Newham London

NEW LOCAL PLAN | CLIMATE EMERGENCY

Retrofit topic paper

May 2022 | Rev D

Levitt Bernstein People.Design

ELEMENTA

Currie & Brown

Etude

Who prepared this topic paper?

The London Borough of Newham commissioned a multidisciplinary team of architects, engineers, cost consultants and energy specialists to develop this topic paper.

The work was directed by Ellie Kuper Thomas (Planning Policy Manager) and James Scantlebury (Senior Planner).

Levitt Bernstein is an award-winning architectural practice with a progressive and sustainable outlook.

Levitt Bernstein have specialised in the design of homes since 1968 and have a national reputation for our work in policy, standards and regulation. This includes work on the Nationally Described Space Standard and the three-tier standard for Approved Document M..

Elementa Consulting, a member of Integral Group, provide Mechanical, Electrical and Public Health (MEP) services design, fire and lighting design, resilience consultancy, strategic sustainability, wellness consultancy and advanced energy modelling for projects in the UK and abroad.

Elementa operate in all sectors of the built environment.

Currie & Brown has developed over the last 15 years specialist expertise in cost, technical and commercial advice on sustainability in construction, high performance and low carbon buildings. They provide specialist cost and techno-economic modelling to support the development of national policy and work with a range of private and public developers to maximise the benefits of their projects.

Etude is a SME of engineers specialising in energy and sustainability and dedicated to finding solutions to the climate crisis. One of our strengths is to combine building projects (which we work on at all phases) and strategic technical work on Net Zero carbon, including evidence bases and action plans. We regularly advise Local Authorities on carbon reduction, including Greater Cambridge, Cornwall Council, and many London boroughs.

1.0

Background and general information on retrofit

Context

The regulatory framework is not always helpful

The threat posed by climate change requires all levels of government to act with ambition and at pace. Planning policy and Building Regulations are the principle instruments for Local Authorities to implement change in buildings but neither is able to mandate better carbon performance in existing buildings other than a few specific circumstances of particular types of retrofit work.

The current regulatory framework does not encourage a whole building approach to retrofit or heat decarbonisation and there are no carbon reduction targets for existing buildings.

Not enough retrofits, and not low carbon enough

As a result, there are not enough retrofits happening and their impact is very variable.

If Local Authorities wait for sufficiently ambitious national frameworks to be put in place, it is likely that a large portion of the UK carbon budget will have been used.

Increasing Demand

Many building owners 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. Every building presents a different set of issues. The possible solutions can be confusing and the relative benefits and risks are generally not well understood. Reliable and accessible information is needed if some pitfalls are to be avoided, with the reputational risk to the whole programme that significant failures could bring.

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.

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)

6.3 $MtCO_2$

Estimation of Newham's portion of the **remaining carbon budget** for staying well below 2°C global temperature rise.

6 years

The number of years it would take Newham to **consume its entire carbon budget** at current emissions rates

-12.4%

Annual reduction in CO_2 emissions Newham should achieve on average to stay within its carbon budget.

Tyndall Centre carbon budget report for Newham in numbers. Figures relate to CO_2 from energy only and cover energy used by buildings and transport.
Decarbonisation of existing housing stock is a crucial action area.

Regulatory framework within the retrofit landscape

Challenges (and opportunities)

The regulatory framework influences what can be achieved along the carbon reduction pathway, alongside technical, financial and delivery and supply considerations. Ideally, the regulatory framework would work to encourage positive action and dissuade negative action.

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

- Does my building use too much energy? Can I significantly improve its energy efficiency 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.

Regulatory framework

- Can be obstructive or enabling
- Can influence costs and funding and demand and take up

London & Newham Retrofit Policies

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.

National 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.

The Retrofit London Housing Action Plan

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.

The Retrofit London Housing Action Plan sets out a path to achieving the first of these pledges: to bring forward a cross-tenure home retrofitting programme in London that can achieve an average EPC B rating by 2030.

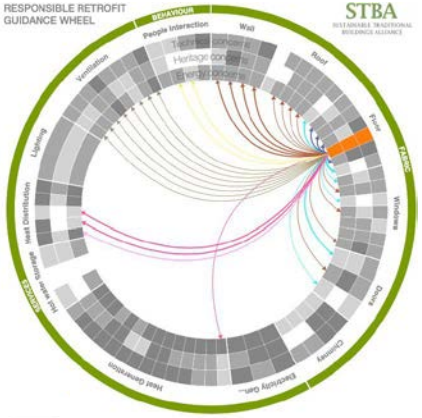
Every building needs a retrofit plan

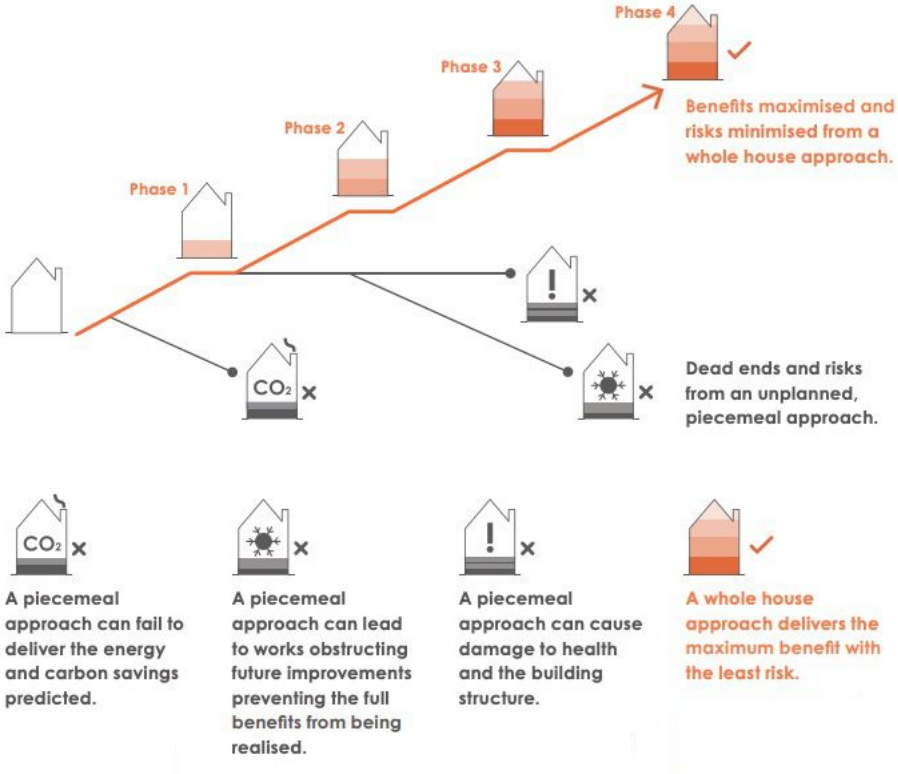
Thinking holistically

A retrofit plan should consider all aspects of energy balance introduced on the previous page, it should ensure that the most appropriate combination of technologies and measures are used for the building. It should be planned in a way to maximise energy savings, while minimising unintended consequences to health and the building structure. The plan should be developed to comply with PAS 2035 with the support of a *Retrofit Co-Ordinator.*[1] The STBA Guidance Wheel is also a good resource for identifying risk.[2]

Thinking about sequence

It is not always possible to reach the target in one go. A long term retrofit strategy can take advantage of planned maintenance, urgent repairs and funding opportunities. The phased plan should consider interdependencies between measures (for example ventilation strategy should be assessed alongside significant airtightness improvements) and ensure that the end goal for the retrofit is not jeopardised (for example, tying in window details and eaves overhangs with planned wall insulation). *Retrofit passports* would help to ensure change of ownership does not derail the retrofit plan.





