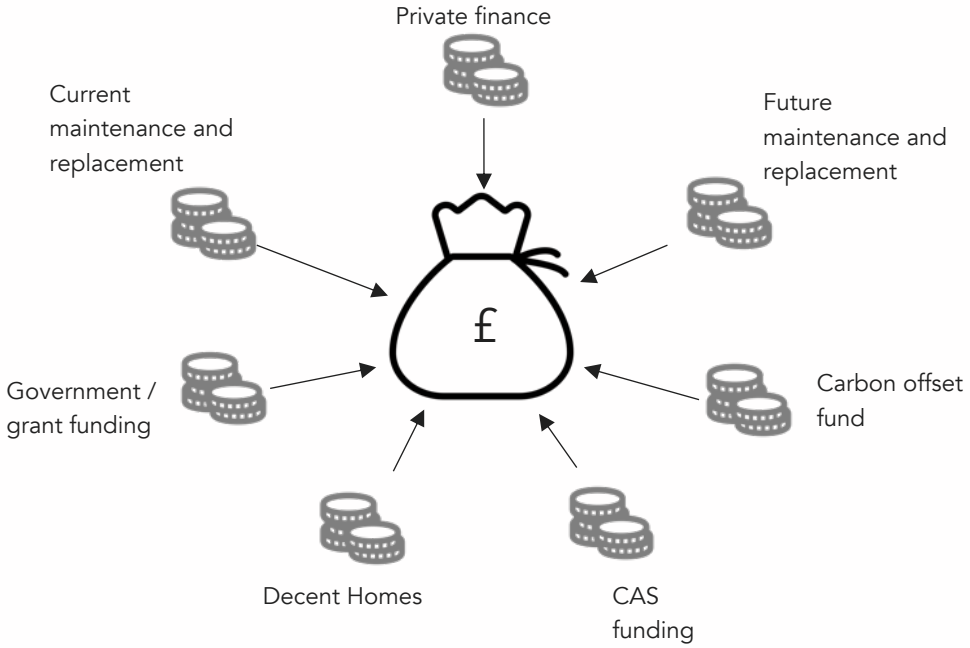
We estimate the cost of implementing the Scope 1 and 2 measures across the estates to be £46million for labour and materials (this covers communal heating replacement, photovoltaic panels, lifts and communal lighting). We recommend roof insulation is added to roofs at the same time as PV, at a further cost of approximately £21.6million.

When looking to understand how this could be funded, we have considered both the internal and external sources of funding discussed on previous pages. Funding estimates are expressed in ranges, which reflect the uncertainty surrounding the funding that could be secured:

- Maintenance and replacement (currently allocated) - £25 million (this reflects the monies allocated for heating system replacements at the Golden Lane Estate, the major refurb at George Elliston House and Eric Wilkins House, the roofing repairs at various estates and the lighting replacement at Avondale Square).
- Maintenance and replacement (future funding to 2027) - We have estimated, based on the spend 2020-2022, you may spend £4-16million (the Corporation should refine this if possible).
- Climate Action Strategy funding - £6-10million (as advised by the Corporation).
- City Corporation's carbon offset fund - £3.6million available over the next 2-5 years (as advised by the Corporation).
- Government grant funding - £1-10million (estimate based on upcoming government schemes. There is much uncertainty around how much will be available.

Total cost 2040 – £221,000,000 (labour and materials)

We estimate the cost of implementing the "Package 1, 2 and 3" measures across the estates (2021-2040) to be £221,000,000 for labour and materials.



Potential funding sources for measures

Notes on costs

Our cost estimates are based on cost per measure per unit figures derived from estimates from the work Parity Projects have produced for the London Retrofit Action Plan. As such, more detailed cost assessments should be carried out for each block or estate at more detailed design stages.

Costs are based on labour and materials only and exclude for example, design fees, prelims, overheads and profit, enabling works, ancillaries etc). Currently cost estimates do not reflect cost uplifts that may be associated with listed buildings such as the Barbican or the Golden Lane Estate. This would likely affect cost of replacement windows and ventilation system costs.

6.0
Prioritisation and other recommendations

This section includes recommendations for next steps and how to take things forward.

How to prioritise and what to start with

Prioritisation

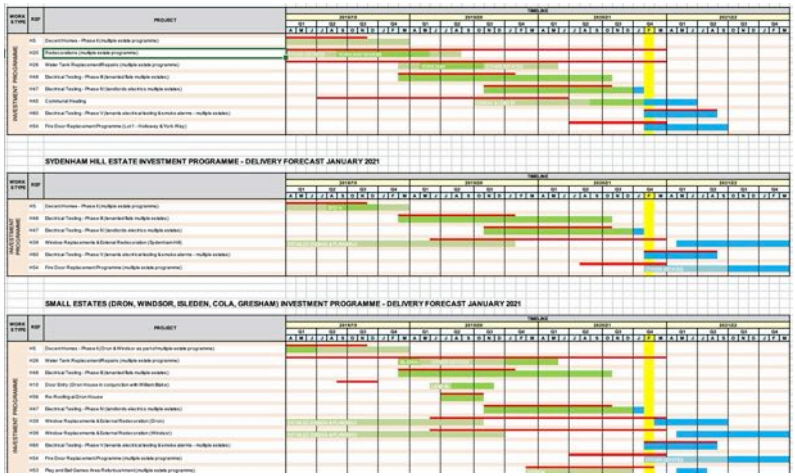
The scale of the retrofit challenge is significant. Over the next 19 years, most if not all of the 5,028 homes managed by the City of London Corporation will have to undergo some form of retrofit in order to put them on the right track towards Net Zero. The cost of doing this is also significant and is only partially funded at present so the question of prioritisation makes sense. Different logics can be followed, for example:

- The current **maintenance and replacement programme** could set the priorities both in terms of buildings to be addressed and type of work taking place. This would make sense as some heating systems or windows need replacing anyway.
- The biggest **carbon emitters** (per m^2 or total) could be addressed as a priority as reducing their emissions will help to save very significant amounts of cumulative emissions, even if they have a comparable goal.
- The issue of **fuel costs and fairness** could give priorities to the worst performing buildings in terms of energy costs: this would assist residents directly while helping the City of London Corporation to comply with current or future EPC obligations (e.g. EPC B or C by 2030).

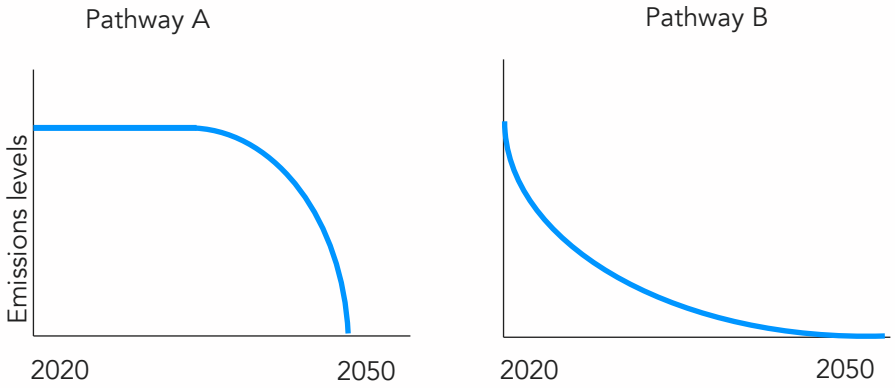
It is for the City of London Corporation to decide on the most suitable way to establish priorities. Whichever method is being selected what matters is that each intervention forms part of a well thought though, Net Zero compliant, long term renovation plan.

Getting started

It is also crucial to get started on this 19-year programme. Our recommendation would be to pick at least one the archetypes and use it to develop detailed whole house retrofit plans for each building. They will derive from the confrontation of the archetype's whole house retrofit plan template to specific constraints and opportunities for the building. And obviously, our recommendation would be to then pick the most natural candidate building and undertake design, consultation and retrofit works.



Extract of the maintenance replacement programme: it provides a natural priority for retrofit works.



Cumulative carbon is more critical than a target date for zero carbon: *Two emissions reductions pathways that achieve zero carbon emissions by 2050. Pathway A emits twice as much carbon as pathway B.*

Energy efficiency

The homes with the highest energy consumption

One way of prioritising energy efficiency measures is to identify the poorest performing homes.

This can be done indicatively through EPC data (not yet available) or through metered energy use data. Utilising a combination of the two may be the best approach.

We analysed tenant gas consumption through use of BEIS data (postcode statistics) and normalised it by the internal area of the units. From this we were able to ascertain an indicative space heating demand for each block (how much gas is consumed to heat each block on average and a reflection of fabric efficiency), in kWh/m_2/yr.

Our analysis shows the blocks listed to the right have relatively high space heating demand (above 100 kWh/m^2/yr) which is above the threshold we consider appropriate for low carbon heat. These blocks would be a logical prioritisation for energy efficiency measures over other blocks, particularly Holloway Estate (consistently low fabric efficiency), Sydenham Hill Estate, and Windsor House (selected as they have the most units).

Energy efficiency measures should be considered a priority over low carbon heat for these blocks, however, ideally whole house retrofit would be undertaken to include low carbon heat in addition. George Elliston and Eric Wilkins House are expected to undergo a full refurbishment in 2022. This is a great opportunity to retrofit these blocks for zero carbon, starting with the retrofit plan for Archetype 3.

Energy efficiency for the 2027 target

Some energy efficiency measures are suggested in Package 1 of our archetype retrofit plans. These primarily relate to the installation of roof insulation on blocks. This is because we recommend photovoltaic panels are installed on as many roofs as possible in Package 1 also, since this helps directly towards the 2027 target.

Block	Estate	Indicative space heating demand (kWh/m2/yr)	No. units
Barnersbury House	Holloway Estate	100+	18
Bunning House	Holloway Estate	100+	18
Fairweather House	Holloway Estate	100+	41
Hilton House	Holloway Estate	100+	24
McMoran House	Holloway Estate	100+	11
Whitby Court	Holloway Estate	150+	64
McAuley Close	William Blake Estate	150+	36
Lammas Green	Sydenham Hill Estate	100+	57
Otto Close	Sydenham Hill Estate	150+	30
City of London Almshouses	Ferndale Road	100+	43
Gresham Almshouses	Ferndale Road	100+	8
Colechurch House	Avondale Square Estate	100+	62
Tovy House	Avondale Square Estate	100+	52
Pakeman House	Southwark Estate	100+	56
Blake House	William Blake Estate	100+	48
Windsor House	Windsor House	100+	104

List of all blocks with the poorest fabric efficiency (as per our analysis), and above the threshold considered appropriate for low carbon heat. Priority could be given to the Holloway Estate, Sydenham Hill Estate and Windsor House (shaded in red), selected as the estates on the list with the most units.

Low carbon heat

Prioritisation

For the 2027 net zero carbon target, the Corporation may wish to prioritise the decarbonisation of communally heated blocs. This is discussed on pages 27 and 28.

For the 2040 target, all blocks and estates will need to have transitioned to low carbon heat, and the order in which they are tackled may depend on a variety of factors. One of which may be readiness for low carbon heat.

Some blocks may be ready for low-carbon heat now

Where our analysis indicates that space heating demand is low enough, it may be acceptable to prioritise the swap to low carbon heating systems over energy efficiency, and plan for energy efficiency measures to come later.

As per the logic set out on page 29, we recommend the minimum space heating demand acceptable for the use of heat pump systems is 100 kWh/m^2/yr, and the minimum space heating demand acceptable for the use of direct electric heating systems is 40 kWh/m^2/yr.

The blocks listed to the right all indicatively have space heating demands of less than 75 kWh/m^2/yr. They are grouped by storey height because storey height is a strong determinate of whether individual Air Source Heat Pumps would be suitable. Due to the indicative space heating demands being well below 100 kWh/m^2/yr, the blocks in Table A may well be suitable for Air Source Heat Pumps without needing any additional energy efficiency measures immediately.

The blocks in Table B are mid-rise, and may upon further investigation, prove suitable for communal heat pumps. If not, they will likely be suitable for direct electric heating with some energy efficiency measures.

The blocks in Table C are high-rise, and therefore unlikely to be suitable for a heat pump system. Additional energy efficiency measures are likely to make these properties suitable for direct electric heating systems.

Table A: Low-rise – may be suitable for individual Heat Pumps with no or minimal energy efficiency measures

Block	Estate	No storeys
Longland Court	Avondale Square Estate	4
Markstone House	Southwark Estate	4

Table B: Mid-rise – may be suitable for communal Heat Pumps with no or minimal energy efficiency measures

Block	Estate	No storeys
Collinson Court	Southwark Estate	8

Table C: High-rise – direct electric heating likely to be most suitable. Undertake all energy efficiency measures before installation

Block	Estate	No storeys
Centre Point	Avondale Square Estate	19
East Point	Avondale Square Estate	19
Eric Wilkins House	Avondale Square Estate	20
Proctor House	Avondale Square Estate	10
West Point	Avondale Square Estate	19
Great Arthur House	Golden Lane Estate	15

All the blocks listed above have an indicative space heating demand of less than 75kWh/m^2/yr.

Low carbon heat - Communal heating on HRA Estates

Gas communal heating must be phased out

Communal heating features at the HRA estates Middlesex Street Estate, York Way Estate, Isleden House and Frobisher Crescent (Barbican Estate). These communal heating systems all utilise gas fired boilers as the source of heating. Transitioning to low carbon heat will put the estates on a trajectory to achieving the Climate Action Strategy zero carbon targets.

The communal heating networks at Middlesex Street Estate and York Way Estate are currently being replaced with new gas boiler systems. If we model that these gas systems remain until 2027 at least, the remaining carbon emissions at that date are significant (see page 54).

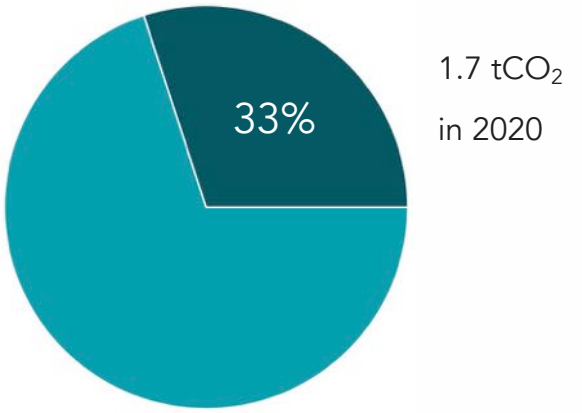
For the 2027 target of the Climate Action Strategy be achieved, the replacement of these systems would need to be paused, and design changes made so that large scale communal heat pump systems are installed instead. Without doing so, the zero carbon target for housing cannot be achieved.

Improve controls and heat loss

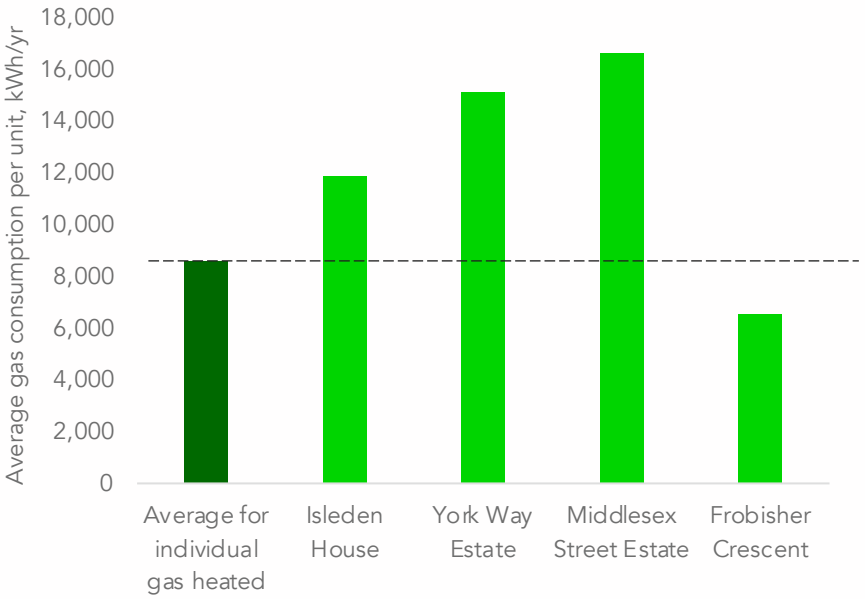
Our analysis shows that the communal heating systems consume approximately twice as much gas per dwelling than comparable individually heated units. This suggests that there are poor controls or high levels of heat loss in distribution. This should be investigated and improved.

Golden Lane Estate

There are plans to reinstate the Golden Lane Estate district heating system. We recommend that this is only done with low carbon heating systems, preferably at low temperature distribution to improve efficiency.



One third of the Corporation's housing Scope 1 & 2 emissions came from gas communal heating in 2020.



Three of the four gas communally heated estates use significantly more than the average consumption of individually gas heated units across the portfolio. Frobisher Crescent is the exception.

Low carbon heat - Communal Heating on the Barbican Estate

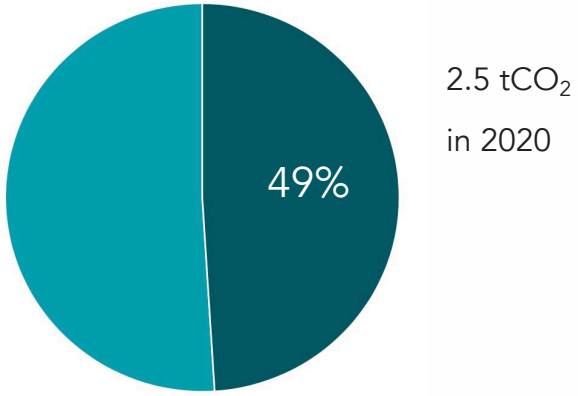
Barbican Estate

The majority of the Barbican Estate features electric underfloor communal heating. The associated emissions contribute to the City of London Corporation's Scope 2 emissions. Emissions were approximately 2.5 $ktCO_2$/yr in 2020 (49% of Scope 1 and 2 emissions from housing).

These emissions are set to drop year on year as the electricity grid decarbonises (see page 17). Therefore the Barbican Estate's heating system should remain.

However, we understand from the experience of residents that the underfloor heating system may need optimising to ensure that electricity is used efficiently. Currently, many residents complain of too much heat in the winter (leading to open windows in mid-winter to cool flats), and not enough heat in shoulder seasons (spring and autumn). The residents have formed an Underfloor Heating Working Party which is looking in detail at how the controls can be optimised.

The issue is a complex one to solve. It's not entirely technical – there is also the problem of resident expectations and comfort and these vary greatly. A summary of conversations with the Underfloor Heating Working Party can be found in the Appendices, together with some recommendations.

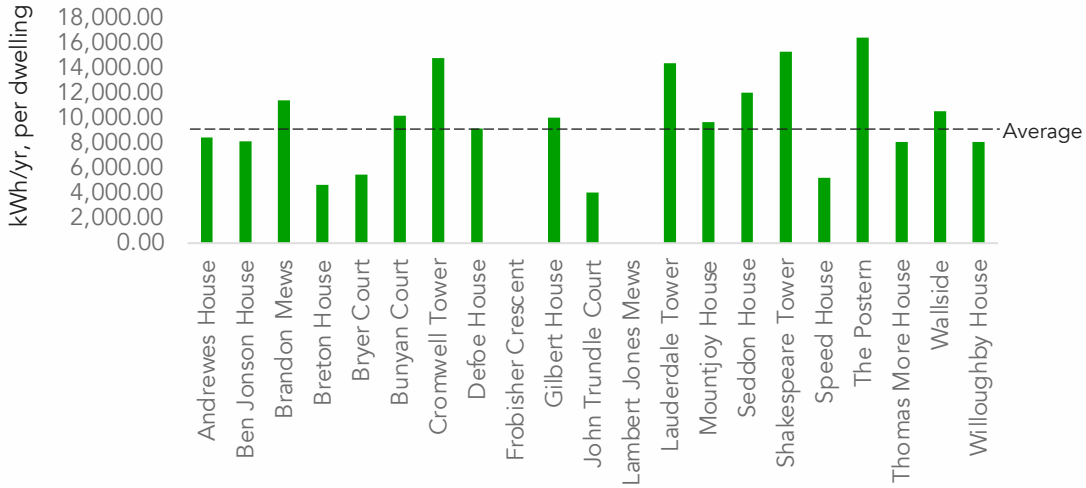


One half of the Corporation's housing Scope 1 & 2 emissions came from heating the Barbican in 2020.

Investigate reasons for large variation in heating per dwelling

The graph on the right shows the metered electrical consumption, per dwelling, on a block by block basis at the Barbican. The range is large given that the controls are the same across every block. Further investigation of this might yield useful clues as to how to reduce energy consumption and emissions. For example obtaining reliable internal area data would allow normalisation for different sizes of flats.

It's possible that the metering system is not complete and is labelled incorrectly - this should also be investigated.



Metered electrical consumption for underfloor heating across the Barbican Estate per dwelling. While the control system is the same across all blocks, consumption varies widely. Metering should be checked to ensure all heating is picked up.

Energy metering and data collection

Improve quality of metering and review regularly

A good level of energy metering, with the right amount of detail, can really help deliver efficient and cost effective strategies for carbon reduction.

We have used metered energy consumption from the Corporation to determine Scope 1 and 2 emissions for housing (landlord energy use).

Going forward, metering of landlord energy could be improved through greater consistency in meter labelling and clearer end-energy uses.

Good quality energy data is extremely useful. It allows us to:

- make useful comparisons of energy use before and after retrofit. If energy savings aren't as large as expected, reasons for this can be identified – has something not been commissioned properly? Is it being used incorrectly?
- Make useful comparisons between similar blocks and units. Are there any blocks with unusually high or low energy consumption? What could be going wrong (or right)?

For tenant energy consumption, BEIS gas and electricity by postcode statistics give annual average consumption by meter for a postcode. Given the size of the estates and blocks in the Corporation's housing portfolio, almost all estates have unique postcodes – sometimes multiple postcodes. This means data isn't muddied by consumption from non-relevant properties. Our analysis of the data from these datasets shows consistent energy consumption between similar blocks on a per meter basis, giving us confidence in these figures.

Energy metering is more useful that EPCs (Energy Performance Certificates) because it is based on actual energy consumed.

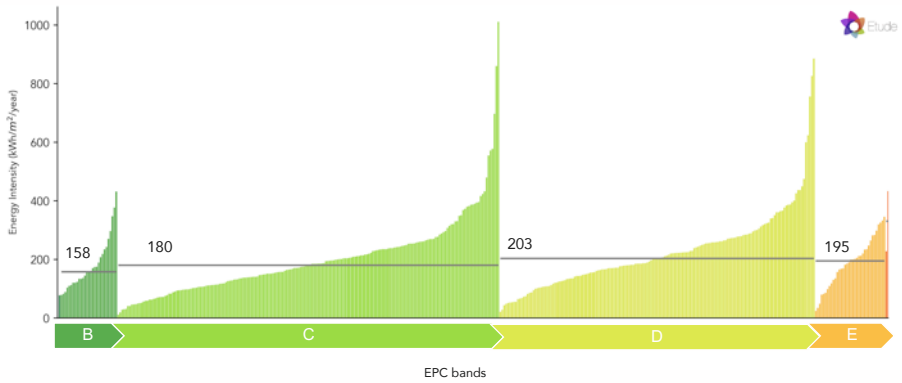
Additional recommendations regarding energy metering and data collection are suggested on the right.

Collecting residents' experiences

In addition to energy data, qualitative data from residents is helpful in identifying energy issues, and rectifying them.

- ❑ Compare landlord electricity consumption on Avondale Square Estate for 2021 and 2022 with 2019 and 2020, in order to assess effectiveness of LED lighting installation.
- ❑ Check Barbican underfloor heating meters – are they labelled correctly, are all supplies to underfloor heating included?
- ❑ Create a consistent, clear metering strategy per estate – or across all estates

Recommendations relating to energy metering and data collection



Distribution of metered energy use from 420 dwellings in London

This analysis of actual energy used in homes shows that improved EPC ratings are associated with some reduction in average energy use, but a limited one. For example, there is only a 22% reduction in total average energy use intensity from D- to B-ratings.

The mean total energy use in EPC band A is 161kWh/m²/yr, which is very high.*

Renewable energy

Prioritisation

Some estates appear to have a greater area of suitable roof space for photovoltaic panels and therefore a greater potential for renewable energy generation and associated carbon emissions reductions.

Estates and buildings which should be considered for photovoltaic panel installation as a priority include:

- **Avondale Square Estate -** The Avondale Square Estate is a large estate with buildings with strong potential for photovoltaic panels. For example, Colechurch House, Brettinghurst House, Tovy House and Proctor House all have large areas of flat, unobstructed roof space (see right). Longland Court has a lot of available flat roof space, but overshading from the towers (Centre Point, East Point and West Point) will need to be assessed.

York Way Estate - Similar to the Avondale Square Estate, the York Way Estate has large areas of clear roof space.

Southwark Estate - Collinson Court and Markstone House show particular potential.

- **Golden Lane Estate -** The Golden Lane Estate appears to have good potential for photovoltaic panels, especially Crescent House. It is Grade II listed estate (and Crescent House Grade II* listed). The listing will mean permission is required for panels, but it would be worth taking on the challenge.
- **Others -** Other estates with good potential for PV production include Middlesex Street Estate, Isleden House Estate, Windsor House, Lammas Green and Petticoat Square.

Note

The potential output from photovoltaic panels across the 82 buildings in the Corporation's portfolio have been estimated through a high level desk top study, and do not constitute detailed feasibility studies. These would be necessary to understand the true potential of each building.

Colechurch House, Tovy House and Proctor House on the Avondale Square Estate appear to have large, unobstructed roof areas suitable for photovoltaic panel installation.

	Potential annual output, MWh/yr
Avondale Square	1,000
Golden Lane	750
Southwark	650
Holloway	500
York Way Estate	450
Middlesex Street Estate	450

Estates with the largest renewable energy output potential. Renewable energy from photovoltaic panels can be used to power landlord electricity uses, directly offsetting grid electricity and associated carbon emissions.

Why a whole house retrofit plan for each building is crucial

A clear objective for each building, compliant with Net Zero

In order to achieve Net Zero, the approach to retrofit needs to anchor this objective as the end goal to be achieved by all buildings by 2040. Whole house plans specific to each building are likely to be both the most practical and successful way to set this target for each building, and ensure that it is compliant with the Net Zero carbon by 2040 commitment from the City of London Corporation.

A long term renovation plan

Successful retrofit relies on a structured process including adequate assessment, design, installation and monitoring as set out within PAS 2035. A long term renovation plan also enables to plan ahead so that packages of work are coherent and complementary, and avoid 'carbon lock-ins'. Opportunities can easily be identified (e.g. current maintenance and replacement programme, void properties) and retrofit costs minimised

The opportunity of a Building Digital Logbook

Alongside the long term renovation plan, a Building Digital Logbook should be developed to gather and retain all relevant information about the building. Together, they will what is referred to as the 'Building Renovation Passport' and should be accessible to tenants and leaseholders.

Step 1: developing whole house retrofit plan templates

Whole house plan templates created for the main archetypes would:

- Be useful at a **strategic level** by developing an understanding of the measures, costs, skills and supply chain needed over the next 20 years. This information could be used to help support and build capacity, lever finance and build a business plan for retrofit programmes.
- Be useful for **each individual building** as it would provide them with a template which can then easily be made specific to each building.

A long term, step-by-step renovation plan is the most practical approach to retrofit in order to achieve a long term objective compliant with Net Zero. The above image shows an example used in Germany iSFP

Core features of a building renovation passport

- Information on **the building's current condition and performance**, ideally supported by resident engagement.
- A **phased renovation plan** establishing a roadmap to the best possible carbon reduction.
- A **digital logbook** recording the works carried out and by whom, in-use performance data, and possibly drawings and additional information.

Next Steps

For 2027 target

- ❑ Develop plans for large scale roll out of photovoltaic panels across the estates' roofs. Most estates have good potential, but if priorities are sought the Corporation should prioritise installation at Avondale Square, Golden Lane, Southwark Estate, Holloway Estate, York Way Estate and Middlesex Street Estate since these have the greatest potential for energy generation.

- ❑ Simultaneously, plans for roof insulation across estates should be made with appropriate feasibility studies and permissions sought where appropriate (should be added before photovoltaic panels).

- ❑ Remove communal gas boilers and replace with low carbon alternatives where at all possible. This relates to Middlesex Street Estate, York Way Estate, Isleden House Estate and Frobisher Crescent (Barbican Estate).

- ❑ Where heating systems are installed, also install energy storage and smart controls to optimise use of low carbon heat.

- ❑ Review controls of communal heating systems at Middlesex Street Estate, York Way Estate and Isleden House Estate – all are consuming a large amount of gas per dwelling. For the same estates, review and improve insulation of distribution pipework. These measures should happen before fabric efficiency measures.

- ❑ Review controls of landlord lighting – internal and external. Are there lights on unnecessarily in daylight hours? Are there efficiencies that could be made to night time use? Priorities include the Barbican Estate and City of London and Gresham Almshouses.

- ❑ Replace inefficient lamps with LEDs.

For 2040 target

- ❑ Develop detailed whole house retrofit plans for Holloway Estate, Sydenham Hill Estate and Windsor House as a priority (along with the other blocks indicated on page 67).

- ❑ Consider early replacement of gas boilers with individual Air Source Heat Pumps for Longland Court (Avondale Square Estate) and Markstone House (Southwark Estate). Low metered energy consumption indicates a level of efficiency sufficient for heat pumps without an uplift in running costs.

- ❑ Consider early replacement of gas boilers with direct electric heating system for Collinson Court (Southwark Estate) in tandem with roof insulation. Based on low metered energy consumption, and windows already being replaced, external wall insulation could be a secondary measure without an uplift in running costs.

- ❑ Great Arthur House – complete window replacement, add energy storage and smart controls and replace gas boilers with direct electric heating.

- ❑ Roll out energy efficient measures at the Avondale Square Estate and install direct electric heating in all blocks except Longland Court and Twelve Acres House.

Next Steps, cont

General

- ❑ Utilise action plans for each archetype to create long term retrofit action plans for each estate or block.
- ❑ Develop 'building logbooks' for each building in the first instance (with a view to each dwelling) that records what measures have been undertaken and when, and includes details of the long term retrofit plans.
- ❑ Improve metering strategy and labelling of meters across all estates.
- ❑ Carry out at least an annual analysis of energy use across all blocks and estates and compare trends.
- ❑ Monitor effectiveness of retrofit measures by noting date of installation and any changes in energy use.
- ❑ Ensure no new build has gas communal heating.

Glossary

Air Source Heat Pumps (ASHP) – an electric heating system that gathers ambient heat from surroundings to efficiently heat a dwelling.

Air-tightness – A measure of how much air naturally leaks out of or into a building, through gaps around doors, windows, keyholes etc. Usually measured in $m^3/m^2/hr$ @ 50Pa.

Building fabric – a term used to describe collectively the walls, roof, floor, windows and doors of a building.

Carbon budgets – a term used to state remaining carbon emissions, or share of carbon emissions, that can be emitted before the amount of cumulative emissions exceeds that aligned with a given atmospheric temperature change.

Carbon footprint – the amount of carbon emitted by a person or organisation in a given timeframe.

Carbon offsets – a way of balancing emissions in one area by reducing emissions in another or by sequestration of carbon*.

Climate resilience – enabling a building, dwelling, geographical area or organisation to adapt to the changing climate.

CO_2 – carbon dioxide, a greenhouse gas.

Coefficient of Performance (CoP) - a measure of efficiency usually used when describing heat pumps. The CoP is the amount of useful heat (or coolth) produces from every kilowatt of electricity used. E.g. a heat pump with a CoP of 3 produces 3 kW heat for every 1 kW of electricity it uses.

CoL - City of London Corporation

Communal heating system – a multi dwelling heating system.

Energy efficiency – the relative amount of energy a building or system uses to achieve a certain aim (e.g. maintain a specific internal temperature)

Fabric Efficiency – a measure of how effective a building's fabric is at retaining heat or staying cool.

Greenhouse gas – a gas that retains heat in the atmosphere, e.g. carbon dioxide (CO_2).

$ktCO_2$ – kiloton of CO_2, a measure of the amount of carbon dioxide emitted or offset.

kWh – kilowatt hour, a measure of the amount of energy used or generated in one hour.

Leaky building – A building with a low level of air-tightness.

Mechanical Ventilation with Heat Recovery (MVHR) – a form of building ventilation that recovers heat from stale air before it is vented outside the building and uses it to warm incoming fresh air.

Net Zero Carbon – where the amount greenhouse gases emitted by an organisation are equivalent to the emissions either: i) sequestered or offset , ii) displaced by production of renewable energy.

Renewable energy – energy from a renewable source e.g. wind or solar.

Space heating demand (SHD) – the amount of heat energy required to heat a space. SHD is a reflection of building fabric efficiency and is usually expressed in $kWh/m^2/yr$.

Scope 1 emissions - emissions from the direct combustion of fossil fuels (e.g. gas, petrol and diesel)

Scope 2 emissions - emissions from the production of electricity

Scope 3 emissions - emissions from activities or assets not owned or controlled by the reporting organization, but that the organization indirectly impacts in its value chain e.g. purchased goods and services, business travel, commuting, waste, leased buildings (emissions from tenants or leaseholders fuel consumption) and financial investments.

***Sequestration** – the storing of carbon in land based assets.

Solar photovoltaic (PV) – a form of renewable electricity generation from solar energy well suited to buildings and urban environments.

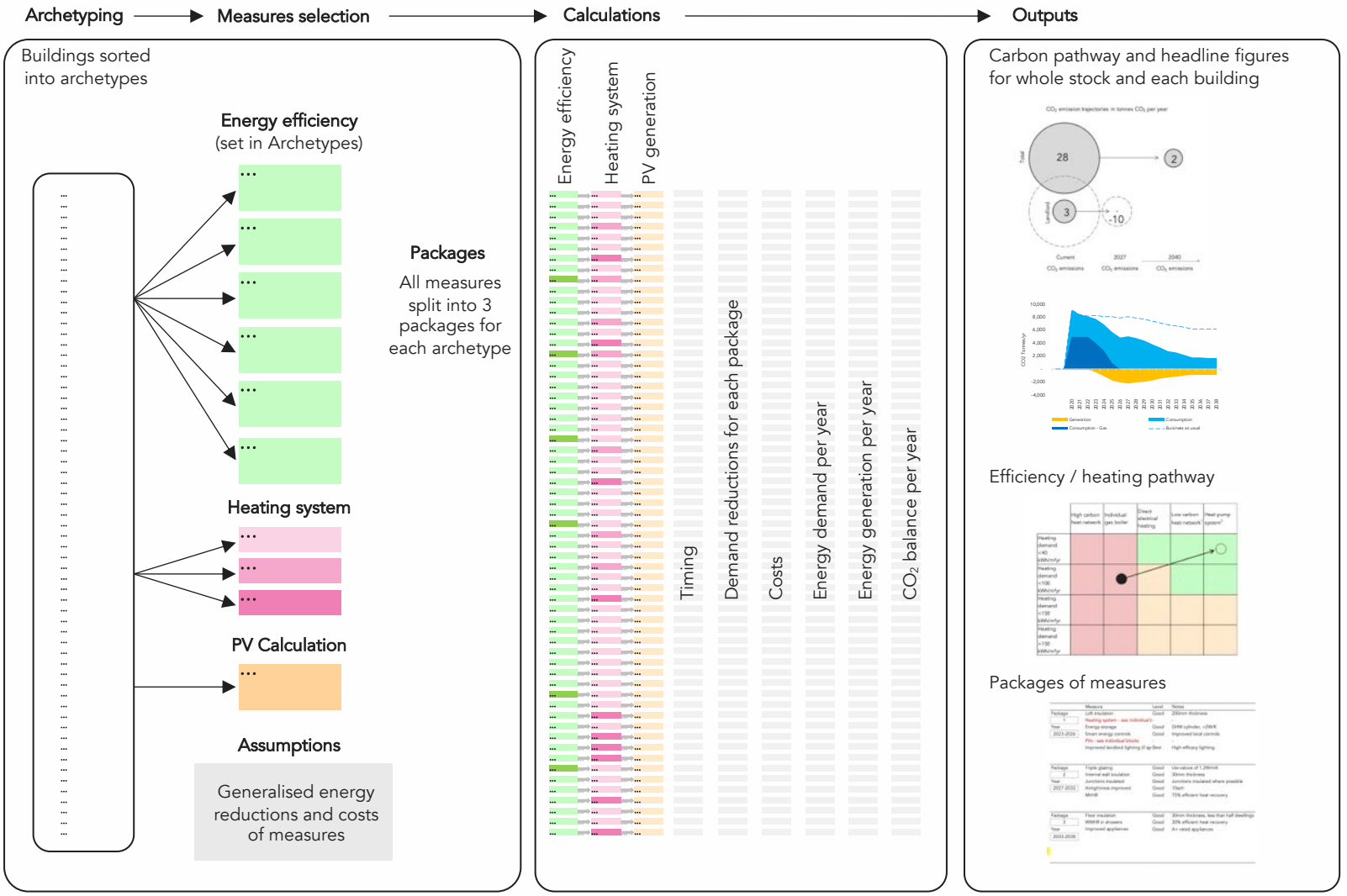
Waste Water Heat Recovery (WWHR) – A proprietary system fitted to the outlets from sinks, showers and baths, which collects heat from the waste water and transfers it to the cold water feeding a hot water store.

Whole House Retrofit – where a building is retrofitted for energy efficiency in an holistic manner, and many different fabric elements and systems are considered at once.

Key assumptions

The diagram to the right, introduced the structure of the Net Zero Matrix, the tool we used to recommend measures for every building and estimate costs for the action plan.

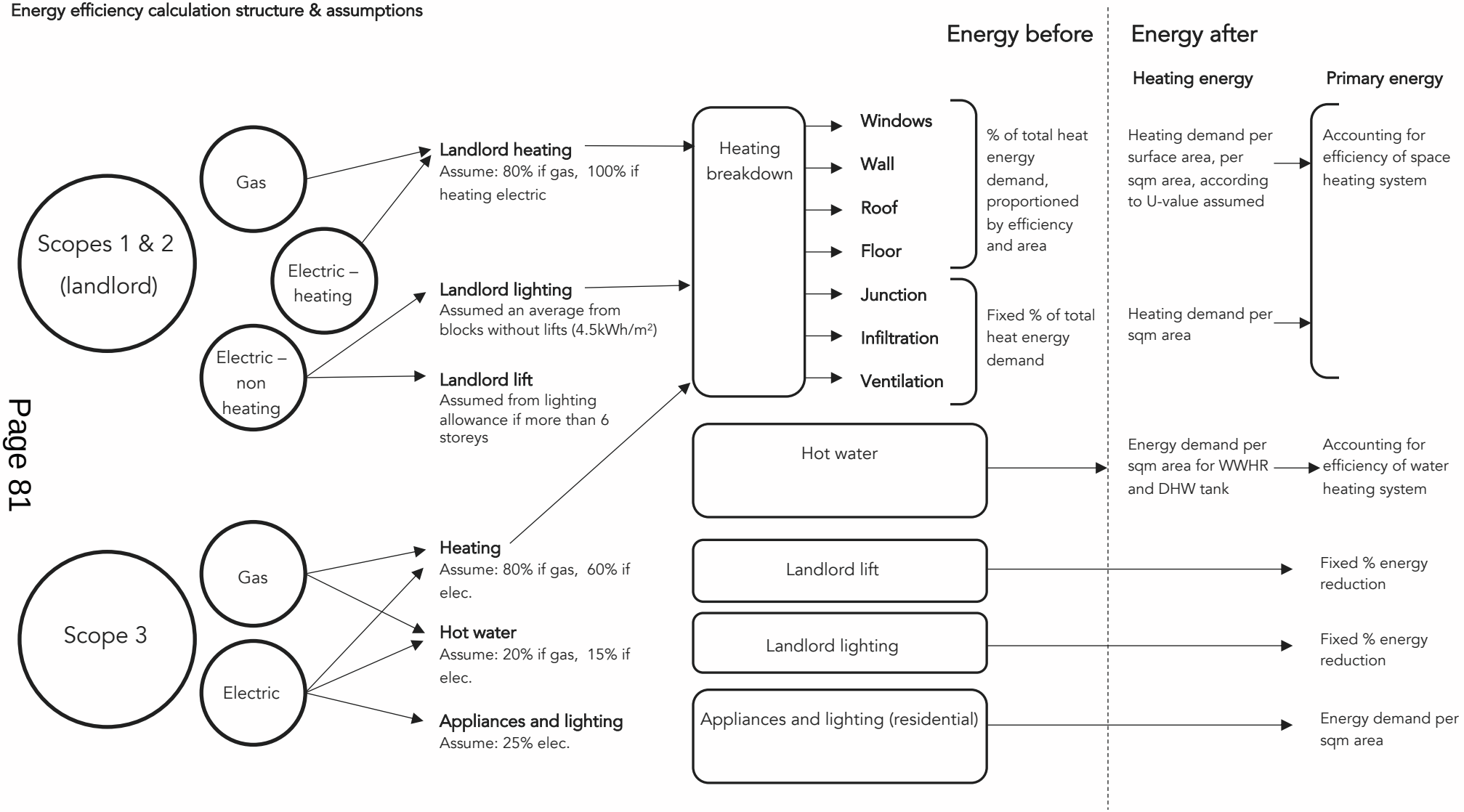
The following pages explain more about how the results were calculated and the assumptions used to generate them. This includes information on the energy efficiency calculation structure, energy efficiency assumptions and cost assumptions.



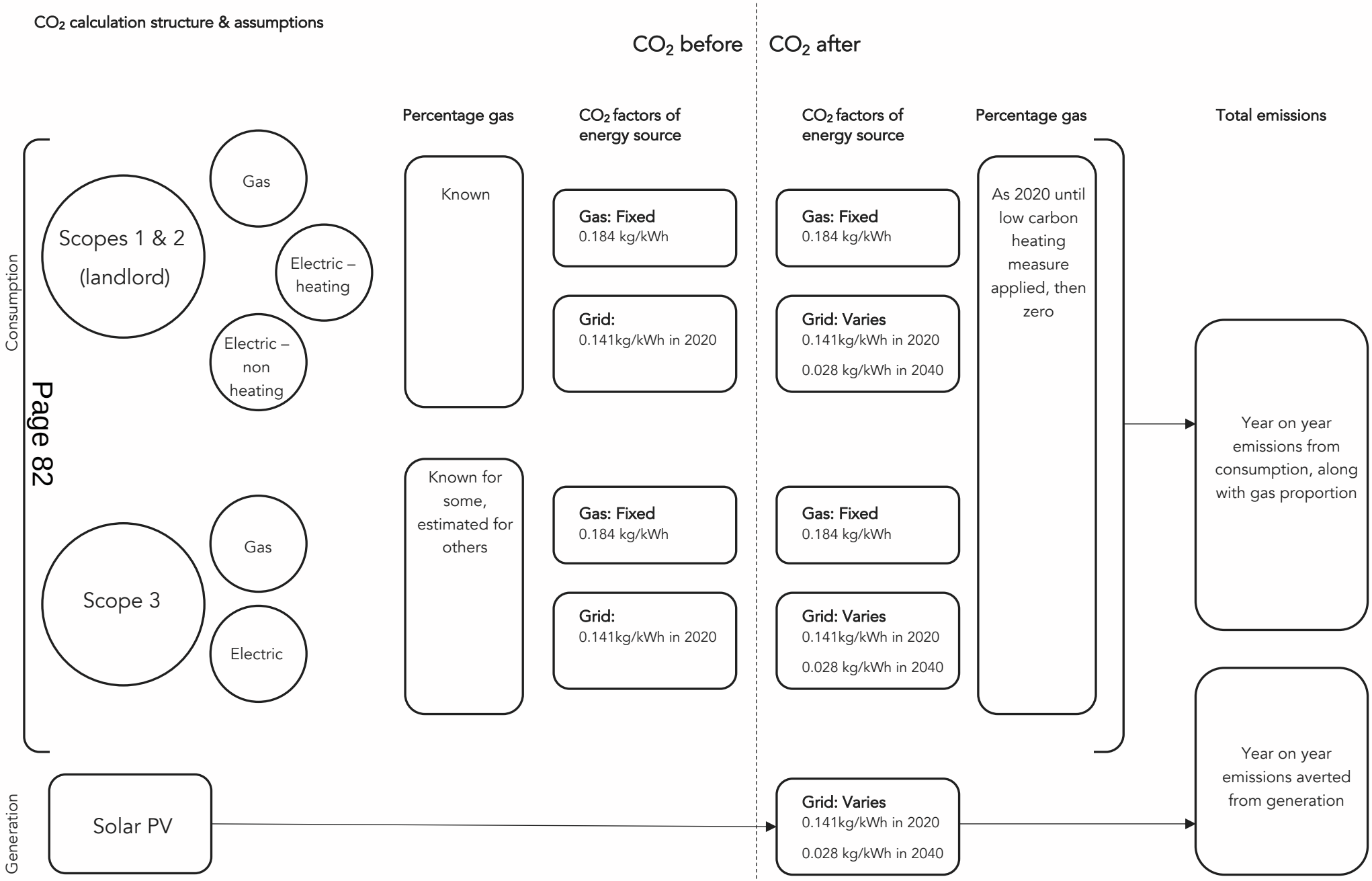
Net Zero Matrix structure (graphics reproduced at larger scale on following pages).

