

# The Green Shift

The existing financial incentives for higher environmental performance of new homes

# About

This is an exploration to see if a 'tipping point' has been reached in the provision of new homes, where existing financial incentives provide high levels of environmental sustainability in a way that are financially advantageous for all stakeholders, and if this route is now the most financially viable option.

This discussion document was authored by Rafe Bertram as part of the Good Homes Alliance 'Build Net Zero Now Campaign', with input from Good Homes Alliance, Homes England, Green Finance Institute, Enfield Council, London Councils, L&Q group, Centre for Social Justice, BEIS, OnePlanet, Useful Projects, Net Positive Solutions. HTA Architects, Savills, Inner Circle Consulting and many others.

## NOTE:

Please satisfy yourselves regarding the validity of this information, some of it has been collected over a long period so may be out of date.

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# Executive Summary

## Introduction

There are many anecdotes about how 'doing the right thing' is beneficial financially for all concerned, but little research as to how it can all come together. Many discussions revolve around the need for change, rather than the mechanisms needed to bring about the change.

Three principal factors in a societal transition, such as 'Build Net Zero', are the:

- imperative to change
- regulations that direct the change
- incentives that encourage the change.

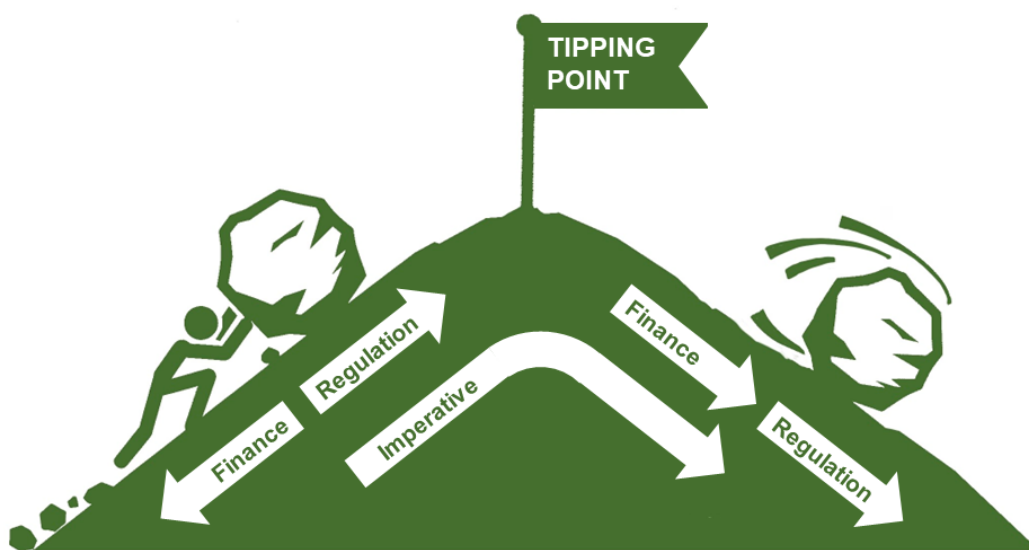
The imperative is clear, the regulations are being developed, and this paper focusses on the progress of the financial ecosystem that support both the imperative and the regulations.

The market failure of not providing net zero homes as standard is obvious when climate change effects are considered externalities to business plans and decision making. Many examples show that when issues become

included in every-day decision making they create a huge positive effect. Think of the change when the price of plastic bags in supermarkets shifted from being an unseen 'externality' to being obvious and tangible. Like many examples in the built environment, the three factors were present - the imperative (reduction in plastic pollution), the regulation (legal retailer's responsibilities) and the incentive (10p valuation).

Three hypotheses are explored in this discussion paper. Firstly, there are many financial incentives that exists already in the built environment and documenting these would be beneficial and revealing. For instance, Green Mortgages and ESG loans at discounted rates for green projects.

Secondly, like many issues of sustainability, an eco-system of stakeholders and the relations between them are likely to reveal the answers, rather than looking at each type of organisation working in silos. For instance, higher insulation levels by the developer result in lower energy costs for the residents.



# Executive Summary

## Introduction

Thirdly, the scale of the changes needed are more likely to come about at the required speed if direct financial benefits for all stakeholders work together with the environmental imperatives and regulation. For instance, efficiencies and cost reductions of the solar and wind energy sectors has been a huge driver in their scaling-up and decarbonising the energy sector. The increase in this change, the 'tipping point', was reached when a financial opportunity supported the imperative and the regulation.

We hope that this review is useful for:

- Business plans, financial models and business justifications for any of the stakeholders
- Local plan evidence, that could input into viability assessments
- Ideas for new incentives
- Lobbying to increase availability of these incentives

We are aware that any 'system thinking' is complex and we are aware that this is a much wider discussion, but to help understand the 'system' we are consciously focussing on a narrow part of the sustainable built environment:

- New build - although solving this for retrofit is potentially more impactful

- Homes – although this could be developed for other building types.
- Existing incentives - although many better and more widespread savings, funding, policies and other incentives are likely to follow.
- Direct financial benefits - though environmental, social, indirect and wider benefits are incredibly important and touched upon, they are not the main focus here.
- A concise eco-system – we are looking at six stakeholders only, although contractors, suppliers, energy providers and insurers are important, they are not included in this yet.
- Market sale and rent tenures - although other tenures are an essential part of the picture such as social rent, intermediate rent, shared ownership, help to buy etc
- Two scenarios only – though a scenario with even better performance could be assessed. The two scenarios used here are:
  - The baseline - taking the Building Regs (Part L 2021), London Plan 2021 and existing Local Plans
  - Evolved scenario - comprising new Local Plans, the RIBA 2030 climate challenge, the UKGBC framework, LETI guides and targets, and the emerging work on the Net Zero Carbon Building.

