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Barbican Residential Committee

Date: FRIDAY, 8 OCTOBER 2021

Time: 11.00 am

Venue: COMMITTEE ROOMS, 2ND FLOOR, WEST WING, GUILDHALL

Members: Randall Anderson Mark Bostock Deputy David Bradshaw Mary Durcan Michael Hudson (Deputy Chairman) Jeremy Mayhew Andrew McMurtrie Deputy Barbara Newman Susan Pearson Ruby Sayed (Ex-Officio Member) Jeremy Simons Deputy John Tomlinson Mark Wheatley (Chairman) Dawn Wright

Enquiries: Julie.Mayer@cityoflondon.gov.uk

JOHN BARRADELL Town Clerk and Chief Executive

AGENDA

1. APOLOGIES

2. MEMBERS' DECLARATIONS UNDER THE CODE OF CONDUCT IN RESPECT OF ITEMS ON THE AGENDA

3. MINUTES

To approve the public minutes and non-public summary of the meeting held on 28th June 2021.

For Decision (Pages 7 - 16)

4. MINUTES OF THE RESIDENTS' CONSULTATION COMMITTEE

To receive the minutes of the meeting held on 27th September 2021.

For Information (Pages 17 - 24)

5. CAR PARK CONCIERGE SERVICE

To consider a resolution from the Barbican Residents' Consultation Meeting (RCC) meeting held on 27th September 2021.

For Decision

(Pages 25 - 26)

6. 'YOU SAID; WE DID' - OUTSTANDING ACTIONS LIST

To note the Committee's Outstanding Actions List.

For Information

(Pages 27 - 28)

7. HOUSING NET ZERO CARBON ACTION PLAN

Report of the City Surveyor.

The appendices to this document are very large. They will be available on the web site and circulated separately.

For Decision (Pages 29 - 260)

8. 2020/21 REVENUE OUTTURN (EXCLUDING THE RESIDENTIAL SERVICE CHARGE ACCOUNT)

Report of the Chamberlain and Director of Community and Children's Services.

For Information (Pages 261 - 266)

9. SERVICE CHARGE OUTTURN 2020/21

Report of the Director of Community and Children's Services.

For Information

(Pages 267 - 276)

10. IMPLICATIONS OF THE FIRE SAFETY ACT 2021

Report of the Remembrancer and the Director of Community and Children's Services.

For Information (Pages 277 - 284)

11. FIRE SAFETY ORAL UPDATE

Assistant Director, Barbican and Property Services to be heard.

For Information

12. RECOGNISED TENANTS' ASSOCIATION (RTA) AUDIT 2021

Report of the Town Clerk.

For Decision (Pages 285 - 290)

13. SERVICE LEVEL AGREEMENT (SLA) QUARTERLY REVIEW: APRIL - JUNE 2021

Report of the Director of Community and Children's Services.

For Information (Pages 291 - 306)

14. **PROGRESS OF SALES AND LETTINGS**

Report of the Director of Community and Children's Services.

For Information (Pages 307 - 312)

15. UPDATE REPORT

Report of the Director of Community and Children's Services.

For Discussion

(Pages 313 - 318)

16. BLAKE TOWER ORAL UPDATE

Assistant Director, Barbican and Property Services to be heard.

For Information

17. ARREARS UPDATE

Report of the Director of Community and Children's Services. Please note a non-public appendix at agenda item 22.

For Information

18. QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE

19. ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT

20. EXCLUSION OF THE PUBLIC

MOTION – That under Section 100(A) of the Local Government Act 1972, the public be excluded from the meeting for the following item(s) on the grounds that they involve the likely disclosure of exempt information as defined in Part 1 of the Schedule 12A of the Local Government Act.

For Decision

21. NON-PUBLIC MINUTES

To approve the non-public minutes of the meeting held on 28th June 2021.

For Decision (Pages 319 - 322)

22. ARREARS (NON PUBLIC APPENDIX)

To be read in conjunction with agenda item 2.

For Information (Pages 323 - 326)

23. BARBICAN ESTATE RESIDENTIAL TENANCY RENEWALS

Report of the Director of Community and Children's Services.

For Decision

24. LEASE APPROVAL

Report of the Director of Community and Children's Services.

For Decision (Pages 333 - 336)

25. GATEWAY 5 - FIRE SAFETY IMPROVEMENT WORKS - FROBISHER CRESCENT RESIDENTIAL PREMISES

Report of the Director of Community and Children's Services

For Decision (Pages 337 - 350)

26. NON-PUBLIC QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE

27. ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT AND WHICH THE COMMITTEE AGREES SHOULD BE CONSIDERED WHILST THE PUBLIC ARE EXCLUDED

Confidential

28. CONFIDENTIAL MINUTES

To approve the confidential minutes of the meeting held on 28th June 2021.

For Decision

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Agenda Item 3

BARBICAN RESIDENTIAL COMMITTEE Monday, 28 June 2021

Minutes of the meeting streamed to You Tube at: https://youtu.be/T35sx425oNw

please note the above recording will be available for one month from the date of the meeting

N.B. This meeting was held as an informal one, with the views reached by the Committee approved formally by the Town Clerk after the meeting, in accordance with the Court of Common Council's Covid Approval Procedure. This process reflects the current position in respect of the holding of formal Local Authority meetings and the Court's decision of 15 April 2021 to continue with virtual meetings, with formal confirmation of decisions provided through a delegation to the Town Clerk (or his nominated representative) after the informal meeting has taken place and the will of the Committee is known.

Present

Members:

Mark Wheatley (Chairman) * Michael Hudson (Deputy Chairman) * Randall Anderson Mark Bostock Deputy David Bradshaw Mary Durcan Andrew McMurtrie * Deputy Barbara Newman Susan Pearson * Ruby Sayed (Ex-Officio) * Deputy John Tomlinson Dawn Wright *

*indicates non-resident Member

Officers:

- Paul Murtagh Assistant Director, Barbican and Property Services **Community and Children's Services** Barry Ashton -Michael Bennett Community and Children's Services Alan Bennetts Comptroller and City Solicitor's Department -Mark Jarvis Chamberlains Michael Bradley **City Surveyors** -Helen Davinson Community and Children's Services -Michael Gwyther-Jones Community and Children's Services Anne Mason Community and Children's Services -Jason Hayes Community and Children's Services Becky Bello Community and Children's Services
 - Town Clerk's

1. APOLOGIES

Julie Mayer

Apologies were received from Jeremy Simons and Jeremy Mayhew. The Chairman gave apologies for absence from 3.30 pm.

2. MEMBERS' DECLARATIONS UNDER THE CODE OF CONDUCT IN RESPECT OF ITEMS ON THE AGENDA

The following resident Members declared pecuniary interests in respect of agenda item 11 (Annual Review of Charging Policy for Car Parks and Stores) and a confidential, urgent item of business on Efficiency Savings and the Target Operating Model report at agenda item 31. *NB. These Members are not entitled to vote on recommendations in respect of car parking and stores.*

- Deputy David Bradshaw rents a car parking bay and a store
- Mrs Barbara Newman rents a store
- Mary Durcan rents a car parking bay and a store
- John Tomlinson rents a bar parking bay and a store

Mr Andrew McMurtrie (non-resident Member) declared a non-pecuniary, general interest by virtue of his membership of the Salters Livery Company, which is in close proximity to the Barbican Estate.

Vote of Thanks

It was proposed by Barbara Newman, seconded by Deputy David Bradshaw and RESOLVED, unanimously, that - the Members of the Barbican Residential Committee wish to place on record their sincere appreciation to:

MICHAEL HUDSON

for the enthusiastic and affable manner in which he has chaired their Committee since 2018. Michael has sought to build strong working relationships between the City and Barbican Residents, whilst remaining objective and open-minded.

Michael has driven the fire safety agenda, alongside other health and safety policies, and championed the various building and maintenance projects which will improve the aesthetics of the Estate. Michael has shown exceptional diligence in seeking the best outcome for both the City Corporation and its future residents in Blake Tower.

Michael has also shown leadership in climate change strategies, promoting energy saving options wherever possible and his Chairmanship has overseen a pioneering electric vehicle charging policy for the Estate, which is likely to set a benchmark for similar Estates across the Country. Michael has demonstrated exemplary attention to detail in both this and other complex projects.

In order to ensure value for money and sustainability, the Committee is currently considering options in respect of its charging policy on car parking and stores on the Estate and Michael has led discussions in a fair and equitable manner. During the covid pandemic of 2020-21, Michael's compassionate Chairmanship oversaw a programme of assistance, which reached out to the Estate's commercial tenants and its most vulnerable residents.

Finally, in taking leave of their Chairman, Members would like to place on record their recognition of Michael's dedication to their Committee, his commitment to the quality of life of the Barbican residents and the Estate's sustainability and convey their gratitude and best wishes for the future.

In response, Mr Hudson thanked Members and Officers for their support over the past three years. He was also pleased at the affirmation of his Chairmanship in building a solid working relationship and spirit of co-operation between the City and the Barbican residents.

3. MINUTES

3.1 RESOLVED, that - the public minutes and non-public summary of the meeting held on Monday, 15th March 2021 be approved.

Matters arising

The Deputy Chairman thanked Solicitors - Alan Bennetts and Andrew Cusack, and Surveyor - Michael Bradley for their exemplary advice on the Virgin Active lease.

Members noted that some of the Cromwell Tower block locks were being changed gradually, as they had reached the end of their natural life. Officers would provide updates outside of the meeting in respect of any further issues.

- 3.2 RESOLVED, that the minutes of the Special Meeting held on Wednesday, 5th May 2021 be approved.
- 3.3 RESOLVED, that the draft minutes of the Residents' Consultation Committee held on Monday, 14th June 2021 be received.

4. TO APPOINT A MEMBER TO THE CULTURE MILE WORKING PARTY

RESOLVED, that – following a ballot in which Mr Randall Anderson received 6 votes and Mr Mark Bostock received 4, Mr Anderson was appointed to serve as the Chairman's representative on the Culture Mile Working Party.

5. TO APPOINT A MEMBER TO THE CAR PARK CHARGES WORKING PARTY

RESOLVED, that – being the only Members expressing a willingness to serve, Mr Randall Anderson, Deputy John Tomlinson and Deputy David Bradshaw be appointed to the Car Park Charges Working Party, together with the Chairman and Deputy Chairman.

Members noted that the membership of the Working Party would, therefore, remain unchanged for 2021/22.

6. 'YOU SAID: WE DID' - OUTSTANDING ACTIONS

The Committee received the outstanding actions list.

Members noted that a bid was being progressed in respect of additional funding for the Walkways, for the current financial year, and this would include inspection and maintenance for a number of items; i.e. smoke vents, drainage gulleys, planters, benches and signage.

7. FIRE SAFETY UPDATE

The Committee received a report of the Director of Community and Children's Services, which provided an update on the progress made in relation to fire safety matters since the last update report in December 2020.

Members noted that the Frobisher Crescent fire stopping contract would be awarded shortly, for works to start, hopefully in August 2021, and the Contractor would be developing a robust communications strategy with residents. The Assistant Director advised that, this was a unique project and, the cost of retro-fitting had been higher than expected. Therefore, a request for additional funding would need to be presented to the Finance Committee and Members would be kept updated on the position.

In respect of the Arup Fire Safety Survey, the first draft in respect of Andrewes House was due to be discussed at a meeting later this week. The survey for Cromwell Tower was underway and making good progress. The Assistant Director thanked Deputy Tomlinson for raising the new Fire Safety Act 2021 at the recent meeting of the Residents Consultation Committee (RCC). Members noted that the new Bill focussed on external wall cladding, fire doors and the role and responsibilities of the 'premises controller' on the premises'. The Assistant Director reminded Members that work on cladding and fire doors had commenced immediately after the Grenfell fire. The relevant Committees would receive a joint report of the Remembrancer and Director of Community and Children's Services in the Autumn Committee cycle, in respect of the implications of the new Fire Safety Act 2021 and, the progress the Corporation is making to ensure it remains compliant.

Members also noted that an independent draft report on the new fire signage was being reviewed by the Fire Engineer and was due to be sent to the London Fire Brigade later this week, either for comment or endorsement.

RESOLVED, that – the report be noted.

8. BARBICAN FIRE DOOR REPLACEMENT PROGRAMME - PROGRESS REPORT (GATEWAY 2)

The Committee received a report of the Director of Community and Children's Services in respect of a programme of works to replace all fire rated doors (including any associated panel surrounds, fanlight windows, refuse cupboards

and intake cupboards) within the residential blocks of the Barbican Estate, to ensure that they meet the requirements of the current Building Regulations in relation to fire safety. The Committee noted that the award of tender was expected in July and the Autumn cycle of meetings would receive a further update.

There was some discussion in respect of the current recruitment moratorium, and the Assistant Director advised that this was a long-term project, which would require adequate staff resources over a 2-3 year period. Members also noted that the current recruitment moratorium was having an adverse impact on the ability to recruit high calibre project managers. Whilst Directors were able to submit a business case to the Town Clerk, seeking to waive the moratorium in such circumstances, it was proposed by Michael Hudson, seconded by David Bradshaw, and RESOLVED unanimously that - the Establishment Committee be asked to note the above concerns and consider ceasing the current recruitment moratorium in respect of the project manager appointment.

RESOLVED, that – the report be noted.

9. COMMUNAL REPAIRS & REDECORATION PROGRAMME FOR THE BARBICAN ESTATE (2015-2020) - OUTCOME REPORT (GATEWAY 6) The Committee considered an outcome report of the Director of Community and Children's Services in respect of a programme of works which encompassed the cyclical redecoration of internal common parts, external common parts or both of the identified blocks of the Barbican Estate.

RESOLVED, that – the content of this report and the lessons learnt be noted and the closure of the project be authorised.

10. BARBICAN ESTATE REDECORATION PROGRAMME (2020-2025) -PROGRESS REPORT (GATEWAY 5)

The Committee received a report of the Director of Community and Children's Services in respect of a programme of cyclical redecoration of internal and external areas of the residential blocks of the Barbican Estate, as identified for the next five financial years of the redecorations programme.

RESOLVED, that – the report be noted.

11. CHARGING POLICY FOR CAR PARK AND STORES - ANNUAL REVIEW

The Committee received a report of the Director of Community and Children's Services in respect of the Annual Review of the Charging Policy for Car Parking and Stores on the Barbican Estate.

RESOLVED, that - the work and recommendations of the Member/Officer Working Party be endorsed, and the following be approved:

Car parking

1. The Barbican car park charge per parking space for the ensuing year be paused at £1,420 per annum, subject to review in 2022.

2. An increase in the miscellaneous charges of 5% for motorcycles (to £255), bicycle lockers (to £96), bicycle pods (to £34), temporary car parking (to \pounds 11.00), subject to review in 2022.

3. The Barbican car park charge per premium parking space for the ensuing year be £2,130 per annum (based on 1.5 of the current charge for a standard car bay), subject to review in 2022.

Stores

4. An increase in the rents for stores within Barbican buildings for the ensuing year to £27.50 per square foot per annum; i.e. - stores not constructed in the car parks which are all classed as small/standard stores, subject to review in 2022.

5.An increase in rents for the residential new stores in the car parks for the ensuing year of 5% to £21.30 per square foot per annum, subject to review in 2022.

6. An increase in rents for the non-resident new stores in the car parks for the ensuing year of 5% to £42.60 (including vat) per square ft and per annum, subject to review in 2022.

7. An increase in rents for the original resident stores in the car parks for the ensuing year of 5% to £21.00 per square foot per annum, subject to review in 2022.

12. ELECTRIC VEHICLE CHARGING UPDATE

The Committee considered a report of the Director of Community and Children's Services which provided an update on the provision of EV charging points across the Barbican Estate Car Parks, following the introduction of Phase 1 in 2018 and the implementation of Phase 2 to the remaining car parks during Summer 2021.

The Chairman thanked Ted Reilly, Deputy Chairman of the RCC, Deputy John Tomlinson and City Officers - Michael Bennett and Barry Ashton for their initiative in this project, which demonstrated excellent joint working between officers and residents.

RESOLVED, that - as part of the implementation of Phase 2 of the new EV charging points across the remaining Barbican Estate Car Parks:

- 1. EV users be directly billed per kWh of electricity at 16p/kW, by BP Chargemaster, for electricity at the domestic rate that they use and standing charges for electricity per car park location.
- 2. Maintenance contract charges be recharged to the Car Park Account..

13. CLIMATE ACTION STRATEGY

The Committee received a report of the Director of Community and Children's Services in respect of the current position of the Barbican Residential Estate in relation to the City of London Corporation's Climate Action Strategy, and the opportunities and next steps in progressing towards decarbonisation of the housing stock.

RESOLVED, that – the report be noted.

14. SERVICE LEVEL AGREEMENT WORKING PARTY QUARTERLY REVIEW -JANUARY - MARCH 2021

The Committee received a report of the Director of Community and Children's Services, which updates Members on the review of the estate wide implementation of Service Level Agreements (SLAs) and Key Performance Measures (KPIs) for the quarter January – March 2021.

RESOLVED, that – the report be noted.

15. **PROGRESS OF SALES AND LETTINGS**

The Committee received a report of the Director of Community and Children's Services which advised Members of the sales and lettings approved under delegated authority by officers since the last meeting. The report also provided information on surrenders of tenancies received and the number of flat sales to date.

RESOLVED, that – the report be noted.

16. UPDATE REPORT

The Committee received the update report of the Director of Community and Children's Services.

A Member of this Committee, who is also Chair of the Barbican Association Safety Committee, advised that the programme for recording incidents of antisocial behaviour was now live, and would enable the Committee to measure the seriousness of the problem. In respect of the Barbican prohibition signs, an update was expected later this week and it was expected that this would also help to alleviate the situation.

RESOLVED, that – the report be noted.

17. BARBICAN ARREARS

The Committee received a report of the Director of Community and Children's Services which advise members of the current arrears in respect of tenants and leaseholders on the Barbican Estate. Members noted a more detailed appendix on the non-public agenda at item 22.

18. QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE

There were no questions.

19. ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT

Due to the new Chairman's family commitments, the Town Clerk would be emailing all Members to suggest alternative dates in October 2021 and January 2022, which would replace the meetings scheduled for September and December. This would have an added advantage in shortening the gap between meetings in early 2022, due to the Common Council elections.

20. EXCLUSION OF THE PUBLIC

RESOLVED, that - under Section 100A(4) of the Local Government Act 1972, the public be excluded from the meeting for the following items of business on the grounds that they involve the likely disclosure of exempt information as defined in Paragraph 3 of Part I of Schedule 12A of the Local Government Act.

Item nos	Par nos
21	1,2 & 3
22	1 & 2
23	3
24 - 27	1 & 2

21. NON-PUBLIC MINUTES

RESOLVED, that – the non-public minutes of the meeting held on 15th March 2021 be approved.

- 22. **BARBICAN RESIDENTIAL ARREARS NON- PUBLIC APPENDIX** The Committee received an appendix in respect of agenda item 17,
- 23. BARBICAN PODIUM WATERPROOFING, DRAINAGE AND LANDSCAPING WORKS (BEN JONSON, BRETON & CROMWELL HIGHWALK) - PHASE 2 -1ST PRIORITY ZONE

The Committee received a report of the Director of Community and Children's Services.

24. BARBICAN ESTATE COMMERCIAL PROPERTIES, RENTAL SUPPORT -REPAYMENT PLANS FROM JUNE 2021

The Committee received a report of the Director of Community and Children's Services.

25. **COMMERCIAL LETTING: SHAKESPEARE TOWER** The Committee considered and approved a report of the Director of Community and Children's Services.

26. **PENDING URGENT DECISION REQUIRED FOR A RENT FREE CONSIDERATION FOR COMMERCIAL TENANT** The Committee received an oral update.

27. BLAKE TOWER

The Committee received an oral update.

28. NON-PUBLIC QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE

There were no questions.

29. ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT AND WHICH THE COMMITTEE AGREES SHOULD BE CONSIDERED WHILST THE PUBLIC ARE EXCLUDED

The Chairman agreed to accept a confidential item of business in respect of achieving efficiency savings, prior to consideration of the report on the Target Operating Model. This was taken at item 31.

At 3.30 pm it was agreed that the meeting be extended to 4pm to conclude the business on the agenda. At this point the Deputy Chairman took the Chair.

The Town Clerk reminded the Committee that this was an informal meeting, convened under the Court's Covid Approval Procedure, and that resident Members would not have been able to vote on the matter if this had been a formal Committee. Also, the quorum for formal meetings was 3 non-resident members. Just after the Deputy Chairman summed up as to the will of the Committee, a number of Members had to leave as it was approaching 4pm.

30. MINUTES

- 31.1 RESOLVED, that the confidential minutes of the meeting held on Monday, 15th March 2021 be approved.
- 31.2 RESOLVED, that the confidential minutes of the Car Park Charges Working Party held on Monday, 29th March 2021 be received.
- 31.3 RESOLVED, that the confidential minutes of the Car Park Charges Working Party held on Wednesday, 26th May 2021 be received.
- 31 PROPOSALS FOR THE IMPLEMENTATION OF THE 12% EFFICIENCY SAVINGS FOR 2021-22

The Committee considered and approved a report of the Director of Community and Children's Services.

32. COMMUNITY AND CHILDREN'S SERVICES – TARGET OPERATING MODEL (TOM) PROPOSALS

The Committee considered and approved a report of the Director of Community and Children's Services

The meeting ended at 4.08 pm

Chairman

Contact Officer: Julie.Mayer@cityoflondon.gov.uk

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Agenda Item 4

BARBICAN ESTATE RESIDENTS CONSULTATION COMMITTEE Monday, 27 September 2021

Minutes of the meeting streamed live to You Tube: <u>https://youtu.be/L9eXfK-GeiA</u> please note that the recording will be available for 1 year from the date of the meeting

Present

Members:

Christopher Makin (Chairman) Ted Reilly (Deputy Chairman) Mike Cribb (Deputy Chairman) James Ball - Brandon Mews Mary Bonar - Wallside Mark Bostock - Frobisher Crescent Jim Durcan - Andrewes House Adam Hogg - Barbican Association Chair Tim Hollaway - Lambert Jones Mews Andy Hope - Breton House Helen Hudson - John Trundle House Rodney Jagelman - Thomas More House Sandra Jenner - Defoe House Monique Long - Mountjoy House David Lawrence - Lauderdale Tower Fiona Lean - Ben Jonson House **Guy Nisbett - Speed House** Jane Smith - Seddon House Prof. Michael Swash - Willoughby House Dave Taylor - Gilbert House John Tomlinson - Cromwell Tower Sandy Wilson - Shakespeare Tower

In attendance:

Mark Wheatley - Chair of the Barbican Residential Committee Helen Fentimen - Ward Member for Aldersgate

Officers:

Mark Jarvis	-	Chamberlains
	-	Assistant Director, Barbican and
		Property Services
Michael Bennett	-	Community and Children's Services
Helen Davinson	-	Community and Children's Services
	-	Community and Children's Services
Anne Mason	-	Community and Children's Services
Graeme Low	-	City Surveyors
Julie Mayer	-	Town Clerks

1. APOLOGIES

There were no apologies.

The Chair welcomed Sandra Jenner (Defoe House) and Monique Long (Mountjoy House) to their first RCC Meeting.

2. MEMBERS DECLARATIONS UNDER THE CODE OF CONDUCT IN RESPECT OF ITEMS ON THE AGENDA

There were no declarations.

3. MINUTES

RESOLVED, that – the minutes of the meeting held on 14 June 2021 be approved.

4. UPDATE REPORT

The Committee received a report of the Director of Community and Children's Services which updated Members on issues raised by the Residents' Consultation Committee and the Barbican Residential Committee at their meetings in June 2021. This report also provides updates on other issues on the Estate. Members noted that all figures were up to date when the agenda was published.

RESOLVED, that – the report be noted.

5. 'YOU SAID; WE DID' - OUTSTANDING ACTIONS LIST

The Committee received the Outstanding Actions List

6. HOUSING NET ZERO CARBON ACTION PLAN

The Committee received a report of the City Surveyor in respect of the key points and recommendations from the City of London Corporation's Housing Net Zero Carbon Action Plan in relation to the Barbican Estate.

In response to questions the following points were noted:

- a) The plan set out priorities aimed at those estates emitting the most carbon and experiencing the highest levels of fuel poverty. It also sought to create synergies with the existing Capital Works Programme. However, there was scope for opportunities to implement cost effective carbon safety initiatives earlier in the programme; i.e., soffits insulation for flats at podium level and improving the controls of existing heating systems.
- b) Triple glazing would also fall within prioritisation, if found to be cost effective. The officer confirmed that triple glazing can be installed, but consideration is given on a case by case basis, due to the different depths and sizes, and in accordance with the Deed of Variation and Listed Building Consent.

- c) Resident groups had identified a couple of quick fixes in terms of insulating soffits and air handling in the blocks, which is currently poor, and the officer confirmed that they would also be looked at in terms of prioritisation. The officer confirmed that suggestions (a) to (c) above would be raised when the report is presented to the BRC.
- d) Embedded carbon from buildings does not form part of the action plan but falls under design standards in the Climate Action Strategy, which is being taken forward as part of planning policy. In the future, it is likely that there will be a lot more scrutiny on new developments, rather than demolishing and rebuilding.
- e) Whilst grants are available to decarbonise homes, these might fall outside the scope of the Barbican Estate. Officers are looking to utilise other funding options and, whilst they cannot be specific at this time, external funding would be utilised first, supplemented by Climate Action Strategy funding from the City Corporation.

RESOLVED, that – the report be noted.

7. IMPLICATIONS OF THE FIRE SAFETY ACT 2021

The Committee received a joint report of the Remembrancer and the Director of Community and Children's Services in respect of the relevant provisions of the Fire Safety Act 2021, which received Royal Assent on the 29 April 2021. Members noted that the report also provided an update in terms of how far the City Corporation had progressed in terms of Fire Safety since Grenfell Tower.

Members noted an error on the 'You Said: We Did' report earlier on the agenda in terms of the ESW1 forms. At the time, the Assistant Director reported that the City Surveyor had accepted responsibility for ESW1 forms on public buildings but not for the City's housing estates or the Barbican. The Assistant Director would therefore be making a representation to both the Community and Children's Services and Barbican Residential Committees and the BRC would need to agree to implement them by the end of the year.

Subsequent to the meeting, the Assistant Director confirmed that the Asset Maintenance Working Party had received the Fire Signage Strategy document. Members noted that this document would be shared with the Chairs of the respective House Groups for their comments and observations.

RESOLVED, that – the report be noted.

8. 2020/21 REVENUE OUTTURN (EXCLUDING THE RESIDENTIAL SERVICE CHARGE ACCOUNT)

The Committee received a joint report of the Chamberlain and the Director of Community and Children's Services which compared the revenue outturn for the services overseen by the Barbican Residential Committee in 2020/21 with the final agreed budget for the year.

RESOLVED, that – the report be noted.

9. SERVICE CHARGE OUTTURN 2020/21

The Committee received a report of the Director of Community and Children's Services which provided information in respect of the residential service charge expenditure for 2020/21. It also compared the outturn with the 2020/21 estimate and the 2020/21 actual expenditure.

In response to a question, Members noted that 'annually recurring items' represented projects on the supplementary revenue list, rather than from revenue budgets, and the officer would be able to provide a breakdown. RESOLVED, that – the report be noted.

10. PROGRESS OF SALES AND LETTINGS

The Committee received a report of the Director of Community and Children's Services, which advised Members of the sales and lettings approved by officers since the last meeting, under delegated authority and in accordance with Standing Orders. The report also provided information on surrenders of tenancies received and the number of flat sales to date.

RESOLVED, That – the report be noted.

11. SERVICE LEVEL AGREEMENT (SLA) QUARTERLY REVIEW: APRIL - JUNE 2021

The Committee received a report of the Director of Community and Children's Services which updated Members on the review of the estate wide implementation of Service Level Agreements (SLAs) and Key Performance Measures (KPIs) for the quarter April – June 2021. The report also detailed comments from the House Officers and the Resident Working Party and an ongoing action plan for each of the SLAs.

RESOLVED, that – the report be noted.

12. WORKING PARTY UPDATES

The Committee received reports from the following working parties

12.1 Gardens Advisory

RESOLVED, that – the temporary uplift in the service charge (averaging less than £25 per flat per year) be made permanent to ensure that the service levels the gardens require are maintained. NB. By making the uplift permanent, the RCC will enable City Gardens to make a permanent appointment to the team, thereby reducing the potential for unwanted turnover.

12.2 Asset Maintenance

Received.

12.3 Background Underfloor Heating

Received.

12.4 Electric Vehicle Charging (Oral Update)

The Chair of the Working Party advised that the supplier had been facing resourcing issues nationally, which might last for the next 3-4 months. However, Members noted that 30 charging points had been installed; with 20 working and another 30 currently being installed. Assuming operation at 60%, it was expected that 40 would be working effectively in the next 3-4 weeks, which is more than the number of electric vehicles on the estate. Members also noted that the new accounting system was much more efficient, but more work was required on the app.

12.5 Leaseholder

The Chair asked that the following proposals be supported and that the Estate Officers be tasked with accountability for expenditure, whilst seeking efficiency and effectiveness.

- A. Annual budgets which are used for managing costs and decision making and not just the latest estimate.
- B. A single point of accountability in the BEO for efficient and effective management of the Service Charge account.
- C. Costed options so that the RCC and House Groups can have control over certain elements of the package of services they receive.
- D. Resident engagement with the specification of service tenders to ensure that they meet the broad requirement of residents before putting out to tender.
- E. Resident engagement in structural changes to service delivery.
- F. Improved 5 year forecasts of major costs.

13. RECOGNISED TENANTS' ASSOCIATION REVIEW 2021

The Committee received a report of the Town Clerk in respect of a Review of the Estate's Recognised Tenant Association. The Town Clerk reported that all of the House Groups, which applied for Recognised Tenant Association (RTA) status, had been successful in meeting the requirements for recognition. The Chair highlighted the benefits of holding RTA status, which were set out in the report.

RESOLVED, that – the report be noted.

14. BLAKE TOWER ORAL UPDATE

The Assistant Director was pleased to give a more positive update to this meeting, following improved communications with Redrow. Members noted progress in terms of fire safety compartmentation, based on lessons learnt from the Frobisher Crescent Development. Members also noted that Saville's had undertaken an independent survey in respect of fire safety and their recommendations were being actioned by Redrow. Residents would be notified once there had been significant progress in terms of a date for handover to the Barbican Estate Office.

15. FIRE SAFETY ORAL UPDATE

The Assistant Director provided the following updates:

- a) The Fire Strategy Document, which includes fire signage was being finalised and would be forwarded to the House Groups for their input.
- b) The Fire Safety Officer/Member Working Party had been set up 2 years ago to deal with the 'stay put' policy. The Working Party would be convened again, once feedback on fire safety had been received, to consider the strategy and ensure a jointed up approach. The Assistant Director agreed to provide bullet point notes after the next meeting.
- c) The fire door audits were underway and once complete, a design team would be procured, and the project would enter Gateway 3-4 of the decision making process.
- d) The draft report on compartmentation at Brandon Mews was complete and James Ball was thanked for his assistance.
- e) The Barbican Estate fire risk assessments were expected complete in the next 3-4 months and residents would be updated in due course.
- f) The Arup Survey and London Fire Brigade (LFB) Inspections had taken place and Helen Davinson and Sean Moore (Property Services Manager) were thanked for their hard work during difficult circumstances. The towers had been audited at the end of August, with nothing major to report. There was an outstanding item in respect of how the LFB would access Shakespeare Tower, and whether the premises information box was in the correct place, both of which were under consideration.
- g) The Arup Survey was underway; with Andrewes House now complete and a first draft received for Cromwell Tower. The Assistant Director advised that the intention was for the full set to be presented to the BRC, rather than piecemeal, but stressed that anything of substance would be dealt with immediately and reported to the House Groups.
- h) In respect of the design of the fire doors, the Assistant Director advised that this was a complex task, but full consideration would be given to the views of residents, planning colleagues, English Heritage and 20th Century Society.

16. QUESTIONS ON MATTERS RELATING TO THE WORK OF THE COMMITTEE

There were no questions

17. ANY OTHER BUSINESS THAT THE CHAIRMAN CONSIDERS URGENT

The Chairman agreed to admit an item of urgent business in respect of the Car Park Concierge Service and a Resolution to the Barbican Residential Committee on 8th October 2021 is appended to this set of minutes.

The meeting ended at 8.20 pm

Chairman

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TO: BARBICAN RESIDENTIAL COMMITTEE 8TH OCTOBER 2021

FROM: BARBICAN RESIDENTS CONSULTATION COMMITTEE 27th SEPTEMBER 2021

THE FUTURE OF THE CONCIERGE SERVICE IN THE CAR PARKS ON THE BARBICAN ESTATE

The Chair agreed to admit an item of urgent business and asked that it be considered before moving on with the business on the published agenda. Members noted that the Assistant Director and Officers had been working with residents, in a Task and Finish Group, in order to seek a mutually agreeable solution in respect of the future concierge service in the car parks. Elected Members and Chief Officers had received a number of emails from residents on this matter, and this meeting of the Residents' Consultation Committee (RCC) was the first public forum for RCC Members to share the views of their House Groups. Furthermore, time was now of the essence as the Barbican Residential Committee was due to meet on 8th October 2021 and was not scheduled to meet again until 27th January 2022.

The Committee noted that the Task and Finish Group had produced a report, which had been circulated it to all House Groups, encouraging them to meet and share views. The report contained a broadly written proposal for a way forward, which had been refined into a proposed Resolution from the RCC to the Barbican Residential Committee (BRC. The RCC had drafted an alternative resolution, which was similar but more specific.

The Town Clerk then read out both draft resolutions and the representatives of the T&FG and the RCC; i.e. – Mike Cribb (Deputy Chair of the RCC) on behalf of the T&FG, and Mary Bonar (Wallside representative of the RCC) were invited to expand on their content and invite comments. Members noted that the T&FG had been party to exempt information, as defined by the local Government Act. As the wider RCC had not been sighted on this, they had produced a more detailed resolution; asking the BRC to give consideration to a number of bullet points.

Mary Bonar felt that the RCC had been placed in a difficult position, without having being sighted on the full set of non-public documents, as their proposed resolution was seeking to impose significant costs. It was suggested that this might facilitate a future discussion about how the RCC is constituted. Mike Cribb defended a perceived vagueness in the T&FG's resolution, acknowledging that it was not specific in terms of negotiations, but the Group had acknowledged that they would follow.

The Chairman asked Members to give consideration to both, with a view to presenting a unified Resolution to the BRC, who would ultimately take the decision.

Following an extensive debate, the following Resolution to the BRC was agreed, with a caveat that the BRC be asked to consider the following bullet points during subsequent negotiations :

- 1. Work flexibly and imaginatively and in good faith; i.e. the proper disclosure of service charge accounts with service charge payers and the RCC, to find a longer term solution to this issue within the structure of the current lease and freehold transfers;
- 2. in carrying out this work, identify specifically what services are provided by the Estate Concierges, how much they cost and who receives them;
- 3. to assist an RCC Working Party in finding ways to significantly reduce service charges, without materially affecting the level or quality of front-line services offered by the Barbican Estate Office.

RESOLVED, that – The Barbican Residents' Consultation Committee are asked to note that the terrace block representatives on the Barbican Residents' Consultation Committee (RCC) have voted in favour of retaining the current number of Estate Concierges.

'We will support the City of London Corporation in levying a one-off surcharge on terrace block leaseholders, to cover the pro-rata share (for the remainder of the 2021/2022 financial year) of the direct costs of employment of the 6 Estate Concierge roles scheduled to be removed, pending more detailed negotiations between service charge payers and the City Corporation. These costs were estimated by the Barbican Estate Office to be approximately £232,000 per year.

This is being offered as a matter of goodwill and is not an acceptance that the City Corporation would be entitled to reduce services in this way, or of the calculation of the terrace block car park inputs and outputs used to arrive at service charges. If an agreement is reached with the City Corporation, service charge payers will ask for a commitment (from the City Corporation) to that agreement in writing.

In consideration of accepting the one-off surcharge, service charge payers would ask City Officers to work flexibly and imaginatively with the RCC to find a longer term solution to this issue, within the structure of the current lease and freehold transfers, and to assist the RCC Service Charge Working Party in finding ways to significantly reduce service charges, without materially affecting the level or quality of front line services offered by the Barbican Estate Office'.

The representatives from Cromwell, Shakespeare and Lauderdale Towers asked for their abstentions to be recorded.

In concluding, the Chairs of both the RCC and the BRC thanked officers and residents for their hard work in seeking to achieve a mutually satisfactory solution. The Chair of the BRC gave assurance that, going forward, he would seek to share as much information as possible with residents.

"You Said; We Did" - Action List - September 2021

Actions from June 2021 Barbican Residential Committee (BRC) & other outstanding issues (updates appear in italics)

Issue	Source	Officer
Barbican Highwalks - Planned Maintenance of the Public Realm		
A bid is being progressed in respect of additional funding for the Walkways, for the current financial year, and this would include inspection and maintenance for a number of items; i.e. smoke vents, drainage gulleys, railings, planters, benches and signage.	RCC March 20	Paul Murtagh
Lessehalden Osmiss Ohenne Wenting Dente		
Leaseholder Service Charge Working Party The Assistant Director had been working with residents on the Working Party in respect of a detailed review of service charges; looking at efficiency savings that could protect and possibly reduce charges in the future. This would be an extensive piece of work, likely to take about six months, and the findings would be reported to both the RCC and BRC. It was stressed that any benefits from the findings of the Working Party would not become apparent until the next financial year.	BRC September 2020	Anne Mason Paul Murtagh
Fire Deer Benlagement Broject Cateway 2.4		
The programme of works to replace all fire rated doors (including any associated panel surrounds, fanlight windows, refuse and intake cupboards) within the residential blocks, to ensure that they meet the requirements of the current Building Regulations in relation to fire safety is ongoing and a fire door audit is progressing.	BRC June 2021	Jason Hayes
Recruitment for a Project Manager is on-going and will support the next phases of design development. It has become clear that the audit will need to be completed prior to the design team appointment in order for design teams to accurately quote for each aspect of the RIBA design stages and subsequent Listed Building Consent application. A communications consultant will also be appointed to support the project and work with all stakeholders during the lifespan of the project.		
Barbican Podium Waterproofing Beech Gardens Phase 1 In respect of the Gateway 6 (Outcome/Lessons Learnt Report) for Phase 1, as there were issues outstanding with this project, officers have commissioned the Building Research Establishment (BRE) to undertake a review of the project from design to completion. The new Project Team would be taking the lessons learnt into Phase 2. Meetings between Officers and the BRE are ongoing and an interim report is expected to be presented to next Committee in January 2022.	BRC June 2021	Paul Murtagh Mike Saunders
Contact : Michael Bennett, Head of Barbican Estates E: michael.bennett@cityoflondon.gov.uk		

Committee:	Dated:
Residents Consultation Committee	27th September 2021
Barbican Residential Committee (for information)	8 th October 2021
Subject:	Public
Housing Net Zero Carbon Action Plan - Barbican	
Which outcomes in the City Corporation's Corporate	5,10,11,12
Plan does this proposal aim to impact directly?	
Does this proposal require extra revenue and/or	N
capital spending?	
If so, how much?	N/A
What is the source of Funding?	N/A
Has this Funding Source been agreed with the	N/A
Chamberlain's Department?	
Report of:	For Decision
Paul Wilkinson, City Surveyor	
Report author:	
Graeme Low	
Energy Manager, City Surveyor's Department	

Summary

The purpose of this report is to set out the key points and recommendations from the City of London Corporation's Housing Net Zero Carbon Action Plan in relation to the Barbican Residential Estate and to seek the agreement of the Committee in respect to the recommended decisions. The Action Plan has been developed in response to the position of the DCCS Housing Portfolio, including the Barbican Estate within the City of London Corporation's Climate Action Strategy. In addition, it supports the regional approach being taken by London Council's Climate Action Programme and more specifically, the Retrofit London Housing Action Plan that was agreed on the 16th July by the London Housing Director's Group.

Recommendation

The Committee is asked to:

- Note the report and its contents.
- Agree the recommended approach to developing priority projects.
- Note that future projects to be taken forward will be received separately for approval via the Gateway process.

Main Report

Background

- 1. The UK has set in law a target to bring all its greenhouse gas emissions to net zero by 2050. To help achieve this target, the government's ambition is to improve the energy efficiency of homes, and move to cleaner ways of heating homes, in order to halve the energy use of new buildings by the end of this decade.
- In January 2020, the City Corporation set out on a fast-paced, cross-Corporation journey to develop an ambitious Climate Action Strategy (CAS). The resulting Climate Action Strategy was adopted at Court of Common Council on the 8th October 2020.
- 3. The CAS marked the start of a new and transformative programme of action. It set out three interlinked primary objectives for the City Corporation and the Square Mile:
 - to support the achievement of net-zero emissions,
 - to build resilience, and
 - to champion sustainable growth.
- 4. The Climate Action Strategy also set out 4 targets for the City Corporation and Square Mile:
 - Net zero by 2027 in the City Corporation's operations
 - Net zero by 2040 across the City Corporation's full value chain
 - Net zero by 2040 in the Square Mile
 - Climate resilience in our buildings, public spaces and infrastructure
- 5. To achieve these global goals, the City Corporation has committed a major investment of £68 million. The Net Zero Carbon Housing Action Plan (HAP) seeks to provide recommendations and priorities to ensure our housing stock can meet the net zero targets for both 2027 (housing landlord supplies) and 2040 (residents' own emissions).
- 6. The plan supports the regional approach being taken by London Councils Climate Action Programme and more specifically, the Retrofit London Housing Action Plan (Appendix 3) that was agreed on the 16th July by the London Housing Director's Group. The HAP is attached as Appendix 2 to this report.
- 7. Nationally, it has been recognised by Government that grant funding and investment is central to ensuring our homes are improved to the standards required for existing Net Zero Carbon (NZC) commitments. Although indicative costs have been highlighted within the report, the actual cost of meeting the targets will need to be confirmed through more detailed feasibility studies.
- 8. Two online resident workshops were held in May and July for Barbican Residential Estates, themes such as ventilation and renewable energy were discussed in groups (pg22 of the HAP). These were preceded by a survey which received 45

responses from Barbican Residents. All the information collected has helped to inform the HAP.

Considerations

Pathways to meet targets

- 9. The Housing Action Plan has modelled scenarios to understand if the identified pathways will reach the CAS targets for 2027 and 2040. It confirms the 2040 target can be met and exceeded, with potential to become carbon negative.
- 10. For the near term 2027 target two scenarios are presented:
 - a. Scenario 1: Retaining communal gas heating systems at York Way and Middlesex St Estates, reaches an overall 95%, or approximately 4.75ktCO₂e reduction in emissions with land-based sequestration. This scenario will require 5% (approx. 250 tCO₂) of Housing CO₂ emissions to be reduced elsewhere within the City Corporation's operational emissions.
 - b. **Scenario 2**: Removing all communal gas heating systems alongside energy efficiency measures and Solar Photovoltaics. This scenario exceeds the 2027 target by **7%**, becoming carbon negative.
- 11. We recommend the adoption of scenario 1 due to the potential to save the additional CO₂ (approx. 250 tCO₂) within the wider operational building portfolio and the recent replacement of these heating systems. Once details surveys have been completed, this position can be reviewed.

Housing Action Plan Priorities

- 12. The Housing Action plan promotes the prioritisation of project delivery to ensure the right approach is taken to expedite carbon savings. It is recommended that we focus on the following three areas:
 - a. Create synergies with the existing capital works programme. For example, utilising the roof replacement projects to include photovoltaic panels.
 - b. Focus on our biggest carbon emitting estates. For example, tackling estates such as York Way, and Middlesex St Estates first.
 - c. Identify and focus on our estates with the largest potential for fuel poverty. For example, using LSOA data, known energy performance data and Low Income, Low Energy Efficiency (LILEE) indicator data provided through National Statistics to ensure these residents are supported earlier.
- 13. The Plan has reviewed all 82 buildings within the HRA and Barbican Estates. It has highlighted recommended priorities to be taken forward. Tables 1 and 2 list all recommended priorities with Barbican specific priorities highlighted:

 Table 1: Scope 1 & 2 Key Priorities (2027 CAS target).

٠	Stop using gas within communally heated estates (as soon as possible)	•	Maximise use of photovoltaics on th roofs of estates.	е
٠	Make communal lighting more efficient	•	Install roof insulation early	
•	Review controls for energy systems	•	Review pipework insulation for communal heating systems	or

 Table 2: Scope 1, 2 & 3 Key Priorities (2040 CAS target).

•	Remove individual gas boilers and replace	ce with low carbon heating alternatives
•	Improve the energy efficiency of fabric measures through:	
1.	Replace windows with triple glazing.	2. Installing wall insulation where possible
3.	Install roof insulation	4. Improve airtightness of homes
5.	Installation of floor insulation	6. Improve ventilation & heat recovery
7.	 Install wastewater heat recovery to showers and baths 	

Housing Action Plan Archetypes

- 14. The Housing Action Plan develops six archetypes covering the 14 housing estates included within the City Corporation's Housing portfolio (pages 37-50 of the HAP). Two of these Archetypes relate to Barbican residential buildings and are used to highlight specific measures for implementation through retrofit plans and carbon pathways. Examples are provided of these plans, and it is recommended that these are further developed for each specific housing block. Samples include:
 - a. Archetype: **4. Mix-IWI-Flat**. These include sites with complex facades, with windows, infill panels and brick or clad walls. Roofs are flat and these buildings are often in conservation areas. There is limited internal space for internal wall insulation. Shakespeare Tower is an example of this. Recommended works include: Flat roof insulation; smart controls; heating and DHW storage, solar PV and improved communal lighting.
 - b. Archetype: **5. Mix-IWI-Barrel.** These are sites with complex facades, including a mix of windows, panels and bricks. Generally high rise (over 10 stories), they have barrel vaulted roofs which reduces the capacity for insulation. Gilbert House is an example of this archetype. Recommended works, again within the retrofit plan for this site includes: Flat and Barrel roof insulation; smart controls; solar PV and improved communal lighting.

Funding Opportunities

15. Whilst a high-level estimate has been put on achieving a net zero Carbon position for 2027 and 2040, these figures will require further investigative work through feasibility studies to confirm the exact cost and CO₂ saving opportunity. The cost figures within the Housing Action Plan are **indicative only**.

- 16. The Plan suggests that between now and 2027, the scope 1 & 2 supplies will need investment of approximately £9,000 per unit. Some of this will be found from the CAS allocation of £6m for Housing related projects, which could be expanded if needed from the wider buildings funding allocation. Taking this into account, there will be a need for further funding. Two likely funding routes will be explored further but could be difficult for the Barbican to secure grant funding due to its tenure type. These are as below:
 - Social Housing Decarbonisation Fund (SHDF). This BEIS funding is expected to provide up to £3.8 bn long term investment to ensure Social Housing can reach a minimum EPC "C". This funding limits the number of leasehold properties that could apply as part of a wider bid and will be delivered in waves phase 1 (£160M) application deadline is October 15th, 2021. SHDF will require 1/3 match funding contribution.
 - Energy Company Obligation 4 (ECO4). Opening in 2022 this is likely to provide significant funding opportunities (up to £1bn per annum) through to 2026. It is likely to continue focusing on low-income, fuel poor homes and those homes that are least efficient. A target to improve homes to EPC level B by 2025 and EPC level C by 2030.
- 17. As this programme of works represents a significant opportunity to improve the efficiency of our stock, the Net Zero Carbon Housing Action Plan (HAP) considers an approach to maximise the benefit of this programme, by recommending minimum U values for thermal elements. Other measures which form part of the programme, which will support the decarbonisation of the Barbican residential estate include:
 - Installing LED lighting to replace inefficient, older less efficient communal lighting across all Barbican residential properties.
 - Installing improved heating controls, to maximise the efficiency of the existing heating system.
 - Installation of improved roof insulation with the integration of PV where suitable.

Next Steps

18. Whilst the action plan has set out a path detailing how we should approach the decarbonisation of our housing portfolio; it is not intended to provide sufficient detail to enable individual projects to proceed. We recommend that the outlined priorities of: Improving building fabric; integrating photovoltaic panels within roofs; reviewing control systems and the continued replacement of inefficient lighting with LED technology are taken forward with further feasibility studies and presented in due course to Committees for approval accordingly.

19. In achieving scenario 1, current long-term projects for gas communal heating that are in progress can remain. Due to the nature of communal heating projects, we recommend undertaking further investigation into the removal of fossil fuel derived communal heating to enable our CAS targets to be met.

Corporate & Strategic Implications

- 20. **Strategic implications:** Our energy performance helps to shape outstanding environments for our residents through the reduction of CO2 emissions and our commitment to procuring clean renewable energy. In this way our energy performance helps shape outcomes 5, 11 and 12 of the Corporate Plan.
- 21. Financial implications: Whilst the Housing Action Plan highlights estimated costs of £45m to reach the 2027 CAS targets for the City Corporation's own scope 1 & 2 emissions, these figures are speculative and require further detailed feasibility work to priority projects before confidence can be placed on the cost of meeting these obligations. There remains a strong possibility that meeting the objectives of the CAS for Housing will require further funding including external grant support.
- 22. **Climate implications:** The Housing Action Plan has provided further detailed evidence supporting the approach we need to take to reach the NZC challenges for the City of London Corporation's Housing Stock. It demonstrates the potential to meet and go beyond these targets but presents many challenges such as the decarbonisation of heat that must be addressed if we are to meet our goals.

