

WRAP

## **GREEN REPORT FOR HOMES**

ALL YOU NEED TO KNOW TO MAKE YOUR  
HOME ENERGY EFFICIENT

2023

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## WHO WE ARE AND WHAT WE OFFER

WR-AP works collaboratively with partners who share our passion for architecture's role in creating a balanced relationship between society and the planet.

We bring large practice experience to our studio approach, ensuring we provide a committed and hands-on service to every brief and client.

Our team specialises in guiding people and organisations through the rigorous process of planning and delivering responsible and inspiring architecture.

We are committed to creating buildings that have a positive impact on the world around us, and address the twin crises of climate breakdown and biodiversity loss.

We can help assess your property, maximise its potential to create a high quality new building, or a full renovation with extended low energy space.

Our design process will enable a dramatic reduction in carbon emissions and significantly lower associated energy costs.





## 1.0 CAN I MAKE MY HOME MORE ENERGY EFFICIENT ?

Absolutely! By making an existing home more efficient you are contributing equally or more to the environment than building a new super-efficient home, Why? Because all the energy that was used to build your house in the first place is already there, literally within every brick. Your 'old' home could improve its energy performance with some very simple measures. Our five top retrofit measures to make your home perform better are:

- **Insulate your existing envelope:**

Your home was designed and built to last for years but not to be thermally efficient. This is why considering insulation for your floor, external walls and roof is very important. You wouldn't go for a long walk in January without some efficient layers on!

- **Change inefficient windows and roof lights:**

Windows, roof lights and external doors will need to be thermally broken and well-sealed to make your house perform better. Sorry but single glazed windows must go!

- **Get rid of drafts:**

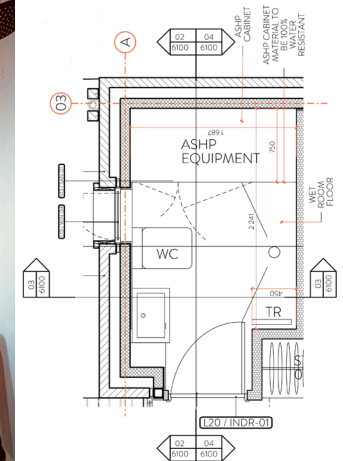
As your house ages; floors, roofs, walls and windows settled leaving small gaps that allow cold drafts inside your home. So, as you will close your jacket on a windy day, make sure you zip-up your house to feel the difference.

- **Change to efficient lighting:**

Lighting is considered one of the biggest energy 'sinners' in UK homes; alongside cold storage (fridges) and boilers. Luckily in the last few years lighting technology has developed super-efficient bulbs for homes such as LED's. Check the colour (K value) and wattage (W) of the light you like before rushing to order 40 new LED bulbs, otherwise you will be living with that rushed decision for long time... as LED's last 42 times longer than incandescent bulbs and 13 times longer than halogen bulbs.

- **Invest in an efficient heating system:**

If you are serious about energy efficiency, probably the most important decision to make is the type of heating system you will be using. Please don't only consider changing your gas fired boiler for a more efficient one (an efficient gas boiler is still using Gas – a fossil fuel, that we all now know is not a good thing for the environment), alternatively think about a complete different approach such as air source heat pumps (ASHPs). These types of heating systems absorb heat from the outside air and combined with electricity they heat your home and provide your hot water. Moving away from gas will dramatically reduce the carbon consumption of your home, therefore you can sleep well in your new home, safe in the knowledge that you and your family are doing your bit for the environment



Discreetly hidden Air Source Heat Pump equipment Cabinet behind demountable treated timber panels at WR house

## 1.0 CAN I MAKE MY HOME MORE ENERGY EFFICIENT ?

### WHY UPGRADE YOUR PROPERTY:

#### ENERGY CONSERVATION

Significant reduction in CO<sup>2</sup> emissions are possible.

#### HOME EFFICIENCY

Improving your homes efficiency will result in a large reduction in energy cost.

#### RENEWABLE ENERGY

Lower carbon emissions and reduced energy costs will result from the introduction of renewable energy initiatives.

#### INCREASED HOME VALUE

##### Efficient housing is more attractive to prospective buyers :

*'A majority (77%) of buyers say that the prospective energy consumption of their next home has become more important to them, in a clear sign that the rising cost of living is at the forefront of buyers' minds'*

*'The energy rating of a property played an important part in decision making for more than two-thirds of respondents. And, six in ten buyers (59%) would be willing to pay more for a home if 75% of its energy came from renewable sources'... as more and more importance is placed on our homes' energy performance, it's not just going to be about a long term saving on running costs but also future-proofing its value'*

*Savills October 2022*

#### RENTING OUT YOUR HOME ?

Under new regulations it is unlawful to let properties with an Energy Performance Certificate (EPC) rating below an 'E' rating. Further legislation has now been passed to further raise the EPC standards to a D rating by 2025 and a B rating by 2030. Making your property more energy efficient will future proof your home.