Key assumptions

Energy efficiency calculation structure & assumptions



Key assumptions



Key assumptions

Energy efficiency calculation detailed assumptions – This table gives the assumptions used to predict energy demand and generation

Energy use category	Energy use breakdown	Technology	Description		Before	After	
			Good	Best		Good	Best
					kWh/m²a/m²HLA, combined with % of current heating	*kWh/m²a / m²HLA*	
Space heating	Window glazing	Triple glazing	Uw-valuve of 1.2W/mK	Uw-value of 0.8W/m2K	0.047	0.029	0.022
	Wall insulation	Internal wall insulation	30mm thickness	100mm thickness	0.037	0.011	0.006
		External wall insulation	100mm thickness	200mm thickness	0.037	0.004	0.003
	Roof insulation	Flat roof insulation	100mm thickness	250mm thickness	0.037	0.004	0.003
	Floor insulation	Loft insulation	200mm thickness	400mm thickness	0.037	0.004	0.003
		Floor insulation	30mm thickness some dwellings	100mm thickness some dwellings	0.007	0.006	0.004
					% of current heat demand	*kWh/m2a*	
	Junctions	Junctions insulated	Junctions insulated where possible	Good connections possible	1.1%	6.3	4.2
	Airtightness	Airtightness improved	5ach	2ach	16.1%	28.8	11.6
	Ventilation	MVHR	75% efficient heat recovery	90% efficient heat recovery	11.0%	11.7	8.3
					% of energy demand		
Hot water	Hot water use	WWHR in showers	30% efficient heat recovery	50% efficient heat recovery	10.0%	11.5	9.0
	Hot water storage	DHW tank	DHW cylinder, <2W/K	DHW cylinder, <1W/K	10.0%	11.5	9.0
	Appliances, fans and pumps, lighting	Improved appliances	A+ rated appliances	A+++ rated appliances	12.5%	15.0	12.0
	Demand flexibility	Smart energy controls	Improved local controls	Whole dwelling controls with zoning	12.5%	15.0	12.0
					% of current lighting energy		
Landlord electricity	Landlord lighting	Improved com. lighting (if appl.)	N/A	High efficacy lighting	1.0	0.8	0.6
					% of current lift energy		
	Landlord lift	Improved lift (if appl.)	N/A	High efficiency lift	1.0	0.8	0.6
		No change			*SFP applied to heating energy*		
Low carbon heat and no more fossil fuels		Individual HP	SFP of 2+	SFP of 3+	N/A	N/A	2.8
		Communal heat pumps	Using existing communal heat infrastructure		N/A	N/A	2.8
		Direct electric			N/A	N/A	0.0
Renewable energy generation		Solar PVs	360Wp panels with microinverters			Wp per panel	
					N/A	N/A	360Wp

Key assumptions

Cost calculation assumptions

Energy use category	Energy use breakdown	Technology	Description		Good	Best
			Good	Best	*Cost is £k per unit unless otherwise stated*	
Space heating	Window glazing	Triple glazing	Uw-valuve of 1.2W/mK	Uw-value of 0.8W/m2K	8.1	12.2
	Wall insulation	Internal wall insulation	30mm thickness	100mm thickness	9.1	13.7
		External wall insulation	100mm thickness	200mm thickness	9.3	13.9
	Roof insulation	Flat roof insulation	100mm thickness	250mm thickness	5.3	7.9
		Loft insulation	200mm thickness	400mm thickness	0.6	0.9
	Floor insulation	Floor insulation	30mm thickness some dwellings	100mm thickness some dwellings	1.8	2.6
	Junctions	Junctions insulated	Junctions insulated where possible	Good connections possible	1.0	2.0
	Airtightness	Airtightness improved	5ach	2ach	1.0	2.0
	Ventilation	MVHR	75% efficient heat recovery	90% efficient heat recovery	2.1	3.1
Hot water	Hot water use	WWHR in showers	30% efficient heat recovery	50% efficient heat recovery		
	Hot water storage	DHW tank	DHW cylinder, <2W/K	DHW cylinder, <1W/K	0.5	1.0
	Appliances, fans and pumps, lighting	Improved appliances	A+ rated appliances	A+++ rated appliances	1.0	2.0
	Demand flexibility	Smart energy controls	Improved local controls	Whole dwelling controls with zoning	1.0	2.0
Landlord electricity	Landlord lighting	Improved com. lighting (if appl.)	N/A	High efficacy lighting	0.8	1.5
	Landlord lift	Improved lift (if appl.)	N/A	High efficiency lift	Per lift:	80.0
Low carbon heat and no more fossil fuels		Individual HP	SFP of 2+	SFP of 3+	6.0	12.0
		Communal heat pumps	Using existing communal heat infrastructure		5.0	11.0
		Direct electric			1.0	1.0
Renewable energy generation		Solar PVs			Cost per kWh/m2a	
			360Wp panels with microinverters		1.0 if <50kWh/m2a	0.8 If >50kWh/m2a

Communal Heating – Barbican Estate

Barbican Estate

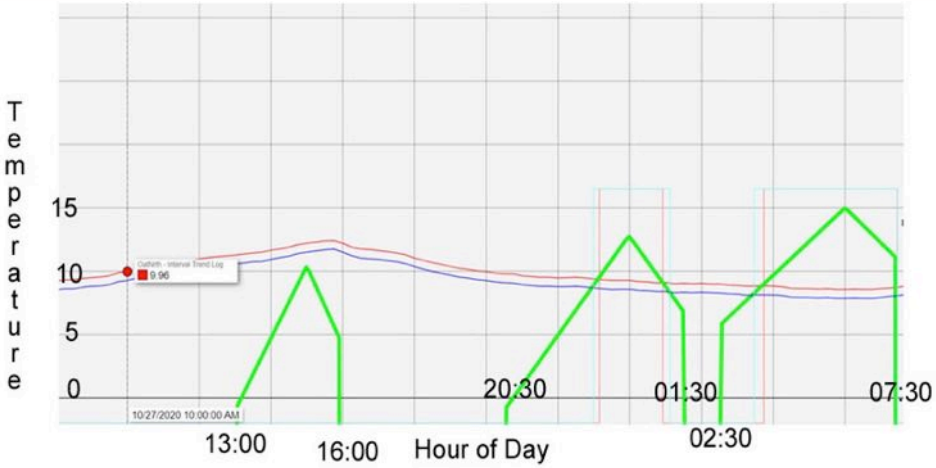
We understand from the experience of residents that the underfloor heating system may need optimising to ensure that electricity is used efficiently. Currently, many residents complain of too much heat in the winter (leading to open windows in mid-winter to cool flats), and not enough heat in shoulder seasons (spring and autumn). The residents have formed an Underfloor Heating Working Party which is looking in detail at how the controls can be optimised.

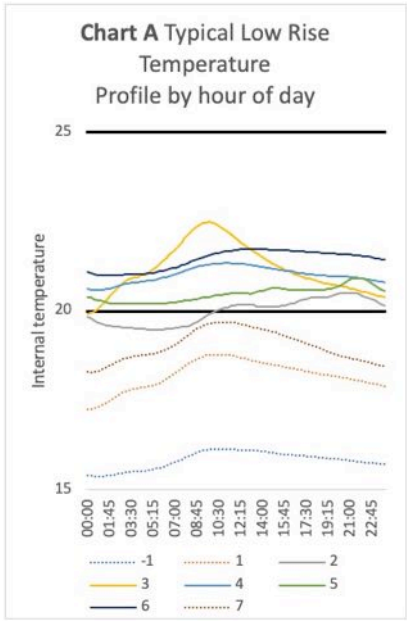
The issue is a complex one to solve. It's not entirely technical – there is also the problem of resident expectations and comfort and these vary greatly. A summary of conversations with the Underfloor Heating Working Party can be found in the Appendices, together with some recommendations.

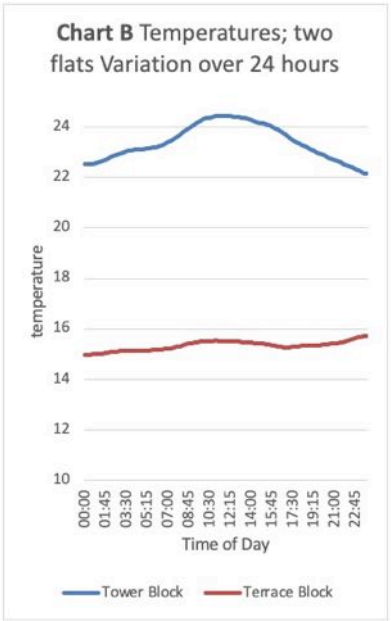
The most pragmatic solution to improving the control over how much heat is delivered to residents homes would be to deliver less heat through the communal heating system (and charge residents less) and install electric radiators in each unit that residents have easy, individual control over. However, an appropriate charging mechanism would need to be established. This could be through the Corporation itself – either a fixed charge (although this does not incentivise efficient behaviours) or through metering of electrical supplies to each unit. Alternatively, residents could have full control and pay bills to the utility companies themselves, although they would not benefit from the beneficial tariff the Corporation is understood to have secured.

Barbican underfloor heating system description

Barbican resident Ted Reilly has put tougher a very useful summary of the underfloor heating system at the Barbican Estate. Anyone wishing to understand this document better is encouraged to refer to this document entitled "Barbican Underfloor Heating System Description".







Extracts from "Barbican Underfloor Heating System Description" document provided by Ted Riley, Barbican resident.

Resident engagement

See following pages for:

- Barbican workshop 1
- HRA Estates workshop 1a
- HRA Estates workshop 1b
- Survey responses

Project	City of London Corporation - Housing Net Zero Action Plan					
Workshop	Barbican Residents Workshop 1 - Understanding the buildings through the residents eyes.					
Date	5th May 2021					
Time	19:00 – 20:30					
Venue	Online through Zoom					
Attendees	Barbican residents - 15					
	Etude (Anna MacKenzie, Thomas Lefevre, Kate Millen, Naomi Grint)					
	Corporation of London (Graeme Low, Julia Makin, Lochlan MacDonald)					
Duration	90 mins					
Purpose	To understand the buildings through residents eyes.					
Roles	Facilitator - Anna Presenter – Kate Break out room chairs – Thomas, Kate, Naomi					

Stage	**Duration, mi**	**Time**	**Objective**	**Activity**	**Who**	**Resources**
1. Arrival	5	19:00	Time to arrive	- People arrive and settle	Anna	
2. Introduction	5	19:05	Intros	- Introduce the team (we are not CoL) - Introduce the purpose of the workshop - Establish ground rules - Present the agenda	Anna	
2. Scene setting	10	19:10	Set the scene Participants understand what the end-goal is for the building they live in.	- Who we are, what are we for (we are not CoL). - What we are doing – introduce the study - Why we are doing it - e.g. Climate Action Strategy. - What we want to achieve - what is net zero? - Describe the long term vision - Elaborate explaining the intermediate steps we need to get there.	Kate	Slides
4. Results of questionnaire	5	19:20			Anna	Slides
5. Group discussion	30	19:25	Residents share insights and ideas for improving the heating system.	- 30 mins: 3x Breakout rooms. Topic – Heating systems, energy efficiency, ventilation, controls. (discuss people's experiences and ideas for improvements)	Anna facilitate _____ Kate, Naomi, Thomas chair breakout rooms	Note taking spreadsheet
6. Group feedback	20	19:55		- 5 mins each: Return together to share thoughts – 1 volunteer from residents to report back and check our understanding with the attendees (5 mins each).	Anna facilitate _____ Kate, Naomi, Thomas present back	Note taking spreadsheet
7. Polls	5	20:15		- Priorities - what's the most important to deal with? -	Anna	Questions in chat Poll
8. Conclusion and next steps	5	20:20		- What we will do with the results - Next workshop	Anna	

9. AOB	5	20:25	Opportunity to ask questions and voice any other views		Anna	
Total	90					
NOTES						
Heating, Energy Efficiency, Ventilation						
Breakout room 1	cmd+ Enter for new line in cell					
Group 1 - permeabilty. Drafts - lack of control (too hot at night). Single and double glazing - mainly on road facing flats. Reverse fan light single glazing. Moisture in the air - down to 25% in some flats. People accept the background heating and dress accordingly, oil heaters commonly used. Colin and Sally - system is on the whole time - water tank is cycling constantly (hot water). Barbican - hot water can be turned off - immersion. West facing - can get very hot. Some residents have used films to reduce gain.						
Breakout room 2	cmd+ Enter for new line in cell					
Group 2 - Communal gas heating in Frobisher Crescent - review recent report. Interested in hearing ideas for changing heating system. Energy efficiency - opportuniutes around glazing, but it might be sufficient already. Heating system controls seem to be the thing to address - reducing energy wastage. Cost point - must not be a vanity project. Develop a climate change strategy for Barbican as exemplar.						
Breakout room 3	cmd+ Enter for new line in cell					
Group 3 - Overheating in both summer and winter. Dry air. Some residents can control summer overheating through blinds and ventilation. Orientation must be considered. Controls a big issue. How do adjacent flats impact other flats in terms of heating. Glazing - cost, how it works with climate change and overheating in the winter. Needs to be joined up.						
Glazing replacement.						
Case by case basis - can						
Modern building, stuck with cold bridges						
Focus on what's unique here						
Join up opportunities - recent study on changing pattern on transport. Vacant parking spaces for PV?						
Can deals be made with suppliers?						
Load patterns are unique. Surrounded by huge cooling loads neighbours.						
Wrap PV around barrel roofs.						
Can we utilise neighbouring solutions?						

What about non-domestic properties?					

Project	City of London Corporation - Housing Net Zero Action Plan
Workshop	HRA Residents Workshop 1 - Understanding the buildings through the residents eyes.
Date	Thu 6th May 2021
Time	19:00 – 20:30
Venue	Online through Zoom
Attendees	HRA residents - 2.
	Etude (Anna MacKenzie, Thomas Lefevre, Kate Millen, Naomi Grint)
	Corporation of London (tbc)
Duration	90 mins
Purpose	To understand the buildings through residents eyes.
Roles	Facilitator - Anna Presenter – Kate Break out room chairs – Thomas, Kate, Naomi

Stage	Duration, mi	Time	Objective	Activity	Who	Resources
1. Arrival	5	19:00	Time to arrive	- People arrive and settle	Anna	
2. Introduction	5	19:05	Intros	- Introduce the team (we are not CoL) - Introduce the purpose of the workshop - Establish ground rules - Present the agenda	Anna	
3. Who are the participants?	2	19:10		- Poll to see where people are from.	Anna	
2. Scene setting	10	19:12	Set the scene Participants understand what the end-goal is for the building they live in.	- Who we are, what are we for (we are not CoL). - What we are doing – introduce the study - Why we are doing it - e.g. Climate Action Strategy. - What we want to achieve - what is net zero? - Describe the long term vision - Elaborate explaining the intermediate steps we need to get there.	Kate	Slides
4. Results of questionnaire	3	19:22			Anna	Slides
5. Group discussion	30	19:25	Residents share insights and ideas for improving the heating system.	- 30 mins: 3x Breakout rooms. Topic – Heating systems, energy efficiency, ventilation, controls. (discuss people's experiences and ideas for improvements)	Anna facilitate _____ Kate, Naomi, Thomas chair breakout rooms	Note taking spreadsheet
6. Group feedback	20	19:55		- 5 mins each: Return together to share thoughts – 1 volunteer from residents to report back and check our understanding with the attendees (5 mins each).	Anna facilitate _____ Kate, Naomi, Thomas present back	Note taking spreadsheet
7. Polls	5	20:15		- Priorities - what's the most important to deal with? -	Anna	Questions in chat Poll
8. Conclusion and next steps	5	20:20		- What we will do with the results - Next workshop	Anna	

9. AOB	5	20:25	Opportunity to ask questions and voice any other views		Anna	
Total	90					
NOTES						
Will - hardly uses any heating. Doesn't need it. South facing on living room and bedroom side. Gas central heating doesn't come on at all. Electric shower. Uses a combi boiler to do the washing up. Uses an electric fire. Windows are solid. Trickle vents on the windows. Can shut all but hte bathroom, but then the air gets stale. Likes the way the street looks on the outside - would external insulation be ok or worthwhile? Might need to go a long way to get big improvements in energy efficiency. There are both tenants and leaseholders. Would need to consider the options re signing up to a communal system vs staying independant. Doesn't know where a big heat pump system would go. There is an airing cupboard type space. There's a deep boxed out riser space in the bathroom. Some people have taken this out. An old coal store.						
If we were going to do a lot of retrofit, a way to help overheating woudl be to install balconies outside full doors, to give shading (they face south-s-w) - decl access on northnorth east (ktichen and bathrooms). Bedrooms and living rooms face south. Would be interesting to know how it works - some upgrades woudl be communal.						
Hannah - Gas combi boiler is used most days. Heard that top floor gets colder. Interested in getting a heat pump to move away from gas. The block used to have Is there a weak point in energy efficiency? - draft comes in around the front door. Big windows at the bag. Flat room. Pram shed and garages next door. There has been a benefit in the window replacements. Ventilation in the kitchen - open the windows. Problems with condensation - yes on the 5th floor, lots of black mold. But no problem on 4th floor. On the same side of the building. Would there preference be direct electric + fabric improvements or heat pump ? - Upfront costs, running costs and disruption are all considerations. If there are beneifts, then increased running costs may be acceptable. Need to be clear about the postivies in teh package. How will people feel if they are payin						
Would defintiely be in favour of a green makeover. Petrol mowers and leaf blowers! Has been onvolved in community building and engagement - managing a garden patch by the garages. Communications can be frustrating. Golden Lane - lots of community building stuff. Really need to support community building so that they feel they are part of something.						

Project	City of London Corporation - Housing Net Zero Action Plan
Workshop	HRA Residents Workshop 1 - Understanding the buildings through the residents eyes.
Date	Wed 12th May 2021
Time	19:00 – 20:30
Venue	Online through Zoom
Attendees	HRA residents
	Etude (Anna MacKenzie, Thomas Lefevre, Kate Millen, Naomi Grint)
	Corporation of London (tbc)
Duration	90 mins
Purpose	To understand the buildings through residents eyes.
Roles	Facilitator - Anna Presenter – Naomi Break out room chairs – Thomas + Anna (GL) - Kate + Naomi (Others)

Stage	Duration, mi	Time	Objective	Activity	Who	Resources
1. Arrival	5	19:00	Time to arrive	- People arrive and settle	Anna	
2. Introduction	5	19:05	Intros	- Introduce the team (we are not CoL) - Introduce the purpose of the workshop - Establish ground rules - Present the agenda	Anna	
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4. Results of questionnaire	3	19:22			Anna	Slides
5. Group discussion	30	19:25	Residents share insights and ideas for improving the heating system.	- 30 mins: 3x Breakout rooms. Topic – Heating systems, energy efficiency, ventilation, controls. (discuss people's experiences and ideas for improvements)	Anna facilitate _____ Kate, Naomi, Thomas chair breakout rooms	Note taking spreadsheet
6. Group feedback	10	19:55		- 5 mins each: Return together to share thoughts – 1 volunteer from residents to report back and check our understanding with the attendees (5 mins each).	Anna facilitate _____ Kate, Naomi, Thomas present back	Note taking spreadsheet
7. Polls	10	20:05		- Priorities - what's the most important to deal with? -	Anna	Questions in chat Poll
8. Conclusion and next steps	5	20:15		- What we will do with the results - Next workshop	Anna	

9. AOB	5	20:20	Opportunity to ask questions and voice any other views		Anna	
Total	85					
NOTES						
Heating, Energy Efficiency, Ventilation						
Breakout room 1 - Golden Lane Estate		cmd+ Enter for new line in cell				
Dawn - windows. Hands are still cold and the hands are still cold. 75mm of foam glass is on the roofs. There are little windows around the top. THere are undercrofts on some flats, and that room is freezing in the winter. Uninsulated concrete slab. Alternate floors, there are timber floors. Projecting bays have some damp - cold bridges. Walkways to enter the front door. Ventilation - current ventilation is through the windows (there are holes at the bottom of the windows to let the condensations out. No ventilation fans in the bathrooms. Half the flats haven't had their roofs repaired/replaced for some time. Water is still coming in. A lot of the damp is from water ingress through the roof. End maisonette - uninsulated. Doors - they are solid but they leak air all the way around. Letter boxes are drafty too. Curtains in the large room are difficult to put in. Sue tried to get a smart meter, but they couldn't install one / they don't connect. Difficult for people to monitor their energy usage. Some blocks do have smart meters. 8.5m2 of single glazing. Two Basterfield properties - comparison of energy efficiency. Panel system walls on the south side of the blocks. On the north side, upper storey is panels. Under that think kinker block - insulation outside woudl eb difficult due to walkway. Kitchens very narrow. Heating - brand new combi boilers have just been put in. Boiler is coming on and off all day. Leaseholders individually fit their own. Sue has some electric underfloor heating she put in herself. Some boiler flues go out of windows. Shouldn't have to justify individual circumstances. Communal heating system being proposed for Cuthbert Harrowing and Crescent House. Look at Options Appraisal. Pipe routes - are they still there? It was more or less a steam system insulated with asbestos. Maybe use existing ducts but need to check asbestos.						
Breakout room 2	cmd+ Enter for new line in cell					

Breakout room 2 - "Others"	cmd+ Enter for new line in cell					
Horace Jones House and MSE both far too hot and struggling with overheating. Some ares of flat cold (Sandra). HJH uses electric heating (communal heating?). Can't leave windows open ebcause of wind or noise. Sandra - the big issue os replacing teh heating system with a fossil fuel system. Windows are triple glazed. The doors have been replaced - balcony doors have made a slight difference. The side panel was replaced. Horace Jones House has MVHR and winter gardens. Highly glazed facade. Some balonies but not above every day.						

Please select the estate in which you live.	Please select the block in which you live.	How many bedrooms does your home have?	Which of the below best describes your home?	Which best describes your house	Which floor are you on?	What's the main heating source in your home?	Communal system	Combi gas boiler	Immersion heater	Point-of-use heater (e.g. electric shower, hot tap etc)	Thermostat	Additional plug-in electric heaters	Additional gas heaters	Open windows when it's too warm in the winter	No control	Other	You selected "other". Please briefly describe other ways in which you control the temperature of your home.	How comfortable is your home in the winter?	How comfortable is your home in the summer?	Does your home suffer from damp?	Do you use your kitchen and bathroom ventilation?	Could you tell us why you don't use all or some of your ventilation fans?	Do you have broadband and wifi?	Would you be willing to share your energy bill data with us (anonymously)	If you would like to	Use this space to add anything else you would like to say.
Avondale Square Estate	Brettinghurst House	1-bed	Flat		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat							3	5	No	Yes - bathroom only	Don't have ventilation in kitchen just open the windows	Yes	Maybe	ke	
Avondale Square Estate	East Point	Studio	Flat		Top floor	Own gas boiler		Combi gas boiler							No control			1	8	Yes - a lot	Yes - bathroom only	Only have it in the bathroom	Yes	No		The windows are old. The rubber thing that put around it does nothing. Mould builds up on my windows weekly. There is a breeze even when closed. There is a breeze coming from the front door. They was charging me £50 per month for gas in a studio flat.
Avondale Square Estate	George Elliston House	3-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat							1	8	Yes - a little	Yes - kitchen only	I don't have one in the bathroom and toilet	Yes	No		In my flat I have single glass old windows. In the winter it is very cold and we have paddles of water on the floor each morning. During windy weather the curtains "fly"- how bad those windows are! It is time to do something about it. We use a lot of gas to heat the flat and it is still too cold, not to mention the noise level...
Avondale Square Estate	Longland Court	3-bed	Flat		Middle floor	Own gas boiler				Point-of-use heater	Thermostat							3	8	Yes - a little	Yes - both		Yes	No		
Avondale Square Estate	Proctor House	Studio	Flat		Ground/Lowest floor	Electric storage heater			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				0	5	Yes - a little	No - we turn it off	I presume they were fitted when the recent works were done but I don't exactly know if I have them and I certainly don't know how to use them	Yes	Yes	n	I have had some mould in cupboards. In the past I have had a lot of trouble with water leaks from above. A few years ago the bathroom had to be replastered (I think is the word) and redecorated once it had dried out; I tend to worry that it might happen again.
Avondale Square Estate	Tovy House	2-bed	Flat		Top floor	Own gas boiler		Combi gas boiler			Thermostat							1	8	Yes - a lot	Yes - both		Yes	No		The windows and front doors need replacing in tovy house. In the winter the condensation is so bad I have to put towel along the window seal to soak up the water. The front doors have big gaps that let through alot of draught and we lose alot of our heat when the heating is on.
Avondale Square Estate	Tovy House	2-bed	Flat		Top floor	Own gas boiler		Combi gas boiler			Thermostat							2	8	Yes - a lot	Yes - both		Yes	No		The windows in my flat are rubbish they let to much draft and cold in and the front doors are not energy efficient. Double glazed windows and fire doors are required. These need to be updated.
Avondale Square Estate	Tovy House	2-bed	Flat		Ground/Lowest floor	Own gas boiler		Combi gas boiler							No control			2	7	No	Yes - bathroom only	No ventilation on the kitchen. On the bathroom we open the window after every bath as there is not ventilation.	Broadband	Yes		I think CoL can do much more than just providing few recycling bins to help the environment. Normally recycling bins gets full by the end of the week and because the collection only happens about every fortnight, residents used other waste bins for recycling materials too.
Barbican Estate	Andrewes House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion						No control			3	5	No	Yes - both		Yes	Maybe		Residents should be made aware that stuck-open vents can be replaced and offered advice about draught-proofing. Both would help reduce unnecessary use of energy. Also, not everyone knows that underfloor heating 'trimmers' can be adjusted to provide more or less heat.
Barbican Estate	Andrewes House	2-bed	Flat		Middle floor	Electric underfloor heating			Immersion						No control			5	5	No	Yes - both		Yes	Yes	m	I have put both my email addresses in: Marydurcan@hotmail.com Mary.durcan@cityoflondon.gov.U.K. I would be interested in attending both workshops
Barbican Estate	Andrewes House	2-bed	Flat		Ground/Lowest floor	Electric underfloor heating			Immersion						No control			5	5	No	Yes - both		Yes	Maybe	se	
Barbican Estate	Andrewes House	2-bed	Flat		Middle floor	Electric underfloor heating			Immersion					Open windows when it's too warm in the winter				7	5	No	Yes - both		Yes	Yes	aw	xx
Barbican Estate	Andrewes House	1-bed	Flat		Ground/Lowest floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters			No control			3	5	No	Yes - both		Yes	Yes	ar	
Barbican Estate	Ben Johnson House	1-bed	Maisonette		Middle floor	Communal heating			Immersion	Point-of-use heater		Additional plug-in electric heaters		Open windows when it's too warm in the winter	No control			4	6	No	Yes - both		Yes	No		When the new communal heating system was installed, why was it set to run in the same manner as before? Surely there are ways to make the communal heating more climate and user friendly? My heating bill in my 714 sq ft flat is more than a friend's 1023 sq ft flat in a block in Clerkenwell. Outrageous overcharging!
Barbican Estate	Brandon Mews	1-bed	House	Mid terrace		Electric underfloor heating			Immersion					Open windows when it's too warm in the winter	No control			7	8		Yes - both		Yes	No		Cannot select both workshops.
Barbican Estate	Breton House	Studio	Flat		Middle floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter												
Barbican Estate	Breton House	Studio	Flat		Middle floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				1	8	No	Yes - bathroom only	Concerns over fire hazards.	Yes	Yes	fi	Although ours is a middle floor flat, three of its external walls are exposed including to the northern boundary of the block/estate.
Barbican Estate	Bunyan Court	1-bed	Flat		Middle floor	Electric underfloor heating				Point-of-use heater				Open windows when it's too warm in the winter				6	9	No	Yes - both		Yes	Maybe	ra	
Barbican Estate	Bunyan Court	2-bed	Maisonette		Top floor	Electric underfloor heating	Communal system					Additional plug-in electric heaters		Open windows when it's too warm in the winter	No control			5	7	No	Yes - both		Yes	Yes	e	
Barbican Estate	Cromwell Tower	4-bed	Flat		Middle floor	Electric storage heater	Communal system					Additional plug-in electric heaters		Open windows when it's too warm in the winter	No control			3	6	No	Yes - both		Yes	Yes	pa	
Barbican Estate	Cromwell Tower	3-bed	Flat		Middle floor	Electric underfloor heating	Communal system			Point-of-use heater					No control			3	5	No	No - we turn it off	We open the window in the kitchen. There's no ventilation in the bathroom.	Yes	Maybe	ly	Barbican Estate needs to find ways to insulate.
Barbican Estate	Cromwell Tower	3-bed	Flat		Middle floor	Communal heating			Immersion						No control			10	7	No	Yes - both		Yes	Yes	da	The Barbican communal heating system is grossly inefficient and renders many homes uncomfortable. At present I have to leave outside doors open across my flat day and night because otherwise it is much too hot. This is a terrible waste of energy.
Barbican Estate	Defoe House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter		Other	I use full length white reflective roller blinds to block out the sun on hot days and help keep the interior of the flat cool	3	5	No	Yes - both		Yes	Yes	st	I would be very interested if there was a way for a large group of residents to work together with CoL to upgrade the original barbican windows to make them much warmer and more energy efficient. I would be interested also to know if the barrel vault roof tops of the terrace blocks in the barbican could be fitted with solar panels, as I understand there are flexible/curved ones now that could perhaps be used without affecting the listed building roofline. Also could ground source heat pumps be installed under the residents' gardens?

Please select the estate in which you live.	Please select the block in which you live.	How many bedrooms does your home have?	Which of the below best describes your home?	Which best describes your house	Which floor are you on?	What's the main heating source in your home?	Communal system	Combi gas boiler	Immersion heater	Point-of-use heater (e.g. electric shower, hot tap etc)	Thermostat	Additional plug-in electric heaters	Additional gas heaters	Open windows when it's too warm in the winter	No control	Other	You selected "other". Please briefly describe other ways in which you control the temperature of your home.	How comfortable is your home in the winter?	How comfortable is your home in the summer?	Does your home suffer from damp?	Do you use your kitchen and bathroom ventilation?	Could you tell us why you don't use all or some of your ventilation fans?	Do you have broadband and wifi?	Would you be willing to share your energy bill data with us (anonymously)?	If you give us y	Use this space to add anything else you would like to say.
Barbican Estate	Defoe House	1-bed	Flat		Top floor	Electric underfloor heating			Immersion						No control			4	6	No	Yes - kitchen only	There's a passive vent in the bathroom that doesn't work well. There's no other option	Yes	Yes	la	When it's chilly in the winter I need a space heater. But not all winter. It's especially cold in the flat when it is damp and overcast outside. It's only too warm for a few days in the summer. In future we may need air conditioning on the hottest days.
Barbican Estate	Defoe House	2-bed	Flat		Middle floor	Communal heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				5	5	No	Yes - both		Yes	Yes	ta	
Barbican Estate	Defoe House	2-bed	Flat		Middle floor	Communal heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				6	6	No	Yes - both		Yes	No		
Barbican Estate	Frobisher Crescent	3-bed	Flat		Middle floor	Communal heating	Communal system				Thermostat							6	6	No	Yes - both		Yes	Yes	m	
Barbican Estate	Frobisher Crescent	Studio	Flat		Middle floor	Communal heating			Immersion		Thermostat							5	6	No	Yes - both		Yes	Maybe		Yes i would like to attend both workshops
Barbican Estate	Frobisher Crescent	3-bed	Flat		Middle floor	Communal heating	Communal system				Thermostat	Additional plug-in electric heaters						5	5	No	Yes - both		Yes	No		
Barbican Estate	Gilbert House	3-bed	Flat		Top floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				10	8	No	Yes - bathroom only	With all fans on the flat humidity is too low all the time. In winter it is often below 25% even with the kitchen extractor off. The open plan flat design means using a humidifier is not feasible. Also the air turnover is high & bringing more pollution into the flat.	Yes	Yes	w	Solar gain through the windows is a big problem in our flat during hot weather or when the winter underfloor heating is excessive. However, solar gain is very useful during cold weather in Spring, Autumn & Summer when there is no or inadequate communal heating. Outdoor shades would perhaps be the most effective. The underfloor heating is much too hot when the nights are cold & the days are relatively warm. It would be good to regulate the heating taking the next day's weather forecast into account. The lever operated window vent in the 7th floor domed bedroom is so high up it needs a ladder to teach it. This is obviously impractical. Bathroom heaters are very expensive to run as we have been told they must be run at 60 degrees because of Legionella.
Barbican Estate	Gilbert House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion	Point-of-use heater					No control			7	7	No	Yes - both		Yes	Yes	ja	Ok
Barbican Estate	Gilbert House	2-bed	Flat		Middle floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				8	6	No	Yes - both		Yes	Yes	b	I would be happy to pay more to have the electricity used for our communal underfloor heating be from renewable sources.
Barbican Estate	Hilton House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion					Open windows when it's too warm in the winter	No control			3	7	No	Yes - both		Yes	Maybe		I find the underfloor heating in the Barbican too hot overnight and too cold during the day (particularly by mid afternoon)
Barbican Estate	Lauderdale Tower	3-bed	Flat		Middle floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter	No control			3	8	Yes - a little	Yes - both		Yes	Maybe		There isn't a next button, people have to know to click the arrow next to the typeform blue bar
Barbican Estate	Petticoat Tower	3-bed	Flat		Middle floor	Communal heating	Communal system		Immersion		Thermostat							7	7	No	Yes - both		Yes	Yes	m	nothing at this stage
Barbican Estate	Seddon House	1-bed	Flat		Ground/Lowest floor	Communal heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				4	5	No	Yes - both		Yes	Yes	m	na
Barbican Estate	Seddon House	3-bed	Flat		Top floor	Electric underfloor heating			Immersion						No control			3	7	No	Yes - both		Yes	Yes	d	The estate must look at energy loss. All the heat is lost through old glazing. This should be replaced to improve efficiency and comfort. Long term solutions not short terms decisions
Barbican Estate	Seddon House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				7	10	No	Yes - both		Yes	Yes	ja	
Barbican Estate	Seddon House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion						No control			5	5	Yes - a little	No - we turn it off	There are none	Broadband	No		Some of the questions clearly did not understand the estate.
Barbican Estate	Seddon House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion						No control			4	6	No	Yes - kitchen only	Because moths come into my flat via the ventilation system.	Yes	Yes	d	Many of the questions are ones which the Corporation as landlord will know the answers to already.
Barbican Estate	Shakespeare Tower	3-bed	Flat		Middle floor	Electric underfloor heating	Communal system			Point-of-use heater				Open windows when it's too warm in the winter				5	5	No	Yes - both		Yes	Yes	ly	
Barbican Estate	Shakespeare Tower	3-bed	Flat		Middle floor	Electric underfloor heating			Immersion						No control			5	5	No	Yes - both		Yes	Maybe	p	
Barbican Estate	Shakespeare Tower	3-bed	Flat		Middle floor	Electric underfloor heating			Immersion					Open windows when it's too warm in the winter				8	7	No	Yes - both		Yes	Yes	te	
Barbican Estate	Shakespeare Tower	2-bed	Flat		Middle floor	Electric underfloor heating			Immersion					Open windows when it's too warm in the winter	No control	Other	Underfloor heating trimmer	5	5	No	Yes - both		Yes	Yes	c	
Barbican Estate	Shakespeare Tower	3-bed	Flat		Top floor	Electric underfloor heating			Immersion						No control			5	6	No	Yes - both		Yes	Maybe		
Barbican Estate	Shakespeare Tower	2-bed	Flat		Middle floor	Electric underfloor heating			Immersion						No control			5	8	No	Yes - both		Yes	Maybe		
Barbican Estate	Speed House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion					Open windows when it's too warm in the winter				9	5	No	Yes - both		Yes	No		
Barbican Estate	Speed House	2-bed	Flat		Middle floor	Electric underfloor heating			Immersion						No control			5	7	No	Yes - both		Yes	Maybe	ti	How about some solar heating for a start
Barbican Estate	Thomas More House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion						No control			7	8	No	Yes - both		Yes	Yes	m	
Barbican Estate	Thomas More House	Studio	Flat		Ground/Lowest floor	Electric underfloor heating			Immersion					Open windows when it's too warm in the winter	No control			6	4	No	Yes - kitchen only	bathroom fan on all the time. Kitchen hob fan used for cooking on boost	Yes	Yes		

Please select the estate in which you live.	Please select the block in which you live.	How many bedrooms does your home have?	Which of the below best describes your home?	Which best describes your house	Which floor are you on?	What's the main heating source in your home?	Communal system	Combi gas boiler	Immersion heater	Point-of-use heater (e.g. electric shower, hot tap etc)	Thermostat	Additional plug-in electric heaters	Additional gas heaters	Open windows when it's too warm in the winter	No control	Other	You selected "other". Please briefly describe other ways in which you control the temperature of your home.	How comfortable is your home in the winter?	How comfortable is your home in the summer?	Does your home suffer from damp?	Do you use your kitchen and bathroom ventilation?	Could you tell us why you don't use all or some of your ventilation fans?	Do you have broadband and wifi?	Would you be willing to share your energy bill data with us (anonymously)	If you would like to say.	Use this space to add anything else you would like to say.
Barbican Estate	Thomas More House	2-bed	Flat		Ground/Lowest floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				2	5	No	Yes - both		Yes	Maybe		The Barbican needs special analysis due to the block structure and centrally controlled underfloor heating
Barbican Estate	Thomas More House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter				5	5	No	Yes - both		Yes	No		'
Barbican Estate	Wallside	4-bed	House	Mid terrace		Electric underfloor heating			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter		Other	The house had its own trimmer which can turn the temperature of heating provided to the house up or down. Also I replaced the underfloor heating fuse board with permission from the BEO and can pull out fuses to turn the heating off if necessary. However there is no incentive to do so because the heating charges are charged by block, and not by the usage of the individual house.	3	3	No	Yes - both		Yes	No		I cannot attend the times of either workshop but you did not give an option for me to select that said that so I had not other choice but to select that I did not wish to attend. That is not correct. The Corporation has a responsibility to ensure that meetings and workshops are offered at different times of the day and not all in the evening to ensure they give everyone the opportunity to attend. This you have not done. Q11 and Q12 miss the point somewhat. Because there is no control and the heating is other on or off when it is very cold it is too cold and when the weather is very hot it is too cold. Both can happen in the summer and in the winter. Also because there is a lag when the heating kicks in if a very cold day is followed by a very hot day the heating will be full on and the windows have to be opened. Conversely if a hot day is followed by a cold day no heating will be generated and it will be freezing.
CoL Almshouses	39-44	1-bed	House	Mid terrace		Own gas boiler		Combi gas boiler			Thermostat							0	10	Yes - a lot	Yes - both		Yes	Yes	s	nothing else to say
Dron House	Dron House	1-bed	Flat		Top floor	Own gas boiler		Combi gas boiler			Thermostat							4	3	No	Yes - both		No internet	No		We have far too much ventilation, compared with modern standards and builds. This does have advantages re carbon monoxide + damp BUT it does cost more to heat flats..... Combi-boilers will be phased out. In the future you will have to consider other forms of heating. A reasonable 1/2-way stage is Combined Heat and Power generation, with a community heating scheme, but that still would use gas as the most likely fuel source. None-the-less, reduction in electricity transmission cuts energy use considerably. I would still like to see solar power + solar heating panels on the roof + thermal pile & ground-sourced heat pump..... Tho' I doubt if these would provide sufficient energy for the flats
Golden Lane Estate	Basterfield House	3-bed	Maisonette		Top floor	Own gas boiler		Combi gas boiler	Immersion		Thermostat							5	6	Yes - a lot	Yes - both		Yes	Maybe	d	Does HRA ESTATE residents include Leaseholders..
Golden Lane Estate	Basterfield House	2-bed	Maisonette		est floor	Own gas boiler		Combi gas boiler			Thermostat							1	9	No	No - we turn it off	There are none!	Yes	Yes	p	
Golden Lane Estate	Basterfield House	2-bed	Maisonette		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat			Open windows when it's too warm in the winter				8	6	Yes - a little	Yes - both		Yes	Yes	ac	
Golden Lane Estate	Bayer House	2-bed	Maisonette		Middle floor	Electric underfloor heating		Combi gas boiler			Thermostat							3	6	No	Yes - both		Yes	Maybe	ns	
Golden Lane Estate	Bowater House	2-bed	Maisonette		Middle floor	Own gas boiler		Combi gas boiler			Thermostat							3	8	Yes - a little	Yes - both		Yes	Yes	c	Our flats leak heat and gas is becoming very expensive
Golden Lane Estate	Callum Welch House	4-bed	House	Detached		Electric underfloor heating			Immersion						No control			1	2	No	Yes - bathroom only	asdfs	Yes	Yes		
Golden Lane Estate	Crescent House	Studio	Flat		Top floor	Own gas boiler		Combi gas boiler			Thermostat			Open windows when it's too warm in the winter				4	8	Yes - a little	Yes - both		Yes	No		We have internally insulated the walls and ceilings in half of our flat and this has helped control the damp in those areas but the relative humidity in winter can be around 70%. We use a dehumidifier to get it down to around 60% and this extracts about 2-3 litres/day. We can't keep windows open as we face Goswell Road so there is high noise and pollution levels.
Golden Lane Estate	Crescent House	2-bed	Flat		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat							0	4	Yes - a lot	Yes - both		Yes	Yes	e	We need windows from the flat changed in order to save on energy bills
Golden Lane Estate	Crescent House	1-bed	Flat		Top floor	Own gas boiler		Combi gas boiler			Thermostat	Additional plug-in electric heaters		Open windows when it's too warm in the winter				7	5	Yes - a little	Yes - both		Yes	Maybe	s	
Golden Lane Estate	Crescent House	Studio	Flat		Middle floor	Own gas boiler			Immersion		Thermostat							3	6	Yes - a lot	Yes - both		No internet	Yes	tr	The primary issue with crescent house is the lack of double glazing.
Golden Lane Estate	Cuthbert Harrowing House	3-bed	Maisonette		Top floor	Own gas boiler		Combi gas boiler			Thermostat	Additional plug-in electric heaters						1	2	Yes - a little	Yes - both		Yes	Maybe	d	
Golden Lane Estate	Cuthbert Harrowing House	2-bed	Flat		est floor	Own gas boiler		Combi gas boiler			Thermostat							3	5	Yes - a little	Yes - bathroom only	i dont have any	Yes	Maybe	m	not sure what the survey was for ?
Golden Lane Estate	Cuthbert Harrowing House	2-bed	Maisonette		Top floor	Own gas boiler		Combi gas boiler			Thermostat							2	5	Yes - a little	Yes - both		Yes	Yes	r	Double Glazing and roof insulation
Golden Lane Estate	Cuthbert Harrowing House	2-bed	Maisonette		est floor	Own gas boiler		Combi gas boiler			Thermostat							6	7	No						
Golden Lane Estate	Great Arthur House	1-bed	Flat		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat			Open windows when it's too warm in the winter				2	8	Yes - a little	Yes - both		Yes	Yes	e	Nothing to add.
Golden Lane Estate	Great Arthur House	1-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat			Open windows when it's too warm in the winter				3	8	No	No - we turn it off	Open windows instead	No internet	Yes	m	
Golden Lane Estate	Great Arthur House	1-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat							7	4	Yes - a little	Yes - both		Yes	Yes	s	We all need to audit our energy use
Golden Lane Estate	Hatfield House	3-bed	Maisonette		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat	Additional plug-in electric heaters						4	5	Yes - a little	Yes - both		Yes	Yes	ac	
Golden Lane Estate	Hatfield House		Maisonette		est floor	Own gas boiler		Combi gas boiler			Thermostat							3	5	No	No - we turn it off	We don't have any	Yes	Yes	ta	
Golden Lane Estate	Hatfield House	2-bed	Maisonette		Middle floor	Own gas boiler		Combi gas boiler			Thermostat							7	7	Yes - a little	Yes - both		Yes	Yes	pi	
Golden Lane Estate	Hatfield House	2-bed	Maisonette		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat	Additional plug-in electric heaters						2	5	No	No - we turn it off	I don't have a ventilation system I open the windows in the summer and the front door and kitchen window if I cook something with a lot of steam	Yes	Yes	s	I trust there will be a positive outcome to your research
Golden Lane Estate	Stanley Cohen House	2-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat							2	9	Yes - a little	No - we turn it off	We do not have any	Yes	Yes	s	How many more years do we have to live in cold, noisy, dust ridden homes due to the corporation not double glazing our homes. We have rotting window frames, expensive fuel bills, damp, fungal spores and year after year we are fobbed off. Pointless survey after survey like these, costing how much? Shameful!!!!!!!
Holloway Estate	Crayford House	1-bed	Flat		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat	Additional plug-in electric heaters						2	5	No	Yes - both		Yes	Yes	e	The draughty windows are a total disgrace. Why consult before fixing this serious problem You know about it please do something

Please select the estate in which you live.	Please select the block in which you live.	How many bedrooms does your home have?	Which of the below best describes your home?	Which best describes your house	Which floor are you on?	What's the main heating source in your home?	Communal system	Combi gas boiler	Immersion heater	Point-of-use heater (e.g. electric shower, hot tap etc)	Thermostat	Additional plug-in electric heaters	Additional gas heaters	Open windows when it's too warm in the winter	No control	Other	You selected "other". Please briefly describe other ways in which you control the temperature of your home.	How comfortable is your home in the winter?	How comfortable is your home in the summer?	Does your home suffer from damp?	Do you use your kitchen and bathroom ventilation?	Could you tell us why you don't use all or some of your ventilation fans?	Do you have broadband and wifi?	Would you be willing to share your energy bill data with us (anonymously)	If you give us y	Use this space to add anything else you would like to say.
Holloway Estate	Hilton House	1-bed	Flat		est floor	Own gas boiler		Combi gas boiler			Thermostat							0	3	Yes - a lot	Yes - both			Yes	b	I would like to participate and give ideas.
Middlesex Street Estate	Petticoat Square	3-bed	Maisonette		Middle floor	Communal heating	Communal system				Thermostat	Additional plug-in electric heaters		Open windows when it's too warm in the winter				5	7	No	Yes - bathroom only	I open window if cooking	Yes	Maybe	ia	New 35 system being installed soon will be fossil fuel at the start
Middlesex Street Estate	Petticoat Square	1-bed	Flat		Ground/Lowest floor	Communal heating	Communal system		Immersion		Thermostat							8	8	Yes - a little	Yes - both		Yes	Yes	b	CoL care not about their residents concerns
Middlesex Street Estate	Petticoat Square	2-bed	Flat		Middle floor	Communal heating	Communal system							Open windows when it's too warm in the winter	No control			7	7	No	Yes - both		Yes	Yes	a	No
Middlesex Street Estate	Petticoat Square	1-bed	Flat		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat							3	9	Yes - a lot	Yes - both		Yes	Yes	fo	Maybe if we had new widows and wall insulation the flat would not be cold in the winter and Spring
Middlesex Street Estate	Petticoat Square	Studio	Flat		Top floor	Communal heating	Communal system								No control			10	8	No	Yes - both		Yes	No		
Middlesex Street Estate	Petticoat Square	3-bed	Maisonette		Middle floor	Communal heating	Communal system				Thermostat							4	8	Yes - a little	Yes - both		Yes	Yes	ju	
Middlesex Street Estate	Petticoat Tower	1-bed	Flat		Middle floor	Other	Communal system				Thermostat	Additional plug-in electric heaters						5	2	Yes - a little	Yes - kitchen only	Nothing is there,only a hole for ventilation but it does not work as i must be for the purpose.	Yes	Yes		They were planning to replace gas cooker to electric cooker thats very good idea as i believe.
Middlesex Street Estate	Petticoat Tower	2-bed	Maisonette		Ground/Lowest floor	Communal heating	Communal system				Thermostat							5	5	No	Yes - both		Yes	No		I am disappointed by the Corporation's unilateral decision to renew the Middlesex Street Estate's communal heating system via a purely fossil fuel powered solution. This new system is projected to remain in place for 35 years going forward.
Middlesex Street Estate	Petticoat Tower	1-bed	Flat		Middle floor	Communal heating	Communal system									Other	Thermostat Radiator valve	5	5	No	Yes - bathroom only	Too noisy	Yes	Yes		Both government and the City of London say that they want to reduce carbon emission, but they are in the process of installing a heating and hot water system in Middlesex Street Estate, that is gas fuelled contrary to the country's move away from fossil fuels. This system is predicted to last for next 35 years. Why weren't resident's views and general populations view about global warming taken into account? It is pointless to act concerned about these issues if you don't walk the walk.
Middlesex Street Estate	Petticoat Tower	1-bed	Flat		Middle floor	Communal heating	Communal system							Open windows when it's too warm in the winter		Other	Radiator thermostats	6	7	No	Yes - kitchen only	There is no working ventilation in the bathroom	Yes	Yes	s	MSE is currently having a replacement communal heating/hot water system installed which is 100% fossil fuel based and expected to have a life of 35 years. Although there is the potential at some future point to use waste water from commercial use to power the system, this is neither assured nor likely to happen for several years, if at all. This is an extraordinarily short-sighted imposition of a carbon-producing system that most residents object to strongly and is completely counter to the CoL's stated objectives to reduce carbon emissions.
Middlesex Street Estate	Petticoat Tower	2-bed	Flat		Top floor	Communal heating	Communal system							Open windows when it's too warm in the winter	No control	Other	Radiators have controls but they are not very effective - more like "off" or "on" rather than any gradual change. Centrally, the system is controlled by computers or manual overrides and regularly fails to provide efficient or reliable heating.	7	7	Yes - a little	Yes - both		Yes	Maybe	d	I am a non-resident leaseholder. I am not able to attend a workshop in person, but I would appreciate the opportunity for a Zoom or online option to attend. The communal heating and hot water system is generally unpopular with residents as an option for our homes. We are not happy with the proposed replacement being 100% fossil fuel powered and believe this (among other CoL policies) stands in stark contrast to the stated aim to reduce the CoL's carbon footprint. Air quality in our area is already among the poorest in the country, yet recent projects by the CoL have included the venting of vehicle exhaust fumes from a basement car park directly onto our communal "garden" area that is an amenity for residents. There is a lack of accountability and clear strategies to reduce the carbon footprint of estates like ours, and only vague promises and ambitions for the future. Any "green" strategy needs to engage with residents and be more than just a box-ticking consultation or survey exercise.
Middlesex Street Estate	Petticoat Tower	1-bed	Flat		Middle floor	Communal heating	Communal system								No control			5	6	No	Yes - both		Yes	Yes	ni	I would like to see the city installing Cavity wall insulation to help with reducing our carbon footprint
Southwark Estate	Collinson Court	3-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat							5	7	No	Yes - bathroom only	We don't have a kitchen ventilation fan	Yes	Maybe	m	Your poster at our estate doesn't explain what Etude is.
Southwark Estate	Collinson Court	1-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler		Point-of-use heater	Thermostat							4	6	No	Yes - bathroom only	there is no fan in the kitchen currently - open window if necessary	Yes	Yes	w	The flat need very little heating. South facing windows warm it up on sunny winter days. North facing bathroom and kitchen windows allow cross vent in summer
Southwark Estate	Horace Jones House	1-bed	Flat		Middle floor	Other			Immersion		Thermostat			Open windows when it's too warm in the winter				5	10	No	Yes - bathroom only	I don't have any ventilation fans as far as I'm aware (there wasn't this option on the drop down list). I have a Vent Axia Sentinel Kinetic heat recovery unit. I really don't know how effective this as I've had periods where I've turned it off for a long while and honestly can't tell what difference it makes. It would be good to understand a bit more about it and if I'm using it effectively or maybe my flat is too small for any difference to be noticeable.	Yes	Yes	re	I would like to understand the scope of the survey/consultation. I feel it really needs to look at the residences and the environment in which they are situated.
Southwark Estate	Sumner Buildings	3-bed	Flat		Top floor	Own gas boiler		Combi gas boiler				Additional plug-in electric heaters				Other	Timed boiler	6	8	Yes - a little	No - we turn it off	There is no ventilation. We can only open the windows that are too old and difficult to open	Yes	No		The windows are too old and not isolated properly. There is no thermostat.
Southwark Estate	Sumner Buildings	2-bed	Flat		Top floor	Own gas boiler		Combi gas boiler			Thermostat							1	7	No	Yes - both		Yes	Yes	m	Even with putting secondary glazing on all windows and insulated plasterboard on all external walls, being on the top floor of a building with no insulation at all (the outside walls have no air gap), means the flat is very expensive to keep remotely warm. I would be interested in what options are available given the restrictions on cladding a restricted building such as Sumner Buildings. Is a green roof an option?
Sydenham Hill Estate	Lammas Green	3-bed	House	Mid terrace		Own gas boiler		Combi gas boiler			Thermostat							5	5	No	Yes - both		Yes	No		The city is cutting down trees on my estate and the new trees will struggle to survive. This is not very environmentally friendly.