Conclusion

23. The City of London Net Zero Carbon Action Plan has been developed to help create a route to reaching our Net Zero Carbon objectives. It advises on the scope of this work and lays out suggested priorities to be taken forward. The plan provides commentary on the potential costs and sources of funding that can be utilised. With our next steps, we need to build on the outlined approach and begin implementing feasibility studies to provide greater certainty around the cost and carbon savings that will be attributed to these projects

Appendices

Appendix 1– City of London Corporation's Climate Action Strategy Appendix 2 – City of London Corporation Housing NZ Carbon Action Plan (rev J) Appendix 3 – London Council's Retrofit London Housing Action Plan (rev N)

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Climate Action Strategy 2020-2027

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CITY LONDON



Executive summary

The headlines

This document sets out the City of London Corporation's Climate Action Strategy from 2020 onwards. It explains the importance of climate action to the achievement of the economic, societal and environmental outcomes described in our Corporate Plan, 2018-23. It describes why we need to act now and the our rigorous approach for the first six years.

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View online at: theglobalcity.uk/resources









Protecting our shared natural resources



Driving net zero through our supply chain



Integrating climate considerations into all our decisions


Who we are

Why us? Why now?

The City of London Corporation is the governing body of the Square Mile, dedicated to a vibrant and thriving City, supporting a diverse and sustainable London within a globally-successful UK.

The Square Mile is the historic centre of London and is home to the 'City' the financial and commercial heart of the UK. Our reach extends far beyond the Square Mile's boundaries and across private, public and charitable and community sector responsibilities. We bring an independent and nonparty political voice and convening power. This enables us to promote the interests of people and organisations across London and the UK and play a valued role on the world-stage.

ଞ୍ଚୁଁ What we can do 3



beyond the Square Mile's boundaries and across private, public and charitable and community sector responsibilities.



In the context of climate action, this means we can support the achievement of net zero, build climate resilience and champion sustainable growth to achieve a truly sustainable City. We will do this by means of the following actions, committed to in our Corporate Plan, 2018-23, against which we drive our performance.

1. SUPPORT THE ACHIEVEMENT OF NET ZERO BY...

- Influencing UK and global policy and regulation and international agreements to protect the environment.
- Providing environmental stewardship and advocacy, in the use of resources, emissions, conservation, greening, biodiversity and access to nature.
- Providing a clean environment and driving down the negative effects of our own activities.

2. BUILD CLIMATE **RESILIENCE BY...**

- Preparing our response to natural and man-made threats.
- Protecting consumers and users of buildings, streets and public spaces.
- Providing thriving and biodiverse green spaces and urban habitats.

3. CHAMPION SUSTAINABLE **GROWTH BY...**

- Providing world-class spaces for businesses and markets to thrive.
- Modelling new ways of delivering inclusive and sustainable growth.
- Supporting organisations in pioneering, preparing for and responding to changes in regulations, markets, products and ways of working.
- Supporting, celebrating and advocating responsible practices and investment.

This means we must commit to achieving net zero and to ensuring that the Square Mile, and our assets outside it, are resilient to more extreme weather events."

Alderman William Russell, The Rt. Hon. The Lord Mayor of the City of London

The City of London Corporation's core purpose is to promote the long-term interests of the City, and thereby support the UK's economy. We have long been champions of sustainability. We were the first local government body to introduce a smokeless zone, in 1954, two years ahead of the Clean Air Act. We developed a climate change adaptation strategy in 2010. Since then, we have supported the growth of the UK's green finance sector.

Scientific evidence tells us that the climate is already changing. We need to act now if we are to limit global warming to 1.5 degrees, thereby avoiding the more extreme effects of climate change. This means we must commit to achieving net zero. And we must ensure that the Square Mile, and our assets outside it, are resilient to more extreme weather events. Acting now is the right and responsible thing to do. It is also key to securing and advancing our global market position as a financial centre. It will also strengthen the appeal of our buildings, investment properties and public spaces as attractive places to work, live, study and visit, both now and in the future.

We do not need to compromise the economy to fix the environment. In reality, climate action will drive growth and jobs. In order to remain relevant and commercially viable, we need to be responsible and resilient.

Alderman William Russell The Rt. Hon. The Lord Mayor of the City of London 5

What used to be 'green finance' is fast becoming the only option for the financial and professional services sector. Integrating climate risks and opportunities into all decision-making is similarly becoming the new normal.

In developing this strategy, we have focused on achieving best practice. Driven by an evidence-based approach, we have included a broad range of emission sources and physical risks. Founded on science-based targets, rather than simply a call to action, our Climate Action Strategy aims to ensure that the Square Mile and City Corporation make a positive contribution. We will help tackle climate change, address the resilience risks it poses, and seize the opportunities presented by the transition to a net zero economy.

This is one of the defining cross-City Corporation policies. It supports delivery of our Corporate Plan, 2018-23. But we cannot do this alone. This strategy sets out how we will work in partnership with our stakeholders to develop the solutions to tackle climate change. We must build back better following the pandemic, making sure no one is left behind. We invite you to work with us as we adapt so that our society can flourish for decades to come.



Catherine McGuinness Chair of the Policy & Resources Committee, The City of London Corporation



Our approach

We cannot fulfil our ambitions alone. This means we must first demonstrate robust climate action ourselves. We will also share our methodology with, and learn from, others on this journey.

In developing this strategy, we have focused on achieving best practice with our evidence-based approach and the breadth of emission sources and physical risks we address. We are committed to embedding climate action in everything we do and working within the latest standards and advice.

OUR EVIDENCE BASE

This strategy brings together numerous related City Corporation strategies, policies and campaigns – from our Local Plan and Responsible Business Strategy w through to our Clean City Awards. It **G** builds on the momentum, progress $oldsymbol{\Phi}$ and lessons learned so far. See the 'Our baseline' section for more information on achievements to date.

To understand how far we had come already and what is left to do, we commissioned expert advice on our current and future resilience levels, carbon emissions and capacity for removing carbon from the atmosphere. We followed the leading global standards and best practice guidelines in developing our approach.

We explored resilience risks with the sectors and organisations that our economic growth is built upon, from utilities and transport providers through to financial and professional services and our cultural sector. Together, we identified what is needed for the Square Mile to continue to compete successfully in the face of climate change. And we asked the public how important climate action should be to us. We asked them what they would like to see happen and what they would be willing to do themselves. Three-quarters of respondents said climate change should be extremely important to us.



We have identified separate targets for the Square Mile and the City Corporation. These have been understood **by emission** type to ensure progress in all key areas.

which we have designed our action plan. We have the data we need to set and track stretch but achievable targets. We will test and learn as we go. We have identified separate targets for the Square Mile, the City Corporation and types of emissions to ensure we deliver as much as possible, as soon as possible.

We have built an evidence base upon

THE BREADTH OF EMISSION SOURCES WE INCLUDE

Many organisations and authorities focus on driving down the emissions they have most control over – scope 1 and 2. Addressing scope 3 can be daunting as it covers everything an organisation buys, sells, invests in, leases to others and disposes of as well as commuting and business travel. But for organisations and financial centres like ours, scope 3 makes up a large portion of the total carbon footprint. Measuring it can lead to the design of innovative solutions to reduce carbon emissions significantly.

We have included scope 1, 2 and all scope 3 emissions to take ownership, show leadership and help make this standard practice. This can make it appear that we are greater emitters than our peers that have not included Scope 3. We will continue to enhance our understanding of scope 3 data with our partners. We will also advocate for standardisation of reporting to ensure everyone addresses their total carbon footprint effectively.









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Scope 1 and 2



For organisations and financial centres like ours, scope 3 makes up a large portion of the total carbon footprint - and measuring it can lead to the design of innovative solutions to reduce carbon emissions significantly.

7



TURNING RISKS INTO OPPORTUNITIES

Whatever action we and others take, we still need to prepare for hotter drier summers, warmer wetter winters, stronger winds, more frequent extreme weather events and rising sea levels. As we do this, we will go beyond mitigation and seize opportunities to deliver social, economic and environmental outcomes that mean that everyone benefits from the action we take.



OPPORTUNITIES





A **resilient** global

impacts.

business environment

in the face of climate



HOW WE COMPLEMENT OTHERS' EFFORTS

This strategy has been developed to support the delivery of The Paris Agreement on climate change (2015) and our obligations under the UK Climate Change Act (amended 2019). This has enshrined in law both a target of net zero emissions by 2050 and measures for climate adaptation (improved resilience). It is complementary to London-wide and national efforts to reduce emissions and improve the resilience of our communities and urban spaces.

Crucially, this includes the draft London Plan, the Greater London Authority's London City Resilience Strategy 2020, the UK Committee on Climate Change Climate Risk Assessment 2017 and National Adaptation Programme. It also covers the landscape of policies set out by government and advice from the Intergovernmental Panel on Climate Change (IPCC).



The UK Climate Change Act (amended 2019) has enshrined in law both a target of net zero emissions by 2050 and measures for climate adaptation.



FACTORING CLIMATE ACTION INTO EVERYTHING WE DO

Reinforcing and building on the commitments we made in our Corporate Plan (2018-23), and to make sure we are doing all we can to reach our goals, we commit to:

Working with our stakeholders and partners and listening to their ideas, experiences and views.

Ensuring that vulnerable groups who are most likely to be impacted by climate change **are prioritised** in our decision-making.

Identifying measurable targets to track performance against our goals.

Keeping our actions and targets **in line with** changing **legislation** and recommendations (see next section for more details).

Accessing the best evidence of our impact possible so we can learn, share our experience and hone our actions as we go.

Embedding a climate lens into all our decision-making.

Monitoring progress against our targets at regular intervals.

Reporting publicly to our committees and via published annual reports.

Reviewing and **refreshing** the action plan every five years.

9



Our Baseline

SUPPORTING THE ACHIEVEMENT OF NET ZERO

The City Corporation has achieved a 19% reduction in energy consumption within our operational sites since 2008. Since 2018, 100% of the electricity we have purchased has been from renewable sources.

We bought six new electric vehicles and eight new hybrid vehicles in 2018/19. And in 2019/20 installed 20 new electric vehicle charging points as part of the City's "Transition to a Zero Emission Fleet" policy.



2008

Square Mile

scope 1 and 2

2020

emissions

The Square Mile has achieved a 55% reduction in Scope 1 and 2 emissions since 2008 (using data from 2018/19). This has been assisted by our ambitious planning requirements which have led to 75% of new commercial developments with over 20,000m² floor space achieving at least a BREEAM 'Excellent' rating since 2014.



20,000m²

of floor space achieving at least a BREEAM 'Excellent' rating since 2014.

1,050 ktCO₂e

HOW WE REMOVE CARBON FROM THE ATMOSPHERE

We look after over 11,000 acres of green spaces across London and its green belt. This equates to approximately 5,500 football pitches. This natural capital not only provides valued space for people and nature but also currently removes 16 ktCO₂ per year. This is equivalent to 40% of the City Corporation's scope 1 and 2 emissions.



5,500

The equivalent of nearly **5,500 football pitches** of green spaces across London and its green belt are managed by The City of London Corporation.

City of London Corporation emissions



Square Mile emissions





BUILDING RESILIENCE

The City Corporation has long used our planning role to implement a range of resilience measures in the Square Mile. These include green roofs, urban greening, landscaping, flood resilience and climate resilient new buildings.

As of 2020, the Square Mile has 42,600m² of green roof, up from 11,200m² in 2005. This is set to increase to 65,800m2 by 2024. The Square Mile has achieved a 55% reduction in Scope 1 and 2 emissions since 2008 (using data from 2018/19). This has been assisted by our ambitious planning requirements which have led to 75% of new commercial developments with over 20,000m² floor space achieving at least a BREEAM 'Excellent' rating since 2014.

42,600m²

of green roof in the Square Mile.

CHAMPIONING SUSTAINABLE GROWTH

The UK is the only global financial centre that is also a leading centre for green finance, topping both conventional and 'green' rankings. UK market players are committed to sustainable principles and the regulatory context is both favourable and innovative. The London Stock Exchange is the 'greenest' main stock exchange across all global financial centres. The UK was the first government to adopt a Green Finance Strategy, which was launched at the Guildhall alongside the Green Finance Institute. The UK is the leading destination for talent that is trained and skilled in sustainability matters. This allows us to lead and support other economies as they transition to net zero.



Adapting to climate change



Our climate vision, aims and goals



City of London Corporation scope 1 and 2 emissions are net zero by 2027 and scope 3 emissions are net zero by 2040.

The City of London Corporation and its assets are resilient to climate change.

The City of London Corporation supports UK and overseas organisations to become climate responsible.

For the Square Mile's fabric and function

The Square Mile's scope 1, 2 and 3 emissions (BASIC+ definition) are net zero by 2040.

The Square Mile's buildings, public spaces and infrastructure are resilient to climate change.



To build climate resilience



To champion sustainable growth



For society

People in the Square Mile and beyond benefit from a clean, green and safe environment and job creation.



13



The first six years

Our actions and the targets we set build upon our Responsible Business Strategy (2018 - 23) – "Towards a Sustainable Future". They also reflect ongoing work in supporting innovation and growth in the financial and professional services sector. These actions relate to the first six years of the strategy. The strategy and action plan will then be refreshed for the next phase of implementation to achieve our 2040 goals.



Actions to support the achievement of net zero

THE CITY OF LONDON CORPORATION

Transform the energy efficiency of our operational buildings through the adoption of best available technologies

Maximise the use of renewable energy sources across our operational buildings

Introduce new land management practices across our open spaces aiming to maximise their ability to remove carbon, and optimise their biodiversity and resilience value

Align our financial investment portfolio with the goals of the Paris Agreement on climate change

Embed circular economy principles into our capital projects and reduce carbon intensity by using life cycle carbon and cost assessment techniques and design specifications

Accelerate the move to net zero carbon and energy efficient tenanted buildings, working closely with tenants to achieve shared goals

Strengthen our requirements and supplier engagement to drive performance and innovation in delivering sustainable products and solutions

Upskill our workforce on net zero

THE SQUARE MILE

Work with other organisations to develop a Climate Action Fund to invest in effective zero carbon technologies and accelerate decarbonisation

Develop a Square Mile renewable energy strategy

Use our planning role to influence others to embed carbon analysis and circular economy principles in capital projects

Advocate the importance of green spaces and urban greening as natural carbon sinks, and their contribution to biodiversity and overall wellbeing

Support organisations in the Square Mile to build circular, lowcarbon and resilient supply chains

Provide tailored support to SMEs on their decarbonisation journeys

Increase engagement and communications about sustainability with residents, businesses, visitors and other stakeholders



ctions to build climate resilience

THE CITY OF LONDON CORPORATION

Build on our existing work to develop an early warning system, and clear resilience strategies for pests and diseases across our ports and markets, driving down the climate related food security risks

Embed resilience measures into our upgrade plans for our owned and operated buildings

Upskill our workforce on climate resilience

Embed a climate resilience lens into all our decision-making

THE SQUARE MILE

Make the Square Mile public realm more climate change ready through adding in more green spaces, urban greening, flood resistant road surfaces, adaptable planting regimes and heat resistant materials

Reduce the risk of flooding through developing sustainable rain and surface water management policies, resulting in a connected system of water recycling, sustainable urban draining and rainwater management measures

Strengthen our planning guidance on climate resilience measures for new developments

Work with our partners to create a more climate resilient and diversified energy network across the Square Mile

Develop a strong, data-led approach to deepen our understanding of climate related risks and mitigations across the Square Mile

Ensure that we continue to protect the residents, critical assets, infrastructure and heritage of the Square Mile



s to champion sustainable growth

THE CITY OF LONDON CORPORATION

- Mobilise capital into sustainable finance
- Secure the UK's place as a leader for investment in sustainable finance products
- Help faster development and adoption of sustainable finance products and services
- Share best practice on standards, tools, platforms and expertise to facilitate green and sustainable investment and growth
- Encourage global movement towards disclosure and production of credible transition plans as the norm
- Foster an ambition to achieve net zero emissions by 2050 or sooner for UK-based financial and professional services firms
- Join other investors working through development and implementation of net zero transition action plans
- Support financial institutions committing to net zero in the 2040s at the latest, covering all emissions, including scope 3 and where data allows reliable measurement
- Support charities and SMEs to consider, prepare for and lead the response to climate change
- Promote responsible procurement and investment practices.
- Enhance the UK/London's capacity to finance sustainable investment opportunities globally, including emerging markets
- Work with the financial services sector and UK Government to promote and scale sustainable finance products and services that countries and corporates need to help them transition to net zero
- Influence and support the delivery of technical solutions to increase comparability of data and ease of reporting
- Share learning and best practice about the challenges and opportunities of our net zero journey
- Address existing inequalities and ensure no one is left behind
- Prepare people for skills needed in a net zero economy
- Facilitate collaborative action on air pollution in London
- Reduce pollution and increase the resilience of the Square Mile
- Reduce air pollution through implementing our ambitious air quality and transport strategies
- Embrace circular economy principles across our strategies and work
- Work with our creative and educational sector partners to deliver sustainable initiatives
- Enhance greening and biodiversity across our public realm and open spaces



Glossary

BASIC+ definition emissions include those from within the Square Mile from stationary energy, transportation and waste, as well as transboundary transportation, industrial processes and product use and the agriculture, forestry and land use sectors. It does not include emissions from investments.

Carbon removal is the process by which a carbon sink, such as forestry, reduces the amount of greenhouse gases in the atmosphere.

Circular economy means keeping resources in use for as long as possible, extracting the maximum value from them whilst in use, then recovering and regenerating products and materials at the end of each service life.

Climate resilience is the ability to anticipate, prepare for and respond to hazardous events, trends or disturbances related to climate (Centre for Climate and Energy Solutions).

Ecosystem services are benefits to humans from the natural environment and from healthy ecosystems.

GHGs means greenhouse gases - the emissions responsible for global warming. These include methane, nitrous oxide and fluorinated gases amongst others.

ktCO, is the unit of measurement for GHG emissions. It standardises greenhouse gases into units of kilotonnes of carbon dioxide equivalent (ktCO₂e).

A low-carbon economy is simply an economy that causes low levels of GHG emissions compared with today's carbon-intensive economy. 'Carbon' refers to carbon dioxide, the GHG which contributes the most to climate change. The low-carbon economy can be seen as a step in the process towards a zero-carbon economy. (Science Direct)

Natural capital refers to the stock of natural resources, which includes geology, soils, air, water and all living organisms.

Net zero emissions are achieved when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period (Science Based Targets initiative (SBTi) and CDP, Towards a science-based approach to climate neutrality in the corporate sector, September 2019). N.B. Further guidance on the definition of net zero and its guiding principles are due later in 2020 from the SBTi.

Science-based / Paris-aligned (Science-Based Target Setting Manual, April 2020) GHG emissions reduction targets are considered "science-based" if they are in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement (2015) - to limit global warming to wellbelow 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C.

SMEs refers to small and medium-sized enterprises.

Scopes 1, 2 and 3 for an organisation:

(Defra Environmental Reporting Guidelines and the Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, revised edition)

Scope 1 (direct) means emissions from activities owned or controlled by your organisation that release emissions into the atmosphere. They are direct emissions. Examples of scope 1 emissions include emissions from combustion in owned or controlled boilers, furnaces, vehicles, emissions from chemical production in owned or controlled process equipment.

Scope 2 (energy indirect) means emissions released into the atmosphere associated with your consumption of purchased electricity, heat, steam and cooling. These are indirect emissions that are a consequence of your organisation's activities, but which occur at sources you do not own or control

Scope 3 (other indirect) means emissions that are a consequence of your actions, which occur at sources which you do not own or control and which are not classed as scope 2 emissions. Examples of scope 3 emissions are business travel by means not owned or controlled by your organisation, waste disposal which is not owned or controlled, or purchased materials.

Scopes 1, 2 and 3 for a city: (GHG Protocol, Global Protocol for Community-Scale Greenhouse Gas Emission Inventories)

boundary

Scope 2 means GHG emissions occurring as a consequence of the use of grid- supplied electricity, heat, steam and/or cooling within the city boundary

Scope 3 means all other GHG emissions that occur outside the city boundary as a result of activities taking place within the city boundary.

Scope 1 means GHG emissions from sources located within the city

About The City of London Corporation:

The City of London Corporation is the governing body of the Square Mile dedicated to a vibrant and thriving City, supporting a diverse and sustainable London within a globally successful UK.

We aim to:

- Contribute to a flourishing society
- Support a thriving economy
- Shape outstanding environments.

By strengthening the connections, capacity and character of the City, London and the UK for the benefit of people who live, work and visit here.

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City of London Corporation



City of London Corporation Housing NZ Action Plan

August 2021 | Rev J





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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 ktCO₂/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 ktCO₂/yr.

The CAS also commits the Corporation to being net zero carbon by 2040 fpr all emissions, including Scope 3 emissions. For the housing stock, this Phoompasses all landlord emissions (Scope 1 and 2) plus emissions Associated with energy that tenants and leaseholders consume in their poperties. Scope 3 emissions from CoL's housing stock amount to 6.2 ktCO₂/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 ktCO₂/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 tCO₂/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 CO₂ 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



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.

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

 \mathbf{K} e have modelled the impact of the above retrofit actions on energy and \mathbf{K}_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.

Scenario 1 - Total reduction (excluding GGR) = 49%

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 dependent on the building),
 - Install roof insulation (where not already undertaken for 2027 target),
- Improve air-tightness of homes to avoid unnecessary heat loss Page through leaky buildings,
 - Install floor insulation,
- 40 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 CO₂ 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 CO₂ 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.

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

Action	Ву	Priority buildings / estates	Rationale
Stop using gas for heating as soon as possible	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.
CARBON HEAT			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	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
DEMAND FLEXIBILITY			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	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
ENERGY EFFICIENCY			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).	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	Ву	Priority buildings / estates	Rationale		
Make communal lighting more efficient – upgrade to LED lighting and review lighting controls for each	2026	Barbican Estate CoL Almshouses Gresham Almshouses	Some estates have large landlord electricity consumption relative to others (see left).		
estate. ENERGY EFFICIENCY			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		
Review, and replace if necessary, insulation on pipework of communal heating systems.	2026	Middlesex Street Estate York Way Estate Isleden House Estate	having to open their windows in winter to avoid overheating.		
			Despite having triple glazing, the Middlesex Street Estate uses the most ga dwelling of all communally heated estates, suggesting it has poor controls 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.		

Actions for helping achieve the 2040 target for Scope 3 emissions

Action	Ву	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	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.
CARBON HEAT	ELEXIBILITY		Co-benefits : Improved local air quality. Improved health and safety through removal of gas connection and associated risks.
Replacing windows with triple glazing	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.
EFFICIENCY			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)	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.
ENERGY EFFICIENCY			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)	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.
EFFICIENCY			Co-benefits: Improved comfort, improved indoor air quality, lower energy bills.

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

Action	Ву	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).	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.
Sinstall floor insulation	2038	All	Uninsulated floors can present comfort and heat loss problems, especially in ground floor units.
ENERGY EFFICIENCY			Co-benefits: Improved comfort, less risk of damp and mould.
Install waste water heat recovery to showers and baths.	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
EFFICIENCY			Co-benefits: Lower energy bills. Reduction in peak electricity demand.
	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
EFFICIENCY			consumption across the estate.

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.

City of London's Climate Action Strategy

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.

T Climate resilience in its buildings, public spaces and infrastructure. တို့ ကြာow the Net Zero by 2027 target relates to housing

Grope 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 ktCO₂e 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 ktCO₂e in 2020, representing 14% of the Corporation's total Scope 1 and 2 emissions.





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.

City of London's Climate Action Strategy

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 $\rm ktCO_2e$ 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 ktCO₂e** 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 **30** ould underpin any retrofit action plan.

The two Action Plans are complementary

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.



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.

Retrofit London Housing Action Plan

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.

to w carbon heat strategies applicable to archetypes are identified. Solar hotovoltaic generation potential has been quantified.

Gurrent 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 form gas. The most likely solutions will use electrical heating systems, such 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.



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 $K^{\rm CO}_2$. Meeting the budget must not rely on carbon offsets.

GA – 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 commodate both more load and also local generation from roof ounted PV arrays. UKPN, the local District Network Operator, are vesting in the infrastructure to make it more suited to the developing oeeds, 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 versupply on the grid), then customers can pay substantially less for their energy, on average.

n Mermal 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
 Cross the Barbican and Golden Lane Estates, but also on the Sydenham
 II 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



Lammas Green, Sydenham Hill Estate



Frobisher Crescent, Barbican Estate



Hatfield House, Golden Lane



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 CO₂ emissions, which are estimated to have been 6.2 ktCO₂ 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.

Randlord's emissions only

Sprporation 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 $5ktCO_2$ (excluding non-residential energy uses on estates) and $5.3ktCO_2$ including non-residential energy uses on estates.





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.

Bey insights from residents

σ

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.



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

Old, single glazing is draughty and residents are keen for replacements



Controls in communal heating systems are a priority issue to address.



Winter comfort varies. Individually heated homes report worst comfort.

Communally heated homes report wintertime overheating



Summertime comfort varies. There is a trend to overheating, especially in communally heated homes.

Key insights from residents

Simplifying the challenge: identifying archetypes

Flat – For flat roofs. Most likely external.

Lane Estates. External insulation if possible.

Barrel – For barrel roofs commonly found on the Barbican and Golden

Archetypes based on construction type	Archetype code	Example	Location of insulation
When considering grouping blocks into archetypes, it was clear that there are numerous ways in which this could be done.			\bigtriangleup
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.	1. Trad – IWI - loft		
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.	2. Trad – EWI – loft		
Archetype Code		The store of the s	
A short code for the archetypes has been used, with the following format:		HI H	
[Elevation – Wall insulation location – roof insulation location]	3. Trad – EWI - flat		
Traditional – Mostly solid or cavity wall, with discrete windows that can be replaced individually.			$\tilde{\mathbf{Q}}$
Mix - Combined / Mixed – Mostly composite wall/window elevations. Requires whole wall/window element to be replaced at the same time.	4. Mix – IWI - flat		
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).	5. Mix – IWI – barrel		
IWI - Internal wall insulation - Pre 1920s buildings or listed buildings.			
Roof insulation			
Loft – For pitched roofs with lofts. Most likely internal.	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.

23

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 2m³/h/m² 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.

a Gesulation

See 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 ovides clean, fresh air to every room, without wasting valuable heat. It so is a key enabling technology for low carbon heating systems, because reduces the peak heating loads and slows heat loss.

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.

indows in some blocks have been replaced relatively recently, and do the need to be replaced again. Window replacements for a further nine
 indocks are programmed. The proposed specification should be reviewed
 indocks are programmed. The proposed specification should be reviewed

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



- $\hfill\square$ Single glazed or old double glazed? \rightarrow Replace.
- □ New double or triple glazing? → Spot check performance and airtightness



Wall insulation

- □ Pre-1920s? → Internal wall insulation
- \Box Complex façade? \rightarrow Internal wall insulation
- \square Listed or conservation area? \rightarrow Internal wall insulation.
- \square Simple external form? \rightarrow External wall insulation
- □ Post-1920s \rightarrow External wall insulation.

Air tightness

 $\hfill\square$ 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.

buildings where the heat demand is very high and difficult to reduce within the necessary timeframe, a hybrid arrangement where heat pumps to installed alongside existing gas boilers may provide an interim step to duce 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		3.50
	Closed GSHP	2.50	4.50
	Open GSHP		5.50
Domestic Hot Water CoP	ASHP		2.50
	Closed GSHP	2.0	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
- $\hfill\square$ 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 Gemand target

mply swapping a heat pump to replace an existing gas boiler is generally eqen 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/m² for homes heated by a heat pump system, and 40 kWh/m² 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.

Be 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

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South facing array – panels need to be spaced apart to avoid intershading 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 -mea suitable for PV installation and iii) orientation.

Control of London Corporation to stetermine 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 e 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

75 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.

timately, it is recommended that by 2040 (or earlier) I homes are moved to one of the green squares. The Buildings which should be most urgently retrofitted will 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. FABRIC AND VENTILATION

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		
	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						 Low energy
Heating demand <100 kWh/m ² .yr						
Heating demand <150 kWh/m ² .yr						
Heating demand >150 kWh/m².yr						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.

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 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.

Low energy

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.

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.

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3.0 Housing Net Zero Action Plan templates

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 Host appropriate heating system is en determined by using the Heating system decision tree. Next V 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

e.g. City of London Almshc Page ARCHETYPE 4: Mix-IWI-Flat



e.g. Basterfield House

ARCHETYPE 2: Trad-EWI-Loft



e.g. Barnersbury House, Holloway Estate

ARCHETYPE 5: Mix-IWI-Barrel



e.g. Bunyan Court, Barbican Estate

ARCHETYPE 3: Trad-EWI-Flat



e.g. Collinson Court, Southwark Estate.

ARCHETYPE 6: Mix-EWI-Flat

© Google street view

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.









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 Road¹
- Gresham Almshouses, Ferndale Road
- age Lammas Green, Sydenham Hill Estate
- Commercial Street, Spitalfields
- Brushfield Street, Spitalfields
- Lamb Street, Spitalfields ٠
- Lynton Mansions, William Blake Estate ٠
- McAuley Close, William Blake Estate ٠
- St James Mansions, William Blake Estate ٠
- York House, William Blake Estate ٠

Retrofit plan to Net Zero

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



Images of some of the buildings

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

CO₂ emission trajectories in tonnes CO₂ per year

City of London Almshouses

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.









Carbon balance for City of London Almshouses





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

Breakdown of measures per package for City of London Almshouses



Photograph of City of London Almshouses

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 ٠
- Tevatree House, Avondale Square Estate .
- Barnersbury House, Holloway Estate .
- Bunning House, Holloway Estate .
- Crayford House, Holloway Estate ٠
- Fairweather House, Holloway Estate
- Hilton House, Holloway Estate
- age 85. McMoran House, Holloway Estate
- Whitby Court, Holloway Estate
- Isleden House, Prebend Street .
- Great Suffolk Street, Southwark Estate .
- Pakeman House, Southwark Estate ٠
- Otto Close, Sydenham Hill Estate¹

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
- Floor insulation, junctions and airtightness 2)
- WWHR, improved appliances, energy controls 3)



Images of some of the buildings

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

Otto Close

Archetype A2

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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 missions from onsite renewable energy generation by 2040. \mbox{CO}_2 emission trajectories in tonnes \mbox{CO}_2 per year



Current20272040CO2 emissionsCO2 emissionsCO2 emissions

Current and projected heating demand and system



Use of fossil fuels

changed.

energy costs

Not compatible with Net Zero.

Low carbon heat but risk of high

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 heating system must be

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 feels and/or with high distribution losses is unlikely to qualify.

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









Breakdown of measures per package for Otto Close

Photograph of 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 ٠
- George Elliston House, Avondale Square Estate ٠
- Twelve Acres House, Avondale Square Estate ٠
- Dron House ٠
- Bazeley House, Southwark Estate .
- Collinson Court, Southwark Estate¹ ٠
- Horace Jones House, Southwark Estate ٠
- Markstone House, Southwark Estate Stopher House, Southwark Estate Markstone House, Southwark Estate
- 20 Sumner Buildings, Southwark Estate
- Blake House, William Blake Estate ٠
- Donnelly House, William Blake Estate ٠
- Windsor House, Windsor House ٠
- Petticoat Square, Middlesex Street Estate ٠

Retrofit plan to Net Zero

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



Images of some of the buildings

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 Prenewable energy generation by 2040.





 \mbox{CO}_2 emission trajectories in tonnes \mbox{CO}_2 per year





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

Photographs of Collinson Court

Carbon balance for Collinson Court

Breakdown of measures per package for Collinson Court

Current and projected heating demand and system

Use of fossil fuels

changed

energy costs

Not compatible with Net Zero.

Low carbon heat but risk of high

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 heating system must be

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 Estate¹
- Bayer House, Golden Lane Estate .
- Bowater House, Golden Lane Estate .
- Cullum Welch House, Golden Lane Estate ٠
- Cuthbert Harrowing House, Golden Lane Estate ٠
- Great Arthur House, Golden Lane Estate (Tower, curtain wall) ٠
- Hatfield House, Golden Lane Estate ٠
- Page Stanley Cohen House, Golden Lane Estate
- Cromwell Tower, Barbican Estate (Tower)
- Lauderdale Tower, Barbican Estate (Tower) .68
- Mountjoy House, Barbican Estate
- Shakespeare Tower, Barbican Estate (Tower) .
- The Postern, Barbican Estate ٠
- Wallside, Barbican Estate ٠

Retrofit plan to Net Zero

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



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 mprovement measures. It should also be possible to install MVHR units.

There is a small amount of landlord energy or om 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.



CO₂ emission trajectories in tonnes CO₂ per year





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 Basterfield House

Carbon balance for Basterfield House

Breakdown of measures per package for Basterfield House

Current and projected heating demand and system

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
- 'age Crescent House, Golden Lane Estate¹
- Defoe House, Barbican Estate
- State Crescent, Barbican Estate
- Gilbert House, Barbican Estate
- John Trundle Court, Barbican Estate ٠
- Lambert Jones Mews, Barbican Estate .
- Seddon House, Barbican Estate ٠
- Speed House, Barbican Estate .
- Thomas More House, Barbican Estate
- Willoughby House, Barbican Estate

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)
- Floor insulation, IWI (small areas where possible), window 2) replacements (where possible - redesign of panelised systems may be appropriate in some cases), junctions and airtightness, MVHR

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B) WWHR, improved appliances
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Images of some of the buildings

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.





 CO_2 emission trajectories in tonnes CO_2 per year





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

Current and projected heating demand and system



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

Level Notes

Photographs of Crescent House

Carbon balance for Crescent House



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

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 ٠
- Centre Point, Avondale Square Estate (Tower) ٠
- East Point, Avondale Square Estate (Tower)
- West Point, Avondale Square Estate (Tower) ٠
- Colechurch House, Avondale Square Estate (Tower) ٠
- Proctor House, Avondale Square Estate (Tower) ٠
- Tovy House, Avondale Square Estate (Tower)
- age Petticoat Tower, Middlesex Street Estate (Tower)¹
- Longland Court, Avondale Square Estate
- မ္မ 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
- External wall insulation and window replacements (where possible -2) redesign of panelised systems in some cases), junctions, airtightness and MVHR
- Floor insulation, WWHR, improved appliances 3)











Images of some of the buildings

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

CO₂ emission trajectories in tonnes CO₂ per year

Total

40.0

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.



 $\begin{array}{c} Current & 2027 & 2040 \\ CO_2 \mbox{ emissions } & CO_2 \mbox{ emissions } & CO_2 \mbox{ emissions } \end{array}$





Use of fossil fuels

changed

energy costs

Not compatible with Net Zero.

Low carbon heat but risk of high

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 heating system must be

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





Carbon balance for Petticoat Tower

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

Breakdown of measures per package for Petticoat Tower

Photograph of Petticoat Tower

4.0 Relating the actionplan to the Climate ActionStrategy

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.

dew build

Be City of London Corporation are adding to their housing portfolio Prough 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 = 5 ktCO₂/yr (2020)

Scope 1 and 2 emissions from non-residential buildings on housing estates = $0.2 \text{ ktCO}_2/\text{yr}$ (2020)

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: $\overline{\mathbf{U}}$

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

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.

Scenario 1 - Total reduction (excluding GGR) = 49%

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

Scenario 1 achieves a 33% reduction from the CO₂ 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 tCO₂/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
- \mathbf{T} communal heating.
- Install roof insulation early

O 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 CO₂ 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 tCO₂/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, υ
- age • Installing wall insulation where possible
- Install roof insulation (where not already undertaken)
- 100 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 CO₂ 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.

Total reduction (excluding GGR) = 86 %

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 Torporation may wish to use from their land based assets. If this were to e applied in a proportional way to this pathway, net zero carbon for the Pousing 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.

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.



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



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).

™ethodology

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 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 r unit but the glazing will be the most expensive overall. Low carbon measures are expensive per unit, but the total cost ranks lower as not all units are affected.





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.

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

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 \pm tonne CO₂ 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.

Bhergy efficiency and demand flexibility deliver other benefits, including proved comfort, healthier indoor environment, reduced energy bills and 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 f/tonneCO₂ metric is problematic. This is because the amount of CO₂ 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 CO₂ savings from PV towards 2040. Local renewable energy generation is a necessary part of our future energy mix.



CO₂ saved per £1 spent

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 comfortImproved indoor air	 Improved local air quality 	 Source of income / reduced energy bills 	
quality	No gas safety issues	Contribution of local	
 Reduced damp and mould 		renewable electricity grid.	
Better acoustic performance			
Reduced energy bills			
Greater resilience to climate change			

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Internal sources of funding

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 reprint of this Retrofit Action Plan and measures carried out as part of andard maintenance and replacement works – e.g. replacement of mindows and heating systems. If planned replacements are carried out th components of the right type and specification, cost efficiencies can 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).
- **9** 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.

	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

Current funding allocated through capital works programme

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

External sources of funding

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

Control of 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
- 'age 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 m² or total) could be addressed as a priority as reducing their emissions will help to save very significant
- \mathbf{v} 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/m₂/yr.

Our analysis shows the blocks listed to the right have relatively high space heating demand (above 100 kWh/m²/yr) which is above the threshold we misider 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.

Dia da	Fatata	Indicative space heating demand	N.aita
DIOCK	Estate	(KVVh/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 City of London	Sydenham Hill Estate	150+	30
Almshouses	Ferndale Road	100+	43
Gresham Almshouse	es 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 ter.

s 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 Wh/m²/yr, and the minimum space heating demand acceptable for the use of direct electric heating systems is 40 kWh/m²/yr.

The blocks listed to the right all indicatively have space heating demands of less than 75 kWh/m²/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/m²/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 placement of these systems would need to be paused, and design hanges made so that large scale communal heat pump systems are stalled instead. Without doing so, the zero carbon target for housing connot be achieved.

4 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.







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 hough heat in shoulder seasons (spring and autumn). The residents have mrmed an Underfloor Heating Working Party which is looking in detail at the winter controls can be optimised.

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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.

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?

A 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 placement programme, void properties) and retrofit costs minimised

The opportunity of a Building Digital Logbook

ongside 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, inuse 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.
- $\hfill\square$ 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

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- 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.

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

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CO₂ – 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 CO₂, a measure of the amount of carbon dioxide emitted or offset.

 ${\bf kWh}$ – 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.

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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.

Page 122



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

Energy efficiency calculation structure & 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	Belore	Good	Best
					kWh/m²a/m²HLA, combined with % of current heating	kWh/m²a / n	n²HLA
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 insulatior	100mm thickness	250mm thickness	0.037	0.004	0.003
		Loft insulation	200mm thickness	400mm thickness	0.037	0.004	0.003
	Floor insulation	Floor insulation	30mm thickness some dwellings	100mm thickness some dwellings	0.007	0.006	0.004
_					% of current heat demand	kWh/m2	2a
Pa	Junctions	Junctions insulated	d Junctions insulated where possible	Good connections possible	1.1%	6.3	4.2
ge	Airtightness	Airtightness improved	5ach	2ach	16.1%	28.8	11.6
12	Ventilation	MVHR	75% efficient heat recovery	90% efficient heat recovery	11.0%	11.7	8.3
Ŭ Ŭ					% 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
	Low discust Parkets a				% of curren	t lighting energy	0.4
Landlord electricity		Improved com. lighting (if appl.)	N/A	High efficacy lighting	1.0	0.8	0.6
					% of curr	ent 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 infrast	ructure	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 pa	anel
-					NI/A	NI/A	360Wp

Cost calculation assumptions

Energy use category	Energy use breakdow	n 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
	Roof insulation	External wall insulation	100mm thickness	200mm thickness	9.3	13.9
	Roof insulation		roomin unckness	230mm unceness	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
ס	Junctions	Junctions insulated	Junctions insulated where possible	Good connections possible	1.0	2.0
ag	Airtightness	Airtightness improved	5ach	2ach	1.0	2.0
е ->	Ventilation	MVHR	75% efficient heat recovery	90% efficient heat recovery	2.1	3.1
N∂t water O	Hot water use Hot water storage	WWHR in showers DHW tank	30% efficient heat recovery DHW cylinder, <2W/K	50% efficient heat recovery 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	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		Solar PVs			Cost per kWh	/m2a
generation			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 delivered to residents homes would be to deliver less heat through the mmunal heating system (and charge residents less) and install electric diators 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 Londo	on Corporation - Hou	using Net Zero Actio			
	Workshop	Barbican Res	sidents Workshop 1	- Understanding the	e buildings through the residents eyes.		
	Date	5th May 2021					
	Time	19:00 - 20:30					
	Venue	Online through	h Zoom				
	Attendees	Barbican resi	idents - 15				
		Etude (Anna M	MacKenzie, Thomas L	efevre, Kate Millen, 1	Naomi Grint)		
		Corporation of	of London (Graeme	Low, Julia Makin, Lo	ochlan MacDonald)		
	Duration	90 mins					
	Purpose	To understand	the buildings through	residents eyes.			
	Roles	Facilitator - A Presenter – k Break out roc	nna Kate om chairs – Thomas	, Kate, Naomi			
	<u>~</u> ;	.					2
	Stage	Duration, mi	Time	Objective	Activity	Who	Resources
\mathbf{U}	1. Arrıval	5	19:00	lime to arrive	- People arrive and settle	Anna	
D D D D D D	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	
100	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	- 30 mins: 3x Breakout rooms.	Anna facilitate	Note taking spreadsheet
				Insights and ideas for improving the heating system.	Iopic – Heating systems, energy efficiency, ventilation, controls. (discuss people's experiences and ideas for improvements)	Kate, Naomi, Thomas chair breakout rooms	
	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	

			Opportunity to ask questions and voice					
9. AOB	5	20:25	any other views		Anna			
Total	90							
NOTES								
Heating, Energy Efficiency, Venti	ilation							
Breakout room 1	cmd+ Enter	for new line in ce	I					
Moisture in the air - down to 25% ir system is on the whole time - wate Some residents have used films to	r tank is cycli reduce gain	People accept th ing constantly (hot	e background hea water). Barbican	- hot water can be turned off - immersion. West facin	ed. Colin and Sally - ig - can get very hot.			
Breakout room 2								
 opportuniutes around glazing, but i must not be a vanity project. Deve 	t might be su elop a climate	ufficient already. He change strategy	eating system con for Barbican as e	trols seem to be the thing to address - reducing ener xemplar.	gy wastage. Cost point			
<u>×</u>								
X								
Breakout room 3	cmd+ Enter	for new line in ce	I					
Group 3 - Overheating in both sum be considered. Controls a big issue overheating in the winter. Needs to	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 br	idges							
Focus on what's unique here								
Join up opportunities - recent study	/ on changing	g pattern on transp	oort. Vacant parki	ng spaces for PV?				
Can deals be made with suppliers?	?							
Load patterns are unique. Surround	ded by huge	cooling loads neig	hbours.					
Wrap PV around barrel roofs.								
Can we utilise neighbouring solution	ons?							