55 WA benefits from ASHP, new insulation, and a biodiverse roof.



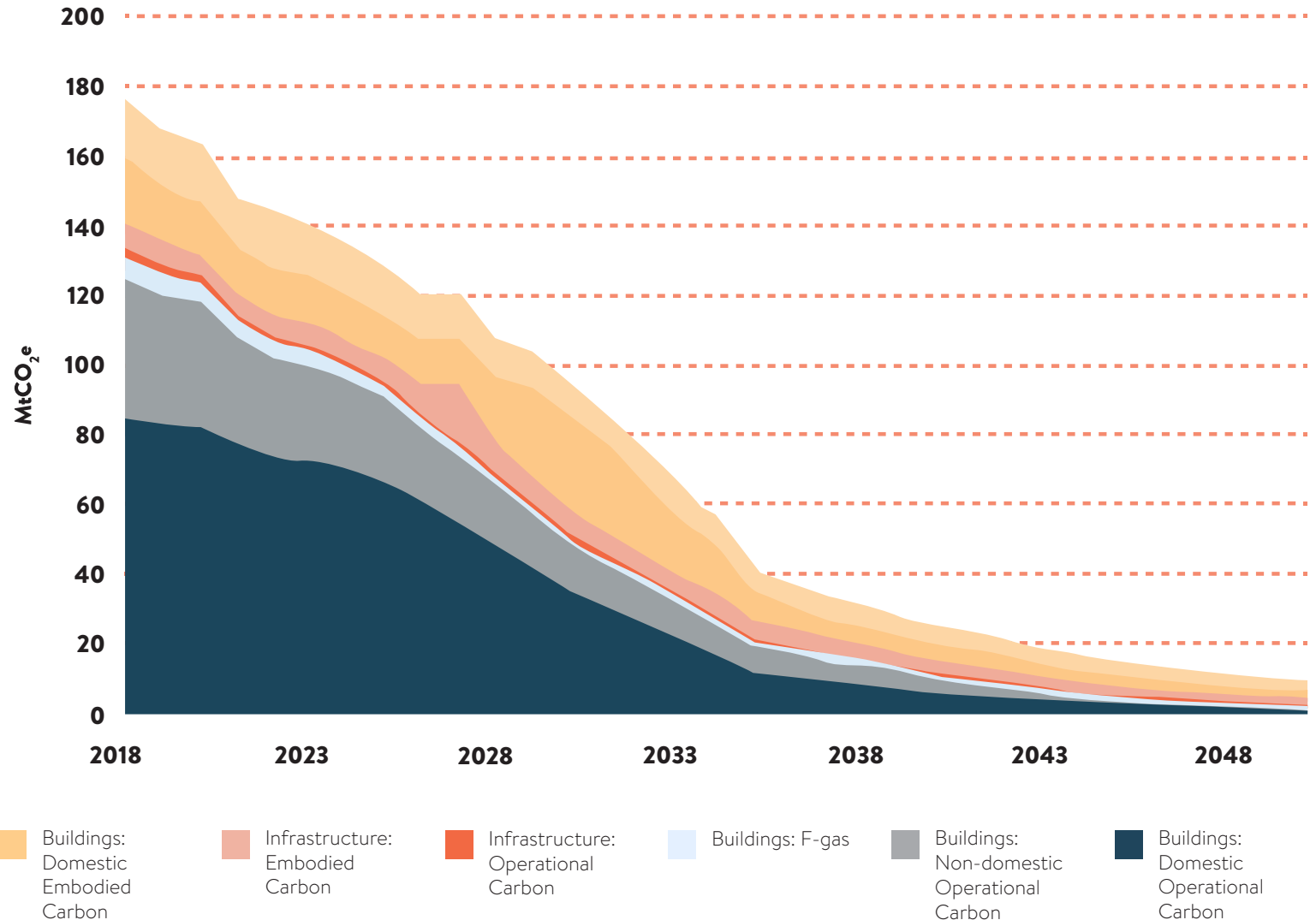
## 2.0 THE PROBLEM- IMPACT OF THE BUILT ENVIRONMENT

The UK Built Environment is currently responsible for 25% of total UK greenhouse gas emissions (buildings and infrastructure). If surface transport (vehicle emissions) is included within the scope of the built environment, the total share of UK emissions increases to 42%.

Newly constructed buildings are more energy efficient, but 80% of buildings in 2050 have already been built, so a major priority is de-carbonising our existing stock.

UK Green Building Council 2022

The Net Zero Whole Life Carbon Roadmap (graph to the right) sets out a trajectory for the built environment sector, broken down by sub-sector, which will enable us to meet our net zero by 2050 target.





## 2.0 THE PROBLEM- IMPACT OF THE BUILT ENVIRONMENT



**NOW** ----- **2050**

Energy usage within the existing housing stock represents 48% of UK built environment emission, which in turn represent 16% of total UK domestic emissions. Of this, 62% are produced by heating, mainly due to fossil fuel boilers.

To achieve our climate targets, there must be no gas boilers in operation by 2050 (currently the main source of heating for 85% of homes in the UK), with sales of all gas boilers ending by 2030.

Implementing a UK wide retrofit programme has the potential to reduce household bills by up to £430 per year as well as create 500,000 green jobs and deliver up to £56 billion in health benefits linked to improved air quality and thermal comfort

By 2050, 80% of homes will be using a heat pump system, representing around 23 million domestic installations over the next 30 years.

## 2.1 THE CHANGING NEEDS OF HOMEOWNERS

*“London needs 66,000 new homes each year, for the next 20 years”*

*“Those involved in development must... deliver good quality homes that meet high standards of design... including for specialist housing”*

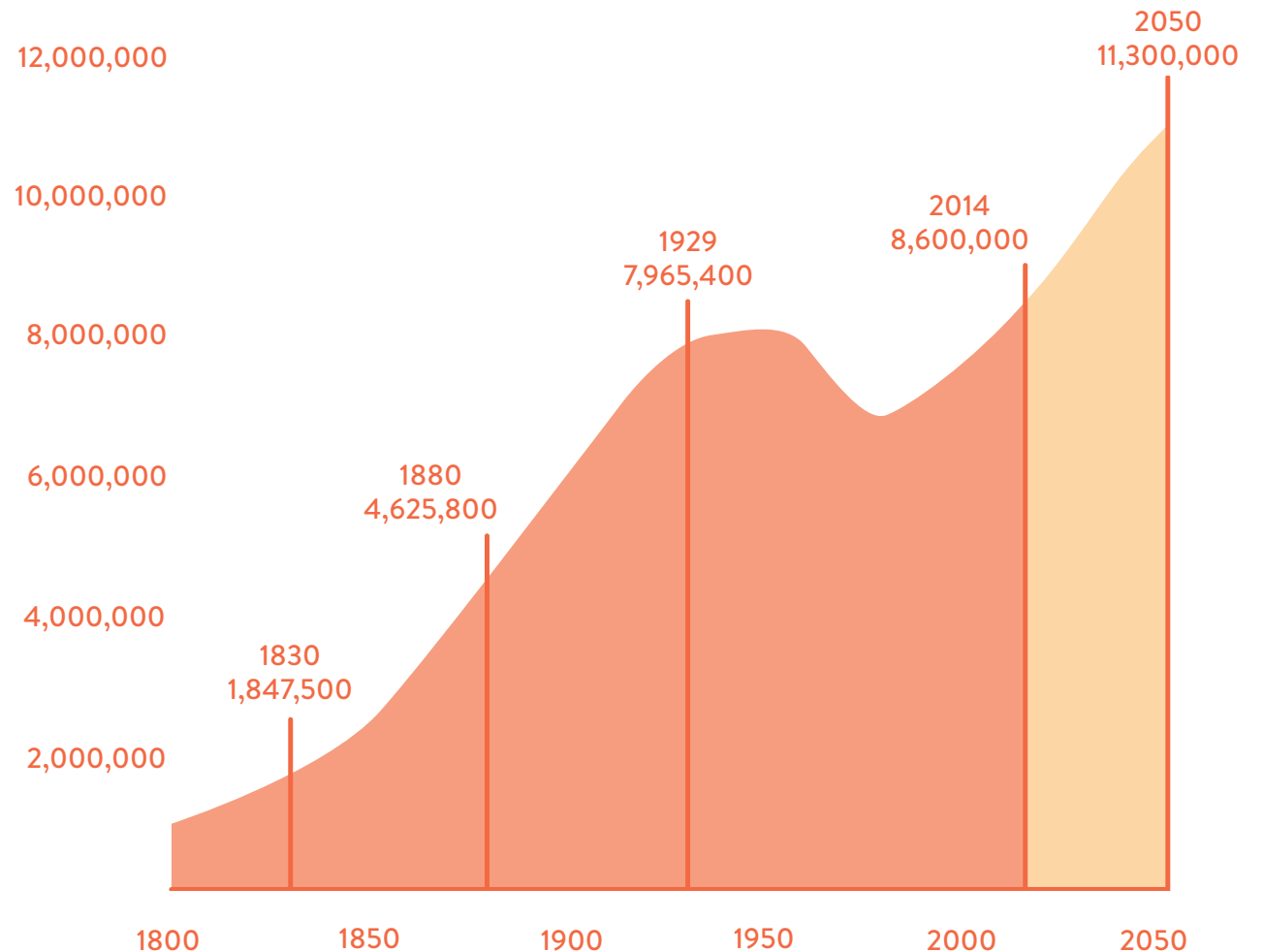
London is rapidly changing, and the population has grown significantly in recent decades (6.8 million, 1982 – 8.6 million, 2014).