Extract from LETI Climate Emergency Retrofit Guide, illustrating the importance of a well considered long term retrofit strategy

[1] *More information about PAS 2035 and finding a retrofit co-ordinator can be found on the Trustmark website: www.trustmark.org.uk/homeowners/whole-house-retrofit*

[2] *The STBA Guidance Wheel: https://stbauk.org/guidance-wheel/*

Energy performance targets and accreditations

Identifying a target

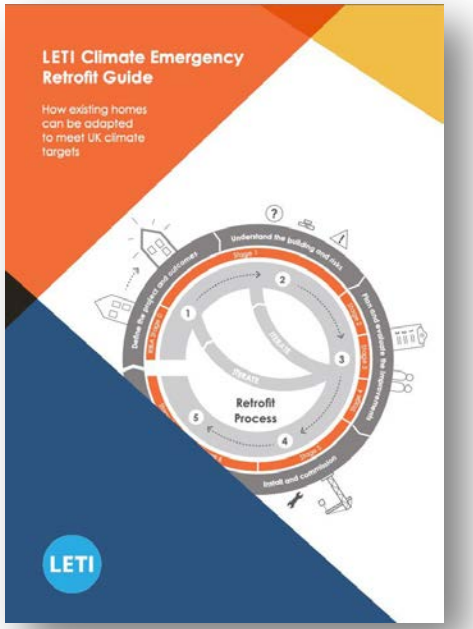
A building retrofit plan needs energy targets. For example, a heating energy demand target (which is an indicator for comfort and health, and enables a larger range of heating technologies to be used), a total energy consumption target, and a total renewable energy generation target. Some example targets are given by initiatives such as the *LETI Climate Emergency Retrofit Guide*, The *Passivhaus EnerPHit standard* and *Energiesprong*.

LETI Climate Emergency Retrofit Guide

The London Energy Transformation Initiative (LETI) Climate Emergency Retrofit Guide was released in October 2021. This is designed to complement existing guidance, tools and accreditations such as PAS2035, the STBA Retrofit Wheel. The guide sets out 'best practice' and 'exemplar' targets for retrofit, based on a combination of improved fabric efficiency and a heat pump to provide heating and hot water.

EnerPHit, Energiesprong and AECB retrofit standard

- *Passivhaus EnerPHit* is the most challenging retrofit standard, and can be achieved via the criteria method, based on energy targets, or the component method, based on limiting values for building elements, which takes into account constrained situations, for example when the structure needs to be insulated on the inside. The *step-by-step* approach allows for a long term retrofit strategy.
- *Energiesprong* is a standard and funding approach for whole-house refurbishment and new build using offsite manufactured panels. Instead of defining energy targets, the process is modelled to be financed by energy and maintenance savings.
- *The AECB retrofit standard* offers a self-certified method that is flexible enough to be followed for most buildings, and which targets an energy and carbon performance which can be improved upon to suit requirements.



LETI Climate Emergency Retrofit Guide – www.leti.london/retrofit

EnerPHit Certified Retrofit Passivhaus Institut | classic | plus | premium |

energie sprong uk

See the following websites for more information:

www.passivhaustrust.org.uk

www.energiesprong.uk

www.aecb.net

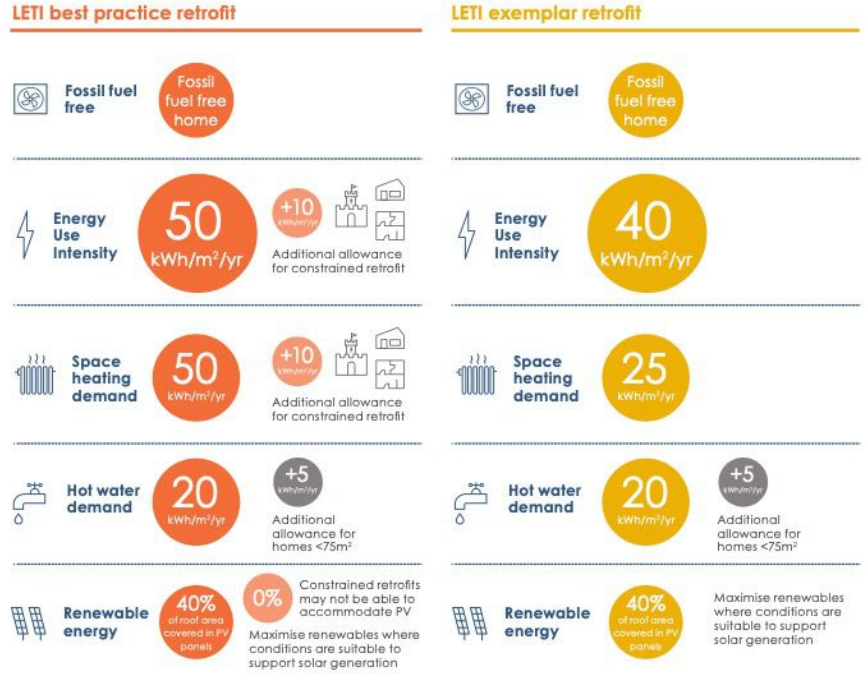
Summary of energy performance targets

When to use performance targets

Performance targets are useful when there is an energy modeller involved in a project. For very small projects this may not be as practical, and constituents (AKA elemental or component) targets may be more appropriate, these are described later.

Example performance targets

The diagram on the right shows the *LETI Climate Emergency Retrofit Guide* targets for best practice and exemplar retrofits. The table below gives examples of other targets: EnerPHit and AECB. It should be noted that EnerPHit using the 'component' method results in a higher overall space heating demand. Energiesprong has not been included as the standard is not defined by an energy target, but as a guide the space heating demand is likely to be between 25-40kWh/m^{2}a. The table also includes an indication of whether a quality assurance process is required. This is an important aspect of ensuring a retrofit goes according to plan.