What about non-domestic properties?	
-------------------------------------	--

	Project	City of Londo	on Corporation - Hou	using Net Zero Actio			
	Workshop	HRA Residen	nts Workshop 1 - Un	derstanding the bui	ildings through the residents eyes.		
	Date	Thu 6th May	2021				
	Time	19:00 - 20:30					
	Venue	Online through	h Zoom				
	Attendees	HRA resident	ts - 2.				
		Etude (Anna M	MacKenzie, Thomas L	efevre, Kate Millen, 1	Naomi Grint)		
		Corporation of	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
υ	1. Arrival	5	19:00	Time to arrive	- People arrive and settle	Anna	
age	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	
ω	3. Who are the participants?	2	19:10		- Poll to see where people are from.	Anna	
Ñ	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
Ī	4. Results of questionnaire	3	19:22			Anna	Slides
Ī	5. Group discussion	30	19:25	Residents share	- 30 mins: 3x Breakout rooms.	Anna facilitate	Note taking spreadsheet
				Insights and ideas for improving the heating system.	Iopic – Heating systems, energy efficiency, ventilation, controls. (discuss people's experiences and ideas for improvements)	Kate, Naomi, Thomas chair breakout rooms	
	6. Group feedback	20	19:55		- 5 mins each: Return together to share thoughts – 1	Anna facilitate	Note taking spreadsheet
					understanding with the attendees (5 mins each).	Kate, Naomi, Thomas present back	
	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	
_							

			Opportunity to ask questions and voice				
9. AOB	5	20:25	any other views		Anna		
Total	90						
NOTES							
Windows are solid. Trickle vents would external insulation be ok o leaseholders. Would need to con would go. There is an airing cupb There's a deep boxed out riser s An old coal store.	on the windows r worthwhile? M sider the option poard type space pace in the bat	s. Can shut all but Might need to go a ns re signing up to ce. hroom. Some peo	the bathroom, bu long way to get b a communal syst	It then the air gets stale. Likes the way the street loo big improvements in energy efficiency. There are both tem vs staying independant. Doesn't know where a b is out.	ks on the outside - h tenants and ig heat pump system		
If we were going to do a lot of ref access on northnorth east (ktiche be communal.	rofit, a way to h en and bathroo	nelp overheating w ms). Bedrooms ar	voudl be to install nd living rooms fac	balconies outside full doors, to give shading (they fac ce south. Would be interesting to know how it works -	ce south-s-w) - decl some upgrades woudl		
)							
_							
 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 paying 							
Would definitely be in favour of a garden patch by the garages. Co so that they feel they are part of	green makeov ommunications something.	er. Petrol mowers can be frustrating	and leaf blowers! J. Golden Lane - Io	Has been onvolved in community building and enga ots of community building stuff. Really need to suppo	gement - managing a ort community building		

	Project	City of Londo	on Corporation - Hou	ising Net Zero Actio	n Plan		
	Workshop	HRA Resider	nts Workshop 1 - Un	derstanding the bui			
	Date	Wed 12th Ma	ay 2021				
	Time	19:00 - 20:30					
	Venue	Online through	h Zoom				
	Attendees	HRA resident	ts				
		Etude (Anna M	MacKenzie, Thomas L	efevre, Kate Millen, 1	Naomi Grint)		
		Corporation of	of London (tbc)				
	Duration	90 mins					
	Purpose	To understand	the buildings through	residents eyes.			
	Roles	Facilitator - A Presenter – N Break out roc	nna Vaomi om chairs – Thomas	+ Anna (GL) - Kate	e + Naomi (Others)		
	Stage	Duration, mi	Time	Objective	Activity	Who	Resources
U	1. Arrival	5	19:00	Time to arrive	- People arrive and settle	Anna	
ΰ Ω Ω	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	
λ	3. Who are the participants?	2	19:10		- Poll to see where people are from.	Anna	
4	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. 	Naomi	Slides
	4. Results of questionnaire	3	19:22			Anna	Slides
	5. Group discussion	30	19:25	Residents share	- 30 mins: 3x Breakout rooms.	Anna facilitate	Note taking spreadsheet
				Insights and ideas for improving the heating system.	Iopic – Heating systems, energy efficiency, ventilation, controls. (discuss people's experiences and ideas for improvements)	Kate, Naomi, Thomas chair breakout rooms	
	6. Group feedback	10	19:55		- 5 mins each: Return together to share thoughts – 1	Anna facilitate	Note taking spreadsheet
					understanding with the attendees (5 mins each).	Kate, Naomi, Thomas present back	
	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					
				any other views							
	Total	85									
	Total	00									
	NOTES										
	Heating, Energy Efficiency, Venti	lation									
	Breakout room 1 - Golden Lane I	Estate	cmd+ Enter for n								
Page 135	THere are undercrofts on some flat Alternate floors, there are timber flo Projecting bays have some damp - Walkways to enter the front door. Ventilation - current ventilation is the bathrooms. Half the flats haven't had their roofs End maisonette - uninsulated. Doors - they are solid but they leak Curtains in the large room are diffic Sue tried to get a smart meter, but meters. 8.5m2 of single glazing. Two Basterfield properties - compa Panel system walls on the south sid due to walkway. Kitchens very narr Heating - brand new combi boilers underfloor heating she put in herse Some boiler flues go out of window Shouldn't have to justify individual of Communal heating system being p Pipe routes - are they still there? It	is, and that re pors. cold bridges arough the will s repaired/rep air all the wa cult to put in. they couldn't rison of ener de of the bloc ow. have just bee ris. circumstance roposed for 0 was more or	bom is freezing in ndows (there are h placed for some tin ay around. Letter to install one / they of gy efficiency. cks. On the north s en put in. Boiler is es. Cuthbert Harrowing less a steam syst	the winter. Uninst noles at the bottor me. Water is still c boxes are drafty to don't connect. Diff side, upper storey coming on and of g and Crescent H em insulated with	ulated concrete slab. n of the windows to let the condensations out. No ve coming in. A lot of the damp is from water ingress thro too. icult for people to monitor their energy usage. Some is panels. Under that think kinker block - insulation of f all day. Leaseholders individually fit their own. Sue ouse. Look at Options Appraisal. asbestos. Maybe use existing ducts but need to che	ntilation fans in the bugh the roof. e blocks do have smart butside woudl eb difficult has some electric eck asbestos.					
	Broakout room 2	omd+ Entor	for now line in col								
		CITUT EITREI		1							

Breakout room 2 - "Others"	cmd+ Enter	for new line in ce	11												
Horace Jones House and MSE bo heating?). Can't leave windows op triple glazed. The doors have bee Horace Jones House has MVHR a	orace Jones House and MSE both far too hot and struggling with overheating. Some ares of flat cold (Sandra). HJH uses electric heating (communal sating?). 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 iple glazed. The doors have been replaced - balcony doors have made a slight difference. The side panel was replaced. lorace Jones House has MVHR and winter gardens. Highly glazed facade. Some balonies but not above every day.														
1															
ī															

Please select the estate	Please select the block	How man bedroom does your	Which of y the below s best r describes your	Which best describes	Which floor	What's the main heating source			Immersio	Point-of-use heater (e.g. electric shower,		Additional plug-in	Additional	Open windows when it's too warm in the			You selected "other". Please briefly describe other ways in which you control the	How comfortable is your home in	How comforta ble is your home in the	Does your hom suffer from	Do you use your e kitchen and bathroom	Could you tell us why you don't use	Do you have broadban d and	Would you be willing to share your energy bill data with us (anonym	t y u u u v u u use this space to add anything else you would like to
in which you live.	which you live.	have?	home?	your house	are you on?	in your home?	Communal system	Combi gas boile	r n heater	hot tap etc)	Thermostat	electric heaters	gas heaters	winter	No control	Other	temperature of your home.	the winter?	summer?	damp?	ventilation?	all or some of your ventilation fans?	wifi?	ously)	y say.
Avondale Square Estate	Brettinghurst House	1-bed	Flat		est floor	Own gas boiler		Combi gas boiler			Thermostat								3 6	5 No	Yes - bathroom only	the windows	Yes	Maybe	k
Avondale Souare 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 case in a studio flat.
																									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 windly 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
Avondale Square Estate Avondale Square Estate	George Elliston House Longland Court	3-bed 3-bed	Flat		Middle floor Middle floor	Own gas boiler Own gas boiler		Combi gas boiler		Point-of-use heater	Thermostat Thermostat								1 8 3 8	3 Yes - a little 3 Yes - a little	Yes - kitchen only Yes - both	I don't have one in the bathroom and tole	t Yes Yes	No No	mention the noise level
Avondale Square Estate	Proctor House	Studio	Flat		Ground/Low est floor	Electric storage heater			Immersion			Additional plug-in electric heaters		Open windows when it's too warm in the winter					0 8	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 certain don't know how to use them	y Yes	Yes	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 worm rithat it might happen again.
Avondale Square Estate	Toyy 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 door have big gaps that let through alot of draught and we lose alot of our heat when the heating is on.
																									The windows in my flat are rubbish they let to much draft
Avondale Square Estate	Tovy House	2-bed	Flat		Top floor	Own gas boiler		Combi gas boiler			Thermostat							:	2 8	3 Yes - a lot	Yes - both		Yes	No	and cold in and the tront doors are not energy efficient. Double glazed windows and fire doors are required. These need to be updated. I think CoL can do much more than just providing few
Avondale Square Estate	Tovy House	2-bed	Flat		Ground/Low est floor	Own gas boiler		Combi gas boiler							No control				2 1	7 No	Yes - bathroom only	No ventilation on the kitchen. On the bathroom we open the window after ever bath as there is not ventilation.	y Broadband	Yes	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 8	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.
																									I have put both my email addresses in:
Public Entry		0.1.1	F 141			Electric underfloor															Y		¥		Mary.durcan@cityoflondon.gov.U.K.
barbicari Estate	Andrewes House	2-060	Fiat		Ground/Low	Electric underfloor			Intricision						NO CONDO					NO NO	res - pour		res	105	in wood be interested in attending boar workshops
Barbican Estate	Andrewes House	2-bed	Flat		est floor	heating			Immersion						No control				5 5	No	Yes - both		Yes	Maybe	54
Barbican Estate	Andrewes House	2-bed	Flat		Middle floor	Electric underfloor heating			Immersion			Additional abus in		Open windows when it's too warm in the winter					7 (i No	Yes - both		Yes	Yes	in xx
Barbican Estate	Andrewes House	1-bed	Flat		est floor	heating			Immersion			electric heaters			No control				3 5	5 No	Yes - both		Yes	Yes	3
	0					0						Additional plug-in		Open windows when it's too							Mar Anton				When the new communal heating system was installed, why was its 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 bil in ny 714 sq.ft flat is more than a friend's 1023 sq.ft flat in a normal sector of the same sec
balocali Estate	Ben Johnson House	ribed	masonette		Middle Hoor	Communal nearing			IntrictStort	Point-or-use neater		electric rieaters		warmin une winter	NO CONDO					110	res - boar		res	NO	block in Clerkenweit. Odirageous 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	3	Yes - both		Yes	No	Cannot select both workshops.
						Electric underfloor						Additional plug-in		Open windows when it's too											
Barbican Estate	Breton House	Studio	Flat		Middle floor	heating			Immersion			electric heaters		warm in the winter											
						Electric underfloor						Additional plug-in		Open windows when it's too											Although ours is a middle floor flat, three of its external walls are exposed including to the northern boundary of the
Barbican Estate	Breton House	Studio	Flat		Middle floor	heating Electric underfloor			Immersion			electric heaters		Open windows when it's too					1 8	3 No	Yes - bathroom only	Concerns over fire hazards.	Yes	Yes	fr block/estate.
Barbican Estate	Bunyan Court	1-bed	Flat		Middle floor	heating				Point-of-use heater				warm in the winter					6 9	No	Yes - both		Yes	Maybe	ra
						Electric underfloor						Additional plug-in		Open windows when it's too											
Barbican Estate	Bunyan Court	2-bed	Maisonette		Top floor	heating	Communal system					electric heaters		Warm in the winter	No control				5 7	7 No	Yes - both		Yes	Yes	e
Barbican Estate	Cromwell Tower	4-bed	Flat		Middle floor	heater	Communal system					electric heaters		warm in the winter	No control				3 6	No	Yes - both		Yes	Yes	P
Barbican Estate	Cromwell Tower	3-bed	Flat		Middle floor	Electric underfloor heating	Communal system			Point-of-use heater					No control				3 8	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			11	0 7	7 No	Yes - both		Yes	Yes	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 da terrible waste of energy.
						Electric underfloor						Additional plug-in		Open windows when it's too			I use full length white reflective roller blinds to block out the sun on hot days and help keep the								I would be very interested if here 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 of tops of the transe blocks in the barbican could be fitted valid soft panels, as i understand there are fittedbarburved ones now that could perhaps be used without affecting the lated building roofline. Also could ground source heat pumps be installed under the resident
Barbican Estate	Defoe House	1-bed	Flat		Middle floor	heating			Immersion			electric heaters	1	warm in the winter	1	Other	interior of the flat cool	1	3 6	No	Yes - both	1	Yes	Yes	s gardens?

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	Please select the estate	Please select the block	How many bedrooms does your k in home	Which of y the below best describes your	Which best describes	Which floor	What's the main heating source		Immera	Point-of-use heater ico (e.g. electric shower,	Thomas at a	Additional plug-in	Additional	Open windows when it's too warm in the	No	You selected "other". briefly describe other which you control the	Please ways in How co is your	Hi cc bi promfortable home in th	ow omforta e is our ome in le	Does your home suffer from	Do you use your kitchen and bathroom	Could you tell us why you don't use	Do you have broadban d and	Would you be willing to share your energy bill data with us (anonym	y o u u u u u u u u use this space to add anything else you would like to
	in which you live.	which you live.	naver	nomer	your nouse	are you on?	in your nome?	Communal system	Combrigas boller in neace	not tap etc)	memostat	electric reaters	gas neaters	winter	NO CONTROL OF	temperature of your m	sine. the will	iter st	inner r	damp r	ventilation	an of some of your ventilation fails?	wittr	ousiy)	When it's chilly in the winter I need a space heater. But not ell winter I for an environment of the first where it is done and
	Barbican Fetala	Defee House	1-bed	Elat		Top floor	Electric underfloor		Immere						No control				6	No	Yes - kitchen only	There's a passive vent in the bathroom that doesn't work well. There's no other cotion.	Vas	Var	an when it's especiary cool in the har when it is damp and overcast outside. It's only too warm for a few days in the summer. In future have may need air conditioning on the bottest days
	Darbierr Estate	Delot notice	1.000	1 MAX		Top hoor	including							Open windows	NO CONDO					10	Tua - Kitchich Grig	opton	103	103	and may need as considering on the notest days.
	Barbican Estate	Defoe House	2-bed	Flat		Middle floor	Communal heating		Immers	ion		Additional plug-in electric heaters		when it's too warm in the winter				5	5	No	Yes - both		Yes	Yes	ta
												Additional plug-in		Open windows											
	Barbican Estate	Defoe House	2-bed	Flat		Middle floor	Communal heating		Immers	ion		electric heaters		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	2 had	Flat		Middle floor	Communal heating	Communal availant	Immers	ion	Thermostat	Additional plug-in						6	6	No	Yes - both		Yes	Maybe	Yes I would like to attend both workshops
	Barbican Estate	Gibert House	3-bed	Fiat		Top floor	Electric underfloor heating		Imners	ion	110110314	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 writer it is often below 25% even with the kitchen extractor off. The humiditie is not beaution. Also the air humover is high & bringing more polition not be flat.	Yes	Yes	Solar gain through the windows is a big problem in our fait during the washier or when the window underface heating a concession. However, or gain is very underface heating and exception of the second s
_	Barbican Estate	Gilbert House	1-bed	Flat		Middle floor	heating		Immers	ion Point-of-use heater					No control			7	7	No	Yes - both		Yes	Yes	je Ok
a	Barbican Estate	Gilbert House	2-bed	Flat		Middle floor	Electric underfloor heating		Immers	ion		Additional plug-in electric heaters		Open windows when it's too warm in the winter				8	6	No	Yes - both		Yes	Yes	I would be happy to pay more to have the electricity used for our communal underfloor heating be from renewable b sources.
ge	Barbican Estate	Hiton House	1-bed	Flat		Middle floor	Electric underfloor heating		Immers	ion				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)
<u> </u>	Barbican Estate	Lauderdale Tower	3-bed	Flat		Middle floor	Electric underfloor heating		Immers	ion		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
ω	Barbican Estate	Petticoat Tower	3-bed	Flat		Middle floor	Communal heating	Communal system	Immers	ion	Thermostat							7	7	No	Yes - both		Yes	Yes	m nothing at this stage
∞	Barbican Estate	Seddon House	1-bed	Flat		Ground/Low est floor	Communal heating		Immers	ion		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		Immers	ion					No control			3	7	No	Yes - both		Yes	Yes	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 dedecisions
							Electric underfloor					Additional plug-in		Open windows when it's too											
	Barbican Estate	Seddon House	1-bed	Flat		Middle floor	heating Electric underfloor		Immers	ion		electric heaters		warm in the winter				7	10	No	Yes - both		Yes	Yes	some of the questions clearly did not understand the
	Barbican Estate	Seddon House	1-bed	Fist		Middle floor	Electric underfloor		Immers	ion					No control				6	No.	No - we turn it on	Because moths come into my flat via the vantilation system	Yee	Var	Any of the questions are ones which the Corporation as displayed will know the answer to already.
	Durbhan Catal	Ot June 7	0.000	The second			Electric underfloor	0						Open windows when it's too	No consta						Yes hat			No.	
	Barbican Estate	Shakespeare Tower	3-bed	Eist		Middle floor	Electric underfloor	Communal system	Immere	Point-or-use rieater				warmin ure winer	No control			5	5	No	Yes - both		Ver	Masha	7
	Barbican Estate	Shakespeare Tower	3-bed	Flat		Middle floor	Electric underfloor		Immers	ion				Open windows when it's too warm in the winter	NO CONDO			8	7	No	Yes - both		Yes	Yes	te
	Barbican Estate	Shakespeare Tower	2-bed	Flat		Middle foor	Electric underfloor		Immers	ion				Open windows when it's too	No control Ot	ber Linderfloor besting trime	er	5	5	No	Yes - both		Yes	Yes	d
	Barbican Estate	Shakespeare Tower	3-bed	Flat		Top floor	Electric underfloor heating		Immers	ion					No control			5	6	No	Yes - both		Yes	Maybe	
	Barbican Estate	Shakespeare Tower	2-bed	Flat		Middle floor	Electric underfloor heating		Immers	ion					No control			5	8	No	Yes - both		Yes	Maybe	
	Barbican Estato	Sound Mouron	1.000	Elat		Middle Asses	Electric underfloor			ion				Open windows when it's too						No	Yes - hoth		Vas	No	
	Barbican Estate	Speed House	2-bed	Flat		Middle floor	Electric underfloor		Immers	ion		1		waim in the winter	No control			9	7	No	Yes - both		Yes	Maybe	fe How about some solar beating for a start
	Barbican Estate	Thomas More House	1-bed	Flat		Middle floor	Electric underfloor		Immers	ion	1	1			No control			7	/ 8	No	Yes - both		Yes	Yes	m
	Barbican Estate	Thomas More House	Studio	Flat		Ground/Low est floor	Electric underfloor		Immers	ion				Open windows when it's too	No control			R		No	Yes - kitchen only	bathroom fan on all the time. Kitchen hob	Yes	Yes	
	man and the shares	contrast more model	010010		1	mark interest	· · · · · · · · · · · · · · · · · · ·		L Puttiers			1		the second secon			I	3			norman only	for country on boost	1304	- 608	L

	Please select the estate in which you live.	Please select the block is which you live.	How man bedroom: does you home have?	Which of y the below s best r describes your home?	Which best describes your house	Which floor are you on?	What's the main heating source in your home?	Communal system Co	ombi gas boiler	Immersio n heater	Point-of-use heater (e.g. electric shower, hot tap etc)	Thermostat	Additional plug-in Add	Open windows when it's too ititional warm in the heaters winter No contro	I Other	You selected "other". Please briefly describe other ways in which you control the Itemperature of your home.	How comfortable is your home in the winter?	How comforta ble is your home in the summer?	Does your home suffer from damp?	Do you use your b kitchen and bathroom ventilation?	Could you tall us why you don't use all or some of your ventilation fans?	Do you have broadban d and wifi?	Would you be willing to share your energy bill data with us (anonym ously)	y a a Use this space to add anything else you would like to asy.
						Ground/Low	Electric underfloor						Additional plug-in	Open windows when it's too										The Barbican needs special analysis due to the block
	Barbican Estate	Thomas More House	2-bed	Flat		est floor	heating			Immersion			electric heaters	warm in the winter			2	5	No	Yes - both		Yes	Maybe	b structure and centrally controlled underfloor heating
		-		511			Electric underfloor						Additional plug-in	Open windows when it's too						V		¥		
	Barbican Estate	Thomas More House	1-bed	Flat		Middle floor	heating			Immersion			electric heaters	warm in the winter			6	5	No	Yes - both		Yes	No	
							Electric underfloor						Additional plug-in	Open windows when it's too	0.0	The house had is own trimmer which can turn the temperature or go of down. Also I replaced the underloor heating fue board with permission from the BEO and can pul out fuese to turn the heating off i necessary. In this of the second the second charges are charged by block, and not by the usage of the								I cannot diamine the times of ether workshop but you diror by ear registor from to subset that that all that is to later of the second secon
	Barbican Estate CoL Almshouses	Wallside 39-44	4-bed 1-bed	House	Mid terrace Mid terrace		heating Own gas boiler	Co	ombi gas boiler	Immersion		Thermostat	electric heaters	warm in the winter	Other	individual house.	3	3	No Yes - a lot	Yes - both Yes - both		Yes	Yes	generated and it will be freezing. s nothing else to say
P	Dron House	Dron House	1-bed	Flat		Top floor	Own gas boiler	Ca	ombi gas boiler			Thermostat					4	3	No	Yes - both		No interne	t No	We have for to much vertilition, compared with modern standards and builds. This does have analystication of the detail
<u>m</u>	Golden Lane Estate Golden Lane Estate	Basterfield House	3-bed 2-bed	Masonette		l op floor est floor	Own gas boiler Own gas boiler	Co	ombi gas boiler ombi gas boiler	Immersion		Thermostat Thermostat					5	6	Yes - a lot No	Yes - both No - we turn it off	There are none!	Yes	Yes	d Does HRA ESTATE residents include Leaseholders.
Q														Open windows										
D	Golden Lane Estate	Basterfield House	2-bed	Maisonette		Ground/Low est floor	Own gas boiler	Ca	ombi gas boiler			Thermostat		when it's too warm in the winter			8	6	Yes - a little	Yes - both		Yes	Yes	38
、	Golden Lane Estate	Bayer House	2-bed	Maisonette		Middle floor	Electric underfloor heating	Co	ombi gas boiler			Thermostat					3	6	No	Yes - both		Yes	Maybe	
$\overline{}$	Golden Lane Estate	Bowater House	2-bed	Maisonette		Middle floor	Own gas boiler Electric underfloor	Co	ombi gas boiler			Thermostat					3	8	Yes - a little	Yes - both		Yes	Yes	Our flats leak heat and gas is becoming very expensive
39	Golden Lane Estate	Callum Welch House	4-bed Studio	Fiat	Detached	Top floor	heating Own gas boiler	Ca	ombi gas boiler	Immersion		Thermostat		Open windows when it's too warm in the winter			1	8	No Yes - a little	Yes - bathroom only Yes - both	asdfs	Yes	Yes	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 humbly in wheter can be around 70%. We use a dehumidifier to get a down to around 80% and this extracts about 2.3 Interviday. We can't keep windows open as we face Goswell Road so there is high noise and polation lervel.
	Golden Lane Estate	Crescent House	2-bed	Flat		est floor	Own gas boiler	Ca	ombi gas boiler			Thermostat					0	4	Yes - a lot	Yes - both		Yes	Yes	energy bills
					1	1								Open windows										1
	Golden Lane Estate	Crescent House	1-bed	Flat	1	Top floor	Own gas boiler	Co	ombi gas boiler			Thermostat	electric heaters	when it's too warm in the winter			7	5	Yes - a little	Yes - both		Yes	Maybe	
	Golden Lane Estate	Crescent House	Studio	Flat		Middle floor	Own gas boiler			Immersion		Thermostat	Additional above he		-		3	6	Yes - a lot	Yes - both		No interne	tYes	In primary as de war crescent house is and BCK of double in glazing.
	Golden Lane Estate	Cuthbert Harrowing House	3-bed	Maisonette		Top floor	Own gas boiler	Co	ombi gas boiler			Thermostat	electric heaters				1	2	Yes - a little	Yes - both		Yes	Maybe	d
	Golden Lane Estate Golden Lane Estate	Cuthbert Harrowing House Cuthbert Harrowing House	2-bed 2-bed	Flat Maisonette		est floor Top floor	Own gas boiler Own gas boiler	Co	ombi gas boiler ombi gas boiler			Thermostat Thermostat					3	5	Yes - a little Yes - a little	Yes - bathroom only Yes - both	i dont have any	Yes	Maybe Yes	n not sure what the survey was for ? . Double Glazing and roof insulation
	Golden Lane Estate	Cuthbert Harrowing House	2-bed	Maisonette		est floor	Own gas boiler	Co	ombi gas boiler			Thermostat					6	7	No					
	Golden Lane Estate	Great Arthur House	1-bed	Flat		Ground/Low est floor	Own gas boiler	Co	ombi 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.
	Californ I anno Estato	Creat Arthur Maure	1 had	Elus		Middle Beer	Our an halv	C-	ambi nan bailar			Thermostat		Open windows when it's too					Ne	No	Comp windows instead	Nie interne	t Yan	
	Golden Lane Estate	Great Arthur House	1-bed	Flat		Middle floor	Own gas boiler	Co	ombi gas boiler			Thermostat		warm in one winter			7	4	Yes - a little	Yes - both	Open wildows listeau	Yes	Yes	s We all need to audit our energy use
	Golden Lane Estate	Hatfield House	3-bed	Maisonette		Ground/Low est floor	Own gas boiler	Co	ombi gas boiler			Thermostat	Additional plug-in electric heaters				4	5	Yes - a little	Yes - both		Yes	Yes	34
	Golden Lane Estate Golden Lane Estate	Hatfield House Hatfield House	2-bed	Maisonette Maisonette		est floor Middle floor	Own gas boiler Own gas boiler	Ca	ombi gas boiler ombi gas boiler			Thermostat Thermostat					3	5	No Yes - a little	No - we turn it off Yes - both	We don't have any	Yes	Yes	5 2
	Golden Lane Estate	Hatfield House	2-bed	Maisonette		Ground/Low est floor	Own gas boiler	Cc	ombi gas boiler			Thermostat	Additional plug-in electric heaters				2	5	No	No - we turn it off	I don't have a ventilition system I open the windows in the summer and the front door and klichen window I I cook something with a lot of steam	Yes	Yes	I trust there will be a positive outcome to your research 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 cotting window frames, expensive fail bills, damp, Lingdi sports and year and after year we are
	Golden Lane Estate	Stanley Cohen House	2-bed	Flat	+	Middle floor	Own gas boiler	Co	ombi gas boiler			Thermostat			+		2	9	Yes - a little	No - we turn it off	We do not have any	Yes	Yes	s how much? Shamefull!!!!! The draughty windows are a total disprace. Why consult
	Holloway Estate	Crayford House	1-bed	Flat		Ground/Low est floor	Own gas boiler	Co	ombi gas boiler			Thermostat	Additional plug-in electric heaters				2	5	No	Yes - both		Yes	Yes	before fixing this serious problem You know about it please e do something

 world
 r

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 o

 willing to u
 share g

 your i
 i

 Do you
 energy v

 have
 bill data e

 brondbar with us to us us use to u How comforta ble is your home in Does you the suffer fro summer? damp? Which of How many the below bedrooms best does your describes home your have? home? You selected "other". Please briefly describe other ways in Wow comfortable which you control the temperature of your home. the winter? Do you use you kitchen and bathroom ventilation? Open window when it's too warm in the Which best describes your house hat's the m Point-of-use heate er vour ho Which floor heating source are you on? in your home? Immersio (e.g. electric show hbi gas boiler n heater hot tap etc) dditional plug-in Addition actric heaters gas heat suffer from Could you tell us why you don't use Ill or some of your ventilation fans? s Use this s and dilate in which you live. which you live b I would like to participate and give idea way Estate Own gas boiler Combi gas boiler 3 Yes - a lot Yes - hoth en windows en it's too itional plug-in tric heaters ew 35 sys sex Street Estate rm in the win dlesex Street Estate Petticoat Square st floor nmunal heating munal system Yes - a little Yes - both b CoL care not about their residents concerns her neta en windows en it's too rm in the win Street Estate Maybe if we had new widows and wall insulation the flat would not be cold in the winter and Spring Fround/Low st floor lesex Street Estate Petticoat Square wn gas boiler nbi gas boiler es - a lot (es - both mostal lesex Street Estate ticoat Square op floor nunal heat unal system es - both fiddle floor Addlesex Street Estate Petticoat Square mmunal heating Communal system Yes - a little Yes - both hermostat Nothing is there only a hole for ventilat but it does not work as i must be for the ni-pula Isocifi They were planning to replace gas cooker to electric cooker thats very good idea as i believe. diesex Street Estate Petticoat Tower ddle floor unal system lectric beaters /es - a little (es - kitchen only cooker thats very good idea as i betwee. I am disappointed by the Corporation's unilateral decision to renew the Middlesex Street State'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 ind/l c iddlesex Street Estate Petticoat Tower st floor s - hoth Loward. Both government and the Cky of London say that they want to reduce carbon emission, but they are in the process of installing a heating and heat water system in Middleses. Shere Estate, that is gas fuelded contrary to the country's more away from Kosi false. This system is predicted to last for next 35 years. Why weren't resident's where and general population was aloud (polisi awaring taken that account? It is polities to act concerned about these account? bits polities the main. lesex Street Estate Petticoat Towe hermostat Radiator va munal he Results you don't wak ne wak. MCK is currently having a replacement communal heatinghoit water system installed which is 100% fossil ter based and expected to have a life of 30 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, fat al. This is an actionalmy short-alighted imposition of carbon-producing system that most residente doject to shorty and is completely counter to the CuS stated Page Open windows when it's too here is no working ventilation in the lesex Street Estate Petticoat Tower le floo nunal hea varm in the win iator therm es - kitchen only ectives to reduce carbon emissions. am a non-resident leaseholder. I am not able to attend a I am a non-resident leaseholder. I am not able to atten workshop in person, but I would appreciate the opport for a Zoom or online option to attend. The communal 140 The scalar product outputs the start time start time to the scalar product the start time scalar product the scalar product time scalar 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 beating pen windows hen it's too llesex Street Estate Petticoat Tower Fop floor nmunal heatin munal system warm in the winte control stable heating. es - a little Yes - both I would like to see the city installing Cavity wall insulation t in help with reducing our carbon footprint dlesex Street Estate Petticoat Tower Middle floor -bed Flat ommunal heating Communal system lo control Yes - both Yes m Your poster at our estate doesn't explain what Etude is. hwark Estate m gas boiler nbi gas boile hermostat Yes - bathroom only We don't have a kitchen ventilation fan The flat need very little heating. South facing windows wa it up on sunny winter days. North facing bathroom and there is no fan in the kitchen currently chen windows allow cross vent in summer outhwark Estate linson Court iddle floor Own gas boiler mbi gas boiler int-of-use heater (es - bathroom only open window if necessary I don't have any vertilation fans as far as I'm avare (there wan't this coption on the drop down isit). There a Vent Akia Sentinel Krietic heat recovery unit. I really don't know how effective this as I've had periods where I've turned aloff for a long while and homesity can't tel what periods where I've turned aloff for a long while and homesity can't tel what and another and the sentimeter and a understand a bit more about it and if I'm under start and a bit more about it and if I'm under start and televicy or maybe my fait is too v Imali for any difference to be noticeable. There is in overliablow. We can only open Open windows when it's too 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 uthwark Estab race Jones Ho dle floa arm in the wi There is no ventilation. We can only open the windows that are too old and difficult to tditional plug-in actric heaters The windows are too old and not isolated properly. There is thwark Estat ner Bui no thermostat. bi gas b s-alt - we turn it of Even with putting secondary glazing on all windows and insulated plasterboard on all external walls, being on the to 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 Southwark Estate nner Buildings op floor Own gas boiler mbi gas boiler res - both option? The city is cutting down trees on my estate and the new trees will struggle to survive. This is not very environmentally friendly. Sydenham Hill Estate Lammas Green hi nas hoi

City of London Corporation - Residents' Housing Questionnaire Responses - April/May 2021

		1	1	1	1	1	1	1	1	1	1	1	1	1	1					1	1	1		1	1 1	1
	Please select the estate in which you live.	Please select the block is which you live.	How many bedrooms does your home have?	Which of the below best describes your home?	Which best describes your house	Which floo are you on	What's the main r heating source ? in your home?	Communal system	Combi gas boiler	Immersio r n 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 comforta ble is your home in the summer	Does your hom suffer from ? damp?	Do you use your e kitchen and bathroom ventilation?	Could you tell us why you don't use all or some of your ventilation fans?	Do you have broadba d and wifi?	Would you be willing to share your energy bill data n with us (anonym ously)	f 9 9 1 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
	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	I think the biggest issue for communal energy use at Lammas Green is the huge amount that the ouldoor lighting around the green is often on, even in the middle of bright days. Such a temendous wastel Hours and hours of the bij lights switched on, for absolutely no need. Really wastelful.
	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 vrnyiating 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	Much of the temperature problems in my flat are due to bady fitting windows - gaps where heat escapes, and draft comes in; single glass which does not provide much si insulation ether 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	The biggest problem about wasted energy use in my flat is due to the number of all fitting single-glazed windows - I lose a lot of heating due to draft problems even when windows siare closed
	Windsor House	Windsor House	2-bed	Flat		Middle floor	Communal heatin;	1	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 humidly touches the cold walls, mould grows.
	Windsor House	Windsor House	1-bed	Flat		Ground/Low est floor	v 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	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 opervironment.
	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 1	0 Yes - a lot					
	York Way Estate	Kinefold House	2-bed	Flat		Ground/Low est floor	v Electric storage heater				Point-of-use heater	Thermostat								5	5 No	Yes - bathroom only	Does not work correctly	Yes	Maybe	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 d 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 1	0 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 fars most of the time. This is due to large windows, which are nearing the end of their useful if e- several teak. 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	1	Middle floor	Communal heating	Communal system	L	1		Thermostat	1	ļ	L					6	8 No	Yes - both		No intern	et Maybe	al dont take part in online forums
	York Way Estate	Penfields House	3-bed	Flat		Middle floor	Communal heating	1	Combi gas boiler							No control				7	5 No	Yes - both		Yes	Maybe	di

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Retrofit London Housing Action Plan

July 2021 | Rev N





Introduction to the Retrofit London Housing Action Plan

The need to act now

The threat posed by climate change requires all levels of government to act with ambition and at pace if we are to combat and avoid its worst effects.

The London Councils Joint Statement on Climate Change demonstrated London local government's determination to act and established a series of stretching commitments on behalf of all 33 councils that strive for a level of ambition necessary to address the challenges we face.

A collective Action Plan

The Retrofit London Housing Action Plan sets out a path to achieving the first of these pledges: to bring forward a crosstenure home retrofitting programme in London that can there an average EPC B rating by 2030. It also further substantiates this by introducing a series of metrics to guide boroughs' retrofitting activity – including metrics on overall carbon emissions, space heating demand and energy use – to ensure the average EPC B target is achieved in a way that can fully realise London's ambitions to address climate change and alleviate fuel poverty.

Councils are uniquely placed to drive forward retrofit locally, both through acting on their own stock, and by utilising their local connections to residents, private landlords and housing associations to achieve a cross-tenure approach.

Significant benefits can be delivered

The benefits of the plan are substantial. Not only does the action plan provide a framework for achieving the commitments that all levels of government have to drastically reduce carbon emissions, it also provides an opportunity to grow the green economy, create thousands of new jobs and provoke innovation within the sector.

London can and should be at the forefront of this agenda.

This plan is ambitious; successful delivery will require coordinated and consistent action from local, regional and central government, as well as the private sector and other key stakeholders. Most notably, councils face significant funding constraints that present a barrier to the full realisation of this plan, while the wider policy challenges identified, such as in relation to planning, the cost of electricity and trades capacity, require a joined up approach to resolve.

By working collaboratively, the action plan can prompt the necessary step change in home retrofitting across London and support wider efforts to tackle the climate emergency.


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10-min summary

This section provides a high level summary of the Retrofit London Housing Action Plan. It explains why it was commissioned and where it sits in relation to the whole process led by London Councils to address the retrofit challenge.

The key principles which underpin the Action Plan and the list of recommended actions are provided.

More information on each of them can be found in the report.



Retrofitting London's homes is crucial

According to a recent poll¹, the overwhelming majority of Londoners (82%) are concerned about climate change, with 40% describing themselves as 'very concerned'.

In order to respond to their concerns and for London to play its part in mitigating climate change, retrofitting London's homes is crucial. Fossil fuel heating needs to be phased out, houses and blocks of flats need to become more energy efficient, and they should contribute to the generation of solar renewable electricity.

A daunting challenge, which we should address together

Each house and block of flats is different, and tenure is also a key consideration. And the retrofit challenge is happening at a time of huge essure on local authorities (e.g. limited budgets, building safety, etc.). Of knowing where to start, we may not retrofit our homes as the challenge seems too complex. It is not: by working together, London Froughs can make it simpler and address the different issues, one by one. This Retrofit London Housing Action Plan is seeking to articulate the actions needed to achieve this.

The aim of this project is to develop a pan-London, borough-owned action plan to determine the most effective suite of retrofitting measures to achieve the key target of average EPC B by 2030, incorporating a radical reduction in carbon emissions and a suite of other complementary targets, together with recommended actions in terms of delivery, skills, costs, funding and communication. The Action Plan looks forward to the ultimate aim of achieving Net Zero by 2050 at the very latest.

¹ What do Londoners think about Climate Change? Results from London Council's 2020 climate change polling, London Councils, 2021

Genesis of the project

The project is funded by London Councils, the London Housing Directors' Group, the Greater London Authority and the London Environment Directors' Network (LEDNet).

In December 2019, London Councils agreed an ambitious Joint Statement on Climate Change, which sets out the boroughs' approach to governance, citizen engagement and resourcing for climate change, as well as seven major programmes for cross-borough working.

In 2020, TEC endorsed a lead borough or boroughs for each of these programmes, who will be responsible for overseeing implementation of the action plan for each area:

#1 Retrofit London

#2 Low-carbon development (i.e. new buildings)

#3 Halve petrol and diesel road journeys

#4 Renewable power for London

#5 Reduce consumption emissions

#6 Build the green economy

#7 Creating a resilient and green London.

This project is part of Programme **#1 Retrofit London;** the lead boroughs are LB Enfield and LB Waltham Forest and it focuses on housing.

Overview of key challenges at each stage of the retrofit process

The Retrofit London Housing Action Plan will only be able to succeed if we are able to meet a number of key challenges.

Demand and take-up

Increasing the quantity of retrofit work being undertaken will support development of the skills and technology needed in London, with many benefits to the local economy beyond the core aim of reducing carbon emissions.

Many homeowners and landlords are currently unaware of what they can or should achieve with retrofit and they will not act until they are confident about what needs to be done.

Technical

Bery home presents a different set of issues. The possible solutions can be confusing and the relative benefits and risks are generally not well Inderstood by the general public. Reliable and accessible information is reeded if some pitfalls are to be avoided, with the reputational risk to the independent of the programme that significant failures could bring.

Finance

The plan has to recognise that individual homeowners and many landlords cannot afford to carry out a full retrofit of properties in a single phase, so a process is required which allows smaller steps to be taken which lead to the necessary ultimate performance.

London local authorities have limited means due to the considerable competing demands on their resources. Recent government schemes have increased the public funds available, but not yet to the level required, and private finance solutions are not yet widely available.

Delivery and supply

Once homeowners and landlords have decided what to do and when, they need to be able to call on a capable and reliable supply chain which will deliver the work to a sufficient level of quality.

Technical

- Retrofit often appears to be an excessively complex set of measures.
- Tenure adds another element of complexity.
- Retrofit can be over-simplified, leading to inappropriate measures and potential issues (e.g. moisture in walls).
- The risks involved in retrofit are not clearly identified and catalogued per measure.

Delivery and supply

- The customer/client journey is challenging.
- The choice often appears to be between (expensive) professionals or contractors lacking an overview or understanding of the end goal.
- Every new retrofit needs to manage risks on its own (e.g. procurement, heat pump installation and commissioning) instead of mutualising them.
- Planning is a very clear hurdle.

Costs/funding

- The costs of retrofit are high and the financial benefits can be unclear and uncertain.
- Energy cost savings are generally not a sufficient motivation.
- Running costs of heat pumps (including maintenance) are perceived as a concern.
- Application for grant funding is complex and uncertain.
- Procuring the services of an architect or a Retrofit Coordinator can be seen as expensive.

Demand and take-up

- Is my home emitting too much carbon? Can I significantly reduce its carbon emissions and put it on the right track towards Net Zero? It is difficult for Londoners to access responses to these basic questions.
- Finding reliable advice on what to do is also not straightforward.
- It is very difficult to determine the relevance of generic information and there is a clear need for more specific advice.

A structured approach to the challenge

This project is part of a wider process to develop the Retrofit London programme.

It has been informed by Parity Projects' data analysis summarised in the *London Councils: Pathways Report,* and includes some extracts of their analysis. It will form the basis of the Implementation Plan which will be led by Enfield and Waltham Forest.



A structured approach to the challenge

Working together on data, principles, this action plan and later the implementation plan helps to prepare and map out the next steps of this challenging and ambitious journey. We need to avoid paths which go in the wrong directions and focus on those which will achieve the ambition.



The eight key principles underpinning the action plan

Facing in the same direction

The plan is built around a set of core principles that apply to all boroughs and underpin all of the proposed actions.

It is important for the London boroughs and their partners, including GLA, to be aligned and therefore moving in the same direction, albeit at different speeds and with a varying focus, depending on the particular issues affecting each local area.

Those differences will create different emphasis and potentially altered priorities from borough to borough and even within individual boroughs. However, having a common set of over-arching coals will allow consistent policy to be set so the regional level issues such as infrastructure evelopment, workforce training and housing chality standards are clear and unambiguous to those businesses and other organisations who are vital to the successful delivery of the plan.

For investment in the significant costs of the work needed to be forthcoming, a clear set of aims is a vital first step.



Summary of recommended actions

Decisive steps forward

The key recommended actions of this Retrofit London Housing Action Plan are listed in the adjacent table, split by category:

- Retrofit measures and plans
- Delivery models, skills and supply chain
- Costs, funding and finance
- Engagement, take-up and lobbying

Some of them include more detailed activities and each action and activity is explained succinctly in this report. Together they represent decisive moves towards addressing the housing retrofit challenge in London.

The full list of actions and activities is provided in a parate spreadsheet which London Councils and the lead boroughs of Enfield and Waltham Forest an develop, add to and implement together with the other boroughs when this phase of the project has been completed.

It is important to note that **these actions cover all tenures**: social housing (including but not limited to councils' own stock), owner occupied homes as well as private rented homes. The following page identifies which actions relate to:

- The retrofit of councils' own stock
- Facilitation of retrofit for the rest of the housing stock in London
- Efforts towards developing and securing additional funding and support.

Retrofit measures and plans

- 1 Improve the building fabric 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 the 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, take up and lobbying

- 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 Develop and implement the Action Plan together

Summary of recommended actions

		Retrofit of councils' own stock	Facilitation of retrofit for rest of housing stock	Develop and request additional funding and support
1	Improve the building fabric of London's inefficient homes	•		
2	Develop a plan for retrofitting ventilation systems to improve health and air quality	•		
3	Electrify heat	۲		
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	•		
7	Review current maintenance programmes and identify retrofit opportunities	•		
Pa	Facilitate procurement of materials and services at a larger scale	۲	۲	
ge?	Enable planning to facilitate low carbon retrofit, including in Conservation Areas	•	•	
<u>ч</u> о	Develop retrofit skills actively across London	•	•	•
11	Set up a clear and consistent system to report and monitor progress (and success)	•	•	
12	Establish the cost of retrofit, business case and funding gap for the different tenures	•	۲	
13	Maximise capital finance for council-owned stock (and eligible homes)	•		•
14	Create a 'Finance for retrofit' taskforce with finance experts	۲	•	۲
15	Support the owner occupier and private rented sectors to leverage private investment		•	•
16	Social housing: engage with tenants, leaseholders and other registered providers	•	۲	
17	Engage with owner occupiers and the private rented sector		•	
18	Lobby central Government for more support, guidance and funding			۲
19	Continually develop and implement the Action Plan together	۲	•	۲

1.0 Introduction

Housing retrofit: importance, challenges and current initiatives

This section provides an introduction to the Retrofit London Housing Action plan.

It sets out why urgent action is needed, which objectives need to be achieved and what is currently happening in this area. It also identifies a number of current challenges.



The Retrofit London Housing Action Plan | Genesis and brief

The project is funded by London Councils, the London Housing Directors' Group, the Greater London Authority and the London Environment Directors' Network (LEDNet).

London Councils represents London's 33 local authorities. It is a cross party organisation that works on behalf of all of its member authorities regardless of political persuasion. One of its committees is the Transport and Environment Committee (TEC).

LEDNet is the membership association for London's Environment Directors.

London Councils' action on climate change

In December 2019, London Councils agreed an ambitious Joint Statement on Climate Change, that sets out the boroughs approach to governance, izen engagement and resourcing for climate change, as well as seven ajor programmes for cross-borough working.

In 2020, TEC endorsed a lead borough or boroughs for each of these ogrammes, who will be responsible for overseeing implementation of the action plan for each area:

#1 Retrofit London

#2 Low-carbon development (i.e. new buildings)

#3 Halve petrol and diesel road journeys

#4 Renewable power for London

#5 Reduce consumption emissions

#6 Build the green economy

#7 Creating a resilient and green London.

#1 Retrofit London

This project is part of Programme *#1 Retrofit London* and focuses on housing. It covers all tenures and not only council-owned stock. The lead boroughs are Enfield and Waltham Forest.

The Joint Statement on Climate Change commits boroughs to working together to retrofit London's building stock to an average level of EPC B by 2030. The aim of this project is to develop a pan-London, borough-owned action plan to determine the most effective suite of retrofitting measures to achieve our target of average EPC B by 2030 or another target which better conceptualises the level of ambition, together with recommended actions in terms of delivery, skills, costs, funding and communication.

Metrics and target

The issue of metrics and targets was discussed right at the outset of this project. It was agreed to go beyond the single metric of the EPC rating (which is only an energy cost metric) for the modelling undertaken by Parity Projects and complement it with additional metrics including kgCO₂ (for carbon), kWh/m²/yr (for energy efficiency) and connection to gas grid (for fossil fuel use). Each metric is accompanied by a target.

Net Zero is recognised as the ultimate goal, it has a legislative footing, significant political traction and is something which must inform the actions now. The risk of having the EPC B target as the key objective is that it may lead to decisions which would not be compliant with the Net Zero horizon we must now all work together towards.

Housing retrofit: the first priority to deliver shared climate ambitions across London

The climate emergency and Climate Action Plans

London local authorities have already committed to a strategic objective to retrofit all domestic buildings to an average level of EPC B. In addition, all boroughs have published or are in the process of developing a Climate Action Plan to address the climate crisis and achieve Net Zero.

Homes are responsible for around one third of London's greenhouse gas emissions and a quarter of them have the worst energy performance rating. The Climate Change Committee advises that that we need a near complete decarbonisation of homes, and that this should be achieved through low carbon heat to all but the most difficult to treat buildings.

The benefits of a Retrofit London Housing Action Plan

The retrofit and decarbonisation of London's housing stock can reward us with many other benefits, including: addressing fuel poverty, improving eople's health, benefitting air quality (a significant issue in London) and providing a significant source of jobs for the future and economic benefit. These themes are particularly relevant to a green recovery from Covid-19 and London's Green New Deal mission.

The concept of carbon budgets and what it means

Tyndall Carbon budget reports derive fair carbon budgets for the UK and its local authority areas from IPCC global carbon budgets for staying within a 2°C global temperature rise.

If London were to continue to emit CO_2 emissions at current (2017) levels, its entire carbon budget would be used **by 2027**. Total CO_2 emissions cuts must therefore average **-12**% per year to deliver a Paris aligned carbon budget. Achieving the sort of reductions needed will require an immediate and rapid switch away from gas for heating, the majority of which needs to be completed in the next 10 years.



The legal obligation for the UK to achieve Net Zero by 2050, the declarations of climate emergency of many London boroughs and the crucial role of housing justify the development of an ambitious Retrofit London Housing Action Plan (above: CCC Net Zero and Future of Housing reports, 2019)



Estimation of London's portion of the **remaining carbon budget** for staying well below 2°C global temperature rise. The number of years it would take London to **consume its entire carbon budget** at current emissions rates

Annual reduction in CO₂ emissions London should achieve on average to stay within its carbon budget.

Tyndall Centre carbon budget report for London in numbers. Figures relate to CO₂ from energy only and cover energy used by buildings and transport. *Decarbonisation of existing housing stock is a crucial action area.*

A common Net Zero horizon

Net Zero Carbon: What are we trying to achieve?

One simple way to translate the ultimate net zero carbon buildings ambition is to see it as the need to generate all of buildings' energy needs from renewable or nuclear energy sources. This will require a reduction in energy use coupled with an increase in renewable energy generation, as well as phasing out fossil fuels. It is now a legal requirement for the UK to achieve Net Zero by 2050 and a large number of London boroughs and the Mayor of London have set an earlier target.

No offsets

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The Climate Change Committee is very clear that the housing sector should not rely on carbon offsets/removals (e.g. CCS, afforestation) to achieve Net Zero.

det Zero operational carbon

Where possible, Net Zero operational carbon should be achieved on-site. This means that the total renewable energy generated on-site (e.g. through Solar PV) meets or exceeds the energy required by the building.

- Firstly energy use has to be reduced at the point of use.
- Secondly, all fossil fuel heating must be replaced with low carbon heat.
- Thirdly, **renewable energy generation should be maximised** on site, then provided as locally as possible unless there is a very valid reason not to do it¹.

Embodied carbon

This study focuses on greenhouse gas emissions associated with operational energy use only, not embodied carbon of materials. Embodied emissions are very important though and should be a key consideration.



Net zero operational balance

If we want the housing stock in London to achieve Net Zero, we must use have an objective not to use more energy than what can be generated by renewable energy onsite ideally or off-site if it is not feasible (Source: LETI)

6 steps towards Net Zero operational carbon (and associated metrics)

1	Low space heating demand e.g. kWh/m²/yr space heating demand
2	Low total energy use e.g. kWh/m²/yr Energy Use Intensity (EUI)
3	Low carbon heat (no fossil fuels) e.g. kgCO ₂ /m²/yr for heating system average for 2021-2050
4a	Maximise renewable energy generation on-site e.g. kWh solar energy generation/m ² building footprint/yr
4b	Maximise local renewable energy generation e.g. kWh in the borough
5	Energy flexibility e.g. Smart Readiness Indicator or kWh/m²/ energy storage
6	Reduced performance gap

The Retrofit London Housing Action Plan needs to consider these 6 steps for each home. What can be achieved at each of these steps will depend on the typology but they are all important if we are to achieve Net Zero. Possible indicators are provided above.

¹ Some buildings will not be able to generate sufficient energy on site to match their annual energy use, so we need to maximise generation on all buildings and then generate off-site, but locally. Net Zero balances across the country and in London in this case cannot always rely on solutions off-site. They often appear more convenient or cheaper but may not be so.

Housing retrofit in the context of the electricity and data revolution

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 explains the current energy revolution and the very likely electrification of transport and heat as the best strategy to move away from fossil fuels.

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 generation by 2050) and for demand 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 **o** our homes. Electric vehicle charging from homes will also create

The current disparity in cost between gas and electricity is an issue and is discussed in more detail in this report.

Data and knowledge

We come from a time when very little was known about each dwelling in London to one where data can really help us to understand the problem and address it. There is also a growing need (and demand) for information on each dwelling to be accessible and up-to-date to current and future residents. Building Renovation Passports can play a significant role to slowly develop this data on existing housing and capitalise on it.



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.



Recommended data inputs and outputs of a Building Renovation Passport and the benefits such a tool could bring to different sectors © Green Finance Institute

What is currently happening with home retrofit in London, and why it is not enough

There is no regulatory framework

Improving the energy efficiency of existing homes, moving away from gas boilers and installing solar PVs to generate electricity are not sufficiently supported by the current regulatory framework. In particular, it does not encourage enough whole house retrofit and heat decarbonisation and does not capture all opportunities or trigger points.

There is also no consistent and coordinated funding that covers all elements of the puzzle: fabric, heat source and renewable energy generation.

Supporting initiatives, while welcome, are still of a very small scale, and they often support individual measures rather than a whole-house approach. They have not yet reached the tens of thousands of homes required to start really building capacity.

As a result, there are not enough retrofits happening and their impact is By variable, Crucially, this does not support the required upscaling and upskilling of supply chains, not does it realise the job creation and retention potential a full retrofit programme could deliver If London were to wait for a sufficiently ambitious pational transworks to be put in place, it is likely that a large portion of its carbon budget would be used. This is one of the key reasons why this Retrofit London Housing Action Plan is required now. 100,000 80,000 60,000 40,000 20,000 0 20,000 20

The number of energy efficiency measures installed nationally is very low and has been declining (right - © The Guardian, using BEIS data).



Level of wall insulation achieved with past programmes compared with level required in London's zero carbon pathway (ARUP report, quoted in Mayor of London Zero carbon London - A 1.5°C compatible plan, December 2018)

Overview of key challenges at each stage of the retrofit process

If we want the Retrofit London Housing Retrofit Action Plan to have a positive impact, we need to be honest about what the key challenges are.

Demand and take-up

As individuals and organisations change their behaviour, it is very reasonable to think that more and more will want to retrofit their homes to contribute towards Net Zero Carbon. However, homeowners and landlords are currently unaware of what they can or should achieve with retrofit, partly due to weak regulatory drivers and the lack of robust data. This needs to be addressed if we want to switch the demand on.

Technical

Retrofit needs to be specific to each home and household: there is a technical complexity which can be simplified but not excessively so. This alance has not been achieved yet, leaving homeowners and landlords technical complexity which inappropriate recommendations.

-**`** Rinance

Most landlords and homeowners are not able to pay for whole house low carbon retrofit in one phase. A long term whole house renovation plan would address these barriers by identifying measures that can be implemented as part of a cohesive long term plan towards a clear end goal. They are however, also underlying funding issues: London local authorities have limited means due to the considerable financial pressures they are under, and the additional building safety improvements now required. Recent Government funding schemes have ramped up public funding, but not yet to the level required, and private finance solutions are not yet widely available.

Delivery and supply

Once homeowners and landlords have decided what to do and when, the next challenge is to facilitate access to a quality supply chain which would deliver part of the plan to a sufficient level of quality.

Technical

- Retrofit often appears to be an excessively complex set of measures.
- Tenure adds another element of complexity.
- Retrofit can be over-simplified, leading to inappropriate measures and potential issues (e.g. moisture in walls).
- The risks involved in retrofit are not clearly identified and catalogued per measure.

Delivery and supply

- The customer/client journey is challenging.
- The choice often appears to be between (expensive) professionals or contractors lacking an overview or understanding of the end goal.
- Every new retrofit needs to manage risks on its own (e.g. procurement, heat pump installation and commissioning) instead of mutualising them.
- Planning is a very clear hurdle.