London is struggling to accommodate the demand for housing and work-space, resulting in a considerable shortage of homes and increasing pressure on businesses.

The Mayor recognises the need for planners to support development of smaller sites to fulfil the changing needs of home-owners and housing in London.

The emphasis on all new schemes, should be on maximizing the opportunity, efficiency and capacity of each site.

Showing London's population growth and predicted growth over time



## 2.2 THE CARBON EMISSIONS OF UK HOMES

In response to the global climate crisis, the UK Government is seeking to cut 78% of greenhouse gas emissions by 2035, with a target of net zero by 2050. The UK's homes have been identified as some of the least efficient and poorly performing in Europe, producing almost 20% of the UK's carbon output.

Research calculated in 2021 by the National Housing Federation revealed that England's homes produce a greater quantity of carbon emissions each year than all the cars on our roads. The investigate found that:

25m homes produce 58.5m tonnes of CO<sub>2</sub>, the equivalent emissions of 28m cars, however;  
There are 27m cars in use, emitting 56, tonnes of CO<sub>2</sub> per annum

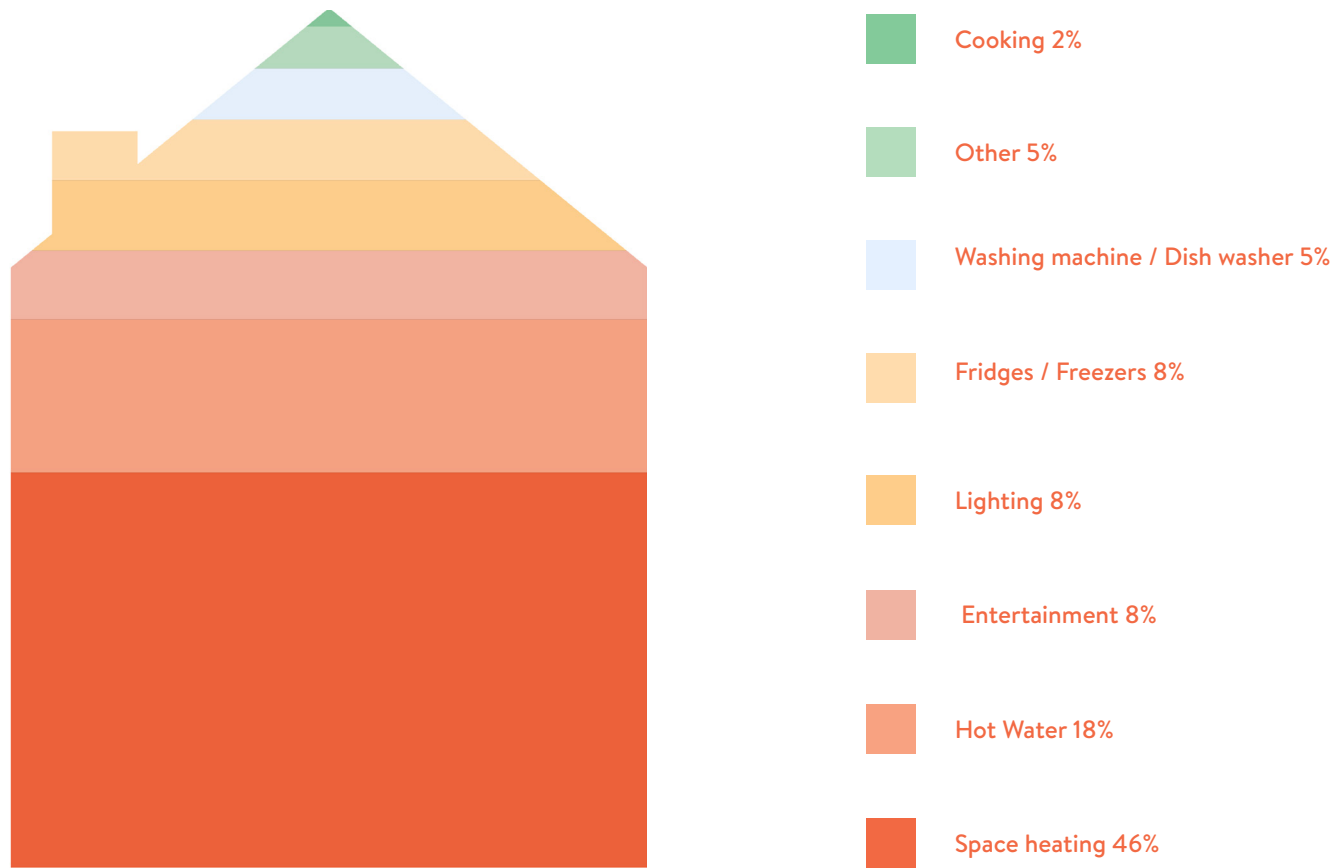
In essence, the average family household produces more CO<sub>2</sub> per year by living in their home than by driving.

The report states that 60% of homeowners believe that their home energy use has little impact on carbon emissions. However, a combination of gas central heating and poor-quality insulation means that many homes leak heat, requiring more fuel to maintain a comfortable living environment. The result is a need to develop a strategic approach to decarbonisation.



## 2.3 ENERGY CONSUMPTION OF UK HOMES

UK household energy consumption by amount of CO<sub>2</sub>

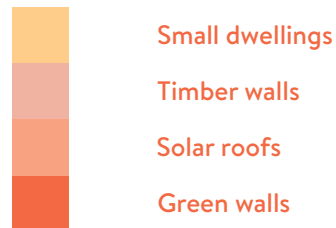


## 2.4 WHAT IS SUSTAINABLE BUILDING

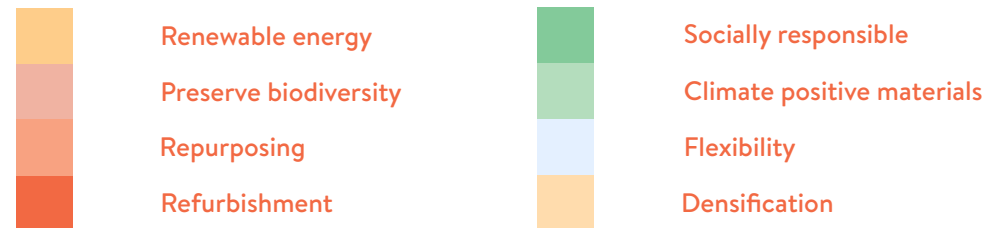
A lot of people can be put off of prioritising their home's sustainability credentials because of the narrow perception of what interventions can be put in place to achieve a more eco-friendly home.