# Executive Summary

## Part 1: The Evidence

**Part 1:** the Evidence - briefly lists and describes existing products, technologies, methodologies, studies and strategies that could be components of the 'Green Shift'. In an academic research sense this would be called a 'literature review', however while some research is literature, much is experience, products and conversations. It is also a practice perspective, rather than an academic perspective, without the time and dedication available that a PhD investigation could provide. It is also 'work in progress' and a live document, as interest rates etc are always changing.

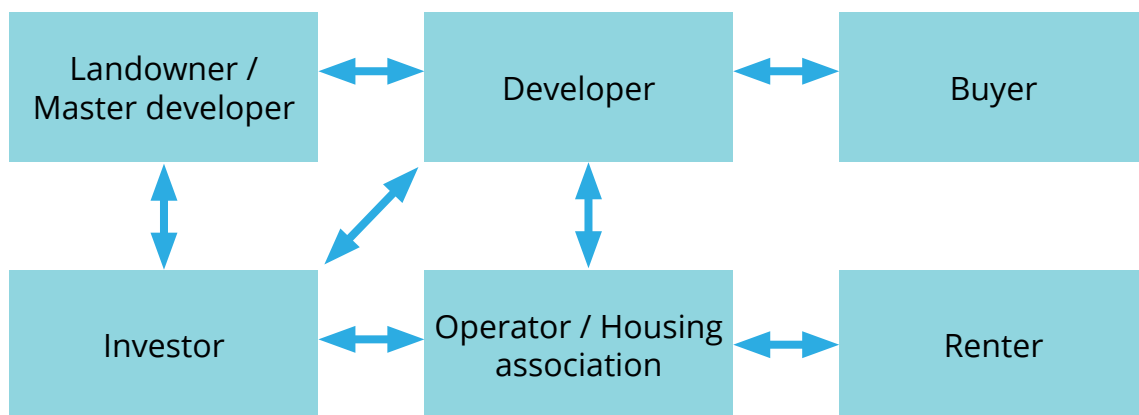
Starting with the consumer, we look at all issues that more sustainable homes would affect each stakeholder's business case:

- From the renter and the buyer perspective, we look at the cost of energy, Green mortgages, rent and sale price.
- From the Operator and Developer perspective, we look at construction cost estimates, development funding, risk and efficiencies available,

- From the Landowner perspective we look at land sale price, and public funding available.
- From the Investor and Funder perspective, we look at the motivation of incentivised investment, how ESG is defined and performance measured.
- From all perspectives, we look at issues that affect all these stakeholders such as carbon markets, law, policy, insurance, transparency, data and reputation.

At the end of each chapter in Part 1, we make some assumptions of each issue, that can be used to create the illustration in Part 2.

Regarding the first hypothesis of the benefits of researching existing incentives – there are many financial incentives that exists already in the built environment and documenting these provides starting points for assumptions that could be used in options appraisals and business plans.



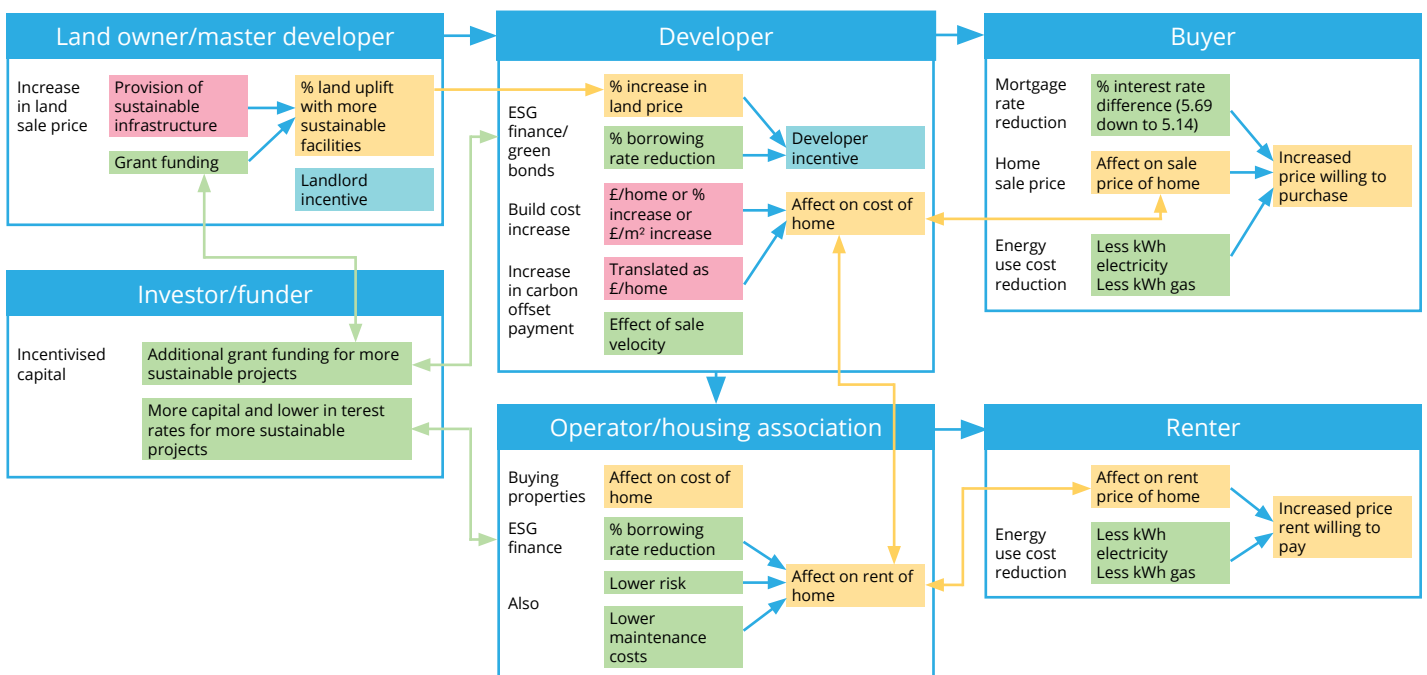
Simplified Stakeholder diagram. Do the financial incentives outweigh the costs when taking these six stakeholder groups as an interconnected system?