Costs/funding

- The costs of retrofit are high and the financial benefits can be unclear and uncertain.
- Energy cost savings are generally not a sufficient motivation.
- Running costs of heat pumps (including maintenance) are perceived as a concern.
- Application for grant funding is complex and uncertain.
- Procuring the services of an architect or a Retrofit Coordinator can be seen as expensive.

Demand and take-up

- Is my home emitting too much carbon? Can I significantly reduce its carbon emissions and put it on the right track towards Net Zero? It is difficult for Londoners to access responses to these basic questions.
- Finding reliable advice on what to do is also not straightforward.
- It is very difficult to differentiate the relevance of generic information and the need for specific advice.

Climate justice and the need to help those in fuel poverty

ECO and the Green Homes Grant voucher scheme are not reaching fuel poor homes in London

Around 12% of households in London live in fuel poverty. London local government feels that ECO is not providing the capital with a fair share of funding from energy suppliers. Under the Green Homes Grant there have only been 2,894 applications by low-income households in London out of the more than 350,000 households currently in fuel poverty.

Directing the funding to those most in need

The Government's Fuel Poverty Strategy uses the EPC rating of the home as well as the household's income to define the problem and direct resources to those in most critical need of support. This approach leads to two potential issues: as residents move home, the calculation and therefore the availability of government support varies; and many of those fuel poverty in London are living in flats, adjacent to families who do not eccessarily meet the same assessment criteria and who therefore may not be access to the same support funds.

For retrofit work to progress reasonably consistently, it may be necessary to focus on the decarbonisation of the buildings and to address fuel poverty in conjunction (e.g. through financial support), instead of considering them as single issue.

A whole house approach will help reduce fuel poverty

Replacing a gas boiler with a heat pump without carrying out fabric improvements could, in some cases, lead to an increase in annual energy costs, which would be an issue for those already living in or close to fuel poverty. However, better energy efficiency, better ventilation and improved air quality as well as mitigation of overheating risks will all deliver better living conditions and health outcomes for the groups most at risk of fuel poverty – the very young and the very old. A whole house approach allows prioritisation of the measures carried out to be adapted to the means and needs of residents without compromising the ultimate aim.



Fuel Poverty in the UK affects all tenure groups.

(Source: BEIS Fuel Poverty Factsheet 2020 (2018 data))

Fuel Poverty Risk - based on Government published data drawn from English Housing Survey

The number of filtered properties that are located in LSOAs with the stated Fuel Poverty Risk %. For example 1842-718 properties are in an LSOA that has over 10% to 15% of the households expected to be in fuel poverty. N.B. If your properties are only a subset of the properties in the LSOA then you should not expect the % risk to directly apply to your properties as they may not be representative of the LSOA.



The map shows postcodes in LSOAs with a greater than 20% risk of fuel poverty. (Source: Parity Projects' London Councils: Pathways Report, April 2021)

Juggling priorities | Financial pressure, affordable housing, building safety, Covid-19... and climate change

A very challenging time for Local authorities

Solving the retrofit challenge is not a simple task. There are many interrelated factors, objectives, requirements, circumstances and constraints to consider. It also comes at a particularly challenging time for London local authorities:

- There are a number of obligations and priorities which all appear essential: providing more affordable housing, improving existing buildings to make them safer, recovering from Covid-19, etc.
- The financial means of local authorities have rarely been so limited. After 10 years of increasing financial pressure, London local authorities are in a much more challenging financial position than when they embarked on their Decent Homes improvement programme.

🖧 limate change action is crucial

Ye can be forgiven for not giving climate change the sense of priority and Ungency it deserves because other issues appear to be more immediate. Wever, not solving climate change will lead to very significant economic and democratic issues in the medium to long term.

For too long the complexity inherent in the retrofit challenge has also delayed real progress from happening. It is no longer an option to remain stuck and we must implement existing solutions and develop new ones.

Barriers must be viewed as an opportunity to innovate and creatively find solutions that deliver multifarious benefits.

Where does the issue sit within the wider system? What is it dependent on and what depends on it? What is complicit in supporting it as a problem, and what would need to happen for it not to be a problem any longer?

Only through investing time to explore questions such as these will solutions to persistent barriers and challenges be found.



Many London local authorities have to invest in building safety improvements for their own stock (Picture above: the Granville Road tower blocks in Childs Hill during recladding, Source: Google)

"We have to get to the point where each individual, each corporation, each community chooses low carbon, because it makes fundamental sense. It should become a no-brainer."

Christiana Figueres

Former Executive Secretary of the UN Framework Convention on Climate Change (UNFCCC)

Different typologies, different challenges

The challenges and opportunities are not the same

As we all know, the variety of different types of homes that exist across London is large. While we can arrange them into broad typologies, there will still be unique features of each building that will require attention. Two homes are rarely exactly the same.

Houses and flats

Houses typically consume the most energy and emit the most CO₂. They are also in some ways the easiest to retrofit. The owner or landlord will likely have autonomy over the measures chosen, space will likely be more easily found for a heat pump system (internally and/or externally) and the roof is likely to be suitable for PVs which can be directly connected. However, their large external area may require significant investment in Torofit measures to reduce overall energy use. On the other hand flats pically have lower heat loss: some flats may only have one external wall. Toplacing the gas boilers with a low carbon heating system may be more allenging though and opportunities for solar PVs more limited.

Building age

The age of the dwellings is another important factor. In general, older properties with solid walls and single glazing are very inefficient. Older properties also need to "breathe" to maintain the integrity of their fabric. Careful retrofit of the fabric of older properties therefore has a lot of potential to reduce energy. For more efficient dwellings it is possible that replacing the gas boiler for an air source heat pump with smart controls is all that needs to happen, or could be a viable first step.

Tenure

The type of tenure has a very significant impact on the opportunities and the incentives to deliver retrofit: not so much in terms of the types of measures applicable but on how they can be delivered. Owner occupied homes, social rented homes and those which are privately rented should be considered separately.



Detached houses vs flats.



Victorian terrace houses



Modern terrace houses

Good work is already taking place in London and we need to build upon it

Current initiatives from London boroughs

Virtually all London boroughs are developing good and best practice retrofit initiatives. These include demonstrator projects (both houses and blocks of flats), specific work on heat decarbonisation, renewable energy generation, demand flexibility, as well as more strategic initiatives on delivery, cost assessment and funding, stock assessment and modelling.

Existing research and guidance published by the GLA

A number of resources are available for homeowners and professionals, including the recent GLA reports on heat pump retrofit in London (2020) and on Building Renovation Passports (2021). In addition, the Retrofit Accelerator - Homes programme aims to help London boroughs and housing associations to develop energy efficiency projects at scale with Technical and commercial solutions.

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$\mathbf{\overline{R}}$ ational initiatives

- Policy proposals including measures for the private rented sector (requiring EPC C by 2030) and for mortgage lenders (requiring disclosure and possibly minimum EPC ratings for the stock they lend to).
- The Construction Leadership Council's draft National Retrofit Strategy placing local leadership and local delivery partnerships at its heart.
- Funding initiatives, including the Green Homes Grant Local Authority Delivery scheme and the energy efficiency local supply chain demonstration projects (BEIS): Six across England, including Parity Projects' Ecofurb in London.

Other relevant local initiatives and guidance

- Nottingham Deep Retrofit Energy Model
- Greater Manchester Combined Authority: People Powered Retrofit with
 Urbed & Carbon Coop
- UKGBC Accelerator Cities Programme, including the Retrofit Playbook.

Demonstrator projects

- Houses: Brent, Enfield, Lewisham, Newham, Richmond , Sutton, Wandsworth, Waltham Forest
- Blocks of flats: City of London, Enfield, Greenwich, Hackney, Haringey, Kensington & Chelsea, Redbridge, Richmond & Wandsworth, Sutton

Delivery, skills, supply chain

- Skills: Camden's stakeholder engagement event
- Energiesprong: Enfield, Haringey, Sutton
- Window manufacturing: Newham
- Parity Projects' Ecofurb

Above are examples of current initiatives on demonstrator projects and initiatives in the area of delivery, skills and supply chain by London Boroughs (as of April 2021)



A number of reports articulate the need and benefits of a more ambitious retrofit strategy (Above left: Retrofitting to decarbonise UK existing stock, RICS, May 2020) (Above right: Greening our existing homes: National retrofit strategy, CLC, December 2020)

It can be done!

The examples on this page demonstrate that retrofit has taken place successfully across a wide number of types and tenures.



Balfron Tower, Tower Hamlets



Grove Road, Hounslow Homes, Hounslow



Edward Woods, Hammersmith and Fulham



Adams Row(Listed) Grosvenor, RBKC



Artic Street, Housing Coop, Camden



Ernley Close, One Manchester Housing



Great Arthur House, City of London



Wilmcote House, Plymouth City Council



Channel Islands Estate, Enfield



Princedale Rd, Octavia Housing, RBKC



Culford Rd, Hackney



Akerman Rd, Lambeth Homes



Bloomsbury house (listed), Camden

2.0

Key principles

This section sets out the eight key principles underpinning the Retrofit London Housing Action Plan.

A consensus on them between the 33 London local authorities and the Greater London Authority forms the foundations of the Action Plan.



The eight key principles underpinning the action plan

Facing in the same direction

Laying the foundations for a successful collaboration between the London boroughs and their partners, including the GLA, is at the heart of this project led by London Councils.

It is important to move forward **together** and **decisively** in order to improve London's housing stock and put it on the right track to Net Zero.

The adjacent eight principles are considered essential to enable London local authorities to face in the same direction and move forward together. Some of them assume that London local authorities will receive additional funding, resources and idance from central government. Cach of them is explained on the following pages.



Boroughs need to act on their own stock <u>and</u> facilitate retrofit on the whole housing stock

Council owned stock

Boroughs have direct influence over their own housing stock which, on average in London, represents between 0 and 20% of all homes. This direct control creates the potential to deliver mass retrofit over the coming 10 years and beyond with aims closely aligned to the principles set out within this Action Plan. London local authorities can programme low energy retrofit as part of their ongoing maintenance programmes and by setting clear, measurable milestones.

Owner occupier sector

The owner occupier sector represents just over half of all homes in London. It is a very fragmented and diverse sector which include both pioneers and people with little desire or means to improve their homes. Retrofit should seen in the context of a very large home improvement market though, with trigger points providing key opportunities for retrofit (e.g. rental, sale, mange of use, extension, repair or maintenance work). London local thorities can help by raising awareness, making the planning process sier, increasing skills, providing certainty to the supply chain, helping administer retrofit programmes and facilitating access to knowledge.

Private Rented Sector (PRS)

The private rented sector is regulated through the domestic Minimum Energy Efficiency Standard (MEES) but is challenging as low carbon retrofit offers landlords little incentive to invest further. It is an important sector from an environmental and social point of view though, due to its weight in terms of carbon emissions and because it has a larger proportion of households living in fuel poverty and sub-standard homes than in the other sectors.

Mixed ownership

Ownership is often complicated by the distinctions of freehold and leasehold. Leaseholders within blocks or rows of terrace houses can significantly affect the ability to roll out retrofit. For private homeowners who are leaseholders, the terms of their lease may be a barrier to retrofit.



The bar chart above shows the relative proportions of dwelling tenures across London. While this has varied over time, the ratio has been stable for a number of years. Owner occupiers are the dominant category at a little over 50%. The private rented sector is next and the social rented sector is a close third (Source Housing tenure over time | Trust for London)



The UK's first Energiesprong project in Nottingham is an example to follow but it also highlights the problem which leasehold tenure can present in retrofit projects, undermining both the technical and architectural ambition here. For multistorey schemes, leaseholders can potentially block entire projects especially where the planned improvements are reliant on external re-cladding (© Mellus Homes).

Boroughs are vital in creating and shaping a stable and sustainable retrofit market

Known and trusted by local residents

The London local authorities are one of the few organisations that are known to all residents in the area, irrespective of tenure. Councils have opportunities to communicate directly with households, landlords and social providers and will have a central role to play in shaping the retrofit market in London.

Although levels of trust in Councils as a whole varies by community and location, Councils also represent trusted organisations and brands. Therefore information and guidance provided by the Council on home advice could be more trusted than from other sources.

Data and insights on local context and building stock

Councils have an intimate knowledge of local social and building context. Bis gives a solid foundation for planning an intelligent retrofit strategy corross housing in the area which is relevant to local people's lives.

Control over policy and local planning

Through the planning process and other policy levers London local authorities are, to an extent, able to incentivise and even mandate upgrades to housing. Although powers are limited this is an important part of encouraging retrofit.

A consistency and scale to steady the market

In the wake of the Green Deal, Green Homes Grant and lack of long term central government policy the retrofit market is very unstable. Councils are already a huge building renovation and maintenance customer, and can be a buffer for local trades and consumers by providing a consistent demand and clear requirements. There is a risk that the supply chain can represent a bottleneck and limit the ability to deliver retrofit in the short to medium term. Providing certainty that there is a sustainable retrofit market is a must for the supply chain to develop and London local authorities can play an important role in this.



Planning decisions and guidance should support low carbon retrofit

Working together across London and sharing expertise

There are significant opportunities for building conservation and climate change officers to work together to make sure that conservation and climate change can go hand in hand and that planning does not constitute an additional hurdle to well considered proposals. It would be particularly helpful if better guidance could be created for conservation areas that actively supported sympathetic retrofit measures.

Conservation of heritage and the planet

Greater London includes over 1,000 conservation areas and approximately 17% of all homes in London are in a conservation area. In some boroughs they represent the majority of the housing stock. They have to be addressed in order for these boroughs and London as a whole to achieve the ir climate ambitions.

The trofit work to historic buildings needs to be done with particular care and skills. This was stated in the Sustainable Traditional Buildings Alliance's Responsible Retrofit Guide and this principle has been adopted with the PAS 2035. Historic England's Heritage Counts 2019 and 2020 papers acknowledge the importance of retrofit within the world of conservation. Buildings need to be preserved from harm, not from change altogether.

There is significant potential for conservation of heritage assets to work in harmony with efforts to mitigate climate change. In particular:

- Retrofit is often part of a wider programme of repairs and upgrading, which increases the value and functionality of a building, making it more likely to remain valuable and well looked-after in the future.
- Low-energy retrofit does not only have energy, carbon and comfort benefits, it also limits the risk of under-heating by occupants worried about energy bills, and the associated risks of fabric degradation.
- Excessive restrictions may lead to 'rogue' works carried out without any regulatory oversight, with worse consequences to the asset.



Conservation areas (green) and listed buildings (numbers in red) represent a significant proportion of the London housing stock, particularly in the inner boroughs. They cannot be ignored if London is to meet its climate objectives. (© London Datastore)



There is a growing library of resources for responsible retrofit of traditional and historic buildings, including the above Sustainable Traditional Buildings Alliance (STBA) and Historic England guidance

Cumulative carbon is key

The Climate Change Committee (CCC) have been very clear that the use of fossil fuels must be eliminated in virtually all buildings by 2050 to achieve the legal obligation of Net Zero for the UK.

If we are also to meet our obligations under the Paris Agreement in limiting global temperature rises to no more than 2°C, a carbon budget approach helps to understand the impacts of the pace of change between now and 2050. They take into account the effect of cumulative CO_2 emissions in the atmosphere. 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 MtCO₂, and meeting the budget must not rely on carbon offsets.

Garbon budgets for London's homes

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We have used London's carbon budget to derive a carbon budget secifically for heating and hot water for London's homes which we estimate at 54 MtCO₂. This helps us understand the impact gas boilers in existing homes are having on achieving carbon budget targets.

We know that in 2019, gas boilers in London's homes emitted 7.3 MtCO₂. The graphs on the right show annual emissions in orange, and cumulative emissions equal to 54MtCO₂ in the pink shaded area. We can see in scenario 1 that if no action is taken to remove gas boilers and replace them with low carbon heating until 2030, all the carbon budget for heating homes will be consumed by 2027. On this pathway, homes are practically zero carbon by 2040, but they have exceeded their carbon budget by more than 100%. This pathway is therefore not Paris compliant.

Scenario 2 shows a gradual but highly ambitious programme of boiler replacement. This could enable the carbon budget to be met, but virtually all boilers in existing homes would need to be removed by the early 2030s.



... and hydrogen is unlikely to be the answer

A growing consensus

Our team analysed recent publications relevant to the potential role of hydrogen in heating homes in the future and discussed it with several experts in energy and buildings. The growing consensus is that hydrogen is unlikely to play a significant role in the short to medium term (if at all) for this purpose. It is an important issue, as a strategy relying on hydrogen could prove to be flawed when it is already too late to switch to other solutions. It would therefore be a risky decision for London local authorities which may prevent them from achieving their climate change obligations.

Costs will be (very) high

Re-using the existing gas grid network into and within London and turning it into a 100% hydrogen network is not possible without major upgrades. The costs of this combined with hydrogen generation costs and the placement of all gas appliances into hydrogen-ready ones will be very Significant. It is unclear why private investors or the Government would in ance this major undertaking when renewable electricity distribution pears comparatively much more attractive and less risky.

The Climate Change Committee view

The Committee on Climate Change sees a limited role for hydrogen where 'electrification reaches the limits of feasibility and cost-effectiveness'. In practice, this is likely to mean industrial heat, top up heating for some buildings on very cold days, back-up power generation and heavy-duty vehicles. This view is based on a maximum practical capacity to produce up to 44TWh of hydrogen a year by 2050, less than 10% of current gas consumption in buildings.



A number of independent reports suggest that hydrogen is likely to have a very limited role (if any at all) to heat our homes (the above examples are from the Fraunhofer Institute, the International Energy Agency and LETI)

'Blue hydrogen' is unproven and not carbon neutral

Hydrogen is currently produced via four methods, three of which require a fossil fuel feedstock to create 'blue hydrogen' with inherently high emissions. Carbon capture and storage (CCS) is therefore required to reduce emissions (60-85% relative to using natural gas) but economically viable CCS at scale for this purpose is unproven.

Heat pumps are 5 times more efficient than 'Green hydrogen'

'Green hydrogen', produced via electrolysis powered by very low carbon sources of electricity such as renewables and nuclear, offers a more plausible route to create genuinely low carbon hydrogen. However, it is more efficient to use electricity directly for heating and hot water instead of turning it into hydrogen and burning it in boilers. Using renewable effectricity to power heat pumps is 5 times more efficient. Using electricity Wirectly or via heat pumps) is also safer with no risk of explosion.

drogen is more flammable, has a faster flame rate and burns hotter than natural gas. The first two make it more risky in terms of accidental explosion, especially if it is used in cooking hobs and the last means the flame is generally invisible in daylight so, again in cooking applications, more likely to cause accidents. The smaller molecule size means it is also more likely than natural gas to leak from normal pipework, including through valve seats. More explosions and burn accidents are likely if we switch to hydrogen. Electricity would be much safer.



'Blue hydrogen' is produced from fossil fuels. Carbon capture and storage (CCS), yet unproven at scale, is then required to reduce emissions (© LETI)



Heat pumps are a much more efficient way to use electricity generated by renewables than 'green hydrogen' (© LETI)

Achieving Net Zero will require energy efficiency and carbon data/metrics in addition to EPC ratings

The EPC rating is not the right metric for climate change

There are several reasons:

- It is an energy cost indicator: the current A to G ratings and the associated SAP scores are energy cost indicators, not energy use or carbon indicators.
- The recommendations to improve an EPC rating can be misleading: The continued use of gas boilers is incentivised with a system based on the improvement of an EPC rating, as gas remains cheaper than electricity despite now being a higher carbon energy source.
- It does not cover all energy uses by the home: EPCs only cover part of the dwelling energy use (i.e. the 'regulated' part) and therefore do not form the 'whole picture' of home
- It cannot be measured: an EPC rating cannot be checked by the home/building owner or local authority against in-use energy.
 It is not accurate: studies indicate a relatively small difference in a

It is not accurate: studies indicate a relatively small difference in actual energy use between different EPC ratings, suggesting that bringing all homes to a particular EPC rating may actually achieve little in practice.

We recommend the following additional metrics

These metrics are already collected and/or can be readily calculated:

Carbon emissions in $kgCO_2/m^2/yr$. If Net Zero carbon is a key objective, a carbon indicator is required which takes into account the carbon impact of all home energy uses and the need to transition away from gas and other fossil fuels. This should be based on long-term carbon factors (e.g. 2038).

Space heating demand in kWh/m²/yr. Heat demand is a major challenge in existing homes and a key opportunity in terms of retrofit. It is an energy efficiency indicator and also links to comfort, health and wellbeing.

Total energy use (Energy Use Intensity - EUI) in kWh/m²/yr. This is independent from changes to the energy system and prices, is easy to understand for consumers, enables a direct feedback loop from metering, and allows comparisons between dwellings.



Analysis of recommendations on all EPC certificates in the UK: this clearly illustrates that the current system is not fit for purpose to put the existing housing stock on the right track towards Net Zero. For example, the installation of a heat pump is never recommended, which is partially due to the current nature of the EPC rating: a cost indicator rather than an energy efficiency or carbon metric (Source: UCL)



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.

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Changing to low carbon heat is an urgent priority

In the UK, electricity per unit currently costs, on average, significantly more than mains natural gas so the shift to low carbon heat could potentially create an overall increase in energy bills for most residents in existing homes. Energy bills can form a substantial part of household expenditure, it is therefore critical that the move away from fossil fuels is managed with particular consideration for low-income families.

In order to enable an early switch to low carbon heat sources, there should be a clear focus on reducing energy demand, especially in low-income homes and specifically to the extent that the switch to a low carbon heat source will not substantially increase annual fuel bills.

Minimising disruption to residents

w carbon heat sources such as heat pumps work at lower operating mperatures than gas boilers, so in some cases (not all) the radiators may not be large enough to keep the rooms warm on the coldest days. If all the radiators or even pipework in homes have to be replaced, the cost of the work and the disruption to residents will be far greater than simply swapping over the heat source.

In order to enable an early switch to low carbon heat sources, improvements to the fabric of homes need to be carried out for these homes to reduce the peak heating demand sufficiently to avoid the need for major changes to the installed heating emitters, and a whole house approach is important and helps to enable this.

Access to Time of Use (ToU) electricity tariffs-

The cost of electricity is variable, far more so than the cost of mains gas for domestic customers. The lowest cost tariffs can greatly reduce the margin of difference between gas and electric heating costs, but these are generally only available to consumers who have smart meters. Therefore, the roll out of smart meters across London is a key facilitator for low carbon retrofit.



Indicative annual energy cost for an average home in London (82m²) based on an existing space heating demand (assumed to be approx. 160 kWh/m²/yr)

- 1. With high existing space heating demands, a direct swap from a gas boiler to an ASHP leads to a relatively poor efficiency for the heat pump and consequently an increase in annual running costs (assumes a coefficient of performance (COP) for heat pump of 1.7)
- 2. Changing the fuel tariff without improving the fabric to a minimum helps to reduce heating costs but is not sufficient to reduce costs below those of the current gas boiler (assumes COP for heat pump of 1.7)
- Reducing the space heating demand to around 100 kWh/m²/year reduces fuel consumption and improves the efficiency of the heat pump in operation-(assumes COP for heat pump of 2.0)
- Direct electric space heating will only be realistic where substantial fabric improvements are possible or fuel cost subsidies can be paid to residents.

Maintenance and replacement will create opportunities

Routine maintenance will create natural trigger points to implement elements from the Retrofit London Housing Action Plan (e.g. change of heating system due to the existing system reaching the end of its life, internal insulation and ventilation works made easier for a void property etc.). It is particularly important to seek synergies between this Action Plan and the current maintenance and replacement programmes in order to make the most of these opportunities and minimise disruption for the residents. This would also greatly help to minimise costs as they would only represent incremental costs. This Action Plan is doomed to fail if it is not integrated and is instead seen as a separate set of requirements.

Review existing maintenance budgets now

Management and maintenance budgets should be reviewed and need to gign with the Retrofit London Housing Action Plan, to ensure existing anned works do not lead to repeated costs.

work going forward should ideally be compliant with this Action Plan and, more fundamentally, not do things which add to the problem. For example, gas boilers are not compliant with a Net Zero pathway and should now be replaced with low carbon heating systems generation and not gas boilers, which would lead to new retrofit costs in the future to meet the Net Zero carbon target.

Cost uplift

In order not to artificially inflate the cost of retrofit, it is useful to consider some of them as a simple cost uplift and measured above existing budgets for routine management, maintenance and replacement work. For example, re-rendering a wall or building safety works is an ideal time to apply external insulation and would mean the actual extra costs are just the additional insulation material and labour to secure the insulation to the wall.



A number of gas boilers are coming to the end of their lives each year and their replacements are already covered by long term replacement and maintenance plans. We recommend a review of these plans and budgets in favour of low carbon heat.



Scaffolding is a large part of the cost for replacing glazing. By including window upgrades as part of routine maintenance and upgrade work, costs can be minimized.

The 33 London local authorities are all different from one another. However, in the context of the retrofit challenge across London, those differences are relatively small compared to what they have in common and most importantly a stock of housing with strong similarities. Our engagement workshops with different boroughs confirmed the fantastic opportunities for collaboration to minimise complexity, risks and costs.

A shared desire to learn

London local authorities have been undertaking retrofit for a long time and a large number of them are very experienced in particular programmes (e.g. external wall insulation). Others should capitalise on this knowledge instead of going through the same learning curve. Heat pumps represent a new area which would benefit from shared knowledge and experience.

Deportunities for collaboration and efficiency

order to achieve the retrofit objectives of this Action Plan a number of w activities need to be developed, from the aggregation of demand to mmunication activities with residents. Collaboration would not only make these tasks easier, it would also make it much more efficient if one London borough was to take the lead, assisted by a few others but for the benefit of all. At a time of pressure on resources, this would be helpful.

The need for joint advocacy

London local authorities and the GLA need help from the Government: articulating their common needs increases the chance of them being heard and securing additional resources, funding and support.

Collaboration with the wider eco system

Transition networks, NGOs, building professionals (architects, engineers, builders, suppliers) and the finance community all have a role to play to meet the retrofit challenge. Working together, including in innovative ways, is our best chance of solving the climate crisis.



A lot of exemplar retrofits already exist across London. There is every reason for London local authorities to learn from them (and from new ones) together instead of each doing their own demonstrator project.



Engaging with Londoners, and in particular with local community and transition groups is essential to engage with other types of tenure, and particularly home owners. The example above is the pop-up space created by Camden Council which hosted a large number of events over a 6-week period on the climate emergency. This included events on retrofit.

3.0 What should be done:

Retrofit measures and plans

- Lessons learnt
- Key retrofitting measures
- Mapping out each building's retrofit journey
- Key archetypes
- Whole house renovation plan templates



Summary of recommended actions in this area

2

4

5

6

The key recommended actions and activities in terms of **retrofit measures and plans** are listed in the adjacent table.

Each action/activity is explained succinctly in the following pages.

The full list of actions and activities is provided in a separate spreadsheet which London Councils can develop and add to when this phase of the project has been completed.

Retrofit measures and plans
Improve the building fabric of London's inefficient homes
Activity 1.1 > Analyse current characteristics and levels of energy efficiency of the housing stock
Activity 1.2 > Set an energy efficiency target for each home
Activity 1.3 $>$ Enable windows upgrades and no more single glazing in London by 2030
Activity 1.4 > Drive better External Wall Insulation (EWI)
Activity $1.5 > \text{Reach a London wide consensus on acceptable Internal Wall Insulation (IWI) solutions}$
Develop a plan for retrofitting ventilation systems to improve health and air quality
Electrify heat
Activity $3.1 > Undertake a stock analysis of heating systems$
Activity $3.2 >$ Establish the most appropriate future low carbon heating system for each home
Activity $3.3 > $ Stop the replacement of gas boilers with gas boilers
Activity 3.4 $>$ Enable a heat pump roll out at scale
Activity 3.5 > Develop clear guidelines/requirements to 'get heat pumps right'
Activity 3.6 $>$ Review the carbon impact of heat networks and focus on sustainable connections
Activity $3.7 > Develop$ a specific strategy for buildings heated by direct electric
Activity 3.8 > Work with District Network Operators and utility providers on electrification of heat
Deliver smart meters and demand flexibility (controls, storage) in retrofitted homes
Increase solar energy generation on London homes
Map out each building's journey towards lower energy costs and Net Zero
Activity 6.1 $>$ Develop whole house retrofit plan templates for key building archetypes
What are the key home retrofit measures?

Energy efficiency improvements

The existing London housing stock is amongst the least efficient in Europe. Improving the fabric by changing single glazed windows to double or triple glazed ones, insulating walls, roofs and ideally floors, reducing unwanted air leakage and retrofitting Mechanical Ventilation with Heat Recovery (MVHR) are the key measures to reduce space heating demand and improve energy efficiency. The level to which these measures should be implemented (i.e. shallow or deep retrofit) depends on:

- the **opportunities**: whether it is technically easy or challenging (including conservation constraints)
- the level of improvement required to avoid a significant increase in heating costs with the switch to low carbon heat.

w carbon heat and no more fossil fuels

The main objective of the Retrofit London Housing Action Plan should be the accelerate the move away from gas boilers towards heating systems ring electricity. Heat pumps should be the priority as they use electricity efficiently to generate heat but direct electric heating and hot water may be acceptable in a very efficient home. Hybrid solutions with a mixture of direct electric and heat pumps are also possible. Households not served by mains gas should remain off-gas (with funding for other measures). Heat networks may have a role to play but they will have to provide a sustainable source of low carbon heat with a Net Zero compliant plan.

Demand flexibility for a smarter London electrical system

Energy storage (e.g. hot water tank) and smart controls will play an important role in integrating homes into the wider energy system.

Solar PVs

We need to increase solar energy generated in London to reduce carbon emissions and balance energy use. Many homes have a significant roof space and residents can directly benefit from this electricity.



What did we learn in the last 30 years?

The importance of whole house thinking

Early retrofit projects tended to focus on single measures driven by funding opportunities. Projects often lacked any strategic and building specific design input and there was no evaluation at the end of the process. The results were often undermined by unintended consequences and there was no feedback loop for developing better practice.

Following the Each Home Counts review it was recognised that successful retrofit relies on a structured process including adequate assessment, design, installation and monitoring to feed back into future work.

These principles as well as the idea of whole house thinking and the role of retrofit coordinators have fed into the creation of PAS (Publicly Available Specification) 2035, the UK's first retrofit standard. Adopting PAS 2035 on projects adds some costs but also, very importantly, value and quality. It is prevented a requirement of central government funded projects.

The diagram alongside illustrates a more mature approach to retrofit where design and post installation learning are built in.

® N How far do we go with energy efficiency?

Opinion has varied on how far to go. Schemes like Green Deal set no metric but used 'pay back rules' which tended to undermine whole house thinking and quality. Standards such as EnerPhit may be too rigid and may also risk leading to very high cost.

A consensus is now emerging that whole house plans en-masse should lead to a medium space heat demand (on average) alongside the electrification of heat. These are considered the two key objectives for reducing carbon emissions associated with homes.

This Action Plan has aimed for a 'sweet spot' in terms of a space heating demand of 65 kWhr/m².yr on average as a way of optimising risk and cost. We envisage a bandwidth of 20-120 kWhr/m²/yr (depending on the building type and its retrofit constraints) within which homes should be encouraged to go as far as possible while avoiding technical risks.



Diagram from Retrofit Academy training showing how the retrofit process should work and how retrofit coordinators should help facilitate this.

Action 1 Improve the building fabric of London's inefficient homes

Parity Projects' Pathway report for London Councils summarises their data analysis for London's 3.78 million homes spread across 33 boroughs. The interim target assumes that 50% of these will receive fabric measures and the Net Zero target will require fabric measures to 100% of homes.

Fabric efficiency

As heating demand represents over 60% of the energy use within UK homes, intervening with the building fabric to reduce this has been long recognised as an essential means of reducing energy use and the resultant carbon emissions. London's housing stock (like that across the UK) tends to be relatively old and therefore typically lacks high levels of insulation and air tightness.

Parity Projects have concluded that the average SAP score for London Tomes is around 63 and the table alongside from their report shows the Stribution of EPC bands where C, D and E dominate. The interim target Tomes to achieve an average EPC rating of B. The graphs indicate the scale challenge in reaching that target.

Space heating metric

One of the findings from the workshops held during this project was that EPC ratings have a limited value with regard to expressing fabric efficiency.

Parity Projects have therefore used an average space heating target of 65 kWhr/m²/yr as a target (for 30% of homes) as a means of reaching EPC B average (interim target). This target is less than half of the current inferred average space heating demand of between 130 and 150 kWhr/m²yr and clearly demonstrates the step change needed in fabric efficiency.

We recommend that, alongside EPC ratings, space heating demand is used as a more suitable measure for fabric efficiency. The target of 65 kWhr/m²/yr may provide a useful average target.

The following pages summarise the recommended activities to achieve it.



This pie chart illustrates the relative energy use within the UK housing stock in 2019. Heating is the dominant element and needs to be reduced significantly (Source: ECUK table U3)

No. properties by	SAP band		Band	Range	96		200K				
A 21			A	92 Plus	0.0%		1504				62.83
8 95,764			в	81-91	2.5%	-	1506				45.08
c	1.043.763		C	69-80	27.6%	ti-la	100K				95% above this score
D		1 926 657	D	55-68	50.9%	C d					33.08
	0.00	1020/037	E	39-54	17.0%		50K			16	99% above this score
L 04	44,000		F	21-38	1.6%						
58,836			G	0-20	0.3%		OK -	0	50	100	
G 11,783								10	SAP Score		

This table shows the EPC scores of London homes at present. Note the very low number of homes EPC B or better, and the large numbers of C,D and E rated properties.

Source: Parity Projects London Councils Pathway Report



This table shows the current performance of London's existing housing stock across key KPIs Source: Parity Projects London Councils Pathway Report

Action 1 Activity 1.1 > Analyse current characteristics and levels of energy efficiency of the housing stock

Each borough needs to review its own stock in greater detail and evaluate the current levels of fabric efficiency and how they can be improved. The Parity Projects report gives a breakdown of the number of homes that have specific characteristics, such as cavity wall insulation or single glazed windows. The model also provides a breakdown of those property characteristics by tenure. Using this data will allow London local authorities to understand the types of work most widely required in the area by tenure type, so plans can be put in place, for example to replace single glazing in all socially rented homes by a defined date.

Considering borough specific opportunities and constraints

Each borough has particular constraints and opportunities which should be evaluated alongside the fabric characteristics.

To rexample, in an area where homes with single glazing are redominantly in buildings with high conservation status, the work equired to replace the windows is likely to take longer and cost more. In apother area with most homes of relatively modern construction, a strategy for the roll out of External Wall Insulation will be easier to develop.

Towards a Retrofit Action Plan for each Borough

Using BEIS data on energy consumption by postcode together with council tax records for average home sizes, it will be possible to see where the worst performing homes are relative to the general target of 65kWh/m²/yr space heating demand and with local knowledge of the stock analysis of fabric characteristic, local constraints and opportunities, form a priority plan for the type of work needed.



Breakdowns of specific property characteristics. (Source: Parity Projects' Pathways report for London Councils)

Postcode	No. of meters	Consumption (kWh)	Mean Consumption (kWh)	Median Consumption (kWh)
W3 6HF	41	615302.7	15007.38	12097.92
W3 6HG	11	161583.6	14689.42	16655.79
W3 6HH	21	417876.4	19898.87	18794.26
W3 6HJ	8	183917.9	22989.74	18248.27
W3 6HL	5	170695.4	34139.07	25512.36
W3 6HN	36	767059.3	21307.2	20439.17
W3 6HP	17	357622.2	21036.6	17264.09
W3 6HR	42	954442.1	22724.81	20719.09
W3 6HT	5	45115.73	9023.145	9839.763

BEIS have begun to publish energy consumption data by postcode (see. extract above. This data can be cross referred to council tax and other records for each postcode to establish an approximate rate of energy consumption per m². Comparison of these figures will provide an indication of the average performance of homes and fuel poverty risks.

Action 1 Activity 1.2 > Set an energy efficiency target for each home

Setting an average space heating demand target

The modelling that Parity Projects have carried out was based on an average target space heating demand of 65 kWhr/m²/yr, which is around half the current average. Further stock review by boroughs proposed in activity 1.1 will help each establish more clearly how energy efficiency, decarbonisation of heat and renewable energy can be woven together optimally to achieve Net Zero in the long run. Reductions in any one of these categories will need to be met by increases in others.

As heating dominates the energy consumption in the domestic sector, setting an energy efficiency target at a city and borough wide level will help inform high level strategic thinking as well as house by house retrofit

Influencing factors which will affect fabric efficiency targets are:

- 1. Planning considerations/restrictions
- Managing technical risks such as moisture
- Approach to decarbonising of heat

1. Planning considerations/restriction Managing technical risks such as n Economics constraints Approach to decarbonising of hea Setting a target for each home

As well as deciding on an average space heating target, boroughs should consider that there will be a 'bandwidth' around this average, where some homes fall short and others can exceed the target.

For some homes such as detached properties that also have technical or heritage constraints, achieving the 65 kWhr/m²/yr target will be challenging. For others, such as flats with fewer constraints on fabric options, it will be possible to get well below 65 kWhr/m²/yr.

It will be important for boroughs to take advantage of the potential for doing better where possible in order to achieve the target on average. Otherwise there is a danger that the average target becomes the aspiration and that more homes fall short than exceed this aim. Retrofit works are also generally disruptive and expensive, it makes sense to take all opportunities when works are carried out, to maximise the added value from the works and to limit additional disruption and costs in the future.



A key measure of building fabric performance is the overall space heating demand.

Lower space heating demand reduces the energy required and also facilitates the use of low carbon heat systems.



To maximise the value of retrofit, for residents and at the system level, it makes sense to maximise the opportunities created by the works by 1) producing a plan for the home to achieve Net Zero 2) ensuring works allow heat decarbonisation but are "Net Zero ready", so it only needs to be done once (example of iSFP step-by-step plan from Germany)

Enabling low carbon heat

Setting a minimum performance level in terms of space heating demand is also necessary to enable the switch to low carbon heat.

It would limit the impact on energy costs. The Carbon Trust's recent report for the GLA, *Options appraisals for heat pump retrofit in 15 London buildings* shows a threshold of space heating demand at around 80-100 kWh/m²/year, above which fabric improvements are necessary when the heat source is changed for annual heating costs to be equivalent to or less than current gas costs¹. As an interim step in a phased whole house retrofit plan, reaching this value is the point at which the heating system can be switched to a low carbon energy source, away from fossil fuels, even if further improvement works are to be carried out later to reach an even lower space heating demand. It also makes it possible for the residents to the switched to a low carbon the switched off, the home retains warmth retrofits a switched off, the home retains warmth retrofits the point at when the heating is switched off, the home retains warmth retrofits for longer.

would enable efficient heat pump operation. If the heat pump has to Produce high temperature hot water in order to ensure the home is kept warm because heat emitters are too small, the running costs will increase as the heat pump efficiency drops.

Radiators could be kept, minimising disruption and costs. The result of a change to heat pumps can be an effective drop in output of up to 60%. In practice, radiators are often oversized though so it should not be a problem but it should be checked and may have to be compensated by energy efficiency measures.

It would limit power peak. The UK power network is undergoing significant upgrades to support the switch to electrical heating and electric vehicle charging. Even so, the generation capacity of the system cannot be infinitely increased.

¹ Please note: the report was not designed to establish this value and further, more direct studies may provide a more accurate or an adjusted value for this threshold.



The Carbon Trust's recent report for the GLA, "Options appraisals for heat pump retrofit in 15 London buildings", showed that for 7 of the 11 properties studied, fuel bills are not increased when a heat pump is introduced with no fabric improvements.

These were generally the properties with an EPC of C or better. That analysis suggests that, with no other measures, a significant number of homes could immediately swap from fossil fuel to low carbon heat with no, or effectively no, fuel cost increase.

Borough	Туре	Floor	Heating	EPC Rating &	Fuel Costs		
		(m ²)	luei	Kvvii/iii-/ yi	Current	Forecast - no fabric changes	
Camden	Ground Floor Flat	49	Gas	C 69	£302	£311	
Barnet	Mid Floor Flat	75	Gas	B 26	£245	£218	
Lambeth	Ground Floor Flat	53	Gas	C 74	£294	£276	
Wandsworth	Top Floor maisonette	114	Gas	D 105	£800	£949	
Hillingdon	Terraced House	60	Electric Boiler	C 66	£895	£342	
Southwark	Semi detached House	93	Gas	C 72	£402	£396	
Croydon	Detached House	133	Gas	D 123	£823	£1101	
Newham	Terraced House	94	Gas	D 94	£823	£741	
Lambeth	Terraced House	142	Gas	E 156	£952	£1,133	
Greenwich	Block of Flats	5700	Gas - Communal	C – E 116	£27,618	£37,459	
Enfield	Block of Flats	2900	Electric Heating	C – E 52	£32,584	£11,849	

Action 1 Activity 1.3 > Enable windows upgrades and no more single glazing in London by 2030

400,000 homes in London still have only single glazed windows and more generally the Parity Projects analysis suggests that window and external door upgrades are required to 1.5 million homes. This represents a large carbon and relatively easy carbon saving and home improvement opportunity. A window upgrade might be part of phase 1 of a whole house retrofit plan for many homes and it is likely the energy savings and peak heat demand reduction from window upgrades may also enable many homes to be 'heat pump ready''. These two measures together, driven by roll out efforts for both, could significantly accelerate and enable a pathway towards Net Zero. London could become the first city in the UK to have a 'No more single glazing' target.

Aesthetic quality

The of the barriers to large scale adoption of better windows are aesthetic and heritage considerations. This has certainly restricted works to listed wildings and in many conservation areas. High quality double, triple and accuated glass now offer aesthetically compatible options for all building pes. Secondary glazing also has its place especially for historic buildings.

Quality installation

While the quality of glazing and windows has transformed over the last decade, the quality of the installation has not necessarily kept pace. Very few installers practice good airtight installation techniques. This skills gap needs to be addressed as part of any push on window replacement, in order to avoid a performance gap.

Embodied carbon

It is recommended that the window choices should be carefully considered in order to maximize energy and carbon saving over time and avoid a large embodied carbon impact, either as a result of short lifespan or inherent high embodied carbon.



Initial data out from Parity indicating that 40% of the stock require window/door upgrades – 11% of homes require window upgrades from single glazing.



An example of a house fitted with various enhanced glazing. New double-glazed sashes on the second floor, secondary glazing to the first and new double glazing into old frames on the ground.



Air tightness . An important but still undervalued aspect of window installation

Action 1 Activity 1.4 > Drive better External Wall Insulation (EWI)

External Wall Insulation is easier than Internal Wall Insulation

It is tempting to assume that External Wall Insulation (EWI) can be avoided, and that Internal Wall Insulation (IWI) is always easier. It is not the case: IWI can be much more disruptive for residents, reduces available floor space (making it more challenging in terms of residents' support) and introduces energy efficiency and technical risks which are easier to manage with EWI. For blocks of flats, difficulties in securing all residents' support IWI may prevent it from happening altogether.

EWI and reputation

The early roll out of EWI within the UK under schemes like CESP and ECO has resulted in some poor quality work, both technically and aesthetically. One of the consequences of that is an increased resistance to EWI within a Tomber of local authority planning departments, especially to buildings which were originally brick faced. EWI has to be designed with great care relation to fire standards and building safety as well as moisture, but there are successful examples. Concerns about combustibility may be a concerns about combustibility may be a moisture to take up and must therefore be addressed.

Encouraging better EWI

Parity Projects' modelling has shown that EWI will be needed at scale (**up to 30% of homes**). It is likely that mid rise blocks of flats will be a key typology requiring this sort of thermal upgrade. Rather than restricting EWI there is the possibility for London local authorities to promote better designed approaches to the use of EWI. The examples shown alongside demonstrate how the use of color and relief can create visually engaging and pleasing elevations.

This does require design and some additional work on site. Quality work might cost a little more but the results can match and even better the existing elevations.



Dallas Road Estate, Lewisham The architecture of this housing block was transformed in a positive way by the use of grey coloured render that forms the backdrop to colourfully painted architectural detail.



Southwark Park Estate The use of colour and pattern to the render of this block has successfully replicated some of the originally features and has lifted the feeling of the whole.



Munich. Housing block renovation. The uses of relief, variation in tone as well as texture makes this attractive elevation feel as though it has always been this way.



Springfield Garden Charlton Originally a brick faced series of blocks, the use of colour raises the quality of this cladding above the light white grey so often seen.

Action 1 Activity 1.5 > Reach a London-wide consensus on acceptable Internal Wall Insulation solutions

Delivering Internal Wall Insulation at scale

Parity Projects' modelling suggests that as much as **35% of dwellings** will require Internal Wall Insulation (IWI). The IWI market has remained much smaller than the EWI market due to the disruption involved with installing it and possibly due to perceived risks around it, including those associated with moisture. Tenants frequently refuse to consent to IWI installation due to the substantial disruption caused. Achieving the required scale of IWI will require engagement with residents but also a specific approach to how to address two key risks together: moisture and fire.

Addressing moisture and fire risks together

It is commonly accepted that the risk of moisture problems is higher with IWI due to potential for moisture trapping to take place at the Will/insulation junction. A consensus is also developing that moisture open sulations may be the safest generally and especially in historic buildings, which often rely on moisture open fabric to manage these issues. Well as moisture risk and following the increased scrutiny on building safety, there is an onus on local authorities to consider the fire safety of all types of applied insulation. With the exceptions of mineral wool and some recently developed insulating plaster products, all insulants are, to some

degree, combustible. Generally, IWI is covered with a non-combustible layer of plasterboard or a wet applied plaster coat. While that covering may minimise the risk of combustion, there remains some notional risk:

- Electrical sockets and conduits that may have been chased into the IWI or that sit within a battened void layer between insulation and plaster finish
- Instances where insulation traverses the joist zone between floors and potentially provides a path for fire spread between separate flats.

We recommend a London-wide review to take place on these risks and guidance to be issued to local authorities on acceptable IWI solutions.



Moisture risk in IWI applications.

The interface between the original wall surface and the IWI has the potential to allow interstitial condensation and trap moisture. These risks can be managed through careful design and specification.



Wet applied insulating plaster

This is one IWI solution that promotes moisture management by reliance on the material property

Action 2 Develop a plan for retrofitting ventilation systems to improve health and air quality

Maintaining and improving indoor air quality

Air quality within homes is a critical factor affecting human health and the building fabric. Controlling moisture load, CO₂ and pollutant levels in the air we breathe requires adequate fresh air from outside and extraction of vitiated air from indoors. Retrofit deliberately makes homes more airtight in order to avoid wasting heat energy. As homes are made more draught free it is important to ensure that adequate controllable ventilation systems are fitted to maintain consistently good air quality.

Where homes are expected to achieve an air permeability better than $5m^3/m^2/h @ 50Pa$, which includes most whole house retrofit projects, it is increasingly recognised that continuous mechanically assisted ventilation will be required. Continuous extract ventilation from wet spaces with trickle vent inlets within windows can ensure that better air quality can be maintained. This can be arranged for with individual fans in each wet space with one centralised fan and a small amount of ductwork.

Further energy savings from heat recovery or demand control

 $\mathbf{\Theta}$ here a central fan is possible, a further improvement is to provide balanced supply and extract ventilation with heat recovery. This provides the best air quality by guaranteeing the supply air path. Heat recovery saves more than 10x the amount of electricity needed to run the fans through saved heat energy.

Demand control extract ventilation can achieve energy saving by monitoring the air quality and adjusting the ventilation rate.

Natural ventilation in summer

All systems should be coupled with opening windows to give residents control and purge ventilation for summer comfort.

London local authorities should consider mechanical ventilation alongside energy efficiency measures and develop a plan to deliver these systems at scale.



A continuous mechanical background ventilation strategy should be adopted wherever a retrofit may improve the airtightness of the home below a permeability threshold of $5m^3/m^2hr$.



Installation of a whole house mechanical ventilation system with heat recovery in a flat as part of a retrofit. In this case installed in the ceiling above a kitchen.

Action 3 Electrify heat

Individual gas boilers are the norm - this needs to change

Parity Projects' analysis shows that individual gas boilers currently vastly outnumber other heating systems. This needs to change and is the most important move we need to make to achieve London's climate change objectives.

Heat pumps are the best option

The electricity grid has decarbonised and will continue to decarbonise, thus the most reliably low carbon heat source is electricity. This is done most efficiently, and has lower running costs, when using heat pumps. There are various types of systems available, including air and ground source heat pumps, exhaust air heat pumps, and heat pumps integrated into a domestic hot water store.

bot water storage is required when using heat pumps.

What other options are available?

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Prect electric heating, for example through panel radiators, will become low carbon in the future, as the grid continues to decarbonise. However direct electric heating can lead to very high heating bills.

Heat networks may have a role to play but they must provide a sustainable source of low carbon heat with a clear Net Zero compliant plan.

Hybrid systems may provide an interim solution for homes with the highest space heating demand to decarbonise quickly. These systems pair a heat pump to provide most of the heating with a gas boiler to provide a top up for the coldest days. With the correct controls in place, and alongside as many fabric improvements as possible, these systems can substantially reduce carbon emissions.

Plotting a course to low carbon heat solutions

The following pages set out the recommended process needed to analyse each home and to determine the most suitable low carbon heat system.