You don't need to compromise on space or aesthetics to do your bit for the environment, it's not all bulky solar panels and timber but instead the collective good of lots of potentially small choices. If it's the cost that's weighing on your mind there's a lot of options that won't break the bank and most of the more expensive options, such as ground or air source heat pumps, will recoup that investment through continued savings in energy bills.

Public perception of a sustainable building



What a sustainable building is





## 3.0 ACT NOW- UPGRADING AND REFURBISHING YOUR PROPERTY

### FAQ'S:

#### ASSESSING YOUR HOME

Firstly you need to ascertain the current performance of your home. The current EPC (Energy Performance Certificate) rating will show the performance level from A-G. More detail on that follows in this report in section 3.2.

We can help advise on the current thermal standard of your home relative to current building standards. Typically this will relate to the type of glazing and degree of insulation. We will then be able to advise how to upgrade your property- Section 4.0 has the details.

#### RENOVATE, EXTEND, OR NEW BUILD

We can advise on maximising the efficiency and potential of your property. A combination of renovation and low energy extension will often yield the best results. If you are interested in building a new home, a 'whole life carbon study' will be needed and it may be possible that this presents a beneficial alternative. We have extensive experience with exceptional new buildings- please talk to us.

#### DESIGN AND BUDGET ADVICE

WR-AP are able to offer outline budget advice at the outset to enable early decisions to be made. As the project progresses professional cost consultants should be appointed to monitor costs.

#### PLANNING AND BUILDING CONTROL CONSENT

WR-AP can handle all aspects of the required Planning and Building control consents, whichever route is best for your property.

#### CONSTRUCTION

As the project progresses and planing consent has been awarded, we can manage the tender and construction process.

#### HANDOVER

It is vital that your new home is properly commissioned and demonstrated to be operating as efficiently as designed. A post-occupancy survey is recommended to check the performance is as expected. We can assist in this process.



Investing in a thermographic building survey at the beginning of the project will identify with precision where your house needs improvements.

These type of survey literally takes a picture of your house to assess the overall performance of the individual building fabric elements such that informed decisions can be made on improving energy efficiency.

*Note: these surveys are carried out by specialists normally during winter months for best results.*

## 3.2 MEASURING YOUR PROPERTY'S PERFORMANCE- REQUIREMENTS

An EPC is intended to inform potential buyers or tenants about the energy performance of a building, so they can consider energy efficiency as part of their investment or business decision to buy or occupy that building. An EPC is only required when a building is constructed, sold or rented out.

By law, all domestic and commercial buildings in the UK available to buy or rent must have an Energy Performance Certificate (EPC).

*“Improving your EPC rating could increase your home’s value by up to 20%”*

**Knight Frank July 2022**

### **A (93 - 100)**

Congratulations! You’re an eco-warrior and money saving maestro.

### **B (81 - 92)**

You should be very proud of this score and with a few tweaks could be hitting A\*.

### **C (66 - 80)**

A good score and above average, the UK average being D or E. A couple of changes in your home could boost you to the top!

### **D (51 - 65)**

You’re about average for the UK but don’t rest on your laurels, the UK average is low so you have some work to do.

### **E (36 - 50)**

At the lower end of the UK average, so not great but with a bit of work you could really boost your scores.

### **F (21 - 35)**

You’ve got a lot of work to do here, start thinking about upgrading your insulation, boiler, and window units.

### **G (1 - 20)**

You’ve hit rock bottom but the only way is up from here! It’ll take a lot of TLC but will be worth it.





### 3.3 BUILDING STANDARDS - RELATIVE EFFICIENCY AND SAVINGS POSSIBLE



#### Poorly Insulated Victorian Housing

- Energy use: Approximately 210-400 kWh/m<sup>2</sup>a \*
- Energy Costs Approximately £3,500++ per year \*\*

#### Typical New Domestic Building

- Energy use: Approximately 120-150 kWh/m<sup>2</sup>a\*
- Energy Costs Approximately £2,500 per year \*\*

#### Low energy Domestic Building

- Energy use: Approximately 75 kWh/m<sup>2</sup>a\*
- Energy Costs Approximately £1,560 per year \*\*

#### Low Energy / Passivehouse

- Energy use: Approximately 15 kWh/m<sup>2</sup>a\*
- Energy Costs Approximately £250 per year \*\*

\* Approximate Unit measure for energy usage per year in kWh per m<sup>2</sup> of building area per year

\*\* Energy costs are an approximate guide for a typical household based on the October 2022 Government Energy Price Guarantee unit rates

## 3.4 REDUCING THE CO<sub>2</sub> CONSUMPTION OF UK HOMES- RETROFIT AND RENOVATION



### Insulation and Building Fabric

Ensuring our homes are insulated to a high standard, sustainably heated and air-tight could mitigate 45% of energy consumption.



### Heating and Hot water Systems

- Low Carbon Heating systems- heat pumps
- Smart meters
- Fittings – install low-flow taps, efficient showersystems, thermostats



### Smart metering and Appliances

Smart meters and low energy lighting could tackle 90% of the energy consumption

- Install A++ and A+++ rate appliances (cookers, fridges, freezers, entertainment devices, washing machines, tumble dryers, dishwashers)
- Install Low Energy and smart lighting systems
- Install smart meters



### Install PV systems

PVs - cost savings  
battery for off-peak



### Other

- Flooding strategies – ground levels, permeable paving, SuDS
- Passive cooling – openable windows

**Improving existing homes can help homeowners dramatically improve energy efficiency and running costs. These works can also prepare for the impacts of the climate crisis.**

**This list shows the types of work that can transform an existing home into a low-carbon, sustainable and energy efficient dwelling.**

### 3.5 CASE STUDY- TEDDINGTON HOUSE RETROFIT

Before we start building anything new, we need to concentrate on improving the performance of current homes—their walls, floors, roofs, windows, and doors—to lower the operational energy, and therefore help in reaching our net zero targets. 25 Coleshill Road showcases several retrofit techniques to improve the efficiency and decarbonise your home.