LETI Climate Emergency Retrofit Guide targets

	Space heating demand kWh/m²/yr	**Air tightness** m³/h/m² at 50Pa (or ach for EnerPHit)	**Total primary energy (PER)** kWh/m²/yr	**Low carbon heating requirements**	**Renewable Generation Requirements** kWh/m²/y (m² footprint)	**QA process?**
EnerPHit Premium	25	1.0	41*	Heat pump required	120	✓
EnerPHit Plus	25	1.0	56*	Heat pump likely required	60	✓
EnerPHit (Classic, Plus or Premium)	25	1.0	75*	Heat pump or direct electric required	Not required, but makes it easier to meet PER target	✓
AECB Retrofit Standard (with modified targets)	e.g. 40	e.g. 1.5	e.g. 75	e.g. "heat pump required"	e.g. 30	✓ (self certified – specify who)
AECB Retrofit Standard	50	2.0	75	-	-	✓ (self certified)

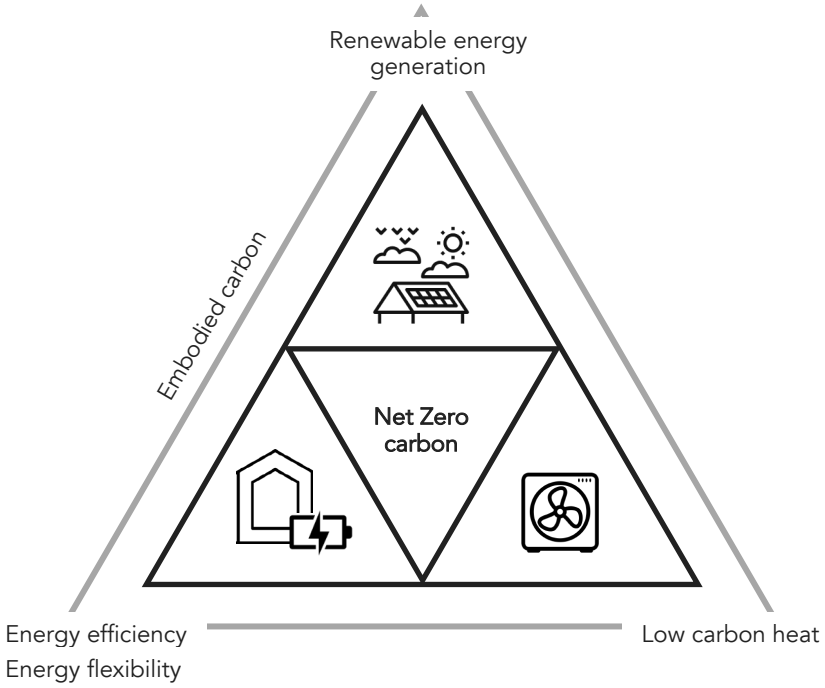
**PER requirement is project specific and depends on the heating / cooling demand that each project can achieve*
*** EnerPHit Certfiication by component can be also pursued – there are not particular heating demand or PER requirements, however there are very specific criteria for envelope U-values, Windows, Glazing, and ventilation depending on the climate zone of each project.*

What measures are needed for retrofit

Towards net zero building stock

The ultimate aim is to decarbonise the existing building stock. In order to do this, there should be a balance of energy consumed and energy produced onsite. The primary energy required – and the associated carbon – can be reduced by making the building fabric more energy efficient, supplying high efficiency low carbon heat, and shifting the demand so the energy use coincides with efficient energy production. This makes it easier to match the demand with on-site renewable energy generation.

The diagram below shows the balance required to bring existing buildings closer to net zero carbon. This also identifies embodied carbon as a key consideration. The amount of carbon emitted during the production of materials should be factored into the balance. To the right is a summary of the types measures required.



Category	Measure
Energy efficiency	Double or triple-glazed windows
	Insulation (wall, roof, floor)
	Simple form
	Airtightness
Low carbon heat	Ventilation (e.g. MVHR)
	Heat pumps (individual / communal)
	Direct electric
Demand flexibility	Energy storage
	Smart energy controls
Renewable energy generation	Solar PVs
Embodied carbon	Retrofit, rather than demolition and rebuild, is generally a lower embodied carbon strategy.

How can Planning policy help?

Where we are now

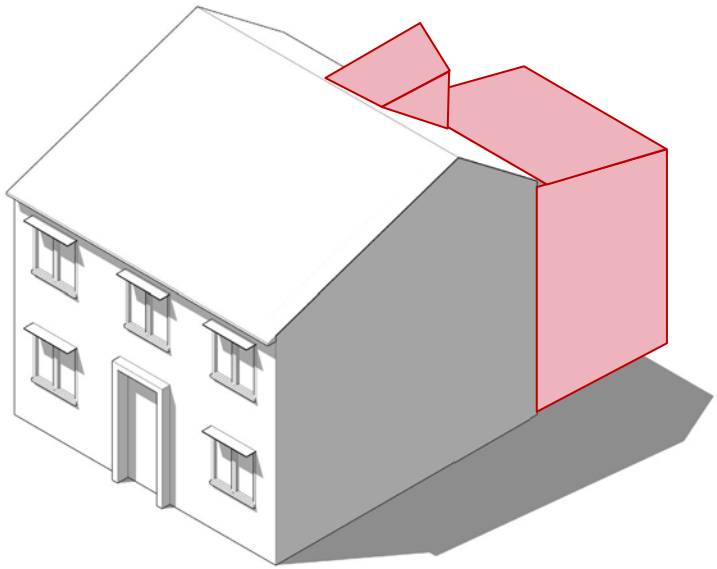
Current Permitted development rights enable large extensions to the rear of properties and complicated roof extensions without requiring significant fabric efficiency requirements to the extension or to the existing property. There are also several change of use class cases qualifying as permitted development, notably the conversion of various commercial uses into dwellings, up to a limit of 1,500sqm.[1] These rights are focused on enabling scale rather than quality developments, and are often not consistent with net zero carbon ambitions.

Where we need to be

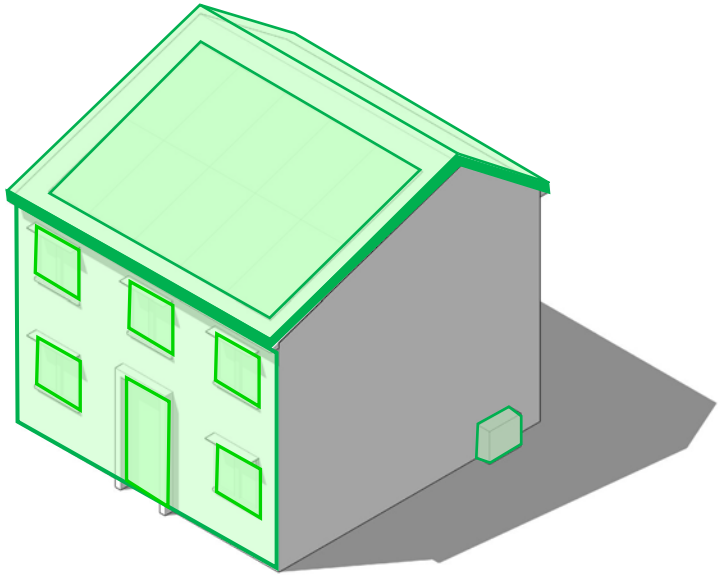
Retrofit measures which reduce the carbon associated with a building should be encouraged, as should a comprehensive energy improvement strategy. Planning should encourage best practice fabric improvements. Insulation to structures works most effectively when installed externally rather than inside. This is not always possible for buildings with complicated facades and detailing, but when it is technically viable, it should be encouraged (e.g. increasing the height of the roof to enable a better insulation strategy).).

It should be easier to make the decision to install a heat pumps and solar photovoltaics, by removing some prohibitive conditions to permitted development (for example, the heat pump location, quantity and size are limited), or providing clear guidance on acceptable locations. Similarly, for solar installations, a shift in focus from minimising the visual impact to quality installations that work well, and last, is required.