Comparison of carbon emissions associated with different heating systems or a typical home over the next 25 years.

Emissions from a gas boiler stay constant, whereas emissions from direct electric systems and heat pumps reduce over time due to grid decarbonisation. Heat pumps have lower emissions than direct electric systems purely because they are more efficient.



This chart shows the current number of installations in each main heating system category in London. The move away from gas boilers is necessary but the task is significant. 'Heat networks' include both district heating systems and communal (building scale) systems. Source: Parity Projects

Action 3 Activity 3.1 > Undertake a stock analysis of heating systems

Current heating system and opportunities for each home

Moving away from fossil fuel heating will require a composite approach between heat pumps, direct electric heating, and low carbon district heating (where already available).

Heat pumps should be prioritised as an energy and carbon efficient technology that is available and can be installed now. This must be as part of a holistic approach, particularly for inefficient homes where there is a risk of fuel poverty.

There are more and more innovative examples of heat pumps being integrated in existing buildings, however they are unlikely to be possible to install in all buildings in London. Example issues include the following situations:

- No space for external unit for air source heat pump
- No space for internal hot water tank (or heat pump if an internal unit is needed)
- No space for communal pump sets and heat pump for communal systems
- Insufficient electrical supply (usually can be upgraded)
- Insufficient building efficiency, heat load is difficult to meet with a heat pump or makes efficiency unacceptable (requires fabric improvements)

London local authorities should undertake a stock analysis of heating systems in their borough. This should include at least their own stock and potentially others' based on publicly available data and/or data provided by homeowners/landlords voluntarily. The Pathways tool developed by Parity Projects, to which boroughs have access for a year under the terms of Parity's work for London Councils, would enable the production of an initial assessment very efficiently which can then be refined.

The stock analysis should aim to include a set of feasibility criteria for finding homes that are appropriate for heat pumps, and use this to categorise housing types suitable for different low carbon heating approaches.



Outline heating system decision flow chart for existing buildings

Action 3 Activity 3.2 > Establish the most appropriate future low carbon heating system for each home

Consider the alternatives, in a logical order

When dealing with an existing boiler in need of replacement, or if a dwelling is at a trigger point for retrofit, heating alternatives which use electricity should be considered in a logical sequence, starting from the ones which are most efficient at transforming one unit of electricity into one unit of heat.

The recommended sequence is shown on the adjacent diagram.

Enabling low carbon heat

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

As the options step down from most to least efficient heat source, the pric performance – the space heat demand – has to be improved in arder to reduce the energy demand such that the change to low carbon peat does not substantially increase energy bills, to limit the changes to the existing heat emitters and pipework and to ensure that fuel poverty is the increased.

Heat networks

For heat networks, the carbon performance should be reviewed and compared to the other options available. The space heat demand threshold has to be set using the same criteria, so that homes on heat networks are not disadvantaged.

Where space heating targets are unachievable

An interim step may be to use a hybrid heat pump while fabric improvement works are undertaken



Action 3 Activity 3.3 > Stop the replacement of gas boilers with gas boilers

The carbon impact of different heating systems

Today, there is less carbon emitted for every kWh of electricity delivered than there is for every kWh of gas burned. This is because of the growing proportion of renewables contributing to our electricity grid.

Every year, as grid electricity decarbonizes, the CO_2 emissions from a heat pump will reduce, whereas the CO_2 emissions from a gas boiler will remain constant.

Over the next 30 years, the carbon content of electricity is predicted to drop even further, with an average carbon factor of 58 gCO₂/kWh, compared with gas which has an almost static carbon factor of 230gCO₂/kWh. This means that relative to an Air Source Heat Pump, for the same amount of heat delivered, gas boilers will emit 10x more CO₂ and direct electric heating systems 4x more CO₂.

ອ ຜູ້ We need to stop adding to the problem

The number of gas boilers in existing homes needs to decrease rapidly in existing new gas boilers – either in new homes or existing homes where old boilers need replacing. Ideally, other actors (landlords, housing associations, homeowners) should be encouraged to adopt the same principle. The planning department in each London borough should be engaged with in order to identify who can help ensure new homes are not connected to communal or individual gas boilers.

Replacing boilers at the end of their lifetime with low carbon heat alternatives provides an ideal opportunity for removing the contribution gas boilers make to cumulative emissions. Approximately 160,000-200,000 gas boilers are replaced in homes in London every year. If all of these were replaced with low carbon alternatives, there would be no existing gas boilers by 2039.

We recommend no new and replacement gas boilers are installed on council-owned stock by 2023 at the latest.



Relative CO_2 emissions of different heating systems: Over the course of the next 30 years, for the same amount of heat delivered, a gas boiler will emit 10x more CO_2 than an Air Source Heat Pump, and 4x more CO_2 than a direct electric heating system using grid electricity.



The London Heat Map could record each connection to the gas grid as their number should be reduced steadily over the next 30 years.

Action 3 Activity 3.4 > Enable a heat pump roll out

The roll out of heat pumps can harness the decarbonisation of the grid and deliver heating at an affordable cost. So far in the South-East, around 30,000 heat pumps have been installed. According to Parity Projects, more than a million heat pumps need to be installed to meet their modelled interim carbon target alone. Local authorities need to enable this heat pump roll out.

Houses

Single dwellings are arguably the 'ideal' type for a heat pump roll out as they can be fitted with an individual air source heat pump (ASHP). Anecdotal experience of fitting these has shown that it is not always easy though; permitted development rights are not always clear, nor do they always help. Clearer guidance on permitted development and possible adjustments to local planning policy by London local authorities, rrticularly in regard to how supporting noise assessments can be carried ore cost effectively would be very beneficial.

茂ock of flats (with open space)

Carge blocks of flats can have limited potential for individual or communal ASHP deployment due to the problems associated with siting the heat pumps and the long runs of pipework. The emerging best solution for these challenging situations appears to be communal ground source heating with local heat pumps within each flat. This allows low temperature heat to be moved over long distances with little heat lost. The local flat heat pump raises the temperature for heating and hot water. This technology relies on having enough space to drill deep boreholes. Local authorities engaged in this type of projects could share their experience of the technical challenges as well as of the long-term performance.

Challenging situations

The biggest challenge for heat pump deployment is likely to be flats within dense blocks of flats without open space and Victorian terrace houses that have been converted to flats. Hybrid solutions and direct electric heating may be required.



The drawing above shows the number of locations that were reviewed for this typical terrace house. The challenges of permitted development clauses and planning in general and the need to have heat pump and hot water tank close to one another frequently makes this exercise harder than it need be.



The Channel Island / Exeter Road estate in Enfield has been retrofitted with a communal ground array and individual water heat pumps in each unit.

Action 3 Activity 3.5 > Develop clear guidelines/requirements to 'get heat pumps right'

The table below sets out the popular concerns associated with heat pump retrofits. The actual level of risk associated with this concern has been ranked between **high**, **medium** and **low**. We would recommend developing a **London guide to heat pump retrofit** to improve quality of design and installations and reduce the risk of associated with heat pump retrofit. This will build on the GLA's report on heat pump retrofit.

Popular concerns on heat pump	Risk level	How to mitigate it?
They do not work in leaky dwellings		Very high space heating demand does diminish the efficiency of heat pumps. Ensuring all homes where a heat pump will be installed have achieved a minimum standard of fabric performance (e.g. 100 kWh/m²/yr) is a key requirement.
Supply chain is not ready to maintain them		The availability of qualified staff to carry out the maintenance is currently limited. Recruitment and training of staff, including upskilling training for plumbers and gas safety engineers, will answer this issue as the demand increases. Consistent policy will assist in encouraging businesses to invest in upskilling their workforce.
Embodied carbon		Embodied carbon of heat pumps may vary significantly depending on the refrigerants they use and the manufacturer. The selection process should seek to minimise the embodied carbon and consider it as part of the whole house approach to lifecycle carbon.
Refrigerant leakage		Packaged units such as monobloc ASHPs are factory made and tested and the risk of leakage is very low. For split units with site made refrigerant pipework, the choice of refrigerant used will be a key factor, as well as workmanship quality and regular maintenance.
The theoretical efficiency of the heat pump system will not be delivered		The performance of the heat pump is a function of the system design. Installers need to be trained to understand the issue and to give proper advice on which system is appropriate where.
here is not enough internal space		Where space is very constrained, higher fabric performance and direct electric space heating may be a more optimal solution or small 'DX' heat pumps with wall mounted heaters. Hot water storage will almost always be required, which may require some loss of space in homes that currently have combi boilers.
There is not enough external space		Where external space is limited, particularly for high density developments such as towers, communal systems with central heat pumps, possibly located on a roof, may not be possible. Alternatively, exhaust air source heat pumps which are located internally could be appropriate if internal space is not as constrained.
They cost three times as much to run		This is a combination of ensuring the system design achieves a good Coefficient of Performance, space heating demand being moderated, and the users being aware of how to use the systems efficiently. A properly designed system, used effectively in a home with reasonable thermal efficiency will not cost more to run than a gas boiler.
Capital costs are too high		There are some funds available to offset the capital costs, including the Renewable Heat Incentive (RHI), but there will need to be other funding schemes to encourage take up of heat pumps.
User experience		The operation of heat pumps is different to combi gas boilers so information explaining how heat pumps work and are best used should be provided to residents. Smart controls are also crucial for their efficient operation and to keep heating costs downs.
High servicing costs		The typical costs of servicing heat pumps should be comparable to the typical costs of gas safety testing and maintenance for gas boilers.
External noise		Acoustic screening may be required for some large (communal) installations. Individual units now on sale are generally quieter than the background noise levels in urban and suburban areas.
External appearance		Perception is subjective but careful integration is key. Guidance can stipulate the types of installation that are not acceptable, but it is not possible to make all units invisible, so familiarity with the units will grow and acceptability will therefore improve.

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Action 3 Activity 3.6 > Review the carbon impact of heat networks and focus on sustainable connections

Heat networks and the challenge of decarbonisation

Traditional heat networks use the combustion of fossil fuels and distributed heat at relatively high temperatures. They are evolving towards lower distribution temperatures that are better suited to non-combustion based heat sources such as heat pumps. Lower system temperatures also reduce heat losses and overheating risk, which is particularly important as buildings become more energy efficient.

Decarbonisation plans should be implemented for every existing heat network as soon as possible, and ideally within the next 12 months. These plans should be consistent with guidance from the Climate Change Committee.

No fossil fuels for new networks

stay within carbon budgets and avoid locking in high emission heat purces, new heat networks should not use fossil fuels. In practice, this means most new heat networks will use heat pumps. Committing to heat mps is important as this will affect the design of the entire system. It also provides a great opportunity for heat networks to take advantage of new lower temperature sources of heat than would previously have been viable.

The future of Energy from Waste

Energy from Waste is one of the highest carbon forms of electricity generation, with emissions of around 890 gCO₂/kWh¹. This is almost five times higher than the 181 gCO₂/kWh emitted by the UK electricity mix in 2020². To achieve Net Zero emissions, the Climate Change Committee report in their Sixth Carbon Budget that emissions from the waste sector must reduce 75% by 2050 through waste prevention, increasing recycling rates to 70% by 2030, and adding carbon capture and storage to waste to energy plants. Any heat network relying on Energy from Waste should be sustainable and therefore be consistent with this trajectory.

- 1. Jeswani & Azapagic (2016) Waste management. (Elsevier)
- 2. National Grid ESO (2021) 2020 greenest year on record for Britain



Heat networks must continue to evolve, and each existing heat network should have a decarbonisation plan in place, ideally in the next 12 months (© Chris Twinn for LETI Climate Emergency Design Guide)



Emissions from the waste sector must reduce 75% by 2050. This will require reductions in waste volumes, increased recycling and carbon capture and storage. Heat networks relying on Energy from Waste need to be sustainable (© Climate Change Committee, using BEIS data).

Action 3 Activity 3.7 > Develop a specific strategy for buildings heated by direct electric

Direct electric heating and the issue of energy bills

For homes already served by direct electric heating, retrofit based on energy efficiency measures including fabric and system optimisation will potentially offer significant energy and fuel cost benefits.

For dwellings which are currently served by gas boilers and not suitable for heat pumps, direct electric could be an option but the impact on energy bills should be carefully considered, requiring fabric improvements.

Direct electric system choices

Direct electric heating comes in a number of different forms. According to Parity Projects' modelling, there are around 400,000 homes in London that currently have some form of electric heating. More than half of the electrically heated homes have either storage heaters or electric mel/convector heaters. In many cases these can be replaced or ograded with modern, more efficiently controlled version of the same type of heater.

Solution of the space of the sp

The choice of which electric heating system would be most suitable is then driven by the physical constraints of the building and the needs of the occupants. In a home that currently has a wet radiator system, it may be simplest to install an electric boiler. Storage heaters offer a good opportunity to adopt Time of Use (ToU) tariffs. Panel heaters give a rapid response and can be turned down to very low outputs in homes with particularly good fabric.

Hot Water Storage

In all direct electric heated homes, priority should be given to installing hot water storage, to provide energy storage which can limit peak loads and consequently manage costs.

Electric heating systems



Parity Projects' summary of existing electric heating systems across London



Choice of electric heating systems: a process largely driven by the physical constraints of the building and the type of user

Infrastructure upgrades are required

In order for the decarbonisation of power generation in the UK to continue to progress, change is required both on the supply side – power generation – and on the demand side. The power network needs to be locally adapted to be able to accommodate more demand from electric heating systems and electric vehicle charging. The network also has to be reconfigured to be able to make use of local generation from roof mounted PV arrays.

Long term plans for major infrastructure works

UK Power Networks and Scottish and Southern Energy, the local District Network Operators (DNOs), are investing in the infrastructure to make it more suited to the developing needs, but they have to have a clear policy sis to demonstrate to Ofgem, the regulator, that the investments they ake are supported by demand. A **clear statement of timescales and Dijectives** will allow the DNOs to plan the work necessary to make it Sisible.

Planning of infrastructure upgrades can be a complex process, requiring negotiation of access and wayleaves and permissions for road closures, all of which can take years. Investment plans are region-wide, crossing borough boundaries and are set out in 5 year budgets, the latest of which is currently in progress. Early engagement with the DNOs by the London boroughs on the strategies that will be adopted across the region is key to their successful and timely delivery.

Make space for demand management

Power demand needs to be flexible, so that energy is used at times of high renewable energy generation. Energy storage and flexible use for homes is a key part of this but there will also be a need for larger scale demand management equipment. Understanding what may be needed and whether Planning Permission may be required is also a part of the discussions with the DNOs to form a city-wide infrastructure that is suitable for the developing needs.

As London continues to develop and grow, so does the need for an increase in network capacity.

As part of our plan to increase capacity to meet the future growth expected in Central London, we are delivering four new substations, located where demand is expected to rise over the corning years. These new large projects will not only provide a combined additional 300MVA of capacity, but also the electrical infrastructure needed to support growth in Central London.





One of the outcomes now in progress from the RII0-ED1 UKPN business plan, which covers the period up to 2023, is the installation of 4 new substations around London. Consultations for the next business plan, RIIO-ED2 are in progress and will form the basis for similar infrastructure work in coming years.

(Source: UKPN published documents including 'Central London Plan Update 2020')



Notional graph of renewable energy supply vs energy demand

Time-shift benefits of energy storage

Action 4 Deliver smart meters and demand flexibility (controls, storage) in retrofitted homes

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 renewable energy 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 was not previously necessary.

Smart Meters and electricity tariffs

Off-peak electricity tariffs are currently widely available to domestic consumers (e.g. Economy 7). More sophisticated Time-of-Use (ToU) tariffs are likely to play a bigger role in balancing supply and demand for electricity in the near and medium term. They have been commercially available for some years and are now becoming available to domestic stomers. These tariffs track the energy price on an hourly or half hourly asis. If customers are able to reduce their use when prices are high and percease it when they are low, they can pay substantially less for their ergy, on average. Smart meters will enable access to a far wider range of energy tariffs than standard meters and provide an opportunity to substantially reduce energy costs if the controls and systems in homes are able to respond to fluctuations in energy prices.

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. Using cheap electricity to heat a tank of water that is then available to use during the day reduces the cost to the consumer and the carbon emissions of the energy. Batteries can also form part of demand management, but the capital costs are currently relatively high, per unit of energy stored and their embodied carbon, chemical constituents and cost are a concern.

London local authorities should encourage and facilitate the roll out of smart meters, especially to fuel poor homes and the installation of heating controls in all retrofitted homes, as well as hot water storage if possible.



The carbon intensity and price of electricity vary depending on the balance between supply and demand. The above 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 enable users to access cheap low carbon electricity, while helping the National Grid to balance the network.

Action 5 Increase solar energy generation on London homes

Setting a clear target for total solar capacity in London

The Mayor of London has published a Solar Action Plan for London and we recommend building on it. It would be very useful to consider which ambition should be delivered on the roofs of London homes.

By energy balance, according to Parity Projects' modelling, the total installed solar capacity by 2030 should be 3.8GW. A solar capacity of **6GW**¹ would then be required if a Net Zero energy balance is to be achieved. We believe these figures should form the basis of London's target for installed solar capacity for homes. The non-domestic sector also should be installing renewable power to match its energy needs.

The CCC's forecast of the UK solar electricity generation requires 85GW by 2050. By **population**, London (9.5 million people) would need to achieve a solar capacity of 12 GW by 2050. By **GDP**, the figure would be when higher – close to 28GW.

The UK has not yet established how to share out the renewable energy requirement nationally. The density of population and economic activity in Andon mean that most power is required where there is least space to generate it. This imbalance needs to be addressed but is not in the control of the London local authorities. For now, balancing the energy required seems the fairest option.

Developing a joined-up plan to achieve it

A lot of great work is already happening. More is required to address each tenure and segment of the market but there is a lot to build upon. Residents of individual homes will naturally benefit from the free electricity generated by these PV panels but ways to enable residents from blocks of flats to benefit from this should also be considered.

We recommend that London local authorities and the GLA consider how to accelerate solar PV roll out.

¹ This would represent a significant increase on the solar generation targets in the Solar Action Plan for London of 1GW solar PV installation by 2030 and 2GW by 2050



Solar deployment is very important in order to achieve Net Zero Carbon

(Source: generated from BEIS data to Nov 2020 and then projected forward using 2020 build rates compared to the 85GW target in the CCC Balanced Net Zero Pathway from the sixth progress report).



The GLA and London Boroughs are running the successful Solar Together London project which should be continued and expanded. The new Mayor's Solar Skills London programme has also launched and is looking to support the supply chain.

(https://demo.london.gov.uk/what-we-do/environment/energy/solar-skills-London)

Action 6 Map out each building's journey towards lower energy costs and Net Zero

FABRIC AND VENTILATION

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, technical and other considerations.

We have developed the adjacent Retrofit Map to enable the journey of each building towards Net Zero to be summarised and understood.

The Retrofit Map can enable users to understand the current situation of the building (e.g. poor energy efficiency, individual gas boiler) and how it could be improved.

Relation to the green squares. The buildings which should be most urgently retrofitted will be in the squares as they will be consuming most of the carbon budget.

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 —	High carbon ——— HEA		T DECARBONISATION			
	High carbon heat network	Individual gas boiler	Direct electrical heating	Low carbon heat network ¹	Heat pump system ²		
Heating demand <40 kWh/m²/yr							
Heating demand <100 kWh/m²/yr							
Heating demand <150 kWh/m²/yr							
Heating demand >150 kWh/m²/yr							

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.

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 ٠ on building fabric and ventilation and a new communal heat pump system.

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.

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 may be 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.

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.

Current stock analysis

Based on the Parity Projects' data, the adjacent retrofit map indicates the current 'position' of London homes currently both in terms of space heat demand and heating system.

Numbers are approximate. The circle sizes indicate relative numbers but are not to scale

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 $-$	HEA	HEAT DECARBONISATION Low of				
		High carbon heat network	Individual gas boiler	Direct electrical heating	Low carbon heat network ¹	Heat pump system ²		
	Heating demand <40 kWh/m²/yr	20k	250k	130k	1k ·	15k ●	 Low energy 	
VENTILATION	Heating demand <100 kWh/m²/yr	30k	1million	160k	1k ·	3k ●		
FABRIC AND	Heating demand <150 kWh/m²/yr	20k	1.5million	60k	<1k ·	<1k ·		
	Heating demand >150 kWh/m²/yr	6k •	500k	30k	<1k ·	<1k .	High energy	

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.

Estimated retrofitted systems

Based on the Parity Projects data, and following the processes set out in this report, we anticipate London's homes to move towards these positions on the 'Retrofit Map'.

Numbers are approximate. The circle sizes indicate relative numbers but are not to scale

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 $-$	HEA	HEAT DECARBONISATION Low carbo				
		High carbon heat network	Individual gas boiler	Direct electrical heating	Low carbon heat network ¹	Heat pump system ²		
	Heating demand <40 kWh/m²/yr			600k	55k	1.5million		
VENTILATION	Heating demand <100 kWh/m²/yr				30k	1million		
FABRIC AND	Heating demand <150 kWh/m²/yr					500k Hybrid systems		
	Heating demand >150 kWh/m²/yr							

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.

Low energy

Activity 6.1 > Develop whole house retrofit plan templates for key building archetypes Action 6

Whole house approach

The term 'whole house (building) retrofit' has emerged over recent years as a fundamental concept underpinning successful retrofit projects. It recognises buildings as complex systems that require whole systems thinking. Consensus is emerging that whole house thinking should include the following:

- Wide ranging assessment of the building
- Identification of repairs required to make the building 'retrofit ready'
- Evaluation of appropriate energy efficiency measures, taking care to manage risk
- Indoor air quality and the need to design in ventilation systems that ٠ deal with winter and summer conditions
- Selection of the most appropriate low carbon heating/hot water .
- system and ensuring that it is compatible with heating load υ
- age Planning for renewable energy generation and energy storage
- Implementation plan over time, taking into account risks and
- components' lifecycle

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Whole house plans as a lodged resource

Along with the renovation plan which may be implemented over a long period of time, it is crucial to gather and keep digital records of the information gathered on a building and update them. Together they form what is generally referred to as a Building Renovation Passport.

Building Renovation Passports have been adopted in different forms across Europe and were highlighted by the Climate Change Committee as a key component to progress on improving the energy efficiency of buildings in the UK.

The Coalition for the Energy Efficiency of Buildings (CEEB) is currently developing work in this area and London local authorities should engage with it to ensure that their work is consistent and complementary.

The Line Carbon Hores Service				2.00101071
8. Phasing your improvements (continued)				
The measures recommended below aim to significantly reduce your energy of good range of the possibilities available. We can of course limit recommendat	ise, annual energy ions to your more in	cests and CO, mediate need	emissions. This is to fit within your	demonstrates current budg
Phase 1 Measures	Estimated Costs	Energy Rating	Fuel Bill	tCOz
Where you are now	Per Measure	58 D	£1,320	5.73
Low energy lighting	£80	60 D	£1,260	5.66
Block open chimneys	£480	61 D	£1,230	5.55
Install PV system where potential has been identified	£4,170	69 C	£920	5.02
External insulation to pre 1900 solid walls	£16,890	79 C	£580	3.25
Part L insulated doors	£1,560	79 C	£570	3.20
Triple glazing from partial single	£7,240	81 B	£520	2.95
After Phase 1 Measures		81 B	£520	2.95
Package Cost & % Improvements	£30,420		61%	49%
Phase 2 Measures	Estimated Costs	Energy Rating	Fuel Bill	tCO ₂
After Phase 1	Per Measure	81 B	£520	2.95
ASHP (55 degree emitters) with existing radiator central heating and hot water, from C rated gas boiler	£12,000	81 B	£540	0.95
After Phase 2 Measures		81 B	£540	0.95
Package Cost & % Improvements	£12,000		-4%	68%
Cumulative Cost & % Improvements	£42,420		59%	83%

Whole house plans have been used by retrofit professionals for a number of years to assess a building pre-retrofit and recommend retrofit measures as part of a coherent plan, either in a single phase or over a long time. The example above is an extract from a whole house plan prepared with Ecofurb.

Building Renovation Passports combine a record of the building attributes and a whole house retrofit plan to allow long term planning, proper sequencing of works and a step by step approach that simplifies the process sufficiently for individual householders to be able to understand and engage with the work needed.

Developed schemes include examples in Germany (Individueller Sanierungsfahrplan, iSFP), Belgium Flanders region (Woningpas) and France (Passeport efficacité énergétique, P2E).

Developing whole house plan templates: a game changer

Since the first step to retrofitting each home is having a whole house plan in place, taking steps to accelerate the creation of good guality whole house plans could help trigger more and better retrofit. London local authorities can help facilitate this by developing whole house retrofit templates for key building types within their boroughs, building on the 'solutions based categories' which is summarised on the following two pages.

The whole house plan templates should be based on the most common solution types and should highlight:

- 1. Packages of measures that are likely to be applicable
- Specific risks and how they might be managed 2.
- Typical detail and interface challenges
 - Potential phasing
 - Expected energy and carbon savings
 - How the fabric measures work alongside the decarbonised heat approach

Templates created at scale would have two far reaching consequences:

- They would provide homeowners and landlords with a starting point so that they can coordinate carbon reduction measures with their ongoing maintenance / extension and other life plans.
- They would help develop a deeper understanding of the costs, ٠ measures, skills and supply chain needed within the borough and in London as a whole. This information could be used to help support and build capacity, leverage finance and build a business plan for retrofit.

The templates should cover all types of tenure.

They have the potential to identify common solutions that can help build larger scale of more efficient procurement, inform emerging planning policy for retrofit, test carbon projections and inform future plans.



Extract from a whole house retrofit plan showing how fabric measures affect the heating demand. This can help to sequence the works.



Extract from a whole house retrofit plan showing the how fabric and electrification of heat generation can affect the overall energy consumption of a specific dwelling.

Categorising the London housing stock to identify key archetypes

Towards archetypes

An important part of the process towards creating whole house plan templates is to define the key or most common archetypes that occur across London.

First step: categories

As a step towards this goal, it was considered that breaking down the retrofit work into around 10-15 categories would be appropriate, of which eight are the most commonly found in the London housing stock.

These categories have been arrived at partly by the architectural form and character and partly by considering common groups of retrofit measures. The focus on category by measure rather than architectural style is a helpful way of differentiating for the specific purpose of evaluating retrofit

Works. ۵

🙆 t present the categories are probably still too crude to be used as ${f \Phi}_{
m archetypes'}$ to create whole house templates, and further work is required identify key archetypes. However, the categories already provide a real \mathcal{G} has not seen that \mathcal{G} and \mathcal{G} do not represent a significant amount of the stock statistically, while they often are considered to be a key archetype. On the other hand, the 'homogenous housing estates' represent a substantial proportion of the total stock but the break down of construction types within the overall number are perhaps not yet adequately defined.

The image on the right shows the categories that represent the majority of the stock in London (i.e. 92%)

The light and dark blue bars cover solid walled properties. Together, these categories make up 44% of the entire stock. The dark blue show portion of homes in conservation areas.

'Homogenous housing estates' cover a further 22% of the entire stock.







Solid brick terraces (1)

built blocks

is housing	(Λ)	
estates	(4)	

(3)







Solid brick mansion blocks &

converted street properties











(6,7)









Suburban cavity semidetached / detached



Solid brick (other) (2)



Analysis based on Parity Projects Data showing eight categories (some combined) which make up 92% of the London housing stock. The numbers in brackets refer to the categories shown on the next page and in the appendices.

29%

22%

Categorising the London housing stock across the 33 London local authorities

The adjacent table profiles each of the 33 London Borough by the categories presented on the previous page. The colour coding highlights the most significant categories within each borough. A few initial conclusions can be drawn from this analysis:

- 1. Three or four categories dominate the housing stock in each borough. This provides a strong lead on how the most important archetypes in each location might be identified.
- 2. A number of London local authorities share similar profiles: that may suggest that they should collaborate especially strongly.
- Around one third of London local authorities have a significant amount of the 'Homogenous housing estates' category. There is therefore a significant need and opportunity to investigate this category in more detail and consider how many archetypes and whole house solutions sit within it. Due to the constraints of the data its has not been possible to split into more specific groups yet.
- The 'Mansion block / converted street property' is a very significant category. This category also tends to be focused in a few boroughs, and in areas with conservation status so may also warrant specific collaboration between boroughs. It would be helpful to differentiate between purpose built mansion block and converted street properties as the typical solutions are likely to be different for those two main sub-categories.
- 5. Many of the other typologies appear to be spread more evenly across London. There would be benefit in exploring which archetypes would be useful on a London-wide basis so that adequate whole house templates and guidance on facilitation can be developed.

Right: Table showing each of the 33 London Boroughs by the categories presented on the previous page. Small groups of different boroughs could work together on a particular category of housing. The category numbers are explained further in the appendices.

	3	4	I	0 + /	10 + 11	0 + 9	Э	Z
Local authority	Solid brick mansion blocks & converted street properties	Homogenous housing estates (solid or cavity or system)	Solid brick terraces	1950s to 1975 system/cavity built blocks	Built from 2007	1983s to 2002 mid- rise flats	Suburban cavity semis/detached with gas boilers	Solid brick non- terraces
City of Westminster	86.2%	1.1%	8.3%	11.0%	4.0%	6.2%	0.1%	1.0%
Kensington and Chelsea	71.4%	0.5%	9.7%	6.7%	2.6%	4.5%	0.0%	1.2%
Camden	66.7%	1.3%	5.4%	10.6%	4.4%	4.2%	0.2%	2.1%
Hammersmith and Fulham	56.8%	1.0%	16.2%	5.8%	5.3%	4.2%	0.1%	1.4%
Lambeth	46.7%	6.4%	10.3%	9.6%	6.0%	5.4%	0.6%	3.6%
Brent	36.8%	23.4%	8.1%	6.5%	5.7%	6.3%	4.2%	4.5%
Hillingdon	6.1%	48.6%	2.7%	10.0%	7.0%	5.7%	17.5%	4.3%
Bromley	11.4%	43.2%	5.6%	8.8%	5.4%	4.5%	17.0%	7.0%
Harrow	15.3%	48.2%	4.0%	6.5%	6.8%	4.6%	11.7%	5.9%
Newham	16.7%	16.2%	25.0%	12.9%	6.4%	7.6%	1.5%	1.3%
Waltham Forest	27.0%	19.7%	23.6%	7.3%	4.9%	5.8%	1.9%	3.0%
Haringey	35.9%	9.8%	22.7%	8.6%	4.0%	5.3%	0.5%	3.5%
Redbridge	13.8%	36.7%	15.5%	7.2%	4.4%	5.1%	5.3%	5.3%
Merton	19.8%	27.4%	15.4%	6.1%	6.1%	5.8%	2.4%	6.6%
City	30.3%	0.0%	0.2%	33.7%	8.1%	12.8%	0.0%	0.1%
Wandsworth	37.7%	4.6%	16.3%	13.3%	6.3%	5.6%	0.4%	3.0%
Islington	48.7%	2.0%	7.8%	13.0%	7.4%	6.5%	0.2%	1.0%
Hackney	45.0%	3.4%	9.3%	12.8%	8.7%	7.1%	0.2%	0.9%
Tower Hamlets	19.0%	2.2%	3.5%	20.4%	13.6%	16.7%	0.4%	0.3%
Greenwich	17.8%	21.6%	12.9%	12.1%	9.5%	4.6%	3.6%	3.8%
Barnet	20.6%	28.3%	5.5%	8.3%	8.8%	7.7%	7.5%	8.0%
Hounslow	15.0%	30.4%	7.1%	10.0%	8.7%	7.2%	6.3%	6.0%
Southwark	34.1%	3.6%	8.8%	12.8%	8.2%	10.3%	0.7%	2.4%
Enfield	13.2%	35.8%	12.6%	10.6%	4.2%	8.6%	4.5%	4.6%
Lewisham	31.4%	16.6%	12.2%	8.8%	6.4%	7.1%	1.8%	4.1%
Havering	4.4%	59.4%	2.5%	8.7%	6.9%	3.7%	12.0%	4.6%
Bexley	4.7%	54.2%	6.1%	8.7%	5.0%	5.4%	15.6%	4.5%
Barking and Dagenham	7.8%	52.1%	6.1%	10.0%	7.6%	4.3%	5.2%	1.3%
Kingston-upon-Thames	10.7%	37.2%	3.3%	8.2%	5.0%	5.8%	10.8%	16.9%
Richmond	21.9%	20.1%	14.2%	8.9%	4.7%	4.7%	4.0%	12.4%
Sutton	9.6%	39.8%	4.3%	11.1%	5.9%	7.7%	6.9%	7.6%
Croydon	16.4%	32.7%	12.7%	9.3%	6.6%	4.6%	10.1%	7.5%
Ealing	24.6%	25.8%	10.9%	10.8%	5.8%	5.6%	5.2%	6.6%

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4.0 How to deliver:

Delivery models, skills and supply chain

- Overview of the whole delivery process
- Opportunities for council-owned homes
- Co-procurement of materials and services
- Skills, trades and installation
- Monitoring progress (and success)
- Interesting delivery models (UK and beyond)



Summary of recommended actions in this area

The key recommended actions and activities in terms of **delivery models**, **skills and supply chain** are listed in the adjacent table.

Each action/activity is explained succinctly in the following pages.

The full list of actions and activities is provided in a separate spreadsheet which London Councils can develop and add to when this phase of the project has been completed.

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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

Activity 8.1 > Share procurement for council-owned homes

Activity 8.2 > Develop area-based strategies to enable bulk procurement and delivery

Activity 8.3 > Consider a London-wide retrofit programme for homeowners

9 Enable planning to facilitate low carbon retrofit, including in Conservation Areas

Activity 9.1 > Provide planning guidance to enable retrofit

Activity 9.2 > Provide guidance for planning officers

10 Develop retrofit skills actively across London

Activity 10.1 > Work with partners to develop a spending commitment for retrofit

Activity 10.2 > Develop a London-wide vetting scheme for retrofit suppliers and subcontractors

Activity 10.3 > Upskill Building Control Officers and drive up the quality of retrofit works

Activity 10.4 > Work with existing training schemes and programmes to develop local skills

Activity 10.5 > Create London retrofit training centres for existing and aspiring tradespeople

11 Set up a clear and consistent system to report and monitor progress (and success)

Activity 11.1 > Agree metrics and report retrofit progress between councils

Delivering a home retrofit: overview of the whole process and key opportunities

Retrofit work at any scale is challenging and the delivery and supply chain constraints could be the biggest hurdle to overcome in order to achieve the objectives set out in this Action Plan. This section looks at how London local authorities should intervene to have an impact on the delivery process.

Need for a planned whole building approach

Improvements to energy efficiency might happen in lots of different ways. However in order to successfully deliver a retrofit, a coordinated approach is needed for the whole building or group of buildings (see Action 6 on mapping each building's journey towards lower energy costs and Net Zero). The London local authorities should set an example and ensure that a whole house approach is taken on all projects under their control.

the whole house plan will be unique to the building but could be based on whole house templates derived the Parity Projects Pathway report stock analysis and key London stock archetypes. For example, Warmer Sussex ses recommendations from a similar analysis to offer a developed plan of work through Retrofit Coordinators.

Funding or delivering one element for multiple homes would need eligibility criteria to check the measure fits into the individual plan for each home.

Opportunities for London local authorities to help

A summary of the process and some specific opportunities for councils to have an impact is summarised to the right. Recommended actions and activities are explored and summarised in more detail in this section.

Example retrofit process

practical constraints.

Building assessment – Context research and building survey. Identify repairs required and reference maintenance schedules. Identify planning and heritage constraints,

Identify suitable interventions – propose appropriate interventions based on opportunity and technical feasibility

Plan – package interventions in line with need, impact of maintenance opportunities, and technical requirements. Get consents if needed. Cost and get funding. Identify suitable delivery mechanism with a single stage or phased approach

Procurement – Find trusted and capable tradespeople to deliver the work.

Installation – Carry out works. Manage installation and minimise disruption to residents. Construction quality assurance.

Feedback – Monitor quality and performance. Use experience from individual projects to refine offer and suggest new interventions.

Opportunities for Councils to help

Review maintenance programmes. Standardise existing condition surveys. Analyse stock for opportunities.

Identify common planning constraints and provide web guidance on what is possible/acceptable.

Offer or recommend defined packages of measures for different types of building.

Training for surveyors or builders on these packages of measures

Identify routes to retrofit and compile resources for residents.

Aggregate works across multiple homes to give better purchasing power.

Make sure offer is compatible with grant funding or finance packages.

Standardise application process for common planning constraints.

Provide training for tradespeople and Trustmark accreditation.

Publicise local trusted tradespeople.

Provide quality assurance checks, e.g. as part of building control and using PAS 2030/2035

Lightweight survey for residents and homeowners on making the process better. Identify new interventions?

Action 7 Review current maintenance programmes and identify retrofit opportunities

Review planned maintenance and upgrade programmes

London local authorities have ongoing regular and planned maintenance programmes for their own housing stock. They generally cover regular maintenance, housing upgrade and more major improvement works. Current or upcoming projects may be missing opportunities to contribute to reducing carbon emissions and improve energy efficiency, or even making the situation worse. London local authorities should therefore review their current maintenance and upgrade programmes as soon as possible to identify projects where opportunities are being missed. These reviews should recommend which changes in scope of works could contribute to the retrofit programme.

Seek synergies with other housing programmes and priorities

The review should include other housing programmes to cross check
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Help others update their maintenance programmes

Maintenance programmes between councils and also other landlords (including Registered Social Landlords (RSLs)) are likely to be similar. The first London boroughs to undertake a review of their maintenance programme against the recommendations of the Retrofit London Housing Action Plan should share the toolkit/framework with other London local authorities and RSLs. The framework/toolkit should:

- list all types of maintenance works that should be included in the review;
- identify an appropriate point in a project where it is not too late to change. For example this could be pre-construction start, or pre-installation of the part of the works in question.

Maintenance item	Lifetime	Retrofit measures to <i>action</i> or consider
Roof repair (tiles, flat roof)	~30 years	 Roof insulation and airtightness Airtightness connections to surrounding elements
External render or paint	<10 years (cement) 25 years (BBA certified)	 External wall insulation Replace windows while there is access Internal wall insulation while there is access and disruption
Windows & door replacement	10 years guaranteed, typically 20- 30 years for new windows.	 Replacement with triple glazed windows or best available for appearance constraint. Ventilation approach. Recommend new windows don't have trickle vents, move to MVHR. Airtightness connection to wall and floor.
Replastering wall or ceiling	~20 years	 Internal wall insulation (if appearance constrained) Roof and wall airtightness
Kitchen replacement	~5-10years	 Ventilation strategy. Replace cooker hood with recirculation type or careful direct extract if strategy is for MVHR, or continuous extract as part of MEV system. Insulation to kitchen floor (if ground floor) Internal wall insulation behind units
Boiler	10 - 15 years	 Replace with heat pump system Improvements required to reduce heat load.
Extract Fan/Cooker Hood	~5-10 years	 Ventilation strategy. Replace cooker hood with recirculation type if strategy is for MVHR, or continuous extract as part of MEV system. Induction hob and all electric cooking.
Electrical Wiring	Tested every 10 years (homeowner) or 5 years (landlord)	 Spare capacity for heat pump Metering including submeter for electric vehicle charging and heating Spare capacity for electric car charging

Action 8 Facilitate procurement of materials and services at a larger scale

The benefits of connecting a fragmented market

A key challenge with retrofit is how dispersed the work is, and the bespoke nature of each project. Finding and connecting common elements of projects would help delivery and financing through:

- Access to larger contractors who might only quote for projects above a certain contract value
- Shared project management, consultancy and quality oversight
- More consistent workforce learning and improving between similar work
- Labour buying power through larger contracts
- Product buying power through increased quantities of material
- Reduced administration or overhead costs through shared contracts

D pportunities for London local authorities to make links

• Ouncils are well placed as a trusted local organisation to facilitate • Occurement of materials and services at a larger scale. This could be • Other ectly working with homeowners and landlords, or by supporting other organisations or community groups to do so.

The main mechanisms for joining the various types of work could be:

- 1. Councils leading the way by comparing works they are carrying out on their own properties and coordinating procurement.
- 2. Group buying similar work as one package. Councils could help this through:
 - Mapping and sharing planning data on opportunities (see Activity 8.2)
 - Actively helping homeowners and landlords to find others needing similar work, or actively setting up opportunities for homeowners (see Activity 8.3)



Estimated total investment for Net Zero Pathway for all London properties from Parity Projects Pathways Report for London Councils v1.4.

69%

Projects that have a total works value of less than £30,000 if completed in one phase. It is more likely that single domestic homes will have multiple packages of work spread over a number of years.



The average project value per home assuming works to a typical home are carried out in three or more phases. The market is very fragmented and aggregation represents a significant opportunity.

Working together is a no brainer

To meet Net Zero carbon targets, all London local authorities will need to embark on a substantial investment programme to retrofit existing homes.

Although there are always unique cases, the homes and types of work across London are actually similar. This provides significant opportunities for sharing procurement, but also design and specification for common types of work. And councils are experienced clients who are well placed to develop efficiency and effectiveness further by working together.

In some cases an individual borough will have sufficient scale of work to procure directly, for example work to a whole block or estate. However for less homogenous property types it is much harder to coordinate and working together would be beneficial.

$\frac{1}{2}$ pportunities for sharing work

Design and specification. Sharing the development of a detailed design and specification that can be repeated. For example, internal wall insulation or the development of a whole house template for a particular archetype.

- Smaller pieces of work, for example pooling work on vacant properties into a larger contract across neighbouring boroughs.
- Quality management and feedback. Setting up a forum for project managers and site teams to share quality issues and experiences for future projects.
- Frameworks are a common way of navigating procurement and offering a pre-selected group of contractors for a particular area or work package. A retrofit framework could be developed, or built on past frameworks (e.g. GLA's RE:NEW) or existing ones (e.g. LHC's energy efficiency measures and associated works).

Any shared procurement should also seek to continue the councils' ambition to work with SMEs in the local area and assist in the development of a local, skills and sustainable supply chain.

Learning from the Decent Homes Programme

The Decent Homes programme had a similar scale and shared ambition across councils. Much of the knowledge and experience from this programme still exists within councils and in many cases is still operating as a home upgrade programme or to implement the Housing Health and Safety Rating System (HHSRS).

Councils should set up a forum to share experiences and lessons learnt to inform the retrofit roll out.

The retrofit revolution and the Retrofit Centre of Excellence

The Mayor has recently announced a 'Retrofit revolution' that includes a Centre of Excellence for Retrofit to help social housing providers including London local authorities to access funding and share resources. This could be part of a forum for sharing retrofit procurement and experiences. Another initiative is the Mayor's new Innovation Partnership which will link up housing providers and builders through all stages of home retrofitting, from planning through to large-scale delivery



The RE:NEW framework was set up by the Mayor of London. It no longer operates, but the structure and ambition could be replicated and improved for use by London Councils. LHC's energy efficiency framework is an existing resource.
Action 8 Activity 8.2 > Develop area-based strategies to enable bulk procurement and delivery

Mapping and sharing planning data on opportunities

The target measures and actions for each home should be accompanied by area-based planning to maximise the efficiency of delivery and allow strategic planning with delivery partners. Bulk procurement could apply to preparation and planning as well as the works themselves, for example the production of whole house retrofit plans. Area planning will also help communicate the intention and potential impact to leaseholders and homeowners.

Area-based retrofit planning should help identify:

Streets and areas which lend themselves to grouped approaches for a whole house strategy, or individual elements. For example streets or estates of repetitive house types or element types. This should apply to the council-owned stock but also to areas of mixed tenures which could then be targeted by engagement campaigns to encourage the various owners to pool together. See next page for example categories.

Conservation areas which will benefit from specific guidance and possibly retrofit plan templates. Councils could procure guidance on this together, or at least ensure they share lessons across boroughs.

- Socio-economic factors which could help prioritise intervention, for example, areas of high fuel poverty, poor health outcomes, or poor air quality, where retrofit interventions could deliver multiple benefits and for which additional funding sources may be available.
- Areas served by different heating technologies. If an area is to be served by a sustainable low carbon heat network, it should be identified precisely (safeguarding large proportions of the borough can be over ambitious and ultimately misleading).

This area-based retrofit planning should also integrate into wider areabased energy planning, as recommended by the Climate Change Committee and Ofgem and for which guidance is starting to be available from the Energy Systems Catapult (<u>https://es.catapult.org.uk/reports/local-</u> <u>area-energy-planning-the-method/</u>).



Where possible delivering whole house retrofits of an entire street should be the goal. This is the model used by Energiesprong, but cab be a challenge due to tenure and desirability (© Google Streetview – Southwest London – groups of similar houses)



The Parity Projects Pathways report for London Councils provides mapping for some types of work across Lower Super Output Areas (LSOAs). This type of analysis at a higher resolution could start to show where similar work packages existed between boroughs.

Different housing types and tenure are likely to be more suited to different delivery mechanisms.

Some of these are already being investigated at scale and this table provides a broad categorisation of delivery mechanisms, suitability and how they might scale. London local authorities should pick the most appropriate route for each context, and prioritise whole building retrofit where possible. Councils should not permit piecemeal renovation of individual elements unless there is a plan in place for how the work fits with the whole retrofit.

For more information about the examples, please refer to the following pages 85 and 86.

Potential delivery route coordinated by a Retrofit plan and identified in area plan.	Building type suitability identified in area plan	Tenure suitability identified in area plan	Potential for scaling	Examples
Whole building refurbishment all at one time. Between tenancy or ownership, temporarily decanting residents, or with residents in place.	Distinct housing archetypes that exist at scale.	All, but requires coordination between residents and shared contracts. More suited to multi-residential freehold or estate properties. Leaseholder engagement is critical.	Medium, limited to repeatable house types and standardisation. Private landlords may be unlikely to opt for this approach. Already being explored in London.	Energiesprong, Retrofit Accelerator: Homes, energy performance contracting
Phased packages of measures delivered across a large number of homes.	Distinct building features that exist at scale.	All, but requires coordination between residents and shared contracts.	Large, but requires aggregation across multiple homes. Familiar to landlords. No large scale success to date.	Solar together, Retrofit Works
Phased packages of measures delivered home by home.	No consistency required. Houses, harder for flats.	More suitable for owner occupied or smaller landlords	Large, but more dependent on the market and supply chain.	Green Home Grant, Carboncoop, Warmer Sussex
Piecemeal intervention with an element by element approach based on opportunity or funding. No retrofit plan.	Not recommended	-	-	ECO grant funding, Green Deal

Action 8 Activity 8.3 > Consider a London-wide retrofit programme for homeowners

Many urban streets have multiple homes sharing a similar layout, construction or building features. If groups of individuals can be brought together to procure the same intervention - window replacement, for example - on multiple properties, this will allow more effective procurement and more efficient installation works than if each house is approached separately.

London local authorities should consider acting as 'aggregators' to pool work of a similar nature and offer packages of work to contractors and

investors. This could be similar in principle to the Solar Together programme. The additional complexity of retrofit measures should be considered as it is likely to represent a significant challenge but a Londonwide retrofit programme for homeowners could and should have the following advantages:

Trust: the combination of Council-led offer with technical support age>2 (webinar, email support) from supply chains is very powerful

Ease and clarity

- Planning: working with planning teams upfront e.g. 'in this area, we have agreed with planning and conservation officers that it's ok to do x under conditions y & z' would add to the appeal of the programme
- ✓ Stepped process: free step 1, relatively low deposit at Step 2, "get out" options afterwards
- ✓ **Community:** residents could be told how many people are taking part, which builds a sense of community and reassurance. This could be taken further by creating local networks or forums.

Community-led investment could also be used and promoted for pooled work. London local authorities should liaise with local suppliers and community groups to promote energy efficiency amongst homeowners, landlords and leaseholders, and to bring together buying power for products and provide access to larger providers and contractors.

Council or partnership company identifies a package of complementary measures and invites interest.



Homeowners/landlords register interest. For example a package of measures including replacement sash windows and improved ventilation.

Council or provider tender all applications as one set of works to a suitable designer and contractor.

Homeowners/landlords directed to national or regional resources for advice, such as https://www.simpleenergyadvice.org.uk/

Example outline process for aggregating a package of works across multiple homes

Solar together is an example of a model to increase the project scale for roll out of building mounted renewable electricity generation from solar PV.

It offers group buying for solar panels and battery storage to homeowners. The programme is operated by iChoosr and is currently active in London as well as Essex, Hampshire, and Warwickshire, with emerging programmes in seven other counties. It provides more competitive prices for solar PV and impartial information and management to ensure quality of the system. A retrofit version of this initiative could use a similar model.



independent experts in group-buying

Learning from Solar Together to create "Retrofit Together"

Action 9 Enhance planning to facilitate low carbon retrofit, including in conservation areas

Positive action in planning

The planning policy requirements for energy efficiency in new construction have improved over time. However, the same has not happened for works to existing buildings requiring planning consent. Planning policy should seek to highlight the opportunities available for existing buildings, and support projects that include improvements in energy efficiency.

Permitted Development rights and local planning special guidance could be used to give more support to energy efficiency. Current guidance focuses on extensions or restrictions, not areas that are positively viewed by the planners.

Environmental and heritage conservation hand in hand

Low carbon retrofit of heritage and traditional construction buildings is possible; there are a growing number of examples which show it can be one, and the PAS retrofit framework provides a risk assessment methodology and supports a growing supply chain.