Please select the estate in which you live.	Please select the block in which you live.	How many bedrooms does your home have?	Which of the below best describes your home?	Which best describes your house	Which floor are you on?	What's the main heating source in your home?	Communal system	Combi gas boiler	Immersion heater	Point-of-use heater (e.g. electric shower, hot tap etc)	Thermostat	Additional plug-in electric heaters	Additional gas heaters	Open windows when it's too warm in the winter	No control	Other	You selected "other". Please briefly describe other ways in which you control the temperature of your home.	How comfortable is your home in the winter?	How comfortable is your home in the summer?	Does your home suffer from damp?	Do you use your kitchen and bathroom ventilation?	Could you tell us why you don't use all or some of your ventilation fans?	Do you have broadband and wifi?	Would you be willing to share your energy bill data with us (anonymously)	If you would like us to say.	Use this space to add anything else you would like to say.
Sydenham Hill Estate	Lammas Green	2-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat							3	6	No	No - we turn it off	I don't have them	Yes	Yes	li	I think the biggest issue for communal energy use at Lammas Green is the huge amount that the outdoor lighting around the green is often on, even in the middle of bright days. Such a tremendous waste! Hours and hours of the lights switched on, for absolutely no need. Really wasteful.
Sydenham Hill Estate	Lammas Green	3-bed	House	End terrace		Own gas boiler		Combi gas boiler		Point-of-use heater	Thermostat							5	5	Yes - a little	Yes - kitchen only	Bathroom extractor needs connecting correctly, if the kitchen needs vrnylating we open a door.	Yes	No		As far as is known all the houses in Lammas Green have cavity wall filling.
William Blake Estate	Donnelly House	1-bed	Flat		Middle floor	Electric underfloor heating			Immersion			Additional plug-in electric heaters						2	6	Yes - a lot	Yes - both		Yes	Yes	in	
William Blake Estate	St James Mansions	1-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat	Additional plug-in electric heaters						3	8	No	Yes - bathroom only	I have a window in my kitchen which I open but no window in my bathroom hence the ventilation fan comes on automatically when I switch on the light there.	Yes	Yes	s	Much of the temperature problems in my flat are due to badly fitting windows - gaps where heat escapes, and draft comes in; single glass which does not provide much insulation either against cold air/wind or heat/direct sun.
William Blake Estate	St James Mansions	1-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat	Additional plug-in electric heaters						4	8	No	Yes - bathroom only	There is only a ventilation system in the bathroom as it's a windowless room. Ventilation only comes on when light is switched on - it'll go off soon after light is turned off.	Yes	Yes	s	The biggest problem about wasted energy use in my flat is due to the number of ill fitting single-glazed windows - I lose a lot of heating due to draft problems even when windows are closed
Windsor House	Windsor House	2-bed	Flat		Middle floor	Communal heating		Combi gas boiler			Thermostat							1	9	Yes - a lot	Yes - both		Yes	Yes		The windows are archaic. The walls are also badly insulated, so they often become very cold in the winter, and as soon as humidity touches the cold walls, mould grows.
Windsor House	Windsor House	1-bed	Flat		Ground/Lowest floor	Own gas boiler		Combi gas boiler			Thermostat			Open windows when it's too warm in the winter				0	2	Yes - a lot	Yes - both		Yes	Yes	g	Windsor house ground floor has a huge problem with damp. I have to run a dehumidifier all winter and most of summer to keep it under control which is hugely damaging to the environment.
Windsor House	Windsor House	2-bed	Flat		Middle floor	Own gas boiler		Combi gas boiler			Thermostat			Open windows when it's too warm in the winter				3	10	Yes - a lot						
York Way Estate	Kinefold House	2-bed	Flat		Ground/Lowest floor	Electric storage heater				Point-of-use heater	Thermostat							5	5	No	Yes - bathroom only	Does not work correctly	Yes	Maybe	d	Since we were moved from Gas to electric systems, our costs for energy have gone through the roof. This as resulted in us not using heating during winter months, which is not really acceptable in this day of age.
York Way Estate	Kinefold House	3-bed	Flat		Middle floor	Communal heating	Communal system								No control			3	8	No	Yes - bathroom only		Yes	No		
York Way Estate	Lambfold House	2-bed	Flat		Top floor	Communal heating	Communal system									Other	Inefficient thermostats on radiators. Either off, or full bore.	8	10	No	No - we turn it off	The noise is like a jet engine and can't be controlled.	Yes	No		The flats become unbearably hot in sunny weather in summer. I need to run fans most of the time. This is due to large windows, which are nearing the end of their useful life - several leak. If they could be replaced, or have a reflective thermal film applied, the flat would be cooler and energy used in running the fans can be saved.
York Way Estate	Lambfold House	2-bed	Flat		Middle floor	Communal heating	Communal system				Thermostat							6	8	No	Yes - both		No internet	Maybe	a	I dont take part in online forums
York Way Estate	Penfields House	3-bed	Flat		Middle floor	Communal heating		Combi gas boiler							No control			7	5	No	Yes - both		Yes	Maybe	d	

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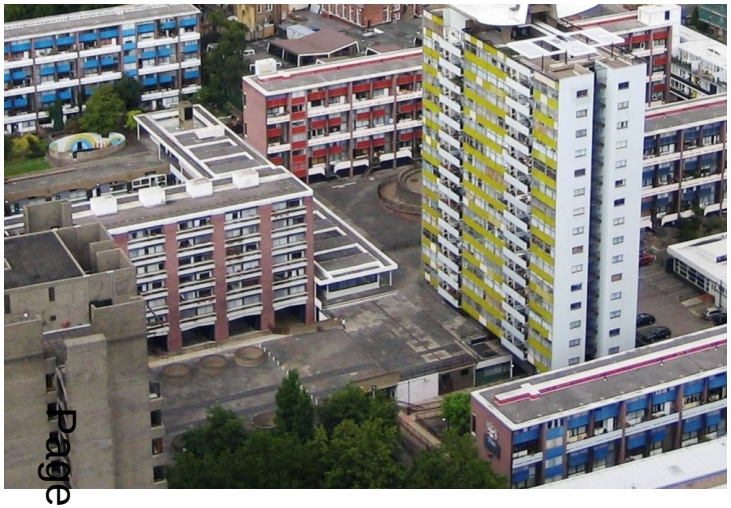


(SHORT-TERM) HOUSING DELIVERY PLAN 2023-2025

Final Draft

April 2024 | Rev G

Etude

This Housing Delivery Plan (HDP) sets out the landscape for delivering lower carbon homes across the City's housing stock, in the context of the Climate Action Strategy carbon targets.

Delivering low carbon retrofit that works for the City and its residents relies on incremental, opportunistic and thorough retrofit that is delivered by multiple teams. To do this though requires immediate action and funding to avoid missing opportunities that may only arise around every 10-20 years.

Immediate actions for improving the position of housing

Within the HDP, short and medium term action have been identified, the former being most critical for the 2027 net zero targets.

Short term priority 1: Landlord services

An external consultant has proposed improvements to landlord services such as lighting, lifts, ventilation etc. This work is expected to be of minimal disruption and ready to proceed to the next phase on most estates.

Short term priority 2: Expanding pipeline projects

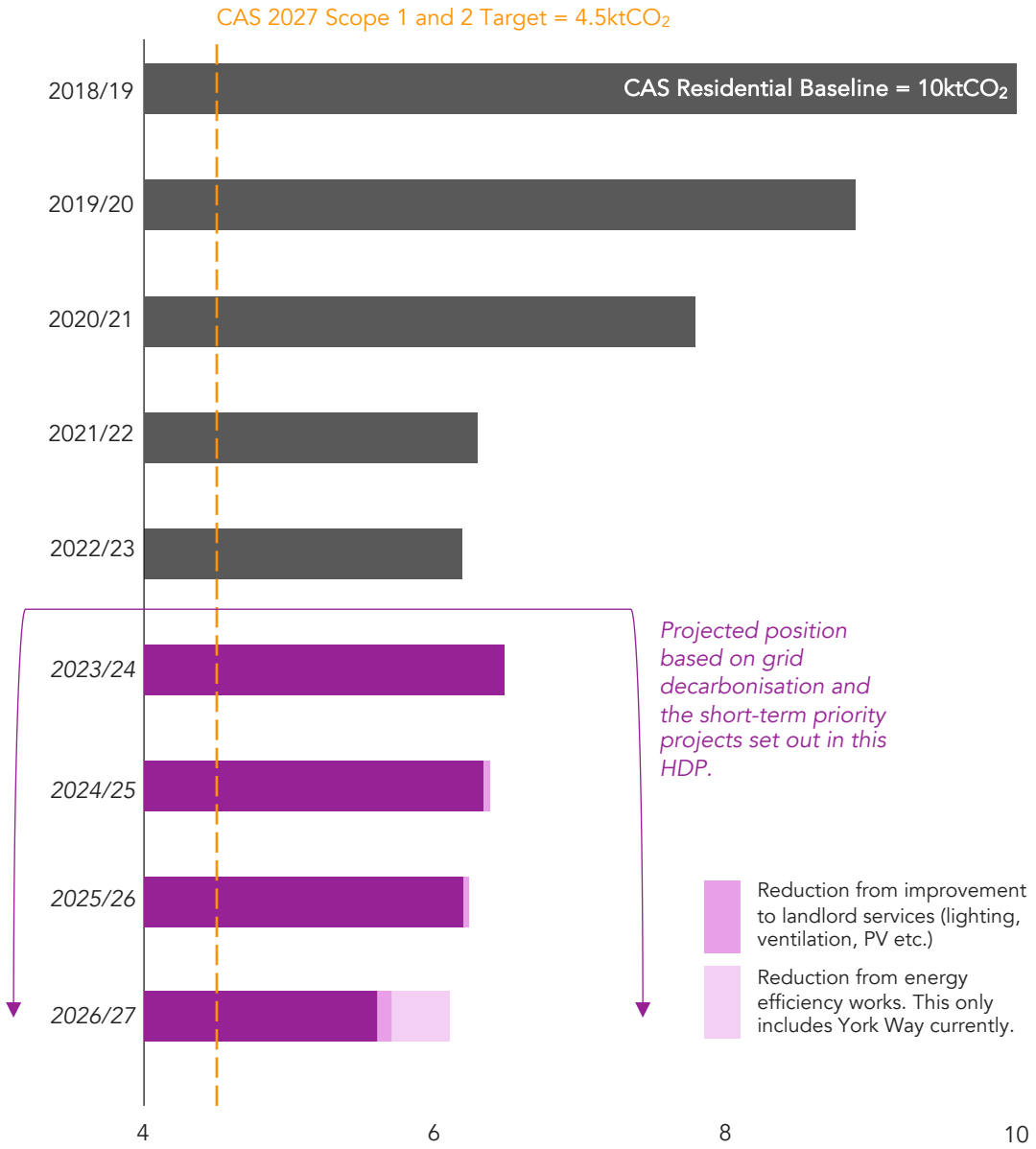
Upcoming capital projects that are in their design phase should be expanded to include low carbon retrofit measures in the scope. One of the largest of these is York Way.

Short term priority 3: Information gathering

More information is needed on the current performance of the housing stock. Relatively cheap and unintrusive surveys must be completed, as standard, to build this information.

Short term priority 4: Expanding the void programme

Voids represent an opportunity to carry out testing and complete incremental improvements towards a low carbon retrofit. Upgrading the standard void specification should be used to deliver this.



Historic measured (in black) and projected (in purple) Scope 1 & 2 emissions for housing, presented in $ktCO_2$. Based on the current projections, the housing stock is unlikely to meet its 2027 carbon target. This could change, but would require investment in identifying projects, gathering sufficient information and data to enable them, alongside commitment from all teams to deliver them.

Contents

1

Introduction | The context to delivering low carbon homes

This section sets out the context to the Housing Delivery Plan

- Targets for the City and how these are related to housing
- Analysis showing the current performance in terms of carbon targets
- Important documents on delivering change in housing

Introduction | Creating the Housing Delivery Plan

Introduction

This document is a short-term assessment of where the City should focus resources in order to move towards its net zero targets for housing.

Responsibility for retrofit falls across several teams within the City and for this reason it can be easy for good improvement opportunities to be missed. This document aims to stop these missed opportunities in the first instance and highlight the key projects requiring immediate attention and funding.

It also outlines the next steps that can be taken to be more proactive in retrofitting the housing stock.

How has this document been developed

Etude, currently on secondment with the City of London Energy and Carbon Team, have been working closely with several teams within the City to understand the current approach to major projects and create strategic and technical guidance on how retrofit could be delivered.

In 2021, Etude worked with the City to create the Net Zero Housing Action Plan, which set out a possible strategic direction for the City as well as processes that could be used for rolling out retrofit across the housing portfolio. The current secondment is a further development of this role, aiming to give more detail to the previous action plan.

This Housing Delivery Plan is a culmination of our work with the City over the past year, talking to various people and trialling ideas for rolling out retrofit. A lot of the thought and concepts expressed are explored more fully in smaller technical documents that have been issued to the City throughout the secondment.

Section 1	The document begins here, detailing the targets and their relevance to housing. This sets the context for why retrofiting homes is an important part of the City's overall net zero ambition. There is an update on the current carbon emissions and energy consumption.
Section 2	The current situation is explored, looking at how the current teams across the City fit into the retrofit picture. There is an explanation of what is meant by 'low carbon retrofit' and how this was expected to be delivered in the Net Zero Housing Action Plan.
Section 3	This is the critical section given the short-term needs for retrofit in the City. We present four priorities to focus on over the next two years, with rationale for why they are important. We want all readers to understand these clearly and think about their role in making them happen.
Section 4	In section 4, ideas for the medium-term ambitions of the retrofit strategy are set out. The understanding here is that the objectives of Section 3 will only get the City so far, and there will need be longer term thinking about retrofit.
Section 5	A brief section that outlines indicative costs for the proposed measures in the rest of the plan.
Section 6	A brief section looking at potential risk associated with retrofit that the City need to consider.

A summary of what each section in the Housing Delivery Plan sets out to achieve

Introduction | Targets that affect the housing improvements

Alongside the needs of residents and providing high quality housing, the main drive for retrofit work across the City's housing stock comes from Corporation level targets.

Carbon emissions-based targets

As part of its Climate Action Strategy (CAS) the corporation has committed to four overarching targets:

- Net zero by 2027 for the Corporation's operations (Scopes 1 & 2)
- Net zero by 2040 for the Corporation's full value chain (Scope 3)
- Net zero by 2040 in the Square Mile
- Climate resilience in its buildings, public spaces and infrastructure

The distinction between Scopes 1, 2 and 3 is important for housing. The City provides community level heating and hot water to some of its homes, this energy would fall under Scopes 1 & 2 and therefore have an earlier net zero target. Where homes are supplied by their own heat system (typically individual gas boilers), this carbon would fall under Scope 3, requiring action by 2040.

London Councils commitment to EPC B

In 2019 London Councils issued its Joint Statement on Climate Change. This was agreed by the Transport and Environment Committee and the London Environment Directors' Network.

Among the seven pledges is a stretching target to achieve an average EPC B rating across London's building stock by 2030. Parity Projects explored the options for achieving this target in their Pathways Report published 21st July 2021.

In general EPC targets do not represent the best method for delivering meaningful change. Other metrics which provide more detail on the performance of the building are better suited. The target however was presented as an interim target (as part of the London Retrofit Action Plan), until more comprehensive net zero targets could be developed.

Climate Action Strategy – Key actions

- *"Transform the energy efficiency of our operational buildings through the adoption of best available technologies"*
- *"Accelerate the move to net zero carbon and energy efficient tenanted buildings, working closely with tenants to achieve shared goals"*
- *"Increase engagement and communications about sustainability with residents, businesses, visitors and other stakeholders"*

Scope 1

Net zero carbon by 2027

Landlord controlled **gas:**

- Communal gas heating
- Gas heating of other estate premises

Scope 2

Net zero carbon by 2027

Landlord controlled **electricity:**

- Communal lighting
- Communal electric heating
- Lifts
- Other communal electricity

Introduction | Latest carbon emissions analysis

Commentary on the targets

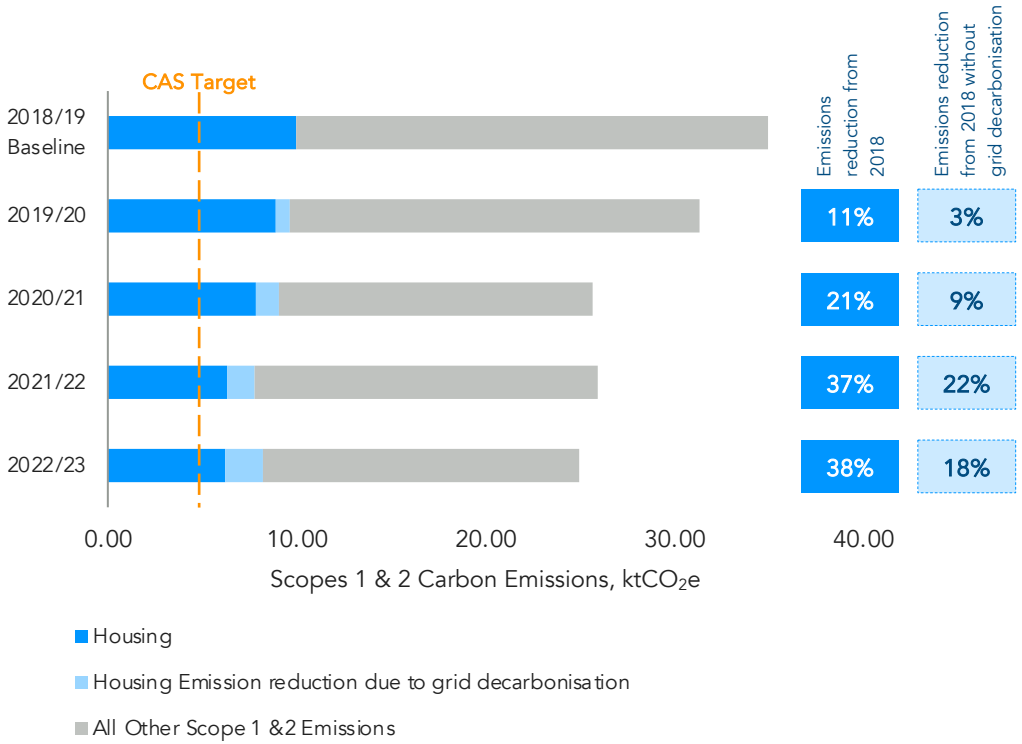
The graph across represents the scope 1 and 2 carbon emissions reported by the City across its housing, investment and operations portfolios. The data suggests there has been a significant reduction in emissions from housing between 2018/19 and 2022/23, nearly 40% However, the absolute reduction, due to reducing energy use is actually less than this, as a large proportion is attributed to the decarbonisation of the national grid. Accounting for the grid, compared with the 2018/19 baseline, there has been an 18% reduction in the housing carbon emissions.

To meet the CAS targets, each department need to reduce their carbon emissions by a minimum of 55% from the 2018/19 baseline. This translates to a target of around 4.5ktCO_2e.

'Housing' is defined by the wider DCCS portfolio and as such includes Golden Lane leisure centre, the Barbican Estate Office and other estate based non-domestic buildings such as community centres and libraries. However, given these account for only 5% of the departmental housing emissions, this Housing Delivery Plan focuses only on emissions arising from the domestic properties.

How the London carbon budget relates to housing

According to the Tyndall Centre for Climate Change, the global carbon budget was 500Gt CO_2 in 2020. Since then, the global budget has fallen by more than half. London and other sub-regional budgets are expected to have followed a similar pattern. Although the net zero targets and their dates are important for the City, it is also important to remember that cumulative carbon emitted up to those dates will contribute to climate change. Staying within the carbon budgets is critical for reducing the impacts of climate change.



Scope 1 and 2 emissions for the Corporation from April 2018 to 2023 across the housing, operations and investment portfolios, for housing this encompasses all emissions associated with communal heating, lighting, lifts and any other landlord-controlled energy. The graph also quantifies the emissions reductions attributed to grid decarbonisation.

Introduction | Latest gas and electricity analysis

Carbon emissions data is taken from energy measured at the meter on buildings. This page summarises this data.

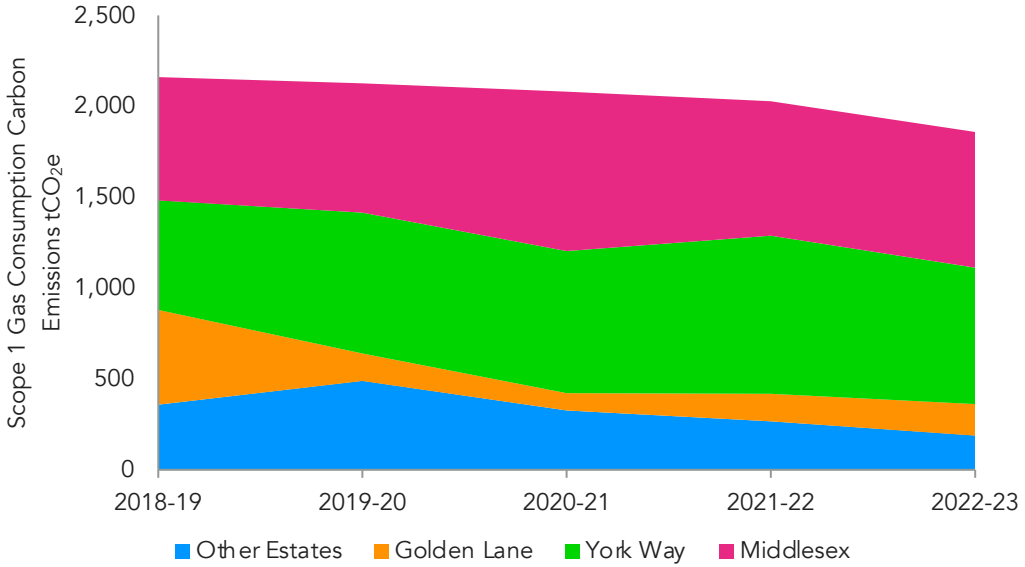
How the data is sourced

At present, the City sources its in-use metered data from invoice files and consumption reports. This performance data is stored on the data management platform, SIGMA. SIGMA captures metered energy consumption, billing and carbon emissions for the City housing (landlord and communal areas), investment and operation stock.

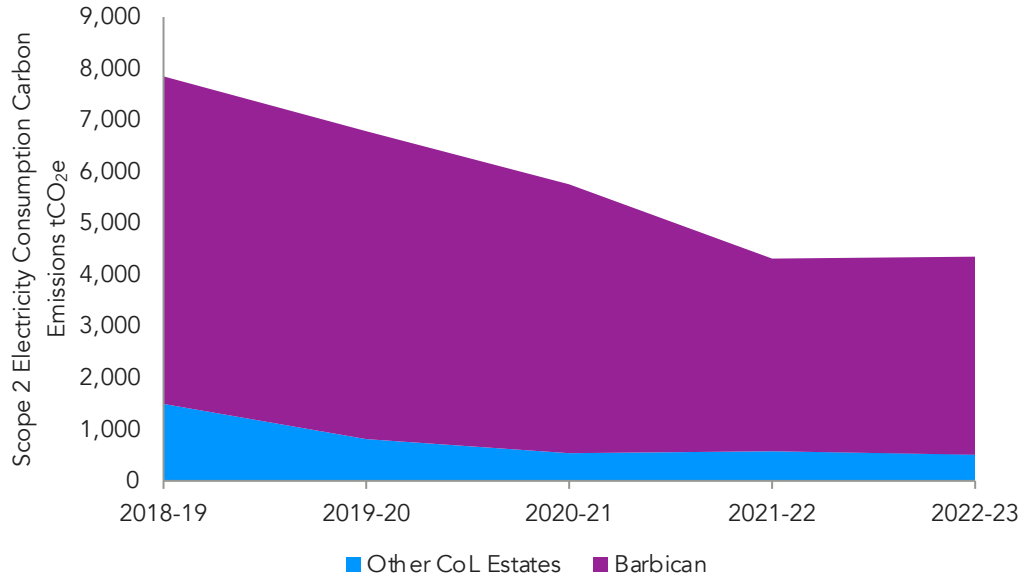
For some estates, data inputs are estimated by the Energy Team in lieu of reliable meter readings, in cases when meters are faulty or discrepancies. Stock information, including fabric, systems and energy survey data are porous for a number estates, hampering accurate retrofit measures analysis as well as funding applications.

A summary of most recent annual consumption

The graphs across highlight the largest consuming estates across the housing portfolio. They indicate a small drop in gas consumption and much more substantial drop in electricity use at the Barbican. Given that gas is a higher carbon energy source than electricity, decreasing gas consumption (both within scopes 1 and 3) should be the priority in decarbonising the housing stock.



Associated Scopes 1 carbon emissions for the gas consumption of all Estates from 2018 - 2023 (Ferndale Road has been excluded due to limited data on consumption)



Associated Scopes 2 carbon emissions for the electricity consumption of all Estates from 2018 - 2023 (Ferndale Road has been excluded due to limited data on consumption)

Introduction | Fuel poverty, an absent target

Fuel poverty is a growing concern

There are no explicit targets for improving fuel poverty, regionally or nationally. According to DESNZ published data, 13.4% of households (3.26 million) were in fuel poverty in England in 2022.

Choosing a definition

CoL should prioritise fuel poor homes for energy efficiency improvement work. Fuel poverty in England is measured using the Low Income Low Energy Efficiency (LILEE) indicator, calculated using both the EPC rating of the home and the income of the household. For CoL this definition would be difficult to apply: CoL may not have data on household incomes of their tenants.

It is possible to use a perception of need measure instead, in the form of a survey of residents' circumstances, which may be more useful to CoL, because it doesn't rely on access to privileged data.

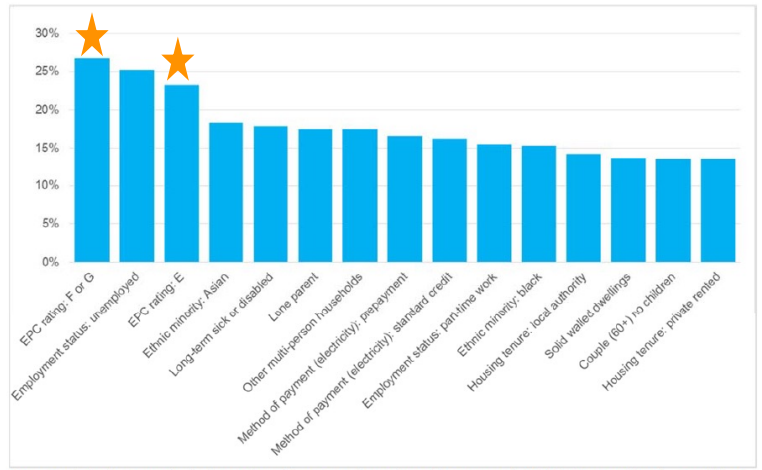
Housing and fuel poverty

The most direct action that CoL could take would be to improve the energy efficiency of their buildings, targeting the worst performing ones first. EPCs have limited value as a measure of energy efficiency so it would be useful to agree on another metric and to set a target, such as a space heat demand lower than 90kWh/m^2/year (aligned with the Social Housing Decarbonisation Fund target).

Climate adaptation and resilience

The increased frequency of extreme weather, especially heatwaves, can impact residents who are not able to make adaptations to their homes that could mitigate the consequences. Overheating is a particular risk to vulnerable people with potentially very serious health impacts. Resilience to the effects of climate change should be a consideration when identifying priorities and potential solutions. In particular, the impact of communal heating systems on overheating should be a criterion when considering which heat decarbonisation strategies to adopt.

Figure 1: Proportion of households in fuel poverty



Source: Fuel poverty in London: Research and policy report; CAG Consultants working with CSE, ACE and SE2, 2017

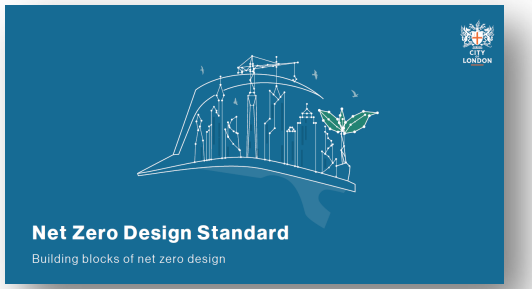
The energy performance of homes is one of the highest impact issues affecting fuel poverty. (Source: GLA Fuel poverty action plan for London)

	ALL EPCs (including those expired)							
	A	B	C	D	E	F	G	
Number of properties	-	58	1,029	744	120	17	11	
% managed properties	0%	2%	36%	26%	4%	1%	0%	69%
% managed properties with data	0%	3%	52%	38%	6%	1%	1%	100%

Proportions of EPC ratings across City of London housing stock. EPCs are available for 69% of housing stock, this includes expired EPCs.

Introduction | Important related documents

This Housing Delivery Plan has been developed off the back of several years of work on retrofit by the City. Actions are dependent on other teams' processes and understanding of the housing stock. The three documents below have been highlighted as being particularly important.

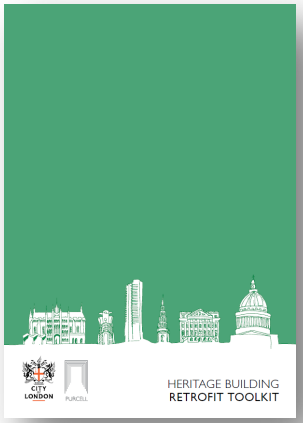


Net Zero Design Standard

For buildings that are not listed or restricted by heritage considerations, this document sets out objectives and elemental performance targets. The performance standards set both limiting and target U values for the principal elements.

Heritage Building Retrofit Toolkit

For historic and listed buildings, the retrofit toolkit sets out a process and the different factors that need to be considered. It includes summaries of areas where energy is often wasted in buildings, potential mitigation measures and improvement measures. It also advocates creating whole building retrofit plans.



Housing Net Zero Action Plan

For all housing owned by the City, the Housing Net Zero Action Plan (HAP) sets out a strategic approach to retrofit, including identification of the key archetypes. It assesses the likely improvement that could be deliverable for each archetype and projects both the costs and the carbon savings that would result from a comprehensive retrofit programme.

2

The retrofit picture | What does strategic retrofit look like for the City

Delivering retrofit across the City's housing stock is a responsibility that falls across several departments. This can present challenges in understanding who should be the first to act. Missing opportunities to make improvements to homes is however a costly error that could set back progress. In this section we explore the opportunities for retrofit and what is needed to meet the targets set out in Section 1.

Improving homes requires joined up thinking

Housing across the City's stock is mixed in age and requires constant maintenance, with capital projects and repair teams engaged in improving homes on an ongoing basis. Low carbon retrofit can involve adding something new to a building to make it operate more efficiently. In most cases, it can involve repairing or replacing particular components with something that is net zero compatible.

These cycles of repair and replacement are crucial to delivering meaningful change to the housing stock. Continuing in a 'business as usual' way will mean projects are being completed, residents are being disrupted, and money is being spent without moving closer to net zero objectives. Instead, low carbon retrofit must be embedded into the repair, maintenance and replacement cycles.

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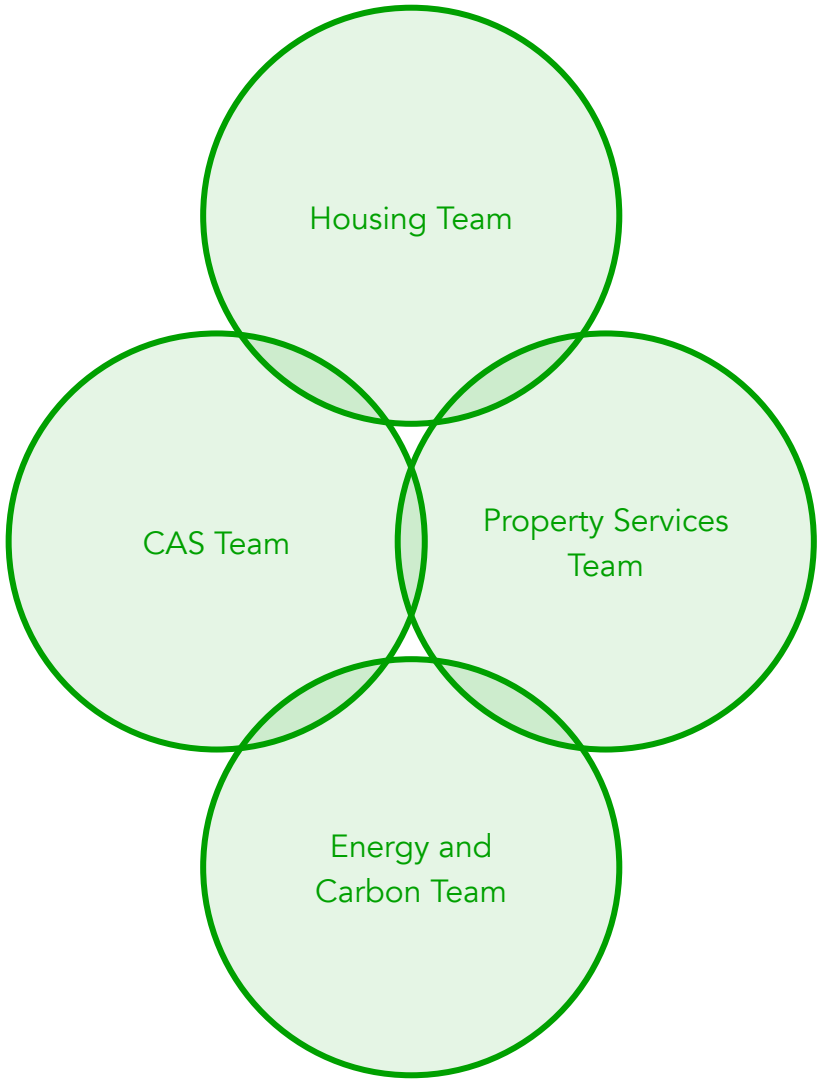
What is low carbon retrofit

Retrofit can seek to achieve several aims but ultimately it is about enabling homes to work with low carbon heat sources. This often means improving the building fabric and ventilation systems as well, which results in many other benefits for residents.

Low carbon retrofit can be risky though, if completed in a piecemeal way. For example, upgrading windows on their own can often lead to an increased risk of damp or mould if ventilation is not also considered at the same time. Although this ultimately leads to bigger, multi-faceted projects, there are often benefits to completing works simultaneously, such as:

- Less disruption for residents in the long run, as overall the approach results in fewer visits.
- Costs can be lower as each component of the project can share enabling works like scaffolding or temporary site accommodation.
- The design team can fully consider the impact of each measure as well as the combined impact, reducing the risk of unintended consequences.

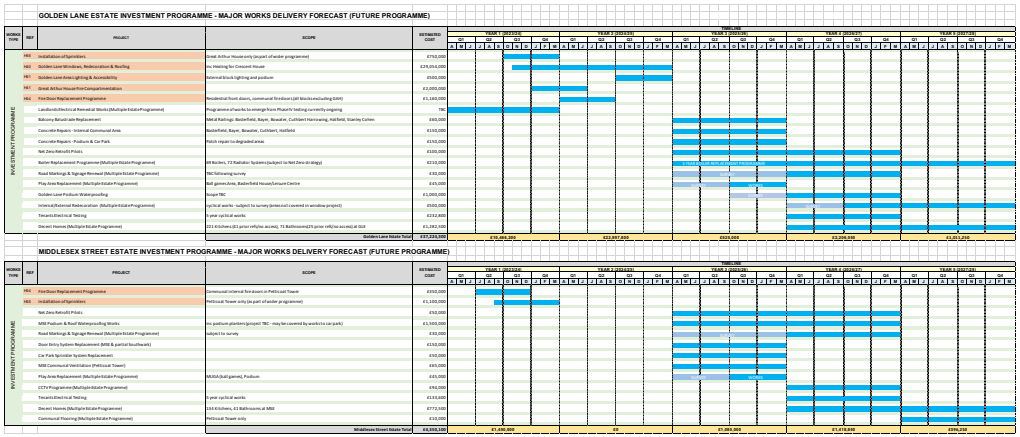


Delivering retrofit across the City's housing stock requires cooperation between several teams. This housing delivery plan sets out priority action, but the distribution of roles and responsibilities within these teams should be decided on and undertaken as soon as possible to give it the best chance of success.

Delivering major projects across the City housing stock

Capital project delivery is managed by the Housing Team and is funded from the Housing Revenue Account (HRA). These major projects are scheduled through a 5-year programme which are based on need, testing requirements, and cyclical replacement. The current 5-year programme is a mix of work which has been allocated funds and other projects that are yet to be funded. For this reason, the immediate focus of the Housing Team is on funded projects.

As capital projects are funded through the HRA the projects are limited in their scope. The budget provides for 'like-for-like' replacement only. This presents an obstacle for retrofit works, as often the required measures are an uplift on what is already there. Other funding streams need to be identified to provide the uplift in budget desperately needed for comprehensive retrofit work.


GOLDEN LANE ESTATE INVESTMENT PROGRAMME - MAJOR WORKS DELIVERY FORECAST (FUTURE PROGRAMME)

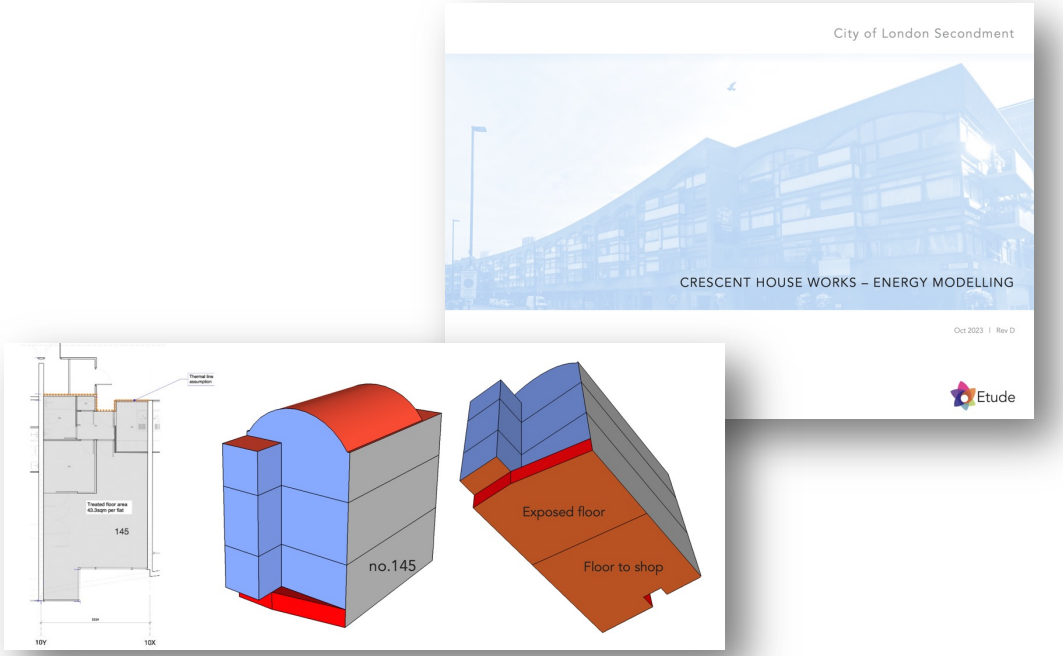
MIDDLESEX STREET ESTATE INVESTMENT PROGRAMME - MAJOR WORKS DELIVERY FORECAST (FUTURE PROGRAMME)

An extract from the unfunded 5-year capital works programme from the Housing Team. This document presents data on programme and cost for each of the identified projects.

The priority projects for the Housing Team

Following discussion with the Housing Team and review of the capital projects forward programme there are a small number of clear priorities for a potential uplift in scope:

- **Golden Lane Estate** – a considerable amount of design work has been completed on one block (Crescent House) involving improvements/renewal to the building fabric and changes in some heat systems. This project will move forward into construction as the rest of the estate then begins a design phase with a similar scope.
- **William Blake Estate** – a window project at this estate has been in design stages for several years following complications in planning. Additional design work will be needed before a new planning application can be submitted.
- **Avondale Estate** – several of the blocks at Avondale are due roof renewal works. This project has not yet been fully scoped but is expected to move into a design phase in the near future.



Etude have been providing support on the Crescent House retrofit project, looking at the impact of the proposed measures on energy use and cost to residents

Using repair knowledge to inform the wider programme

Anecdotal evidence from the maintenance team indicates that they are busy, but focussed on immediate term fixes to common problems. Mould and damp was highlighted as a significant issue, which is often remedied with quick fixes rather than looking at fundamental building level improvements that could be a better remedy.

From our discussions it did not appear as though there is currently a good level of dialogue between the team managing day-to-day repairs and the Housing Team. It is likely that, as a result, the common issues experienced in the various buildings are not being resolved through the capital works programme.

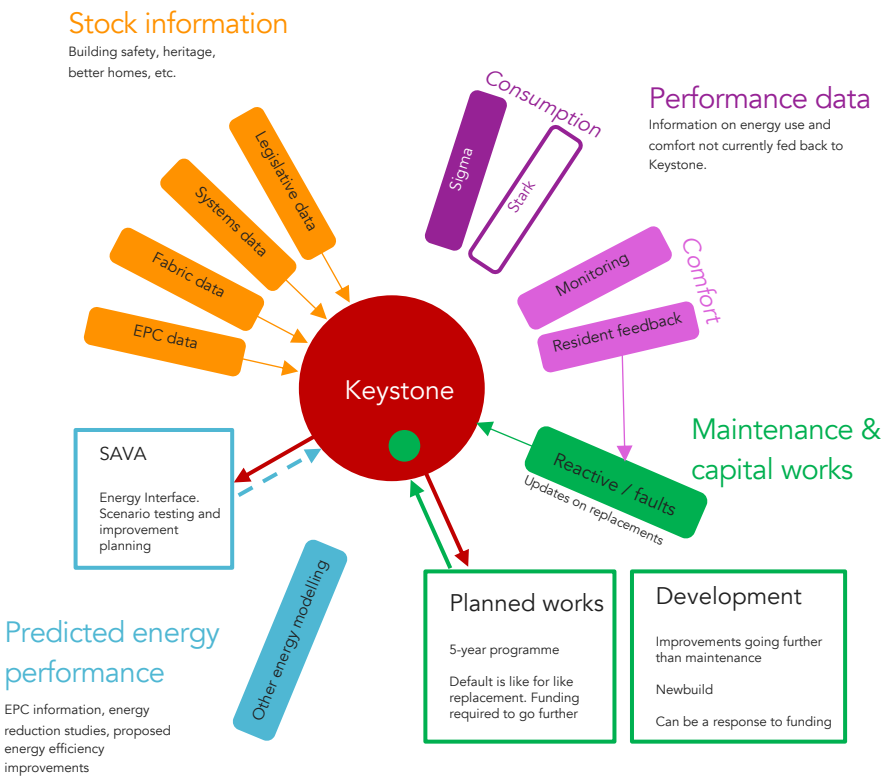
The void programme is due a refresh

Vacant homes offer one of the best opportunities for significant change and resolving problems. It is apparent that the void specification being used is several years old, generic across the variety of buildings, and not responding to the net zero objectives of the City.

Housing data management

Keystone Asset Management System is the previous central database holding the critical core data; it has been replaced by another Civica product (Cx). The data held on the system is mixed and it is unclear how much is it is being used to inform projects. Repair data may or may not be uploaded onto the platform.

Etude carried out a review of housing data systems which recommended that whichever system is used, it is used to capture detailed information about the homes in relation to their potential retrofit, and monitor problems in homes.



Etude's analysis of the current data management processes identified that the maintenance works are generally not considered within the wider planned works and development works and are usually carried out as 'like for like' replacements for expediency.

Improving the flow of data could help the City plan their work on the homes, by making sure common issues are logged and monitored and that planned works responded to this. This greater understanding of the issues with homes could help inform the retrofit strategy, and proposed retrofit plans could help inform the day-to-day building operations.

A complete retrofit strategy must consider the whole of a building, including fabric and ventilation, converting to low carbon heat, and adding renewable energy generation. This page describes individual measures and gives some example decision processes for selecting the right material or method.

Fabric

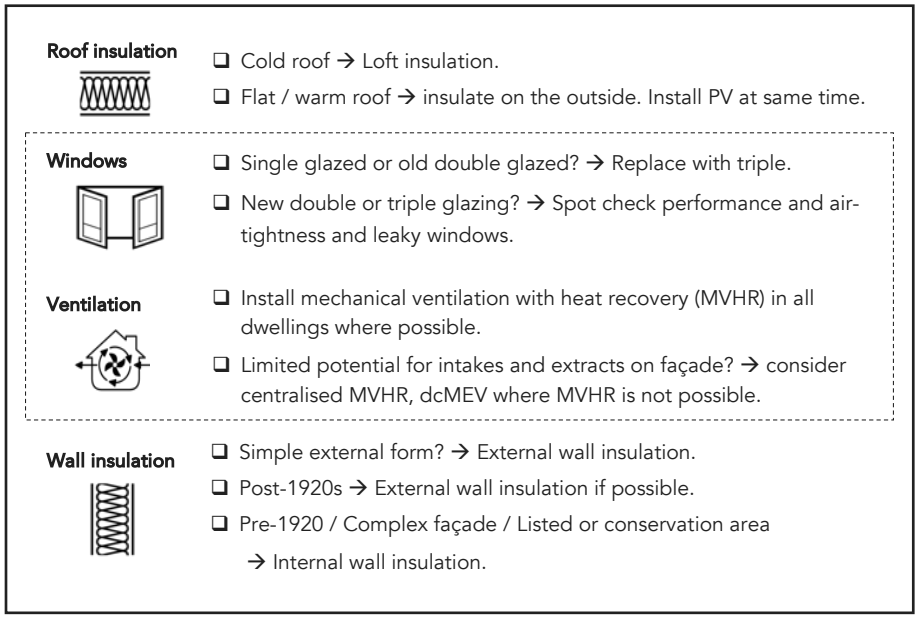
The image top right gives some high-level guidance for decisions on individual fabric and ventilation measures. Roof insulation should be a priority, with PV installed at the same time. Windows and ventilation should be upgraded at the same time, ideally triple glazed windows and MVHR with high efficiency heat recovery. Wall insulation should be installed, with external insulation being the preference if possible. It may be possible to install a low carbon heating system before many fabric measures, depending on the heating load.