# Executive Summary

## Part 2: Illustration and Analysis

**In Part 2:** Illustration and Analysis – we use the assumptions from Part 1 to create an interdependent set of business cases to explore if the financial incentives were sufficient to constitute an industry-wide ‘green shift’, using a hypothetical outer London mid-rise development project to illustrate these issues.

In terms of the second hypothesis, of reading answers by looking at the ecosystem rather than just types of organisation, we find that it is only by the sectors working together the built environment industry can move to creating more sustainable homes.



The interplay of each stakeholder and how working together can produce homes that are more sustainable and more financially viable.

# Executive Summary

## Part 3: Conclusion / Part 4: Next Steps

**In Part 3:** Conclusion, we explore if a 'tipping point' has been reached.

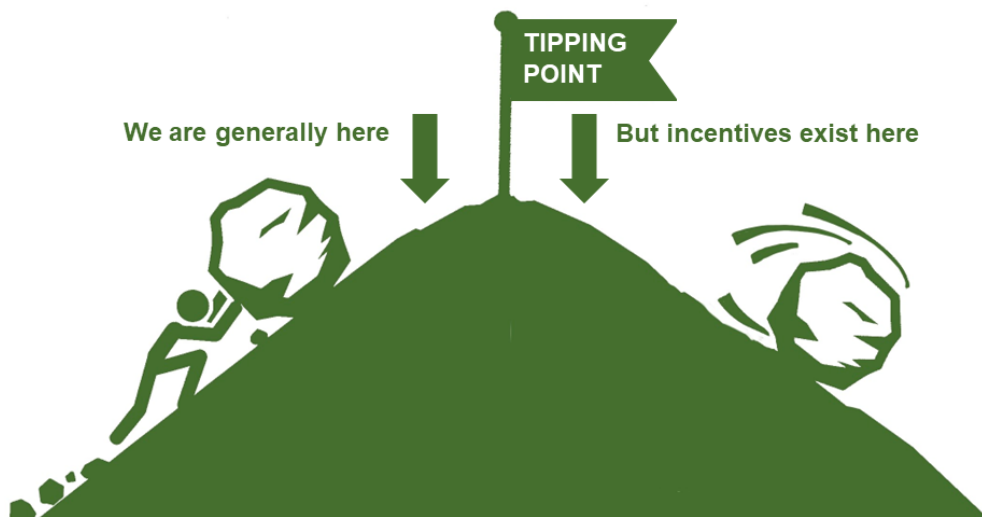
The outcome of the third hypothesis, a shift in speed if financial benefits are found by all stakeholders, we can see where this shift will come from, how it will work, and the beginnings of change taking place. If available incentives were used by all stakeholders in the illustrated project, there would be financial incentives for all concerned. As these incentives do not exist for the 'Business as Usual' case, the 'evolved scenario' becomes more financially viable. This is a huge opportunity for an ecosystem of 'early adopter' stakeholders.

The discussion paper proposes that a proposes that we are now at this tipping point, but not yet past fully past it. There is still much work to be done, as exemplar financial incentives have been chosen, rather than the 'average available', and therefore scaling these incentives is urgent and impactful.

**Part 4:** Next steps – looks at what might be next for this project and how it might develop to include a wider definition of value, retrofit projects, and 'near future' incentives that are not currently in place yet.

This report has been collated through the help of many peoples' inputs, and so a massive 'thank you' to everyone for your help so far. Please see acknowledgement section at the end. This maybe the first in a series of an annual update of this, so please send your comments and suggestions to:

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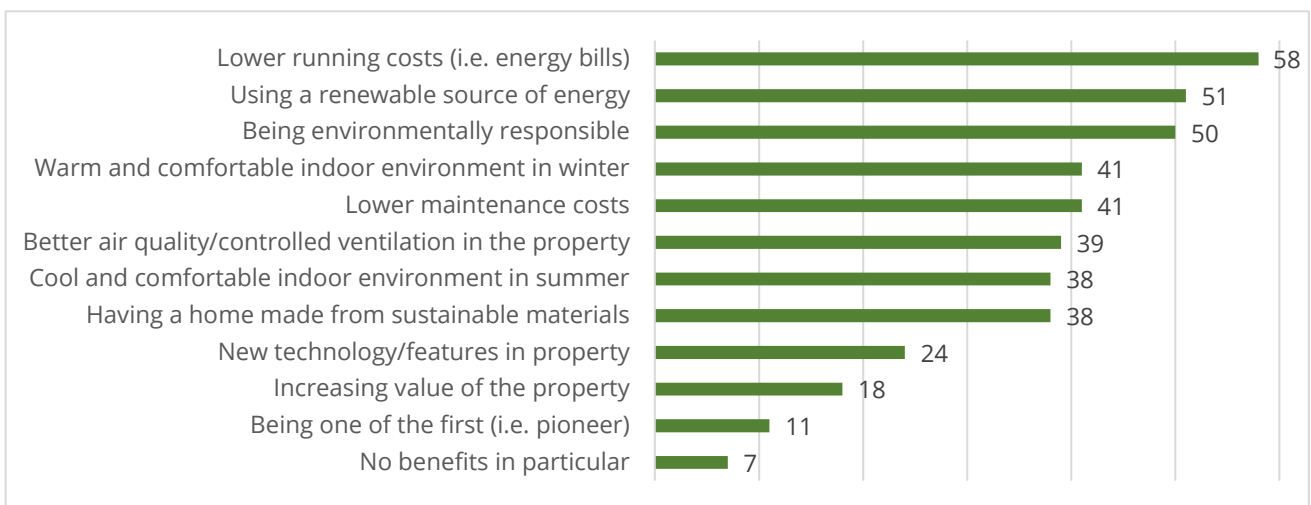
# Part 1: Evidence Review

## Renter and buyer perspective

### Achieving Lower operational and maintenance costs

**Lower running costs are important to the renter and buyer.** An online survey of 2,500 consumers views in relation to sustainable homes was published the [Building for 2050 – Low cost, low carbon homes](#) to capture views and experiences. The main benefits were viewed as lower running cost, but more than 60% cited cost as being the main barrier.

Main benefits to living in a sustainable home from the wider consumer survey (%) - results form from Building for 2050 - Low cost low carbon homes.



**Energy efficient homes are cheaper to heat for residents.** Useful Fuel Bill Cost [Prediction Tool](#) from UKGBC [LENDERS Project](#) – but this uses Ofgem prices from 2015, and a part of a wider European Energy Efficient Mortgages project, [EeMap](#).

**LENDERS**  
Improving energy costs in mortgages  
Promoting energy efficiency in homes

Executive Summary | Download Full Report

### Fuel Bill Cost Prediction Tool

Please choose your required housing choice and family member numbers from the drop down menus

Number of Residents: Four  
Property Type: Flat  
Number of Bedrooms: Two  
EPC Band: C

**Calculate**    Annual Fuel Bill    Monthly Fuel Bill

60% of comparable UK homes have fuel costs within this range, using Ofgem average fuel tariff prices for 2015.

From	To	From	To
£973	£1318	£81	£110

Based on your inputs, the best performing comparable homes (rated as EPC 'A') costs

From	To	From	To
£388	£527	£32	£44

**That means you are probably paying about £688 per year more than the UK's best performing comparable homes. That's around £57 per month.**

This predicts using a two bedroom flat mid-range fuel bill for different EPC ratings would be (in 2015 prices):

- EPC C rating: £1,147
- EPC B rating: £817
- EPC A rating: £458

Fuel Bill Cost Prediction Tool screenshot from the Lenders project

# Part 1: Evidence Review

## Renter and buyer perspective

### Space heating demand

The Toward Net Zero Carbon (TNZC) study by Etude, Levitt Bernstein, Introba, Inkling and Currie Brown, led by Haringey Council and supported by 19 other London Councils, is a technical evidence base to inform the policy making process for planning officers in the participating 19 London. The current draft is not published yet but dated March 2023.

#### Space Heating Demand

- Baseline: 28 kWh/m<sup>2</sup>yr
- Evolved: 10 kWh/m<sup>2</sup>yr

#### Energy Use Intensity (EUI) 'energy at the meter'

- Baseline: 45 kWh/m<sup>2</sup>yr

Mid-rise block of flats | Policy option 2 | Predictive energy modelling (Space heating demand and EUI)



The space heating demand for the mid-rise block of flats modelled varies from 28 (worst) down to 10 kWh/m<sup>2</sup>yr (best). The improvement between the business-as-usual and good practice cases is relatively small in comparison to the space heating demand achieved in the ultra-low energy case. The benefits of MVRH and best practice fabric specifications are clearly showing.

The Energy Use Intensity (EUI) of the mid-rise block flats covers all energy uses: space heating, domestic hot water, ventilation, lighting, equipment (cooking, lift etc.) and appliances. The table shows a graduation of improvement as both the building fabric and heating systems become progressively more efficient. The estimated EUIs range from 55 (worst) down to 20 kWh/m<sup>2</sup>yr (best).

As with the space heating demand, the difference between the good practice and the ultra-low energy is reflected in the EUI results. The cases which generate the ideal compound result for both metrics is the ultra-low energy building fabric with the more efficient heat pump system (e.g. communal heat pump with ambient loop). It leads to significantly lower EUIs due to better heating efficiencies, lower flow temperature requirements and less distribution losses.



Space heating demand - Predictive (kWh/m <sup>2</sup> /yr)	
Business as usual	28
Good practice	22
Ultra-low energy	10

Fabric & ventilation	EUI - Predictive (kWh/m <sup>2</sup> /yr)	Heating options			
		Gas boiler	Direct electric	Heat pump less efficient	Heat pump more efficient
Business as usual	45	42	30	24	
Good practice	41	39	28	22	
Ultra-low energy	36	32	25	20	

Note: the above four heating options are not exhaustive. Other options (e.g. low carbon heat networks with low distribution losses) may perform well.