Sell-planned retrofit programmes can also actually contribute to conservation by incorporating maintenance and repair, and offer a new lease of life to buildings. They limit the risk of under-heating by occupants worried about energy bills, with the associated risks of fabric degradation. By being more comfortable, buildings are also more likely to remain valuable and well looked-after in the future.

Retrofit projects to historic buildings have so far faced an uphill struggle at planning, mainly due to the lack of policy clarity in support of energy efficiency measures. The 'significant weight' placed on buildings with heritage value in the National Planning Policy Framework must be balanced with the 'public benefit' of energy efficiency improvements. Local policy aimed at encouraging low energy retrofit and advice and support on how to do this responsibly and with appropriate care could help expand a market where there is growing demand.



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It can be done: The Technology Strategy Board "Retrofit for the Future" programme, undertaken over 10 years ago, deliver 80% carbon reductions on 37 pilot homes. This included 11 pre-1919 homes which demonstrated that heritage sensitive retrofit measures can deliver the scale of carbon reduction we need to see happening more.



Recent leading-edge examples of considerate and ambitious retrofit: Grade I Trinity Student Halls, Cambridge (left), and Grade II early Victorian home in Clapham, London (Harry Paticas). Both include the application of internal insulation, with attention to moisture movement and monitoring of interstitial moisture level. The Clapham House achieved AECB Silver certification and is considered as exemplar by Historic England.

Action 9 Activity 9.1 > Provide planning guidance to enable retrofit

Clear guidance on what is possible

'Requiring planning' is seen as a significant barrier to retrofit. Existing policy is not necessarily understood, could dissuade a homeowner/landlord from progressing, and at worse directly prevents retrofit from happening through planning refusal.

London local authorities and the GLA should work together to put in place planning guidance to actively promote the process for key retrofit

improvements. In the short term this could be through Supplementary Planning Guidance or Planning Advice Notes at the borough level. Examples for this already exist and could be used as very good starting points: Camden council has a general Retrofit Planning Guidance note, and Brighton & Hove has detailed Planning Advice Notes on external wall insulation and conservation areas.

Birectly addressing heritage concern and value

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Conservation area assessments do not mention retrofit or energy reficiency. Councils should clarify acceptable interventions in each conservation area, such as where external wall insulation is an acceptable approach, for example to the rear of properties, or to some stucco/rendered properties with certain conditions on detailing.

Provide a simple application process for key interventions

Some interventions for retrofit require a change to the external fabric of the building. Where this is known and is not covered by the planning system, London local authorities should seek to create standardised and simplified processes for applications. Examples of where retrofit could require planning are given opposite. **Removing unused chimneys** which, even when blocked, are a large air leakage path and often a large source of moisture ingress. Chimneys that are not protected or critical to a street scape should be decommissioned and removed wherever possible.

Changes to window frame widths or removing glazing bars is often necessary to accommodate improved window performance. Glazing bars significantly impact window performance by being a thermal bridge through the glass and reducing useful solar gain.



Ventilation grilles are needed in external walls to provide supply and extract air and improve air quality. The MVHR location is important, sometimes the best location is on a street facing wall.



Space for external wall insulation and roof insulation in the pitch may require an overhang to the street or neighbour, or an increase in ridge height. Providing clear process for applying to highways, party wall surveyors, and even local permitted development for ridge height increases would make rolling out retrofit easier in many situations. This would need consultation with heritage officers.

Activity 9.2 > Provide guidance for planning officers

Best practice is changing quickly

State of the art in sustainability and retrofit best practice is changing quickly and is likely to continue to do so as momentum builds to address the climate emergency. It can be challenging for sustainability officers, let alone other specialists such as conservation officers, to stay on top of the latest thinking and solutions. Building partnerships between departments within the council specifically on retrofit would be very beneficial.

Using the planning process as a positive opportunity

Questions and comments at pre-application meetings or in planning feedback carry a lot of weight while consequential improvements required by the building regulations are often not considered or given sufficient weight. There is therefore a substantial opportunity for the planning pocess to influence positively the scope and ambition of projects volving retrofit (e.g. extensions, change of use).

Siving planning officers confidence and support we recommend that London local authorities develop internal guidance and knowledge transfer mechanisms on retrofit, including:

- Supporting a network of housing delivery, energy and conservation planning officers from all boroughs, to share concerns, solutions, common questions. The network should have access to advice from the energy efficiency and heritage experts.
- Disseminating existing guidance and case studies.
- **Training** and events tailored to planning officers, on the topic of energy efficiency and low carbon solutions.
- Bringing in external advice for example on design review panels.



Research carried out by Historic England and others has helped to inform advice and guidance on improving the thermal performance of traditional windows. © Historic England

Measures such as internal wall insulation and secondary glazing have been poorly implemented in the past, leading to fabric damage, and as a result they are viewed cautiously by conservation officers who may often recommend their refusal. However, competent professionals understand how and when such measures can be successfully applied and the right type of materials.

Example resources for planning officers

- AECB Retrofit standard and Carbonlite Retrofit course
- Historic England: How to Improve Energy Efficiency
- LETI Climate Emergency Retrofit guide
- London Borough of Camden Energy efficiency and adaptation (2021) and Retrofit Planning Guidance (2013)

Action 10 Develop retrofit skills actively across London



Actively encourage retrofit skills in London

There is a large appetite for home improvement, and a significant opportunity to use the current 'build back better' intentions to promote accelerate a retrofit skills agenda. To capitalise on this and deliver od quality retrofit, there is a need for skilled tradespeople.

Focus on local SME, general builders and insulation installers

SMEs are often cut out of commercial retrofit work. Market engagement should encourage local SMEs, particularly in the largest categories of trades needed. For example giving preference to contractors working with local trades should continue and should be extended to expecting main contractors to provide training to subcontractors. This could focus on a particular insulation installation, or Trustmark registration.

Develop the Retrofit Coordinator role

Retrofit Coordinators are a new and important profession that can provide oversight and enable retrofit work. Creating a clear call for Retrofit Coordinators could drive other parts of the market.



Estimate of number of tradespeople involved in retrofit nationally from historic data (1997 to 2018). The proportion of general builders and insulation specialists is very low and still below the peak in 2008. If anything it is currently falling. The Retrofit Coordinator role did not exist until 2019. (Source: Parity Projects Pathway report for London Councils)



Forecast number of tradespeople required to achieve a net zero retrofit in London.

The peak number of general builders, plasters and insulation installers is 50% of the entire current national pool.

(Source: Parity Projects Pathway report for London Councils)

Action 10 Activity 10.1 > Work with partners to develop a spending commitment for retrofit

Giving confidence to the market with a clear pipeline of work

London local authorities and partners should work together to stabilise the retrofit market locally to buffer the 'boom and bust' central government grant schemes where they can, and help develop the supply chain.

By working together to develop a spending commitment and a timeline for completing retrofit works, London local authorities and others, for example Housing Associations, could stimulate supplier investment in training and scaling up. This would benefit the whole market locally and improve skills.

An example of the approximate investment level has been taken from the parallel work completed by Parity Projects. The exact amount and timescale would need to be decided by those involved.

Any publicity should highlight the skills and qualifications that prospective montractors would need, for example being Trustmark registered. It should so require larger contractors to commit to not only employing local porkforce and SMEs, but also training them to the required level.



The total investment by LSOA area for all properties including council-owned.

It is not possible to separate out the council-owned properties, but the data provided by Parity Projects shows spending on retrofit is needed in all areas with a relatively even distribution across London.

(Source: Parity Projects Pathway report for London Councils)

Action 10 Activity 10.2 > Develop a London-wide vetting scheme for retrofit installation

Construction quality is generally poor

The general quality of retrofit work in the UK is poor. There is no entry level barrier to work in the domestic retrofit market, anyone can advertise and there is no formal qualification or skill level required. There have been some poor examples, including retrofit led at scale by local authorities.

Poor construction quality is particularly noticeable in London where the large demand, size and transience of the market means that trades can avoid the impacts of a poor reputation or bad review. In addition, the feedback from clients is often based around experience such as punctuality, cleanliness and communication – rather than construction quality.

Vetting contractors for retrofit skills

Finiting to existing registration schemes and a transparent review process of uld provide a way of recognising contractors who are working on retrofit projects, which would carry less risk than direct recommendation of pecific companies. This could be by partnering with existing consumer bebsites and through the Trustmark endorsement scheme (see activities 10.3 and 10.4 for more information on this scheme) or through co-op vetting.

Trades get most work through recommendation

Typically through word of mouth, local message boards, or specialist websites. London local authorities should consider engaging with these platforms and actively signpost tradespeople who reach Trustmark accreditation or who have worked successfully on council retrofit projects. Government endorsed register of tradespeople



Checkatrade

WBuildercom

rated people

Commercial tradesperson recommendation services. Checkatrade is the most established in the retrofit sector.

Social media websites where more organic recommendations often take place



Which

Homeowners are unlikely to go through registered schemes to find a builder and are more likely to rely on consumer lead networks or local recommendation. These support individual installers but do not provide guidance on an overall strategy for retrofit. London Councils could promote the scheme provider as a source of trusted trades in the local area.

Examples of ways to engage with trade recommendations

- Publishing lists of local retrofit companies used by the council. Ensuring that they register with Trustmark.
- Leaving a review on Checkatrade or similar for all tradespeople who work for the council. This should be part of the council standard procurement process.
- Working or partnering with existing consumer websites such as Checkatrade or similar to encourage them to include retrofit skills as part of their trade categories.

Action 10 Activity 10.3 > Upskill Building Control Officers and drive up the quality of retrofit works

Quality checks of design and on site

Local authority building control could play a key role in quality checking retrofit. Building control can be under-resourced, however by offering an additional service to give homeowners piece of mind there may be an opportunity to increase the role of professionals who are already experts in residential construction.

London local authorities should provide training for building control officers around energy efficiency and retrofit. They should investigate offering an enhanced service through local authority building control to act as a retrofit quality check.

The service could offer continuity from end to end and oversight of the works. It could be supplementary to the Retrofit Coordinator, or ensure quality where a Retrofit Coordinator is not involved.

Rearning and improving based on project feedback

Byinging monitoring into the process is critical for successfully rolling by trofit out at scale. Feedback and transparent continuous improvement will reassure residents, tradespeople and building owners that the council is in this for the long haul. This could also help to minimise the impact of inconsistency from central government.

London local authorities should carry out a post project review on all council housing retrofit projects.

Example retrofit process

Plan – design information produced, or list of measures from the homeowner or builder. For example window replacements and a quote from a supplier.

Procurement – Find trusted and capable tradespeople to deliver the work.

Installation – Carry out works. Manage installation and minimise disruption to residents. Construction guality assurance.

Feedback – Use experience from individual projects to refine offer and suggest new interventions.

Example check by Council service

Design information review to provide impartial advice on level of performance products achieve compared to market, key considerations, key additional work that will be needed (for example ventilation).

Review contractor tenders and suitability for the works that have been proposed. Preference for specialists with clear experience carrying out the work.

Construction site quality visits with feedback to the builder and client. Could be part of or supplementary to Building Control visits.

Collate lessons learnt from projects to share publicly or with future clients.

Provide contractors with feedback on improving installation.

Ensure resident experience is captured and considered for future projects.

Contact residents 12 months after completion to ask about energy bills and home experience, and to catch any issues.

Part of an example retrofit process showing how a council service could provide quality assurance to homeowners or landlords undertaking improvement works.

Action 10 Activity 10.4 > Work with existing training schemes and programmes

Specific skills required for home retrofit

Local skills should be developed in retrofit specific trades. The approach to retrofit has to be adaptable to the variability between individual homes. Every home will need some work by variously skilled individuals, which represents excellent local job opportunities.

The Trustmark quality scheme

Trustmark is the government endorsed scheme for guality control and registering trusted tradespeople for Retrofit. To register as a provider, tradespeople need to sign up through a 'scheme provider' and achieve a Retrofit Coordinator Level 5 Diploma.

Future grant funding and delivery is highly likely to require Trustmark accreditation. One of the reasons the Green Home Grant voucher scheme Reled is a lack of registered providers. Training should therefore focus ound increasing the number of Trustmark registered providers across Pondon.

🖄 uncil projects should require Trustmark qualifications for contractors and designers.

London local authorities should either partner with a current scheme provider to provide tradesperson training, or set up a dedicated scheme provider to oversee training, marketing of trusted trades, and guality assurance on projects.





Some example Trustmark scheme providers including companies, suppliers and product associations. London local authorities could create a scheme provider to serve the London area, or partner with an existing scheme provider. Retrofitworks have already carried out significant work in London and others are also very active. The full list is available here: https://www.trustmark.org.uk/ourservices/scheme-providers



STROMA



The Retrofit Academy and Green Register (Futureproof) are current course providers for Retrofit Coordinators. The AECB have an excellent existing retrofit course and are launching a coordinator course in the summer. One or more of these organisations could be a key partner to set up courses in London colleges.

Action 10 Activity 10.5 > Create London retrofit training centres for existing and aspiring tradespeople

Qualifications required for access to grant funding

Following industry lobbying, the publication of PAS 2035 and the introduction of Trustmark, it is highly likely that any future grant funding scheme will require Trustmark registration and a retrofit qualification. These qualifications also provide the Councils, as clients, a way of distinguishing between trades with Retrofit experience. London local authorities should positively promote these qualifications ready for future grant funding.

Making training available in London

There are currently no colleges offering Retrofit Coordinator training in London. Existing colleges and training programmes should be made aware of the demand for retrofit qualifications and skills needed including:

General knowledge on existing buildings and construction types Specialist fitting skills such as heat pump installers and window fitters Insulation installers

No Risk assessment, project management and the Retrofit Coordinator role. Trustmark accreditation.

The Mayor's Construction Academy hubs are a Mayor of London initiative to improve skills in the construction sector and are delivered by existing colleges. They already teach many of the skills required, but are typically focussed around new construction. As part of the London Recovery Programme's Good Work Mission, the Mayor will establish a number of similar hubs in different sectors, including the green economy.

London local authorities should work with the Mayor's Academy hubs and Adult Education Budget (AEB) funded providers to ensure suitable retrofit training is available locally. The providers could partner with existing training organisations using existing courses as a basis.



Key MCA Hub Lead

- 1 College of Haringey, Enfield & North East London
- 2 Ealing, Hammersmith & West London College
- 3 London Borough of Barking and Dagenham
- 4 London Borough of Camden
- 5 London South Bank University
- 6 London South East Colleges
- 7 Transport for London8 London Borough of Net
- 8 London Borough of Newham9 South London and Partners

Map of Mayor Construction Academy hubs.

London local authorities should contact these hubs to ensure that retrofit specific training is available, review its consistency with the Action Plan and raise awareness of the skills required.

Action 11 Set up a clear and consistent system to monitor progress and success

With the urgency and complexity of retrofit there is a significant risk of failure or repeated mistakes. It is therefore critical that a feedback mechanism and sharing of experiences is built into any retrofit programme. It will require resources and funding, but we consider that the benefits and value justify them.

Monitor improvement at the dwelling level

Building performance evaluation of individual projects can give insights and lessons learnt to take forward on future projects. Energy monitoring and light touch feedback surveys on all projects would be highly beneficial for showing how effective any programme or works are.

Utilise annual dataset releases from BEIS

The IS release energy and CO₂ emissions datasets every year for each local Authority which are relevant to energy consumption in homes, the total Comestic gas energy sales and total domestic electricity sales. These Sould be monitored annually, with a target reduction in annual domestic So s sales of 10-20%. This gives a high level indication of real impact.

Monitor numbers of low carbon installations

Gathering data on the total number of installations for each technology installed in London will give valuable information on whether we are moving in the right direction and how quickly. The number of gas boilers or Air Source Heat Pumps would for example be a good proxy for heat decarbonisation. These numbers are currently monitored in Germany and evidence the acceleration of the move away from gas boilers towards electric forms of heating.

Communicating success and benefits

Communicating where retrofit has been carried out successfully, had a positive impact on residents and reduced carbon emissions will help accelerate the take up and communicate benefits to other residents, including leaseholders.



Monitoring the impact of the retrofit programme should be implemented at different scales to ensure progress and enable corrective actions along the way.



Borough and post code level domestic gas and electricity consumption is available from BEIS (Subnational gas and electricity) and through the London Datastore website.

This high level data could give a long term indication on whether programmes were achieving real energy reductions.

Action 11 Activity 11.1 > Agree metrics and report Retrofit progress between Councils

London local authorities may independently be progressing retrofit programmes at different speeds and with different approaches. Gathering and sharing data and feedback from retrofitted properties will allow the councils and wider industry to understand and learn from the impact retrofit measures have. This is crucial for successful retrofit. It facilitates identifying and rectifying problems as early as possible.

Potential reporting metrics

Councils should agree a set of reporting metrics that all projects report against. These would be shared between boroughs or could even, with suitable GDPR measures in place, be reported publicly. Example metrics that should be considered include:

- Number of measures installed
- **T** Number of whole house retrofit plans prepared
- Metered energy consumption per property or Standardised post completion resident survey Metered energy consumption per property or per group of properties
- No Post completion spot checks of moisture levels in retrofitted building
- fabric for higher risk scenarios
- Sample monitoring of indoor air quality to build understanding of existing conditions and what makes robust retrofit

Data should be frequently collected and analysed for discrepancies and to feedback learning to other boroughs and the wider retrofit community.

Aligning with emerging industry initiatives

Guidance for carrying out building performance is available for different scales and scope is now available. A full British Standard (BS 40101) is due to be published later this year. London local authorities should ensure the agreed metrics align with the latest industry guidance on effective building evaluation.



Monitoring and data collection of environmental and energy performance is quickly becoming easier. For example the Switchee room thermostat provides landlords with internal temperature, humidity and heating patterns for their building stock to allow early diagnosis or intervention to provide advice for residents.



RIBA Plan for use (2021) and Wood Knowledge Wales Building performance evaluation guide both provide strategic and practical guidance for implementing a range of scales of building performance evaluation.

Borrowing delivery models from the UK and internationally

There is a lot of excellent and innovative work going on to expand retrofit and refurbishment. Councils can borrow and adapt existing models, some are shown and compared on the following page.

BetterHome, started in Denmark was started by private companies Rockwool, Danfoss and Grundfos seeking to stimulate demand for energy efficiency products. It was a one-stop-shop for homeowners to partner them with an installer who would oversee the whole project delivery. There was no tie to using specific products. The scheme was successful and ran from 2014 to 2020 before being closed to new applications.

Bristol City Council Energy services is a dedicated Council team for improving energy efficiency in domestic properties, similar to that provided by some London boroughs. They provide: central application and dissemination of grant funding, guidance on grant schemes, and practical advice. Exploring crowd funding to raise capital for retrofit of community buildings.

The **Carbon Co-op** available in Northwest England, and **Urbed** provide energy services and advocacy for 'People Powered Retrofit' including consultant advice. Their tool, My Retrofit planner, gives a standardised format to give bespoke impartial consultant advice to homeowners. It recommends different strategies and helps householders form a whole house plan with the likely benefits at each step. It is an individual private householder planning tool that costs £550 per home.

M

Energiesprong is an implementation mechanism for retrofit to a net zero carbon standard. It uses energy cost savings from retrofit in a form of energy performance contracting. There have been a number of Energiesprong projects in the UK and more are currently in the planning stage, mainly through housing associations. The Mayor of London's Retrofit Accelerator: Homes programme is aiming to put example homes on the pathway to net zero carbon, including a Whole House approach using Energiesprong UK.

Engie Zero is Engie's version of the Energiesprong model: they help councils unlock finance on the basis of future savings, alongside an energy and comfort plan. An important difference however is that they act as a one-stop-shop, including delivery and, if needed, maintenance and monitoring (while Energiesprong act more as intermediaries).

Parity Projects provide Whole House Plan web tools that show different 'pathways' and compare carbon and energy improvements across a whole stock to create a costed plan for retrofit of each home. It is aimed at local authorities, housing associations, homeowners and landlords who subscribe to the platform. A platform has been developed for London under the name Ecofurb and can be used for free to prepare an indicative whole house plan. It is available at https://www.ecofurb.com. Additional services and works can be provided to take it further,

Retrofitworks is a co-operative with two types of members, contractors and community groups or authorities. The cooperative brokers retrofit work between members and provides quality assurance. This provides contractors with a work pipeline, and authorities a trusted contractor work force. They have delivered ECO and Warm Homes London projects in London and are one of the largest retrofit providers. Retrofitworks was started by Parity Projects, but is a fully independent member-owned cooperative.

SuperHomes, in Ireland, is led by the Tipperary Energy Agency. It is a onestop-shop for homeowners taking them through the initial planning, tendering, and overseeing of the works. The packages include essential elements (e.g. homes have to have an air source heat pump, mechanical ventilation (demand control or MHVR) and insulation) as well as some tailored options. SuperHomes also help with grant funding of up to 35% of the works.

Comparison of example existing energy efficiency delivery models

A number of delivery and financing models could be adopted by councils. Some will be better suited to different parts of the stock, tenure / ownership types or building characteristics. The main models are summarised here in terms of how they address the main challenges to make retrofit happen.

Existing model	Financing	Finding and liaising with homeowners	Planning & technical appraisal	Single phase or phased works	Finding / linking with supply chains	QA / overseeing the works	Follow up	Applicability & notes
ENGIE Zero	Yes	Through landlord	Yes	Single	Yes	Internal	Yes, against guaranteed performance parameters	Social and private rent
Energiesprong	No, but savings guarantee opens opportunities	Currently through landlord	By partners	Single	Partners	No, but contractual performance drives quality	Yes, against guaranteed performance parameters	Social and private rent
People Powered Retrofit (Manchester)	No, group buying for reduced cost	Yes	Yes, my Retrofit planner	Either	No	Yes, Retrofit coordinator	Optional	Individual homeowners
NRetrofit Works	No	Yes	Yes, by Retrofit coordinator	Either	Yes	Yes	Optional	Typically landlords and houses
Super Homes (Ireland)	No (but in Ireland, attracts a 35-50% public subsidy)	Yes, one-stop- shop for homeowners	Yes	Single	Yes	No	No	Individual homeowners
Betterhome (Denmark)	No	Yes, one-stop- shop for homeowners	Yes	Single	Yes	?	?	Individual homeowners. Set up by private companies to drive product demand. Closed, example only.
Other non-energy efficiency models								
PV delivery : Solar Together	No, group buying for reduced cost	Yes	Yes	n/a	via auction	? MCS installers	No	Typically aimed at homeowners

5.0 How to pay for it:

Costs, funding and finance

- Cost of measures and packages
- Funding opportunities for council-owned stock
- Opportunities for collaboration with the finance community
- How to support owner occupiers and the private rented sector



Summary of recommended actions in this area

The key recommended actions and activities in terms of **costs**, funding and finance are listed in the adjacent table.

Each action/activity is explained succinctly in the following pages.

The full list of actions and activities is provided in a separate spreadsheet which London Councils can develop and add to when this phase of the project has been completed.

Costs, funding and finance

12 Establish the cost of retrofit, business case and funding gap for the different tenures

Activity 12.1 > Analyse outline cost of retrofit for whole housing stock

Activity 12.2 > Establish the business case for funding retrofit for council-owned stock

13 Maximise capital finance for council owned stock (and eligible homes)

Activity 13.1 > Coordinate applications for government funding

Activity 13.2 > Assess borrowing and private investment opportunities

14 Create a 'Finance for retrofit' taskforce with finance experts

Activity 14.1 > Assess emerging financial products appropriate for different tenures

Activity 14.2 > Analyse and develop options for seed funding to leverage future finance

Activity 14.3 > Collaborate with other boroughs on finance and funding

15 Support the owner occupier and private rented sectors to leverage private investment

Activity 15.1 > Consider developing innovative finance offerings to support blended funding

Activity 15.2 > Support homeowners and landlords with funding applications and lending

The London local authorities' role in financing retrofit

Money is an issue

London local authorities are committed to working together to retrofit London's building stock to an average level of EPC B by 2030 and many have declared a climate emergency and are targeting net zero emissions by 2030. However, financing and resources are two significant issues as local authorities are under considerable pressure and have limited means. There needs to be a significant amount of public and private finance mobilised for retrofit. And for this to happen there needs to be local and regional co-ordination.

Resources are an issue

Local authorities are also ideally placed to facilitate finance for all stock within their borough, not just council-owned social housing. However, nearly all struggle with a severe lack of resource. So, whilst they are ideally placed to facilitate finance for retrofit, it is recognised that there are significant challenges in funding retrofit for their own stock, let alone the rest of the stock in their borough.

	Social Rented Sector	Owner Occupied	Private Rented Sector
Decision maker profiles	 Housing Association Local council Arms-Length Management Organisation 	First-Time BuyerMortgage HolderOwn Outright	LandlordCorporate LandlordAsset Manager
Who lives Othere and Notho pays?	Tenants in social housing are generally low-income households and have extremely limited ability to contribute to efficiency measures, making owners of social housing the principal investors. Leaseholders can have a different profile.	There is a wide range in purchasing power within this group and a wide range of finance sources available to them to invest in retrofit for their own homes.	The short length of tenancies and lack of disposable income typically seen among private-rented tenants limits their ability to contribute to efficiency measures, leaving landlords as the principal investor.
Financial barriers to retrofit	 Limited funds – new construction, retrofit of existing stock and building safety improvements compete for council budgets High upfront costs – both councils and housing associations have large portfolios Long term financing – short term government grant programmes make it difficult to develop long term plans and finance models Interest rate – housing associations have the highest share of the stock and face higher borrowing rates than local authorities 	 High upfront costs Lack of access to capital Low confidence in energy bill savings – where homeowners are seeking full repayment via energy savings Duration of ownerships - the energy bill savings may not accrue to the homeowner if they move out of the property Improvement not reflected in home value Availability to financial products and limited options and desire for borrowing 	 High upfront costs Lack of access to capital Split incentive – most landlords do not pay energy bills and therefore do not financially benefit from the energy bill savings Improvement not reflected in rental value Availability of finance products Freehold owners of leasehold rental properties are typically interested in ground rent only, which is unaffected by property improvements.
Key drivers	Climate change targetsBroader value of health & wellbeing of tenants	Climate change actionMinimising running costsIncrease in asset value from measures	Increase in asset value from measuresIncrease in rental value from measures

Action 12 Activity 12.1 > Analyse outline cost of retrofit for whole housing stock

How much will it cost to retrofit?

It is challenging to provide an accurate cost assessment of the cost of retrofit for housing. It depends on the current building's characteristics and performance and on what works are required.

Parity Projects have provided both London-wide and individual borough data, not only on the profile and performance of existing stock, but also on the number of measures and level of investment required for two different pathways. Broadly, Pathway 1 presents a scenario that cuts carbon emissions by around 56%, and achieves nearly average EPC B; and the Pathway 2 scenario achieves net zero carbon emissions and average EPC B. These reports can be used to understand the total, average and range of investment required. Their analysis suggests a wide cost range between £5,000 and £100,000 per property with averages of £13,000 and £25,900 respectively for Pathway 1 and Pathway 2 to improve the building fabric d ventilation system, change the heating system to a heat pump, Generate a significant amount of renewable energy on-site with roof bounted PVs and be able to manage demand with more flexibility.

Significant leverage of private capital is required

The Energy Efficiency Infrastructure Group (EEIG) and BEIS have both previously provided estimates on investment for a pathway towards EPC C for all homes in the UK by 2030: £73 billion and £65 billion respectively.

Based on the data from Parity Projects, investment for a pathway to towards **EPC B** by 2030 for **homes in London** would cost £49 billion.

It is imperative for government to provide further capital funding and incentives that leverage private funding to reach this level of investment. As part of their study the EEIG illustrated the demands for both public and private investment. Public investment includes current, pledged and required public funding, calling for an extra £7.8 billion of public capital over the next four years. The private funding includes the contributions required from social housing landlords, private landlords, and finally owner occupiers, who represent the largest contribution.

	Pathway 1 - 56% CO ₂ reductions		Pathway 2 - Net Zero			
Total Investment	£49,296,156,159	,296,156,159		£97,956,743,616		
Average Investment	£13,000	£13,000		£25,900		
Properties Affected	3,416,500	416,500		3,780,6180		
	Number of Properties	%	Number of Properties	%		
< £5K	564,340	14.9%	13,060	0.3%		
£5 - £10K	1,115,800	29.5%	61,370	1.6%		
£10 - £20K	828,900	21.9%	1,118,900	29.6%		
£20 - £30K	515,710	13.6%	1,419,300	37.5%		
£30 - £50K	356,840	9.4%	1,072,500	28.4%		
£50 - £100K	33,540	0.9%	92,010	2.4%		
> £100K	1,280	0.0%	3,370	0.1%		

Investment figures from Parity Projects based on analysis of all 3,781,477 properties in the 32 Boroughs and the City of London



Investment pathway towards EPC C for all homes by 2030 developed by EEIG. It includes a requirement for a further £7.8 billion of public capital funding over the four years to the end of this Parliament, outlined in red.

The cost of retrofit should not be exaggerated

It is important to consider whether a measure is undertaken as part of a planned enhancement or maintenance activity. For example, re-rendering a wall would be an ideal time to apply external insulation and would mean the actual extra costs are just the insulation material and labour to secure the insulation to the wall. Retrofit and energy efficiency improvements should be coordinated with planned enhancement, building safety programmes and maintenance activities like this to keep costs down.

Large-scale retrofit programmes will also generate economies of scale which could be factored in when analysing outline retrofit costs.

Consider the cost of retrofit in context

While the level of investment for retrofit represents a huge challenge, it is worth noting that there is already a considerable amount of money being the proving our homes.

Home improvement market St2,100 per home

is the average **annual** spend on renovation and home improvements by people in London. The UK spends £7billion on DIY supplies. Covid-19 has also triggered an increase in home improvement works and planning applications for extensions.

Private rented property repairs £1,000 per home

is the average spend by landlords each year on refurbishments, replacing or repairing boilers and fixing structural damage. These costs will increase with the Minimum Energy Efficiency Standards (MEES).

Social housing costs

Up to £10,000 per home was spent over the last 10 years on more than 1 million homes to meet the Decent Homes standard. Social housing providers also have significant budgets for maintenance and repair, with building safety works now a priority.

Energy costs and fuel poverty £4.2 billion a year

is spent on energy bills by social housing tenants in the UK, with more than half a million households in fuel poverty in London. Schemes such as the Warm Homes Discount help with these payments.



Fixed and variable costs to re-render a $100m^2$ external wall adding an additional insulation layer. This shows that the actual cost of the insulation material and labour is relatively minor. Assuming that the wall had to be re-rendered anyway, for 100mm off insulation, the low carbon retrofit costs should be considered as £3,000 not £15,000

Top 10 most common home improvements

- 1 Getting a new bathroom (39%)
- 2 Installing a kitchen (38%)
- 3 Installing a new boiler or central heating system (34%)
- 4 Having a garden make-over (26%)
- 5 Installing double glazing (26%)
- 6 Building an extension (17%)
- 7 Knocking through rooms (12%)
- 8 Fitting solar panels (12%)
- 9 Getting a loft conversion (10%)
- 10 Adding an extra bedroom (9%)

The majority of the most common home improvements represent opportunities for energy efficiency improvements, decarbonising heat or generating renewable energy highlighted in orange.

Action 12 Activity 12.2 > Establish the business case for funding retrofit for council-owned stock

Plan investment using your Homes Revenue Account (HRA)

The HRA is the account in which a council's housing revenue (e.g. tenants' rent) and housing costs (e.g. property management and maintenance) are kept. It is a landlord account, recording expenditure and income arising from the provision of housing, it is not a separate fund but a ring-fenced account for certain transactions. By law, this account is separate from the 'General Fund' that local authorities use for other fiscal purposes.

The main sources of income are from tenants in the form of rents and service charges, but public funding and borrowing can provide the capital that would be required for retrofit works and maximising capital finance is explored further under Action 13. There is also revenue from planning policies to consider, such as carbon offset payments under Section 106 agreements.

Then establishing the business case for retrofit it is important to develop a mancial strategy that can be supported by the borough's HRA. The business case for retrofitting council-owned stock should be reviewed angside current investment for Decent Homes, building safety works, and maintenance and repair programmes. Efforts should be made to coordinate these works as much as possible to reduce costs.

There is a broader financial benefit to retrofit

There are several second-order effects of retrofit which provide public value and social return on investment (see following page). They should be considered in the business case. There are a few methodologies available to establish the public value of a project. Social Return on Investment (SROI) is an organisational method of accounting for value creation, primarily social or environmental value. The key difference between SROI and other methodologies is the assignation of monetary values to the amount of change created. This can be used to support the financial case of retrofit. The Cabinet Office's 'A guide to Social Return on Investment' provides a comprehensive account of the methodology of SROI.



Over the last 20 years, a very large number of homes have been brought up to the Decent Homes Standard showing that a concerted effort to achieve a retrofit objective is possible, despite challenges and issues.

Suggestions to frame the business case for retrofit

London local authorities could use this structure to develop an investment and business case for retrofit.

- Strategic context How well does the project fit into the council's strategic priorities?
- Affordability Are financial resources available within existing sources of funding for the proposed project and what will be the net impact of the options under consideration, in terms of cost to the organisation versus benefits?
- **Public value** Is there a consideration of the wider benefits compared with costs to UK society of the proposals? This is not the same as the net effect on the local authority and it considers the same range of options as the financial appraisal but from a wider social perspective.
- Value for money defined as 'Public value divided by financial impact'. It measures the social benefit of an option per pound of public cost. Most public sector organisations will need to develop a business case to secure investment.

Bang for the buck: cost of measures and public value

The most common method of rationalising the cost of retrofit is to divide the capital cost by the annual energy bill savings to give the number of years it will take to payback. But what is a good payback? Should we expect full return on investment from retrofit?

If carbon reductions are our primary goal, we might consider the cost per tonne of carbon saved. However, these figures will depend hugely on the carbon factors used, the building's heat source (which could change) and the timeframe over which they are calculated. It can guickly become difficult to compare like with like.

A more reliable metric would be cost per kWh of energy saved. This would allow easy comparison between different measures and packages of measures. However, as well us understanding comparative cost of Health Energy bills and fuel poverty

 ω Increasing thermal comfort and o improving indoor air quality will have a positive impact on health, especially the vulnerable. The IEA and the OECD suggest health improvements might account for 75% of the overall value of improving the energy efficiency of buildings.

Wellbeing

HACT's Social Return on Investment calculator suggests that an improvement of 3 EPC bands in London improve individual's wellbeing, equivalent to £651 per year.

Targeted high energy savings will reduce bills and take more people out of fuel poverty, reducing the need for financial support.

Local economy and job creation

There is a fantastic opportunity for job creation in London. Parity Projects estimate that it can create 40,900 full time equivalent jobs for 9 years to get all homes to EPC B by 2030 and achieve 56% emissions reductions.

Society's cost to achieve Net Zero

There is finite supply and delivery capacity of renewable energy via the grid. The less grid capacity we will need to achieve net zero, the lower infrastructure costs will be.



Indicative energy savings (top axis) and costs (bottom axis) for primary retrofit measures for a medium size dwelling ordered by cost effectiveness (£/kWh saved). The most cost-effective measures do not necessarily deliver the highest energy savings and actual cost must be considered to understand investment vs budget.



A subjective assessment of the impact of retrofit measures on the second-order effects which could help establishing priorities.

Action 13 Activity 13.1 > Coordinate applications for government funding

A changing landscape of government funding for retrofit

In July 2020, the Government announced a £2 billion Green Homes Grant scheme to upgrade homes across England. It was announced that £500 million of this funding would be allocated to local authorities through the Local Authority Delivery (LAD) scheme. £50 million (later increased to £62 million) were also allocated to demonstrator projects of the Social Housing Decarbonisation Fund. Under a year later there is already a very different landscape: the Green Homes grant voucher scheme has already been closed, and it is estimated only £300 million worth of vouchers will have been issued. In March 2021, the Government have announced £300 million extra funding for green home upgrades to be distributed via the Sustainable Warmth Competition (i.e. LAD3/HUG1).

Details on current government schemes, as of May 2021, are provided in **TD**e adjacent table.

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An unsatisfactory funding application process

Ane of the key challenges is that government funding is generally precemeal and stop-start. There is no recognition that to deliver programmes in many communities, across different tenures, there needs to be a long-term approach that allows local authorities to play a key role.

Councils are not given enough notice of bidding rounds and application deadlines, which often does not allow for a well-considered application. The industry is lobbying the Government to address this, but in the meantime, boroughs should prepare detailed stock assessments and building renovation plans including proposed measures, costs and energy and carbon savings. This will streamline the process, ensuring boroughs are ready to take advantage of government funding as it becomes available. **Obligation**

Grants

The Energy Company Obligation (ECO)

ECO is a government energy efficiency scheme designed to deliver on the Home Heating Cost Reduction Obligation (HHCRO) and the Carbon Emissions Reduction Obligation (CERO). Capital is allocated to electricity suppliers who deliver measures to eligible households, namely those who receive the Warm Homes Discount or live in social housing with a poor EPC. ECO Flex allows local authorities to identify further eligible households. The scheme is expected to run until 2026 with an increase from £640 million to £1 billion each year.

The Green Homes Grant Local Authority Delivery scheme (LAD)

The LAD scheme has already been allocated its original £500 million, with £200 million for local authorities to support low-income, fuel poor households and the other £300 million allocated to the 5 Local Energy Hubs. London boroughs should continue to engage with the Greater South East Energy Hub who were allocated £79,600,000, and to apply for LAD3 as part of the Sustainable Warmth competition.

Social Housing Decarbonisation Fund (SHDF)

The Government have also pledged to spend £3.8billion over ten years on the SHDF. Following the £62 million demonstrator scheme, they have announced that a further £60million will be available to Local Authorities for 2020–21 as part of the main scheme, with £240million and £410million provisionally allocated in 2022–23 and 2023–24 respectively.

Home Upgrade Grants (HUGs)

In 2019 the Government manifesto pledged £2.5 billion in Home Upgrade Grants over 5 years for low income households living in inefficient homes. In 2020, it was announced £150 million would be made available in 2021-22, which has now come forward under the Sustainable Warmth competition.

Warm Homes Discount

The Warm Home Discount is a yearly one-off £140 payment applied to eligible customers' electricity bills to reduce living costs for those on a low income or a state pension. It currently costs the Government £350 million per year, supporting 2.5 million households, with extension proposals to 2025/26.

Domestic Renewable Heat Incentive (RHI)

Homeowners and private or social landlords can receive payments for 7 years to fund biomass boilers, solar water heating and certain heat pumps.

Discount

Action 13 Activity 13.2 > Assess borrowing and private investment opportunities

Boroughs can borrow under their Homes Revenue Account

In 2018, the Government confirmed that the HRA borrowing cap was abolished with immediate effect. As a result, London local authorities with an HRA can borrow for any capital expenditure without Government consent, provided they and their auditors are satisfied they can afford to meet the borrowing costs. Borrowing by councils is governed by the Prudential Code for Capital Finance in Local Authorities.

Borrowing can take many forms

Councils can borrow from any willing lender. Most long-term council borrowing currently comes from the Public Works Loan Board (PWLB), but London local authorities can also borrow from banks and investment funds. Increasingly popular are loans between local authorities and community municipal investments.

ତି 9ustainable finance now uses ESG considerations N

Ander Option Borrower Option (LOBO) loans were developed by banks to compete with the PWLB. They are long-term loans, where the lenders have the option to change the interest rate at pre-agreed dates. The borrower can then repay the loan in full or agree to the new interest rate.

In the 2000's LOBOs were very popular with councils but in recent years, their complexities have come to the fore, making them less appealing.

A growing number of financial institutions are now offering lending products that are based on environmental, social and governance (ESG) considerations, where the borrower receives a set discount on the interest rate if pre-agreed ESG targets are met. An increasing number of housing associations are using Sustainability Linked Bonds for low interest rates and long-term capital to fund retrofit programmes. The PWLB is directly managed by HM Treasury and provides loans to local authorities, primarily for capital projects. Local authorities can borrow money from the PWLB at interest rates lower than market rates.

UK Municipal Bonds Agency (UK MBA)

The UK MBA is a Local Government Funding Agency which allows local authorities to diversify funding sources and borrow at a lower cost than is available from central government. The agency sells municipal bonds on the capital markets, raising funds that it can then lend to councils.

The Mayor of London's Energy Efficiency Fund (MEEF)

The MEEF is a £500m investment fund established in 2018 by the GLA with funding from the European Commission, which looks to providing flexible and competitive finance for low carbon projects across London.

Community Municipal Investments (CMIs)

CMIs are a new way to provide a low cost and longer-term form of borrowing for local authorities. It utilises a local investor crowdfunding approach to create a pool of funding. When investors invest in a CMI they are investing directly in the council and the council sets out how it will use the money. CMIs have a dual benefit, they deliver community wealth, while also raising awareness.

Green Investment Group

Sources of Investment and Loans

Coming soon

In 2012 the UK Green Investment Bank plc (GIB) was launched by the UK Government. It was designed to mobilise private finance into the green energy sector. Between 2012 and 2017, the GIB helped to finance more than £12bn of UK green infrastructure projects. In 2017, Macquarie acquired the GIB to create a team of specialist green infrastructure developers and investors.

UK Cities Climate Investment Commission

This partnership between London Councils, Core Cities and the Connected Places Catapult aims to support investment for low carbon projects by:

- creating increased confidence within the investment community in low carbon projects by leveraging the benefits of the scale across the 12 cities
- identifying opportunities for philanthropic investors
- building stronger relationships between UK cities, investment community, supply chain and academic institutions

Action 14 Activity 14.1 > Assess emerging financial products appropriate for different tenures

Support uptake of finance enabling products

The products presented in the adjacent table have been identified by the Green Finance Institute (GFI) as enablers of green finance. They should help to increase confidence, including confidence in lending, borrowing and payback, by guaranteeing performance, setting out coherent plans and providing certification. Boroughs can look to set up their own versions of these products or look to adopt and use emerging standards.

Guaranteed performance is crucial to finance models

Models such as Energiesprong are financed on future energy cost savings and rely on guaranteed performance for their financing model to work. Under the Energiesprong approach, when a building is retrofitted to Net Zero, the costs of the retrofit are paid back as a service fee with these ditional payments being equal to or smaller than the energy bill savings, metimes complemented by a fixed 'comfort charge'. This approach is ecoming increasingly popular. Products such as metered energy savings n support models like this that rely on energy cost saving to give infidence to investors.

Emerging financial products can help mobilise capital

In their report 'Financing energy efficient buildings: the path to retrofit at scale' the Green Finance Institute have detailed a series of emerging financial products that be used to help mobilise capital, these are presented on the following page. As the owners of social housing, boroughs should assess if any of the products applicable to the social rented sector would be beneficial to them in funding retrofit for their own stock.

Boroughs should also review the role they can play in the uptake of products for owner occupiers and the private rented sector. For some, legislation and policy may need to be amended, and for others the council may be able to serve as third party facilitator.

Product	Description	SRS	00	PRS
Metered energy savings	A standardised calculation methodology for energy savings from retrofit to provide confidence in payback.	✓	✓	✓
Building renovation passports	A tool providing information on what measures are possible and a long-term renovation plan for each building that can be achieved at a flexible pace	✓	✓	√
Trustmark Platform / One Stop Shop	A platform to support customers through the retrofit journey: identifying measures, sources of funding and linking homeowners to a reputable supply chain.	√	√	√
Residential Retrofit Principles	A recognised certification for financial products that support retrofit, to enhance the confidence of lenders and borrowers.	✓	✓	✓
Sustainable Housing Label	A certification scheme for green buildings and retrofit projects, spanning the full breadth of tenures, to stimulate demand and investment.	√	√	√

A table of enabling products for green finance, in different stages of development. For more details see the GFI's publication 'Financing energy efficient buildings: the path to retrofit at scale' (SRS=Social Rented Sector / OO=Owner Occupier / PRS=Private Rented Sector)



The Energiesprong Financing approach (Source: University of Strathclyde)

Туре	Product Description		SRS	00	PRS	Maturity
ancy ments	Affordable Rent Adjustment of the 'affordable rent' definition to include energy costs, to incentivise landlords to deliver properties where tenants can afford the combined cost of rent and energy bills.		\checkmark			Requires lobbying
Teni Agree	Green leases and rental agreements	Enables social and private sector landlords to recover the cost of a retrofit through adjusted rent prices based on the predicted energy savings, addressing the landlord-tenant split incentive.			\checkmark	Guidelines being developed by GFI
0	PACE Financing (Property Assessed Clean Energy) PACE financing enables homeowners to receive capital for retrofit from financial institutions. The liability is secured against the property not the owner and repaid through an additional property tax, collected by the local authority or a third party, typically over extended timescales that make repayments affordable.		√	√	√	Gaining popularity aboard but not uptake yet in the UK
Service	Community Municipal Bonds	Utilises an investor crowdfunding approach to create a source of funding. They can provide a low cost and longer-term form of borrowing for local authorities.	\checkmark			Gaining popularity
 stment or	Comfort as a service	Homes fitted with energy controls that support remote optimisation of the building performance could achieve significant energy savings that outweigh the cost of home energy optimisation paid to a third party.	✓	✓	✓	Needs more innovation
afic and a contract of the con	Insurance backed comfort plans	The Energiesprong model offers guarantee of carbon savings and a household comfort for up to 30 years.	✓		✓	Commonly used on demonstrator projects around the UK
^{pıi} µ⊥ 243	MEES compliant funding	Private landlords pay a service charge to a guarantor who covers the capital investment required to retrofit the property should MEES regulations be tightened, providing landlords long-term security.			✓	Needs more innovation
	Long-term retail Investment	Retail investors provide capital for home improvements, receiving predictable returns from energy-efficient rental properties.	\checkmark	\checkmark	\checkmark	Needs more innovation
sgr	Green mortgages	rtgages Mortgages that offer preferential interest rates on borrowing for retrofit activities or to purchase energy efficient homes.		\checkmark	\checkmark	Increasing availability from banks
nd Savir	Green Equity Release and Loans	Enable homeowners to unlock or borrow against the equity in their property for investment in retrofit.		\checkmark	\checkmark	No available examples
nding ar	Energy Saving ISA	Energy bill savings from retrofit can be directed towards an ISA or savings product, to help tenants build up their savings for a mortgage deposit.	\checkmark		\checkmark	No available examples
ividual Ler	Domestic energy efficiency salary sacrifice scheme	A salary sacrifice scheme that allows employees to draw a loan through their employer and is repaid through gross salary contributions.		✓		No available examples, 'Ride to Work' parallel
lnd	Leaseholder financing	Provides an attractive financing offer to private leaseholders via social landlords to foster positive engagement and consent for multi-property retrofit.	\checkmark			No available examples

Action 14 Activity 14.2 > Analyse and develop options for seed funding to leverage future finance

Finance experts can advise how seed funding and demonstrator projects can catalyse future finance

Seed funding is an initial investment to inject money into a project in order to help stimulate growth. Usually, seed funding is used to see a project through to the next round of funding or into a position where the project generates its own income. The experience of the finance community can be invaluable in demonstrating how seed funding can provide the resource and development capital to kick start a retrofit programme, which can be recovered across the projects as they subsequently develop.

The GLA's Retrofit Accelerator: Homes is a key programme that many London boroughs are participating in to get the technical expertise they need to kick-start 'whole-house' retrofit projects. Social housing retrofit programmes are often used as demonstrators, acting as a catalyst for trofit across the entire housing stock.

The GLA's Retrofit Accelerator for Homes

- Helps London boroughs and housing associations to develop energy efficiency projects at scale with technical and commercial solutions.
- Is targeting 1,600 whole-house retrofits in Greater London over the next three years across different boroughs,
- Aims to create a market for the low carbon and environmental goods and services sector, creating new and sustainable jobs.
- The £3.6m programme is funded on a 50:50 basis by the Mayor of London and the European Regional Development Fund (ERDF).
- The delivery partners, led by Turner & Townsend, include Energiesprong UK, PA Consulting and the Carbon Trust.

Action 14 Activity 14.3 > Collaborate with other boroughs on finance and funding

Collaborations allow boroughs to combine resources and expertise and achieve cost savings

24

Collaborations where boroughs agree to pool their resources and expertise for the purpose of a specific task can be beneficial to all involved. This may range from applications of public funding, to full regional retrofit delivery schemes. There is a growing consensus that the answer to retrofit delivery is through regional and local authority level strategies, with finance as a key pillar. Collaboration will also provide community wealth and increased awareness and demand for home retrofit.

By using economies of scale, the boroughs can also combine buying power to leverage a lower per-unit cost than they would separately. Other cost savings might include administration, labour or outreach.

An example of borough collaboration

The Borough of Barking and Dagenham led a successful bid for the Social Housing Decarbonisation Fund, in collaboration with the London Boroughs of Ealing, Enfield, Hammersmith & Fulham, Haringey and Lambeth. They were awarded £9.6 million to retrofit an estimated 230 homes in London. They will install external wall insulation and replace oil and gas heating with new airsource heat pumps, along with solar panels, to improve energy efficiency, reduce the carbon footprint and keep residents warm through the winter months. They will work with Energiesprong UK, and Turner & Townsend to deliver the programme.

Action 15 Activity 15.1 > Consider developing innovative finance offerings to support blended funding

The majority of homeowners are not fully 'able to pay'

Privately owned properties, including owner occupied and private rented homes, are the largest and most challenging portion of the housing stock to retrofit. Generally, there is a low level of awareness, a perceived 'hassle factor', and limited access to attractive finance.