[1]PD rights and conditions are given in *The Town and Country Planning (General Permitted Development) (England) Order 2015:* https://www.legislation.gov.uk/uksi/2015/596/schedule/2



What is currently encouraged



What we need to be encouraged

How can Planning policy help - Heritage Buildings

Where we are now

Permitted development rights are limited or entirely removed for buildings in Conservation Areas and/on the National Heritage List for England (Listed buildings). Planning permission and Listed building consent is required for most external retrofit works and even for some internal works , depending on the listing.

This presents both an opportunity to make more meaningful policy which will capture many of the principle works, such as window replacement, and also a barrier, either actual or perceived, to any work being carried out.

Where we need to be

Retrofit measures which reduce the carbon associated with a building should be encouraged, as should a comprehensive energy improvement strategy. Planning should encourage best practice fabric improvements. Some restrictions could be modified to allow for specific allowable solutions (e.g. triple glazed mock sash windows). More targeted advice regarding the siting of solar PV in conservation areas may help the current perception that they are simply not allowed anywhere.

Historic England have published guidance on planning the responsible retrofit of historic buildings, in which they set out the arguments for allowing some carefully managed improvements in energy performance whist recognising the particular challenges that heritage buildings can present. They have collected resources and advice on their website

Energy Efficiency and Historic Buildings | Historic England.

The Newham website currently has a list of works to listed buildings which require planning permission. This part of the website could provide links to the Historic England guidance and provide some specific guidance on energy and carbon retrofit for heritage buildings.

Two buildings in this row of London homes have been retrofitted to Passivhaus Enerphit standard, delivering around 75% better carbon savings over the neighbouring properties that were retrofitted to meet Building Regulations compliant standards (source: Passivhaus Trust)

A Victorian terraced house in London before and after EWI was installed (source: Passivhaus Trust).

Retrofit Costs, benefits and impacts

What it costs

Breaking down the costs of retrofit is misleading, as the costs of individual measures is interlinked with what else may be being undertaken at the same time. For example, the cost of PV arrays done in isolation is higher than if they are installed in conjunction with roof upgrades or external wall insulation, when scaffolding may already be accounted for.

The costs in the table adjacent were published in the Net Zero Carbon Toolkit and are applicable to a moderate sized home. They should be used as an indicative cost range and not a firm cost plan.

What it achieves

The efficacy of each measure depends on the condition of the element before the retrofit is carried out, so again, the likely benefits are difficult to quantify accurately. We have suggested a relative improvement factor rather than an absolute reduction.

How difficult it is to do

Measures which are purely internal, quick to do and not disruptive to tenants are rated as the easiest. Works which require substantial interruption to the users, or even may require them to temporarily move out are the most difficult.

Important notes on cost:

- ! The cost, impact and disruption would be dependent on the existing situation.
- ! There will be co-dependencies and benefits. A whole building retrofit plan should be considered alongside decisions on single measures.

Measures	Typical Cost	Impact on energy efficiency and net zero carbon	Difficulty or disruption
Fit 100% low energy lighting	£20	✓	1
Increase hot water tank insulation by 50mm	£50	✓	1
Fit new time and temperature control on heating system	£150	✓ ✓	1
Loft Insulation – add 400mm	£500	✓ ✓ ✓	2
Insulate all heating and hot water pipework	£500	✓ ✓	2
Cavity wall insulation – 50mm	£600	✓ ✓	1
Upgrading to double or triple half glazed doors	£1,500 – £2,000	✓	1
Floor insulation – between & below suspended timber	£1,500	✓ ✓	2
100% draught proofing – improve airtightness	£2,000	✓ ✓	3
Photovoltaic panels, 3kWp array, 21m^2 area	£6,500	✓ ✓ ✓	1
Upgrading to double or triple glazed windows	£7,000 – £8,400	✓ ✓ ✓	2
Fit mechanical ventilation and heat recovery (MVHR)	£7,000	✓ ✓ ✓	3
Main heating – Air source heat pump and new HW tank	£9,000	✓ ✓ ✓	3
External wall insulation – 160mm, expanded polystyrene	£11,000	✓ ✓ ✓	3

Indicative cost of deep retrofit measures for a typical semi detached home (Source: Net Zero Carbon Toolkit)

2.0

Retrofitting Newham

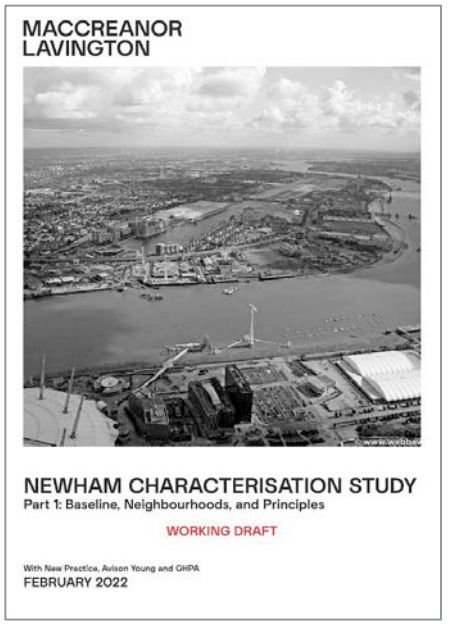
Newham characterisation study

What the study reveals

A characterisation study of the London Borough of Newham is currently in progress by Maccreanor Lavington. The draft study identifies a number of different zones within the Borough and the dominant typology in each, including residential, commercial and industrial buildings.

There are period and architectural differences across the borough which create local character. Simplistically, there are broadly 3 main groups of residential buildings: Historic terraced houses, late 20th Century 2 storey semi detached houses, and contemporary multi-storey blocks.

The study also identifies low density industrial as dominant in employment zones, as well as there being many town centres with a mixture of commercial and retail premises of a smaller scale. There are also around 100 schools, predominantly post 1960s.

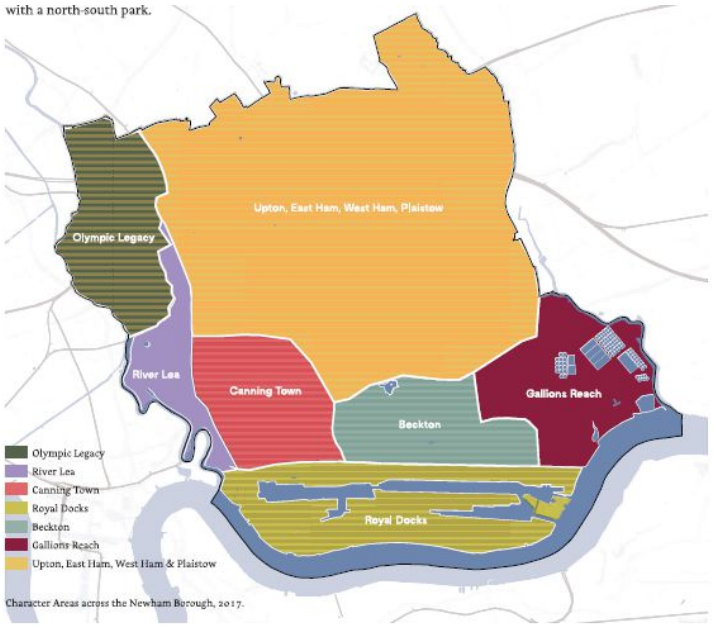


Responding to the study

The following pages consider the types of retrofit measures relevant to the principal typologies identified. The aim is to help the London Borough of Newham Planning Authority and others to ask the right questions and set the right policy to enable or encourage good retrofit, and dissuade development that does not align with Net Zero Carbon ambitions.