The primary design strategy looks to improve the thermal performance of the property significantly with all existing external facades and roofs having new insulation. This quite literally creates a blanket around the whole

property whilst exploring the creative potential in cladding the insulation; in this case brick and render. A significant amount of heat is lost via ineffective windows and doors. They frequently cause draughts and are susceptible to condensation. As such, all windows and openings have been replaced with new double glazed windows.

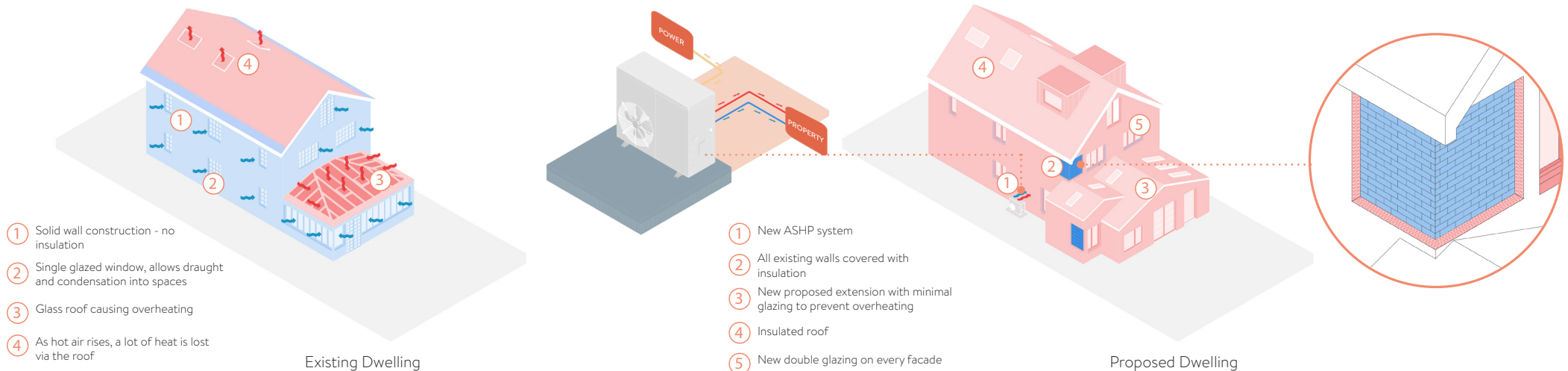
Energy use is being regulated with the introduction of a new ASHP (air source heat pump) heating system. Heat pumps heat your home and provide hot water by absorbing heat from the air, the ground, or water, whilst only using a small amount of electricity to extract it.