Most past and present retrofit schemes can be split into two categories: the 'able to pay' and 'fully funded'. In reality, the majority of the population lies somewhere between these two groups. Homeowners and private landlords will require a combination of public funding, private investment, and financial products to be able to commit to retrofit. The blend of these will be on a sliding scale, relative to the private investment homeowners can contribute.

Going beyond retrofit measures which pay back

Fiten, the economic case for retrofit is only attractive for some measures e.g. those that significantly improve energy efficiency or provide local ergy generation, resulting in cheaper energy bills. A more thorough retrofit, including more substantial energy demand reduction efforts and low carbon heating, is critical to the decarbonisation of homes. However, the savings they elicit, do not return the same level of investment return. Homeowners will therefore need more backing and support to invest in the range of retrofit measures required to achieve EPC B and Net Zero.

Boroughs can provide different offerings for blended finance

Where possible and resources allow, London local authorities should provide direct capital for retrofits to support homeowners and private landlords. However, most of them are unlikely to be in a position to do this. In those cases, boroughs could offer financial support in the form of an emerging financial product that does not require upfront capital, for example, PACE financing (a loan from a financial institution that is secured against a property and is repaid through an additional property tax). Boroughs could collaborate with financial institutions offering PACE financing and offer their services as a tax collector to provide a financial product to homeowners in their borough.



Figure illustrating how to majority of homeowner will require a blended of private and capital finance and the range of funding and benefits associated with different economic groups.

Hackney Green Homes

Hackney Council's publicly owned energy company, Hackney Light and Power have recently launched their Green Homes programme, the first borough-wide programme in London to offer free thermal efficiency measures to privatelyowned and rented homes, including cavity, loft and floor insulation. This will lower energy bills for thousands of residents and significantly reduce emissions produced by heating homes within the borough. They are also set to trial low carbon heating systems, such as hydrogen fuel-cell boilers and air-to-air heat pumps.

The Green Homes programme is aimed at people who privately own or privately rent their home no matter the level of income, with the aim to insulate as many homes as possible. Residents in the borough can also sign-up to access free energy saving advice.



Action 15 Activity 15.2 > Support homeowners and landlords with funding applications and lending

Encourage uptake of public funding and lending

There is currently limited availability of government grant funding for the 'able to pay' market. The recent Green Homes Grant voucher scheme which provided vouchers covering up to two-thirds of the cost of chosen improvements, with a maximum government contribution of £5,000 for homeowners, has now been closed. However, if and when government provides public funding for this sector in the future, London local authorities should facilitate uptake from homeowners by providing details on the scheme and guidance on how to apply.

There are also many emerging financial products that can support homeowners is borrowing money, and London local authorities could inform their residents of these products. Green mortgages such as those provided by Ecology, Barclays and Nationwide offer preferential interest tes on borrowing for retrofit or to purchase energy efficient homes.

One stop shops can make it easier for homeowners

Some one stop shop models are aimed at removing a lot of the Sarriers to retrofit and bringing together compelling financial products. Some one stop shops provide design support and retrofit co-ordination, such as 'Cosy Homes Oxfordshire'.

Change homeowner's perception of investment

Home improvements that directly improve energy efficiency are not currently incentivised and there is often a missed opportunity for homeowners to improve the performance of their homes when they undertake home improvement works. Moving forward, it is hoped that a wider awareness of the benefits of energy efficiency will mean investment is reflected in the property value, therefore incentivising retrofit.

For many homeowners there is also an expectation that retrofitting their home to meet climate change targets should be cost neutral as energy cost savings will enable the initial investment to payback over time. We need to move away from this simplification and understand there may be a pay out, but it is an essential investment that comes with multiple benefits.

£26.6 billion

Current worth of the repair, maintenance and improvement (RMI) market

91,000

Applications for planning in London in 2019 for home improvements.

Source: Home Improvers of Great Britain 2019, BarbourABI

Why was the Green Deal unsuccessful?

- The UK's Green Deal was a government scheme that predated the Green Homes Grants voucher scheme, and was also deemed unsuccessful
- It was an example of a 'pay-as-you-save' scheme, where loans are taken out to pay for the energy efficiency measures and repaid in over a period of time from the energy bill savings.
- However, it had a 7-10% APR interest rate on the loan which was too high.
- It also came with no targets and did not help persuade householders that energy efficiency measures were worth paying for.
- It made many measures unaffordable with its 'Golden Rule' that the cost of works should not exceed the expected energy bill savings.

6.0 How to communicate

Engagement, take up and lobbying

- Engaging with tenants and leaseholders
- Liaising with other social housing providers
- Increasing take up for owner occupied homes and the private rented sector
- A London-wide retrofit campaign
- Lobbying opportunities
- A dynamic and collective Action Plan



Summary of recommended actions in this area

The key recommended actions and activities in terms of **engagement**, **takeup and lobbying** are listed in the adjacent table.

Each action/activity is explained succinctly in the following pages.

The full list of actions and activities is provided in a separate spreadsheet which London Councils can develop and add to when this phase of the project has been completed.

Engagement, take-up and lobbying

16 Social housing: engage with tenants, leaseholders and other registered providers

Activity 16.1 > London local authorities to develop an action plan for their own stock

Activity 16.2 > Develop tools to communicate the benefits of retrofit with both tenants and leaseholders

Activity 16.3 > Liaise with other registered social landlords (e.g. G15) to coordinate actions on retrofit

17 Engage with owner occupiers and the Private Rented Sector

Activity 17.1 > Run a London-wide information campaign on retrofit

Activity 17.2 > Private Rented Sector: provide incentives to pioneers

- 18 Lobby central government for more support, guidance and funding
- 19 Develop, implement and review the Action Plan together

Action 16 Activity 16.1 > London local authorities to develop an action plan for their own stock

The most promising sector for retrofit at scale

Social landlords tend to care about how much their residents spend on energy bills. In fact, it is very close to their core mission: providing access to housing so that it is sustainable financially for the residents and does not require an excessive proportion of their income.

Social landlords also generally have a longer view than homeowners who can decide to move house and sell their assets. They may also have better borrowing capabilities and/or access to funding (e.g. through the Social Housing Decarbonisation Fund).

Obviously social landlords also face many challenges, including the need to convince leaseholders. However, compared to the other sectors, social housing appears to be the most promising sector for retrofit at scale. It is therefore important for this sector to not only lead the way with monstrator projects (a selection of which are shown on this page, more e being delivered through the Retrofit Accelerator programme) but to develop action plans specific to each borough but consistent with this trofit London Housing Action Plan. It is expected that local authorities Il have similar key archetypes, which justifies further collaboration on whole house plan templates relevant to these archetypes.

We recommend that all London local authorities develop their own strategic Retrofit Housing Net Zero Action Plan to take retrofit forward. They should use this document as a starting point but should make it specific to their own stock, and collaborate/share it with the other London boroughs.



City of London George Elliston House and Eric Wilkins House



Enfield Walbrook House



Haringey Broadwater Farm estate



Greenwich Plumstead Estate



Kensington & Chelsea Lancaster West Estate



Richmond & Wandsworth Fitzhugh Estate



Different residents, different drivers

Many residents will already be concerned about climate change and want to understand how they can make changes to help. Communication with residents can tap into this desire to take action and further encourage retrofit.

However, some residents will be worried about what retrofit means for their current home, a place they may have spent time nurturing over many years. Retrofit can change the space and systems in a home. Being honest about what this means will be important, but also emphasise how these changes will benefit them through improvements in the comfort, health, and a possible reduction in ongoing costs. In particular, a clear outcome for any retrofit project should be to create better and healthier places to live. This positive message should be reflected in discussions with

residents.

Depending on the measures needed, there may also be concerns around disruption, and following the Grenfell tower tragedy some residents will tifiably be nervous about the safety and the quality of the retrofit oject. Engaging residents on the details of what will be included in the works and the associated quality assurance process can help reassure residents.

The situation will differ for all residents, so strategies should be developed afresh rather than using a 'one-size fits all' system.

Guidance from industry

A useful summary of how residents may like to hear about improving the energy performance of their homes has been published by TPAS and Placeshapers earlier this year (2021) in a report titled 'Residents' voices in the UK's Net Zero Carbon journey'. The project worked with focus groups, including over 100 residents as well as sustainability experts.

The resultant report makes a series of recommendations, based on the feedback received, on the best way social landlords can engage with residents.

PLACESHAPERS & TPAS

Residents' voices in the VK's Net Zero (arbon journey

Why how we talk about green homes and places really matters

Author - James Bryson

Recommendations

- 1. The social housing sector should work collaboratively to develop clear communications • advice for landlords. This should include:
- Developing tried and trusted messaging that landlords can use. Our groups provided a number of very useful insights into how best to communicate with residents on why upgrading their heating system is beneficial: saving money, providing 'healthy homes', helping reduce climate change. But there isn't a clear, tested message that social landlords can use. The social housing sector should fund further communications research with a representative cross section of residents from across the country to test key messages and phrases which can help residents to understand the benefits of new heating systems to them and how they help meet the net-zero carbon target.
- Developing a bank of case study examples of people who have had positive experiences of retrofit and who are saving money on bills by living in low carbon homes.
- Drafting a high-level road-map which individual associations can adapt and use which shows how the sector will meet the 2050 target.
- Recruiting resident ambassadors who can talk honestly about the pros and cons of the new technology to other residents and communities.

- Engaging with local authority leaders and bodies such as the Local Government Association to develop plans for cohesive local sustainability strategies with associated communications plans.
- 2. The Government must start now to deliver information and awareness campaigns that provide the context for social landlords' work. Work delivered by the social housing sector is vital, but it must be supported by wider communications from all stakeholders including government. It will be far harder to engage residents with the retrofits needed in their homes unless they can see how it fits into the roadmap to the nation's net-zero carbon target.

The UN Climate Change Conference to be held in Glasgow later this year is an ideal opportunity to launch this campaign and demonstrate how we can decarbonise housing across the country.

- 3. There are a number of practical, immediate steps social landlords can consider now:
- Demonstrate commitment to the net-zero agenda through their wider business strategy by investing in more green space, sustainable vehicle fleets and creating low-carbon office space.
- Where possible social landlords should aim for whole house retrofits. Residents showed a clear desire for a co-ordinated whole house approach. This will ensure the home is energy efficient and comfortable. Residents who are completely satisfied in their low carbon home will be more likely to recommend the process to neighbours and friends. Some retrofit measures, such as insulation, are popular and sought after by most residents. Combining retrofit methods that are popular with lesser known technology, such as air source heat pumps, can generate goodwill and create demand from residents.
- Dedicated and trained customer liaison officers should be appointed to co-ordinate engagement campaigns and managing retrofits. An individual who acts as a point of contact for residents from the start to end of the project will provide reassurance for residents.
- Internal training and communications campaigns are crucial. Residents will want as much information as possible regarding their homes, mixed messages or lack of knowledge can undermine resident engagement. Promoting and explaining the benefits of low carbon housing should be done whenever possible, carbon literate staff means engagement can happen organically during home visits and everyday repairs.

Extract from TPAS and Placeshapers report on residents' voices. This resource is available from the Placeshapers website.

Recognising different priorities

The feedback from London local authorities during the development of this Action Plan was very clear: it is very important to draw a distinction between tenants and leaseholders and recognise that retrofitting properties will impact on them in different ways. Tenants, who will not generally carry the cost of retrofit will likely be more worried about the disruption and changes in space whereas a primary focus for leaseholders will the cost of any change.

Communication strategies are a crucial initial step to correct misunderstandings and widen support for retrofit projects. These strategies will need to reflect the priorities for the targeted stakeholder.

By taking to time to talk with residents at the start of the project, a priority list can then be developed to help communicate with residents in a way Reliance their feelings.

 \mathfrak{M} e economics of mass retrofit can be heavily impacted by project scale. We should be aiming to retrofit streets of homes at the same time rather than on a house-by-house basis.

Project programmes should therefore allow substantial time for engaging all residents - this may require the initial stages of project programme to be extended by up 10%-20%.



Example hierarchy of priorities - think about how the needs of different residents are to be addressed in the communication strategy on retrofit measures.



The above external wall insulation and window improvement scheme by Hounslow Council has helped making these homes much more efficient and comfortable. In the future, these schemes should ideally be offered and extended to interested leaseholders, which will take time in terms of communication at the outset of the project.

Action 16 Activity 16.3 > Liaise with other registered social landlords to coordinate actions on retrofit

Councils and Registered Providers share similar challenges

Although there are significant differences between London local authorities and registered providers both in terms of their approach to stock management and their underlying economic model, there is a wide range of actions and activities which will need to be undertaken by both of these groups. Although these could happen in parallel, there is every reason to seek to build bridges between the two programmes.

Create a Retrofit London social housing working group

The adjacent table provides examples of Action Plan activities which represent clear collaboration opportunities between London local authorities and registered providers. They include:

- Technical collaboration on simplifying the retrofit challenge by comparing council and registered providers' social housing stock, identifying common archetypes and sharing whole house retrofit plan templates.
- Procurement collaboration, building on some existing shared procurement models (e.g. LHC) and aggregating demand for the social housing stock in the respective boroughs or in London as a whole.
- **Cost and finance collaboration**, sharing cost estimate, ideas for cost optimisation and analysis of suitable emerging finance products, including investment from institutional investors.
- Communication collaboration, enabling the development of better engagement tools and material around the benefit and necessity of retrofit.

We recommend that London Councils make the most of these collaboration possibilities by creating a Retrofit London social housing working group, open to interested registered providers as well. 6 Map out each building's journey towards lower energy costs and Net Zero

Activity 6.1 > Develop whole house retrofit plan templates for key building archetypes

8 Facilitate procurement of materials and services at a larger scale

Activity 8.3 > Develop area-based strategies to enable bulk procurement and delivery

- **12** Establish cost of retrofit, business case and funding gap for the different tenures Activity 12.1 > Analyse outline cost of retrofit for whole housing stock
- 14 Create a 'Finance for retrofit' taskforce with finance experts

Activity 14.1 > Assess emerging financial products appropriate for different tenures

16 Social housing: engage with tenants, leaseholders and other registered providers

Activity 16.1 > Develop tools to communicate with both tenants and leaseholders

Sample of activities from the Action Plan representing opportunities of collaboration between London local authorities and Registered Providers operating in London



The G15 is made up of London's largest housing associations. Together, they build a quarter of all London's new homes and own or manage more than 600,000 homes.
Action 17 Engage with owner occupiers and the Private Rented Sector

London local authorities will naturally engage with tenants living in their own building stock, as well as leaseholders, and can collaborate with registered providers to engage with social housing residents. In order to deliver their climate change objectives they must also do what they can to facilitate retrofit in the owner occupier and private rented sectors, and this includes significant additional efforts to communicate to a wider group of residents.

Analogy with communication on recycling

An analogy could be established with the efforts undertaken by local authorities over the last 20 years to encourage recycling. Similarly to that challenge, it is obvious that engaging only with social housing tenants and leaseholders would be insufficient. If insulation and heat pump installation rates are to increase to the level required, engaging with all Londoners \mathbf{U} about the need and benefits of retrofit, as well as the support available, Gill be key.

N Mforming all owner occupiers and helping the pioneers

The appetite for retrofit among homeowners is variable and depends on many factors including financial and sociologic considerations but also building related constraints. It would be beneficial to both raise awareness of the need and solution for retrofit and also support those home owners who do not need convincing but require other types of support.

PRS is a very challenging but important sector

The private rented stock is generally in a poorer state, tenants are often on lower incomes and are more likely to be from Black, Asian or Ethnic Minority groups. 18% of London's PRS households are in fuel poverty, compared with 10% of London households overall (2018 ONS). It is therefore important not to ignore this sector but to acknowledge its challenges - particularly its fragmentation and the lack of incentives for landlords. It is more likely to be a sector which 'follows' the examples set by the social housing and the owner occupier sectors.



rate of heat pump deployment it would take

to hit net-zero

Average annual number of installations across low carbon heating technologies compared to the number required to meet Net Zero by 2050 in the housing sector (Source: The pathway to net zero heating in the UK, UK Energy Research Centre, 2020)



Exemplar programmes such as Cosy homes Oxfordshire seek to support motivated homeowners and help then with the retrofit process.

Action 17 Activity 17.1 > Run a London-wide information campaign on retrofit

Raise awareness

Every year 1.7 million boilers are replaced in the UK: this is a key intervention point at which private homeowners can decarbonise their homes, before investing in another gas boiler for the next 15-20 years. Many homeowners are unaware of options for low carbon heat though and, beyond heating, of which retrofit measures would suit their homes.

Engagement with residents should also focus on the "why?" and enable people to see how their choices impact the bigger picture, whilst recognising that even homeowners are a very broad group. Tackling the "why?" and trying to motivate residents 'en masse' is best dealt with by a large-scale, London-wide information campaign.

The collaboration between London local authorities for this is a significant opportunity, and reaching out to social housing providers and other sident associations to guarantee a unifying message that hits home with sidents and does not publish confusing or misaligned information would also be very beneficial. Furthermore, lessons learned from previous mpaigns can ensure that messages are chosen that truly reflect the the eds of residents. One example of this is to focus on improvements in the quality of homes instead of on fuel bill reductions.

Shed light on the unknowns

Retrofitting our homes is a huge step into the unknown for most residents. A separate campaign should be aimed at informing the wider public about what is involved and the ways in which it can be achieved.

Amplifying resident voices

Perhaps the most effective way to communicate improvements from retrofitting homes is through the voices of residents themselves. Boroughs should work together to bring the positive messages of previous retrofit projects forward in public campaign, showing others what retrofit changes people's home and quality of life for the better.



People Powered Retrofit is a householder-led approach to domestic energy efficiency retrofit in Greater Manchester. It is a partnership led by Carbon Co-op and URBED with funding from the Department of Business Energy and Industrial Strategy (BEIS).

Action 17 Activity 17.2 > Private Rented Sector: provide incentives to pioneers

Regulations may help, but are not enough

Government recently consulted on requiring private rented homes to achieve an EPC of C by 2030. This would obviously help but the target is not ambitious enough and exemptions may leave a large part of the PRS stock not even meeting it. Further action by the London local authorities is therefore required to provide incentives to private landlords to retrofit their buildings in line with the recommendations of this Action Plan.

Licensing schemes and the Landlord accreditation scheme

Some local authorities in London operate a selective licensing scheme, which applies to all privately rented properties and the GLA operates the London Landlord Accreditation Scheme. It is possible to use them to encourage landlords to put in place whole house retrofit plans consistent with this Action Plan, for example through a reduction in the licensing fee.

©ommunicate with tenants

Chergy efficient properties (e.g. via the 'advice for renters' GLA webpage).

Create an energy use disclosure: Households could submit data on a voluntary, anonymised basis. This would help them become more aware of energy use and the industry to gather much needed data.

Work with utility companies

Utility companies hold a lot of useful data and could play a more active role in identifying and helping the fuel poor.

Work with Environmental Health Officers (EHOs)

EHOs are generally responsible for helping to enforce minimum standards. Minimum Energy Efficiency Standards (MEES) and retrofit requirements could gradually become part of their responsibilities, particularly for properties where interventions are needed to address excess winter cold or mould.



Tenants should not be put at risk of eviction for requesting energy improvements. Not carrying out regulatory energy efficiency standards should put landlords at risk of being on the "rogue landlords" register.

The Boroughs could also work with the London Landlord accreditation scheme to make energy efficiency an accreditation criterion.



Targeted PRS action could include advice to tenants and landlords. It should also be coordinated with protections for tenants and the overall PRS strategy.

Snapshot from GLA PRS information page: PRS retrofit action should be coordinated between Boroughs and with the GLA, and build on the current overall PRS strategy.

Provide energy efficiency indicator as additional search option?

e.g. average energy use, average fuel bills, EPC rating, carbon emissions?



The London rent map (hosted by the GLA) could potentially allow searches not only by number of bedrooms, but by energy efficiency indicator. This could help stimulate demand, but also provide a more comprehensive indication to tenants of overall monthly running costs of properties.

Action 18 Lobby central government for more guidance, funding and support

The need to retrofit the vast majority of London homes happens at a time of unprecedented pressure on local authorities in terms of budget and resources. Although London local authorities acknowledge the central role they will have to play over the next decades, it is absolutely crucial that central government help them. We recommend that the 33 London local authorities and the GLA articulate a number of key demands.

More legal requirements

It is obvious that legally requiring some retrofit measures (e.g. replacement of a gas boiler with a low carbon heat alternative) would massively simplify the challenge for local authorities, even for their own stock. In the absence of legal requirements the onus will be on them to justify and persuade, making the transition to Net Zero much slower.

For the private rented sector, providing long-term clarity on the trajectory or Minimum Energy Efficiency Standards (MEES) to inform landlords and ouarantors would be very beneficial, and this should reflect much needed forms to SAP and EPCs.

More and better designed funding for all tenures

Most government support schemes for retrofit have generally failed due to the poor design and spending timescales, with disastrous consequences. This should stop and the Government should engage with local authorities to design better and more sustainable funding schemes. VAT reform for retrofit would also be very helpful as VAT currently effectively increases the cost of low carbon retrofit by as much as 20%.

A new approach to electricity prices

The adjacent pie chart shows that environmental and social obligation costs are currently being levied much more significantly on electricity than gas. 23% of the cost of electricity is made up of environmental and social obligation costs compared to only 2% of the cost of gas. Re-adjusting this balance, combined with the roll out of smart meters, would significantly help, making the transition to low carbon heat much easier.

Heat in Buildings

The Department for Business, Energy & Industrial Strategy is working with stakeholders to save carbon and transform the way we heat our homes and businesses.

Co	ntents
-	Government priorities
-	What we have done so far
-	What we are doing next
-	Any recommendations or questions



BEIS are currently developing a UK heat strategy which is due to be released by 2021. It has the potential to help accelerate the transition away from fossil fuels



Breakdown of average gas and electricity bill (pie chart)

Total cost of ownership with time-of-use electricity prices (bar chart)

(source: Getting on track to Net Zero, a policy package for a heat pump mass market in the UK, RAP and E3G, 2021)

Action 19 Develop, implement and review the Action Plan together

Sharing knowledge on current initiatives

The climate emergency declarations of many London councils have triggered an assessment of their current housing stock carbon pathway to 2050, and a review of what may be required of the housing stock in general.

The relative failure of national retrofit schemes in the past few years has also led many London councils to realise that the local and regional scale is the most appropriate scale to define and deliver the low carbon retrofits which need to happen over the next 20-30 years. The adjacent diagram summarises the initiatives under way across London. It is crucial that knowledge and findings are shared in the next few months and years.

Bevelop future activities together

σ

This Action Plan provides a starting point for a coordinated of ort on retrofit across all 33 London local authorities, and it should be seen as a dynamic plan. New initiatives on low carbon retrofit being taken forward in the different boroughs across all tenures should also be signposted. There is currently a particular gap in activity related to London's private housing stock (homeowners and PRS).

The role of the Greater London Authority

Although London local authorities are likely to be 'on the front line' of housing retrofit, there is a significant potential for the GLA to accelerate change by:

- Coordinating efforts on infrastructure related works (e.g. solar PVs, electrical grid and smarter London)
- Reducing planning barriers to retrofit
- Providing guidance
- Helping to fund pioneering schemes

Demonstrator projects

- Houses: Brent, Enfield, Lewisham, Newham, Sutton, Richmond & Wandsworth, Waltham Forest
- Blocks of flats: City of London, Enfield, Greenwich, Hackney, Haringey, Kensington & Chelsea, Redbridge, Richmond & Wandsworth, Sutton

Delivery mechanisms, skills and supply chain

- Stock analysis: Camden, City of London, Enfield, Hackney, Havering, Tower Hamlets, Sutton, Westminster
- Skills: Camden's stakeholder engagement event
- Energiesprong: Enfield, Haringey, Sutton
- Window manufacturing:
 Newham

Heat decarbonisation

- Air source heat pumps: City of London, Westminster
- Ground source heat pumps: Barnet, Enfield, Greenwich, Westminster, Richmond & Wandsworth
- Water source heat pumps: Greenwich
- Waste heat: Camden (hospital), Haringey (Energy from Waste)
- Heat network decarbonisation: LBTH

Costs/funding

- Cost assessment: Enfield, Tower Hamlets, Haringey, Westminster
- Green Homes Grant: Camden, Enfield, Haringey, Lewisham, Redbridge, Waltham Forest, Richmond & Wandsworth
- Funding associated with fuel poverty: GLA. Waltham Forest

Electricity decarbonisation

- Solar PVs: GLA, Tower Hamlets, Waltham Forest
- Demand management/Smart energy system: GLA, Greenwich

Engagement / take-up

 Engagement with residents / Communication: Greenwich, Haringey, Waltham Forest

Making decisive steps forward

In summary, the key recommended actions of this Retrofit London Housing Action Plan are listed in the adjacent table, split by category.

- 1 Improve the building fabric 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 the 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, take up and lobbying

- 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** Develop and implement the Action Plan together

Excellent work on retrofit has already been done across London by local authorities, the GLA and building professionals. We now need to build on it and **accelerate action** in order to retrofit London's homes. London local authorities will need help to meet this challenge but they acknowledge the central role they will have to play in the years to come.

The opportunities for London boroughs to collaborate together, with the GLA, and with the construction industry and wider society are very significant. This Action Plan outlines a wide range of recommended actions and activities for this to happen. It would deliver significant potential benefits for London and Londoners in terms of climate change, health, equality and jobs for the future.

The lead boroughs of Enfield and Waltham Forest will now develop the associated Implementation Plan.

2030 is only 9 years away – we must all work together now.









Appendix | Key housing categories in London

CA	TEGORY	MOST FREQUENTLY RECOMMENDED MEASURES	NOTES
1A	Terraces solid brick	 Solid wall insulation (more EWI than IWI) Window upgrades Individual heat pumps Roof PV 	EWI may be hampered by physical features such bay windows or by desire to maintain streetscape.
1B	Terraces solid brick in conservation areas	 Solid wall insulation (more EWI than IWI) Window upgrades Individual heat pumps 	CA restrictions likely to limit EWI (except of rear elevations and gable walls) and PVs. Heat pumps may also be hampered by planning sensitivities. Window upgrades may include secondary glazing.
2A	Non-terraces solid brick	 Solid wall insulation (more EWI than IWI) Window upgrades Individual heat pumps Roof PV 	EWI may be hampered by physical features such bay windows or by desire to maintain streetscape.
2B	Non-terraces solid brick in conservation areas	 Solid wall insulation (more IWI than EWI) Window upgrades Individual heat pumps 	CA restrictions likely to limit EWI (except of rear elevations and gable walls) and PVs. Heat pumps may also be hampered by planning sensitivities. Window upgrades may include secondary glazing.
3A	Mansion blocks / converted street properties.	 Solid wall insulation (more EWI than IWI) Window upgrades Individual or communal heat pumps Vertical PV 	EWI and vertical PVs may be hampered by physical characteristics and the need to to the entire block despite likely multiple ownership. Individual heat pumps may sometimes be hard to install for mid level flats.
^{3B} Pa(Mansion blocks / converted street properties in conservation areas	 Solid wall insulation (more IWI than EWI) Window upgrades Individual heat pumps 	EWI likely to be rarely possible.
ye 260	Homogenous housing estates (solid or cavity or system)	 EWI and CWI Window upgrades Individual or communal heat pumps Roof PV 	Likely that this group may break down into more archetypes with specific challenges.
5	Suburban cavity semis/detached with gas boilers	 CWI Window upgrades Individual heat pumps Roof PV 	Careful detailing between windows and CWI important as possible cold bridge.
6	1950s to 1975 system/cavity built blocks not communal heating	 CWI and EWI Window upgrades Heat pump or direct electric Vertical PV 	Individual heat pumps may sometimes be hard to install for mid level flats
7	1950s to 1975 system/cavity built blocks with communal heating	Community heat pumpVertical PVCWI	Low carbon community heating may be the most important measure for this type. Need to ensure that the heating system has capacity to adequately heat all flats. Some supporting fabric measures may be required.
8	1983s to 2002 mid-rise flats with electric heating	 Individual Heat pumps or direct electric with some fabric measures to support 	Locating heat pumps may be challenging
9	1983s to 2002 mid-rise flats with gas heating	Individual or communal heat pumpsVertical PV	Locating heat pumps may be challenging
10	Houses built after 2007 (no fabric needed)	Individual heat pumpRoof PV	Assumption that no fabric measures needed should be tested as there may be a performance gap between RdSAP heating estimate and actual
11	Flats built after 2007 (no fabric needed)	Individual or communal heat pumpsPV	Assumption that no fabric measures needed should be tested as there may be a performance gap between RdSAP heating estimate and actual

1-6 relay on multiple measures requiring higher degree of coordination. 7-11 relay more on tech and less on fabric, but actual existing performance should be verified. Categories 1-3 rely on SWI. The modelling relies heavily on EWI outside 118 conservation areas and in IWI within. Its likely that a more mixed approach will be required. Categories 1-4 are likely to require the most coordination and these archetypes may therefore require especially highly resolved whole house plans

Agenda Item 8

	Deteil
Committee(s):	Dated:
Residents Consultation	27 September 2021
Barbican Residential	08 October 2021
Subject:	Public
2020/21 Revenue Outturn (Excluding the Residential Service	
Charge Account)	
Which outcomes in the City Corporation's Corporate Plan	4,12
does this proposal aim to impact directly?	
Does this proposal require extra revenue and/or capital	Ν
spending?	
If so, how much?	N/A
Has this Funding Source been agreed with the	Y
Chamberlain's Department?	
Report of: The Chamberlain Director of Community &	For Information
Children's Services	
Report author: Goshe Munir, Senior Accountant,	
Chamberlain's Department	

Summary

This report compares the revenue outturn for the services overseen by your committee in 2020/21, with the final agreed budget for the year.

These accounts do not include income and expenditure in relation to dwellings service charges, which is the subject of a separate report before you today, but does include the following: -

• Landlord Services

This includes income and expenditure relating to short term lessee flats, void flats and commercial properties as well as grounds maintenance for public areas.

• Car Parks

The running expenses, capital charges, rent income and service charges relating to 1,272 car spaces of which some 850 are currently occupied.

Baggage Stores

The running expenses, capital charges, rent income and service charges relating to 1,621 baggage stores.1,432 baggage stores are currently occupied.

• Trade Centre

This is a commercial area of some 117,000 square feet bounded broadly by Beech Street, Aldersgate Street, Fann Street and Bridgewater Square. Capital charges are the main item of expense, although some premises and supervision and management costs are incurred. Income comprises rent and charges for services including Nuffield Health, GSMD Practice room, Laundrette, Parking Services and Creche.

1. Total net expenditure during the year was £2,943,000, whereas the total agreed budget for net expenditure was £3,036,000, representing an underspend of £93,000. This is summarised in the table below:

Summary Comparison of 2020/21 Revenue Outturn with Final Agreed Budget – Barbican Residential Committee							
Latest Agreed Revenue Outturn Variations							
	Budget		Increase/				
			(Reduction)				
	£000	£000	£000				
Expenditure	(4,091)	(4,407)	(316)				
Income	4,955	5,316	361				
Net Local Risk	864	909	45				
Central Risk	135	185	50				
Recharges (4,035) (4,037) (2)							
Overall Totals (3,036) (2,943) 93							

2. The Director of Community and Children's Service's local risk underspend on the Barbican Residential Committee was £45,000 in 2020/21. Of the Directors overall underspend £73,000 has been agreed to be carried forward to help fund works to welfare facilities for estate cleaning staff which were delayed in the financial year. Further carry forward request totalling £56,000 related to renewal of Cromwell Tower car park smoke vents has also been agreed.

Recommendation(s)

3. It is recommended that this revenue outturn report for 2020/21 and the budgets carried forward to 2021/22 are noted.

Main Report

Revenue Outturn for 2020/21

- 4. This report compares the revenue outturn for the services overseen by your Committee in 2020/21, excluding the dwellings Service Charge account, which is the subject of a separate report, with the final agreed budget for the year.
- 5. Actual net revenue expenditure for your Committee's services during 2020/21 totalled £2,943,000. A summary comparison of this expenditure with the final agreed budget for the year of £3,036,000 as set out in the budget report to this Committee in December 2020, is tabulated below. In the various tables, figures in brackets indicate expenditure or adverse variances, decreases in income or increases in expenditure.

Comparison of 2020/21 Revenue Outturn with Latest Agreed Budget					
	Original	Latest	Revenue	Variations	
	Budget	Agreed	Outturn	Increase/	
	Duugei	Budget		(Reduction)	
	£000	£000	£000	£000	
<u>Local risk</u>					
Employees	(2,001)	(2,009)	(2,058)	(49)	6
Repairs and Maintenance	(1,292)	(1,626)	(1,004)	622	7
Other Property Related	(289)	(300)	(325)	(25)	
Supplies and Services	(163)	(156)	(1,021)	(865)	8
Total Expenditure	(3,745)	(4,091)	(4,407)	(316)	
Total Income	4,827	4,955	5,316	361	9
Net Local Risk	1,082	864	909	45	
Central Risk	225	135	185	50	10
Total Recharges	(3,949)	(4,035)	(4,037)	(2)	
Total	(2,642)	(3,036)	(2,943)	93	

- 6. The overspend of £49k in Employees costs is due to increased costs on overtime and temporary staff cost mainly within the Car Park Service due to the pandemic.
- 7. The underspend in Repairs and Maintenance of £622k is mainly due to repairs delayed due to the pandemic as contractors work was halted to critical and emergency works only. Costs were also contained where possible to offset the overspend related to the large bad debt provision incurred in the year.
- 8. Supplies and Services adverse variance of £865k is due to the provision for bad debt adjustment within the Trade Centre for an existing customer withdrawing from their lease agreement.
- 9. The favourable income variance of £361k is mainly due to higher than expected rental income collected from the stores and Trade Centre, as well as an unbudgeted £78k received as a grant contribution.
- 10. The Central Risk increase income of £50k is related to the actual insurance income being higher than budgeted for in Landlord Services.
- 11. Annex A1 sets out an analysis by service area of the £93,000 overall outturn variance.
- 12. Annex A2 shows the reconciliation of the original budget to the latest agreed budget.

Appendices

- Annex A1 Barbican Residential Committee Comparison of 2020/21 Revenue Outturn with Latest Agreed Budget by Service Areas.
- Annex A2 Barbican Residential Committee Comparison of 2020/201 Original Budget with Latest Agreed Budget.

CONTACTS

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Barbican Estate Office – Anne Mason, Budget and Service Charge Manager T: 020 7029-3912 E: <u>Anne.Mason@Cityoflondon.gov.uk</u>

Annex A1

Barbican Residential Committee – Comparison of 2020/21 Revenue Outturn with Final Agreed Budget

Comparison of 2020/21 Reven				
Se	ervice Area			
	Variations Increase/ Reduction			
Supervision and Management - General	0	0	0	0
Landlords Services	(2.953)	(3,106)	(2,520)	586
Car Parking	(346)	(430)	(339)	91
Stores	5	(4)	75	79
Trade Centre	653	505	(152)	(657)
Other Non-Housing	(1)	(1)	(7)	(6)
Total	(2,642)	(3,036)	(2,943)	93

Recharges include recharges from the Service Charge Account to Landlord and Car Park Accounts for cleaning and electricity as well as and Central and Departmental Recharges.

Annex A2

Barbican Residential Committee – Comparison of 2020/21 Original Budget With Final Agreed Budget

	£'000
Original Budget	(2,642)
Increase in Contribution Pay Centrally Funded	(8)
Carry forward agreed for Building of welfare facilities for estate cleaning staff	(210)
Supplementary Revenue Projects (SRP) increased funding allocation budget	(237)
Increased Recharges including Capital Charges and Technical Recharges	61
Latest Approved Budget	(3,036)

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Committee(s)	Dated:
Residents' Consultation Committee	270921
Barbican Residential Committee	081021
Subject: Service Charge Outturn 2020/21	Public
Which outcomes in the City Corporation's Corporate	4 12
Plan does this proposal aim to impact directly?	
Does this proposal require extra revenue and/or	N
capital spending?	
If so, how much?	£
What is the source of Funding?	
Has this Funding Source been agreed with the	Y/N
Chamberlain's Department?	
Report of: Andrew Carter Director of Community and	For Information
Children's Services	
Report author: Anne Mason Community and Children's	
Services	

Summary

This report provides information on residential service charge expenditure for 2020/21. It also compares the outturn with the 2020/21 estimate and the 2020/21 actual expenditure.

Table 1	Actual 19/20 £,000	Actual 20/21 £,000	Variance Last Year	Estimate 20/21 £,000	Estimate 21/22 £,000
Annually recurring items	(9,513)	(9,518)	0%	(9,095)	(9,716)
Projects	(626)	(133)	78.75%	(112)	(45)
Total	(10,139)	(9,651)	4.81%	(9,207)	(9,761)

The reconciliation between the amounts charged to leaseholders and the City's closed accounts is set out below.

Table 2 Summary service charge reconciliation 2020/21	£,000
Actual Service Charge Expenditure Corporate Accounts Fees, charges and cleaning and lighting recharges Barbican Estate Office Adjustments	<mark>(9,821)</mark> 119 51
Final Service Charge Expenditure	(9,651)

Recommendation

Members are asked to:

• Note the report.

Main Report

Background

1. This report explains the variations in the service charge outturn and also reconciles the service charge being made to residents and following the closure of the Corporate accounts.

Current Position

Key Data

Residents' Service Charge Outturn

2. The total amount charged to the service charge account for 2020/21 is £9,651,021 this is 4.81% lower than the 2019/20 charge and 4.82% higher than the estimate.

Analysis of the 2020/21 Service Costs ANNEX 1 -

- 3. This annex shows the expenditure headings on the service charge schedule, with the main basis of attribution and a comparison between the actual service charges for 2019/20 and 2020/21 The estimates for 2020/21 are also shown.
- 4. The comparison with the 2019/20 actuals shows significant variations for several service heads.

- 5. The lift maintenance charge was higher in 2019/20 due to the final invoice for 2018/19 being charged in 20/19/2020. Also, there was a reduction repair costs in 2020/21 compared to 2019/20.
- 6. The furniture and fittings charge is mainly for replacement carpets in the tower and corridor blocks. These replacements are carried out in consultation with the housegroups and usually vary considerably from year to year.
- 7. The reduction in the window cleaning costs is due to the suspension of the window cleaning service at the start of the financial year.
- 8. Expenditure on cleaning materials and equipment increased significantly due expenditure on PPE and sanitising chemicals.
- 9. The decrease in expenditure on cleaning staff reflects a decrease in the supervision and management costs allocated to cleaning.
- 10. The increase in weekend and bank holiday cleaning costs reflects the additional time spent during the year in the relevant blocks.
- 11. The higher garden maintenance cost is due to the employment of additional resources as requested by residents.
- 12. The increase in Car Park attendants' costs is mainly due to increased agency and overtime costs to cover sickness and higher supervision costs. There was also additional expenditure on PPE.
- 13. The increase in Lobby porters' costs reflects the additional agency and overtime costs to cover sickness and shielding staff. There was also additional expenditure on PPE.
- 14. The increase in garchey costs is mainly due to an increase in repairs expenditure, from £90.6k in 2019/20 to £145.3k in 2020/21. However, garchey repairs expenditure in 19/20 was significantly lower than the previous year (£124.4k). The increase in expenditure was on works to clear blockages and expenditure on spare parts. Also, over £11k was spent on replacement pumps.
- 15. Most of the general maintenance expenditure is demand led and can vary considerably from year to year. Overall, the cost of repairs has decreased slightly in comparison to 2019/20. However, expenditure on estate wide repairs increased. The expenditure included work on the underfloor heating system controls at a cost of £11,999.65 as agreed by the underfloor heating working party. £4,800 was spent on the refurbishment of trimmers for the underfloor heating system. £4,162 was spent on replacing fencing at the Thomas More play area. Also, the final quarter's charge £7,576 for the 2019/20 IRS maintenance was paid in 2020/21.
- 16. Expenditure on electrical repairs decreased. However, in 2019/20 expenditure was higher than usual mainly due to expenditure on emergency lighting and ventilation.

- 17. Expenditure on interior common parts repairs was also lower than 2019/20. Again, expenditure in 19/20 had been much higher than usual.
- 18. Exterior repairs expenditure overall increased by less than 3%. However, the increase in expenditure on water penetration repairs continued to rise significantly, by over 40%. This increase mainly affected four blocks Lauderdale Tower, Shakespeare Tower, Andrewes House and Bunyan Court.
- 19. Expenditure on safety and security was low in 2019/20 due to credits received against previous invoices.
- 20. The allocation of House Officer, Supervision and Management recharge and Technical recharge are mainly based on timesheet information and reflect the time being spent on service charge issues. This year more of the House Officers' time has be allocated to estate management duties which is included in the Supervision and Management Charge. The overall cost for Supervision and Management and House Officer duties increased by 5.48%.
- 21. The electricity consumption for the underfloor heating was higher than in 2019/20.

Comparison Corporate Account and Final Service Charge Schedule- ANNEX 2.

- 22. Due to adjustments made by the BEO is £50,652 lower than the expenditure in the City's accounts.
- 23. The main adjustments are for heating and water tanks. Accruals made at the end of the year for heating were overstated and adjustments were made to reflect the invoices received in 20/21. The adjustment for the water tanks project is the reversal of last year's adjustment.
- 24. The adjustment for the redecoration projects is for technical staff costs.
- 25. The reduction for technical staff cost is for time spent on work chargeable to the landlord.

The Corporate Outturn Report ANNEX 3

26. The service charge schedules reflect the services provided and the Lease. The headings are different to the corporate report. For example, the employees are included under the cleaning, lobby porters, car park attendants and garchey headings on the service charge schedules along with the relevant associated costs such as uniforms, materials and repairs. Annex 3 shows the allocation of expenditure in the corporate report.

Comparisons to previous years' Service Charge ANNEX 4

27. This shows the service charges by service head for the years 2015/16 - 2020/21.

Conclusion

- 28. Overall, the estate service charge for the annually recurring items has increased by 2.67%.
- 29. The Actual Service Charge schedules and an explanatory letter of the various items included on the schedule will be sent to residents by early September.

Appendices

Annex 1-4

Background Papers None

Corporate & Strategic Implications Key Data

Strategic implications –

Financial implications – Service Charge Expenditure is City Fund.

Resource implications - None

Legal implications - None

Risk implications - None

Equalities implications - None

Climate implications - None

Security implications - None

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CROSS	ITEM	ACTUAL	ACTUAL	Variance Last Year	ESTIMATE	ESTIMATE
REF. KEY	(2019/20	2020/21	%	2020/21	2021/22
1	Electricity (Common Parts and Lifts)	(492,180)	(481,982)	2.07%	(516,441)	(518,714)
2	Lift Maintenance	(390,176)	(361,670)	7.31%	(360,649)	(373,378)
3	Resident Housekeepers (Additional Pension)	(283)	(240)	15.24%	0	0
4	Resident Engineers	(379,651)	(374,229)	1.43%	(413,383)	(387,118)
5	Furniture & Fittings	(24,933)	(7,303)	70.71%	(26,000)	(26,000)
6	Window Cleaning	(159,321)	(144,152)	9.52%	(148,785)	(177,800)
7	Cleaning Materials including refuse sacks	(27,196)	(30,074)	(10.59%)	(32,000)	(35,000)
8	Cleaning Equipment	(4,906)	(16,400)	(234.28%)	(4,000)	(4,000)
9	Estate Cleaners	(1,207,899)	(1,144,548)	5.24%	(1,161,214)	(1,166,548)
10	Additional Refuse Collection	(13,992)	(28,389)	(102.89%)	(8,246)	(28,673)
11	Garden Maintenance	(139,377)	(172,002)	(23.41%)	(130,000)	(174,998)
12	Car Park Attendants	(650,067)	(708,355)	(8.97%)	(658,791)	(680,000)
13	Hall Porters	(696,088)	(827,857)	(18.93%)	(752,000)	(777,999)
14	Garchey Maintenance	(243,503)	(306,135)	(25.72%)	(268,000)	(271,554)
15	Pest Control	(16,562)	(21,101)	(27.40%)	(23,000)	(23,000)
16	General Maintenance (Estate)	(142,522)	(174,759)	(22.62%)	(1,438,401)	(1,517,730)
17	Electrical Repairs (Common Parts)	(176,557)	(96,111)	45.56%	included in above	included in above
18	Electrical Repairs (Exterior)	(270)	245	190.74%	included in above	included in above
19	General Repairs (Common Parts)	(135,641)	(131,212)	3.27%	included in above	included in above
20	General Repairs (Exterior)	(1,078,982)	(1,110,265)	(2.90%)	included in above	included in above
22	House Officer	(132,776)	(142,597)	(7.40%)	(140,000)	(145,002)
	Sub Total - Basis for apportionment of estate	(6 112 881)	(6 279 135)		(6.080.910)	(6 307 512)
	wide Supervision and Management Costs	(0,112,001)	(0,273,133)	(2.72%)	(0,000,310)	(0,007,012)
21	S&M technical	(238,918)	(200,364)	16.14%	(228,918)	(231,770)
23	Estate-Wide Supervision & Management costs	(660,991)	(694,660)	(5.09%)	(694,000)	(714,671)
24	Directly attributed Supervision & Management costs	0	0		inc above	inc above
25	Redecorations	(103,225)	(3,655)		0	0
25	Redecorations Programme 2020-2025	(16,356)	(10,951)		0	0
26	Safety/Security (included in general repairs on schedule)	(22,516)	(37,547)	(66.76%)	inc in repairs	inc in repairs
27	Water Supply Works	(107,186)	(139,427)	(30.08%)	inc in repairs	inc in repairs
28	Concrete works	(77,250)	(9,282)		0	0
29	Emergency Lighting	0	0		(3,000)	0
	Electrical Distribiution Boards	0	(8,093)		0	0
30	Asbestos management / removal	(93,127)	(83,971)		0	0
	Electrical testing	0	0		0	0
31	Roof repairs	(211,082)	7,308		0	0
32	Asset management/Stock Condition Survey	(78,983)	0		(75,000)	(75,000)
35	Water Tank Repairs/Replacement	(428,912)	(108,982)		(112,406)	(45,125)
	Drainage repairs	0	0		0	(108,822)
	Window Replacement	0	(29,976)	ł	0	(183,500)
	Total Services	(2,038,546)	(1,319,599)	ł	(1,113,324)	(1,358,887)
33	Heating	(1,987,745)	(2,052,287)	(3.25%)	(2,013,099)	(2,094,743)
	Total Services & Heating	(10, 139, 171)	(9,651,021)	4.81%	(9,207,333)	(9,761,142)

Cross-						
	Reference			BEO	Service Charge	
Narration	key	CBIS	Actual	Adjustment	Schedule	
		£		£	£	
Electricity (Common Parts and Lifts)	1	(481	,973.01)	(9.15)	(481,982.16)	
Lift Maintenance	2	(359	,335.05)	(2,334.79)	(361,669.84)	
Resident Housekeepers (Additional Pension)	3		(239.93)	0.00	(239.93)	
Resident Engineers	4	(374	,228.90)	0.00	(374,228.90)	
Furniture & Fittings	5	(7	,303.33)	0.00	(7,303.33)	
Window Cleaning	6	(144	,151.66)	0.00	(144,151.66)	
Cleaning Materials including refuse sacks	7	(30	,074.21)	0.00	(30,074.21)	
Cleaning Equipment	8	(16	,400.25)	0.00	(16,400.25)	
Estate Cleaners	9	(1,144	,547.53)	0.00	(1,144,547.53)	
Additional Refuse Collection	10	(28	,388.73)	0.00	(28,388.73)	
Garden Maintenance	11	(172	,020.91)	18.75	(172,002.16)	
Car Park Attendants	12	(708	,556.94)	201.80	(708,355.14)	
Hall Porters	13	(827	,857.04)	0.00	(827,857.04)	
Garchey Maintenance	14	(306	,285.01)	150.44	(306,134.57)	
Pest Control	15	(21	,100.76)	0.00	(21,100.76)	
General Maintenance (Estate)	16	(174	,823.70)	65.00	(174,758.70)	
Electrical Repairs (Common Parts)	17	(96	,111.15)	0.00	(96,111.15)	
Electrical Repairs (Exterior)	18		245.00	0.00	245.00	
General Repairs (Common Parts)	19	(131	,211.52)	0.00	(131,211.52)	
General Repairs (Exterior)	20	(1,110	,265.20)	0.00	(1,110,265.20)	
Technical Services	21	(204	,934.48)	4,570.95	(200,363.53)	
House Officer	22	(142	,597.11)	0.00	(142,597.11)	
Estate-Wide proportion of Supervision & Manageme	23	(694	,763.84)	104.25	(694,659.59)	
Directly attributed Supervision & Management cost:	24		0.00	0.00	0.00	
Redecorations	25		880.84	(4,536.11)	(3,655.27)	
Redecorations Programme 2020-2025	25	(2	,717.93)	(8,233.03)	(10,950.96)	
Safety/Security	26	(37	,547.20)	0.00	(37,547.20)	
Water Supply Works	27	(139	,427.16)	0.00	(139,427.16)	
Concrete Works	28	(6	,971.19)	(2,310.36)	(9,281.55)	
Electrical distribution Board	29	(8	,200.00)	106.80	(8,093.20)	
Asbestos Management	30	(83	,970.85)	0.00	(83,970.85)	
Roof Repairs	31	7	,307.93	0.00	7,307.93	
Water Tank Repairs/Replacement	34	(77	,699.14)	(31,282.62)	(108,981.76)	
Window Replacement	35	(29	,976.00)	0.00	(29,976.00)	
Heating	33	(2,136	,926.22)	84,639.05	(2,052,287.17)	
N/C		(9	, <u>501</u> .27)	9,501.27	0.00	
TOTAL		(9,701	,673.45)	50,652.24	(9,651,021.21)	

Annex 2

Actual 2019-20	TABLE 3 - Service Charge Account	Original Budget	Latest Approved Budget	Actual 2020-21	Variances
£'000		£'000	£'000	£'000	£'000
	Expenditure				
(2,588)	Direct Employee Expenses	(2,716)	(2,686)	(2,674)	12
(4)	Indirect Employee Expenses	(8)	(8)	0	8
(2,592)	Total Employees	(2,724)	(2,694)	(2,674)	20
(2,468)	Repairs and Maintenance	(1,939)	(2,099)	(2,219)	(120)
(706)	SRP projects	0	(91)	(91)	0
(2,594)	Energy Costs	(2,503)	(2,567)	(2,656)	(89)
(138)	Rents	(141)	(142)	(140)	2
(15)	Rates	(19)	(19)	(17)	2
(2)	Water Services	(3)	(3)	0	3
(119)	Cleaning and Domestic Supplies	(222)	(243)	(208)	35
(138)	Grounds Maintenance Costs	(130)	(130)	(172)	(42)
(6,180)	Total Premises Related Expenses	(4,957)	(5,294)	(5,503)	(209)
(40)	Equipment, Furniture and Materials	(74)	(74)	(31)	43
0	Catering	(1)	(1)	0	1
(8)	Clothes, Uniform and Laundry	(12)	(12)	(8)	4
(3)	Printing, Stationery	(6)	(6)	(1)	5
(20)	Fees and Services	(1)	(1)	(38)	(37)
(2)	Contribution to funds	0	0	0	0
(12)	Communications and Computing	(20)	(20)	(12)	8
(85)	TOTAL Supplies and Services	(114)	(114)	(90)	24
(8,857)	TOTAL Expenditure	(7,795)	(8,102)	(8,267)	(165)
10,286	Income	9,317	9,485	9,677	192
1,429	Net Income	1,522	1,383	1,410	27
	Recharges				
(1,585)	Expenditure	(1,697)	(1,509)	(1,554)	(45)
156	Income	175	126	144	18
(1,439)	Total Recharges	(1,522)	(1,383)	(1,410)	(27)
0	Total Service Charge Account	0	0	0	0

Annex 3

Annex 4



Committee(s):	Dated:
Barbican Residents Consultation Committee	27/09/2021
Barbican Residential Committee	08/10/2021
Subject:	Public
Fire Safety Act 2021	
Which outcomes in the City Corporation's Corporate	1, 2, 12
Plan does this proposal aim to impact directly?	
Does this proposal require extra revenue and/or	Ν
capital spending?	
If so, how much?	N/A
What is the source of Funding?	N/A
Has this Funding Source been agreed with the	N/A
Chamberlain's Department?	
Report of:	For Information
Director of Community & Children's Services	
Remembrancer	
Report authors:	
Paul Murtagh, Assistant Director, Housing & Barbican	
William Stark	
Parliamentary Engagement Officer, Remembrancer's	
Office	

Summary

This report advises the Committee of the relevant provisions of the Fire Safety Act 2021, which received Royal Assent on the 29 April 2021. The Fire Safety Act amends the Regulatory Reform (Fire Safety) Order 2005 and is one of several measures introduced following the 2017 Grenfell fire tragedy.