The focus is on **Historic terraced houses**. Followed by brief analysis of

- Post war semi-detached houses
- Medium-density residential tower blocks
- Schools
- Employment spaces
- Industrial buildings



What are the key recommendations for Newham ?

Encouraging good practice

Newham has a high proportion of Victorian and Edwardian homes, which are identified as core typologies in the characterisation study. These buildings have some key attributes that make them valuable stock but also some notable shortcomings for energy efficiency – particularly solid walls, single glazing and high infiltration. Encouraging and helping the largely private owners of these homes to pursue effective retrofits should be a priority.

There are also many low-density industrial type buildings in the Borough. These could provide a significant asset as a location for renewable energy generation to serve the whole Borough if the owners can be persuaded and helped to install PV arrays on as much of the suitable roofs as possible.

Suggestions for encouraging good practice:

Holistic thinking

Produce guidance aimed at householders on suitable measures and targets, and encourage whole house retrofit plans and long term strategies.

Building fabric

Make allowances for changes to geometry due to increased insulation on the cold side of structures (e.g. raised ridge heights).

Windows

In conservation areas (not for listed buildings), offer some leeway on change of appearance for glazing provided a superior performance standard is met. E.g., permit triple glazed mock sash windows.

Suggestions for encouraging good practice:

Air Source Heat Pumps (ASHP) & Mechanical ventilation with heat recovery (MVHR)

Provide specific guidance on how to install key technologies, including acceptable types and locations for equipment and grilles for the key typologies in the Borough, and/or provide a pro forma Planning Application for this specific issue that could help individuals who do not have the necessary Permitted Development rights.

Locating MVHR grilles on rear elevations, and ASHP either in back gardens or on rear facing roofs, (where it is structurally safe to do so) could be accepted for all except Listed Buildings.

PV

Encourage owners of Industrial buildings to install PV arrays whenever other works, such as roof replacement or refit works, are undertaken under permitted development rights.

Consider whether matching or other funding. e.g. grants from the carbon offset fund can be provided. It would be necessary to set a minimum fabric and/or energy performance, for example matching the new build standard insulation or predicted energy use, to ensure the funds were not used to support inefficient buildings. The roof space that could be used for PV which may otherwise be wasted is a substantial opportunity to address the energy balance of the Borough overall.

Supporting retrofit rather than rebuild

Consider mechanisms to make retrofit economically more viable. For example, by keeping fabric and energy targets but waiving S106 offset payments, as has been adopted in LB Merton's draft local plan.

What are the key recommendations for Newham ?

Enforcing better standards

Retrofit of all types of buildings falls largely outside the scope of existing regulations and policies. But there are a few circumstances where there are opportunities for more positive intervention at Planning stage to require energy performance to be considered in a holistic way that goes beyond minimum compliance.

Suggestions for enforcing better standards:

Set superior performance targets:

Where planning permission is required for retrofit work, set in policy the minimum standards that are required, which can go beyond the minimum set by Building Regulations. The LETI Climate Emergency Retrofit Guide constituent element method targets are shown in the table to the right. This gives limiting values for U-values, airtightness, systems, hot water and renewables. These could be used to set limits for different scenario (Constrained, unconstrained and exemplar).

For some developments, it may be appropriate to go even further and and require *EnerPHit* or *Energiesprong* as a standard or quality assurance processes. This could be required in situations where a development would normally be less likely to be approved.

Require a whole house retrofit plan:

For some applications it may be appropriate to require a that a whole house retrofit plan is developed to PAS 2035 with a retrofit co-ordinator, to ensure that the property is on an effective and safe trajectory towards net zero carbon.

SIGNPOST *Chapter 4 - LETI home retrofit targets - 4.3 Constituent element method*

Building element		Retrofit actions	LETI best practice: Constrained retrofit	LETI best practice: Unconstrained retrofit (cool temperate climate)	LETI exemplar: All retrofit types
Walls	Cavity	External, cavity or internal insulation	0.24 W/m².K	0.18 W/m².K	0.15 W/m².K
	Solid uninsulated	External or Internal insulation	0.32 W/m².K	0.18 W/m².K	0.15 W/m².K
	Timber frame	External or Internal insulation	0.21 W/m².K	0.18 W/m².K	0.15 W/m².K
Roofs	Cold	Insulate	0.12 W/m².K	0.12 W/m².K	0.12 W/m².K
	Warm/flat	Insulate	0.22 W/m².K	0.12 W/m².K	0.12 W/m².K
Floors	Suspended timber	Insulate between joists	0.20 W/m².K	0.18 W/m².K	0.15 W/m².K
	Solid uninsulated	Excavate and insulate below	0.80 W/m².K	0.15 W/m².K	0.15 W/m².K
Windows and doors	Windows	Replace	1.30 W/m².K	1.00 W/m².K	0.80 W/m².K
	Doors	Replace	1.00 W/m².K	0.80 W/m².K	0.80 W/m².K
General envelope	Thermal bridging	Mitigate where possible	0.10 W/m.K	0.10 W/m.K	0.08 W/m.K
	Airtightness	Draught proofing, sealing of chimneys and vents	3.0 ach@50Pa	2.0 ach@50Pa	1.0 ach@50Pa
Systems	Systems and appliances	Fossil fuel free home	Fossil fuel free	Fossil fuel free	Fossil fuel free
	Ventilation type	Install and remove extract fans	MVHR*	MVHR	MVHR
	Lighting power	Replace lamps and fittings	50 lm/W	100 lm/W	100 lm/W
Hot water	Hot water tank	Increase insulation or replace	1.5 W/K	1.5 W/K	1.5 W/K
	Primary pipework	Insulate all pipework	90% of pipework insulated	90% of pipework insulated	90% of pipework insulated
	Shower demands	Low flow fittings	16 litres/pers.day	16 litres/pers.day	16 litres/pers.day
	Other demands	Low flow fittings	9 litres/pers.day	9 litres/pers.day	9 litres/pers.day
Renewables	Photovoltaic generation	Rooftop installation	0 % of roof area covered in PV panels	40 % of roof area covered in PV panels	40 % of roof area covered in PV panels

* If not possible use demand control dMEV or demand control cMEV

LETI retrofit energy targets (constituent element method)

Towards Net Zero Carbon Newham – Victorian Terrace – Front façade

Description

The image to the right shows an example of historic terraced housing, which is a common typology in Newham. These familiar houses have a consistent 6m façade, are predominantly brick and have large bay windows that face the street.

Challenges

These terraces are often seen as "hard to treat," as the street façades are complex, with features of historic value that are generally assumed will need to be retained. This means that insulation on the front façade is generally internal wall insulation, however, it may also be possible to use additional insulating render.