25CR - EXISTING PROPERTY

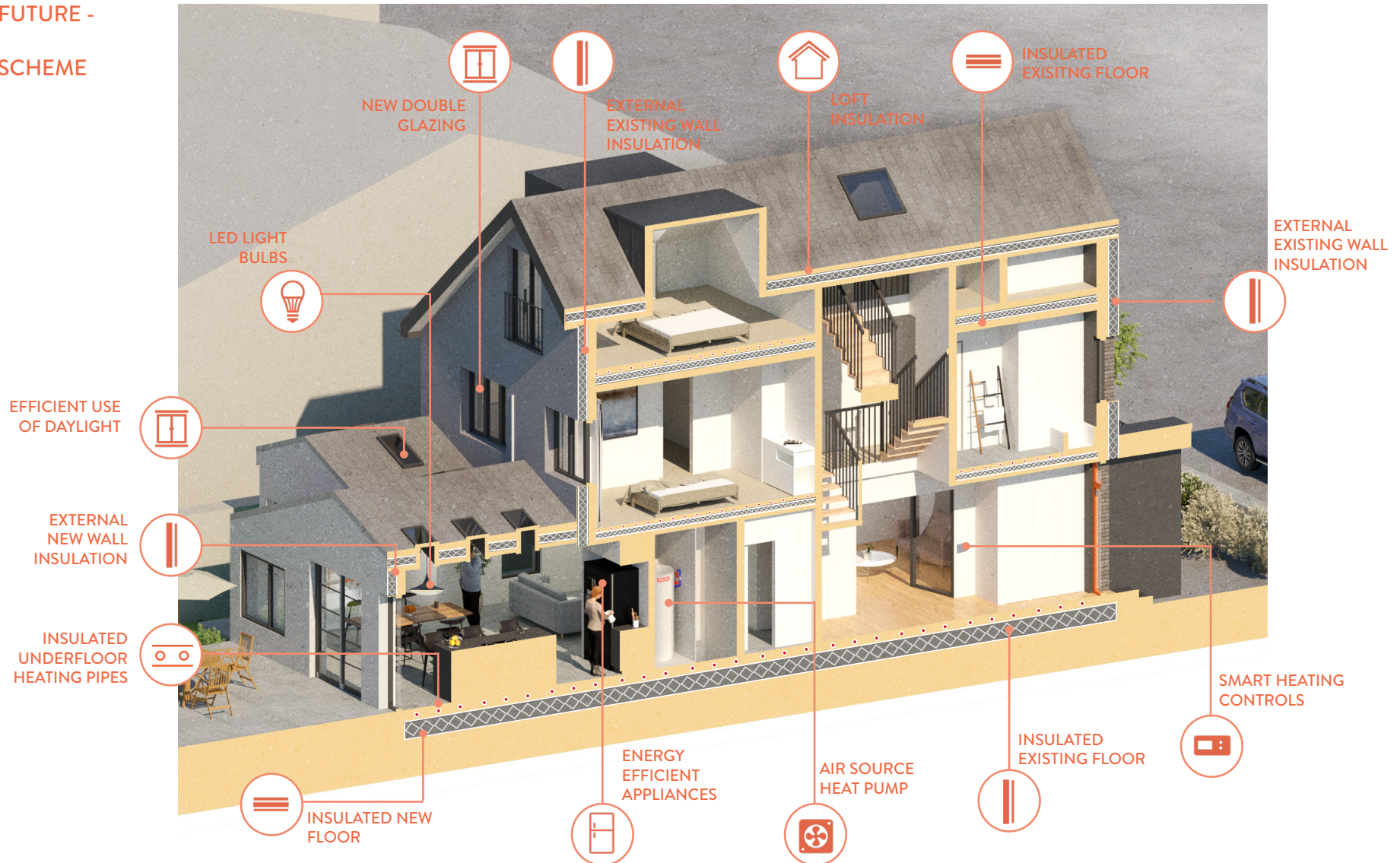


25CR - PROPOSED PROPERTY



### 3.5 CASE STUDY- TEDDINGTON HOUSE RETROFIT

#### RETROFIT FOR THE FUTURE - ENERGY EFFICIENT SCHEME



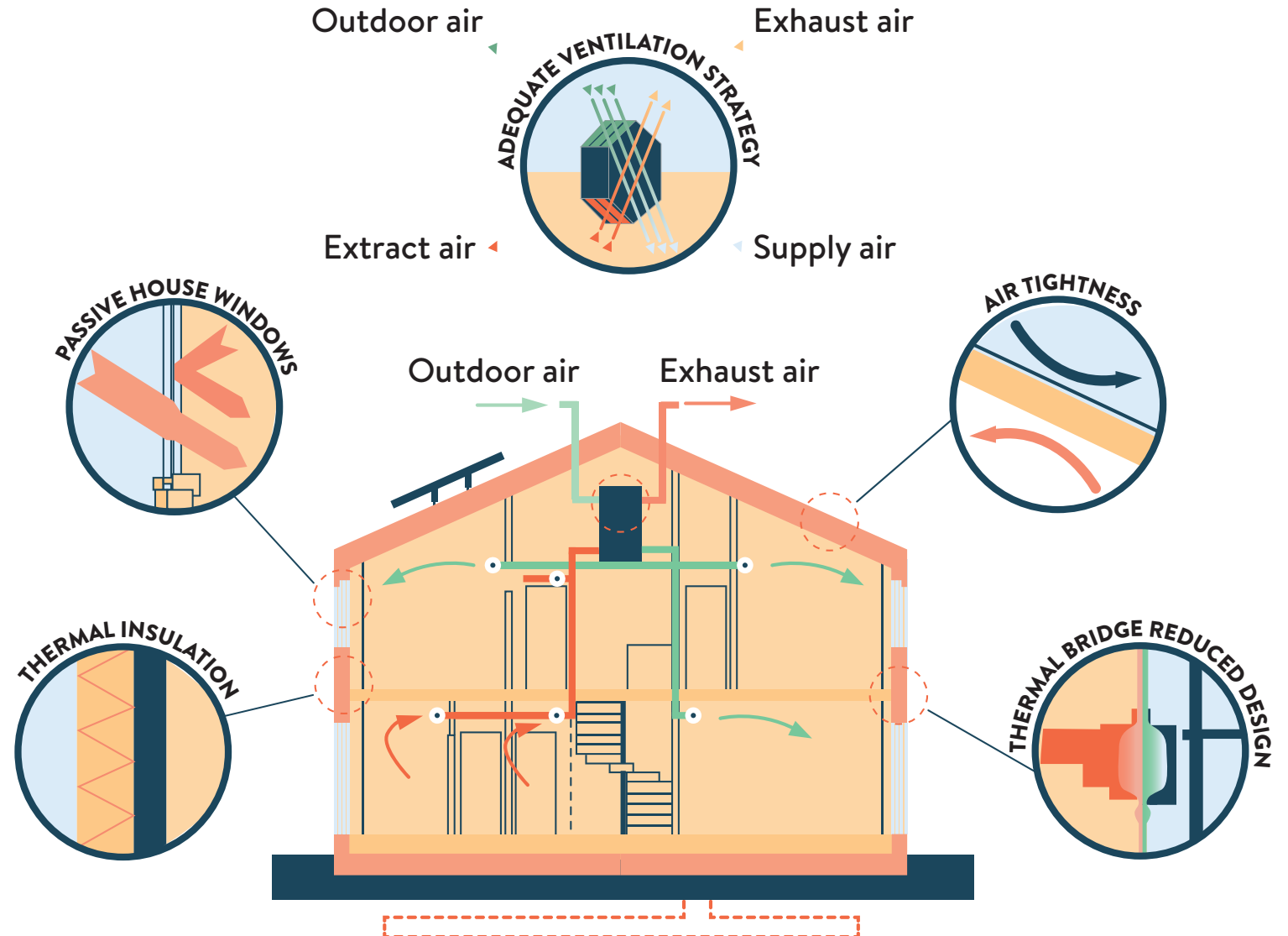
### 3.6 THE PASSIVE HOUSE STANDARD

If you're really serious and want to go the whole hog the Passive House standard might be for you! It's a a lot of work to achieve and is difficult to achieve in retrofit projects but if you get there it is well worth it from the savings on your energy bill alone.

But what is it? Passive House is an internationally recognised building standard that is an accreditation for exceptionally energy efficient buildings. Passive Houses generally have space heating related energy savings of up to 90% compared with typical building stock and over 75% compared to average new builds, substantially less than common low-energy buildings.

Vast emission and energy savings are possible by following these principles:

- Excellent thermal insulation
- High quality building and airtightness
- High performance external doors and windows
- Ventilation with heat recovery systems



### 3.6 THE PASSIVE HOUSE STANDARD

New buildings built to Passive house standards typically are affordable and can offer vast CO<sup>2</sup> and energy costs. While typically employed for new developments, the standard can be applied to retrofit projects to yield very significant building improvements.

Please get in touch should you wish to discuss a potential Passive House standard project.