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### Cost of space heating

The Toward Net Zero Carbon (TNZC) study with normalised energy costs for mid rise

- Baseline: £850 per year, Evolved: £700 per year

And with high energy prices: -

- Baseline: £1600 per year, Evolved: £1400 per year

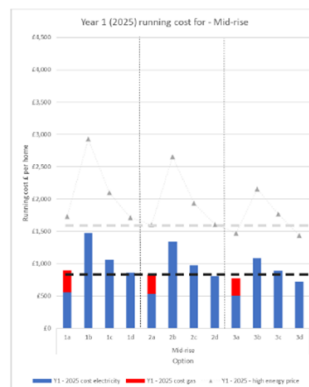
For high rise

- Baseline: £800 per year, Evolved: £650 per year

Mid-rise block of flats | Energy costs



- Compared to the reference scenario only 3a and d are lower cost.
- Direct electric significantly more expensive even with ultrahigh efficiency levels
- 1d, 2d and 3c are broadly similar cost to reference scenario



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# Part 1: Evidence Review

## Renter and buyer perspective

### Innovation for zero bills homes - Octopus Zero

[Octopus Energy](#) has launched a first-of-its-kind energy tariff providing zero bills for five years, guaranteed. Initially focusing on new homes with solar panels and working with housing developers to do so.

### Number of years considered for savings to influence decision making

- [Savills research](#) shows that information in May 2021 those who sold their homes had owned them for almost 14 years on average.
- [Halifax suggests](#) Buyers can usually fix the rate on your mortgage for between two and five years.
- So for the illustration in Part 2, we could assume a 5 year perspective for Buyers
- For renters, given that rent and utility bills are usually monthly, this time period could be used.

### Assumptions to take forward

From all the evidence above, these assumptions are going to be taken forward.

Assumptions	Baseline Scenario	Evolved Scenario	Notes / units
Using Toward Net Zero Carbon (TNZC) study			
Annual energy costs	£825	£675	Half mid rise, half high rise
Time for buyer's savings to be released	5	5	Number of years
Time for renter's savings to be release	1	1	Evened out over 1 year. Units: £ monthly rent

# Part 1: Evidence Review

## Better mortgages available for green homes

Lower mortgage rates are being offered for green homes with good Energy Performance Certificates (EPC). With this, sale prices can reflect slightly higher costs without impacting monthly mortgage payments by the buyer. This also encourages vendors and buyers to retrofit their properties, which is hoped to reduce the amount of properties with EPC D and below. This helps residents with bills and reduces the amount of 'stranded assets' for mortgage lenders.

### Green mortgage overview

The Coalition for the Energy Efficiency of Buildings (CEEB) have produce a [Green mortgages tracker](#), collecting together all mortgage deals available, and what EPC rating they apply to.

Company Name	Product Name	Link to Product	Launch Year	Features of product					Validation required?	Type of Building or target market	EPC Target	Aligned or supporters to the GreenPrint
				Lower interest rate mortgage for new and/or existing customers	Additional financing for new and/or existing customers	Cashback/ refund for new and/or existing customers	Energy efficiency of renovated/renovated property must be improved	Property purchased or built must be energy efficient				
All	Green Mortgage Rate		Feb-20	✓		✓		✓	i	New Builds and Existing Homes	A/B	
Barclays	Green Home Mortgages		2018	✓				✓	i	New build	A/B, B SAP	
Barclays	Green Home Buy-to-let Mortgages		Jan-22	✓				✓	i	Buy-to-let, Existing and New build	A/B, B SAP	
Coverity Building Society	Green Together Reward		Sep-21			✓	✓		i	Residential and Buy-to-let		✓
Chorley Building Society	Green Home Improvements		May-22			✓				Existing Properties	A-B	
Chorley Building Society	Green Home Improvements Additional Borrowing		Jul-22		✓		✓					
Coutts	Green Mortgage		Jun-21			✓		✓	i	Existing homes or New build	A/B	✓
Coutts	Retrofit Green Mortgage		Jun-21		✓	✓	✓		i		A/B/C	✓
Donika Bank	Donika Carbon Neutral Mortgage		Jan-22	✓		✓				Existing Homes	A-C	
Dudley Building Society	Two Year Fixed Energy Efficient Remortgage		Jun-21	✓		✓	✓		i	Residential Homes	A/B	✓

Specialist lenders such as [Ecology Building Society](#) are offering lower rates for highly energy efficient homes. These specialist lenders have opened a market niche, and do not offer standard mortgages for standard homes.

# Part 1: Evidence Review

## Better mortgages available for green homes

Some conventional lenders have both green and standard mortgages. Below is a comparison of mortgage interest rates across lenders (October 2022):

	Halifax	Barclays	Barclays	Lloyds	Virgin Money	Virgin Money	Nation-wide	HSBC UK	Santander
Mortgage type	Standard	Green	Standard	Standard	Green	Standard	Standard	Standard	Standard
Loan to value	90%	90%	90%	90%	85%	85%	90%	90%	90%
Fixed term rate (period)	4.17% (5 years)	5.14% (5 years)	5.69% (5 years)	5.2% (5 years)	5.24% (5 years)	5.29% (5 years)	5.59% (5 years)	5.59% (5 years)	6.14% (5 years)
Variable rate	5.74%	5.74%	5.74%	5.74%	5.99%	5.99%	5.24%	5.04%	5.50%
Annual % rate change (APR)	4.50%	5.90%	5.90%	4.80%	5.80%	5.80%	5.60%	5.50%	5.90%

Comparing the two Barclay rates, the home owner saves £27k over 25 years.