Recommendation

Members are asked to note the report.

Main Report

Background

1. The Fire Safety Act 2021 is part of a series of changes to fire safety and building safety that the Government is making following the Grenfell Tower fire in 2017, with further primary and secondary legislation to follow. The Act seeks to enable the delivery of the recommendations of the Grenfell Inquiry Phase 1 report, published in October 2019, by placing beyond doubt that external wall systems, including cladding and the fire doors to individual flats in multi-occupied residential blocks, fall within the scope of the Regulatory Reform (Fire Safety) Order 2005. In introducing the Fire Safety Bill (as it was then), Ministers made clear that legislation will play a role in tackling delay and inaction by building owners and developers in instigating remediation works.

- 2. Following a strained passage through Parliament, the Fire Safety Bill received Royal Assent on 29 April 2021. The Fire Safety Act, as it became on 29 April 2021, differs from the original Fire Safety Bill in that, it includes two Government amendments with, a new clause dealing with risk-based guidance for fire risk assessments, and the related commencement of that guidance.
- 3. Parliamentary interest in the passage of the Act coalesced around backbench amendments, in both the Lords and Commons, on prohibiting the passing of resulting remediation costs on to leaseholders and tenants. Various iterations of amendments to this effect were agreed by the Lords and caused considerable Government rebellions in the Commons. However, these were eventually rejected on the final day of the parliamentary session.

Current Position

- 4. The Government's explanatory notes for the (then) Bill state that the legislation "will be of particular interest to building owners, leaseholders or managers for multioccupied residential buildings who are likely to be the responsible persons" in ensuring they have assessed the fire safety risks and taken necessary precautions in the buildings they are responsible for. Furthermore, the legislation "will also affirm Fire and Rescue Authorities have the relevant enforcement powers to hold owners or managers to account".
- 5. The Act is intended to complement the existing powers that local authorities have to take enforcement action against building owners and managers under the Housing Health and Safety Rating System, provided for in the Housing Act 2004 and the Building (Amendment) Regulations 2018. The latter, banned the use of combustible materials within the external walls, and certain attachments to the external walls, for any new building with a storey at least 18 metres in height where the building contains at least one dwelling or, met other certain criteria.
- 6. During the passage of the Act, the Government successfully introduced two amendments that saw the introduction of a new clause dealing with risk-based guidance for fire risk assessments, and the related commencement of that guidance. The Act amends Article 50 of the Regulatory Reform (Fire Safety) Order 2005 to ensure that risk-based guidance, to be issued to support commencement of the Act, will have the appropriate status to incentivise responsible persons to comply with such guidance. Furthermore, in line with a report by the "Task and Finish Group" (co-chaired by the Fire Sector Federation and the National Fire Chiefs Council) the Act will be commenced for all buildings at the same time and, Government will issue statutory guidance covering the assessment of buildings with a risk-based approach.
- 7. It should be noted that the Fire Safety Act is far from a 'quick-fix' intended to deal with a specific identified concern. Moreover, the Act has not yet been brought fully into force in England or Wales and, it would seem reasonable to assume that it will only fully come into force when the new guidance is ready. The Act does however, contain provisions (which came into force two months after the Act) allowing government to make future regulations to change the scope of the premises

covered by the Fire Safety Order and to make concomitant changes to fire safety duties.

Implications for Housing

- 8. Fire safety has been of critical concern for all local authorities and housing associations since the Grenfell tragedy in 2017. Essentially, the Fire Safety Act, first proposed in March 2020, was introduced to clarify who is responsible for managing and reducing the risk of fire in different parts of multi-occupied residential buildings to help prevent further tragedies.
- 9. The legislation brings new fire safety obligations to some leaseholders, building owners and managers for the building structure, external walls, common parts and doors between the domestic premises and common parts.
- 10. The Fire Safety Act 2021 amends the Regulatory Reform (Fire Safety) Order 2005 (the FSO) with the intention of improving fire safety in multi-occupancy domestic buildings. Crucially, the external walls of a building and, the fire doors to individual flats must now be assessed as part of the requirement for a fire risk assessment. The Act requires the owners and managers of multi-occupied residential buildings to ensure that the fire risk assessments for such buildings are reviewed and updated to encompass the structure, external walls and flat entrance doors.
- 11. The specific provisions of the Fire Safety Act 2021 include:
 - The Act applies to all multi-occupied residential buildings and is not dependent on the height of the building. The Act further provides English and Welsh Ministers with a regulation-making power to amend the type of buildings the FSO applies to in the future.
 - The FSO designates those in control of the premises as the Responsible Person for fire safety, imposing on them a duty to undertake assessments and manage risks. The Act now requires all Responsible Persons to reduce, as well as to assess and manage, the fire risks posed by the structure and external walls of the buildings and, by individual doors opening onto common parts of the building.
 - The FSO was enforced by fire and rescue authorities but, the Act allows these authorities to enforce against non-compliance in relation to the external walls and the individual doors opening onto the common parts of the premises.
 - The Act also introduces the concept of 'risk-based' guidance in order to support a proportionate approach towards assessing risk.

Ongoing measures for addressing the requirements of the Fire Safety Act 2021

- 12. Back in September 2017, an initial detailed report was presented to the Barbican Residential Committee (BRC) and the Audit and Risk Management Committee updating Members on the City of London Corporation's (CoLC) approach to fire safety in its housing portfolio. This report informed Members of the progress we had made with matters such as:
 - fire risk assessments,

- communication with residents,
- estate management,
- fire safety maintenance and improvement work,
- inspections by the London Fire Brigade (LFB),
- potential future improvement works.
- 13. Regular update and review reports have been brought back to the BRC, informing Members of the work that has been and, is being done to enhance the safety of the Barbican Residential Estate and its residents in the event of fire.
- 14. As Members will be aware from these reports, there is a significant amount of work that has been/is being done across the Barbican Estate that will address some of the requirements and objectives of the Fire Safety Act 2021 including:

Fire Risk Assessments (FRA's)

- 15. As Members are aware, Frankham Risk Management Services Limited completed FRAs for each of the residential blocks on the Barbican Estate in January/February 2018 and, as agreed by Members, these were published on the Corporation's website.
- 16. Whilst, understandably, our focus has been on continuing the progress we have made on the improvements identified in the FRA Action Plan, we have recently appointed Turner & Townsend to carry out new Type 3 (with a number of targeted Type 4) FRA's for our housing stock. Turner & Townsend has now commenced this work on our HRA housing estates, with the residential blocks on the Barbican Estate to follow later in the year. The brief given to Turner & Townsend includes a focus on the assessment of external walls and individual flat entrance doors opening onto the common parts of buildings as specifically highlighted in the Fire Safety Act 2021.

Fire Doors

- 17. The Corporation has committed to replacing all front entrance doors in its residential blocks of flats with fire doors that give up to 60 minutes fire resistance (30 minutes as an absolute minimum).
- 18. We are currently carrying out a full BM Trada audit of the fire doors across all the residential blocks on the Barbican Estate, the results of which, will feed into the Barbican Fire Door Replacement Project. At its last meeting on 28 June 2021, the BRC received a Gateway 2 Progress Report setting out the next steps for this project which, will likely take up to two years to be completed.

External Wall Cladding

19. Shortly after the Grenfell tragedy in 2017, the Corporation carried out an assessment of the construction of the external walls to blocks of flats within its social housing portfolio and across the Barbican Residential Estate. The blocks of flats on the Barbican are, in the main, traditionally built with no significant areas of wall cladding. Furthermore, there have been no subsequent 'improvement' works

carried out to the blocks of flats that has seen the introduction of external wall cladding typically used to improve the level of thermal insulation to traditionally built blocks.

Proposals for further measures to address the requirements of the Fire Safety Act 2021

20. Although the Corporation is taking proactive measures to ensure the continued compliance with relevant fire safety legislation and, wherever possible, preempting future legislation, there is still further work to be done. This includes the following:

Clarification around the role of the Responsible Person

- 21. Under Article 3 of the FSO, the "responsible person" of a premise (either a building or any part of it) is the person who has control of the premises ("the Responsible Person"), which may include building owners, leaseholders or managers.
- 22. Since the scope and scrutiny of fire safety obligations have increased significantly, the Responsible Person needs to review and update risk assessment processes accordingly. Once the risk assessment processes are published, the Responsible Person should apply the risk-based guidance (under Section 3 of the Act) in order to comply with his/her duties in Part 2 of the FSO.
- 23. The clarification provided under the Act, extending the provisions of the FSO set out above, means that the Fire and Rescue Authorities can now better identify the Responsible Person for these parts. This will, by definition, clear the path for enforcement action against and/or prosecution of any Responsible Person who fails to comply with the FSO, which could ultimately lead to unlimited fines and/or criminal prosecutions.
- 24. To a certain extent, the role of the Responsible Person for the Corporation's housing portfolio is currently split between the Estate Office and technical staff with responsibility for ensuring FRA's are carried out and recommendations acted upon. In view of the extended provisions of the FSO, this is not a sustainable option.
- 25. Further work is now being done to assess the role of the Responsible Person and, who that named person will be. It does make sense, as is the case currently, that the Responsible Person should be an estate-based manager however, there is a need to provide targeted and specific training for those staff who will officially take on that role. Similarly, there will also be a need to amend Job Descriptions to reflect the additional responsibility that comes with the role. At this stage however, consideration is also being given to the need for additional specialist resources to carry out the role of the Responsible Person.

Commissioning EWS1 Forms for all our housing blocks of flats

26. An EWS1 (External Wall System) form provides independent assurance that a building meets the requirements of the Government's latest standards. It is not a legal requirement however, some lenders are now asking for EWS1 forms before

they will consider offering a mortgage. We are receiving an increasing number of requests from our residents for EWS1 forms for this purpose.

27. The Royal Institution of Surveyors (RICS) has produced guidance suggesting that any residential building could require an EWS1 form. For guidance purposes and, for members information:

For buildings over six storeys, an EWS1 form should be required where:

- there is cladding or curtain walling on the building or,
- where there are balconies that stack vertically above each other and either, both the balustrades and decking are constructed with combustible materials (e.g. timber) or the decking is constructed with combustible materials and the balconies are directly linked by combustible material.

For buildings of five or six storeys, and EWS1 form should be required where:

- there is a significant amount of cladding on the building or,
- there are ACM, MCM or HPL panels on the building or,
- there are balconies that stack vertically above each other and either, both the balustrades and decking are constructed with combustible materials (e.g. timber), or the decking is constructed with combustible materials and the balconies are directly linked by combustible materials.

For buildings of four storeys or fewer, an EWS1 form should be required where:

- there are ACM, MCM or HPL panels on the building.
- 28. Currently, the Corporation does not provide EWS1 forms to residents who request one and, this is creating problems for residents seeking mortgages. The Corporation has very few blocks of flats that fall into the categories set out in Paragraph 27 above and as stated previously, there is no legal requirement for the Corporation to provide EWS1 forms.
- 29. Officers are currently reviewing the various options around EWS1 forms which include:
 - not providing them.
 - providing them for all our housing blocks to give independent assurance to the Corporation and its residents on the structure and safety of the external wall construction (estimated cost of £60,000).
 - to continue with a risk-based approach based on criteria we gather from our records, surveys and FRA's to allow us to determine the risk level and prioritise those we deem there is a need for an intrusive assessment to be conducted.

30. It should be noted that currently, due to national demand and shortage of skilled professionals who can carry out the required assessments, EWS1 forms are taking a considerably long period of time to acquire.

Further Legislation – Building Safety Bill

- 31. On 5 July 2021, the Secretary for Housing, Robert Jenrick, introduced a revised draft of the Building Safety Bill into the House of Commons. The revised Bill follows a three-year scrutiny and public consultation process and represents a wholescale reform of the building safety regime, in line with the recommendations of Dame Judith Hackitt's 2018 Independent Review: Building a Safer Future. The Bill sets out a new regulatory regime aimed at ensuring the safety of residents in residential buildings.
- 32. The Building Safety Bill establishes a much tighter regulatory regime for buildings above 18 metres high (referred to as 'higher risk' buildings) and includes:
 - a new Building Safety Regulator with approval, enforcement and prosecutorial powers.
 - mandatory reporting of structural and fire safety occurrences.
 - new obligations on Clients, Principal Designers and Principal Contractors, with 'Gateway' points at design, construction and completion to ensure fire and structural safety is considered at every stage of a building's development.
 - the creation of new Accountable Person and Building Safety Manager roles to ensure that fire and structural safety continues to be managed throughout a building's lifetime.
 - criminal liability for both companies and their directors for breaches with unlimited fines and imprisonment for up to two years.
- 33. The Bill is expected to receive Royal Assent in the Spring next year (2022). The Government has indicated that the first round of provisions will come into force within 6-12 months of the Bill receiving Royal Assent (October 2022 to April 2023). The bulk of the new regulatory regime will likely come into force within 12-18 months of Royal Assent (April 2023 to October 2023). Certain obligations will, and have come into force earlier, such as the Gateway 1 process for construction and major refurbishment of higher-risk buildings (1 August 2021).
- 34. The Building Safety Bill is a much broader piece of legislation than the Fire Safety Act 2021, covering risks over and above fire safety (flooding, wind loading etc). However, the Bill has links to the Fire Safety Act 2021 and, officers will be giving due regard to the implications for the Building Safety Bill when finalising proposals for dealing with the requirements of the Fire Safety Act 2021.

Corporate & Strategic Implications

Strategic Implications

35. The proposals contained in this report are consistent with, align with and support the delivery of the Corporate Plan with particular reference to the following:

- Outcome 1 People are safe and feel safe.
- Outcome 2 People enjoy good health and wellbeing.
- Outcome 12 Our spaces are secure, resilient and well-maintained.

Conclusion

- 36. The new Fire Safety Act 2021 brings significant new fire safety obligations to building owners and managers for the building structure, external walls, common parts and doors between the domestic premises and common parts.
- 37. This report sets out the work that officers have done and are doing to ensure that the Corporation is best placed to comply fully with the requirements of the new Fire Safety Act 2021.
- 38. Members should note that further reports will be brought back to the relevant Committees in due course, setting out the progress that has been made and, the subsequent proposals for ensuring compliance with the legislation.

Appendices

None

Paul Murtagh Assistant Director, Housing & Barbican T: 020 7332 3015 E: paul.murtagh@cityoflondon.gov.uk

William Stark Parliamentary Engagement Officer, Remembrancer's Office T: 07522 216 802 E: william.stark@cityoflondon.gov.uk

	-	
Committee(s):	Dated:	
Barbican Residents Consultation Committee (for	27 th September 2021	
information)	8 th October 2021	
Barbican Residential Committee		
Subject: Recognised Tenant Association (RTA) Audit	Public	
2021		
Which outcomes in the City Corporation's Corporate	Contribute to a flourishing	
Plan does this proposal aim to impact directly?	society (1-4)	
Does this proposal require extra revenue and/or	N/A	
capital spending?		
If so, how much?		
What is the source of Funding?		
Has this Funding Source been agreed with the	N/A	
Chamberlain's Department?		
Report of: Town Clerk	For Decision	
Report author: Julie Mayer – Committee and Member		
Services Officer		

Summary

Having undertaken a review of the levels of membership and constitutional make-up of the various house groups, this report sets out those that meet the required qualification for Recognised Tenant Association (RTA) status.

A summary of the results of the review are as follows:-

House Groups				
Achieved RTA recognition	Not achieved RTA recognition			
Andrewes House	Bryer Court <i>(did not apply)</i>			
Ben Jonson House	John Trundle Court (did not apply)			
Brandon Mews (pending AGM minutes)	Lambert Jones Mews (did not apply)			
Cromwell Tower	The Postern <i>(did not apply)</i>			
Defoe House	Bunyan Court <i>(did not apply)</i>			
Frobisher Crescent				
Gilbert House				
Lauderdale Tower				
Mountjoy House				

Seddon House	
Shakespeare	
Speed House	
Thomas More House	
Willoughby House	
Barbican Association	
Breton House	

Recommendations

- 1. The Barbican Estate Residents' Consultation Committee are asked to note the results of the RTA Review for 2021, as set out in paragraph 8 of the report.
- 2. The Barbican Residential Committee are asked to formally recognise the status of the House Groups and the Barbican Association as Recognised Tenants' Associations, as set out in paragraph 8 of the report.

Background

- 1. Following a review of House Groups, we are pleased to report that all of those which applied for Recognised Tenant Association (RTA) status, have been successful in meeting the requirements for recognition.
- 2. Members are asked to note that the Barbican Estate's officers continue to encourage house groups to achieve this status and the Town Clerk's request for documents includes those who have not previously applied.
- 3. The Landlord and Tenant Act 1985 (as amended), governs the process by which the City, as landlord, may grant Recognised Tenant Association status. Recognition demonstrates that an RTA has a degree of representation and that it operates in a fair and democratic manner. Such recognition also confers legal rights involving tenants in informal and formal consultation practices. It is, therefore, incredibly important that a landlord regularly reviews this information, as they engage with RTAs on many levels.
- 4. Furthermore, an RTA can, on behalf of its members :
 - Ask for a summary of costs incurred by their landlord in connection with matters for which they are being required to pay a service charge;
 - Inspect the relevant accounts and receipts;

- Be sent a copy of estimates obtained by the landlord for intended work to their properties;
- Propose names of contractors for inclusion in any tender list when the landlord wishes to carry out major works;
- Ask for a written summary of the insurance cover and inspect the policy;
- Be consulted about the appointment and re-appointment of the agent managing the services.
- 5. Prior to the 2021 review, the House Groups were written to, requesting the submission of various documents.
- 6. The criteria which, at a minimum, a Residents' Association must meet in order to qualify for RTA status is as follows:-
 - □ The Tenants' Association must represent a minimum of **50%** of the long leaseholders in a block/tower who pay a variable service charge to the Landlord.
 - □ An annual general meeting must have taken place (a copy of the minutes of the last AGM were requested)
 - Names and addresses of residents elected to the following posts must also be provided – Chair / Hon. Secretary / Hon. Treasurer
 - □ To conform with the provisions of SS18-30 of the Landlord and Tenant Act 1985 (as amended) there should be only one vote per dwelling.
 - □ A copy of the House Group's Constitution is required once every five years; a review of all Constitutions took place in 2016, and they were provided for 2021.
 - □ The Constitution should cover the following points and House Groups are asked to advise the Town Clerk, in the intervening period, if any of the following details change.
 - Openness of Membership
 - Payment and amount of subscription
 - □ Election of Officers
 - □ Voting arrangements and quorum
 - □ Notice of meetings
 - □ Independence from the Corporation
- 7. Failure to meet the criteria of an RTA does not affect the status of representation on the Barbican Estate's Residents' Consultation Committee. It does, however, mean that, as landlord, the City may withdraw RTA recognition from an existing RTA if the minimum requirements have not been met. However, should this be necessary, the City would be required to give at least six months' notice of its intention. This would hopefully provide a house group with enough time to resubmit a successful application.

Current Position

8. Having now received the required information, for which the co-operation of all the House Group Chairmen and Secretaries is very much appreciated, the following table sets out which Groups have qualified for RTA status.

BOLD = Successful House Groups	Total no. of Long Leaseholders	Number of Flats registered	Expressed as a percentage	
Andrewes House	184	Opt-in membership		
Ben Jonson House	196	53%		
Brandon Mews	24	87.5%		
Breton House	109	Not recognised		
Bryer Court	55	Not recognised		
Bunyan Court	68	Not recognised		
Cromwell Tower	103	Opt-in/out membership		
Defoe House	173	Opt-in/out membership		
Gilbert House	87	Opt-in/out membership		
Frobisher Crescent	69	Opt-in/out membership		
John Trundle Court	133	Not recognised		
Lambert Jones Mews	8	Not recognised		
Lauderdale Tower	114	Opt-in/out membership		
Mountjoy House	63	Opt-in/out membership		
Seddon House	75	89%		
Shakespeare Tower	111	Opt-in/out membership		
Speed House	109	Opt-in/out membership		
Thomas More	162	Opt-in/out membership		
The Postern/Wallside	22	Not recognised		
Willoughby House	147	Opt-in/out membership		
Barbican Association	2011	85%		

RTA Qualifying Membership

9. Most of the House Groups have adopted an '*opt-in/out*' membership, whereby all residents (leaseholders) will be members unless they choose not to be.

Legal Implications

10. It is important that the City regularly reviews levels of membership to ensure that RTAs, with which it consults, properly represents long leaseholders in a block and that these procedures do not become flawed. However, this review does not have to be annual.
Conclusion

11. In light of the returns submitted by the various House Groups, the Residents Consultation Committee (RCC) are asked to note the outcome of this years' RTA Review. The Barbican Residential Committee (BRC) are asked to formally recognise those House Groups which have qualified as RTAs, as identified in paragraph 8 of the report.

Julie Mayer

Clerk to the Barbican Residents' Consultation Committee and Barbican Residential Committee, Town Clerks

julie.mayer@cityoflondon.gov.uk

Committee(s):	Dated:
Residents Consultation Committee – For Information	27/09/2021
Barbican Residential Committee – For Information	08/10/2021
Subject:	Public
Service Level Agreement Working Party Quarterly	
Review - April - June 2021	
Which outcomes in the City Corporation's Corporate	1, 2, 3 & 4
Plan does this proposal aim to impact directly?	
Does this proposal require extra revenue and/or	Ν
capital spending?	
If so, how much?	n/a
What is the source of Funding?	n/a
Has this Funding Source been agreed with the	n/a
Chamberlain's Department?	
Report of:	For Information
Director of Community and Children's Services	
Report author:	
Michael Bennett	
Head of Barbican Estates	

Summary

This report, which is for noting, updates Members on the review of the estate wide implementation of Service Level Agreements (SLAs) and Key Performance Measures (KPIs) for the quarter April – June 2021. This report details comments from the House Officers and the Resident Working Party and an ongoing action plan for each of the SLAs.

Recommendation

Members are asked to:

• Note the report.

Main Report

Background

 This report covers the review of the quarter for April – June 2021 following the estate-wide implementation of the SLAs and KPIs with comments from the House Officers and the resident Working Party as well as an ongoing action plan for each of the service areas.

Current Position

2. All of the agreed six weekly block inspections have been completed in the quarter April – June 2021.

- 3. House Officers, Resident Services Manager and the Head of Barbican Estates attended the recent virtual SLA Working Party review meeting in July to review the SLAs and KPIs.
- 4. New comments from the residents Working Party (Jane Smith, David Graves, Christopher Makin, Averil Baldwin, Juliet McNamara, Tony Swanson, Andrew Tong), House Officers, surveys, House Group meetings, RCC and resident general comments/complaints are incorporated into the April – June 2021 comments.
- 5. Actions identified following each quarterly review have been implemented where appropriate and comments are included in the action plans in Appendices 1 to 5.
- 6. The KPIs are included in Appendix 6. The action plans monitor and show the progress made from each of the quarterly reviews together with all of the comments and responses/actions from the House Officers and resident working party.
- 7. All of the unresolved issues from the previous quarterly reviews have been carried forward to this current quarterly review. The House Officers as residents' champions determine whether the issue has been dealt with and completed.
- 8. All of the resolved issues have been filed as completed by the House Officers in conjunction with the resident working party. Once comments are completed, they will be removed and filed.

Proposals

- 9. The Barbican Estate Office will continue to action and review the comments from the House Officers and Resident Working Parties related to the Customer Care, Supervision and Management, Estate Management, Property Maintenance, Major Works and Open Spaces SLAs.
- 10. The review of the SLAs and KPIs for the quarter July to September will take place in October and details of this review will be presented at the January 2022 committees.

Conclusion

11. The reviews will continue on a quarterly basis with the Resident SLA working party and actions will be identified and implemented where appropriate, to improve services.

Appendices

• Appendices 1- 5 SLA Action plans. Appendix 6 – Key Performance Indicators.

Michael Bennett

Head of Barbican Estates Department of Community and Children's Services E: michael.bennett@cityoflondon.gov.uk

APPENDIX 1

SERVICE LEVEL AGREEMENT REVIEW- CUSTOMER CARE, SUPERVISION AND MANAGEMENT 2020-21

	Quarter	Source	COMMENT/QUERY	RESPONSE/ACTION	COMPLETED
1	Jul - Sept 18	НО	Review of SLA booklet.	On hold due to other priorities & current resources. This has been on hold for a long time, is there likely to be any movement this year (2021)? Awaiting lifting of moratorium on permanent recruitment in the COL but we anticpate being able to begin to look at this piece of work this year. Will be re-launched to new SLA WP in September.	
14	Jan - Mar 21	SLA	Will there be a BEO announcement about non lockdown measures?	Frontline provision of services were unaffected except window cleaning of the lower levels of the Towers in this last lockdown. From September office-based Officers will be back in for two days a week. Reception opening hours extended to 10.00-15.00 from 6 September and will be subject to further review at the end of September.	
15	Apr - Jun 21	НО	Informal comments about turnaround of some Home Improvements Applications.	Home Improvements Pack states that provided all appropriate forms have been completed correctly most applications are decided within 2 months but large and complex applications can take up to 3 months. Officers have been managing the process the best they can during COVID-19 and with the start of 2 new House Officers.	
16	Apr - Jun 21 Apr Q Q Q	SLA WP	Officers to collaborate with the SLA WP in reviewing the residents survey expected to be distributed in Autumn 2021.		
17	Appr - Jun 21	SLA WP	Complaints KPI to include numbers as well as percentages.		
	~				
			Completed Actions - House		
			Officers as residents' champions		
			determine whether the issue has		
			been dealt with and completed		
			satisfactorily.		
			GAG Gardens Advisory Group	PS Property Services	
			CPA Car Park Attendant	LL/SC Landlord/Service Charge cost	
<u> </u>			LP Lobby Porter	DCCS Department of Children & Community Services	
<u> </u>			BAC Barbican Centre	BOG Barbican Operational Group - senior officers from BEO and Property Services	
			Source of comments:		
			HO House Officers	COM Complaint	
<u> </u>			RCC Residents Consultation Committee	SURV Survey	
			AGM House Group Annual General Meeting	HGM House Group Meeting	
1			ESS Estate Services Supervisor		

APPENDIX 2 SERVICE LEVEL AGREEMENT REVIEW - ESTATE MANAGEMENT 2020-21

	Quarter	Source	COMMENT/QUERY	RESPONSE/ACTION	COMPLETED
1	Oct- Dec 19	AGM	Concierge to notify House Officers when a new resident moves onto the Estate and clarify if a leaseholder or sub-tenant.	SLA WP agrees. Welcome cards are being distributed. Agreed to include Barbican Association information on next re-print. New move information is being provided. The ESS, CPAs and Reception are providing information about moves in and out of the Estate.	Completed.
5	Oct - Dec 20	НО	Pink card delivery system for residents parcels. Halted during pandemic.	At October meeting agreed for Sub-Working group of the SLA WP to be set up (to include David Graves, Graham Wallace and Fred Rodgers. The group will also include a House Officer and be chaired by Barry Ashton, Car Park and Security Manager). Agreed that resident members meet to review options. Meeting in June of Sub-Working group to review and agree interim local system of notifying residents within 24 hours of parcel delivery not collected by text, email or telephone for further roll-out across the Estate. Meeting notes to be forwarded to the SLA WP.	
7	Jan - Mar 21	HO	Some issues experienced with delivery drivers of food deliveries.	Several reminders have now been provided in the bulletin.	Completed.
8	Jan - Mar 21	НО	Some complaints about quality of window cleaning received.	Raised at the weekly contractor review meetings. A few minor complaints received which have been resolved within 5 working days.	Completed.
9	Jan - Mar 21	RCC	Clarification of when rubbish can be left in corridors. Also contractors items.	Reminders included in the bulletin. Fire Safety inspections have commenced on the residential block balconies on the Estate.	
11 5	D pr - Jun 21	HO/HGM	Pigeon proofing in communal areas of the residential blocks.	Increase in number of complaints about pigeons on the Estate. Comments about the installation of deterent spikes without consultation (both positive & negative).	

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APPENDIX 3

SERVICE LEVEL AGREEMENT REVIEW - PROPERTY MAINTENANCE 2020-21

	Quarter	Source	COMMENT/QUERY	RESPONSE/ACTION	COMPLETED
1	Oct - Dec 19	СОМ	Recommendation from formal complaints that the residents should be better informed of any delays to Repairs.	BOG meeting to review procedures with additional "update" communications to residents from Repairs Service Desk now in place.	Completed.
3	Apr - Jun 19	Res	Repairs feedback forms with cost of works to be included.	This was due to "Go Live" on a new Housing Management System but this has been delayed until Autumn 2021. It is expected that this system will enable a survey to be sent to residents at the end of the work with an accurate cost attached. SLA WP will monitor further.	
6	Oct - Dec 20	НО	Delays encountered with some repairs during lockdown due to issues with deliveries and staffing levels.	Staffing levels back to normal. Deliveries returned to near normal. Glazing – still experiencing some delays due to backlog with suppliers catching up with orders from others.	
8	Jan - Mar 21	СОМ	Additional communications to residents when jobs are extended.	For comment only.	Completed.
9	August 21 HO In-house contractors Metwin have secured additional team members to get through the roof works backlog.		In-house contractors Metwin have secured additional team members to get through the roof works backlog.	For comment only. Addtional resources have helped to reduce the backlog.	Completed.
11	Apr - Jun 21	BA/RCC	TV service complaints.	Recent meetings with contractor in July and August and ensuing updates in the residents bulletin on fault reporting.	
12	Apr - Jun 21	SLA	New contractor 4th Utility have taken over from VFM to provide TV and broadband services.	Regular updates provided in the residents bulletin.	Completed.

APPENDIX 4 SLA AGREEMENT REVIEW - MAJOR WORKS 2020-21

	Quarter	Source	COMMENT/QUERY	RESPONSE/ACTION	COMPLETED
1	Oct - Dec 20	HO/AGM	Water Tank project. Issues with now much noisier tanks. Resident involvement during contract letting, may have stopped issues.	A satisfaction survey is scheduled to be distributed to all affected properties. Still a few outstanding tanks to be completed. Once done surveys will be distributed.	
2	Oct - Dec 20	НО	Fire signage project currently on hold pending Planning Advice.	The Fire Signage Project on the Estate had been suspended for the time being, while discussions were ongoing with Planning and English Heritage. Whilst Listed Building Consent would not be required, the Planning Department would need to approve a Fire Strategy, in order for the project to proceed. Residents' comments in respect of the signage would be taken into account but the signage must be legally compliant. Site visits would form part of the development of the Fire Strategy in order to check the readability at different times of the day. Architects have completed their report which fire safety consultants are currently reviewing which will then be submitted to the London Fire Brigade. The results, including the signs themselves, will then be shared with the Asset Maintenance Working Party (AMWP) and residents for comment which is expected to take place in the Autumn.	
4	@ge 296	НО	5 year redecorations programme 2020- 2025.	The scope and timing of redecorations for the external components would remain substantially as originally intended. Proposals for reducing the scope of internal work by deferring certain areas (e.g. little used stairwells) will be developed in consultation with each House Group prior to the redecoration of their building. Negotiations with the contractor regarding pricing, especially of items that might be omitted from the original scope of work, are continuing. Concerns over the shortage of raw materials and the general uncertainty besetting the building industry are making the process more difficult than usual. However, it has been agreed to consult with residents regarding any carbon reduction opportunities that might exist regarding alternate materials or components. The AMWP will work with Officers to analyse the rates and quantities for all the elements involved in the redecorations and especially the impact of removing the internal doors from the specification of work to be done.	

APPENDIX 4 SLA AGREEMENT REVIEW - MAJOR WORKS 2020-21

5	Oct - Dec 20	SLA	Front entrance door set replacements. Could information about this be publicised so that all residents are aware? Timings of project, what it will look like, how it will be delivered.	Following the March Gateway 1-2 report to committee the next stages include site surveys and the appointment of a design team during Spring/Summer 2021 and a Gateway 3-4 options appraisal report to committee in the Autumn. A full audit is currently being undertaken which included not only doors to flats but also glazed windows and fire doors. The objective is to ensure that all existing conditions including the presence of asbestos are accounted for and that the replacement programme can take advantage of standardisation in production and installation. Actual work on site is unlikely to commence before 2022/23, which is important to House Groups in connection with the scope of internal works to be undertaken. The order of work will depend on the risk of exposure for each block, as indicated in the forthcoming Arup analysis, and the need to coordinate with other projects in the various blocks. Communication with residents was an essential component of the project.	
6	Jan - Mar 21 Page 297	HO	Joinery on top floors. HOs have noted there are a number of complete window replacement works on the top floors of various blocks. Has an assessment been carried out in terms of trends & will this feed into the Asset Maintenance Working Party & or a project? Has this been taken into account with regards to the redecorations programme?	The AMWP have agreed that a procedure needs to be developed to ensure that, when multiple similar repairs arise across the estate, they are promptly brought to the attention of the AMWP.	
7	Apr- Jun 21	НО	Asbestos survey for common parts completed	Any remedial works have been completed.	Completed.
8	Apr- Jun 21	HO	The Barbican Projects Hub is now live on the website https://www.barbicanprojects.co.uk	comment only	Completed.

APPENDIX 5

SERVICE LEVEL AGREEMENT REVIEW - OPEN SPACES 2020-21

	Quarter	Source	COMMENT/QUERY	RESPONSE/ACTION	COMPLETED
7	Jan - Mar 21	AGM	"Desire lines" in the new planting in	This has been passed to the gardeners who will re-seed	Completed.
			Thomas More have led to areas of	where needed. In the most part, grass is very resilient and	
			grass being worn away.	will grow back.	
8	Jan - Mar 21	SLA	"No Mow May" that is, not lawn	More consideration will be given to 'No Mow May' going	
			mowing an area of the lawn. Will an	forward - experimenting with leaving verges longer to	
			area of Thomas More follow this?	promote wildflowers. The grass will be left a little longer to	
				lessen effects of possible drought.	

Appendix 6. Barbican KPIs 2021-22

	Title of Indicator	Actual 2019/20	TARGET 2021/22	Apr - June 21	July - Sep 21	Oct - Dec 21	Jan - Mar 22	PROGRESS AGAINST TARGET	COMMENT
	Customer Care								
	Answer all letters satisfactorily with a full reply within 10 working days	100%	100%	100%				0	10 out of 10 responded to in 10 days
	Answer all emails to public email addresses within 1 day and a full reply to requests for information within 10 days	100%	100%	100%				:	138 out of 138
Т	To respond to complaints no later than 10 working days from the date of acknowledgement.	100%	100%	100%				٢	5 out of 5 responded to
ag	Repairs & Maintenance								
e 299	% 'Urgent' repairs (complete within 24 hours)	96%	95%	94%				\odot	116 Completed In Target 8 Out of Time
	% 'Intermediate' repairs (complete within 3 working days)	95%	95%	95%				0	352 Completed In Target 17 Out of Time
	% 'Non-urgent' repairs (complete within 5 working days)	97%	95%	90%				3	308 Completed In Target 35 Out of Time

	% 'Low priority' repairs (complete within 20 working days)	98%	95%	90%		3	593 Completed In Target 68 Out of Time
		99.57%	Tower lifts 99%	98%		::	Cromwell B Lift was out of for an extended period due to damage & Shakespeare A Lift has an issue with the safety rope and extended fault
Page 300	Availability % of Barbican lifts	98.9%	Terrace lifts 99%	99.5%		٢	
	Percentage of communal light bulbs - percentage meeting 5 working days target	91%	90%	96%		٢	
	Background heating -percentage serviced within target. Total loss 24hrs/ Partial loss 3 working days	Total 100% Partial 100%	Total 90% Partial 90%	100%		٢	
	Communal locks & closures - percentage of repeat orders raised within 5 working days of original order	0%	0%				

Replacement of lift car light bulbs - percentage meeting 5 working days target	100%	90%	100%		\odot	
New KPI for % of 15% repairs checks from October 2019. How many jobs failed inspection?	0.04%		0%		\odot	23.6% Post Inspections Checked
Estate Management						
House Officer 6-weekly joint inspections with House Group representatives monitoring block cleaning - good and very good standard (& outstanding)	94%	90%	100%		٢	Inpsections completed without residents on this cycle
House Officer 6-weekly joint inspections with House Group representatives monitoring communal window cleaning - good and very good standard	93%	80%	100%		\odot	
Open Spaces						
To carry out variations/additional garden works (other than seasonal works and unless other timescale agreed) within 6 weeks (30 working days) of BEO approval	100%	80%	100%		٢	
Major Works						
% Overall Resident satisfaction of completed Major Works Projects (£50k+)	NA	90%	N/A			
Short Term Holiday Lets						
Possible STHL reported to BEO because of noise or nuisance	NA	NA	NA			
STHL reported to BEO after being found on a website and being investigated	NA	NA	NA			
STHL at Stage 1	NA	NA	NA			
STHL at Stage 2	NA	NA	NA			
Lease Enforcement cases						

Number of officer cases regarding breaches of lease (specifically installation of wooden floors/non-carpeted floors and animals)	NA	NA	NA		0	
Number of cases outstanding.	NA	NA	NA			

Agenda Item 14

Committee(s):	Dated:
Decidente' Cancultation Committee For Information	002021
Residents Consultation Committee - For Information	092021
Barbican Posidential Committee For Information	002021
	092021
Subject: Progress of Sales & Lettings	Public
Subject. 1 Togless of Sales & Lettings	T UDIC
Which outcomes in the City Corporation's Corporate	4
Plan doos this proposal aim to impact directly?	
Fian does this proposal and to impact directly?	
Does this proposal require extra revenue and/or	Ν
capital spending?	
If so, how much?	c
	L
What is the source of Funding?	
Has this Funding Source been agreed with the	
Chambarlain's Donartmant?	
Chambenam's Department?	
Report of Andrew Carter Director of Community and	For Information
Children's Services	
Benert euther: Anna Masan Cammunity and Children's	
Report author: Anne Mason Community and Children's	
Services	

Summary

This report, which is for information, is to advise members of the sales and lettings that have been approved by officers since your last meeting. Approval is under delegated authority and in accordance with Standing Orders. The report also provides information on surrenders of tenancies received and the number of flat sales to date.

Recommendation(s)

Members are asked to:

• Note the report.

Main Report

Background

1. The acceptance of surrenders of tenancies and the sale and letting of flats are dealt with under delegated authority.

Current Position

SURRENDERS/TERMINATIONS

2.

Case No	Туре	Floor	Rent Per Annum	Tenancy commenced/ expired	Reason for Surrender	Date of Surrender
1	20	1	£25,350	17/09/19 16/09/22	Tenant Deceased	15/09/21
2	16	01	£22,700	11/10/18 10/10/21	Tenant Deceased	03/09/21

RIGHT TO BUY SALES

3.

	27 August 2021	12 May 2021
Sales Completed	1080	1079
Total Market Value	£96,348,837.21	£94,546,908.01
Total Discount	£29,830,823.62	£29,539,064.26
NET PRICE	£66,518,013.59	£65,007,843.75

OPEN MARKET SALES

4.

	27 August 2021	1 June 2021
Sales Completed	866	864
Market Value	£163,969,271.97	£162,379,271.97

- 5. Fifteen exchanges of sold flats have taken place with the sum of £720,254 being paid to the City of London.
- 6. The freeholds of 14 flats in Wallside have been sold with the sum of £35,000 being paid to the City of London.
- 7. A 999 year lease has been completed with the sum of £43,200 being paid to the City of London.

APPROVED SALES

8.

CASE	Block	Floor	Туре	Price	Remarks as at 26/08/2021
1	Andrewes House	2	58 (1 bed)	£775,000	Completed
2	Thomas More House	3	21 (2 bed)	£815,000	Proceeding

COMPLETED SALES

9. Since the last report the sale of 156 Andrewes House and 106 Andrewes House have completed. Also, a studio flat has been purchased on Right to Buy terms.

SALES PER BLOCK 10.

BLOCK	TOTAL NO. OF FLATS	TOTAL NO. SOLD	NET PRICE £	% NO. OF FLATS SOLD
ANDREWES HOUSE	192	186	18,238,760.00	96.88
BEN JONSON HOUSE	204	196	14,877,454.83	96.08
BRANDON MEWS	26	24	1,057,460.00	92.31
BRETON HOUSE	111	110	8,869,412.50	99.10
BRYER COURT	56	55	2,307,338.50	98.21
BUNYAN COURT	69	68	6,484,280.00	98.55
DEFOE HOUSE	178	173	17,414,782.50	97.19
FROBISHER CRESCENT	69	69		100.00
GILBERT HOUSE	88	87	11,046,452.50	98.86
JOHN TRUNDLE COURT	133	133	5,467,527.50	100.00
LAMBERT JONES MEWS	8	8	1,400,000.00	100.00
MOUNTJOY HOUSE	64	63	5,925,723.50	98.44
THE POSTERN/WALLSIDE	26	22	5,959,130.00	84.62
SEDDON HOUSE	76	75	8,445,677.50	98.68
SPEED HOUSE	114	109	13,589,848.50	95.61
THOMAS MORE HOUSE	166	162	13,668,455.00	97.59
WILLOUGHBY HOUSE	148	147	14,972,670.50	99.32
TERRACE BLOCK TOTAL	1728 (1728)	1687 (1684)	149,724,973.33 (147,772,273.33)	97.63 (97.45)
CROMWELL TOWER	112	103	27,005,801.00	91.96
LAUDERDALE TOWER	117	114	24,553,779.63	97.44
SHAKESPEARE TOWER	116	111	30,001,185.60	95.69
TOWER BLOCK TOTAL	345 (345)	328 (328)	81,560,766.23 (81,560,766.23)	95.07 (95.07)
ESTATE TOTAL	2073 (2073)	2015 (2012)	231,285,739.56 (229,333.039.56)	97.20 (97.06)

Key Data

Strategic implications -

Financial implications – Receipts from sales are credited to the City Fund. Resource implications - None Legal implications - None Risk implications - None Equalities implications – None Climate implications - None Security implications - None

Appendices

None

Anne Mason

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Agenda Item 15

Committee:	Date(s):	ltem no.				
Residents' Consultation Committee	27 September 2021					
Barbican Residential Committee	08 October 2021					
Subject: Update Report						
Report of: Director of Community and Children's Services Public						
Summa	Summary					
Barbican Estate Office	Barbican Estate Office					
1. Security - Anti-Social Behaviour						
2. Agenda Plan						
Property Services – see appendix 1						
3. Public lift availability						
4. Asbestos inspections						
Recommendations that the contents of this report are noted.						

Background

This report updates members on issues raised by the Residents' Consultation Committee and the Barbican Residential Committee at their meetings in June 2021. This report also provides updates on other issues on the Estate.

1. Security - Anti-Social Behaviour

As previously reported, the Barbican Estate Security Committee ('BESC') and its Chairman, Deputy David Bradshaw C.C. launched an easy-to-use computer programme, the "ASB Reporter" in June 2021, whereby residents are be able to record anti-social behaviour ('asb') occurring across the estate.

The main objective of the programme is to determine the level and type of asb activity; the success of which depending on the willingness of residents to use it. The ASB Reporter will provide evidence to inform future decisions and policy changes both for residents and local enforcement agencies.

This is the latest summary of the type and amount of asb activity that has taken

place across the estate for July:

There were 137 asb incidents reported which represents an increase from the June total of 44, however, June was the month of launch and asb incidents were only recorded from 19 to 30 June. A brief analysis shows that 42% and 17% of the reported incidents were by Ben Jonson House and Shakespeare Tower residents respectively. In terms of the number of incidents and type of asb activity reported, skateboarding (24%), rowdy behaviour (17%) and parkour (16%) were the main recorded results.

Full details of the incidents reported during July 2021 can be found on the BA website at <u>asb@barbicanassociation.co.uk</u> under the News section for Security & Safety.

Officers in the Department of the Built Environment have confirmed that they have received the new Prohibition signage for the Podium walkways on the Estate and are awaiting for the installation programmed from their contractors.

2. Agenda Plan

The table below includes a list of pending committee reports:

Residents' Consultation Committee & Barbican Residential Committee

Report Title	Officer	RCC Meeting Date	BRC Meeting Date
"You Said; We Did" Actions (Separate list for RCC & BRC)	Michael Bennett	17 Jan	27 Jan
Service Level Agreement Review	Michael Bennett		
Fire Safety Update	Paul Murtagh		
Service Charge Expenditure & Income Account - Original Budget 2021/22 & Original Budget 2022/23	Chamberlains		
Revenue & Capital Budgets – Original Budget 2021/22 and Original 2022/23 - Excluding dwellings service charge income & expenditure	Chamberlains		

Progress of Sales & Lettings	Anne Mason
Arrears Report (BRC Only)	Anne Mason
 Working Party Updates (RCC Only) Gardens Advisory Asset Maintenance Background Underfloor Heating Leaseholder Service Charge 	Working Parties
 Update Report: Main update - Agenda Plan 2022 Property Services Update (Appendix 1) 	Michael Bennett

Contact:	Michael Bennett, Head of Barbican Estates
Tel:	020 7029 3923
E:mail:	barbican.estate@cityoflondon.gov.uk

3. Public Lift Availability

Availability of the public lifts under the control of Property Services is detailed below:

Lift	From April 2020 to March	From April 2021 to June	
	2021	2021	
Turret (Thomas More)	99.92%	99.87%	
Gilbert House	99.67%	99.75%	

4. Asbestos Re-inspections

Asbestos re-inspections were completed in July. Remedial works following these reinspections are currently taking place and will be completed in October.

Agenda Item 21

By virtue of paragraph(s) 3 of Part 1 of Schedule 12A of the Local Government Act 1972.

Document is Restricted

Agenda Item 22

By virtue of paragraph(s) 3 of Part 1 of Schedule 12A of the Local Government Act 1972.

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Agenda Item 23

By virtue of paragraph(s) 3 of Part 1 of Schedule 12A of the Local Government Act 1972.

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Agenda Item 24

By virtue of paragraph(s) 3 of Part 1 of Schedule 12A of the Local Government Act 1972.

Agenda Item 25

By virtue of paragraph(s) 3 of Part 1 of Schedule 12A of the Local Government Act 1972.

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