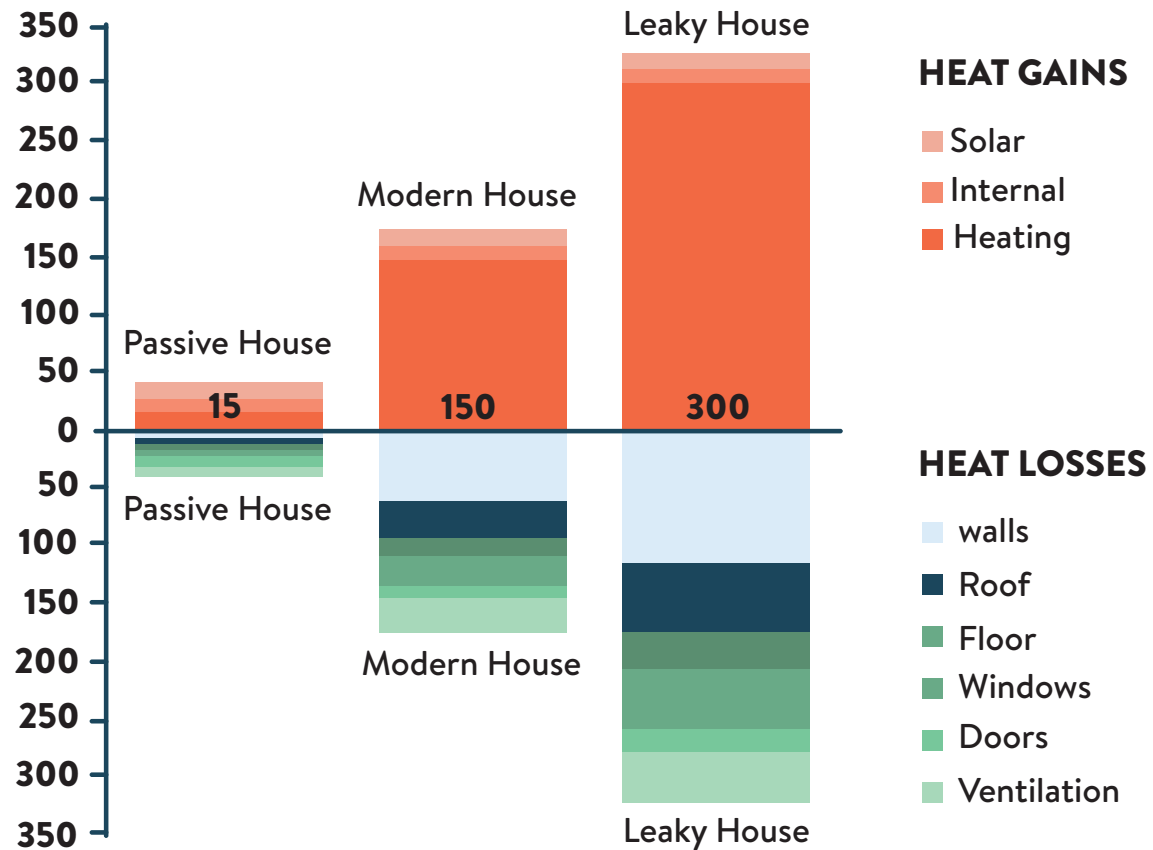


Passive House on London infill site



London's first Passive House

## HEAT GAINS AND LOSSES BY HOUSE TYPE: kWh/m<sup>2</sup>a



Note: Typical values for a northern European country



## 4.0 POTENTIAL IMPROVEMENTS, BENEFITS, CONSIDERATIONS

### Building Upgrade Area

#### Glazing Upgrade

- Double or triple low emission glazing to reduce heat loss
- solar protective coating to avoid summer overheating
- Secondary glazing systems can improve performance

#### Insulation strategy

- In lofts and roofs insulation upgrades
- Insulating slabs and walls (cavity and solid)

#### Heating strategy

- Consider replace gas central heating with heat pumps or possible connections to district heat networks

#### Renewables

- Photovoltaics provide a renewable electricity supply
- Consider battery storage systems
- Air or ground source heat pump installations (see above)

#### Water strategy

- Low-flow taps and shower systems

### Emission Reduction and Cost Benefit

- Significant reductions to emissions and heating costs and increase in home performance EPC.
- Air sourced heat pumps are between 3 to 4 times more efficient than gas boilers and run from increasingly renewable based electricity.
- Significant reductions to home energy costs, particularly if PV's are used with battery storage systems.
- Reductions to water use and costs, also associated reductions to water heating costs .

### Planning / Consent Considerations

- Planning permission may be required if in a conservation area or if renovations are significant.
- Listed buildings have more restrictions.
- Depending on how significant, building control consent may be required.
- Air source heat pumps require the installation of an external unit, which is allowed under permitted development guidelines.
- Planning approval will be required if the installation differs to these regulations.
- Planning permission may be required, particularly in conservation areas.
- No consents required.



## 4.1 POTENTIAL IMPROVEMENTS

### Building Upgrade Area

#### Biodiversity

- Gardens, planting and trees to reduce the impacts of flooding and overheating
- Encourage biodiversity, consider green roof systems

#### Lighting and appliances strategy

- Installation of A++ and A+++ rated appliances
- Installation of LED lighting and smart lighting systems
- Install smart meters to monitor performance

### NEW BUILD CONSIDERATIONS:

#### Construction Strategy

- Use of low embodied carbon materials
- Responsibly sourced materials

#### Flooding prevention

- In new construction there should be consideration for future flood risk and reducing risks

### Emission Reduction and Cost Benefit

Landscaping interventions can encourage biodiversity, provide natural shade in summer, reduce contribution to localised flood risk.

Consider blue roof systems that slow down storm drainage, and planted biodiverse roofing. Permeable paving can reduce drainage flows.

Embodied carbon measurement is becoming an important factor in a building's environmental performance and in increasing factor in planning approval.

- Treated timber floors
- New concrete floors

### Planning / Consent Considerations

- Planning permission generally not required for landscaping works unless in a conservation area
- No consents required- immediate benefits

- While permitted development rights are normally available for extension and renovation, new development will require planning approval
- Planning applications require flood risk assessments

## 4.2 GRANT SCHEMES AVAILABLE

Despite the closure of new applications to the Green Homes Grant scheme in March 2021, there are grants still available to UK households for installing low carbon and clean energy technologies. Here we introduce the available grants and the incentives behind them:

### Boiler Upgrade Scheme

Launched in April 2022. Three-year scheme aids the decarbonisation of buildings. The property has to provide a valid EPC issued within the last ten years. Provides upfront grants of £5000 to support installation of heat pumps, and in some circumstances biomass boilers. Grant allows people installing a heat pump to pay a similar amount to those installing gas boilers

<https://www.ofgem.gov.uk/environmental-and-social-schemes/boiler-upgrade-scheme-bus>

### Energy Company Obligation

Government energy efficiency initiative to lower carbon emissions by supporting low income and vulnerable households to heat their home. Enables the replacement of broken or inefficient systems

<https://www.greenmatch.co.uk/green-energy/grants/energy-company-obligation-eco>

### Smart Export Guarantee

Incentivises UK homes that have installed renewable energy technologies like solar panels to generate electricity for their homes. You can sell the surplus energy generated by the renewable technology back to the grid and earn money. Smart meters are beneficial as they take measurements every 30 minutes and automatically send the readings to your SEG licensee

<https://www.greenmatch.co.uk/green-energy/grants/smart-export-guarantee>

### Local Authority Delivery Scheme

Aims to raise energy efficiency of low income and low energy performance homes with a focus on homes with an EPC Rating of 'E, F or G'. Designed to help reduce fuel poverty and to phase out fossil fuel heating

<https://www.gov.uk/government/publications/green-homes-grant-local-authority-delivery-scheme-phase-2-funding-allocated-to-local-energy-hubs>

### VAT Reduction

Certain households with solar panels can get a 5% tax reduction under the new VAT pricing system for the installation of energy-saving technologies

<https://www.greenmatch.co.uk/solar-energy/solar-panels/solar-panel-grants>



## 5.0 YOUR HOME CHECKLIST

Home type			
End of terrace	Mid-terrace	Semi-detached	Detached

Lighting strategy				
Incandescent	Halogen	LED	Smart Bulbs	Low energy

Insulation strategy				
Ext. walls (front)	Ext. walls (rear)	GF substrate	Upper floors	Loft and roof

Appliances ratings						
Cooker	Fridge	Freezer	Devices	Washing machine	Dish washer	Tumble dryer

Window glazing strategy		
Single-glazing	Double-glazing	Triple glazing

Water fittings				
Cisterns	Low-flow taps	Shower systems	Insulated tanks	HW thermostats

Window / door frame strategy				
Timber	Aluminium	Steel	uPVC	Composite

Water saving strategy		
Water stores	Rainwater Harvesting	Green roofs

Heating strategy	
Gas boiler	
Combi boiler	
Megaflow	
Air Source Heat Pump	
Ground Source Heat Pump	
Photovoltaic panels	
Solar thermal collector	
Thermostats	
Radiators	
Thermostatic radiator valves	
Underfloor heating	
Electric heat emitters	
Smart meter	