Low carbon heat

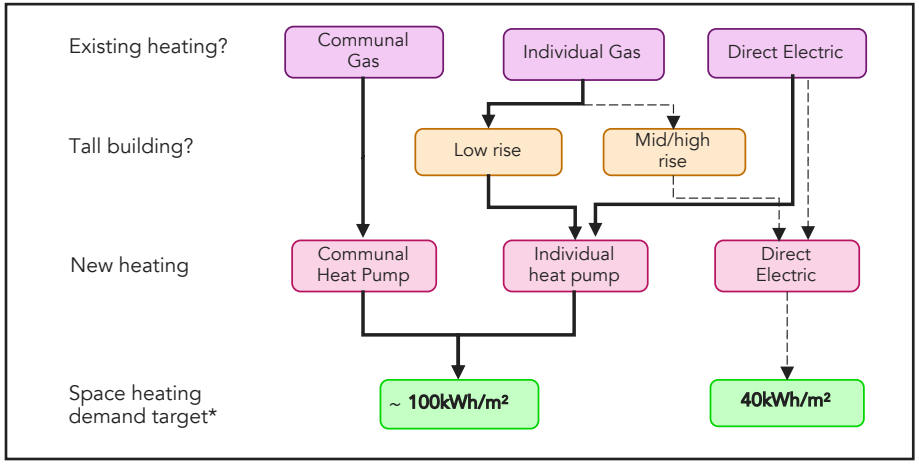
The image to the bottom right shows a strategic decision process for decarbonising different heating systems. The preference would be individual heat pumps, or a communal heat pump system with low temperature distribution. For ultra-low heating demands (e.g. less than 40kWh/m²), direct electricity is also more viable.

Solar photovoltaics

Install as many high efficiency panels as possible, as early as possible, taking advantage of opportunities to share scaffolding. Building mounted generation is a significant way to reduce the final energy and carbon balance of a building. It is a relatively 'easy win' as implementation does not necessarily need to affect the tenants and is under City of London's control.



Simple decision processes for fabric improvements – a good starting point for considering what is needed on a building-by-building basis



Decision processes for low carbon heat, bold arrows show preferred route
**note that this should be assessed on a case-by-case basis as the threshold for heat pumps is often higher*

Archetypes help to simplify the challenge

Decarbonising housing stock can be daunting, and finding ways to group the buildings is a useful way to help to identify common measures and develop a simple roadmap.

Archetypes at CoL

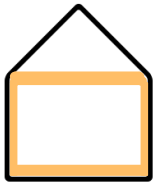
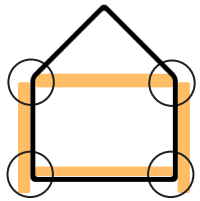
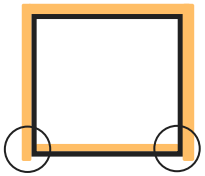
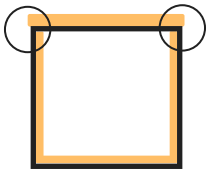
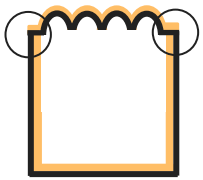
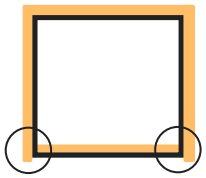
City of London's housing stock is unique in that there are many large blocks, and relatively few low-rise street properties, compared to the national average. Many of the blocks have complex facades, due to the composition and ratio of window to wall, and some are also listed or in conservation areas. Our archetyping process combined the composition of window and wall, the anticipated location of the wall insulation and the location of the roof insulation. The images to the right show examples of the six archetypes and the diagrams show the insulation locations and where complex junctions might occur.

For each archetype we developed a set of typical fabric and ventilation measures, and for each individual building an appropriate low carbon heating strategy was indicated and the potential for PV panels on the roof was assessed.

Importance of a whole building plan

The previous page described the decision processes for retrofit measures. The measures would ideally be implemented together and to the maximum possible standard. In reality, a stepped retrofit is often required, and the details influenced by numerous factors, including financial constraints, maintenance priorities and funding availability. When creating a plan, it is important to consider the desired end point and work backwards, ensuring none of the earlier steps conflict with the final goal, minimising abortive works. It is also critical to follow a PAS 2035* process to minimise unintended consequences and ensure that interdependent measures are installed together, e.g. window replacements and ventilation systems.

**For more information about PAS 2035 and unintended consequences refer to https://retrofitacademy.org/wp-content/uploads/2023/10/PAS2035_2023.pdf.*

Archetype code	Example	Location of insulation
1. Trad – IWI - loft		
2. Trad – EWI – loft		
3. Trad – EWI - flat		
4. Mix – IWI - flat		
5. Mix – IWI – barrel		
6. Mix – EWI – flat		

The six archetypes. Circles indicate where insulation is discontinuous, and attention needs to be paid to junctions.

The retrofit picture | High level strategy | HAP net zero roadmap

The Housing Action Plan (HAP) gave the City a plan to deliver retrofit across its housing stock to meet both 2027 and 2040 targets. It is worth noting that the HAP was not formally adopted by the City following publication. For this reason, it is seen as an advisory document rather than a formal strategy one. The priorities is sets out the methodology for setting a retrofit strategy are still relevant to the work presented in this Housing Delivery Plan and the work of the various teams in the City.

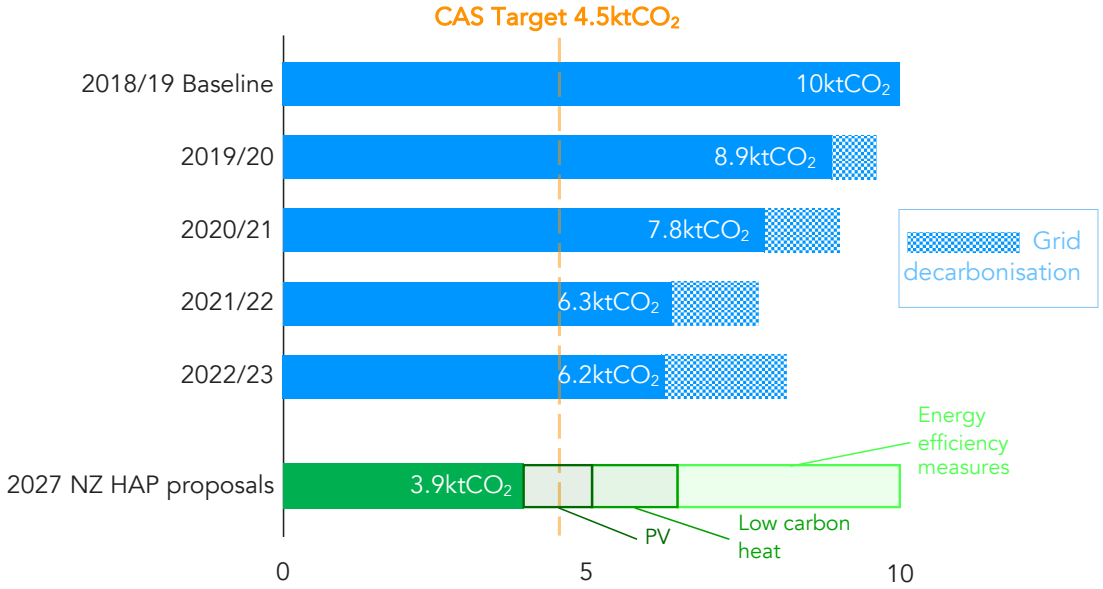
Meeting the 2027 and 2040 targets

The diagram to the right shows the predicted impact of energy efficiency measures (including fabric improvements), low carbon heat and solar PV on bringing scope 1 & 2 emissions as close to zero as possible by 2027 and scope 1, 2 & 3 emissions as close to zero as possible by 2040.

This is predicted to reduce emissions by approximately:

- 86% from the 2020 baseline by 2040 for scopes 1, 2 &3
- 49% - 61% from the 2020 baseline by 2027 for scopes 1 & 2

The reductions achievable in scope 1 & 2 emissions by 2027 is dependent on how many of the gas communal heating systems are decarbonised.



The Net Zero Housing Action Plan strategy – *The original plan demonstrated that if building fabric and ventilation was improved, as well as low carbon heat and solar PV installed, the CAS target could be achieved for Scope 1 & 2 emissions by 2027. The measured results from previous are shown in blue with the impact of grid decarbonisation separated out. The 2027 NZ HAP proposals include for the predicted grid decarbonisation figures from the time of publication.*

HAP Scope 1 & 2 priorities

- Switch gas communal heating to a low carbon alternative
- Upgrade controls and distribution of communal heating systems
- Install roof insulation early with PV systems
- Make communal lighting more efficient

HAP Scope 3 priorities (also partially required on communally heated estates)

- Replace individual gas boilers with low carbon heating alternatives.
- Improve the fabric efficiency through:
  - Upgrading to triple or vacuum double glazing
  - Installing wall, roof and possibly floor insulation
  - Improve airtightness of homes
- Improve ventilation – preferably through mechanical ventilation with heat recovery
- Install waste-water heat recovery to showers and baths.

The missed opportunities

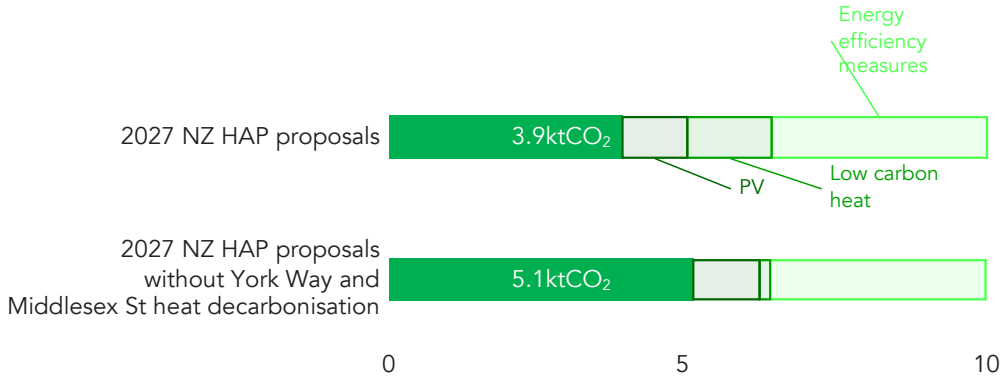
Since the HAP was published in 2021, capital projects have continued, without the 'upgraded specification' needed to meet the proposed targets. This has resulted in a series of missed opportunities that this Housing Delivery Plan is trying to help move away from.

These missed opportunities represent a mixture of fabric measures (such as window replacements) and communal heat renewals.

The replacement of gas boilers at York Way and Middlesex Street with new gas boilers has effectively 'locked in' the carbon emissions on these sites. These boilers will certainly not be replaced before 2027 and possibly not before 2040. This was known at HAP stage and 'scenario 1' in that report identified a shortfall at the 2027 target even with best case scenarios for all other buildings.

Improvements have, however, been made to the distribution pipework and controls system for the heat networks at York Way and Middlesex Street. This will likely only make a very small difference to the energy used and associated carbon emissions, but it may make the switch over to a low carbon communal heating system in the future more feasible.

Alongside this, Middlesex Estate has benefitted from the addition of roof insulation and PV, as well as improvements to landlord lighting.



Updated graph from the previous page showing the indicative impact of the missed opportunities at York Way and Middlesex Estate on the scope 1 and 2 emissions, based on the Net Zero Housing Action Plan measures. The updated green bars indicate the impact of retaining a gas fuelled communal heating system, rather than switching over to a low carbon system.

Decarbonising the gas communal heating system at York Way and Middlesex Street was assumed to deliver a 12% reduction on the baseline scope 1 and 2 emissions by 2027. Although this opportunity has been missed, there are ways to decrease energy use at these estates to partially mitigate this impact until the heating system can be replaced, as well as exploiting other upcoming opportunities across the rest of the stock.

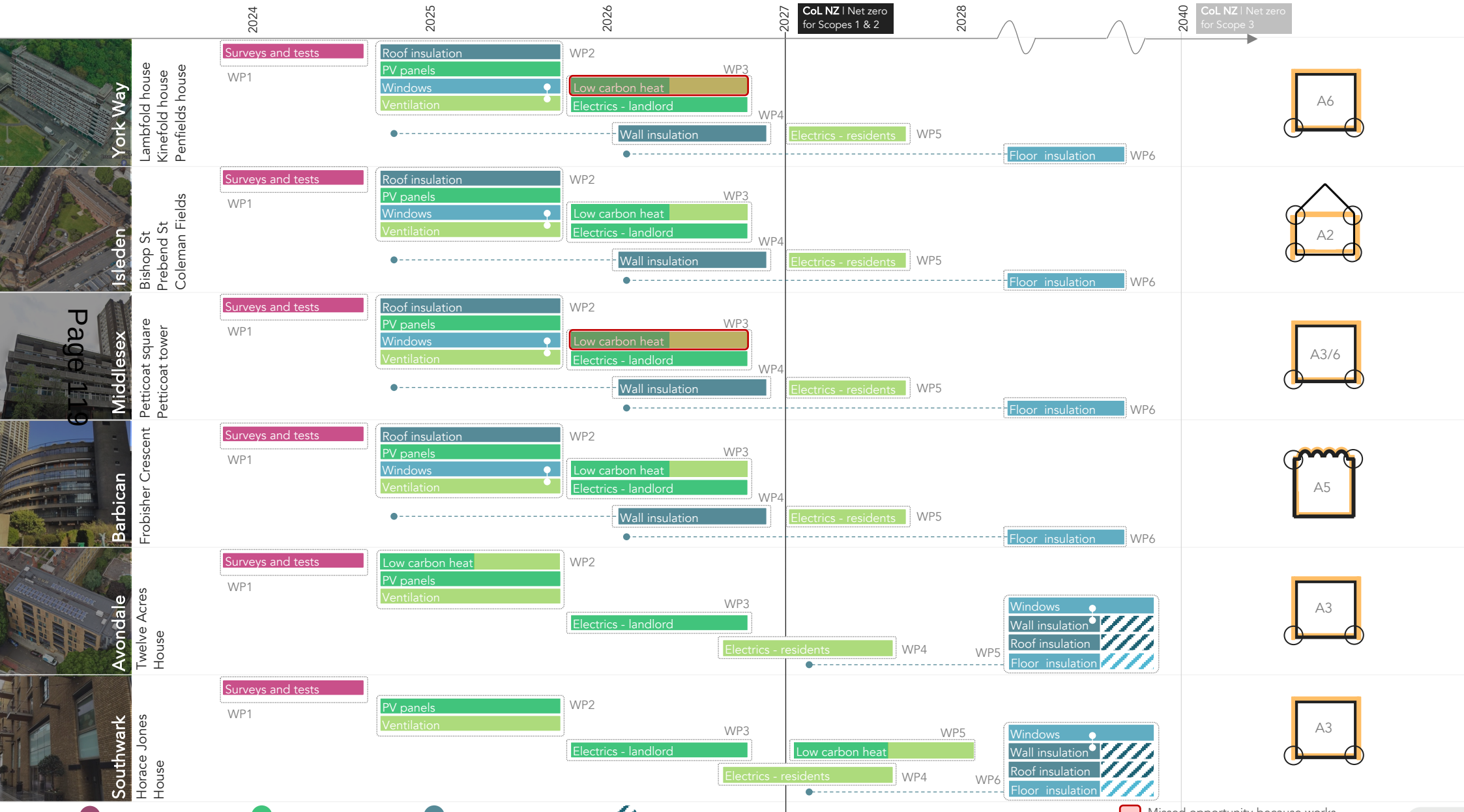
Critical estates – Isleden House

The communal gas boilers at Isleden are around 20 years old. Larger boilers like this typically have a service life of 25 to 30 years, so the boilers are likely to need replacement in the near future. The lesson learnt from York Way and Middlesex Estate is that, in order to replace gas boilers with a low carbon alternative, the City must be ready with both a plan and the necessary infrastructure to enable its delivery.

The Energy and Carbon Team have submitted an application to the Heat Network Efficiency Scheme (HNES) for a match-funded grant to improve the existing heat network infrastructure at Isleden. The proposed scope of work includes monitoring of the current system, as well as measures to reduce heat loss in the distribution pipework and increase the overall efficiency. This will provide a small decrease in gas consumption in the short term but will also facilitate the future switch of heating systems to a low carbon option, when the boilers have reached the end of the operable life. This should be combined with work to reduce the heat loss of the homes.

The retrofit picture | High level strategy | Detailed roadmap for communally heated estates

To deliver the 2027 net zero target retrofit work will be needed across all the housing estates served by a communal heating system. This page sets out the packages of work needed to deliver this and the potential order for delivery. Low carbon heat should be delivered earlier if possible. More detail on each package is provided later in the HDP.



KEY:
- Communal areas surveys
- Home surveys
- Communal services
- Home services
- Communal fabric measures
- Home fabric measures
- Measures to renew if surveys suggest necessary
- Measure to be installed renewed earlier if necessary, e.g., for low carbon heat strategy
- Missed opportunity because works have recently been completed

3

Short-term priorities | Focusing efforts and funding before 2027

Given the picture presented in Section 2 there are some short-term priorities the City must work to achieve. These mostly seek to avoid any further 'missed opportunities' and put the City in a good position to continue delivering well informed retrofit projects. Funding these priorities is a crucial step and will require immediate work across several teams in the City.

Short term priorities | Overview and rationale

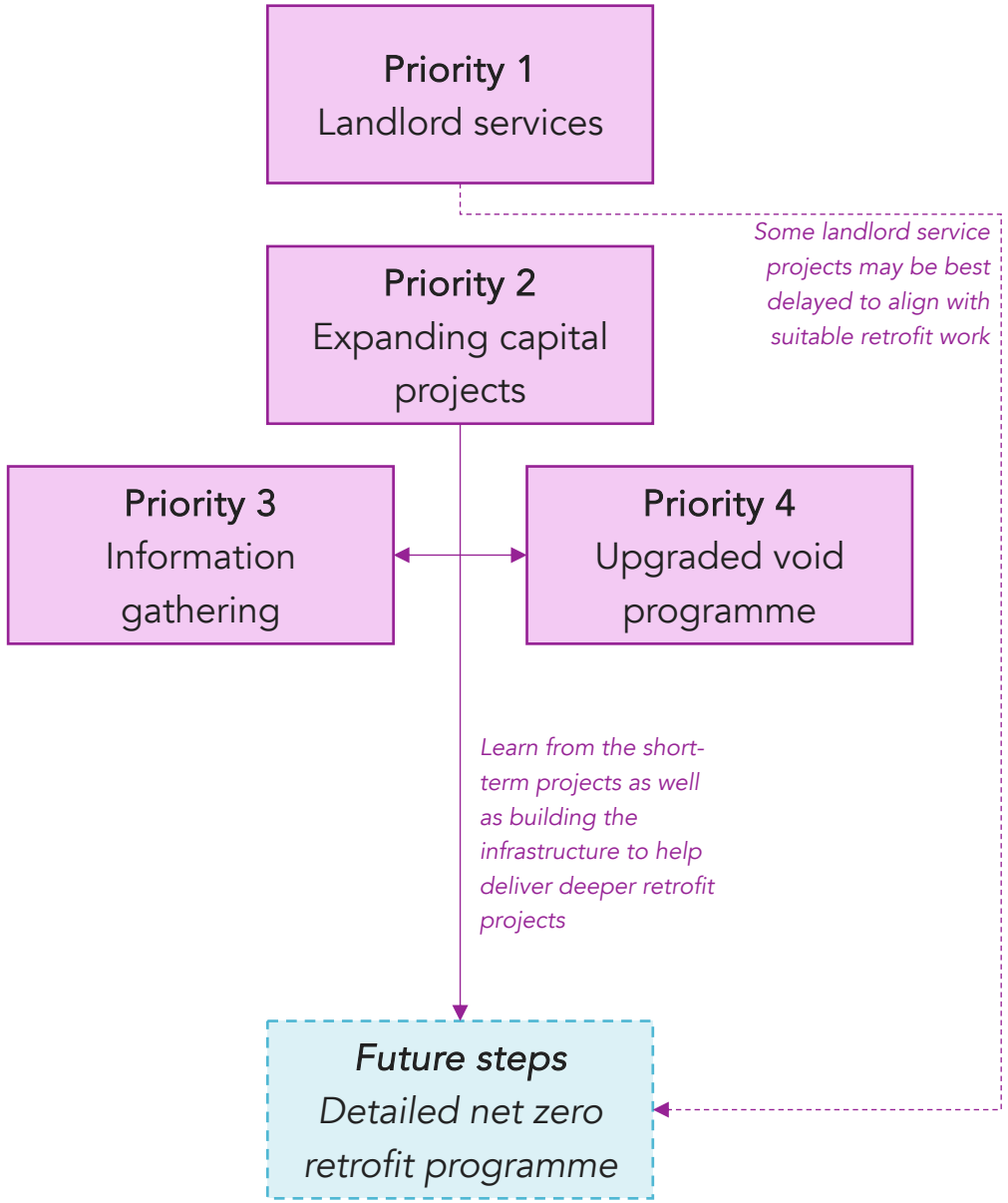
Net zero retrofit must be embedded into standard practice

The previous sections have highlighted that there has been a small change in the carbon emissions from housing since 2018. Capital projects and repair work completed within that period has continued in a business-as-usual manner. For this reason, it is unlikely that the retrofit roadmap set out on page 18 is achievable, given the quantity of work needing delivery by 2027.

With the 2027 target approaching it is crucial that the City looks towards the short-term priorities, setting out clear responsibilities for each of the involved teams and identifying the funding sources suitable for providing the uplift over business-as-usual.

From the review of the team structure, the work completed by external consultants, and the understanding of upcoming capital projects, 4 short term priorities have been identified and could be considered the main purpose of this Housing Delivery Plan. These priorities are summarised here with more detail on subsequent pages.

- Priority 1 – Landlord managed services (such as lighting, lifts, ventilation etc.) have been surveyed by an external consultant. They have developed options for their upgrade, where appropriate. This work can be completed in a relatively independent way of other retrofit work and disruption to residents kept to a minimum.
- Priority 2 – Upcoming capital projects that are in their design phase should be expanded to include low carbon retrofit measures in the scope.
- Priority 3 – De-risking retrofit projects will be key to their success and speed. More information is needed on the current performance of the housing stock. Relatively cheap and unintrusive surveys must be completed, as standard, to build this information.
- Priority 4 – Voids represent an opportunity to carry out testing and complete incremental improvements towards a low carbon retrofit. The void specification and programme should be upgraded to take advantage of this.



Short term priority 1: Landlord services | CAS funded survey work

Communal heat decarbonisation plans

Beveridge Associates were appointed in 2022 to produce a decarbonisation plan for each communally heated block. These plans set out options for changes in heat generation and distribution.

The decarbonisation of heat in communally heated blocks is a complex topic with many factors that can influence the right path for a particular building. The outcome of this work is more an initial appraisal of the potential options. Further work will be needed to take this work forward and develop more detailed options.

For this reason, they are not considered a 'quick win' and do not form part of the short-term priority in terms of immediate delivery work. Their further development should however be a priority for the City as many of the systems are approaching the end of their service life and a low carbon option should be identified prior to this.

Landlord services energy conservation measures

Elevate Everywhere were appointed in 2022 to carry out site energy usage surveys of all housing estates to analyse potential energy conservation measures (ECMs) in landlord or communal areas. The review looked at:

- Landlord managed services, such as lighting, lifts, pumps and ventilation systems.
- The electrical metering and distribution systems.
- Options for installing solar photovoltaics (PV) on the roof.

A distinction was made between systems that were economical to replace and those that were considered modern enough to not require replacement.

Given the potential to start these projects quickly and for them to be completed in relative isolation to other retrofit activities, these are considered quick wins for moving closer to the 2027 net zero target.

The landlord services survey highlighting potential energy conservation measures has been completed for all of the City housing estates. Alongside this is a heat decarbonisation plan for each of the communally heated estates/blocks.

Short term priority 1: Landlord services | Delivering it

A plan is in place for delivery

The landlord services projects have started to be scheduled by the City's Energy and Carbon and Housing Teams. A certain proportion of the projects have been considered economical to go ahead. This comprises a proportion of the lighting and PV projects, which have begun the Gateway 2 process.

Although timing will be dependent on funding, contractor and availability and access to the estates, a rough timetable up to 2027 has been developed:

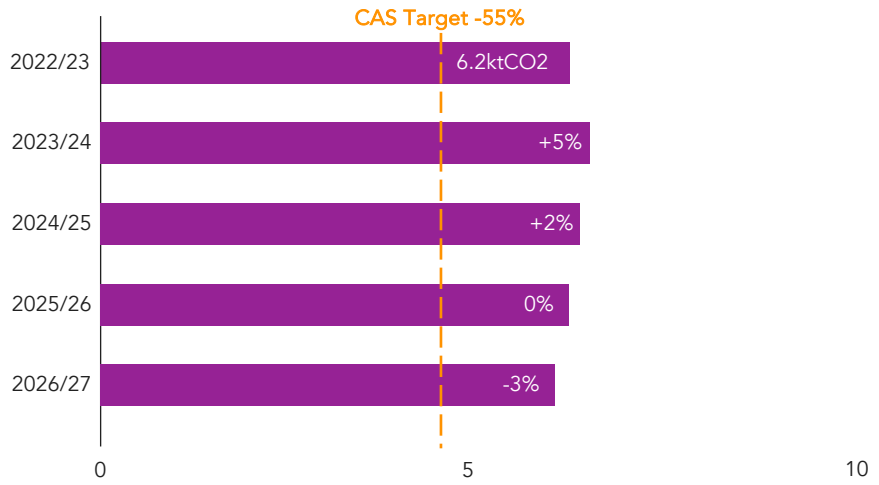
- **2024/25** – All HRA housing estates, apart from Golden Lane to undertake the proposed landlord lighting upgrades. Approximately a quarter of the overall proposed PV panels will be installed across several estates.
- **2025/26** – Golden Lane Estate upgrade to landlord lighting and installation of 50% of the remaining PV systems.
- **2026/27** – Barbican upgrade to landlord lighting and installation of remaining PV systems.

Uncertainties in these estimates

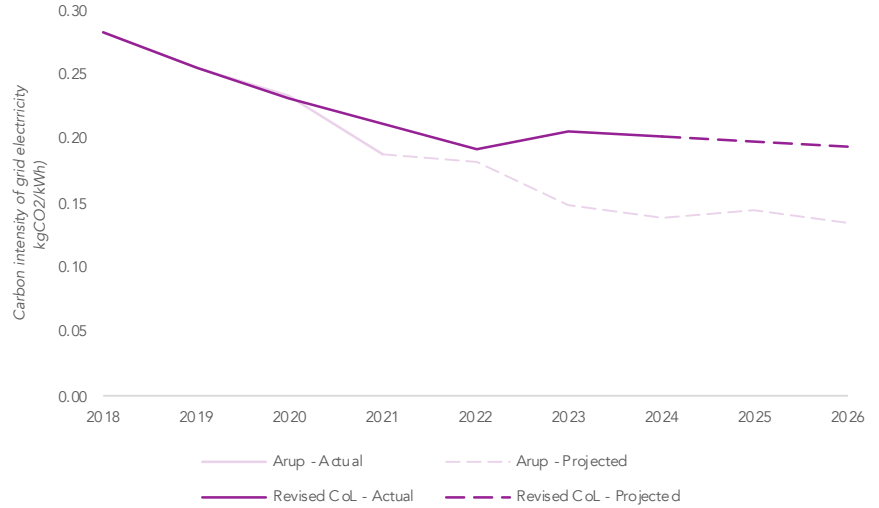
The savings associated with lighting energy are based on high level estimates for the current consumption by Elevate Everywhere. The energy generated from PV is based on desktop studies of the potential PV and further design work will be needed to improve on these estimates. In a similar way costs associated with the proposed measures are high level.

Other projects should be delivered as well

The savings shown on this page assume that no other improvements are made to the building stock and show the landlord services in isolation. As can be seen on the next pages, there are plenty of other opportunities that can be delivered alongside this.



The estimated reduction in scope 1 & 2 carbon emissions from implementing the plan for landlord services. This estimate takes the 2022/23 electricity and gas consumption as a baseline and reduces the electricity consumption based on the proposed measures installed year-on-year. Reductions/increases are also as the result of changes in the carbon intensity of grid electricity, based factors in the graph below.



Updated analysis of the carbon intensity of grid electricity. The original Climate Action Strategy was based on the projection completed by Arup and shown here. More recent analysis undertaken by the Energy and Carbon Team has shown that decarbonisation is happening slower than initially expected. Grid carbon intensity is still decreasing, and the grid has a robust decarbonisation plan.

Short term priority 1: Landlord services | Decarbonising communal heat

Studies for the communally heated estates

Beveridge Associates were commissioned to carry out decarbonisation feasibility reports for the communally heated estates. Their recommendations include a forecast of potential carbon savings arising from the various options considered. These possible reductions have not been included in the forecast 2027 carbon reduction figures for a number of reasons:

- Where the recommendation is to **connect to Citigen:**
  - There is no defined decarbonisation plan for this network with dates and currently heat is primarily supplied through fossil fuel-based systems.
  - Significant infrastructure upgrades would be needed within the buildings, as well as to the network, to connect the nominated estates to Citigen. Both of which will take time to plan and deliver. This is not expected to be delivered before 2027.
- None of the estates with the recommendation to install **new communal air source heat pumps** are scheduled for a heating system replacement prior to 2027. If systems could be replaced earlier than their standard lifetime, some significant carbon reductions could be achieved.
- Where the recommendation is to **use a local source of waste heat**, the timescale for delivery of the source is uncertain and outside the City's control. The interim system proposed is to continue to use existing boilers, so no carbon reductions are expected to be delivered by 2027.

Isleden HNES funded measures

At Isleden, funding has been secured to carry out some monitoring and investigative works to the existing heating system. It's understood that these are enabling works but will not, in themselves, achieve direct carbon reductions. However, the hope is that they will lead to efficiency improvements and the enabling of low carbon heat in the medium term.

7.5 System Options Matrix

DECISION MATRIX - WEIGHTED												
CRITERIA DESCRIPTION	Criteria 1 Operational carbon emissions	(Tonnes of CO2 over 20 years)	Criteria 2 Embodied Carbon	Criteria 3 Capital Costs	(£)	Criteria 4 Ongoing cost impact to residents	(£)	Criteria 5 Level of disruption to residents	Criteria 6 System functionality - resident control/comfort	Criteria 7 Planning permission / external space	Criteria 8 Impact on air quality	
WEIGHT (%)	20		5	20		20		20	5	5	5	100
OPTIONS	Scores		Scores	Scores		Scores		Scores	Scores	Scores	Scores	
Option A – Like for Like Replacement, including HIUs	0	4,514	1	3	£1,216,390	2	£2,591,723	3	1	3	1	1.90
Option A + PVT – Like for Like Replacement, including HIUs + PVT	1	3,239	2	3	£1,537,328	3	£1,739,464	2	1	2	1	2.10
Option B1 – Central ASHP Plant & Local HIUs	3	1,000	1	2	£2,719,642	3	£2,051,258	1	2	1	3	2.15
Option B1 + PVT – Central ASHP Plant & Local HIUs + PVT	3	657	2	1	£3,117,142	3	£1,348,076	1	2	1	3	2.00
Option B2 – Central ASHP Plant with Elec Boiler Assistance (Bivalent) to HIUs	2	1,852	1	2	£2,132,242	1	£3,799,581	3	2	3	3	2.05
Option B2 + PVT – Central ASHP Plant with Elec Boiler Assistance (Bivalent) to HIUs + PVT	2	1,609	2	2	£2,589,742	1	£3,301,276	2	2	3	3	1.90
Option B3 – Cascade Central Heat Pump Plant & Local HIUs	2	1,844	1	2	£2,518,185	1	£3,783,381	3	2	3	3	2.05
Option B3 + PVT – Cascade Central Heat Pump Plant & Local HIUs + PVT	2	1,502	2	1	£2,836,185	2	£3,080,200	2	2	3	3	1.90
Option B4 – Ambient Loop Heating	2	1,571	1	2	£2,634,108	1	£3,579,630	2	2	2	3	1.80
Option B4 + PVT – Ambient Loop Heating + PVT	2	1,317	2	1	£2,952,108	2	£3,003,603	2	2	2	3	1.85

Table 7 – System matrix used to score feasibility of decarbonisation strategies.

Beveridge Associates produced decarbonisation feasibility reports for each communally heated estate. Each report compares various options for that estate and evaluates potential carbon savings (example options matrix from Isleden House).

Short term priority 2: Expanding capital projects | Introduction

Existing projects are a clearer route to delivering retrofit

The forward programme sets out the capital projects over the coming 5 years. From this and an understanding of which ones are currently funded, it is possible to derive a list of projects that are likely to start on site before 2027.

Given that these projects will involve some level of fabric renewal there is a golden opportunity for retrofit, both uplifting the proposed specification for the identified building element, as well reviewing other retrofit works that could be completed alongside it.

Only some of these works are funded, the rest remain as a future need that can only progress once a budget is made available. Here they are identified as *medium-term* priorities.

* Multiple estates - Individual boiler replacement

Within the capital works programme there are multiple boiler replacement projects needed across almost all the housing estates. These mostly refer to individual gas boilers. Although these contribute to scope 3 rather than scope 1 or 2 emissions, continuing to replace individual gas boilers with new ones threatens the 2040 net zero target.

Boilers typically last over 15 years, meaning that replacing them beyond 2025 may result in them being removed earlier than their full lifecycle potential. This may make the option of continuing to install new gas boilers not actually cost effective when considered over the lifetime of the appliance.

As part of this priority, a strategy should be developed for replacing individual gas boilers with with heat pumps to begin the incremental decarbonisation of the entire housing stock. This would require a strategy for each building and would need agreement from several teams as well as a funding source.

Missed opportunities

Projects that are complete or almost completed and therefore opportunity for improvement has been missed

- **Southwark Estate** - window replacement
- **Holloway Estate** – window replacement
- **York Way** – replacement boilers to communal system
- **Sydenham Hill** – window replacement
- **Middlesex Estate** – replacement boilers to communal system

Urgent priority projects

Projects about to start their design work or have started design and are funded. These are priority projects for improvement.

- **William Blake Estate** – All buildings – window replacement and external redecoration
- **Golden Lane Estate** – All buildings – window replacement and roof structural check
- **Avondale Estate** – Avondale House – Flat roof renewal

Medium-term priority projects

Projects that are short-term priorities for cyclical renewal but have not received funding.

- **York Way** – All buildings – window replacement and external redecoration
- **Isleden House** – All buildings – communal heating improvements
- **Middlesex Estate** – communal ventilation system replacement/upgrade
- **Multiple Estates** – boiler replacements expected* see note across

Note: Estates highlighted in purple are 2027 NZ Target Priority estates

Short term priority 2: Expanding capital projects | 2027 NZ Target priorities

Opportunity for retrofit works at York Way

The Housing Team Capital Works programme currently includes a major refurbishment project at York Way. This comprises window replacements, external redecoration, and improved communal ventilation. These improvements come with a forecasted investment of £4.14 million based on a 'business as usual' approach.

The type of work and scale in the proposed project represents a significant opportunity to improve the energy efficiency of an estate connected to communal heating. It is doubly important given the fact that recently the mains gas heating systems was renewed, keeping York Way on carbon intensive fossil fuels for the immediate future.

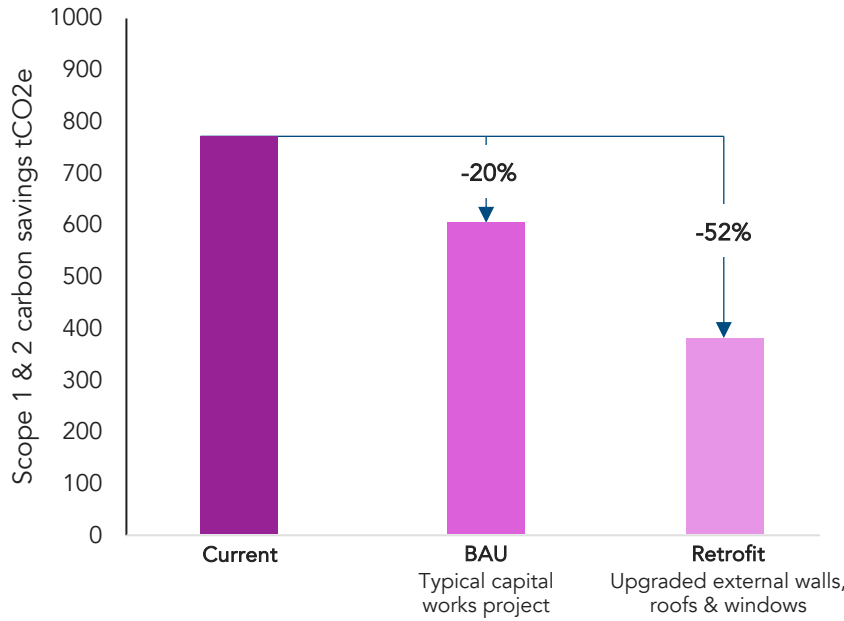
To quantify the potential, energy models have been created for:

- The **current** situation
- A **business-as-usual (BAU)** capital project – assumed to be compliant with building regulations minimum standards (including insulating walls and double-glazed windows), and
- A low carbon **retrofit** option – including best practice wall (EWI), ground floor, and roof insulation, the installation of triple-glazed windows, MVHR, best practice communal ventilation, and PVs. PV panels have been discussed as part of 'Short term priority 1' and are therefore not included in this analysis. PV should be installed at the same time as these measures, rather than before, however.

Shepherd House has been excluded from the analysis because it is not a priority block for 2027. Given the scale of the works required in both the BAU and Retrofit cases, the work may extend beyond 2027.

Other estates

There are two other medium-term priority projects: Isleden House communal heating system renewal/improvements and Middlesex Street communal ventilation. Both these projects should seek to deliver an expanded scope as a contribution to the 2027 net zero target. The Housing Team has begun looking at options for Isleden House through HNES, as discussed on previous pages.



The estimated reduction in Scope 1 & 2 carbon emissions for the current estate, a business-as-usual capital works replacement programme, and an upgraded capital works programme including wall insulation, triple glazing and roof insulation. The potential further impact from adding PV is also presented.

North-west view of Kinefold, Lambfold and Penfield in York Way Estate.

Short term priority 2: Expanding capital projects | 2040 NZ Target priorities

In addition to the priority projects with communal heating (i.e. the priorities for the 2027 target) there are significant planned capital projects that are currently in, or approaching, design phase. The estates are:

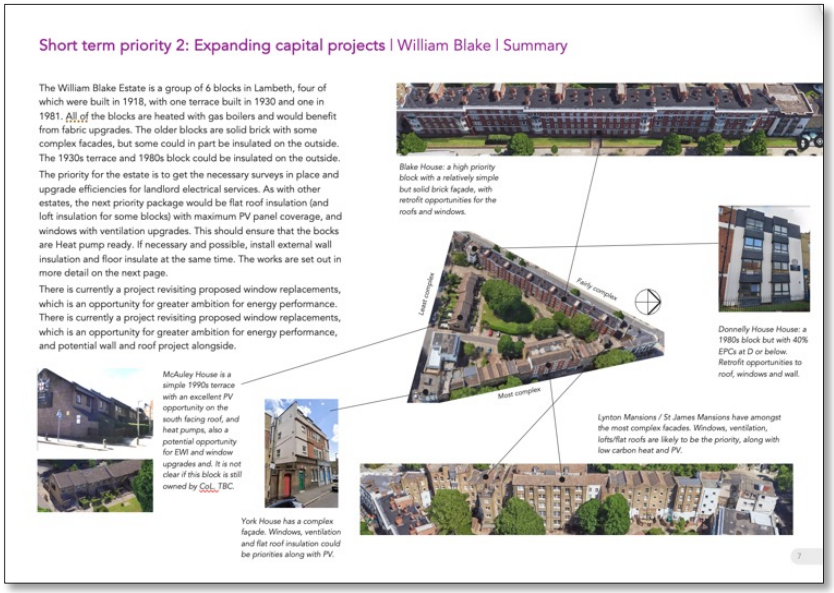
- William Blake
- Golden Lane
- Avondale Square

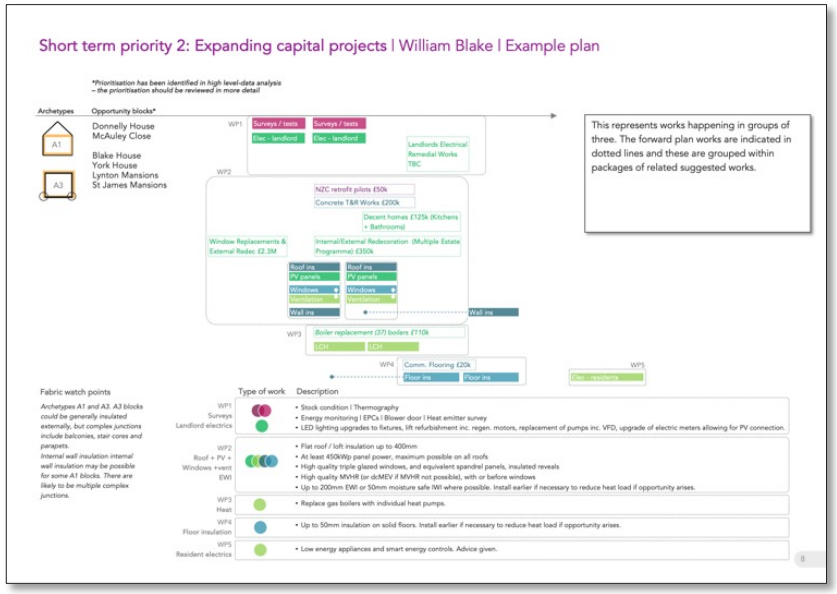
The following pages show a high-level strategy for selected blocks within these estates. These include an introduction to the estate and a Gantt chart of potential energy efficiency works, in the context of planned capital works.

The order might change but the ambition should remain

These plans are based on our understanding of technical priorities, other strategic priorities will need to be incorporated. The order for the estates and blocks is indicative, but they give an overview of the **quantity of works** that need to be completed.

This should therefore be adapted to suit other priorities, but the ambition for the amount of work, and potential carbon emission savings should not be sacrificed if specific works get delayed.





Example estate overview and potential works for William Blake Estate

Short term priority 2: Expanding capital projects | William Blake | Summary

The William Blake Estate is a group of 6 blocks in Lambeth, four of which were built in 1918, with one terrace built in 1930 and one in 1981. All of the blocks are heated with gas boilers and would benefit from fabric upgrades. The older blocks are solid brick with some complex facades, but other façades could in part be insulated on the outside. The 1930s terrace and 1980s block could potentially be insulated on the outside.

The priority for the estate is to get the necessary surveys in place and upgrade efficiencies for landlord electrical services. As with other estates, the next priority package would be flat roof insulation (and loft insulation for some blocks) with maximum PV panel coverage, and windows with ventilation upgrades. This should ensure that the bocks are Heat pump ready. If heating loads allow, heat pumps could be installed earlier. If necessary and possible, install external wall insulation and floor insulate at the same time. The works are set out in more detail on the next page.

There is currently a project revisiting proposed window replacements, which is an opportunity for greater ambition for energy performance. Potential wall and roof projects are being considered alongside.

Page 128

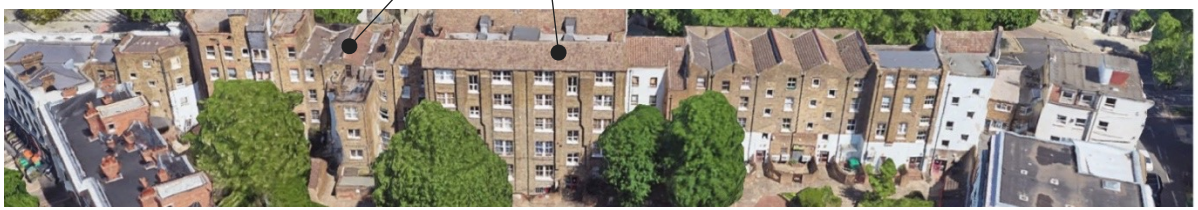
Blake House: a high priority block with a relatively simple but solid brick façade, with retrofit opportunities for the roofs and windows.

Donnelly House House: a 1980s block but with 40% EPCs at D or below. These are potentially heat pump ready with retrofit opportunities to roof, windows and wall.

McAuley House is a simple 1990s terrace with an excellent PV opportunity on the south facing roof, and heat pumps, also a potential opportunity for EWI and window upgrades and. It is not clear if this block is still owned by CoL. TBC.

York House has a complex façade. Windows, ventilation and flat roof insulation could be priorities along with PV.

Lynton Mansions / St James Mansions have amongst the most complex facades. Windows, ventilation, lofts/flat roofs are likely to be the priority, along with low carbon heat and PV.



Short term priority 2: Expanding capital projects | William Blake | Example plan

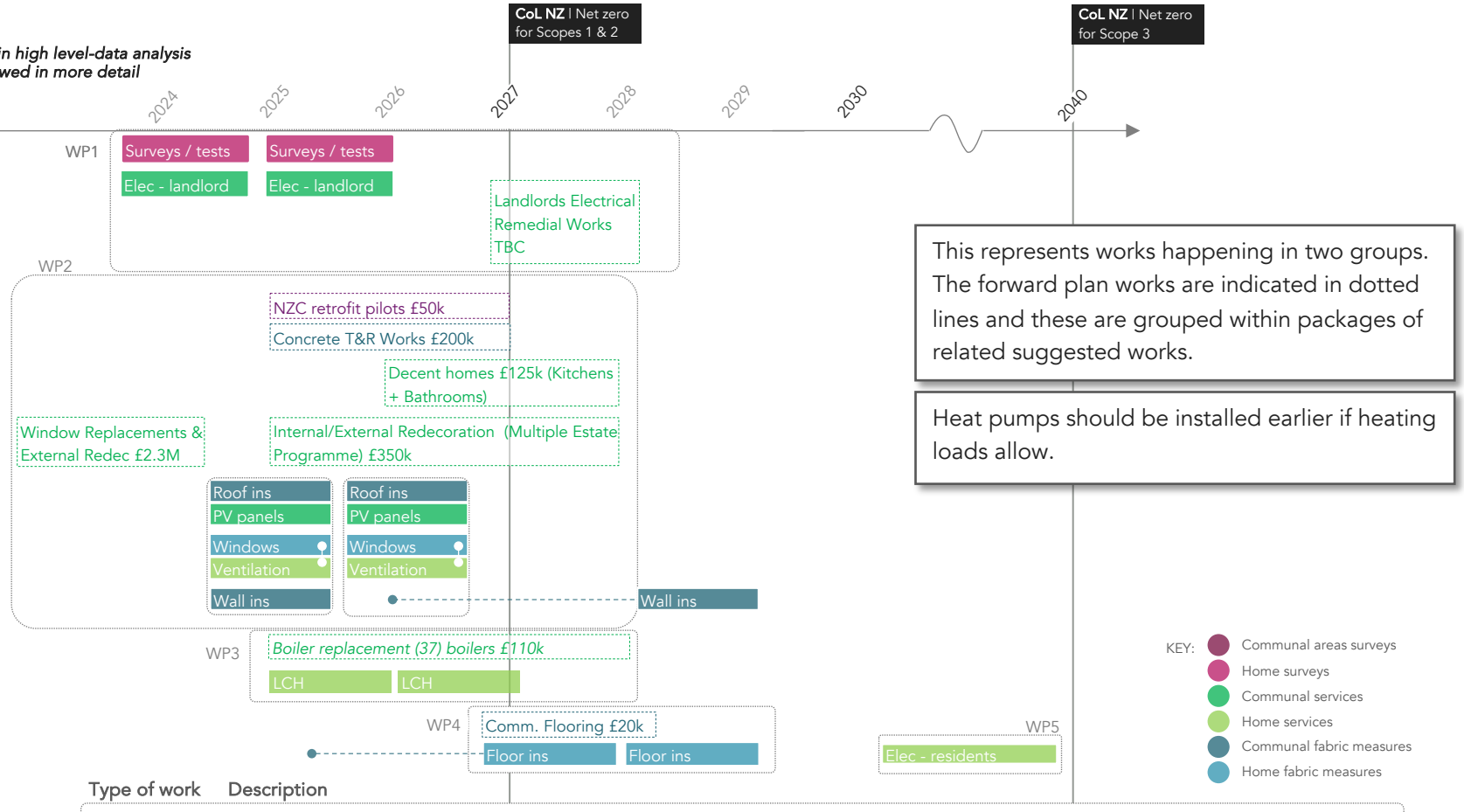
**Prioritisation has been identified in high level-data analysis – the prioritisation should be reviewed in more detail*

Archetypes

Blocks*

Donnelly House
McAuley Close

Blake House
York House
Lynton Mansions
St James Mansions



This represents works happening in two groups. The forward plan works are indicated in dotted lines and these are grouped within packages of related suggested works.