**Example: For a home-owner borrowing 270k GBP on a property valued at 300k GBP, with a payback period over 25 years, what would the difference in repayment be for a Standard Mortgage compared to a Green Mortgage (assuming a fixed rate for 25 years)?**

### Standard Mortgage:

How much could my mortgage repayments be?

This calculator helps to provide an overview of what your repayments could be based on the interest rate, term and repayment type selected.

Interest rate  
Enter the interest rate you will be paying on your mortgage

5.69%

Payment details

Monthly repayments  
GBP 1,689

Mortgage amount  
Enter the amount you will be borrowing

GBP 270,000

Total interest payable  
GBP 236,643

Mortgage term - years  
Enter the number of years between 0 and 35 you wish to pay the mortgage over

25

**Total:  
GBP 506,700**

### Green Mortgage:

How much could my mortgage repayments be?

This calculator helps to provide an overview of what your repayments could be based on the interest rate, term and repayment type selected.

Interest rate  
Enter the interest rate you will be paying on your mortgage

5.14%

Payment details

Monthly repayments  
GBP 1,600

Mortgage amount  
Enter the amount you will be borrowing

GBP 270,000

Total interest payable  
GBP 210,148

Mortgage term - years  
Enter the number of years between 0 and 35 you wish to pay the mortgage over

25

**Total:  
GBP 480,000**

**Savings: GBP 26,700 over 25 years  
5.27 % saving**

According to [The Intermediary](#) there are also changes in the buy-to-let sector. As of April 2022, there were 292 green buy-to-let products on the market. This is being driven by changes in the regulations for rental properties, which will have to have an EPC rating of C and above by 2025 for new tenancies, however, the advancements in Green Mortgages are ahead of the roll out of help for renters, though this is some movement in the Green Rental Agreements. This is discussed in Part 3.

## Assumptions to take forward

In a time of interest rates changing, the difference between baseline and evolved rates seem to remain constant. It is the difference, or 'discount' that is being used in the analysis, not the interest rate itself.

Assumptions	Baseline Scenario	Evolved Scenario	Notes
Interest rates for mortgage	5.67%	5.14%	Barclay Standard vs Barclay Green

# Part 1: Evidence Review

## Developer and operator perspective

### Increase in sale price of homes

The collection of evidence below is showing that property prices now reflect the energy efficiency of a home. Research from October 2022.

The Halifax building Society research shows that, when measured against traditional homes, those with increased energy performance sold for a higher price. Source: [Homebuyers pay a 'green premium' of up to £40,000 for the most energy efficient properties](#)

The below chart is value added per property based on EPC upgrades:

	Change in EPC rating					
	G-F	F-E	E-D	D-C	C-B	B-A
Average difference in price (% increase on average house price)	£9,954 (3.8%)	£7,584 (2.9%)	£6,162 (2.4%)	£5,214 (2.0%)	£5,214 (2.0%)	£4,740 (1.8%)

### Energy efficiency and house prices

From analysis from [MoneySuperMarket](#), on average property prices in England, there is a correlation between a stronger energy efficiency rating and a higher house price, higher A rated property values can be as much as 14 per cent higher.

### Green improvements to become major factor in asking prices:

Rightmove analysed over 200,000 homes listed on its website that had sold twice, with an improved EPC rating the second time. This analysis has shown that those who had upgraded their rating from an "F" to a "C" added an average of 16% to the price achieved for their home. Moving from an "E" to a "C" banked sellers an extra 8% on average, while moving from a "D" to a "C" resulted in an average of 4% extra

Source: [Mortgage Introducer](#) and [Preston Baker](#)

### Green homes gaining ground with buyers:

New survey suggests the energy efficiency of a home is becoming an important consideration. Asked how important the energy efficiency of a home was, 86% of respondents rated it as either very important or important. Only 3% said it had no relevance, according to Knight Frank's latest UK sentiment survey.

Source: [Knight Frank](#)

### Homes with heat pumps demand a 59% premium:

Compared to regional averages, according to research from property firm Savills.

Source: [Savills](#)

# Part 1: Evidence Review

## Developer and operator perspective

### Green buildings have a higher asset value than traditional buildings:

In the 2018 World Green Building Trends Report, 30% of home owners interviewed reported that new green buildings have an asset value more than 10% greater than that of traditional buildings.

Source: [World Green Building Trends 2018](#)

### House buyers willing to pay almost 10 per cent more for energy efficient properties:

A new report from Santander shows that homebuyers are putting a 9.4 per cent premium on homes that have been retrofitted. This equates to an average premium of £26,600 – more than double the average cost of making green upgrades to a property. Energy efficiency is now more sought after than traditional features like a garden or off-street parking.

Source: [Santander](#)

**The Housing Finance Corporation (THFC)** as unveiled [THFC Sustainable Finance](#), a £2bn finance vehicle designed to help housing associations deliver on their sustainability objectives across new and existing homes.

Much of the above is from the perspective of the buyer looking at older and newer homes on the housing market. Input is particularly needed in the uplift in sale price of new homes from those that barely meet minimum regulatory standards to higher performing homes.