Window replacement opportunities can be limited in some areas. In the example image to the right the original sash windows have been replaced, with what appears to be early double-glazed units. Ideally these would be high performance double or triple glazed units.

Solar photovoltaic panels, optimise orientation (allow on street elevation if necessary)

Roof insulation, is best when applied to the cold side of the roof. Consider allowing increased height at the front for additional insulation.

Windows, good quality double or triple glazed, should be installed in centre of insulation line.

Wall Insulation, internal wall insulation likely to be required. Ensure continuity at junctions. Use suitable insulation that will not create moisture problems.

Examples of houses forming part of a typical historical terrace, in Cambus Road, Newham

Policy opportunities?

Fabric

- Require, or permit the best performing windows.
- Permit increase in roof height to allow for increased insulation.
- Permit insulating render up to 30mm along side internal wall insulation.

Renewables

- Permit PV on the front façade if this is the optimal orientation for the property.

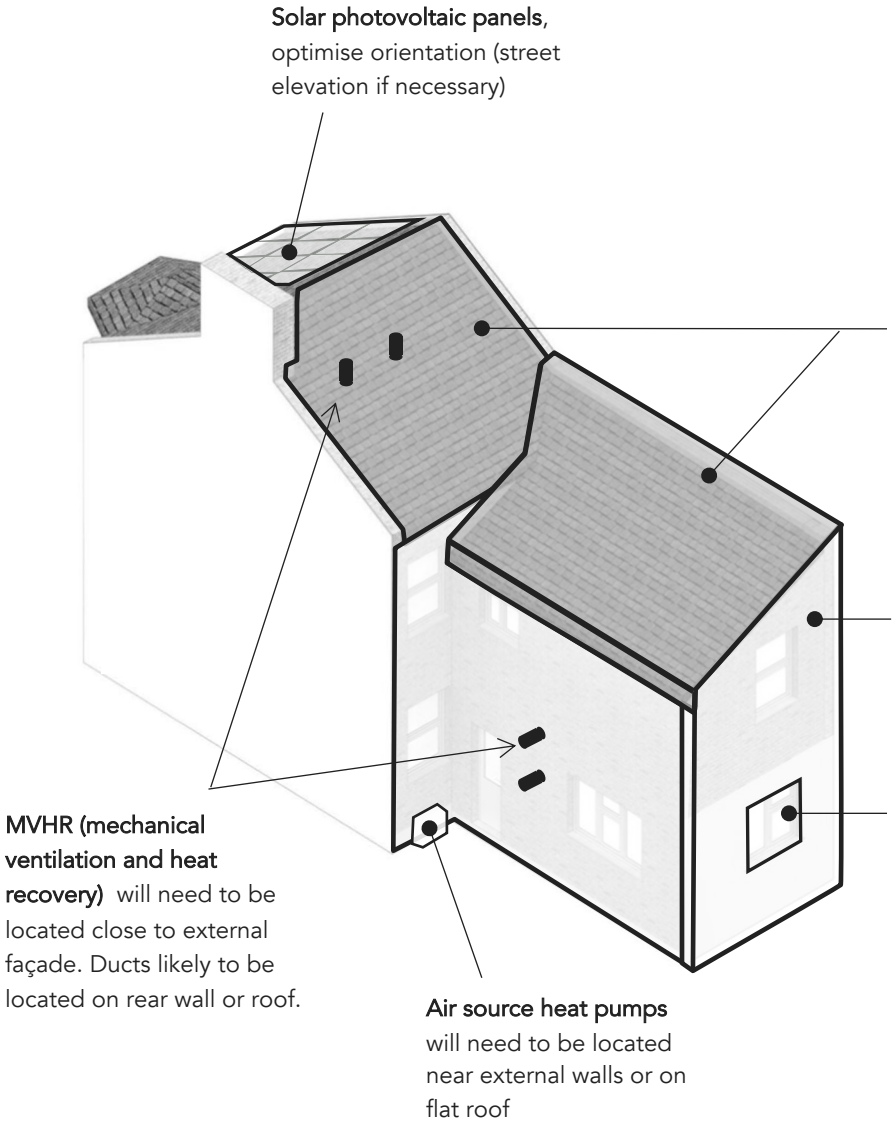
Towards Net Zero Carbon Newham – Victorian Terrace – Rear façade

Description

Historic terraced housing generally has a complex form to the rear, usually with a double height kitchen / bathroom extension, and often with subsequent small extensions stepping down to the rear. However, the detailing is less ornate and it is normally possible to insulate on the outside of the walls. There is also more flexibility in window products deemed suitable as replacements.

Challenges

There are awkward junctions to consider, along with building services that may need to be extended in order to accommodate insulation. It can be difficult to find locations for heat pumps and MVHR ducts that are in the optimum location for energy efficiency, acoustics and visual concerns. The perceived difficulty in finding a suitable location can be a risk to a project being realised. Some suggestions are noted below for how policy can help incentivise the best solutions.



Policy opportunities?

Fabric and ventilation

- Require, or permit the best performing windows.
- Permit increase in roof height to allow for increased insulation, e.g. up to 150mm.
- Permit a wider range of MVHR duct locations – suggest workable solutions.

Low carbon heat

- Permit a wider range of ASHP locations – suggest workable solutions.

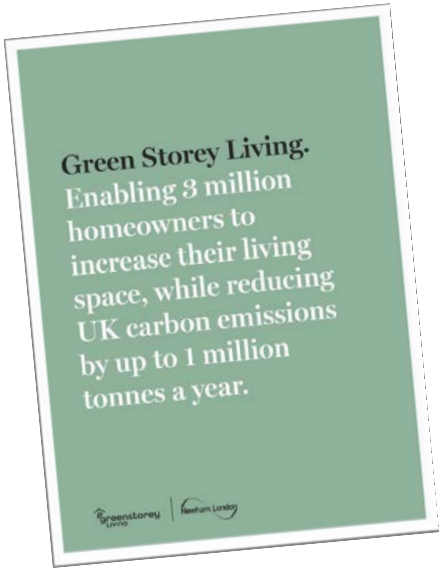
Towards Net Zero Carbon Newham – Victorian Terrace – Form

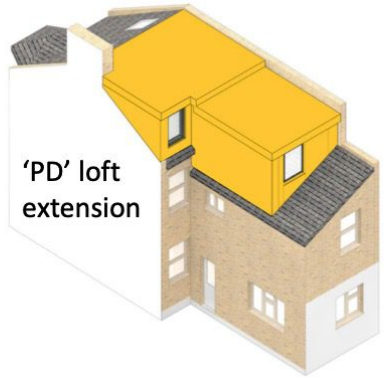
Simplest is more efficient

An important factor in energy efficient design is the ratio of external surface compared to the usable floor area, or "form factor". Simplifying the form can mean less heat loss through the fabric and less complex junctions that are hard to insulate continuously, leading to cold spots and potential moisture problems.

Populo Big Green Lofts proposal

An opportunity has been identified to allow / encourage an increased area of loft extension compared to the usual permitted development limitations, on the condition that certain fabric standards are met. This has the dual advantages of increasing the usable area, improving the form factor and reducing the heat loss per m^2 through the new fabric. However, the total energy of the dwelling will still increase if the existing fabric is not also retrofitted. There is also the opportunity for more ambitious U-values requirements over those required by building regulations (e.g. 0.18W/m^2K vs 0.10W/m^2K). Other opportunities are identified below.