Heat pumps should be installed earlier if heating loads allow.

Fabric watch points

Archetypes A1 and A3. A3 blocks could be generally insulated externally, but complex junctions include balconies, stair cores and parapets.
Internal wall insulation internal wall insulation may be possible for some A1 blocks. There are likely to be multiple complex junctions.

	Type of work	Description
WP1 Surveys Landlord electrics		• Stock condition | Thermography • Energy monitoring | EPCs | Blower door | Heat emitter survey • LED lighting upgrades to fixtures, lift refurbishment inc. regen. motors, replacement of pumps inc. VFD, upgrade of electric meters allowing for PV connection.
WP2 Roof + PV + Windows +vent EWI		• Flat roof / loft insulation up to 400mm • At least 450kWp panel power, maximum possible on all roofs • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals • High quality MVHR (or dcMEV if MVHR not possible), with or before windows • Up to 200mm EWI or 50mm moisture safe IWI where possible. Install earlier if necessary to reduce heat load if opportunity arises.
WP3 Heat		• Replace gas boilers with individual heat pumps as early as possible.
WP4 Floor insulation		• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.
WP5 Resident electrics		• Low energy appliances and smart energy controls. Advice given.

Short term priority 2: Expanding capital projects | Golden Lane | Summary

The estate can be summarised as seven similar blocks with slightly different façade articulations, and two more distinct blocks: Crescent House, which is Grade II* listed, and Great Arthur House, which is a tower block. All of them are Grade II listed except Crescent House.

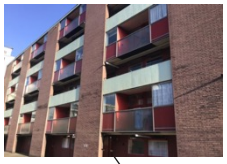
All blocks are challenging to retrofit due to their listed status and complex façades. The buildings are also in high need of retrofit due to their poor energy performance and considering that some tenants are also in fuel poverty.

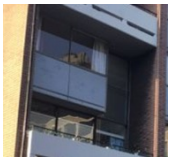
Despite the challenges there are some opportunities for retrofit. The windows or window systems can be upgraded, and there is currently a project to assess and upgrade these across the estate. Alongside these works, the ventilation systems should also be assessed and upgraded to MVHR wherever possible. There is also the opportunity to insulate flat or barrel roofs and install PV to some extent, to most of the blocks. Walls are difficult to insulate generally, but there are some examples of end walls which may be possible to insulate on the outside. There are also some exposed soffits that can be insulated on the outside. Crescent House is currently undergoing an extensive retrofit and many of these strategies are proposed. This is a learning opportunity, with lessons that can be applied to other blocks.

Basterfield House, Stanley Cohen House, Bayer House, Bowater House. Attached blocks to the east of the estate.

Basterfield and Bowater have most complex window articulation

Stanley Cohen House has possibly the least complex façade




Crescent House

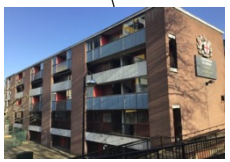
*Grade II**

Very complex façade & Barrell roof.

Hatfield House and Cullum Welch House are attached to Crescent House but are much less complex. Callum Welsh one of the least complex façades.


Great Arthur House

15 Storey tower. Mostly windows and panels, solid wall on "ends". Complex roof



Cuthbert *Harrowing*

Detached block. Similar to Bayer/Hatfield. 4 Storeys

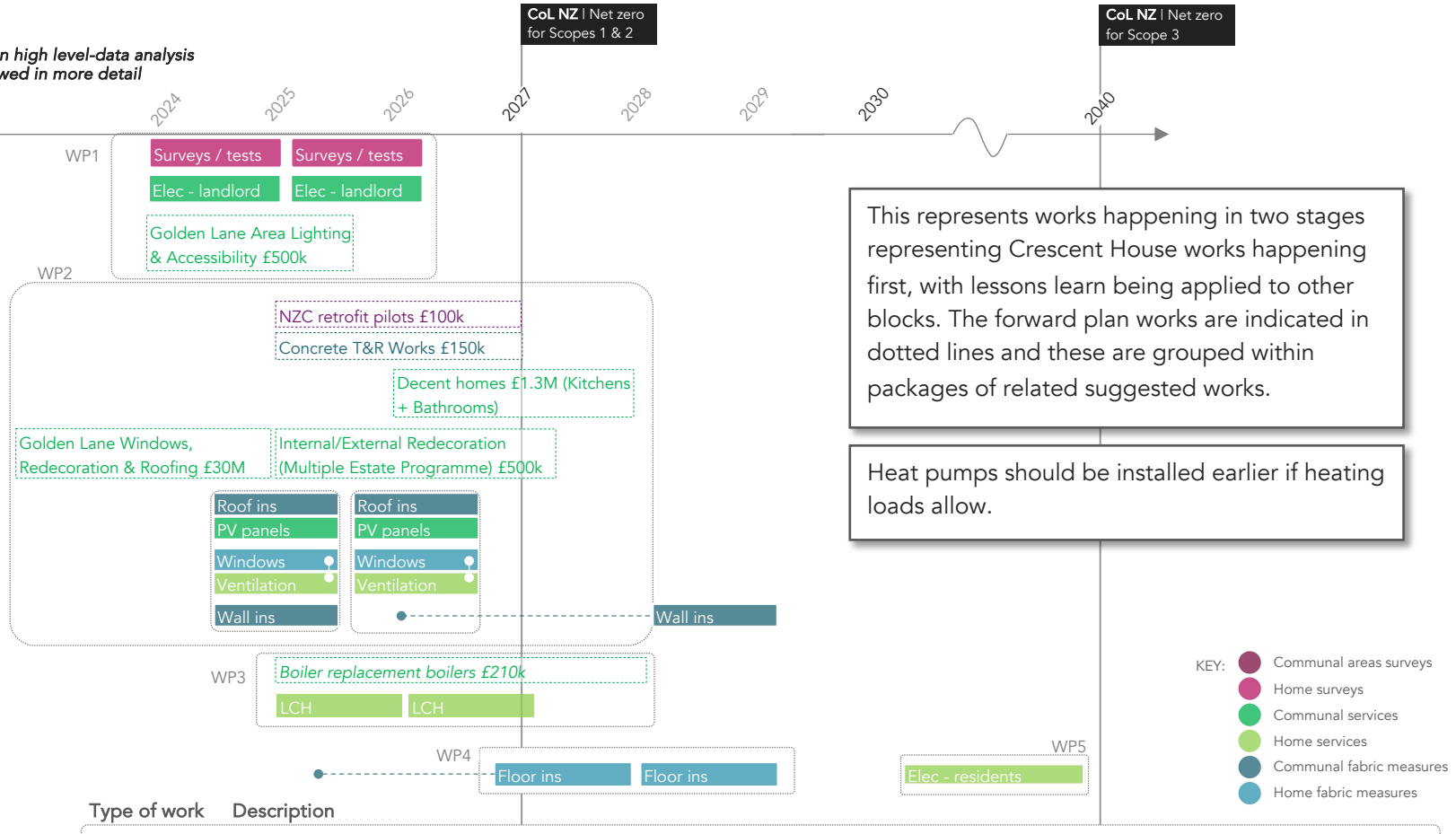
Short term priority 2: Expanding capital projects | Golden Lane | Example plan

**Prioritisation has been identified in high level-data analysis – the prioritisation should be reviewed in more detail*

Archetypes

Blocks*

Crescent House
Cullum Welch House
Bayer House
Stanley Cohen House
Cuthbert Harrowing House
Great Arthur House
Basterfield House
Hatfield House
Bowater House



This represents works happening in two stages representing Crescent House works happening first, with lessons learn being applied to other blocks. The forward plan works are indicated in dotted lines and these are grouped within packages of related suggested works.

Heat pumps should be installed earlier if heating loads allow.

Fabric watch points

Archetypes A4, A4a, A5. Façade is highly glazed, internal wall insulation may be possible in places. Roofs, soffits and some walls could be insulated on the outside. There are multiple complex junctions around windows.

Type of work	Description
WP1 Surveys Landlord electrics	• Stock condition | Thermography • Energy monitoring | EPCs | Blower door | Heat emitter survey • LED lighting upgrades to fixtures, lift refurbishment inc. regen. motors, replacement of pumps inc. VFD, upgrade of electric meters allowing for PV connection.
WP2 Roof + PV + Windows +vent EWI	• Flat roof, insulation up to 400mm. Soffit insulation, up to 150mm. • At least 450kWp panel power, maximum possible on all roofs • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals • High quality MVHR (or dcMEV if MVHR not possible), with or before windows • Up to 200mm EWI or 50mm moisture safe IWI where possible. Install earlier if necessary to reduce heat load if opportunity arises.
WP3 Heat	• Replace gas boilers with individual heat pumps as early as possible.
WP4 Floor insulation	• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.
WP5 Resident electrics	• Low energy appliances and smart energy controls. Advice given.

Short term priority 2: Expanding capital projects | Avondale | Summary

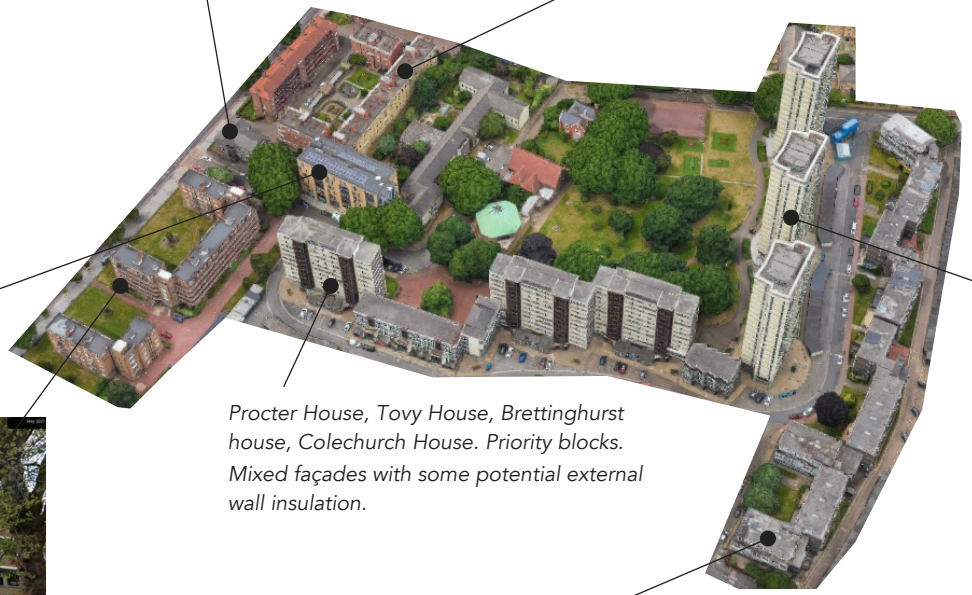
Avondale Square Estate is the largest of the decentralised estates, with 14 blocks, 6 of which are 10 storeys or more, and a total of 687 dwellings. Apart from Twelve Acres House with a communal heating system and Harman House, with direct electric heating, they are all heated by individual gas boilers. Although this is not primarily a communally heated estate this should still be considered priority due to the scale of the estate and upcoming works.

Although some are complex, most facades could be insulated on the outside. The priority for Avondale estate is to get the necessary surveys in place and upgrade efficiencies for landlord electrical services. The next priority package would be roof insulation with maximum PV panel coverage, and windows with ventilation upgrades. This should ensure that the bocks are Heat pump ready. If necessary and possible, install external wall insulation and floor insulate at the same time.

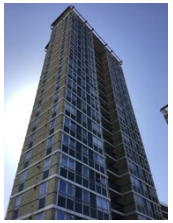
The works are set out in more detail on the next page.

Tevatree House: a high priority block with relatively straightforward retrofit opportunities

Avondale House : A priority block. Slightly more complex façade but opportunities for window replacements, some wall insulation, roof insulation and PV



Procter House, Tovy House, Brettinghurst house, Colechurch House. Priority blocks. Mixed façades with some potential external wall insulation.



The three towers: more challenging due to height, but upgrades, particularly to windows and wall insulation would have a large impact.

Twelve Acres House: A newer block. Opportunity for low carbon heat, fabric measures could be upgraded if surveys find this to be necessary.

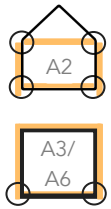
George Elliston House: A priority block. Slightly more complex façade but opportunities for window replacements, some wall insulation, roof insulation and PV

Longland court: Potential for external wall insulation, window replacements, flat roof insulation and PV

Short term priority 2: Expanding capital projects | Avondale | Example plan

**Prioritisation has been identified in high level-data analysis – the prioritisation should be reviewed in more detail*

Archetypes

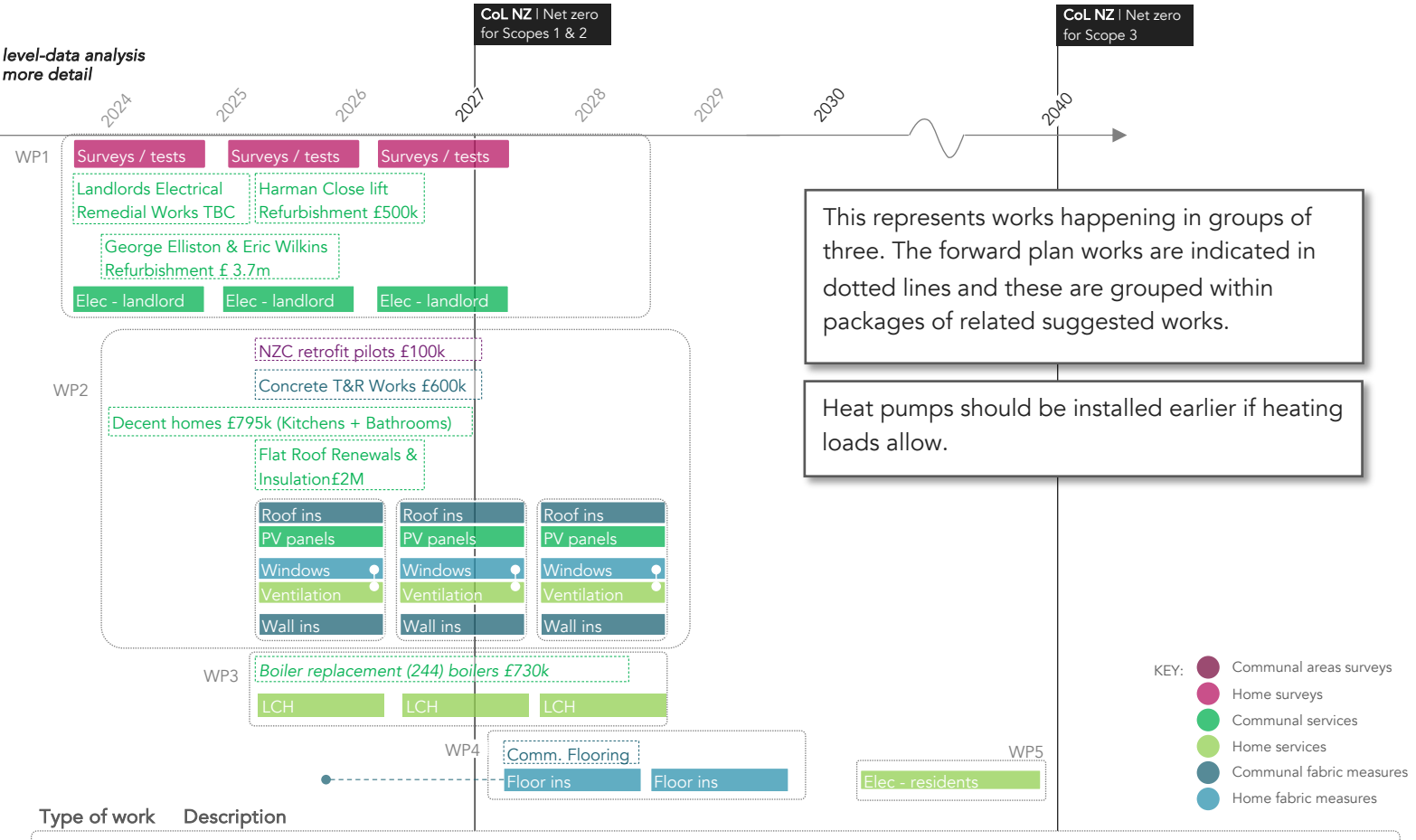


Opportunity blocks*

Tevatree House
Avondale House
George Elliston House
Proctor House
Eric Wilkins House
Tovy House
Brettinghurst house
Colechurch House

Other blocks*

Centre Point
Longland Court
West Point
East Point
Harman Close
Twelve Acres House



Fabric watch points

Archetypes A2, A3, A6. These blocks could be generally insulated externally, but complex junctions include balconies, stair cores and parapets.
Some A6 blocks have a high proportion of windows on main façades.

	Type of work	Description
WP1 Surveys Landlord electrics		• Stock condition | Thermography • Energy monitoring | EPCs | Blower door | Heat emitter survey • LED lighting upgrades to fixtures, lift refurbishment inc. regen. motors, replacement of pumps inc. VFD, upgrade of electric meters allowing for PV connection.
WP2 Roof + PV + Windows +vent EWI		• Flat roof, insulation up to 400mm • At least 450kWp panel power, maximum possible on all roofs • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals • High quality MVHR (or dcMEV if MVHR not possible), with or before windows • Up to 200mm EWI where possible. Install earlier if necessary to reduce heat load if opportunity arises.
WP3 Heat		• Replace gas boilers with individual heat pumps as early as possible.
WP4 Floor insulation		• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.
WP5 Resident electrics		• Low energy appliances and smart energy controls. Advice given.

Short term priority 3: Information gathering | Its importance

Confirmation of brief and assessment of risk

The City are aiming to apply for funding wherever possible to support their decarbonisation work. Not all funding schemes require PAS 2035 compliance but some of the key ones do, including the Social Housing Decarbonisation Fund. Following the PAS 2035 process rules should be the default at least until the intended procurement and funding of the works has been confirmed.

The first step that should be undertaken for each block is to identify the goals. Carbon reduction is a common aim for all properties, fuel poverty reductions apply to some, rectification of defects or replacement of equipment at the end of its service life will be identified by the capital works programme on a block-by-block basis. EPC targets will also generally apply as part of the CoL overall targets for housing.

The next step is to assess the risk pathway as defined by PAS. For CoL. This is relatively simple – all communally heated blocks (and most others) will be Pathway C.

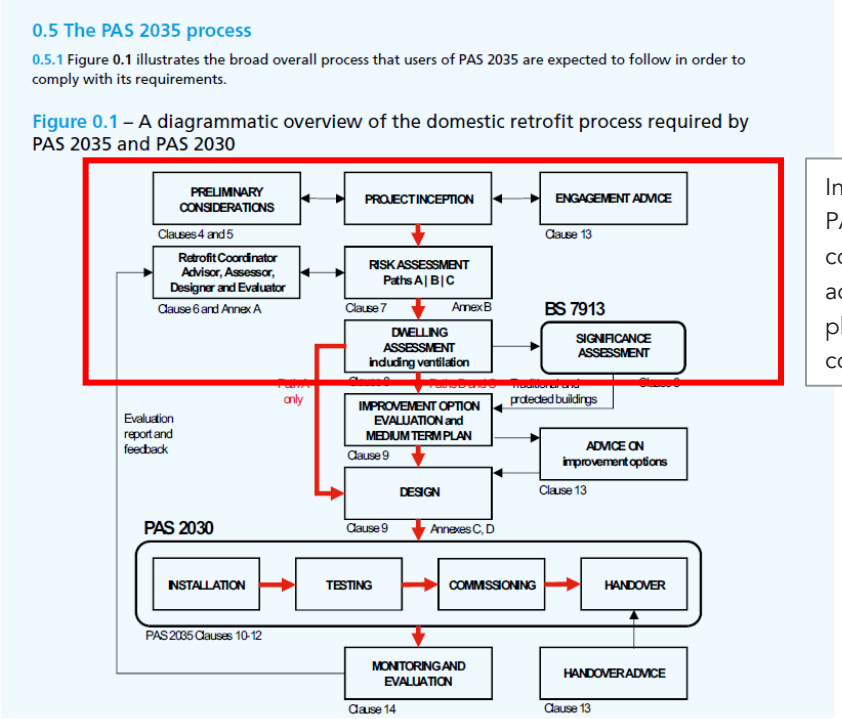
Physical Surveys

As part of the PAS process, various surveys are needed to identify the particular risks for each property before retrofit work plans are developed (refer to following page), specifically to avoid unintended consequences of retrofit, such as increased condensation.

Resident Engagement

The SHDF requirements include a strong emphasis on resident engagement. The residents, including leaseholders should be surveyed or consulted about planned retrofit works and their views recognised and reflected in the final designs wherever possible.

Leaseholders can represent a significant risk to major retrofit works and the approach to their concerns and consent should be an early part of the process of planning the work.



Initial stages of the PAS 2035 process could be in place in advance of works planned commencement

Summary of the PAS 2035 process from BS PAS2035:2019

Table B.1 – Risk assessment table for determining PAS 2035 Path

Criterion 1: Number of dwellings in the project		
The number of dwellings to be improved	Risk grade	Assessed grade
1–10	A	
11–30	B	
More than 30	C	
Criterion 2: Number of measures per dwelling[A)]		
The average number of improvement measures per dwelling	Risk grade	Assessed grade
1–2	A	

Risk Assessments under PAS 2035 – the majority of City projects will be graded 'C' on the basis of the number of dwellings

Short term priority 3: Information gathering | Survey types

Monitoring and thermography

When planning retrofit works, irrespective of whether PAS compliance is needed, thermographic surveys of the buildings would provide the basis for the brief, particularly to identify defects and also to direct where air permeability testing could be most useful.

Monitoring of systems and conditions will allow better understanding of how the CoL buildings are operating, facilitate the reporting required as a heat network provider and also enable accurate assessment of the savings and benefits of retrofit measures. This will help CoL to learn from the pilot projects and to target the most effective retrofit works as the programme advances.

Surveys required as part of the PAS2035 Risk Assessment process

General

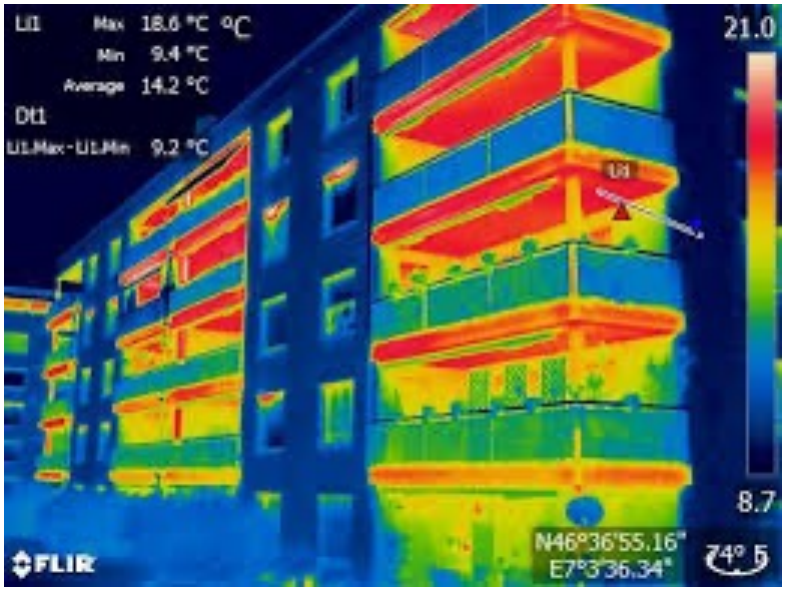
- A strategic assessment of planning risks, heritage and other constraints for each estate.
- Measured surveys of the buildings and confirmation of the main construction materials of each individual building. This may require a review of the information held by the CoL that is not in digital format, either centrally or on each site.
- Surveys of the installed heating and other systems. Elevate Everywhere and Beveridge have carried out surveys to determine the nature, extent and condition of installed communal systems.

Stock condition

- Identification of defects.
- Air tightness testing of each building is required, either as a whole or by type testing dwellings as a representative sample.

EPCs

- Current SAP or RdSAP assessments are required for all properties being retrofitted. Currently around a third are missing.



Thermographic surveys can show specific defects, such as failed double-glazing seals, and identify air leakage paths

Short term priority 4: Void programme | Opportunities

Opportunities that could be offered by voids

When voids occur across the City's housing stock, they could be used for many purposes, including:

- **Pilot projects** to test measures, techniques and products and how well they can be integrated into the building and identifying risks. Showcasing both the process and the outcomes to residents and others in the city. Training of CoL project team and contractor teams.
- **Preparation**. Survey work and preparatory works such as changing radiators to allow a later change to low carbon heating.
- **Reduce disruption**. Where works are likely to be highly disruptive to residents, carrying this out while some flats are empty limits the number of residents who will be affected. Decant space for residents whose flats are being worked on – as at Crescent House.

What needs to be in place

In order to maximise the usefulness of the voids, a whole building retrofit plan needs to be in place for every block across the estate. The plan will identify which measures could be undertaken in individual flats, in isolation. The whole building plan also sets out the sequence and interdependencies of the works. This establishes when in the overall process the voids process can be implemented and whether there is a minimum package of measures that need to be done in every void flat.

Issues to consider

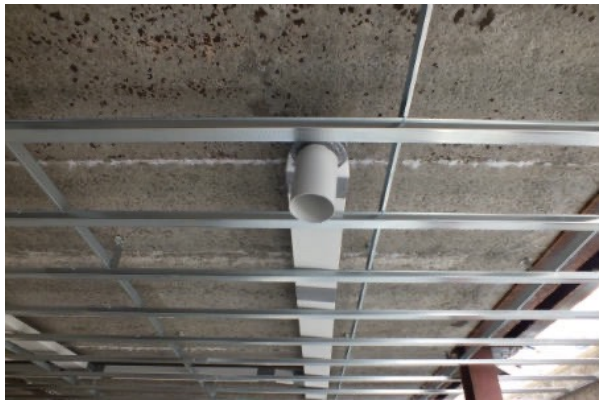
Using the voids to carry out reasonably significant works, such as MVHR installation will extend the void period and therefore affect revenue. Having the whole building plan in place will allow a judgement to be made about when the interventions will be most effective at reducing other disruption (and potentially consequent rent reductions) in order to balance the commercial considerations with practicalities and necessity of the upgrade work.

Add internal wall insulation.

For elevations that are not suitable for external wall insulation, the void offers the chance to strip back the existing finish, prepare and repair, and then install and appropriately specified internal wall insulation.

Install mechanical ventilation with heat recovery (MVHR) ideally, or dcMEV systems and ductwork.

Including intake/exhaust interface with the external wall and fan unit.



Replace existing radiators with higher output emitters suitable for a lower temperature heating system.

Short term priority 4: Void programme | Connection to other standards

The design standards that have been developed can be used as a basis for measures undertaken as part of the voids works.

Net Zero Design Standard

For buildings that are not listed or restricted by heritage considerations, the Net Zero Design Standard sets out objectives and elemental performance targets. These can be used as a baseline to develop a preferred standard for upgrading the fabric in void properties. The performance standards (Appendix 1) set both limiting and target U values for the principal elements.

Heritage Building Retrofit Toolkit

For historic and listed buildings, the retrofit toolkit sets out a process and the different factors that need to be considered. It includes summaries of areas where energy is often wasted in buildings, potential mitigation measures and improvement measures. It also advocates creating whole building retrofit plans.

These summaries provide a useful checklist for every void to eliminate waste, for each building to have a retrofit plan in place and appropriate mitigation and improvement measures to be identified that could be implemented with suitable voids.

Design Standards

CoL have developed design standards for different building types, including housing.

The heritage building toolkit includes a summary of the areas to focus on to eliminate energy wastage.

Short term priority 4: Void programme | Testing and small works

Void flats can be used to make incremental steps towards the optimal net zero retrofit specification.

There are some works that should be done everywhere, in all voids. These are reasonably quick to do and don't affect fixtures or finishes in the properties. They can also all be carried out independently of neighbouring properties.

1. Update EPCs
2. Install monitoring and/or update metering
3. Carry out blower door tests, and draught proofing. In the case of blower door tests, it is useful to carry out a number of tests in every building as a sample, but it wouldn't necessarily be essential to do in every void property.
4. Upgrade meter and/or electrical systems to allow connection to roof mounted PVs where appropriate.

All voids

Type of work	Description
WP1 Surveys	• Stock condition | Heat network monitoring | Thermography • Energy monitoring | EPCs | Blower door | Heat emitter survey
WP2 Roof + PV + Windows +vent	• Flat roof, insulation up to 400mm • At least 450kWp panel power, maximum possible on all roofs • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals • High quality MVHR (or dcMEV if MVHR not possible), with or before windows
WP3 Heat and landlord electrics	• Replace communal gas boiler system with communal heat pumps. • Replace heat emitters with compatible system. OR • Replace individual gas boilers with individual heat pump systems. • LED lighting upgrades to fixtures, lift refurbishment inc. regenerative motors, replacement of pumps inc. VFD, upgrade of electric meters allowing for PV connection.
WP4 EWI	• Up to 200mm EWI where possible. Install earlier if necessary to reduce heat load if opportunity arises. OR • Up to 100mm IWI
WP5 Resident electrics	• Upgrade meters and enable PV connections where appropriate • Low energy appliances and smart energy controls. Advice given.
WP6 Floor insulation	• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.

Short term priority 4: Void programme | Upgrade works

There are some works that could be carried out in void properties as part of necessary preparatory work for new tenants. There is an emerging Housing Letting Standard (currently in draft) which describes the condition and facilities that would be a minimum standard for City properties. In some cases, these would be a trigger for upgrades to meet the design standard specification or to install (or prepare for the installation of) new components or systems.

1. Install MVHR ductwork (and fan units)
2. Repair cracks and gaps that are allowing infiltration (uncontrolled ventilation)
3. Review the airtightness strategy and carry out draughtproofing
4. Install internal wall insulation to prevent damp and mould. Ensure that an appropriate specification is selected to avoid unintended consequences.
5. Address cold bridges
6. Replace windows, where planning permission is not required or install secondary glazing if the whole house plan includes this approach. Ensure adequate ventilation is provided to property.
7. Replace gas fired kitchen appliances with electric alternatives
8. Replace and upgrade the distribution pipework and radiators to suit the intended new heating system.
9. Install Waste Water Heat Recovery (WWHR)
10. Install or prepare space for a domestic hot water cylinder or thermal battery where these are integral to the final retrofit DHW system or replace HIUs with modern units to suit the future system.
11. For homes with individual gas boilers, replace gas boilers with low carbon alternative.

Type of work	Description	Potential void works
WP1 Surveys	• Stock condition | Heat network monitoring | Thermography • Energy monitoring | EPCs | Blower door | Heat emitter survey	✓ ✓
WP2 Roof + PV + Windows +vent	• Flat roof, insulation up to 400mm • At least 450kWp panel power, maximum possible on all roofs • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals • High quality MVHR (or dcMEV if MVHR not possible), with or before windows	✓ ✓
WP3 Heat and landlord electrics	• Replace communal gas boiler system with communal heat pumps. • Replace heat emitters with compatible system. OR • Replace individual gas boilers with individual heat pump systems. • LED lighting upgrades to fixtures, lift refurbishment inc. regenerative motors, replacement of pumps inc. VFD, upgrade of electric meters allowing for PV connection.	✓ ✓
WP4 EWI	• Up to 200mm EWI where possible. Install earlier if necessary to reduce heat load if opportunity arises. OR • Up to 100mm IWI	✓
WP5 Resident electrics	• Upgrade meters and enable PV connections where appropriate • Low energy appliances and smart energy controls. Advice given.	✓ ✓
WP6 Floor insulation	• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.	

Example whole building plan. Blue tick indicates the work that could be done as part of a voids process

Short term priority 4: Void programme | Other work opportunities

There are some works that could be carried out in void properties as part of necessary preparatory work for new tenants. There is an emerging Housing Letting Standard (currently in draft) which describes the condition and facilities that would be a minimum standard for City properties. In some cases, these would be a trigger for upgrades to meet the design standard specification or to install (or prepare for the installation of) new components or systems.

Ceilings and walls

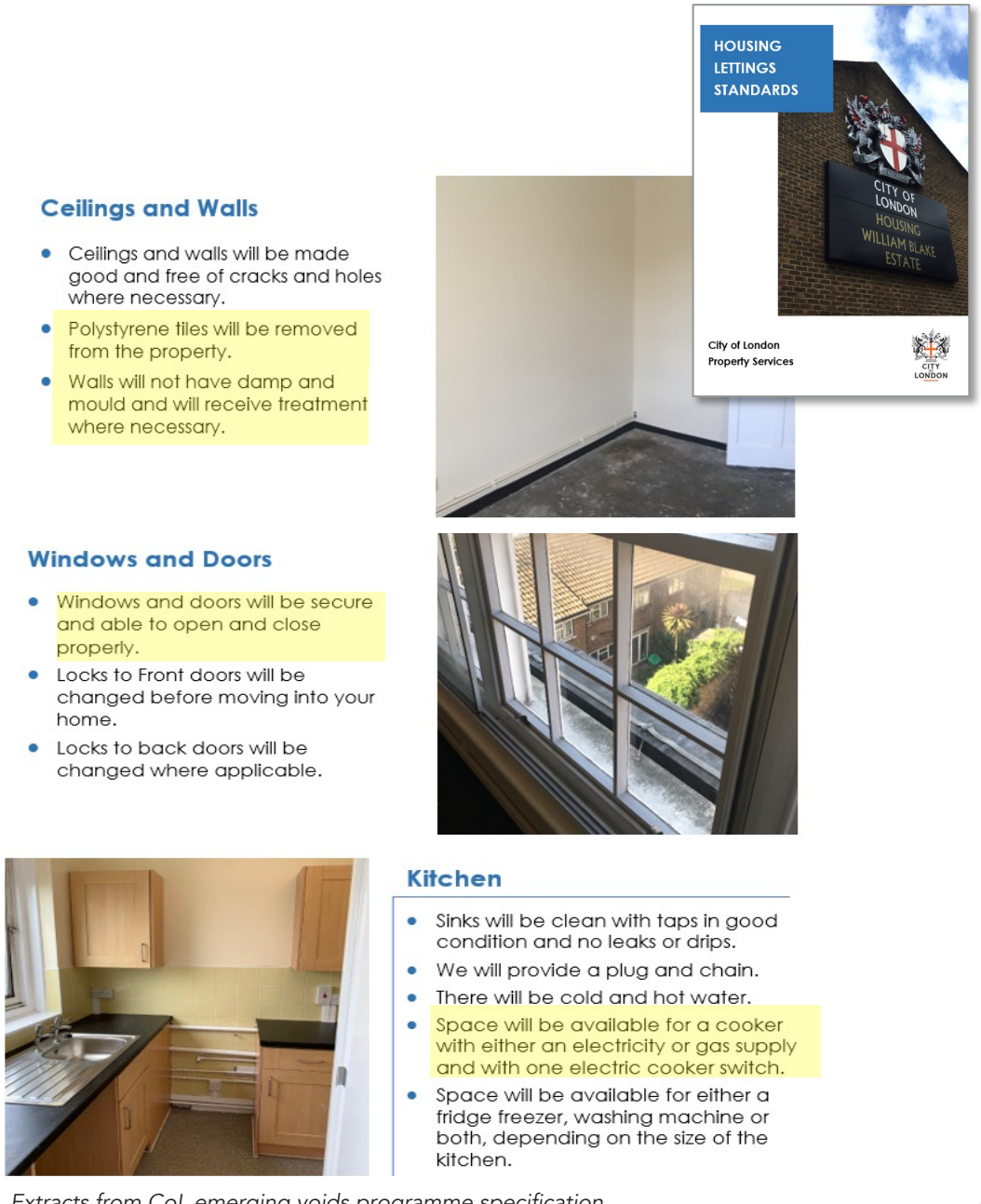
1. Where polystyrene tiles or other deleterious materials are removed from ceilings, install MVHR ductwork as part of the replacement ceiling installation.
2. When damp or mould are found (and necessary repair work has been completed / leaks and ingress resolved) add insulation and/or address cold bridges that are causing the problem.
3. Where major redecorations are needed, internally insulate. Carefully consider the material used and detailing to avoid moisture risk.

Windows and doors (subject to planning permission for some properties)

1. Where window furniture is broken, consider whether a replacement window unit (with a better standard of glazing) could be installed rather than repair the existing.
2. Replace windows or prepare for their future installation

Kitchens

1. Only provide electric connections for cookers and remove gas hobs to eliminate fossil fuels from homes.



Extracts from CoL emerging voids programme specification

Short term priority 4: Void programme | Other work opportunities

Specific measures that can be carried out in voids as part of the normal preparation works.

Heating

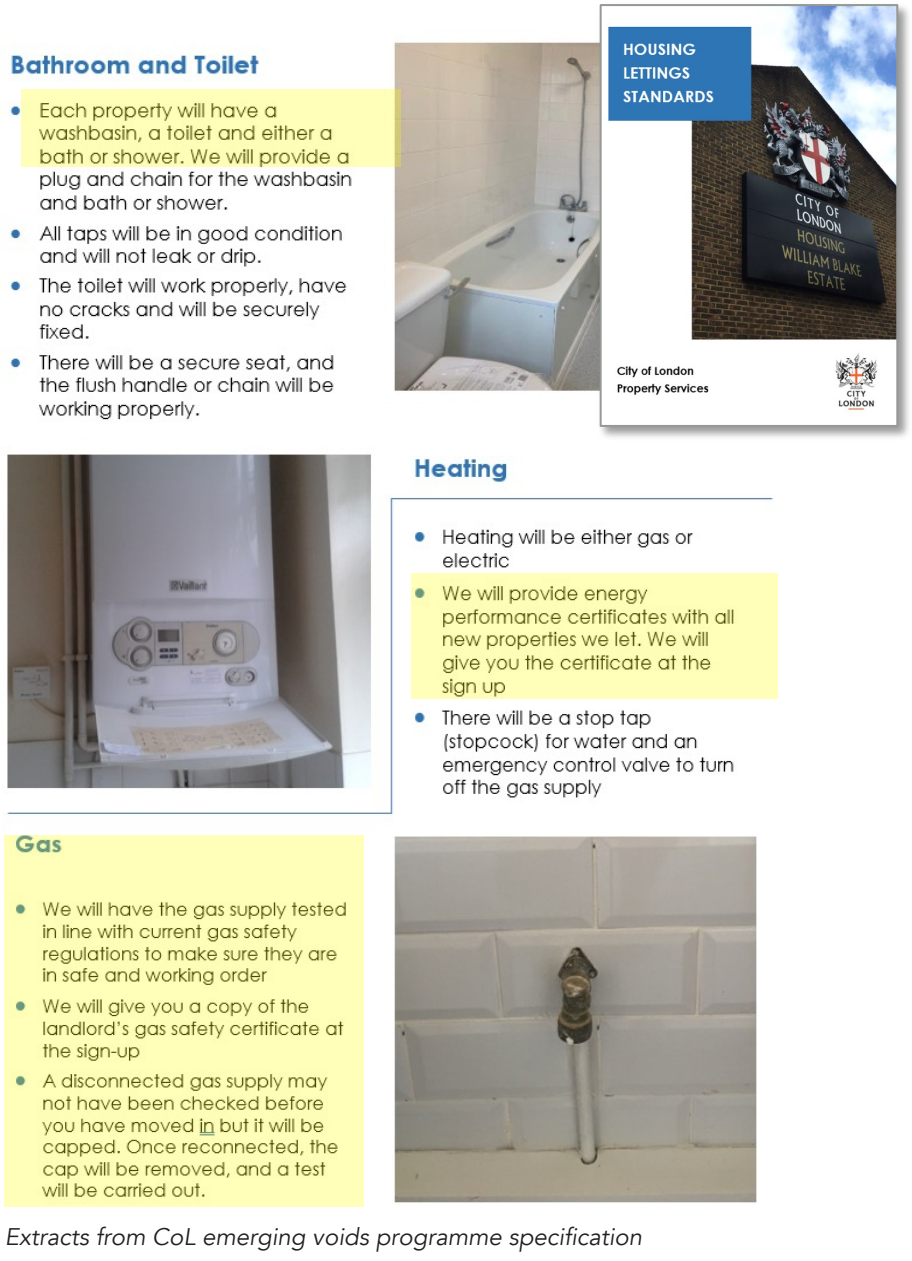
1. Update all EPCs and carry out survey work to check air tightness and insulation continuity.
2. Replace and upgrade the distribution pipework and radiators to suit the intended new heating system.
3. For homes with individual gas boilers, replace gas boilers with low carbon alternative.

Bathrooms

1. Install Waste Water Heat Recovery wherever baths or showers are replaced
2. Install or prepare space for a domestic hot water cylinder where these are integral to the final retrofit DHW system or replace HIUs with modern units to suit the future system.

Gas

1. Aim to remove all gas supplies and provide electric replacement equipment.



Extracts from CoL emerging voids programme specification

Short term priority 4: Void programme | Possible costs

Costs of measures

The costs of the individual measures are indicated in the finances section of this HDP. The piecemeal nature of the work will mean there generally won't be economies of scale, although it may be possible to procure some measures across multiple estates (e.g. survey work). For some work, such as HIU upgrades, the voids may be pilot projects for later roll outs to occupied flats, in which case there may be an opportunity to procure more of the materials than only those for the current voids, subject to having suitable storage.

Costs of lost revenue

Where the void works only include the 'all voids' measures, the time taken to carry out the void programme, if planned in advance, should not exceed the normal void turnaround times. However, in other cases, where more extensive installation or repairs are undertaken, the void period will be extended. The revenue loss associated with this period needs to be discussed with the City.

Cost savings

Using the void programme to carry out surveys and preparation work will reduce the lead in time for major retrofit projects. Retrofit projects can often be challenging to programme and price for, due to the unforeseen issues that can arise when opening up existing fabric and components. Using the voids as pilot projects will provide better certainty on the scope and detail of the work needed, enabling a more defined specification and potentially lower contingency.

Indicative costs of example void measures

	Measures	Cost range
Surveys	Blower door test (per home)	Circa £200
Windows and doors	E.g. Advanced secondary glazing (per m2)	£900 - £1,400
	New entrance door (per unit)	£1,400 - £5,000
Air tightness and ventilation	Draught proofing (per home)	£300 - £800
	New MVHR and ductwork (per unit)	£5,000 - £10,000
Insulation	40 – 80mm Internal wall insulation (per m2)	£200 - £500

Indicative costs only – refer to Finances section for more comprehensive list of potential retrofit measures and costs

Survey work such as blower door tests will not disturb neighbouring homes and will provide valuable data on the overall building condition for following retrofit programmes

Short term priority 4: Void programme | Possible risks

There are risks associated with any retrofit and these would apply to physical installation works carried out as part of a void programme. There are also some specific risks associated with the voids strategy.

Generally, the risks for non-invasive and survey work are negligible, so the 'all voids' works proposed don't present any significant additional risks.

Damp and mould growth

Damp and water ingress are the major risk for all types of retrofit work. Adding insulation can exacerbate cold bridge effects and increase the risk of condensation and associated mould growth. Any insulation work should be planned as part of a whole building installation but designed to be undertaken in individual homes by a competent retrofit designer. PAS2035 highlights this risk and provides advice on how to mitigate it.

Abortive work

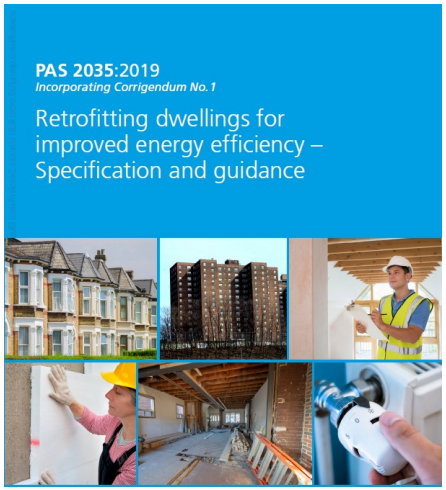
There should be an agreed and developed whole building retrofit plan in place in order to mitigate the risk that measures carried out in voids do not combine to a satisfactory overall retrofit of the building. In particular, works to the fabric and associated with communal heating systems should be planned with an understanding of the medium term overall intended outcome for that building.

Disruption to neighbouring properties

Noisy work such as fixing to walls and ceilings can potentially be disruptive to neighbouring properties, including on the floor above as well as to either side or close by.

Storing and transport of materials in communal areas, access for workers and interruptions to power and/or heating systems could also cause disruption to homes with common access to the void property.

Cold bridges at junctions can be worse after a retrofit, leading to condensation and mould.



PAS2035 includes advice on mitigation of risks and the preparation of whole house retrofit plans.

Short term priority 4: Void programme | Example – Isleden House

Isleden House is an estate in Islington, comprising 77 residential units, some of which are managed for vulnerable residents (sheltered housing). It does not have conservation or heritage status and it has gone a number of refurbishments and upgrades through its life. It has a communal heating system.

A whole building retrofit plan

A draft decarbonisation strategy for Isleden House was prepared in summer 2023, which identified a set of retrofit measures that could be implemented in two stages to allow early replacement of the communal heating boilers with heat pumps. The strategy is predicted to reduce the energy consumption of the building overall by between 70 and 80%.

Avoid strategy for Isleden

A number of the proposed works in step 1 of the proposed strategy could be carried out using voids, as set out in decarbonisation report:

- Carry out blower door testing to determine the characteristic leakage paths and to set a deliverable target for all properties.
- Carry out draught proofing, including sealing passive vents
- Replace windows and front doors
- Replace radiators with larger units where possible,
- Install MVHR

	Existing Specification	First step Specification	Optimal Specification
Building fabric			
Floor	No insulation assumed	-	25mm, 0.019 W/mK
Walls *		150mm, 0.035 W/mK*	100mm, 0.035 W/mK
Soffit		-	100mm, 0.035 W/mK
Roof main		300mm, 0.035 W/mK	300mm, 0.035 W/mK
Roof bay		100mm, 0.035 W/mK	100mm, 0.035 W/mK
Deck		-	25mm, 0.019 W/mK
Windows	Metal frame with double glazing	Excellent triple glazing	Excellent triple glazing
U-values (W/m^2K)	Glazing: 2.9 Frame: 5	Glazing: 0.6 Frame: 1.5	Glazing: 0.6 Frame: 1.5
Doors U-values (W/m^2K)	Door: 2 Frame: 2	Equivalent door quality to new windows	Equivalent door quality to new windows
Air change rate (ach)	8	5	3
Ventilation Heat Recovery (%)	0%	90%	90%
Heating and hot water			
Heating system T supply (° C)	We have tested communal ASHP with a high temperature circulation (70°C) and a lower temperature circulation (45°C) with Sunamp cylinders		
Renewable energy			
Solar panel (number)	No PVs assumed	PV panels to the ESE roof	PV to both roof elevations of the block (ESE & WNW)

Specification assumed for the energy analysis, showing the assumed current performance, a 'first step' option which seeks to meet the heating load reduction needed for the communal heat pumps, and an optimal specification which should be targeted in the longer term. For a building with individual heat pumps proposed, fewer initial fabric improvements may be necessary to achieve a suitable space heating load.

4

Future steps | Looking beyond the urgent priorities

In Section 3 the HDP explored the urgent priorities to avoid missing opportunities across the housing estate. To reach net zero a more proactive approach to retrofitting homes will be needed. This should build upon the work completed as part of the short-term priorities but should also be considered now so that teams are ready and plans are in place

Future steps | Overview and rationale

Getting the retrofit programme on the front foot

The short-term priorities represent an urgent need to avoid missed opportunities and deliver on quick wins. Achieving them would represent a significant improvement, but further work would be needed to continue the improvement across the rest of the homes.