Ecological strategy			
Green roof	Brown roof	Blue roof	Rainwater harvesting

Construction strategy: External walls				
Solid brick	Brick and block	Cavity	Timber frame	Solid timber

Construction strategy: Substrates	
Timber	Concrete

Construction strategy: Roofs			
Pitched (cold)	Pitched (warm)	Flat (cold)	Flat (warm)

Other strategies		
Flood prevention	Passive cooling	Renewables

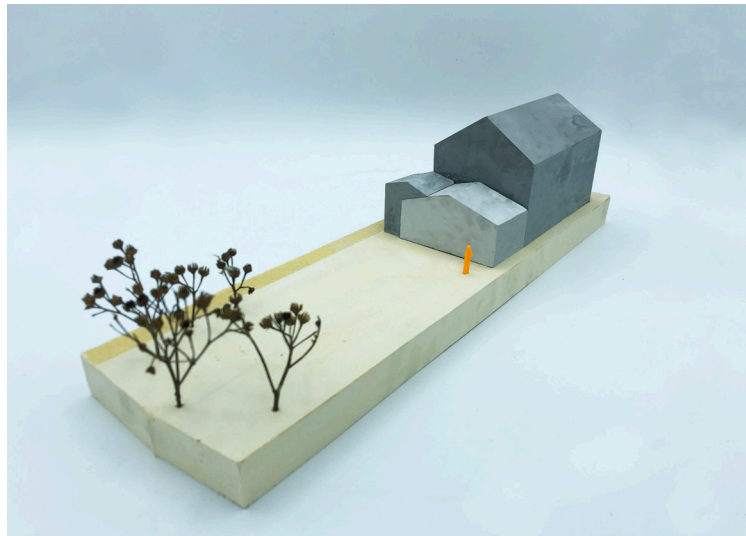
## 5.0 YOUR HOME CHECKLIST

Now you've completed your checklist don't hesitate to get in touch! We're looking forward to learning more about your project and helping you on your journey to create a greener home.

You can drop an us an email at [info@wr-ap.com](mailto:info@wr-ap.com) or give us a bell on **020 8050 5107**. You can also check out more of our projects at [wr-ap.com](http://wr-ap.com).



WR House



23 CR





## 6.0 WHAT CLIENTS LIKE YOU SAY ABOUT US...

"We have recently commissioned Max and his team to design an extension to our property in Dorset. Right from our first meeting, Max was fully engaged and excited about the possibilities. Together we prepared a design brief which was invaluable in terms of us really thinking about and prioritising our requirements. Max arranged for a measured survey to be undertaken which was completed expediently. Max and his team worked quickly and efficiently in preparing initial ideas and were receptive to our feedback and suggestions. Quickly a preferred option was selected and this moved into a worked up design for a planning application. We received planning permission in April 2020 and are excited to take our project onto the next stage with Max's oversight to achieve our design vision. We highly recommend WR-AP for their excellent service and bespoke approach to architectural design."

**Juliette Callaghan**

"Right from the start of the design process we have felt totally supported by WR-AP's professionalism, they have been great at listening to our needs and their 3D images and Virtual Reality presentations have been very helpful."

**Marianna Ferrara**

"The team are great and really listen to our needs our vision whilst giving vital feedback. WR-AP have been quick to deliver. I highly recommend them."

**Laetitia Allen**

"We highly recommend WR-AP for their architectural services. Max and Sean (the architects at the practice WR-AP) have done a brilliant job designing our loft, rear extension and house renovation works. Everyone that has seen the package of works provided by WR-AP has been impressed and commented on how good the drawings, details, specifications and tender package was prepared. Planners, engineers, and all the builders who gave quotes for the works were impressed with the quality of the work and commented that they had never seen such high quality work and attention to detail."

**Ken MacKenzie**

"Sean and the team have been great since the beginning. We are dealing with a very difficult Richmond planning process and due to the positive work from WRAP we are optimistic with the outcome. Great company and very thorough in all aspects of what they do. I would highly recommend."

**Steve MacDonald**

"We would highly recommend the services provided by WR-AP. We are undertaking a complete house renovation and they have given a professional, responsive, and innovative service. They are very easy to work with and have delivered a plan that meets our expectations."

**David Brill**

"We're so happy we chose WR-AP to design our extension. They have listened to what we wanted and come up with innovative but practical ideas to help make the design work for our budget. They have managed to get the balance between designing us something a bit different that's realistic to achieve. Great attention to detail, very friendly and efficient in discussing plans which excite us at every stage! Would definitely recommend :-)"

**Emily Sinclair**





## 7.0 BIBLIOGRAPHY AND FURTHER READING

### Overview/data/energy consumption

- <https://www.theccc.org.uk/wp-content/uploads/2019/02/Homes-of-the-future-are-needed-today-Infographic-A4.pdf>
- <https://www.housing.org.uk/resources/decarbonisation-guide-for-housing-associations/>
- <https://www.housing.org.uk/our-work/climate-and-sustainability/>
- <https://www.housing.org.uk/news-and-blogs/news/englands-leaky-homes-greater-threat-to-climate-than-cars/#:~:text=The%20research%20calculates%20for%20the,million%20tonnes%20of%20CO2%20annually.>
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- <https://www.housing.org.uk/globalassets/files/climate-and-sustainability/07085855-9cf8-456c-8099-9506a6839b5d.pdf>

### Boiler Upgrade Scheme/Clean Heat Grant

- <https://www.ofgem.gov.uk/environmental-and-social-schemes/boiler-upgrade-scheme-bus>
- <https://www.gov.uk/government/news/plan-to-drive-down-the-cost-of-clean-heat>
- <https://www.greenmatch.co.uk/blog/clean-heat-grant>

### Grants overview

- <https://www.gov.uk/guidance/apply-for-the-green-homes-grant-scheme>
- <https://www.ofgem.gov.uk/environmental-and-social-schemes/energy-company-obligation-eco>
- <https://www.gov.uk/government/publications/green-homes-grant-local-authority-delivery-scheme-phase-2-funding-allocated-to-local-energy-hubs>
- <https://www.greenmatch.co.uk/blog/green-homes-grant#:~:text=The%20Green%20Homes%20Grant%20was,the%20end%20of%20March%202021.>
- <https://www.simpleenergyadvice.org.uk/grants>
- <https://www.simpleenergyadvice.org.uk/energy-efficiency/reduce-bills>

### Renewable Heat Incentive

- <https://www.gov.uk/domestic-renewable-heat-incentive>

### EPC

- <https://find-energy-certificate.service.gov.uk/energy-certificate/8600-3307-0229-6396-0203#recommendations>

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