Policy / improvement opportunities?

Fabric and ventilation

- Require a whole house retrofit plan – ensure detailing allows for future external wall insulation to lower walls, and thermal bridges are minimised.
- Require element U-value limits for extension (e.g. 0.10W/m^2K)
- Require / permit MVHR installation

Low carbon heat

- Require / permit ASHP installation

Renewables

- Require solar PV (on the front or rear roof)

Towards Net Zero Carbon Newham – Post war semi-detached

Description

The image to the right shows an example of post-war semi-detached housing, another common typology in Newham. These 2 storey houses have a relatively simple brick façade but with some articulation, there is typically a small private space to the front and a back garden.

Challenges

These types of dwellings are generally easier to retrofit than heritage properties, as there are less constraints on the location of insulation and services, such as heat pumps and MVHR. There is normally more flexibility on the types of windows that would be permitted.

The basic form of these dwellings is generally simple and homogenous amongst the typology, but articulations such as porches, garages and dormer arrangements may differ. These details are likely to be more challenging to insulate continuously, and care should be given to avoid thermal bridging.

Policy opportunities?

Fabric and ventilation

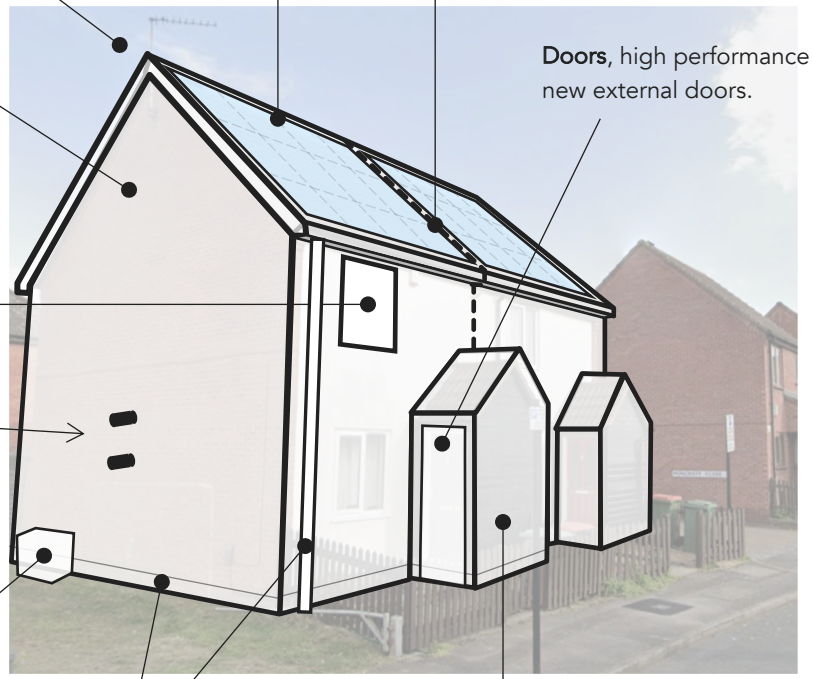
- Permit increase in roof height and overall wall width to allow for increased insulation, e.g. up to 250mm.
- Use increases in property size beyond PD to trigger a whole house retrofit plan, including minimum fabric standards.

Low carbon heat

- Permit a wider range of ASHP locations – suggest workable solutions.

Renewable

- Encourage maximum PV generation, e.g. fill the whole roof.



Examples of typical Post-war semi-detached house, in Linton Road, Newham

Towards Net Zero Carbon Newham – Medium-density residential / mixed use

Description

The image to the right shows an example of medium-density buildings including residential and mixed use, which are common around the Olympic legacy area in Stratford. These were built in the last 10-15 years, and although would have been built to building regulation energy efficiency standards at the time, may require retrofitting in the future. The addition of PV panels and communal ASHPs to the roofs, as part of a new low carbon heating strategy would have a relatively minor visual impact to the street, but some services may be visible above existing rooflines.

Challenges

Upgrades to the thermal efficiency of the buildings would have more of a visual impact and might include remodelling of the façade, for example to add insulation, simplify junctions or reduce window proportions, as well as upgrading window specifications. MVHR units could also be installed.

Policy opportunities?

Fabric and ventilation

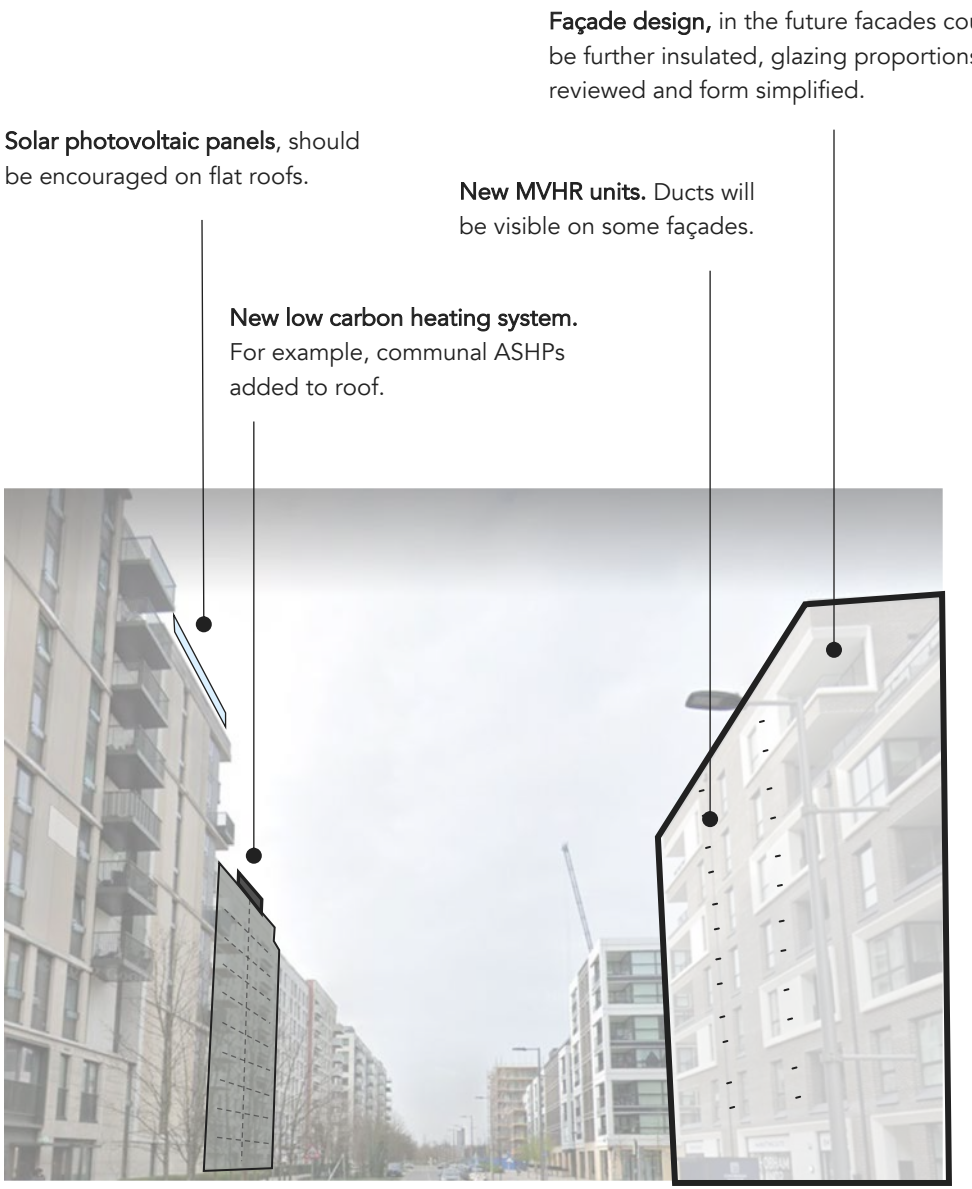
- Permit changes to façades to accommodate better form factors, a reduction in thermal bridges, improved thermal performance of walls and windows. Require the best performing windows in this scenario.
- Ensure MVHRs are encouraged and flexibility is allowed for duct locations.