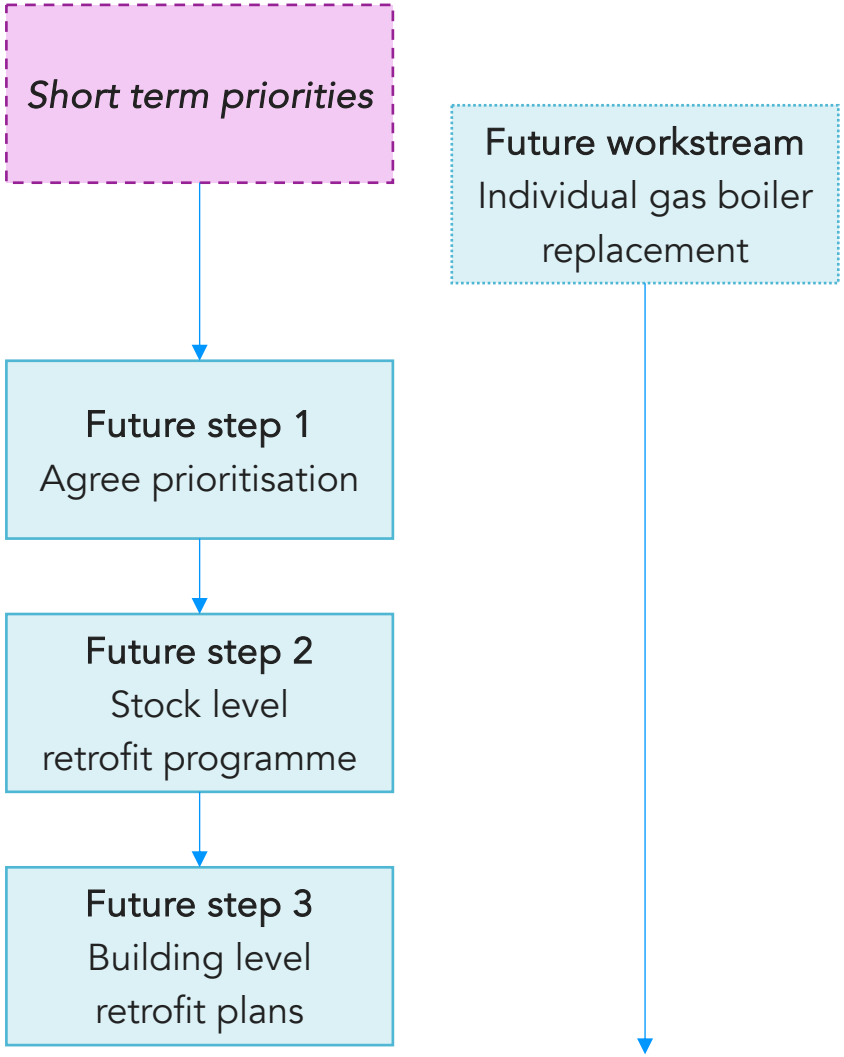
The future steps would represent a pivot from reactive retrofit projects to proactive ones, which are well informed and prioritised in a way that provides more benefit to the City and its residents.

The work completed as part of the short-term priorities will inform any future steps, so these are a snapshot of where the City is expected to be in 2 or 3 years time. The outline future steps are summarised below and discussed in more detail on subsequent pages:

- Future step 1 – the retrofit projects currently being considered are because of an urgency in terms of cyclical replacement. In future the priority set for retrofit could be based on other factors, such as resident needs, energy costs, comfort etc.
- Future step 2 – Once the priorities are agreed, the City along with external consultants can begin to map out a programme that meets the net zero objectives.
- Future step 3 – Building level retrofit plans will be needed so that the teams are ready to start incremental works on voids and to inform future capital works programmes.

Tackling the gas boiler issue

One of the biggest obstacles to overcome to meet the 2040 objective is the many individual gas boilers in the homes. Replacing these with a low carbon heat source in a considered way must be a focus of a future workstream, and something that can not afford to wait much longer, as boilers are replaced continually.



Future step 1: Prioritising the greatest need | What are the needs and opportunities

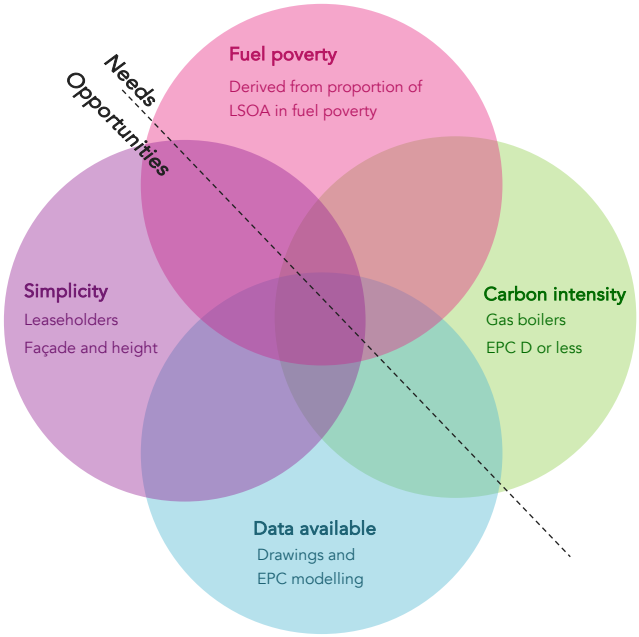
Prioritising retrofit based on needs and opportunities

We have started developing a prioritisation tool which presents a clear overview of the properties within the housing stock that are particularly well-suited for retrofitting interventions. This tool highlights properties that warrant immediate attention given the timescale to achieve the Corporation's Net Zero targets. The properties are scored based on the following metrics:

- Fuel poverty (proportion of LSOA in fuel poverty).
- Simplicity (based on number of leaseholders, number of storeys and wall type, identified during our work on Archetypes).
- Data available (drawings and EPC modelling).
- Carbon intensity (Percentage gas boilers and EPC ratings).

Within the prioritisation system there are some "red flags", e.g. the heating system must be gas, and the building should not be listed. This gives a table of potential priority properties that could be used alongside other information to decide on retrofit priorities i.e. the capital works and repairs programmes.

Further development of the tool incorporates the heating system as a parameter to prioritise properties, so it aligns with the City of London's decarbonisation of communally heated estates.



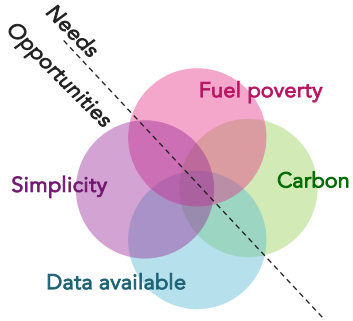
Key themes of needs and opportunities

Archetype	Block Name	Estate	Fuel poverty	% Tenant	No. of Storeys	Simple Façade	% EPC coverage	Drawings Available	% Gas Boilers	EPCs rated D or below	Communal Heating System	Prioritisatio
A2	Tevatree House	Avondale Square Estate	17%	100%	4	Y	71%	Y	100%	57%	-	13
A2	Avondale House	Avondale Square Estate	17%	71%	4	Y	55%	Y	100%	41%	-	11
A3	George Elliston Hou	Avondale Square Estate	17%	84%	5	Y	58%	Y	100%	38%	-	11
A2	Hilton House	Holloway Estate	16%	38%	3	Y	79%		100%	63%	-	11
A2	Whitby Court	Holloway Estate	16%	35%	2	Y	100%		100%	81%	-	11
A3	Eric Wilkins House	Avondale Square Estate	17%	60%	5	Y	45%	Y	100%	30%	-	10.5
A3	Dron House	Dron House	16%	54%	4	Y	99%		100%	30%	-	10.5
A6	Proctor House	Avondale Square Estate	17%	77%	10	?	94%		100%	56%	-	10
A6	Tovy House	Avondale Square Estate	17%	75%	10	?	90%	Y	100%	31%	-	10
A2	Great Suffolk Street	Southwark Estate	19%	80%	3	Y	44%		100%	31%	-	10
A6	Brettinghurst house	Avondale Square Estate	17%	68%	4	?	56%	Y	100%	39%	-	9.5
A2	Fairweather House	Holloway Estate	16%	59%	4	Y	63%		100%	32%	-	9.5
A3	Bazeley House	Southwark Estate	19%	69%	4	Y	59%		100%	31%	-	9.5
A3	Markstone House	Southwark Estate	19%	59%	4	Y	53%		100%	31%	-	9.5
A6	Colechurch House	Avondale Square Estate	17%	89%	10	?	64%	Y	100%	33%	-	9
A6	Lambfold House	York Way Estate	15%	84%	7	?	100%	Y	100%	32%	Communal	9
A3	Sumner Buildings	Southwark Estate	19%		5	Y	59%		100%	30%	-	9
A6	Shepherd House	York Way Estate	15%	47%	4	?	100%	Y	100%	47%	-	9
A3	Blake House	William Blake Estate	12%	58%	3	Y	92%		100%	42%	-	8.5
A3	Windsor House	Windsor House	9%	69%	4	Y	53%		100%	33%	-	7.5

Prioritisation tool - Identifying needs and opportunities across City of London Housing Stock. Showing the top 20 properties.

Future step 1: Prioritising the greatest need | Developing the retrofit process

Prioritisation



Developing solutions

Decisions on individual measures

Decision trees (generic) — Details & specification

Fabric	Windows – Triple glazing	✓
	Wall – External wall insulation	✓
	Wall – Internal wall insulation	
	Roof – Loft insulation	✓
	Roof – Flat roof insulation	
	Floor – slab insulation	✓
	Floor – suspended insulation	
	Junctions – insulated	✓
	Airtightness – improved	✓
	Ventilation – MVHR	✓
DHW	Hot water use – WWHR	✓
	Hot water storage tank	✓
LCH	Individual HP	✓
	Communal heat pumps	
	Direct electric	
Elec	Appliances – improved	✓
	Landlord lighting improvements	✓
	Landlord lift improvements	
	Smart energy controls	✓
Generation	Solar PVs	✓

Design standards

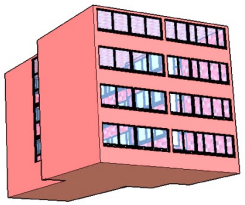
Case studies

Confirm if standards are enough, develop timeline

Challenges and interdependencies

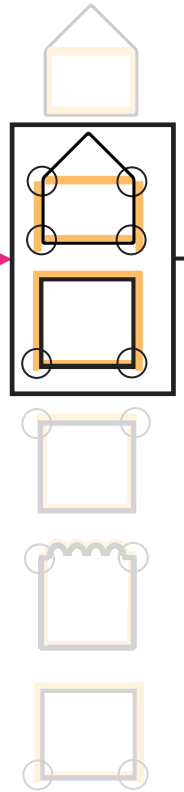
	Windows – Triple glazing	Wall – External wall insulation	Wall – Internal wall insulation	Roof – Loft insulation	Roof – Flat roof insulation	Floor – slab insulation	Floor – suspended insulation	Junctions – insulated	Airtightness – improved	Ventilation – MVHR	Hot water use – WWHR	Hot water storage tank	Individual HP	Communal heat pumps	Direct electric	Appliances – improved	Landlord lighting improvements	Landlord lift improvements	Smart energy controls	Solar PVs
Windows – Triple glazing																				o
Wall – External wall insulation					J		J													
Wall – Internal wall insulation																				
Roof – Loft insulation		J																		
Roof – Flat roof insulation																				o
Floor – slab insulation		J																		
Floor – suspended insulation																				
Junctions – insulated																				
Airtightness – improved																				
Ventilation – MVHR	!									!										
Hot water use – WWHR	Heating load dependent																			
Hot water storage tank																				
Individual HP																				
Communal heat pumps																				
Direct electric																				
Appliances – improved																				
Landlord lighting improvements																				
Landlord lift improvements																				
Smart energy controls																				
Solar PVs	o			o																

Energy modeling



Whole house retrofit plan (block by block)

Simplifying stock into archetypes and refining the plan for archetypes



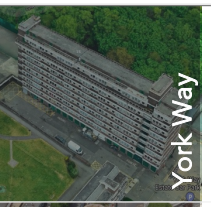
Template plans for Archetypes

Project triggers & funding

- Voids
- Repairs
- Planned maintenance
- Internal funding
- Capital works
- Internal funding
- External funding
- Delivery plan

Future step 2: Developing the net zero roadmap | Communally heated estates

This page sets out a strategy for the communally heated estates, based on our understanding of technical priorities, other strategic priorities will need to be incorporated. The order in which estates are retrofitted will depend on the prioritisation established in Future Step 1. Low carbon heat should be delivered earlier if possible.



Lambfold house
Kinefold house
Penfields house

Surveys and tests (WP1)
Roof insulation, PV panels, Windows, Ventilation (WP2)
Low carbon heat, Electrics - landlord (WP3)
Wall insulation (WP4)
Electrics - residents (WP5)
Floor insulation (WP6)

Generally insulated externally, but complex junctions include balconies, stair cores and parapets. High proportion of windows on main façades.

Bishop St
Prebend St
Coleman Fields

Surveys and tests (WP1)
Roof insulation, PV panels, Windows, Ventilation (WP2)
Low carbon heat, Electrics - landlord (WP3)
Wall insulation (WP4)
Electrics - residents (WP5)
Floor insulation (WP6)

Walls insulated externally and cavity wall insulation replaced. Complex junctions include balconies, bay windows and continuity at eaves / parapets.

Petticoat square
Petticoat tower

Surveys and tests (WP1)
Roof insulation, PV panels, Windows, Ventilation (WP2)
Low carbon heat, Electrics - landlord (WP3)
Wall insulation (WP4)
Electrics - residents (WP5)
Floor insulation (WP6)

Generally insulated externally, but complex junctions include balconies, stair cores and parapets on low rise and complex detailing around windows on tower.

Frobisher Crescent

Surveys and tests (WP1)
Roof insulation, PV panels, Windows, Ventilation (WP2)
Low carbon heat, Electrics - landlord (WP3)
Wall insulation (WP4)
Electrics - residents (WP5)
Floor insulation (WP6)

Façade is highly glazed, internal wall insulation may be possible in places. Barrell roof insulation is possible. There would be multiple complex junctions.

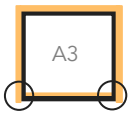
Twelve Acres House

Surveys and tests (WP1)
Low carbon heat, PV panels, Ventilation (WP2)
Electrics - landlord (WP3)
Electrics - residents (WP4)
Windows, Wall insulation, Roof insulation, Floor insulation (WP5)

Horace Jones House

Surveys and tests (WP1)
PV panels, Ventilation (WP2)
Electrics - landlord (WP3)
Low carbon heat (WP5)
Electrics - residents (WP4)
Windows, Wall insulation, Roof insulation, Floor insulation (WP6)

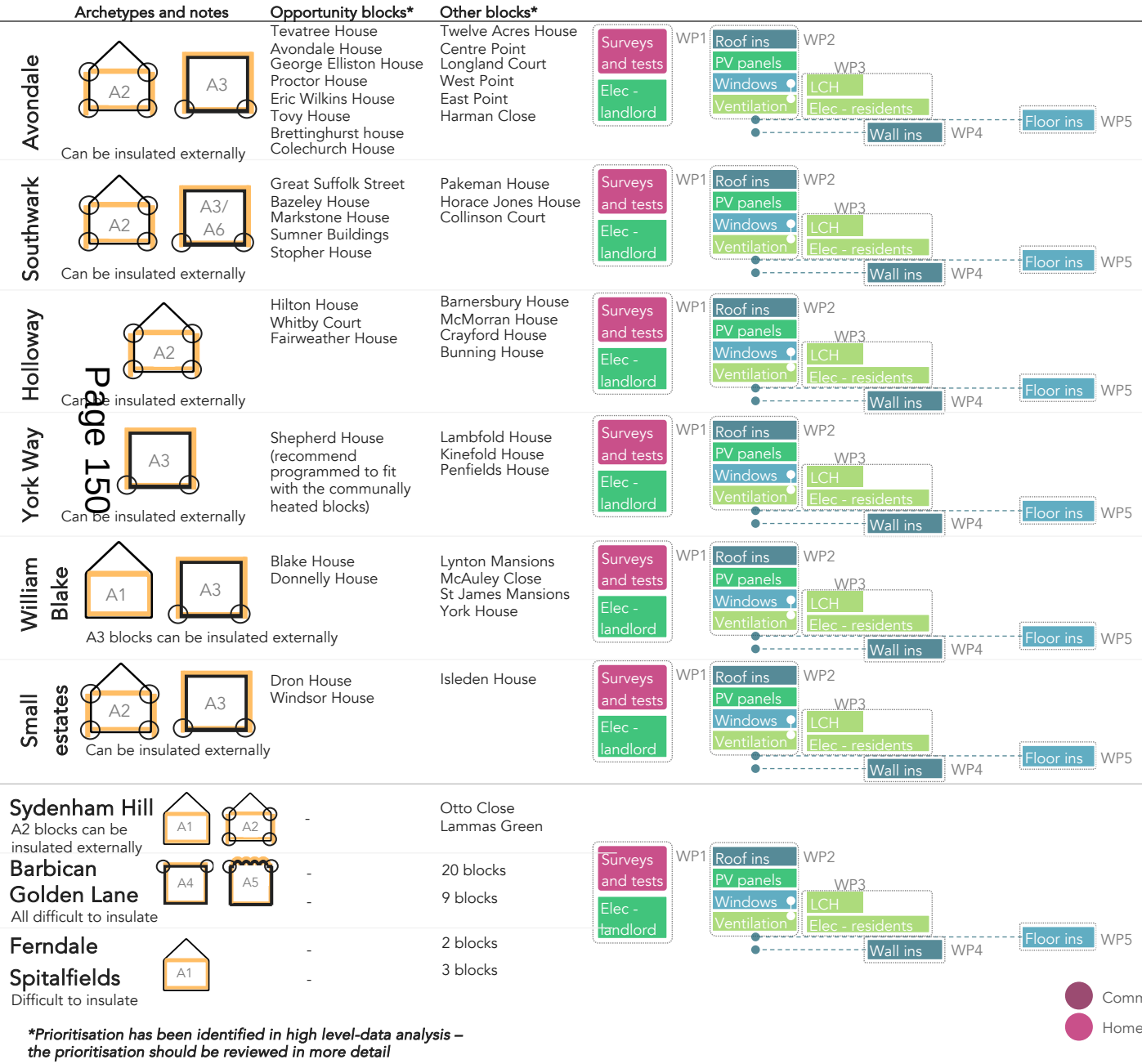
Relatively new buildings. Assumed to be "heat pump ready". Horrace Jones House connected to district heating network not controlled by CoL, so changing to heat pump system may be complex. Thermography may identify problem areas for fabric. Top up roof Insulation and install EWI if necessary / possible. Replace windows with high quality triple glazed when possible.



KEY:
- Communal areas surveys
- Home surveys
- Communal services
- Home services
- Communal fabric measures
- Home fabric measures
- Measures to renew if surveys suggest necessary
- Measure to be installed renewed earlier if necessary, e.g., for low carbon heat strategy

Future step 2: Developing the net zero roadmap | Non-communally heated estates

This page sets out a strategy for the **non-communally** heated estates based on our understanding of technical priorities, other strategic priorities will need to be incorporated. The order in which estates are retrofitted will depend on the prioritisation established in Future Step 1.



Prioritisation has been identified in high level-data analysis – the prioritisation should be reviewed in more detail

The estates towards the top are those with most opportunity blocks, these have been ranked on the basis of needs (e.g. fuel poverty, low EPC rating, gas boilers) and opportunity (e.g. simple façade, number of floors, proportion of tenants

Those towards the bottom are more challenging to insulate. However, in order to meet the 2030 and 2040 targets, measures that can be installed should be installed as soon as possible on these blocks too.

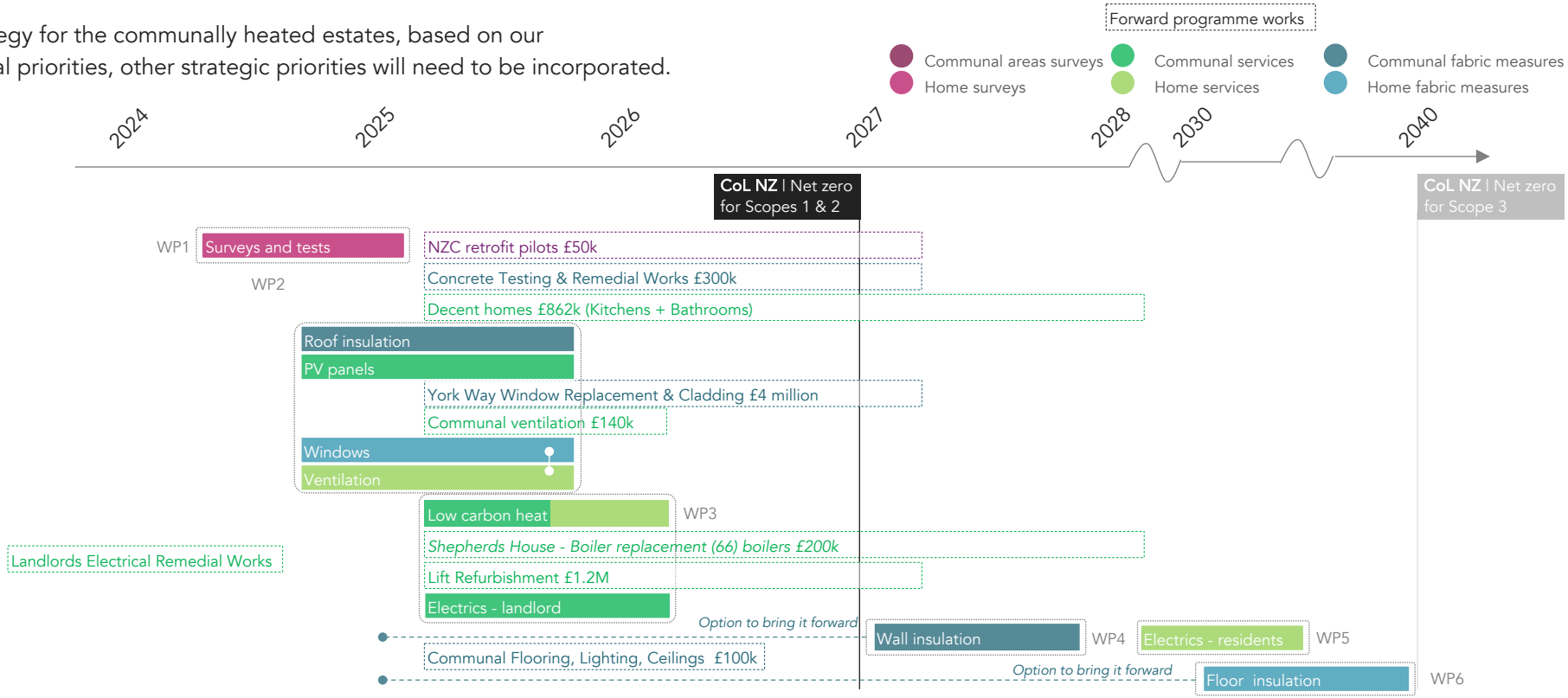
All sites are shown as starting immediately, as this is the ideal scenario. This page does not take into account any planned works or previously identified works. These will be addressed in the estate by estate pages, and should evolve as more information becomes available.

Heat pumps should be installed earlier if heating loads allow.

Future step 3: Create building retrofit plans | York Way example | Overview

This page sets out a strategy for the communally heated estates, based on our understanding of technical priorities, other strategic priorities will need to be incorporated.

- Lambfold house
- Penfields house
- Kinefold house
- Shepherds House
(not communally heated, but opportunity to include in works)



Fabric watch points

Archetype A6. This blocks could be generally insulated externally, but complex junctions include balconies, stair cores and parapets.
There is a high proportion of windows on main façades.

	Description
WP1 Surveys	• Stock condition | Heat network monitoring | Thermography • Energy monitoring | EPCs | Blower door | Heat emitter survey
WP2 Roof + PV + Windows +vent	• Flat roof, insulation up to 400mm • At least 450kWp panel power, maximum possible on all roofs • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals • High quality MVHR (or dcMEV if MVHR not possible), with or before windows
WP3 Heat and landlord electrics	• Replace communal gas boiler system with communal heat pumps. Associated works to pipework and hot water storage. • Shepherds House likely to require individual heat pump systems – surveys required. • LED lighting upgrades to fixtures, lift refurbishment inc. regenerative motors, replacement of pumps inc. VFD, upgrade of electric meters allowing for PV connection.
WP4 EWI	• Up to 200mm EWI where possible. Install earlier if necessary to reduce heat load if opportunity arises. • Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.
WP5 Resident electrics	• Low energy appliances and smart energy controls. Advice given.
WP6 Floor insulation	• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.

Future step 3: Create building retrofit plans | York Way example | Work packages

Communal areas surveys | Home surveys | Communal services | Home services | Communal fabric measures | Home fabric measures

	Type of work	Description	Access/enabling works	Cyclical opportunities	Timescale	Cost	Carbon
WP1 Surveys		• Building condition, airtightness and EPCs– *aim to identify defects and focus for measures* • Communal and flat services – *aim to highlight heating system upgrades needed for low carbon heat*	• Minimal • Access to several homes & landlord areas	• No relevant opportunities in forward programme	9 months	£	→
WP2 Roof + PV + Windows +vent		• Remove existing roof covering and install flat roof insulation up to 400mm on top of roof slab • Install maximum possible PV across the 3 taller buildings • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals inside flats • High quality MVHR (or dcMEV if MVHR not possible), with or before windows	• Full height scaffolding, temporary shelter for roof • Resident decant for ventilation system install c. 2 weeks per flat? Align with Decent Homes	• Window and cladding replacement – 2025 • Communal ventilation – 2025 • Decent Homes – 2025 • NZC retrofit pilots - 2025	**D**: 6 months **C**: 2 years	££££	↘
WP3 Heat and landlord electrics		• Replace communal gas boiler system with communal heat pumps. Shepherds House likely to require individual heat pump systems – surveys required. • LED lighting upgrades to 307 fixtures, upgrade 12 fans to VFD, lift refurbishment	• TBC	• Communal ventilation – 2025 • Shepherds House boiler replacement 2025 • Lift refurb – 2025 • Communal lighting - 2025	**D**: 6 months **C**: 2 years	££££	↘
WP4 EWI		• Up to 200mm EWI where possible. Install earlier if necessary to reduce heat load if opportunity arises.	• Similar to WP2, opportunity to carry out at same time	• WP2 works	**D**: 6 months **C**: 2 years	£££	↘
WP5 Resident electrics		• Low energy appliances and smart energy controls. Advice given.	• TBC	• WP2 works	1-3 years	££	↘
WP6 Floor insulation		• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.	• Access to flats needed, could be completed same time as WP2 + 3	• Communal flooring & Concrete testing/remedials	**D**: 3 months **C**: 1 year	££	↘

Commentary

York Way represents one of the most promising schemes for comprehensive retrofit given its current capital works programme. Most areas of the building's external envelope are due for some form of renewal, inspection or repair before 2028. In addition to this the Decent Homes scheme will mean that bathrooms and kitchens are renewed in many properties and this offers the opportunity to install new ventilation systems in the flats.

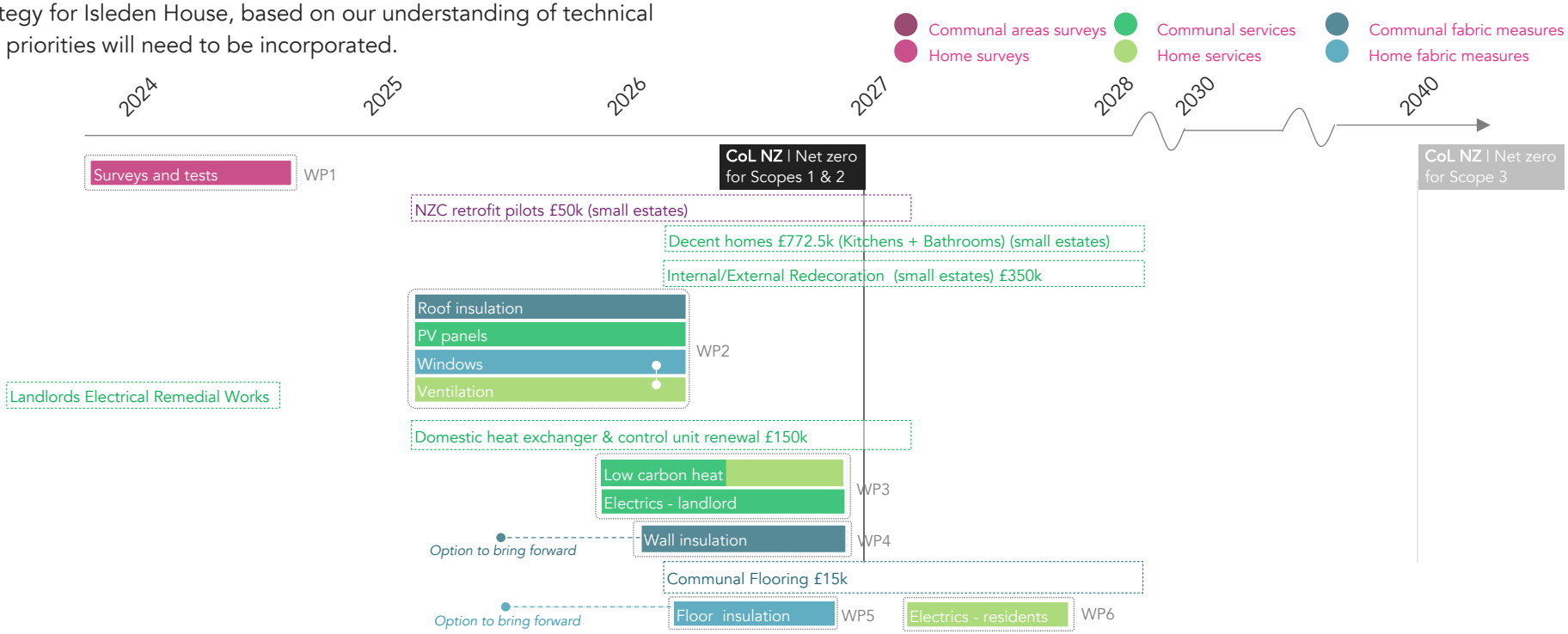
York Way has recently had its heating system renewed but this has led to the installation of new gas boilers. The retrofit works offer the opportunity to build in the measures needed to decarbonise this heat supply looking at changes to the distribution and the systems in the flats themselves. The gas boiler system should be switched to a heat pump-based system as soon as possible. Shepherds House is the smallest block and not connected to the main heating system and instead has individual gas boilers which are due for replacement in 2025 (unfunded). It's likely these homes could be switched over to an individual heat pump system.

Minor changes to landlord services including lift upgrade/replacements and lighting changes could also be completed within the scheduled programme of works but would give minimal savings.

Future step 3: Create building retrofit plans | Isleden example | Overview

This page sets out a strategy for Isleden House, based on our understanding of technical priorities, other strategic priorities will need to be incorporated.

- Bishop St
- Prebend St
- Coleman Fields



Fabric watch points

Archetype A2. The walls could be insulated externally, and cavity wall insulation replaced. Complex junctions include balconies, bay windows and continuity at eaves / parapets.

	Type of work	Description
WP1 **Surveys**		• Stock condition | Heat network monitoring | Thermography • Energy monitoring | EPCs | Blower door | Heat emitter survey
WP2 **Roof + PV + Windows +vent**		• Flat roof, insulation up to 400mm • At least 450kWp panel power, maximum possible on all roofs • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals • High quality MVHR (or dcMEV if MVHR not possible), with or before windows
WP3 **Heat and landlord electrics**		• Replace communal gas boiler system with communal heat pumps. Associated works to pipework and hot water storage. • LED lighting upgrades to fixtures, lift refurbishment inc. regenerative motors, replacement of pumps inc. VFD.
WP4 **EWI**		• Up to 200mm EWI where possible. Install earlier if necessary to reduce load and /or if opportunity arises.
WP5 **Floor insulation**		• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.
WP6 **Resident electrics**		• Low energy appliances and smart energy controls. Advice given.

Future step 3: Create building retrofit plans | Isleden example | Work packages

Communal areas surveys | Home surveys | Communal services | Home services | Communal fabric measures | Home fabric measures

	Type of work	Description	Access/enabling works	Cyclical opportunities	Timescale	Cost	Carbon
WP1 Surveys		• Building condition, airtightness and EPCs– *aim to identify defects and focus for measures* • Communal and flat services – *aim to highlight heating system upgrades needed for low carbon heat*	• Minimal • Access to several homes & landlord areas	• No relevant opportunities in forward programme	9 months	£	→
WP2 Roof + PV + Windows +vent		• Remove existing roof covering and install flat roof insulation up to 400mm on top of roof slab • Install maximum possible PV across the 2 taller buildings and a row of bungalow terraces • High quality triple glazed windows, and equivalent spandrel panels, insulated reveals inside flats • High quality MVHR (or dcMEV if MVHR not possible), with or before windows	• Full height scaffolding, temporary shelter for roof • Resident decant for ventilation system install c. 2 weeks per flat? • Align with Decent Homes	• Landlords Electrical Remedial works -2024 • Decent Homes – 2026 • NZC retrofit pilots - 2025	**D**: 6 months **C**: 2 years	££££	↘
WP3 Heat and landlord electrics		• Replace communal gas boiler system with communal heat pumps. • LED lighting upgrades to 117 fixtures	• TBC	• Domestic heat exchanger & control unit renewal - 2025 • Communal lighting - 2025	**D**: 6 months **C**: 2 years	££££	↘
WP4 EWI		• Up to 200mm EWI where possible. Install earlier if necessary to reduce heat load if opportunity arises.	• Similar to WP2, opportunity to carry out at same time	• WP2 works	**D**: 6 months **C**: 2 years	£££	↘
WP5 Resident electrics		• Low energy appliances and smart energy controls. Advice given.	• TBC	• WP2 works	1-3 years	££	↘
WP6 Floor insulation		• Up to 50mm insulation on solid floors. Install earlier if necessary to reduce heat load if opportunity arises.	• Access to flats needed, could be completed same time as WP2 + 3	• Communal flooring • Internal/ External Redecoration - 2026	**D**: 3 months **C**: 1 year	££	↘

Commentary

Isleden House represents one of the most promising schemes for short-term comprehensive retrofit given its current cyclical replacements programme. Most areas of the building's external envelope are due for some form of renewal, inspection or repair before 2028. In addition to this the Decent Homes scheme will mean that bathrooms and kitchens are renewed in many properties, and this offers the opportunity to install new ventilation systems in the flats.

Retrofit works offer the opportunity to build in the measures needed to decarbonise the heating supply by looking at changes to the distribution and the systems in the flats themselves. The gas boiler system should be switched to a heat pump-based system as soon as possible. The bungalow terraces could be switched over to an individual heat pump system.

Minor changes to landlord services including lift upgrade/replacements and lighting changes could also be completed within the scheduled programme of works but would give minimal savings.

Archetypes to case studies

The last section described the potential of archetypes to simplify the retrofitting process. For the housing action plan our analysis of the CoL stock was high-level and gave a strategic route to retrofitting a large number of buildings. To develop this further, individual examples of each archetype can be examined in more detail, the proposals tested and modelled, and the predicted energy and carbon saving and any potential issues fleshed out.

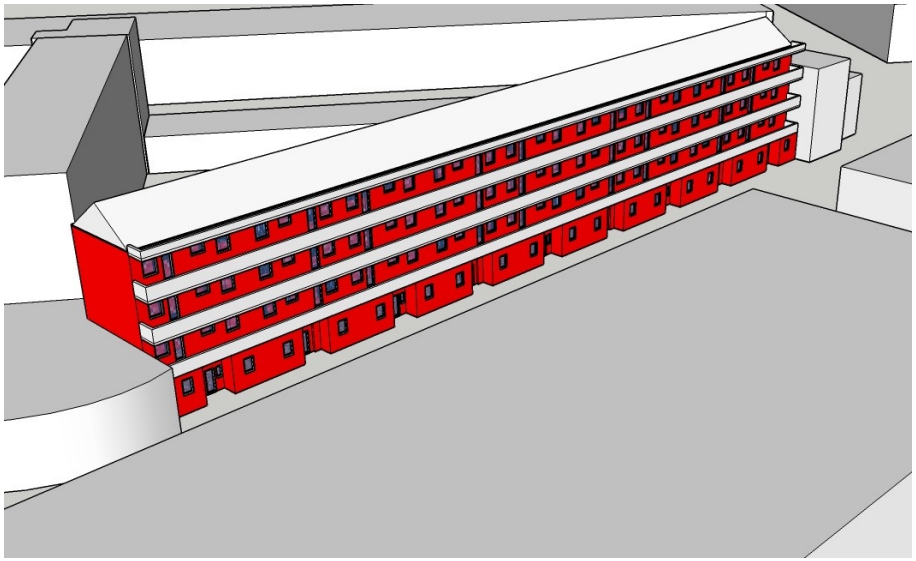
Strategy to detail

Once a specific strategy is refined for a building, details would be produced as part of the retrofit, which would help to inform other buildings within the same Archetype – leading to a standard set of details that were broadly relevant to all blocks within an archetype. Variations could also be explored, e.g. different types of balcony arrangement, different unheated spaces or vertical circulation. These could then be adapted as appropriate for individual blocks. Technical challenges should be identified both across whole archetypes and gradually for each block.

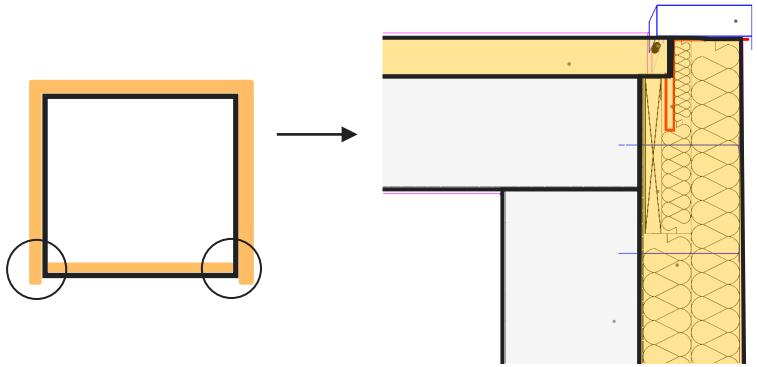
Stock retrofit process

At the beginning of this section is a stock retrofit process, this indicates:

- Prioritisation process – used to identify useful pilot projects and projects to tackle first.
- Case studies feeding into Archetype knowledge and used to develop template Archetype plans.
- Case study insight into individual measures used to inform CoL design standards.
- Individual building plans combining with CoL specific triggers and funding to develop a coherent delivery plan.



Example of an energy model – DesignPH model of the Bishop Street block of Isleden House



From strategy to detail – Diagram of Archetype 3 insulation locations and example insulation detail (adapted from retrofit pattern book – retrofit.support/detail/19/)

Isleden House is a priority

Isleden House meets several of the prioritisation criteria: it has an old communal gas heating system in need of replacement, it is an area that has relatively high levels of fuel poverty and low EPC banded properties, and it fits within Archetype 3, which is relatively easy to retrofit.

Applying the retrofit principles to Isleden House

We conducted site surveys to understand the current building fabric and services in more detail and assessed the current and potential heating capacities of the radiators in example flats through visual inspection. This enabled us to propose the extent of fabric improvements required as a 'first step' to enable a heating system with a lower distribution temperature. This has a significant impact on final energy use, carbon emissions, cost and comfort. This has also indicated that more than half of the energy consumption for the Bishops street block could be matched by renewable energy generation from PV panels.

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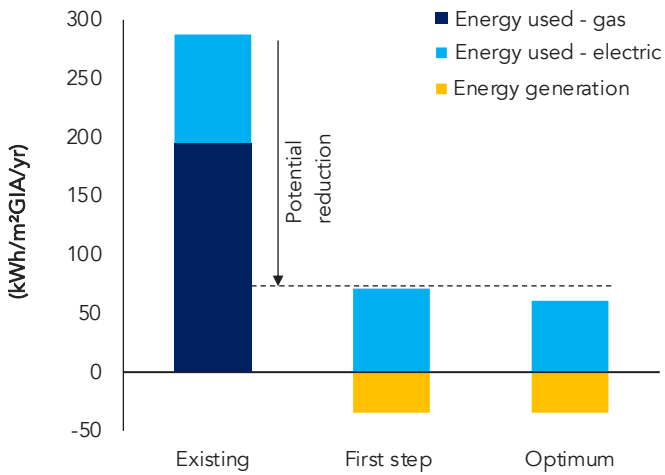


This graph shows the potential energy reduction and generation from interventions at the first step and 'optimum' stages of retrofit. More detail on what is included on those stages is provided in the following pages.

Top to bottom: Isleden house from above, Coleman fields elevation, steel beams, metal framed windows, hot water insulation condition and original steel structure.

Isleden house building fabric

Isleden House currently has a steel frame superstructure with reinforced concrete slabs. The roofs are precast concrete slabs which are sheltered by the pitched roof above and uninsulated. The facing walls appear to be solid brick, but there is evidence suggesting the headers are false with a 50mm cavity which was insulated at some point. Steel beams traversing the block are visible as bulkheads in all the homes. These could be a source of increased heat loss.

Windows – the current steel framed windows were installed as part of a renewal project in 2008 and were manufactured for the estate by Crittal. Although described as insulating double glazed units, given the age and build-up of them we would expect them to still be a point of thermal discomfort for residents and a possible risk of condensation.

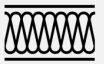
Infiltration – the homes are likely to be draughty, there are many paths for air infiltration. Fire places are vented, lots of passive vents through walls, old windows and doors, and trickle vents on the windows (residents may actually close these though).

Isleden fabric improvements

Our proposals include new triple glazed windows, MVHR, roof insulation and external wall insulation as part of the 'first step' and floor soffit and deck insulation in the optimal scenario. The graph to the right shows the proportions of the heat loss for the existing building and two retrofit stages. The potential reduction in heat loss through the walls, roofs and windows are particularly notable.

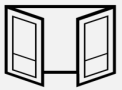
The 'first step' measures were selected to deliver nearly 60% reduction in average space heating load per flat, in order to allow a reduced hot water circulation temperature with the same size radiators and to reduce overall energy consumption. Our modelling shows that the set of measures identified in the optimal scenario would deliver approximately 70% reduction in heating load on average per flat. This is an average for this block and flats in different locations will have different energy balances.

Roof insulation



- ☑ Cold roof → Loft insulation
- ❑ Flat / warm roof → insulate on the outside. Install PV at same time

Windows



- ☑ Single glazed or old double glazed? → Replace with triple.
- ❑ New double or triple glazing? → Spot check performance and air-tightness and leaky windows

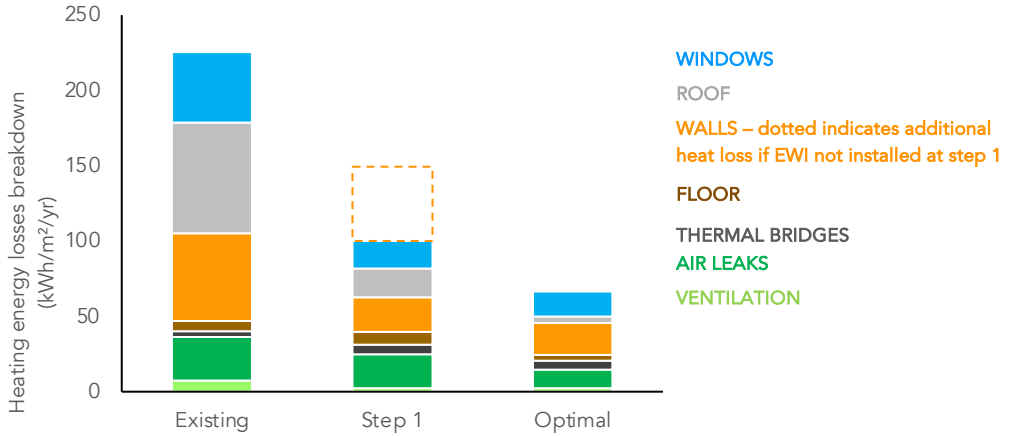
Ventilation

- ☑ Install mechanical ventilation with heat recovery (MVHR) in all dwellings where possible.
- ❑ Limited potential for intakes and extracts on façade? → consider centralised MVHR, dcMEV where MVHR is not possible

Wall insulation

- ☑ Simple external form? → External wall insulation
- ❑ Post-1920s → External wall insulation where possible
- ❑ Pre-1920 / Complex façade / Listed or conservation area → Internal wall insulation, external insulation where possible

Decision processes for fabric improvements applied to Isleden House. The dotted line indicates that ventilation must be upgraded with window improvements (or before)



This graph shows the breakdown of heat losses per TFA m² for the existing building and the two retrofit stages

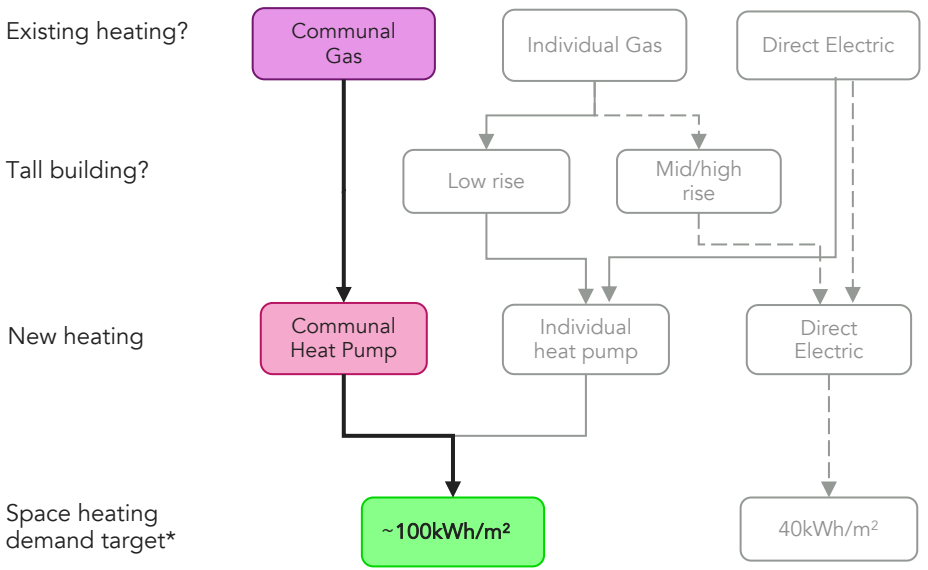
Isleden house heating system

The gas communal heating system is 20 years old. Space heating pipework distributes at roof level and drops through risers between pairs of flats, serving heat interface units (HIUs) in kitchens. From the HIUs, pipework drops to low level into channels running through the floor to serve radiators. In some cases, the pipework in the floor has been replaced with pipes at skirting level, suggesting there may be some issues with access to replace the pipework in the floors (e.g. pipes cast in, or possibly that the parquet floors are difficult to remove and replace).

Domestic hot water is supplied instantaneously via the HIUs. There are cupboards which may have housed storage cylinders in the past.

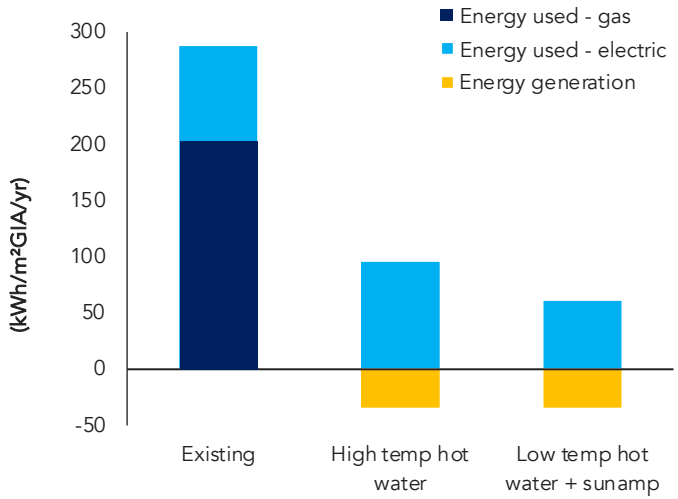
Isleden house heating system improvements

Alongside fabric and ventilation improvements, two heating options were modelled: central heat pumps with high temperature circulation and central heat pumps with lower temperature circulation and SunAmp thermal batteries. The graph below shows the impact of the lower temperature hot water circulation compared to a high temperature hot water scenario. This makes it possible to get closer net zero carbon and reduces overheating risks.



*Where space heating targets are unachievable in the short term, an interim step may be to use a hybrid heat pump while fabric improvement works are undertaken

Decision processes for low carbon heat, bold arrows show preferred route
**note that this should be assessed on a case-by-case basis as the threshold for heat pumps is often higher*



This graph shows the impact of the lower temperature hot water distribution compared to high temperature hot water distribution, both at the 'optimum' stage of retrofit.