### Assumptions to take forward

Assumptions	Baseline Scenario	Evolved Scenario	Notes
EPC rating	B/C	A	
Percentage uplift of house price	0	1.8%	ref. Halifax research for band B to A
Increase in house price	£0	£40,000	Max increase in house price - Halifax research



# Part 1: Evidence Review

## Developer and operator perspective

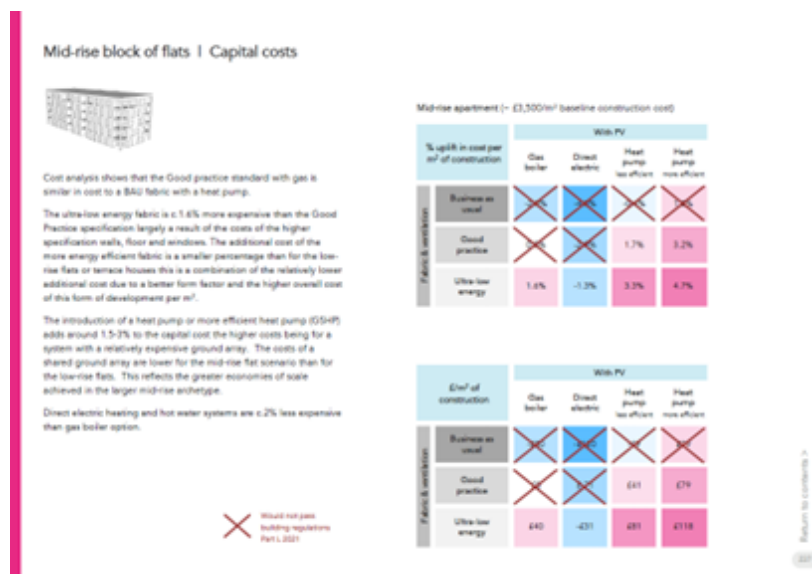
### Additional build costs are getting smaller

Sustainability measures can be implemented on a building for a capital cost only slightly higher than conventional buildings. The costs of building sustainably have fallen and building technologies and active energy management is now becoming standard practice. There are some technologies such as Solar Panels and EV charging that have become an investible proposition which can be covered by a revenue stream rather than a construction cost

### The Business Case for Green Building

The Toward Net Zero Carbon (TNZC) study by Currie and Brown, Etude and team, takes the cost baseline of £3500/m<sup>2</sup> (for mid rise) and £3400/m<sup>2</sup> (for high rise) for a building control compliant specification of good practice and gas boilers, and for the fabric, heat systems and PV uplift would be:

Mid-rise block of flats: 3.3 to 4.7% uplift  
 High-rise block of flats: 1.9 to 2.9% uplift



### Sustainability measures can be implemented for little or no additional capital cost

Research by BRE and Sweett Group, 'Delivering sustainable buildings' has quantified the cost of achieving BREEAM certification for different sites and building types. It concludes that there are many sustainability measures that can be implemented for little or no additional capital cost, but with a positive effect on operational costs. In cases where there is a slight increase in capital costs, this cost can be paid back within two to five years due to the savings in operational costs.

Source: [BREEAM - Commercial Buildings](#)

### Costs of building sustainably have fallen

Installing building technologies and active energy management is becoming standard practice. Source: BREEAM Commercial Buildings and Costs of building to the Code for Sustainable Homes

Source: [BREEAM Commercial Buildings](#) and [Costs of building to the Code for Sustainable Homes](#)



# Part 1: Evidence Review

## Developer and operator perspective

### Cost effective design interventions for low-rise residential developments

In early 2022, The UK Green Building Council (UKGBC) published a study demonstrating how housing developers can achieve a 20% embodied carbon reduction across low-rise residential developments through simple masterplan-level design interventions, which are cost-effective and achievable - This is a good example on carbon reduction and cost for masterplan works. 0.6% uplift in cost achieving 20% CO<sub>2</sub> reductions.

Source: [\*Building the Case for Net Zero: A case study for low-rise residential developments, UKGBC\*](#)

### Material and construction savings in wood buildings

In terms of showing the business case for reducing embodied carbon, there are some case studies on the business case for timber. The value proposition for wood buildings varies by project and structural system, but elements can include material and construction cost savings, installation speed, and wood's relative light weight (which can reduce the need for foundation capacity). Wood's sustainability and carbon-related benefits can also add tangible value—from helping to meet a company's ESG goals to greater leasability.

Source: [\*Business case for timber, Woodworks\*](#)

### Passivhaus construction costs

Extra costs associated with building to the Passivhaus standard have reduced. As of 2018, best practice costs were around 8% higher when set against comparable projects. However, once the quality assurance process is adopted as standard and no longer seen as a Passivhaus-specific over cost, and considering further development of skills, expertise and supply chain maturity, indicates that extra costs could come down to around 4%.

Source: [\*Passivhaus Construction Costs, Passivhaus Trust\*](#)

### The business case for green building

A review of the costs and Benefits for Developers, Investors and Occupants by the [World Green Building Council](#) in 2013, this study found that the green building costs were in the range of minus 0.4 to plus 12.5%.

### Carbon offsetting – reduction in carbon costs

Through the Greater London Authority's London Plan [carbon offset requirements](#), there is a reduction in the cost payable the more carbon emissions are reduced, currently priced at £96/tCO<sub>2</sub>e. The planning application of 676 [new homes in Enfield](#) of code compliant homes, a carbon offset payment of £650,208 has been accommodated in the [planning committee supplementary report](#).