Low carbon heat

- Permit communal ASHP on roofs, require a low carbon heating study to ensure the most appropriate systems are installed.

Renewable energy

- Permit PV on roofs, require ambitious coverage.



Examples of typical modern medium-density apartment and mixed use blocks, in Honour Lea Avenue, Newham

Education

Many of the school buildings in Newham are relatively modern or very modern buildings. Some of the older buildings have already had some refurbishment work carried out.

A number of the primary school buildings are single storey, lightweight and highly glazed. There are a small number of legacy Victorian or Edwardian school buildings with large single glazed windows. Some refurbishment / redevelopment has been carried out on many of the sites.

Energy Efficiency

In many of the school buildings, the fabric may have already been upgraded as far as is practical. Any remaining single glazed windows should be replaced as a first priority. Flat roofs can be insulated when renewing waterproofing as part of routine maintenance.

Ventilation systems have been reconsidered in many schools in the light of the Covid pandemic, increasing fresh air rates by temporary means. Establishing these improved vent rates in a more permanent and more energy efficient system with heat recovery could improve both energy performance and protect the schools from future disease control issues.

Low Carbon Heat

Heating and ventilation systems, catering provisions and hot water use may all have greater potential for improvement, particularly moving away from gas fired boilers and calorifiers.

Renewable Energy

If flat roofs are being upgraded, PV arrays could be added as part of the same works.

Colegrave Primary School, Newham – lightweight structure, highly glazed

Forest Gate Community School, Newham – a mixture of buildings of different ages and construction, typical of secondary schools, with some new additions, some replacement windows and some new blocks

Employment Spaces

Employment space in Newham falls principally into two types of accommodation; industrial style sheds and retail / offices in buildings that were built for other purposes, usually residential.

The industrial buildings are usually in low density developments, such as identified in the characterisation study as the dominant typology of buildings in the River Lea area, and common elsewhere.

The retail/office buildings are generally clustered around the local town centres and high streets. These often have a number of purpose built, small retail buildings with accommodation on upper floors and some larger residential properties in the immediate area which have been converted into commercial office space.

Energy efficiency via focus on working conditions

Achieving comfortable working conditions is often challenging in buildings designed for another purpose. This can lead to high energy demands from heating over-large spaces, high ventilation rates in deep plan buildings and high lighting loads where daylight is poor for desk based working. The result can be an ad-hoc collection of local fans, fan heaters, air conditioners and lighting which may be inefficient in operation as well as poor for the health and safety of the workers.

For retrofit of these types of buildings to be successful, a focus on the delivered working conditions, especially daylight and ventilation, may lead to better performance of both the building and its occupants. Building Regulations generally does not consider these issues and a simple measure of carbon emissions may be misleading. The retrofit standards introduced earlier could be used to set appropriate performance targets.

Dominant typology

- Older industrial warehouses.
- Low density industrial buildings.
- Typical uses include some retail and warehouse space.
- Buildings are set back from the street to allow off street, perpendicular parking on the pavement.
- Some gated warehouse estates.
- Poor pedestrian and cycling environment.

Industrial

The characterisation study identifies low density industrial buildings as a common type of building throughout the Borough.

Energy Efficiency

These units are generally light weight, steel framed buildings with metal cladding and relatively poor insulation. Improvements to insulation may significantly improve the energy performance of this type of construction, where glazing is often minimal. Air tightness of these buildings can be excellent as they have simple forms and use few materials.

Low carbon heat

Heating and ventilation is often specific to the building use. Replacing gas fired radiant heating with electric (infra-red) type units could substantially improve the carbon emissions. Control systems which ensure only the parts of the buildings that are permanently occupied are fully heated and ventilated and that lighting is also only provided to areas where it is needed will also help to improve the energy performance.

Renewable energy

These units could present an opportunity to the area as a significant renewable electricity generation resource if the roofs are fully utilised for PV arrays. It should be possible to achieve a renewable energy generation of at least 120kWh/m^2 (based on the building footprint) where there are no other uses, such as green roofs or plant and equipment on the roofs, which is often the case with industrial buildings. As PV technology advances this target performance will increase.

Dominant typology

- Older industrial warehouses.
- Low density industrial buildings.
- Logistics and storage warehouse space.
- Buildings are set back from the street to allow off street, perpendicular parking and storage on the pavement.
- Poor pedestrian and cycling environment.

Thames Road.

Illegible network of streets leading to private industrial estates.

Potential next steps on retrofit for Newham

This document has given an overview of the retrofit policy landscape in the context of Newham, and potential areas for policy intervention and guidance. This is based on typical typologies identified from the *Newham characterisation study* and has included some guidance on the general principles of retrofit. Some suggestions are given below on how to take this further.

Actions for London Borough of Newham

Evidence base for retrofit

Similarly to the operational energy study evidence base, a retrofit evidence base could be developed to identify specific retrofit policies applicable to Newham's buildings.

Additionally, the conversation around retrofit vs demolition and newbuild has changed in recent years with increasing recognition of the significance of whole life carbon. This could benefit from in depth analysis and an evidence base developed to inform Newham's position on how to support retrofit.

Retrofit Action Plan for Newham

A retrofit action plan could be developed for London Borough of Newham owned buildings. This would involve assessing the condition and energy use of the existing building stock and developing a retrofit strategy to move towards net zero carbon.

Guidance for householders (applicable to all London boroughs)

Develop extensive, specific and accessible guidance for householders, covering development of whole house strategies and technical advice. Include recommended allowable solutions for retrofit applications sometimes perceived as contentious, e.g., window details and positions of key technologies such as MVHR, ASHP and PV.

Retrofit London Housing Action Plan

This Joint Statement on Climate Change established a series of stretching commitments that strive for a level of ambition necessary to address the challenges we face. The Plan also sets out a path to achieving the first of these pledges: to bring forward a cross-tenure home retrofitting programme in London that can achieve an average EPC B rating by 2030. Borough level retrofit strategies and ideas for policy intervention should be developed in conjunction with this plan.