PV strategy in order to achieve Net Zero

Improved levels of energy efficiency through the proposed 'optimal' retrofit strategy would be the first step towards achieving a net zero energy balance on-site. A net zero energy balance would only be possible if solar PV were installed on the roofs and the renewable energy generated in a year matched the energy used in a year (the EUI). The results show that it is possible to generate 50% of the energy consumption for the block modelled.

Key Assumptions

The analysis was based on the following:

- Panel Sizes: 1.1 x 1.7 m (i.e. Longi Hi-MO6 Scientist)
- PV Module Type: Monofacial Crystalline Mono-Si with microinverters or DC optimisers
- Assumed system Loss: 10%
- PV Peak Power: 450 Wp

Maximised PV option

The roofs on the block modelled (roof A) can accommodate 210 PV panels, which is proportionally more than could fit on the other two blocks (roofs B and C). Half are assumed to be on the East-SouthEast facing roof and the other half on the West-NorthWest roof. This number of panels uses all the available roof space for PV generation. Based on our site visit to Isleden House the supported living bungalow roofs (roof C) were fairly wide and could allow for three rows of landscape panels in order to maximise the number of panels. PV installers typically prefer to mount the modules portrait rather than landscape, though both options are possible.

Maximum PV array highlighted in green for the block modelled (pitched roof arrangement at 30 degrees tilt)

Example of PV panels installed on an existing roof. (Source: Alamy Stock Photo)

5.0

Finances | The costs and savings associated with retrofitting

Retrofit plans will need a comprehensive costing exercise. We have provided indicative figures based on our experience on previous projects.

Finances | Example costs of measures

Considerations and costs of a retrofit measure

It is notoriously challenging to provide an accurate assessment of the cost of retrofit. It depends on a building's characteristics and construction type. There is a significant difference in the size and complexity between apartments and houses which will produce variance in the costs – more for some and less for others.

Sequencing and batching work packages based on the retrofit measures covered in this guide as well as other works are also factor influencing cost. A list of indicative costs for key energy retrofit measures is provided on this page. They are expressed per measure and in different units, therefore, amalgamate the cost for a project requires geometric data of a building.

How much will it cost to retrofit? (Isleden case study)

There are two steps of specifications given for the retrofit of Isleden. The first step is designed to meet a 60% heating load reduction per flat. This allows for a reduced hot water circulation temperature and reduced energy consumption while keeping the same size radiators.

We have estimated the cost of retrofitting the block of flats on Bishop Street using the cost ranges of singular measures (on the right). The cost is estimated to be between £800,000 and £1,500,000 to get to step 1 and an additional £300,000 to £500,000 to get to optimal specification. Therefore, the total retrofit cost would range from **£1,100,000** to **£2,000,000.** These costs include installation, but exclude other project costs such as prelims, contingencies, VAT and attendances such as scaffolding. A reduction factor of 20% has been applied to the total cost of the retrofit measures to account for price reduction when doing works in bulk. The refurbishment of the heating system - separate to the total retrofit cost report – has been estimated to range between **£1,500,000** and **£1,700,000** by Beveridge Associates.

For the solar panels, the cost was estimated using "Annual cost of small-scale solar technology summary - May 2023" from BEIS.

Indicative costs of a range of retrofit measures

	Measures	Cost	
Windows & doors	Advanced secondary glazing with refurbishment of existing window (per m^2)	£900	£1,400
	Evacuated glazed sash (per m^2)	£900	£1,600
	Double glazed sash (per m^2)	£900	£1,500
	Double glazed casement (per m^2)	£800	£1,200
	Triple glazed 'mock' sash (per m^2)	£1,300	£1,500
	Triple glazed single casement (per m^2)	£900	£1,300
	New entrance door (1 unit)	£1,600	£5,000
	Rooflight (per m^2)	£700	£1,000
	Improved draught proofing - New window sealing, filling cracks and taping junctions	£300	£800
Airtightness & ventilation	Mechanical ventilation system - MEV with associated ducts	£1,200	£2,800
	Mechanical ventilation with heat recovery - MVHR with associated ducts	£5,000	£10,000
Insulation	Front façade - 40-80mm internal insulation (m^2)	£163	£465
	Rear façade - 100-200mm external wall insulation (m^2)	£152	£326
	Roof (slope+loft) - 100-400mm + 25-50mm insulation (m^2)	£125	£500
	Suspended floor - 100mm insulation (m^2)	£39	£98
	Solid floor - 25-50mm insulation (m^2)	£157	£255
Solar PV	Photovoltaic panels, pounds per kWp	£938	£1,034

The costs above are only indicative. A specific cost plan must be undertaken for each retrofit.

Finances | Example costs of survey works

Considerations and costs of surveying

Surveying provides a baseline assessment of the housing stock and plays a critical role in the prioritisation and scheduling of measures outlined in this delivery plan. Some estates might need less or more survey work relative to one another. The following list outlines valuable surveys and their indicative costs:

- External whole building thermography £5,000 - £10,000 per medium rise building.
- Airtightness testing £200 per area tested (this might be a flat or a core of a building).
- EPCs – required for each flat, cost £100 per property – it is important to note that the accuracy of results are proportional to what you pay.
- Heritage Impact Assessments – variable depending on building size, location and architecture but assumed to be £2,000 for smaller estates, £6,000 for medium estates and £10,000 for larger estates.
- Stock condition survey – variable depending on building size, location and architecture but assumed to be £2,000 for smaller estates, £6,000 for medium estates and £10,000 for larger estates.
- Heat network monitoring - £30,000

	Isleden	York Way	William Blake	Avondale – Tevatree House
Thermography	£20,000	£20,000	£20,000	£5,000
Airtightness*[1]	£2,000	£2,000	£2,000	*[2]£600
EPC	£3500	-	-	*[3]£200
Heritage Impact Assessment	£10,000	£10,00	-	-
Stock condition survey	£10,000	£10,000	-	£2,000
Heat network monitoring	£30,000	£30,000	-	-
Total	£75,500	£72,000	£22,000	£7,800

Indicative survey costs for Isleden, York Way and William Blake estates and Tevatree House (which was highlighted as priority for retrofit on the prioritisation table and would serve as a good net zero pilot project)

[1]**Air test cost typically for 10 sample flats*

[2]** Air test for 3 sample flats out of the total of 7 in the building*

[3]** EPC for 2 flats in the building*

Finances | How this impacts on residents - their energy bills and costs from the CoL

The cost of switching from gas to electricity

The UK has announced that it is aiming to increase the number of heat pump installations from 55,000 a year in 2021 to 600,000 a year by 2028. Heat pumps run on electricity, which releases fewer emissions than gas. This hasn't always been the case but is true now since just under 43% of UK electricity comes from renewable sources.

Gas boilers, on the other hand, are powered by natural gas – a fossil fuel that's responsible for around 75% of global emissions today.

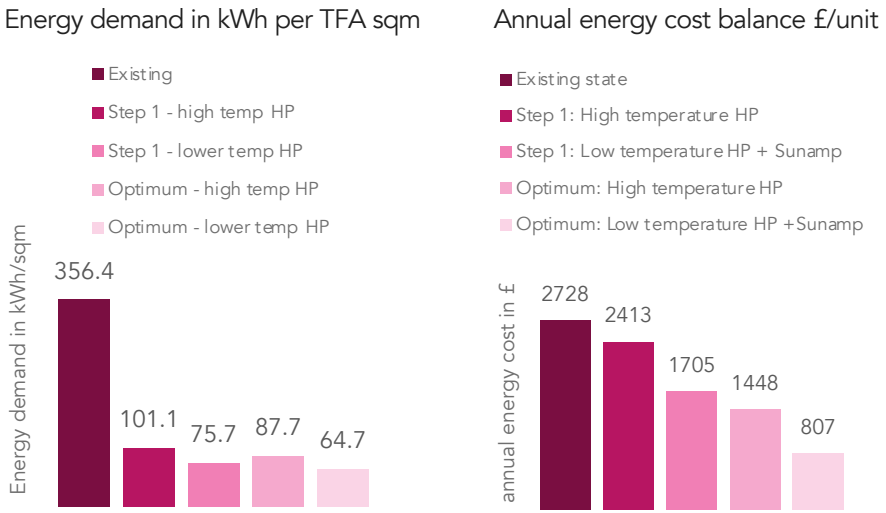
Boilers do not age very well and lose efficiency overtime; most boilers operating in the UK are around 82% efficient according to a study conducted by the Energy Saving Trust. On the other hand, heat pumps can achieve much higher efficiencies: around 350% when installed on older properties as part of a retrofit.

The average UK price for electricity is just under 29p per kWh with a 0p standing charge while it is about 7p per kWh with a 28p standing charge for gas.

Different energy bills cost estimates based on level of retrofit

Using the specifications of a housing unit in Isleden, we have estimated the bills for different energy options. The energy demand of a unit in its existing state is 360 kWh/m^2 but it can be reduced to 65 kWh/m^2 with optimum retrofit measures and a heat pump led heating system. The reduction in energy demand paired with installation of PVs can significantly reduce the annual energy bill.

The average total annual energy bill (including all energy demands - heating, appliances, lighting etc.) for an Isleden unit has been estimated at £2700. This can be reduced to £1700 with Step 1 recommendations. If the optimum recommendations are performed the bill can be reduced to around £800 which represents an annual reduction of almost £2000/unit!



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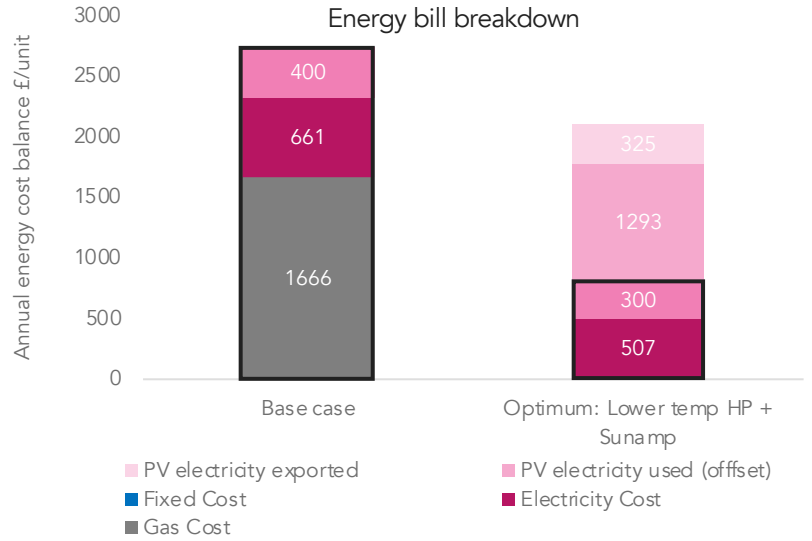


Using all of the solar panels

Social Housing Decarbonisation Fund (SHDF)

The UK Government Department for Energy Security and Net Zero (DESNZ) has provided, so far, three tranches of funding for qualifying projects. A fourth (Wave 2.2) is currently open for bids, until 31st January 2024. There is no firm timetable for future waves but the expectation is that there will be future funding rounds in this programme.

The programme rules include criteria for the current and improved EPCs, a target space heat demand threshold, a minimum number of homes (100) and a maximum time period in which to complete the work. The bid windows are generally quite short – around 2 months – and detailed project information is required in each submission.

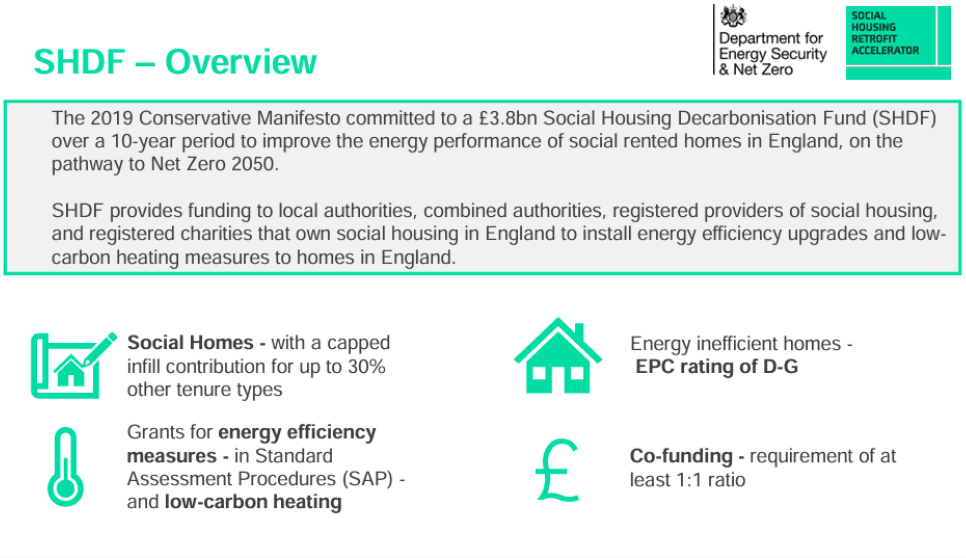
Heat Network Efficiency Scheme (HNES)

DESNZ also provide funding grants through HNES for improvements to communal and district heating systems. The scope of works covered is quite restricted, but some CoL buildings would qualify for some funding support. The awards are general fairly modest and would not support major works, but could be used for controls, monitoring and efficiency improvements such as pipework insulation. Applications have to be made by May 2024 and the funded work must be completed by March 2025. It isn't clear whether there will be future funding rounds in this programme.

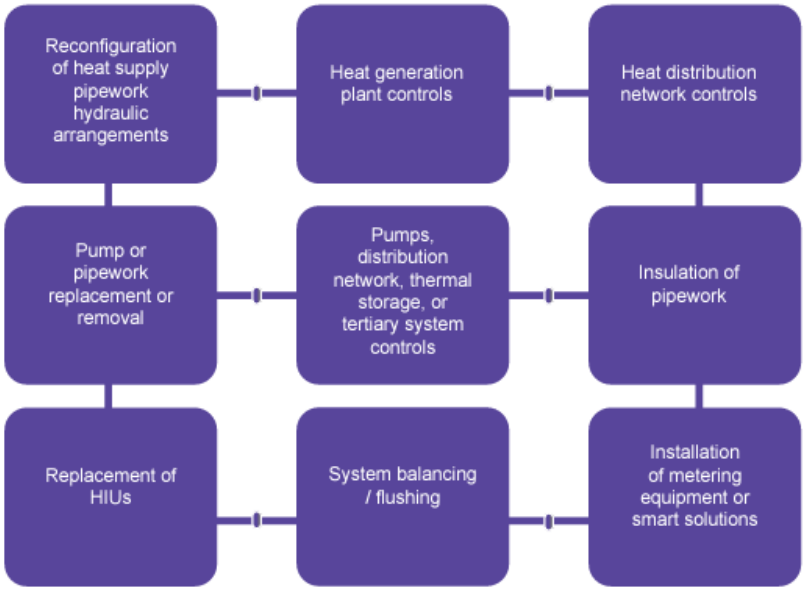
Other potential funding schemes

The Government have indicated a number of other funding schemes are planned, although details are not confirmed and, with a general election in the near term, may not be realised. Other funding schemes may be brought in as well or instead.

- A new energy efficiency grant for households to make changes such as bigger radiators or better insulation.
- A new local authority retrofit scheme to support low-income and cold homes with measures such as insulation.



SHDF scheme summary from the 'Wave 2,2 handbook' (published by DESNZ)



Summary of key measures eligible for HNES funding from HNES Scheme Overview (DESNZ)

6.0

Risks | Avoiding the mistakes of poor retrofit or not intervening

Summary of the risks to be considered by the City when discussing retrofit.

Risks | The risk of doing nothing or too little

Carbon emissions and climate change

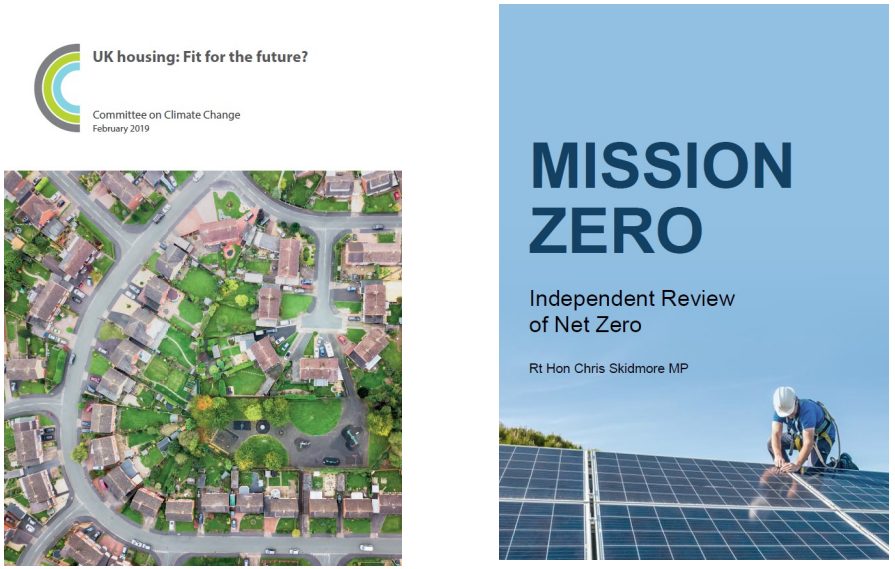
It would be impossible to attribute a specific climate outcome to the emissions from one building or estate. The climate risk for one organisation not meeting the net zero target is more in the principle than the fact; action to reduce carbon emissions does not sit with one organisation, even the Government. The public must act as well, and the leadership of Local Authorities like CoL will be crucial in persuading individuals to make the changes that, collectively, will achieve the UK's legal targets.

Legislation and Regulation

There is currently a legal minimum EPC (MEES) of Band E for all privately rented homes. Although currently social rented homes in England are exempt from the MEES target, the recommendation of both the Climate Change Committee and the government's Mission Zero report is to require a minimum standard for all housing. Although the Government has recently withdrawn proposals to tighten the MEES standard, it is likely that a higher minimum energy efficiency rating will be a legal requirement for all properties in due course. Currently around 46% of CoL homes for which there are EPCs have a rating of Band D or worse. All of these, plus any of the 31% of homes that don't currently have an EPC that fall into that category when they are assessed, should be planned to have some retrofit undertaken to avoid them becoming stranded assets if and when the rules change.

Increasing costs

As the various deadlines for action come nearer, the Government is likely to have to bring in more regulation to encourage and enforce action. This may be in the form of banning low cost, high carbon technology (gas boilers) or of setting performance targets (EESSH). As these are introduced, the constriction in the supply chain will inevitably mean demand outstrips supply, at least for a while. Costs for the most common retrofit works and installers are therefore likely to increase ahead of general inflation rates in the next ten years.



Reports to Government are emphasising the need for urgent action on Climate Change, including legislation to mandate retrofit, especially for landlords and social housing providers. More regulation in the near term seems inevitable.

Health & Wellbeing

It is also important that the sequencing and pairing of retrofit measure is thought through. Work packages for retrofitting need to be considered holistically; for instance, changes to the building fabric i.e. insulation installation and making the envelope more airtight necessitates implementing an improved ventilation strategy to avoid moisture build-up and conditions conducive to mould growth. Adequate inspections and building diagnostics is also critical to identify the trouble spots and to primitively predict where condensation and mould growth could occur.

Decanting vs Ongoing Occupancy

Although decanting allows for comprehensive and major works, it has the associated cost of temporary relocation which may fall on the residents depending on the decanting agreement set by the City of London. While retrofitting a building with residents present allows for ongoing occupancy and functionality of the building. The scope of works would be more targeted improvements, less invasive but likely be more disruptive and stressful for residents. Both approaches have their merits and considerations and are suited to different scopes of retrofit.

Cost

While retrofitting aims to improve energy efficiency, residents will likely experience temporary fluctuations in their utility bills as they adjust to the shift from gas to electricity. Depending on the financing model, retrofit could result in rent increases to cover the costs of the retrofit which some residents may not be able to afford.

It is important for the Corporation to consider these factors and work to minimize any negative impacts on residents during retrofitting. Implementing transparent communication, providing support during disruptions, and offering financial assistance or subsidies can help mitigate the potential challenges and ensure that retrofitting projects deliver long-term benefits for residents.

Example of mould growth in apartment ceiling due to moisture build-up and poor ventilation strategy

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Immigration

The UK: OK plan

You are welcome here.

All care leavers who need it get help with immigration. Talk to your social worker to find out about the help we can offer. The City of London is signed up to the South London Refugee Association Pledge.

Your social worker will

- Be skilled and informed on immigration issues
- Connect you with good quality legal support as soon as possible
- Want to support you through immigration applications and appeals (alongside your legal representative)
- Know when your status expires and make sure you have your next application in to extend/appeal (if eligible)
- Help you make plans if you do not get status in the UK
- Enable you (if eligible) to apply for permanent status and British citizenship
- Enable you (if eligible) to apply for a British Passport

Things we will not provide

- Travel documents (passports only are provided).

Because they are temporary, not all countries accept them, and it is not in our duty to provide.

Communication

We will use interpreters if you need them, via telephone, in writing or face to face.

> We have a range of languages used to different levels of understanding within our service, currently including Polish, Farsi,

Punjabi, Hindi, Urdu, Patois, Creole, Yoruba, Igbo, Pidgin, French, Italian, Makaton and British Sign Language.

Housing

We can help you find a home and also support you with living independently so that you feel confident and prepared.

All care leavers can get help with accommodation. Talk to your social worker to find out about the help we can offer.

Options include:

- staying with your foster carer
- moving into supported or semi-independent accommodation
- renting your own home privately
- applying for a council home

What is social housing and why is it good?

Social housing is a great choice. The rent is much cheaper than private rent. This is very important because the cost of living is very high.

As a care leaver, you are at the front of the queue for the City of London Social Housing. As a single person you are eligible for a studio property. This may be one large room which includes a kitchen space, some studio properties have a separate kitchen.

Lots of people want social housing because it is affordable, and many thousands of people are waiting because there are not enough properties. The cost of rent in central London is extremely high, and most people cannot afford to live here. You are at the front of the queue (along with people who are homeless, and people escaping from violence in the home).

There are not enough properties so you might wait 2-4 years before one becomes available.

You are responsible for your rent once you are 18 or over. This may be paid via Universal Credit if you are in college, or from your earnings if you are in work.

> An example rent of a studio flat in London is between £1,500 and £2,000 a month
>
> An example rent of a studio flat in social housing is £500 a month

When your social worker completes the housing application with you, choose your preferred three housing areas. Put your favourite first, then the one you like second best and then the one you like third.

You have a choice of:

> Holloway Estate and York Way in the London Borough of Islington
>
> Golden Lane and Middlesex Street (in the City of London -the square mile)

A council tenancy has the lowest rent in the UK. It is much cheaper for you than private renting.

A council tenancy is the best sort of tenancy you can get it means you have stronger rights within the property good for staying for a long time, so long as you are paying rent. As long as you pay the rent and follow the tenancy conditions you can stay there for as long as you need. You are less likely to be asked to leave.

Most people never get a council tenancy. Even if it is small and in an area of Central London you have not chosen, it is a good option.

For the first year you are in your tenancy with the City of London you are on an introductory tenancy. After 12 months, if you have paid your rent and kept to the tenancy agreement you will become a secure tenant. Once you are in a secure tenancy you can swap your home if you want to move area or find a bigger home. This can take a long time because lots of people want bigger homes. As a secure tenant you can apply to buy your property through the Right to Buy scheme if you have enough money to do so.

If you get a partner or start a family and your flat becomes too small, if you are a 'secure tenant' you will be eligible to apply for a larger one within the City of London.

Once you are a secure tenant you can apply to do a mutual exchange which enables them to swap with a social housing tenant – both Local Authority and Housing association – anywhere in the UK. The Housing Needs Team can provide full details of how this works once you are a secure tenant

To be eligible for social housing you need a local connection to the area where that housing is situated. You have a local connection to the City because you are a care leaver under City of London Children's Services. In some instances you may be able to apply to another local authority.

- You have a local connection if you're under 21 and were previously in care in the area for at least 2 years even if you were placed there by another council.
- You also have a local connection if you're under 25 and you get advice and support from the council's social services team under a pathway plan.
- If your pathway plan is provided by a county council, you have a local connection to every local housing department in the county council area.

Things we will not provide:

- One-bedroom flats or bigger

These flats are reserved for people with children over the age of 6 months

Rent Privately

If you want to rent privately then we can help you with a deposit. We can be your guarantor so that you can rent.

This can be a good option if you want to move with friends, or if you want to move to a different location in the UK which is more affordable than London.

Your social worker will:

- ensure you are supported to find a home that you can afford (check you can afford the rent on your wages from your job, or that that rent will be covered by Universal Credit)
- seek approval for the deposit and first month's rent if you have found somewhere that you can afford
- arrange for the City of London Corporation to act as a guarantor for your first year of tenancy (when you are ready and able to be a tenant) so you can rent a room/studio/flat privately
- you can rent a room/studio privately whilst you wait on the list for a council tenancy

Housing and Risk

It is important that your accommodation is for you. The support in this offer is to help you build safe caring friendships. Sometimes people involved in criminal activity (such as dealing drugs) might want to use your home. This is called 'cuckooing'. This is unsafe and puts you at risk. Please tell us if you feel unsafe and we can work to support you.

-

You do not have to move into your council home/private renting until you are ready.

We will provide you with accommodation until you move into private renting or council tenancy (or you reach 25 years of age)

- You will have keywork support for as long as you need and use it.
- The keyworker will support you to learn how to run your own tenancy, including how to:
    - use a washing machine
    - use a launderette
    - budget for food and bills
    - make healthy food
    - use a bank account
    - make a doctors/dentist/optician appointment
    - call your immigration lawyer
    - travel around by bus
    - keep yourself safe sexually
    - set up services and pay bills (e.g. electricity)
      and anything else agreed between you, your social worker and support worker

Apply for a council home

As a care leaver you can apply for a City of London home. As a care leaver you will be given priority.

The home will be in one of five City of London estates. You will be offered a studio flat when one becomes available. The flat will be suitable for you. Do accept the flat as you will not be offered another.

Your social worker will

- help you apply for a City of London home
- work with you to understand the responsibilities of running your own home
- ensure your keyworker helps you be confident with running your own home
- offer you the opportunity to practice living in your own home and/or access expert financial support via https://www.mybnk.org/
- you will have the support of your own Tenancy Support Officer as you move into your own home and afterwards

Things we will not provide:

- One-bedroom flats or bigger

These flats are reserved for people with children over the age of 6 months

- Permanent housing outside of City of London properties

We have no access to these properties. You can join the housing register in another borough/county if you have lived there for 2 years or more but you only have priority with the City of London as a care leaver. This means you would wait many more years for a permanent place to live.

Council Tax

As a care leaver you are exempt from paying Council Tax until you are 25.

Your social worker will:

If you live in the City of London (square mile)

- make sure that the City of London exempts you from Council Tax bills if you reside in the square mile

If you live outside of the City of London (square mile)

- make sure you have single person/any other subsidy from the local authority (borough) you are living in
- arrange for payment for the rest of your council tax bill (to be paid direct to the local authority where you live)

Help with moving into a new home

When you are ready to move into your own home we will support you to buy the essential things that you need. This is known as a setting up a home allowance.

You will receive up to £3,000

Your social worker will support you to make the most out of your money. This will include accessing low cost/second hand items and charity funding to set you up in your first home.

- furniture, flooring and white goods
- decorating costs
- your first TV licence
- removal and transport costs for moving in
- cooker and washing machine connection costs
- one year of contents insurance
- support with winter fuel payments for your first winter (December-February £10 a week)
- additional support for single parents

Your social worker can also provide you with luggage to help you move.

Culture, music and arts

We will support you to enjoy culture, music and arts.

The City of London runs

- Epping Forest
- Hampstead Heath and their men's and women's swimming ponds
- The Barbican
- The Guildhall Art Gallery
- The Museum of London
- Tower Bridge
- A large number of green spaces

Your social worker will take you to see drama/music/art at least once a year, in addition to organised CiCC group activities. Your social worker will celebrate your culture with you throughout the year.

Education, employment and training

We want you to succeed and we will support you to achieve

Your social worker will be able to help you decide what route is the best for you.

You can also get help and advice from:

- Our Virtual School Headteacher
- Our Participation Officer
- Our Careers Coordinator
- Our Adult Education Service

Your social worker and/or keyworker will support you into education training or employment.

ESOL

You will have access to English for Speakers of Other Languages (ESOL) if you need it. For new arrivals there is a college set up for you in the Guildhall.

Enrichment

There are learning activities to add to your college timetable. We know that ESOL at college takes up 15 hours per week, and if you are studying you would benefit from extra opportunities.

There will be enrichment activities such as:

Monthly visits to Epping Forest (for wellbeing)

Music

Physical Education (PE/sport)

History

Arts/design/crafts

Oracy: learning to speak clearly – this helps with succeeding in interviews

Football/sport activities

Bespoke courses

We can find bespoke courses to help you in your journey to work. Recent examples include lifeguarding and security training.

Work experience

You have priority for work experience within the City of London Corporation. Ask your social worker to set this up.

Support with college

To qualify for help, you must be able to show you have good attendance and that you are doing your best to keep up with the work.

Laptop

You will be given a laptop when you enter into care. You Should take care of your laptop and use it to study, complete homework and apply for college and work.

If you are going to be with us for a short time, before you move to your permanent area via the National Transfer Scheme, then you will need to return your laptop before you move.

Government bursary

You might be able to get help with education related costs from the Government if you are:

- aged 16 to 19

- in care or a leaving care

Find more information on the Government bursary for 16 to 19 year olds external link.

You can also speak to your social worker who can support you apply to charities such as the Trussell Trust or the Buttle Trust for additional funds.

Travel

We will provide you with an annual bus pass until you are 25

Speak to your social worker for more information.

We will continue to lobby central government to be able to provide funding for the tube and trains

University

We offer you university taster days in February half terms, so you can see what university is like.

We can help with finding universities with flexible admissions processes and those with foundation courses.

We will help you with your UCAS form

If you decide you would like to go to university, we will support you to go to university if you are able to and would like go

Our support includes:

- supporting you to apply for student loans
- paying for accommodation in the holidays
- your social worker will, if you would like them to, visit university campuses with you before you apply
- keeping in contact and reviewing your pathway plan
- supporting you to move into your university accommodation (if you move outside of London)
- up to £100 towards graduation costs (gown & photo)
- retaining the place on council tenancy waiting list whilst you study

The university may also offer bursaries and student finance can offer grants and loans. We can help you with that.

Find out more about student finance

We will offer you a bursary of £3K per year whilst you are studying for your first degree and/or masters degree (or PHD) if you conclude your study before you are 25, in addition to paying for your holiday accommodation.

Employment and training

You have access to an information and guidance specialist who has extensive experience in supporting children who are in the UK unaccompanied by an adult to care for them.

If your immigration status allows, we will support you with finding a job or training to do a job.

- We will offer you work experience and practice interviews
- We will help you write and update your CV
- We will help you search for work
- We can help you into extremely short (a week or two) training or longer training
- We often use Breadwinners to support you with work/training

If you decide you want to find a job or a training course, get information and guidance from the National Careers Service external link. Or contact your dedicated careers worker

Help with money if you are working or in training

We can support you to buy clothes for an interview, and for starting work.. We will apply to Suited and Booted, Dress for Success or Smart Works for this clothing.

We will provide you with an annual bus pass to support your travel

There may be support via the job centre if you are on universal credit

Health and wellbeing

We will support you to be healthy and well.

You can speak to your social worker and/or your keyworker for help and advice.

We will provide you an annual health card so that you have free prescriptions until you are 25.

We will pay for gym/physical exercise until you are 21 years old
The cost of a council run gym (currently £30 a month) will be paid direct to the gym, and usage reviewed in your pathway plan. This is to help keep you healthy. You can choose a different sport/exercise if you do not want to go to the gym. Discuss with your social worker.

Support with health appointments
Your keyworker or social worker can help you with any health appointments. They will help you find the nearest GP/walk in clinic/sexual health clinic/dentist/optician nearest to you and can help you with appointments.

We will cover the cost of your prescription if you have to pay, until you are 21 years old. Ask your social worker to find out how.

Drugs or Alcohol
If you have problems with drugs or alcohol, we can connect you with specialists who can help. You can talk to them privately and you don't need to worry about getting in trouble.
Smoking is very bad for your health, but it can be difficult to stop. Help is available if you want to quit, and your keyworker can introduce you to this service.

Access to the Family Therapy Clinic
You have access to the family therapy clinic attached to our service.

The clinic offers therapeutic support to any child and/or family open to social care or early help in the City of London.

The clinical lead has a doctorate in global mental wellbeing and the clinic will be there to welcome you.

Your social worker will look with you at your health and wellbeing when they meet up with you and in your pathway plan review. Do ask if there is anything worrying you.

Race & Ethnicity

You are valued for who you are. We will celebrate your race and ethnicity with you and support and connect you with others who share similarity with you if you would like to. We will promote your rights and belonging.

Racism: racism is not acceptable, and is against the law. We will support you to complain or report and we will listen to you and be your champion.

Ability/Disability

You are valued for who you are. We will support you recognising your ability and championing enabling environments. We will listen to you, ask your advice and views and advocate for you to achieve your goals.

Abuse based on your ability/disability is not acceptable and is against the law. We will support you to complain or report and we will listen to you and be your champion.

Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual +

You are valued for who you are. We will support you in your identify. We will record your preferred name and pronouns and use these in all our communication with you. We will not assume heterosexuality or gender binary norms. This includes in pregnancy and parenthood. We will tailor our services to you and we will know about and/or find out about support for you and your identity. We will think about safe spaces for you.

Homophobic and Transphobic abuse is not acceptable and is against the law. We will support you to complain or report and we will listen to you and be your champion.

Your Say

To make sure you are able to share your views and experiences we will communicate with you in a way that you can understand. We will use interpreters if you need them during phone calls, or face to face meetings, and to translate important documents for you. This might include using Makaton or sign language for those that need it.

You have a right to be involved in all decisions affecting your life and this includes having your voice heard in meetings and plans made for you. We will try and include you in planning meetings, so that we hold meetings at a time that suits you, in a place that you feel comfortable. Your social worker, and carer or key worker if you have one, will support you to attend meetings, have your say, and understand the decisions made.

Sometimes you might want someone outside of Children's Social Care to support you, and help you understand how decisions are made, and how to share your views, these people are called advocates.

Advocacy

When you come into care you are always asked if you would like an independent advocate – someone independent who works for you, helps you share how you are feeling, and what you want.

You can have any advocate at any time, please ask your social worker to make a referral or contact; London Advocacy Service | Action For Children

An advocate is someone who understands the law, knows how social services work and knows about your rights. Your advocate can speak up for you. It is their job to make sure that you are listened to and taken seriously in decisions being made about you and your life.

The Promise

The City of London has made a promise to all our children in care and care leavers, about how we will look after you, and what we will offer. We spoke with children in care and care leavers to ask what you feel it

is important for us to do, and how we can best help you have the life you want. Our pledge (promise) is here.

These were then written down and are translated into a range of languages: Vietnamese, Tigrinya, Persian, Kurdish Sorani, Dari, Arabic Morocco, Arabic 1, Arabic 2, Amharic.

If you do not think that the service, you are getting meets these promises, you should let us know so we can make sure we do meet our promises to you. You can speak with your social worker directly, speak with a manager, talk to an advocate, or you might want to make a complaint.

Your social worker can use a telephone or in person interpreter (translator) to help you.

Complaints and Compliments

You have a right to complain if you are not happy with a service you have received from the City of London Corporation. If you've a positive experience, we would love to hear your compliments too.

You can call: 020 7332 3498

Or Email: Complaints and Compliments Team

Having your say about services for care leavers

It is important that we are always working to improve our services, so that children in care and care leavers achieve the best outcomes possible. The Children in Care Council (CiCC) is a group for children and young people aged 12 to 25 years. They meet regularly and work together to talk about what is working well, what might not be working well, or things that young people are finding difficult, and come up with suggestions to improve the services care leavers receive from the City of London Corporation.

It's a great way to meet other care leavers, share your views and experiences, and work together on important campaigns and projects.

You can join the group or share your views by contacting the Participation Worker or by calling; 020 7332 1215, or messaging; 07795 090649.

London Children in Care Council

The City of London also works with the London Children in Care Council run by Partnership for Young London. You can find more information here; London Children In Care Council | PYL (partnershipforyounglondon.org.uk)

The London CiCC helps to;

- Improve the care experience for looked-after children & young people and care leavers across London.
- Identify common themes and issues across London.
- Enable opportunities to influence policy and services affecting looked after children & young people and care leavers in London.
- Improve young people's skills and confidence through participation.

If you would like to get involved speak with your social worker, the Participation Worker or contact Partnership for Young London directly, from the link above.

Social Activities and Events

There are a range of activities and events that you can attend if you would like. The Children in Care Council run activities, which help you to meet other care leavers, and contribute your experiences and feedback. Please speak with your social worker or the Participation Worker (020 7332 1215 or 07795 090649)

The Virtual School also offer a number of activities and events which can support your learning not only educationally, and emotionally, but also practically e.g. cooking. They also support opportunities to access employment. Your social worker or the Participation Worker can share these details with you, or you can contact the Virtual School directly to discuss; Virtual School Head or Virtual School Deputy Head

Your social worker, carer or keyworker, can also explore local social opportunities for you depending on where you are living.

Independent Visitor

You might want to develop a relationship with an adult outside of the services you work with, especially if you don't have a family network locally. We can match you with an independent visitor who is an adult who volunteers to regularly spend time with a young person in care. They will meet with you each month for a minimum of 2 years. You can spend your time with as you like, doing activities, or going for a coffee and a chat. They will support you to develop your interests and provide guidance and advice as needed.

To find out more please see; London Independent Visitors | Action For Children, or speak with your social worker.

Getting your say through elections

From the age of 18 if you are a British Citizen you will have the right to vote. You will need to register to do this. This also makes it easier to do other things such as applying for housing, your passport or a bank account.

If you need support with this speak to your social worker. Find out about your rights when you are leaving care.

Accessing your social care records

Find out more on your rights and access to your social care files with the Care Leavers' Association.
Find films, podcasts and blogs produced by young people in care and care leavers with IMO.
Your advocate via Action for Children can help if you need https://www.actionforchildren.org.uk/

Becoming a parent

Your social worker will support you in preparing for and becoming a parent. Support will be clearly set out in your pathway plan. There is a special section for this so you know what is available local to where you are living, and the plan is updated as your child(ren) grow.

You can join our online parenting programme and/or in person programme to help you prepare and to meet other parents. Ask your social worker or email children.duty@cityoflondon.gov.uk. It is a programme accredited by the Race Equality Foundation.

If the timings don't suit you, we can find other online parenting programmes to help.

Support services and financial help

Your social worker or keyworker can support you to attend doctor, initial midwife and health visitor appointments. As well as this, you can get the sure start child maternity grant and vitamin vouchers for when your baby is born.

If you want to return to education, training or an apprenticeship, your personal advisor can help you access costs for child care and apply for care to learn grants.

If you're a lone parent and have sole care of your child moving into your first home, you can get additional financial support on top of your setting up home allowance, to help you furnish the property.

There are lots of other services and financial support that you may be able to access:

Support during pregnancy or if you've recently given birth

Prepare for a baby

Get help to prepare for your new life as a parent.

Get free vouchers each week to spend on:

- milk
- fruit and vegetables (tinned, frozen or fresh)
- pulses (fresh, tinned or dried)
- infant formula milk
- vitamins

Find more information on Healthy Start.

Help with money

You could get a one off payment of £500 to help towards the cost of having a child. This is known as a Sure Start Maternity Grant. Find more information on GOV.UK.

Family Information and Support

Family services in the City of London can be found via https://www.fis.cityoflondon.gov.uk/ . This includes information on childcare, the children's centre, libraries and services available to families.

You may be living outside of the City of London. Your social worker will ensure you know about information and support nearest to where you are living and will include this in your pathway plan.

City of London Children's Centre

You can access our children's centre wherever you are living. We can also help you find a children's centre near to where you are.

Find a variety of services in our Children's centre including:

- stay and play groups

- parenting courses
- a nursery

Children over the age of two get 15 hours per week free nursery (subject to criteria)

Financial support for care leavers

Find out about the financial support and advice available to you from your social worker.

There may be times when you find yourself short of food or struggling to pay some of your bills. We want to help if you are having difficulties.

If you speak with your social worker they will help you work out what help you need and make sure you have the right support moving forward. This could be helping you to make some budget plans or sorting out any benefit problems. They can also get you food parcels or help towards energy bills if things get really difficult – subject to financial assessment.

Claiming benefits

If you are a British Citizen or you have immigration status (such as limited leave to remain) you may be entitled to benefits to help you pay rent and money to live on.

You can speak to your social worker or keyworker who can help you.

Your social worker can connect you to City Advice who are experts on making the most of your money. They can also provide emergency vouchers if you have run out of money.

The department for work and pensions is the government department that pay most benefits, such as Universal Credit.

Birthdays and religious festivals

We want to celebrate your birthday and will give you £60 each for these, as well as for one religious festival a year such as Christmas or Eid until you are 21 years old.

Clothes

You can get costs for interview clothes and shoes via the job centre.

You will be supported of up to £150 per year until you are 21 (unless you are in employment) to help with winter clothing/to assist with sportswear/clothes.

Free gym/exercise support for 18 to 21 year olds

We will pay the cost of a council gym membership directly to your gym. If you do not want to go to the gym/swimming we can fund a sport/physical fitness activity up to the equivalent funding (currently £30). Use will be reviewed in your pathway plan as we want to support you to be fit and healthy.

Identity Documents

You will need ID for lots of things. This includes opening bank accounts, starting a new job, getting a library card, accessing services and going abroad.

We want to make sure that you have a suitable form of photo ID, so we will support you to get your first adult passport or provisional drivers licence if you do not yet have British Citizenship. We will keep a copy of your immigration ARC card, and your provisional licence on our database so that we can support you to get a replacement if you lose it.

TRAVEL: Driving lessons, tests and licence

In London, public transport is easily accessible. You can travel by bus, tram, tube or train. We support you with an annual bus pass.

London is aiming to be an environmentally friendly city, and there is a congestion zone for drivers, and the ULEZ

Learning to drive can be expensive. We can help you pay for it if is relevant to your education or your job. Your social worker will help you access:

- one provisional driving licence
- 10 driving lessons (up to £400), you will need to top up the rest yourself
- one theory test and one practical driving test
- help to find a good instructor

We may be able to support you with driving lessons subject to grant funding if it is not relevant to your job/study if your college attendance is excellent.

Things we will not provide

- A car or motorbike

TRAVEL: Cycling

Cycling in London is a good travel option.

Transport for London have bikes to hire as well as cycle maps which show quieter roads.

Dr Bike offers bike checks and cycle safety training. Your social worker can help access this.

Your social worker can also access cycles via the Police schemes and via charitable organisations. It is important to wear a cycle helmet, and we will fund this for you.

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City of London Adult Social Care Self-Assessment
February 2024

Overall Summary and Assessment

The City of London and its governing body, the City of London Corporation are unique. There are 8,600 residents who live in the Square Mile, 14% of whom are aged 65 or over. There is high life expectancy in the City of London and this, coupled with the high number of rough sleepers in the City of London, create the key drivers of demand for health and social care support in the City of London.

Our vision is for residents to get the right information, advice, support and care to live their best lives, maintain their health and wellbeing, and live safely in the place of their choice.

There is one commissioned homecare provider and a high rate of people who have a direct payment to purchase their own provision. There are no accommodation-based support options within our boundaries and placements are therefore spot purchased. A project is underway to make this process more efficient, to strengthen quality assurance and to triangulate this with our practice and systems.

The City of London Adult Social Care workforce is stable, experienced and generic, creating a flexible and agile response to need. A strengths-based approach practice model and manageable workloads allow staff the time to build relationships and trust with people to identify and meet their outcomes. Strong partnership working across the system supports this approach.

Our service is innovative and impactful, operating in a complex, high risk and financially challenging environment. Complex hospital discharge and rough sleeper cases present specific challenges for us but a new hospital discharge model and innovative rough sleeper social worker post within homelessness have helped reduce some risk. These areas remain specific challenges for us, however. Census data shows there are nearly 500 unpaid carers in the City of London. Recently, specific support to unpaid carers has been strengthened and more unpaid carers have been identified. A new Carers Strategy will continue to focus on this.

Innovative approaches to care and support planning in partnership with the individual are put in place and people are supported with direct payments where desired and appropriate. Our aim is to co-produce the ASC services that are needed. Going forward our feedback and engagement with service users will be strengthened to have richer data on how outcomes are achieved and the impact this has. The information provided to services users and how is currently being reviewed.

Safeguarding Practice in the City of London is robust, and the promotion of safety and reduction of risk is built into both our internal and external systems. Our Safeguarding Adults Board function is delivered jointly with the London Borough of Hackney but with an additional sub-group for the City of London to ensure a specific focus.

The City of London Corporation is governed by a committee system and the Adult Social Care Service and budget is governed by the Community and Children's Services Committee. There are also strong links to the Health and Wellbeing Board and services are also scrutinised by the Health and Social Care Scrutiny Committee. There is strong political support for Adult Social Care.

In response to new legislative requirements and knowing our areas for development, an Adult Social Care Transformation Programme is currently being delivered.

Our overall assessment is that our practice and service to residents is good quality but that there are areas of development around systems and processes. One of our key strengths is our personalised and

strengths-based approach to identify and deliver individual outcomes and there is strong partnership working to deliver this. Though there are specific challenges around complex needs, there has been a proactive and innovative response which has reduced risk in this area. Some of our key areas of work include strengthening triangulation around commissioned placements, developing a stronger performance culture within the service, strengthening quality assurance and improving on some specific processes such as timeliness of reviews.

Overview

The City of London

The City of London, also known as the Square Mile, is the financial centre of the UK. It has 8,600 residents, half a million daily commuters and 10mn visitors a year. It sits at the heart of London and is surrounded by 7 local authorities.

The number of residents in the City of London has increased by 16% since 2011. The majority are working age but there are 1200 people - 14% - who are aged 65 and over. Although the percentage of population aged over 65 has stayed the same between the censuses, the actual number of people has increased. There is high life expectancy in the City of London with females having a life expectancy at birth of 90.7 years and males 88.8 years.

Compared with the England average, overall, the City of London has significantly lower levels of income deprivation, child poverty and older people in deprivation. However, according to the Indices of Multiple Deprivation 2019, the City of London's most deprived ward, Portsoken, on the east side of the City of London, was among the top 20% in the country for levels of income deprivation, including income deprivation affecting older people. The Mansell Street & Petticoat Lane area is the most deprived in the City of London falling into the 40% most deprived in England.

Asian people are the largest global majority group in the City of London accounting for 16.8% of the population; and 3% of the City of London population are Black according to the 2021 census. Portsoken, in the east of the City of London is the most ethnically diverse ward.

Census data shows that the City of London has 496 self-identified unpaid carers. The majority provide 19 hours or less of unpaid care per week. However, there are a small percentage who provide upwards of 20 hours per week.

There are a significant number of people sleeping rough in the City of London. In 2022 (the most recent full year data) 372 people were rough sleeping within the boundaries of the City of London which is the 7th highest level amongst London's local authorities. Many of these rough sleepers have significant mental health or substance misuse issues.

There is one GP Practice in the City of London which has around 75% of City of London residents registered while around 16% of residents (on the east side of the City of London) are registered with Tower Hamlets GPs. All these practices now sit within the North East London Integrated Care System. In terms of acute hospitals, City of London residents generally go to the Royal London Hospital in Tower Hamlets or University College Hospital London in Camden (which is in the North Central London Integrated Care System). Community Services for City of London residents are provided by Homerton Hospital. This creates a complex pattern of service delivery for City of London residents.

The City of London Corporation

The City of London Corporation (the City Corporation) is the governing body of the Square Mile and provides local authority services to its residents. The City Corporation has 125 Members operating on a committee system and has its own Lord Mayor and independent police force.

The Department of Community and Children's Services delivers local authority services including social care, homelessness and rough sleeping, public health, education and SEND, housing and libraries.

The Corporate Plan is being relaunched in 2024 and the Community and Children's Services Business Plan will support the outcomes in the Plan. The Departmental Business Plan focuses on safety, independence and choice, potential, health and wellbeing and community.

The Department also delivers several strategies including Homelessness and Rough Sleeping, Carers, and Joint Health and Wellbeing.

Adult Social Care

Key Statistics

181 Residents requesting support from ASC services (2022/23) **94** April – December 2023	**102** Discharges from hospital supported (2022/23) **86** April – December 2023	**96** Adults receiving a Long – Term Service on 31 December 2023	**34** Carers Supported on 31 March 2023 **33** 31 December 2023
24 Safeguarding Enquiries (2022/23) **16** April – December 2023	**50%** Percentage of all working age clients receiving care and support related to Mental Health on 31 December 2023	**42%** Percentage of all clients aged 65+ receiving Personal Care and Support on 31 December 2023	**£6.3mn** Adult Social Care Gross Budget 2023/24

Our vision is for residents to get the right information, advice, support and care to live their best lives, maintain their health and wellbeing, and live safely in the place of their choice.

Our skilled workforce will work with people through the options, and actively champion equality, diversity and inclusion so all people can get the support they need, when they need it.

This underpins all our work and our practice model. The table below sets out some of the key principles of the Care Act 2014 and ASC good practice and how the City Corporation approaches this.

Principle	City of London Corporation Approach
Empowerment, engagement and co-production	A Strengths Based Approach practice model is used in the Service which places the individual at the centre, working with individuals to identify their outcomes and using these to underpin all the actions taken together from there. Individuals or their advocates are involved in care planning and review processes. Innovative approaches to care and support planning in partnership with the individual are put in place and people are supported with direct payments where desired and appropriate (see theme 2). In 2021, the homecare service was recommissioned, and this was a co-produced approach (see theme 2). There is a recognition that we need to strengthen our approach to co-production with service users and we are currently developing this approach. Going forward our feedback and engagement with service users will be strengthened to have richer data on how outcomes are achieved and the impact this has. The information provided to services users and how is currently being reviewed. An Anti-Racist Practice Framework has recently been adopted across Adult Social Care which is being embedded into the service with staff. There is also a range of other initiatives to strengthen our approach to equality and inclusion (see theme 4) and a key area of work for us is to strengthen the collation and recording of equalities data and use this to inform and shape service delivery.
Safety, protection and risk management	Safety, protection and positive risk management are all embedded into our system work (see theme 3). This is in place right from the start, in our preventative work, with our commissioned providers and with our colleagues at the City Corporation. In meeting our statutory requirements around safeguarding, a timely, proportionate and person-centred approach to managing risk is used. There is good feedback from Making Safeguarding Personal in terms of meeting people's outcomes and reducing or removing risk (see Theme 3) ASC are active partners in the local Safeguarding Adults Board (City and Hackney Safeguarding Adults Board) but also have a specific City of London focus through a designated sub-group which is chaired by the Chair of the Safeguarding Adults Board.
Prevention and delay of needs	Prevention is a key tenet of all our work in ASC and is delivered in a wide range of ways including an innovative Early Intervention Project, a commissioned Early Intervention and Prevention Service and through a range of information and advice (see theme 2). There has been significant investment in prevention through our new Target Operating Model which at a time of financial constraints, prioritised ASC and

	prevention and saw the establishment of Strengths Based Practitioners in the service.
Working in Partnership	Partnership working is a key principle of our Strengths Based Approach (see theme 2). There is good partnership working with local health partners, commissioned providers and other stakeholders. Despite its size, the ASC team has to build relationships and partnerships across a wide breadth of partners. Innovative responses such as the Care Navigator post which provides links between several acute hospitals, GPs and social care helps facilitate some of this partnership working.

Workforce

Our ASC Team is a generic team of experienced practitioners with good rates of retention. The Team includes Social Workers, Occupational Therapists and Strengths Based Practitioners. The Strengths Based Practitioner roles were introduced as part of a new Target Operating Model and reflected the organisation's commitment to Adult Social Care and prevention in a context of financial constraints. These innovative roles are designed to support people at the edge of care with short term interventions to improve wellbeing and delay the need for care.

Caseloads in the team are manageable and are managed dynamically, taking into account complexity and aiming for under 20 cases per social worker (this can include assessments, support planning and reviews). This gives staff the time to develop positive relationships with residents to enable effective and ongoing assessment of need and subsequent care and support planning.

Within the team, there are designated champions who act as expert leads in certain areas such as carers, dementia or transitions. These champions keep up to date with current good practice and engage in local and national partnerships and support peers to develop in these specific areas. This is also designed to help support development of leadership skills.

An ASC workforce development plan for ASC has recently been updated to ensure it is fit for purpose and meets needs. Social Workers have access to a wide range of training, both internal and external and over the past year have attended training on applying the legal framework of the Mental Capacity Act and the need for speed to discharge people safely, Safeguarding Adults Level 3, Motivational Interviewing and Making Every Contact Count. Recent team wide training has focused on development of the Strengths Based Approach and the specific skills required for this.

ASC has recently appointed a dedicated Principal Social Worker (PSW) as a standalone role, rather than it being embedded into the Head of Service role, to strengthen practice governance and staff development amongst other things. The Principal Social Worker is consolidating some of this skills-based training noted above.

A survey of the children's and adult social care teams was undertaken in September 2022, based on the Employers Standards. Though feedback was generally positive, an action plan has been developed (across both services) to consolidate reflective practice, career development and improved induction for new staff (this is also reflected in a wider corporate commitment as part of the People Strategy).

Case Study – Feedback from Staff Survey (Survey, September 2022 and Suggestions Box, January 2024)

How do we respond to staff concerns and suggestions?

Staff feedback: *"Being part of such a small stable team, has lots of positives but also challenges. New **ideas**, ways of working, wider conversations are less likely to happen. It's important to keep practice current and alive rather than falling back on our 'uniqueness' which can sometimes stop changes in our practice to align ourselves with the London LA's."*

We listened:
We now have full-time stand-alone post of Principal Social Worker, and our Senior Occupational Therapist is a member of Principal Occupational Therapists Network. These practitioners enable local and national networking, share policies and guidance, and make improvements to our processes and practice.

We also have a "Staff Suggestions digital box" system, where our staff can make positive suggestions and share their views, and we learn from our Exit Interviews, which are reviewed by the Principal Social Worker.

We invite external guests and speakers to our events, to boost our engagement in ASC national and local agenda, such as at World Social Work Day or visit by Chief Social Worker, Lyn Romeo.

Staff feedback: *"I think there is a well-balanced understanding of case workload and stress. I feel listened to and understood, for example if I ask for a little space/time to finish off work before new cases are allocated."*

We listened:
We also review themes shared as positive feedback to ensure we maintain good mental health of our practitioners.

An anonymous staff comment through our Suggestions Box: Response to question what we can do to improve our work: *"A total review of ASC proportionality of roles and how work is distributed."*

We listened:
Principal Social Worker (PSW) addressed the issue of allocations and how work is distributed with the Head of Service (HoS). Agreed and shared with the team an action for PSW and HoS to review the allocation and distribution of long-term and short-term cases, safeguarding work and other tasks. At the same time managers updated case allocation Case Note template on Mosaic to include specific information about the case, its complexity, timeframes, and expected tasks, which can help practitioners to manage caseloads better.

Supervision plays an important part in supporting and developing our workforce and our commitment to this is demonstrated by:

- The development of a new supervision protocol and new supervision forms that include a reflective approach
- Auditing supervision as part of the annual audit schedule and annual staff survey
- Establishment of new peer group reflective supervisions, held once a month on complex case studies using a reflective model

Other support is provided to social workers around wellbeing including an Employee Health and Wellbeing Hub and various team wellbeing tools. There is also guidance for Managers in the Team about how to support wellbeing. Social Workers also have access to the PSW for individual practice improvement sessions or wellbeing support.

The City Corporation has joined the South East London Teaching Partnership (SELTP) which brings together Goldsmith and South Bank Universities, Royal Borough of Greenwich, London Borough of Lewisham, London Borough of Southwark and now the City Corporation. The SELTP's ambitions align with the Department for Education's vision for teaching partnerships and aim to raise standards in children and adults' social work by supporting high-quality training for social work students and qualified practitioners.

ASC supports students on regular basis, which enriches practice with their academic research, social work models and theory. Having a social work student in the team has a positive impact on the workforce, enhancing motivation and enthusiasm levels. At the same time we embrace our partnership with academia and contribute to developing the social work profession.

Working in Partnership

Working in partnership has been a key approach in our work over recent years but is specifically strengthened in the Strengths Based Approach practice model.

There are good working relationships with the one NHS GP practice in the City of London and the relevant GP practices in Tower Hamlets. A social worker or the Care Navigator attend the Multi-Disciplinary Team meetings at these practices.

The City Corporation is part of the North East London Integrated Care System which provides some benefits as it includes Tower Hamlets where 16% of our residents are registered with a GP and access health services. As noted above, the pathways for delivery of health services and therefore integration are complex for the City of London.

More locally, the City Corporation is part of the City and Hackney placed based partnership, reflecting our previous partnership with City and Hackney CCG. This local partnership is well developed in terms of integration and has a neighbourhood model for care closer to home and out of hospital services. It is underpinned by a principle of tackling health inequalities. Primary Care Networks across City and Hackney mirror the eight neighbourhoods across City and Hackney. Our unique situation and different infrastructure means that often bespoke models for integration have to be developed for us, for example in the neighbourhood.

At the neighbourhood level, social workers are active members of the Multi-Disciplinary Meetings which are designed as a space for complex cases to be considered, owned as a group and lead organisation agreed. A number of City of London cases have been taken here and this has been beneficial in terms of partners being accountable and taking responsibility for certain areas of work.

There are a number of new roles emerging within the neighbourhood structure such as care co-ordinators, health and wellbeing coaches and Care Co-ordinators for proactive care. Community

Mental Health Services have also been re modelled on to neighbourhood footprints with Community Connectors. The Service is proactive in making connections with all these roles to ensure that City of London needs are recognised and responded to and that services work for us.

The voluntary and community sector in the City of London is small but vitally important for our residents and our practice model. There are two key voluntary sector providers of large contracts – a City Advice Service provided by Toynbee Hall and an Early Intervention and Prevention Service (known as City Connections, provided by Age UK). It is recognised that there are other smaller VCS groups providing support within the community and there is work currently underway looking to build the capacity and scope of the VCS in the City of London to play an ongoing role as key partners. There is also a strong Healthwatch organisation within the City of London.

Our Care Navigator, who is part of our Early Intervention and Prevention Service, plays a key role in building partnerships between acute hospitals, GPs and ASC to facilitate safe hospital discharge from a number of hospitals that City of London residents attend.

There are strong relationships with our other commissioned providers such as the London Borough of Hackney who provide our out of hours service, the East London Foundation Trust who provide our Approved Mental Health Practitioner (AMHP) Function and the providers of our reablement and rapid response service.

Having external providers for these services ensures capacity and continuity of service and in the case of the AMHP, ensure there is appropriate clinical supervision and embedding within a relevant discipline.

CQC Theme 1: Working with People

Our Strengths

- Experienced and knowledgeable workforce (managers and staff with good rates of staff retention) and a workforce who know our residents well and develop positive relationships
- Strengths Based Approach Practice Model
- A co-ordinated, multi-agency approach to the assessment and support of our residents

Areas for Improvement and Direction of Travel

- Continuing to strengthen our Strengths Based Approach practice model
- Exploring timeliness and impact of assessments and reviews
- Capturing and recording equalities data more effectively and using this to shape services
- Improving the quality and accessibility of our information offer for residents

Key statistics

181 Residents requesting support from ASC services (2022/23) **94** April – December 2023	**49** Supported Self-Assessments (2022/23) **33** April – December 2023	**31** Occupational Therapist assessments (2022/23) **38** April – December 2023
8 New Carers Assessments completed (2022/23) **10** April – December 2023	**0** % waiting more than 6 months for an assessment (any assessment) (April – December 2023)	**64%** **(37 cases)** % ongoing reviews completed within 12 months of previous review (April – December 2023)
	26 Receiving a Direct Payment 31 December 2023	

ASC operates within the People's Directorate which includes Children's Social Care and rough sleeping. It also works closely with the Education and Early Years Team who sit within the Education Unit. This enables cross-cutting work across, for example, transitions or homelessness. There are monthly People's Senior Management Team meetings (which also includes Education and

Early Years) where various policies and initiatives are discussed, and cross-cutting work is identified or reported back on. There is also a complex cases meeting where teams from across the Peoples Directorate bring their most complex cases and teams work together to share ideas and good practice and identify if / where they may need to be involved.

A Strengths Based Approach Practice Model

The ASC Team use a Strengths Based Approach Practice Model which was implemented in 2022 and is designed to support people to maintain their independence and meet their outcomes and aspirations. The model is built on:

- Working in collaborative ways on mutually agreed goals
- Using the community as a resource
- Having trusted and workable relationships

Empowering residents through preventative measures and clients through our assessments, service planning and delivery is a key tenet of our approach. This includes:

- Working together on assessments to ensure that the individual is able to identify and express their outcomes
- High rates of Direct Payments. In 2021/22 placed 28th out of 151 Local Authorities for direct payments)
- Service users are part of various commissioning cycles for example for the Homecare Service which was recommissioned throughout 2021. This was co-designed with service users, carers, Healthwatch and City Connections. Stakeholder feedback was used to understand service priorities and needs, which shaped the service model and specification, the procurement approach, and the design and scoring within the tender.

The ASC service meets the Care Act duty to prevent, delay or reduce needs wherever possible in a variety of ways including Occupational Therapy, Reablement, Commissioning and Social Work Practice, all set within the wider context of a strengths-based approach across the service.

ASC developed an innovative Early Intervention Service which is a pot of funding that empowers ASC practitioners, together with a resident, to identify and implement low-cost one-off interventions which help improve wellbeing and in turn prevent, reduce or delay needs. This has included things like a microwave so that someone was able to have hot food to eat, a zoom licence to reduce social isolation amongst unpaid carers and fishing equipment to help improve mental health. During an 8-month pilot period in 2022, 26 individuals were supported, and 46 purchases were made costing a total of £5,288. All the people supported in the pilot had identified social care needs but were considered to be 'at the edge of care' in relation to the meaning of the Care Act. Of the 26 people supported, none were receiving costed social care support and in all cases no care needs increased.

The pilot has now been made a permanent service. Work has now been undertaken within our system to report more systematically on the impact of the intervention and evidence is now showing that there is greater take up and confidence in the use of the fund by social care practitioners. One practitioner noted:

'*Having the support from management to use my initiative and listened to what would actually be helpful to the service user, led to improved outcomes for clients and improved relationships. I could show to clients that we actually do want to help in a person-centred way and prioritise what they need to make meaningful change'.*

The City Corporation also commissions an Early Intervention and Prevention Service called City Connections. This is provided by Age UK and includes a signposting service, a general wellbeing support service and a specific memory café for people with memory issues and their carers. Recently, a specific carers support service has also been provided through a sub-contract (see Theme 2).

Case Study – working in partnership with the voluntary sector.

The Carer is 40 years old, caring for a parent-in-law and lives in a small household with 4 other family members. They are linked in with the City Connections service commissioned from Age-UK by City of London. The Carer reports that the caring role can sometimes be frustrating, and they feel they do not have time for themselves. In addition, the Carer does not use English as their first language and can sometimes find it difficult to access services.

As a result of living in a small space, it was important that the Carer was provided with opportunities to have break from their living situation by encouraging them to join as many community activities and trips as possible with one of our community groups. City connections took into account the Carer's religion and culture when planning these with them.

The Carer took part in many of the organised trips, such as Hampton Court, Kensington Palace, Sky Garden, and Buckingham Palace. They said that they enjoyed the outings very much as it enabled them to see places in the city. The carer was able to go out with people from the same estate and it helped them make new friends.

The Carer also accessed the exercise classes and commented, **"The exercise we do is hard, but when I go home, I feel good. I like that the classes are every week, whereas before when it was only two times a month."**

City Connections linked in with another City of London commissioned service, City Advice, to provide an information session. The whole group were actively engaged in the topics being discussed. This particular Carer engaged with City Advice advocate coordinator, who speaks the same language, and they talk about issues with housing and the support they would like to receive.

This was a good example of voluntary services working together, City Connections providing the space and audience for City Advice to do their work and it has shown how important multi-agency can be for residents in the City of London.

The ASC service has also developed innovative winter warmth packs and summer cooling packs to respond to cost-of-living pressures and extreme weather. These are given out by the Strengths Based Practitioners and include things like fleeces, cuppa soups, a small fan and jelly drops which help with hydration.

Case Study – Strengths Based Practitioner Support

A resident described our Strength Based Practitioner as outstanding saying: **"she has an outstanding gentle, step by step approach to making progress in a friendly way".**

The Adult is a 74-year-old and had a number of medical conditions including persistent pain, weight loss and a skin condition. There was a general lack of strength to cook and care for themselves and concerns over possible self-neglect.

The Strengths Based Practitioner's intervention was planned with the intention of re-establishing a personal care routine, support with setting up a self-funded package of care with a previous provider. The practitioner enabled the Adult to build back their personal care routine and improve skin condition. This was achieved through going through the skin care procedure together, setting up a system of text prompts to remind the Adult to carry out the skin care routine regularly and then visiting again to check in.

This resulted in improving their general wellbeing and self-confidence. The adult reported in their feedback that they had benefitted from the intervention and that they felt more independent because of it.

Following the intervention and final visit, the Strengths-based practitioner arranged for a social worker to visit as the adult wanted to discuss future options around potential private residential care.

Case Study – Strengths Based Practitioner Support

The Adult had been married for over 50 years until their partner passed away 2 years ago. They had kept themselves to themselves, not been known to local services and were not registered with a GP. The property was very cluttered and the adult, who is in their 90s was very reluctant to engage with Adult Social Care.

The Strength Based Practitioner engaged with them on weekly basis via telephone and in person building a relationship learning about their history, estranged family and love of Jazz. SBP persevered over an extensive period of time and despite initial reluctance the adult began to discuss the risks in the home with the SBP and agreed to suggestions on how to mitigate these with equipment and support at a level acceptable to them.

The SBP also supported him to access a GP and navigate the phone call system.
The Adult is now more excepting of care and support and engages with ASC, equipment and telecare have been installed, and domestic home care support is in place, which keeps him safe, independent, and living at home. They are now registered with a local GP and engages with the surgery, is more confident and has made contacts & friendships within the local community.

The SBP used the Eary Intervention pathway to provide a fan during the heatwave and a fire safe heater for the cold weather.

The Adult said that the SBP had been wonderful & they didn't know what they would have done without her. They reported that he has regained confidence due to the SBP encouragement, reassurance, and support.

Case Study – Social Worker support

The Adult came to the UK in 2022 as a sponsored refugee from Ukraine and presented to the City Corporation as homeless, unable to speak English and with possible care and support needs. At that time, they were supported by a daughter who was caring for them.

Our work focused on needs and risks, for both Adult and Carer, while enhancing their independence and resilience. The social worker completed a Care Act Assessment, assisted with applying for sheltered accommodation and helped to access a range of different grants (for clothing, furniture, bedding, and kitchen items). Reablement support was provided followed by a longer-term package of care. The Adult and their Carer were both referred to City Advice, for assistance with a benefits review. A Carers Assessment was offered several times. Social Worker guided both through our processes and understanding of relevant legislation, offered advocacy when needed, and emotional support, time, and empathy.

Information was given to the daughter about Ukrainian groups, befrienders, churches, and church groups.

The adult's anxiety and depression began to improve, and the number of panic attacks reduced. Her needs stabilised and they are now independently accessing their local community, supermarket, and shops.

They moved into sheltered accommodation in another local authority, and while it took time for the adult and their daughter to access the appropriate benefits the accommodation is now stable. They have a lot of phone contact with their extended family, and they occasionally go and stay with a sister, who lives outside of London.

<u>Feedback from the daughter of Adult with care and support needs (10.05.2023):</u>

"I just want to express my heartfelt appreciation for all the support and assistance you provided to me and my … (parent) during one of the most difficult times in my life. Your unwavering dedication and commitment to helping my … (parent) and me through our struggles were truly invaluable. I will always be grateful for your guidance in funding resources and solutions that were tailored to my …(parent's) unique situation! Your expertise in navigating the complex web of services available to my ...(parent) was a true blessing, and I am confident that I would not have been able to find my way without your help! I want to commend you for your professionalism, kindness, and dedication to helping those in need. Your passion for helping others truly shines through in everything you do, and I feel incredibly lucky to have had you as my …(parent's) social worker! Thank you! You have made a lasting impact on my ...(parent's) life, and we both will be always grateful for your support."

Within our practice model, the Strengths Based Approach is operational from first contact. Rather than 'screening out' at the front door, practitioners are expected to be 'helping out' with information, advice and signposting. ASC are the main referrer to the City Connections service which supports people to access some of the services signposted to.

A commissioned information and advice service (City Advice), covers a range of issues and provides advice to residents and workers in the City of London along with our tenants in housing in various London boroughs. Part of the specification for the service includes some of the basic information and advice about accessing social care services. During 2022/23, there were 27 requests for this information. Our carers webpages were recently reviewed with carers and updated to make them useful and user friendly. Other ASC service pages are currently being reviewed to ensure that information is most relevant and user friendly.

Our mechanisms for feedback and how people's outcomes from the service are measured are currently being strengthened (see theme 2).

Assessments

The service uses a supported self-assessment model for assessments and there is an expectation that timeframes are responsive to the needs of and risk to the individual and their family. They can also be impacted by other factors such as the need to discharge someone from hospital. There is an expectation in our practice standards that assessments will be completed within 30 days, while our current reporting uses an indicator of 28 days. We will review and align these targets. Where assessments are more involved, discussion around this would take place within supervision.

Summary

- Our ASC workforce is experienced with good rates of retention and with manageable workloads allowing presence and time for strong relationship building as a core of our Strengths Based Approach
- The generic nature of the team allows for a flexible and agile approach and a more holistic view of the person
- A new Target Operating Model for the City Corporation recognised the importance of Adult Social Care and of prevention and as a result a new innovative role – Strengths Based Practitioner was developed
- A new standalone Principal Social Worker Post is in place which will allow for the strengthening of practice assurance and personal development
- Working in partnership is well established but is strengthened within our Strengths Based Approach
- There is active engagement with our place-based partnership and within this, the neighbourhood model
- Relationships with the voluntary sector are strong but the voluntary and community sector in the City of London is small. This is an area for development
- Strong relationships with health providers provides a base for working in a co-ordinated and multi-agency approach to assess and support residents (see also theme 2)
- Our approach to service delivery is person centred and empowering, but it is recognised that feedback mechanisms and measurement of outcomes from our work need to be strengthened

CQC Theme 2: Providing Support

Our Strengths

- A strong hospital discharge model
- Agile and flexible approach with the ability to spot purchase to meet needs
- Well established integrated care models locally and established relationships with health and Voluntary and Community Sector organisations

Areas for Improvement and Direction of Travel

- Improving the timeliness of reviews
- Improving triangulation of quality assurance of services
- Strengthening collection of feedback and measures of outcomes from service users

Key Statistics

21 Receiving domiciliary care directly on 31 December 2023	**26** Receiving a direct payment on 31 December 2023	**23** Living in supported housing on 31 December 2023
1 Using Day Care on 31 December 2023	**18** Living in residential care on 31 December 2023	**7** Living in nursing care on 31 December 2023
	14 Received a Reablement Service April – December 2023 **92%** those over 65 who required less support following a period of reablement April – December 2023	

Agile and flexible approach to meeting needs

Our approach to commissioning services is set out in our Market Sustainability Plan, and our Market Position Statement is emerging. Our strategic commitment is to support people to remain at home, which shapes demand for homecare, also informs a more complex need, and costly delivery when a placement is required.

The City of London has no accommodation-based support within its boundaries other than a sheltered accommodation unit which is provided by a housing association.

There has been a consistent level of demand for residential and / or nursing home care over the past 5 years. It is expected that at any one time there would be 20 – 25 placements in place, with an annual placement rate of around six to eight. The growth and ageing of the resident population have not led to a corresponding increase in demand for residential care provision.

As part of the ASC Transformation Programme, a project around brokerage is currently underway. This is designed to make our processes around commissioning residential, nursing and supported living placements more robust, to increase the strength of quality assurance and to ensure that all information on placements is triangulated through our social care system, Mosaic.

There is one commissioned homecare provider and a number of people who have a direct payment to purchase their own provision – some people chose a direct payment when the homecare provider changed, and they wished to remain with the previous provider.

Rough Sleepers

There has been an innovative approach to supporting rough sleepers with a permanent social worker post within the homelessness service but with professional supervision from the Head of ASC. This brings knowledge and expertise to working with a cohort who experience some of the highest health inequalities and poorest outcomes. Our work with rough sleepers involves strong engagement with outreach and mental health services to support and inform effective assessments.

As part of our approach to meeting the needs of rough sleepers, a complex needs hostel for City of London rough sleepers was established in partnership with a homelessness charity and a neighbouring local authority. This year, a specific rough sleepers assessment centre to bring together all our assessment services into one physical place will be opened. The Rough Sleeping Social Worker will have strong links into this assessment centre.

Case Study – Rough Sleeping Social Worker

An adult was rough sleeping in and around the City of London for 15 years prior to the pandemic. They made a claim for asylum, but this was declined.

The Adult was experiencing a mixture of mental and physical health problems and was assessed as having care and support needs under the Care Act (2014) and that the local authority had a responsibility to offer support under the Human Rights Act (1998). Following an Occupational Therapy assessment, temporary accommodation was organised.

The adult had a care package of support, which over time was reduced and later discontinued, as they readapted to living independently and their mental and physical health improved.
Our Strengths Based Practitioners supported the adult over time, building their confidence and relationship within the local community and with services.

The strengths-based practitioner helped him look into aspirational training courses which he had identified, such as security and forklift driver, following his lead to help him work out what he can and can't do rather than shutting doors. They also supported him to attend the local library to use their computers, so that he can do his own research.

The adult appealed the previous asylum decision, and in summer 2023 was granted asylum status in the UK. Now with our support they are building a new life. The adult is being supported to present as homeless and it is hoped that they will soon have an option to move into a property provided via the statutory homelessness pathway.

Adult's views/ comments:

The adult says that their community – the GIANTS group with Praxis, the British Red Cross group, and the African Rainbow Family – have all given them "a sense of motivation and encouragement even when times have been hard". They say that it is something they really value and enjoy. The adult has recently been in the GIANTS group's published cookbook talking about food they enjoy. GIANTS group with Praxis is a peer group for men applying for asylum, the British red cross is a similar resource, and African rainbow family is for people originally from Africa who identify as LGBTQI+. These groups have given the adult a sense of community and belonging, and motivation when times have been hard.

The adult also reported that Homelessness and ASC staff working with have been like 'therapists' and added: "I am not good in a crisis" and "a problem shared is a problem solved", as an appreciation of being supported by us.

Carers

The ASC Team were supporting 33 carers at the end of December 2023. All carers' assessments are carried out by social workers ensuring that carers assessments are carried out with a high degree of expertise and support plans are developed together. Carers receive individual budgets in the form of a direct payment to meet individual need, and these are not means tested.

In October 2022, an internal audit was carried out to assess the quality of carers assessments. Findings were largely positive with carers reporting a good overall experience with some recommendations for improvement. This included developing a toolkit for practitioners to improve consistency in approach to assessments and a guide for carers outlining what to expect before, during and after the assessment to help improve both experience and outcomes. There was also a recommendation for management to strengthen monitoring of carers assessments including monitoring of annual reviews to ensure timeliness and avoid slippage.

Initially, general wellbeing support for carers was provided through a commissioned early intervention and prevention service (City Connections). Following engagement with carers, it became evident that there was a need for a higher level of specific support for carers. This was piloted and will now be continued as a standalone service.

The Carer Connections service has been running since October 2022 with a dedicated Project Manager, through the Tower Hamlets Carers Centre. Initial work reflected the national picture that there are a significant number of hidden unpaid carers in the City of London who may not recognise themselves as a carer, and who are not in contact with a carers support organisation. A creative approach to community outreach identified 45 new carers, 51% who identified as being from a Black and global majority background and 49% who live on the east side of the City of London. This has been a significant area of focus for us.

Feedback from carers who had used the service showed an average score of 6.1 / 10 that they are consulted and co-produce the services delivered for them and an 8.2 /10 that they can stay independent and get help when they needed it.

A new Carers Strategy is now in place and to inform this, an innovative peer researcher approach was used to gather the views of carers which allowed us to reach a wider range of carers than usual.

Hospital Discharge

The number of hospital discharges the service has supported has increased since the pandemic but more significantly, so has the complexity of these cases as people are discharged more quickly. During 2022/23 102 hospital discharges were supported by the service (86 April – December 2023).

There is a strong model of services around hospital discharges including the Care Navigator who supports safe hospital discharge by building bridges between services, a rapid response service who can provide intensive care and support for short periods to facilitate discharge to assess and to prevent hospital admissions in the first place, a commissioned reablement service and an in-house Occupational Therapy team. There is also close working with health services such as therapy services.

The City Corporation discharge model is designed to best meet local need. Since April 2020, weekend discharge activity represented just 0.02% of overall discharges and therefore a fixed 7-day discharge service was not appropriate. The approach is built on the following:

- A full discharge service operates during normal working hours of Monday to Friday 9-5. A clear expectation is set for the service to work flexibly outside these hours, subject to demand and need
- Friday pressure points are expected, which may require ASC cover outside of normal hours; allowing weekend discharge arrangements to be secured
- The City Corporation's Rapid Response Service provider can support pre-arranged weekend discharge
- Bank holidays will not typically be covered, however, cover arrangement requirement will be assessed and responded to, with cover provided based on discharge demand and 'in hospital' figures. The ASC Head of Service provides the final decision on the requirement of responsive weekend cover
- Placing significant emphasis on prevention and early intervention in relation to safeguarding
- Ensuring that appropriate actions are taken where there is reasonable cause to suspect that an adult with care and support needs is at risk of abuse or neglect

Our Better Care Fund Plan is the primary source of funding for most of our hospital discharge work.

Case Study – Hospital Discharge, Care Navigator

The Care Navigator from Age UK worked with an Adult in hospital who had been struggling at home for some time but had been reluctant to ask for help and to share information. However, working with the Care Navigator, the individual wanted to be fully involved in their discharge planning but had a difficulty hearing, so by using email, they were able to provide more information about needs and requirements to help with the discharge home.

The Care Navigator acted as a bridge to adult social care to create positive outcomes for the adult by ensuring equipment such as key safe and pendant alarm were in place to prevent delays and ensure a safe discharge. The hospital did not provide a discharge summary for the Adult, but the Care Navigator ensured relevant details were shared with the GP including the arranged outpatient appointments.

Despite the level of complexity, the work of the care navigator helped facilitate a whole range of organisations working together to support the adult home safely and to meet their needs.

Feedback from the Adult

The Adult said they were proud of their independency and had not had to rely on social services for support before, but, as they said: "things are getting difficult for me now".

The person continued: "I have a hearing problem so using the phone is difficult, but I like using iPad", so they asked the Care Navigator to inform ASC to contact them directly about future discharge to help if access home visit was necessary so "I can point things out things I am concerned about".

The Adult shared that they enjoyed "computers and music in the past, like the trombone and guitar, but these have become more difficult to do now".

During a follow up meeting with the Care Navigator the Adult expressed their anxiety around the home environment being ready for their discharge and their wish to be fully involved in the discharge planning.
The Care Navigator spoke to Adult Social Care Duty on their behalf and a social worker was allocated, instead of managing the discharge through the duty team. The social worker visited the Adult in hospital and completed joint home access visit with an occupational therapist, ensuring the Adult was fully informed and in control of their own discharge.

Learning Disabilities

There are currently 12 adults with Learning Disabilities open to the adult social care team, 1 is aged under the age of 30 and the rest are aged between 30 and 60. 4 live in their own homes in the City of London (2 with family) 1 lives in residential care and 7 live in supported living setting.

There is a joint Learning Disabilities Service in the London Borough of Hackney which brings together the Local Authority and health services for Learning Disabled people together. City of London residents with Learning Disabilities are able to access the health services through this model.

Transitions

The ASC Team are part of a Transitions Group with the Education and Early Years Service and Children's Social Care. A register is kept of children and young people who will need to be reviewed to assess whether they need to transition to ASC services. There is also an ASC social worker who is a champion for transitions cases.

There have been very few transition cases in recent years, but these have been well planned from the age of 14 (through the Transitions Group) and have been a smooth transition.

Summary

- There is an agile and flexible approach to meeting need with spot purchasing, direct payments and innovative approaches
- In responding to the complex needs of rough sleepers we have a homelessness rough sleeper who has had excellent results in providing person centred approaches and linking up with specialist services
- Hospital discharges have become more complex and in response, a new hospital discharge model was developed to meet government requirements. This is supported by our Care Navigator who supports safe hospital discharge and acts as a bridge between partners
- Carers have been a specific area of focus for us over the last couple of years with an audit on carers assessment and associated actions and the development of a specific carers support service

CQC Theme 3: Ensuring Safety Within the System

Our Strengths

- Strong City and Hackney Safeguarding Adults Board with multi-agency support and commitment for safeguarding; but with a distinct focus on City of London through a separate Sub-Group
- Robust and rapid professional response to safeguarding concerns, incidents and provider issues, ensuring safe and personalised responses
- Safety built into all levels of the system

Areas for Improvement and Direction of Travel

- Implementing robust and routine feedback from people who have been safeguarded
- Safety challenges around the Cost-of-Living Crisis and Rough Sleeping
- Responding to the complexity of hospital discharges

Key Statistics

50 Safeguarding concerns inside COL (2022/23) **31** April – December 2023	**24** S42 Enquiries (2022/23) **16** April – December 2023	**29** S42 conclusions (2022/23) **18** April – December 2023
63% Of Safeguarding concerns were related to neglect and acts of omission and self - neglect (2022/23) **63%** April – December 2023	**21** Cases where outcomes were expressed (2022/23) **15** April – December 2023	**86%** Percentage of outcomes that were fully or partially achieved (2022/23) **87%** April – December 2023
24 Number of cases where risk reduced or removed (2022/23) **12** April – December 2023	**5** Number of MCAs which took place (2022/23) **2** April – December 2023	**20** Number of clients with a DOLs in place on 31 March 2023 **25** 31 December 2023

City and Hackney Safeguarding Adults Board

The City and Hackney Safeguarding Adults Board (CHSAB) is a multi-agency partnership including statutory and non-statutory stakeholders. The role of the Board is to assure itself that robust safeguarding procedures are in place across City and Hackney to protect adults with care and support needs who are at risk of abuse and neglect. Where abuse and neglect does occur, the Board and its partners are committed to tackling this and promoting person-centred care for all adults experiencing abuse or neglect.

The CHSAB has been chaired by Dr Adi Cooper, architect of Making Safeguarding Personal, for more than five years which has provided strong and stable leadership around safeguarding locally.

The Assistant Director for People chairs the Safeguarding Adults Review sub-group for the CHSAB and although the City of London has not had any Safeguarding Adults Reviews for a number of years, a discretionary one was carried out in November 2022 in relation to a rough sleeper who died in the City of London. A multi-agency action plan is currently in place via the CHSAB and all actions for the City Corporation Homelessness and ASC teams have been completed. This led to a full review of our participation and engagement work with rough sleepers and the development of an innovative participation project with Groundswell which is now in place.

ASC has been proactive in reviewing any SARs from Hackney and nationally to consider and embed any recommendations where appropriate.

Case Study – Learning from Safeguarding Adult Reviews

Following two Safeguarding Adult Reviews in Hackney, a panel was established to provide a person-centred, timely and effective multi-agency response to situations where the person referred has been assessed as a high level of risk because of complex self-neglect, fire risk or other high-risk issues. The aim of the panel is to ensure that all relevant agencies work together to provide a co-ordinated and accountable response to the person's presenting issues and risks and to focus on the outcomes the person wants to achieve to the greatest extent possible given individual circumstances and risks.
The panel has strong representation from partners and oversees a whole range of interventions form long term therapeutic work with adults with hoarding disorder to short term preventative measures.

For example, in 2022/23 £1,790 was spent on fire prevention equipment for adults in the City of London, this included replacing fan heaters or other high risk portable heating devices with safe electric oil filled radiators, replacement of multiplugs with fused power boards, and provision of fire-retardant bedding.

The Chair of the panel (Head of ASC) also attends the City and Hackney Safeguarding Adults Board SAR group creating strong links between both groups and the ASC service. Following a fire leading to the death of a resident in March 2022 a SAR referral was made. While the referral was not adjudged to meet the SAR criteria, and the Coroner concluding the death to be the result of an accident, it has been agreed with the CHSAB independent chair to hold a discretionary learning review to examine how services across the City of London may be able to learn and improve from this.

In terms of work of the Board, the City of London have been active partners in this work. Historical work has included financial abuse and self-isolation and more recently a focus on the impact of the cost-of-living crisis.

The Board provides training for professionals in 3 key areas:

- Recognised safeguarding training at the required levels
- Specific training commissioned by the SAB relevant to the work it is doing
- SAR learning events

To ensure that there is sufficient focus on the City of London, there is a City of London sub-group of the Board which is again independently chaired by Dr Adi Cooper and includes more local City of London partners and providers. The role of this sub-group is to provide assurance, accountability and the sharing of good practice in relation to the City of London. It considers City of London specific data and priorities in the Board's workplan.

Robust and rapid professional response to safeguarding concerns

The ASC service has a personalised approach at the forefront of its safeguarding work, alongside the assessment and mitigation of risk. These principles are applied equally to the proportionate responses taken to those concerns not meeting S42 enquiry criteria.

As with other London local authorities, the Service applies the London Safeguarding procedures. It is also familiar with Transitional Safeguarding and Joint Working with Children and applies these to support a smooth transition to adulthood.

Within the Team, social workers are qualified to undertake Mental Capacity Assessments and the AMPH, who is provided by the East London Foundation Trust, carries out any Mental Health Act Assessments as necessary. Best Interests Assessments are spot purchased from an independent provider to ensure independence although several of our social workers have training in this to ensure an understanding within the service and a link to the commissioned provision.

Mental Capacity Act (MCA) Assessments and safeguarding are included in our schedule for annual audits.

A system wide approach to safety

The promotion of safety and the understanding and management of risk is embedded across all elements of the system, both internally and externally. This includes:

- A corporate Safeguarding Policy which sets out expectations for Members, Officers and commissioned providers around their role in safeguarding
- Regular safeguarding reporting to Members of the Safeguarding Sub-Committee
- Online Safeguarding Awareness Training across the organisation
- An early intervention project focused on prevention and improving people's wellbeing by keeping them safe in ways defined by themselves
- The Care Navigator who facilitates safe hospital discharge and links hospitals and GP practices supporting more informed hospital discharges and sharing of information to reduce risk
- The ASC Team Manager and Deputy Team Manager are embedded in the Neighbourhood Multi-Disciplinary Meetings

- Social Workers and the Care Navigator attend GP Multi-Disciplinary Team Meetings in the Practices where residents are registered
- The People's Directorate working closely together with ASC presence at all cross-service meetings and work together with colleagues to minimise risk and support safer and more informed transitions between services
- Working closely with colleagues in commissioning and having a quality alert process in place to pick up domiciliary care concerns that are below the level of formal safeguarding and ensure that these are resolved at any early stage and prevent harm. When clients are placed in supported living, residential or nursing care our aim to use providers who are rated good or above wherever possible. When alerts about safety arise, commissioning work with the host local authorities to assess risk. Performance improvement letters are issued where safety or quality is a concern
- Providing access and support to training for commissioned providers such as City Connections and involving them in our City Safeguarding Sub-Group

Summary

- There is a robust approach to ensuring safety that is built across the system including Members, Officers, Health Partners and Commissioned Providers
- Although our Safeguarding Adults Board is a joint one with Hackney, there is a City of London sub-group which is also Chaired by the independent chair of the Board to ensure appropriate focus on the City of London
- Responding to the complex needs of rough sleepers and hospital discharges continues to present a level of risk but our innovative responses have helped to reduce some of this risk
- Though there have not been any mandatory City of London specific Safeguarding Adults Reviews any learning from SARs in Hackney and nationally have been reviewed and responded to accordingly – for example with the establishment of the Hoarding and Self-Neglect Panel

CQC Assurance Theme 4: Leadership

Our Strengths

- Strong, stable political and officer leadership across the City of London Corporation, underpinned by robust and effective financial management including scope for innovation that supports ASC. The development of the Target Operating Model facilitated growth for ASC when there were corporate pressures to reduce budgets elsewhere
- Clear visibility and access of senior management within the Department
- Assistant Director of People's Services provides leadership across all relevant services

Areas for Improvement and Direction of Travel

- Work to increase diversity across the service, as part of wider organisational approach, to reflect our community
- Retain a skilled workforce who are constantly learning

ASC benefits from strong officer member relationships which provide accountability and direction. This is underpinned by an effective formal and informal governance structure.

Informal governance

The ASC Senior Management provide visible and supportive leadership to staff as well as wider health and care partnerships.

There are monthly ASC Management Team meetings as well as People Management Team Meetings which allows cross cutting themes and issues to be considered. There is also a complex needs panel for ASC, a Category Board for the Department and Adult Performance Meetings.

There is also an internal Integration Programme Board which consists of a range of relevant staff and provides the space for system partners to come and talk to us at the City Corporation about our involvement in certain integration initiatives as an efficient way of gaining our input rather than us attending multiple meetings.

Formal governance

The Community and Children's Services Committee is the committee which holds responsibility for ASC and its associated budget. There are regular meetings between the Chair and Deputy Chair of the Committee with the Director of Community and Children's Services and the Assistant Director of People.

Members on the Community and Children's Services Committee also sit on committee relating to the Integrated Care system, the Safeguarding Sub-Committee and the Health and Wellbeing Board providing a strong cross cutting approach to key issues. These all underpin our strategic decision making and include regular scrutiny of our performance data. The Health and Social Care Scrutiny meets 4 times a year and specifically includes social care items on each agenda. Recent items have included an evaluation of the early intervention pilot, hospital discharge processes and proactive care in the local integrated care system.

As noted under Theme 3, our Adult Safeguarding Board function is delivered jointly with the London Borough of Hackney. The Assistant Director of People chairs the SAR sub-group of the Board.

Although the City Corporation attends and participates in key ICS and place meetings, it does not hold any specific leadership roles within this.

Quality Assurance

There is a strong golden thread and connection from management to operational practice with annual direct observation of practice from the Assistant Director of People as well as the Head of ASC alongside that of the Principal Social Worker and operational management.

ASC has recently appointed a dedicated Principal Social Worker (PSW) as a standalone role rather than it being embedded into the Head of Service role to strengthen practice governance amongst other things. This is already having a range of positive benefits including:

- Keeping Social Work practitioners up to date with relevant developments on areas that link with their practice. This is done through a weekly bulletin and a weekly 5-minute reflection is also sent to the whole directorate for use across services. This has enhanced communication with the team and built a habit of reflective practice
- Enabling us to engage more widely across the PSW network regionally as well as nationally and learn from this to update our practice. Recently, the PSW has taken part in an LGA peer review in Bournemouth, learning from other LAs and bringing this good practice back
- Strengthening our approach to Quality Assurance with the development of an annual audit schedule and feeding back learning into the service and reporting to ASMT. For example, following the audit of carers assessments, a guide for practitioners was developed to strengthen the approach to assessments. This was based on direct feedback from carers.

It is recognised that quality assurance could be strengthened by the addition of some external quality assurance. This has been taken forward and the first round of external audit took place in October 2023. A full report is due shortly.

Using Performance Data

The Departmental Performance Team produce monthly performance scorecards for the service which provides Senior Managers and the service with intelligence and performance data to provide assurance that statutory obligations are being met, that any risks are identified and mitigated, targets are being met and any emerging trends or issues are identified. The monthly performance scorecard is discussed at an officer performance meeting in the service. A more detailed summary of safeguarding data is scrutinised at the Safeguarding Sub-Committee quarterly.

Performance monitoring identified that some reviews were not taking place within timescale and changes have been made to the Mosaic system to flag these up so that none are missed.

Across the Directorate, there is a move towards the use of more PowerBI dashboards. One is being developed for ASC and our strategy is that different levels of dashboards will be developed so that they can be used at the front line to support self-management of work and performance.

Leadership on diversity and inclusion

- The Head of Service and Assistant Directors attended Leadership in Colour Conference and reflections from this were discussed at the People's Senior Management Team meetings and the People's Equality Group

- A People's Equalities Steering Group who monitor approaches in this area and established a book club for staff to read and discuss the book Me and White Supremacy
- Anti-Racist Practice Standards have been introduced which are being considered section by section at Team meetings led by the Head of Service, Principal Social Worker and Team Manager
- Reflection and learning on good practice around recording people's diverse needs in our Care Act Assessments were included as part of internal training on the Strengths Based Approach
- During celebrations of World Social Worker Day in March 2023, Tricia Pereira was a guest speaker at the City Corporation. Tricia is the Co-Chair of the Department of Health Social Care (DHSC) Social Care Workforce Race Equalities Standards Advisory Group and is the co-author of Strength-Based Practice Framework and Handbook published by DHSC in 2019

Comment by Principal Social Worker.

"City of London Community and Children's Department's senior leaders monitor the impact our work has on safety and wellbeing of people in our community by leading various board meetings and forums, such as Transformation Board, People's Senior Managers Meeting (PSMT)or Adult Senior Managers Meeting (ASMT), reviewing complaints/compliments and feedback from our citizens and encouraging co-production.

They are interested in wellbeing and performance of our staff receiving regular updates and listening to staff concerns by utilising quarterly meetings between DASS and PSW and by establishing Staff Forum. Both of our Executive Directors, Judith Finlay and the Assistant Director Chris Pelham, and Head of Service Ian Tweedie take part in our quality assurance activities by undertaking Direct Practice Observations of our front-line practitioners, which is very well received by the workforce and champions core ethics and values of our profession.

Example from observation notes, by Chris Pelham, October 2023: "There were interesting dynamics in terms of the relationship between the couple. SH's wife was from Thailand and there was a lot of consideration given to the relationships between the family members. Maria (SW) demonstrated curiosity re. these family relationships and how they might impact in terms of where the 'power' sits within the wider family systems – i.e., SH's wider family and SH not wanting his wife to go to Thailand without him/leave him at home. In doing this, Maria was considering both SH's needs as the cared for as well as his wife the carer."

Our senior leaders are visible and easily accessible having their offices next to operational teams, often "doing the walk" speaking with individual staff, attending our larger and smaller events, such as World Social Work Day or opening of ASC Library.

As PSW I feel reassured that our senior leaders encourage culture of learning and partnership working while promoting wellbeing of the workforce."

Summary

- There is strong and active political commitment to ASC in the City of London
- Senior Managers within the Department are visible and accessible to staff
- Opportunities for staff to develop leadership skills are being rolled out with staff having the opportunity to be champions in certain areas and the PSW focusing on personal development with staff
- Staff undertake a range of training and reflective supervision is developing. There is always the opportunity however to ensure that staff are continuously developing
- There are several initiatives promoting diversity and inclusion amongst staff and within the service. Promoting more diversity amongst staff to reflect our community is a priority

Areas for Development – Summary

Area	Response / Activity
Strengthening triangulation around commissioned placements quality assurance	Undertaking brokerage project as part of Transformation Programme
Developing a stronger performance culture within the service	Power BI dashboards being developed which will be able to be used at different levels of the service including at the front line, to help staff manage their own performance Training planned for Social Work Teams on understanding the role of data and the importance of data quality. Ongoing training in use of Mosaic to ensure correct data is added in correct place Review of reporting and KPIs underway as part of the Transformation Programme
Strengthening Quality Assurance	An external quality assurance mechanism has now been added
Timeliness of Reviews	Traffic light system has been added to Mosaic system to flag reviews. ASC are working with performance and MOSAIC teams to address system issues leading to differing target dates being indicated. Work is underway with practitioners as a whole and individually to ensure timeliness of reviews. Options are being explored to capture reasons for delays in reviews taking place.
Capturing and recording equalities data more effectively and using this to shape services	Review of system and recording of equalities data has taken place and changes identified – will be taken forward as part of the Transformation Project
Improving the quality and accessibility of our information offer for residents	Review of offer underway as part of Transformation Programme
Strengthening co-production and collection of feedback and measures of outcomes from service users	Currently underway as part of the Transformation Programme. Also wider piece of Departmental work underway to look at our framework for

	engagement and co-production and a reward and recognition policy.
Implementing robust and routine feedback from people who have been safeguarded	Currently underway as part of the Transformation Programme
Increase diversity across the service to reflect community	Will be taken forward as part of Corporate wide approach

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