### Carbon offsetting investment into development projects

Where buildings store carbon (such as in a timber structure) over the long term. Schemes available from:

- [Aureus Earth](#)
- [Climate Clean-up](#)
- [Timber Finance Initiative](#)

# Part 1: Evidence Review

## Developer and operator perspective

### Assumptions to take forward

Primarily using the TNZC study – the assumptions to take forward are

Assumptions	Baseline Scenario	Evolved Scenario	Notes/units
Build cost change	0	3.8%	From TNZ study (midrise & highrise, highest performing option)
Build cost	3450	3581	£/m <sup>2</sup>
Cost of carbon offset payment	£962	£0	Enfield example per home

# Part 1: Evidence Review

## Developer and operator perspective

### Cheaper development and operator funding for greener projects is available

Environmental, Social and Governance (ESG) is a set of standards measuring a business's impact on society, the environment, and how transparent and accountable it is. As there is demand for investments to decarbonise (eg pensions), loans for developers for low and zero carbon projects have lower interest rates, in turn lowering development costs. The standards for qualifying for ESG funding is currently quite vague but is being further defined.

The MSCI World Index, the average cost of capital of the highest-ESG-scored quintile was 6.16%, compared to 6.55% for the lowest-ESG-scored quintile

Source: [ESG and the cost of capital, MSCI](#)

### Octopus Real Estate Greener Homes Alliance

A new partnership with Homes England Octopus are providing discounted development finance to support housebuilders in the UK to build high quality energy efficient homes achieving a SAP score of over 85, equivalent to an EPC of B and above.

- Homes that achieve a SAP score of 92 and above (EPC A) will receive 2% discount on interest rate
- Homes that achieve a SAP score of 85 and above (EPC B) will receive 1.25% discount on interest rate

This is Part of Homes England's outcomes and indicators for Sustainable Homes and Places in [Homes England Strategic Plan](#).

Source: [Octopus](#)

### Atelier Carbonlite Challenge

Developed with support from the Royal Institute of British Architects (RIBA) the Carbonlite Challenge rewards property developers who go green by offering cheaper finance for more sustainable projects. Developers will have to meet a series of sustainability metrics, from the embedded carbon of the project to its calculated operational energy and potable water use. Rebate is as much as 2% reduction of interest rates.

Based on a typical development targeting the RIBA 2030 challenge, there could be a saving of 111 tonnes of carbon dioxide per year. For the developer in this instance, this would translate to a Carbon & Sustainability Rebate in excess of £140,000.

Sources:

- <https://carbonlitechallenge.co.uk/>
- <https://www.ukgbc.org/solutions/atelier-carbonlite-challenge/>
- <https://www.mortgagesolutions.co.uk/news/2021/11/03/atelier-launches-offering-to-reward-developers-who-go-green/>

Carbonlite Challenge Scorecard									
Current Business As Usual Performance (compliance route)			RIBA 中 On track against RIBA Challenge v2 2025 target			RIBA 中 On track against RIBA Challenge v2 2030 target			
Sustainability Outcome Metrics									
Operational energy kWh/m <sup>2</sup> /y	120 kWh/m <sup>2</sup> /y		-60 kWh/m <sup>2</sup> /y			-35 kWh/m <sup>2</sup> /y			
Embodied Carbon kgCO <sub>2</sub> e/m <sup>2</sup>	1200 kgCO <sub>2</sub> e/m <sup>2</sup>		-800 kgCO <sub>2</sub> e/m <sup>2</sup>			-625 kgCO <sub>2</sub> e/m <sup>2</sup>			
Potable water use Litres/person/day	125 l/p/day		-95 l/p/day			-75 l/p/day			
Commercial Terms									
	10/16	10/16	10/16	10/16	10/16	10/16	10/16	10/16	10/16
L200V	40%	40%	40%	40%	40%	20%	20%	20%	20%
1. Minimum Standard Rate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
2. Carbon & Sustainability Rebate	0%	0%	0%	1.50%	1.50%	1.50%	2.00%	2.00%	2.00%
3. Effective Interest Rate (i.e.)	5.00%	5.00%	5.00%	3.50%	3.50%	3.50%	3.00%	3.00%	3.00%
Minimum Standard Offer      7% Arrangement 11.0% LAR      7% Arrangement 11.0% LAR      7% Arrangement 11.0% LAR									

# Part 1: Evidence Review

## Developer and operator perspective

**Triodos** will only fund projects with high environmental credentials.

Source: [Triodos](#)

**Lloyds Bank** 0.25% discount for lifting stock to higher EPC rates, and have a [green building tool](#)

### Green Bond Principles

Published by the International Capital Market Association (ICMA), the [Green Bond Principles](#) seek to define which projects are eligible, for building projects to qualify, they must be “Green buildings that meet regional, national or

internationally recognised standards or certifications for environmental performance” (page 5 of Green Bond Principles - [Voluntary Process Guidelines for Issuing Green Bonds](#)), which then goes on to refer to “several current international and national initiatives to produce taxonomies and nomenclatures”

### Climate bonds

Climate bonds are fixed-income financial instruments (bonds ) linked to climate change solutions. They are issued in order to raise finance for climate change solutions, for example mitigation or adaptation related projects

Source: [Climate Bonds Initiative](#)

Examples: [Lendlease](#)

### Anonymous project

This project was able to get an interest rate reduction of 0.75% due to its environmental credentials.

### Buy to Let mortgages

Barclays offer a Green Buy-to-let mortgage for landlords for properties with EPC ratings A or B where the savings could be used to cover the upgrade works. (Rates researched April 2023)

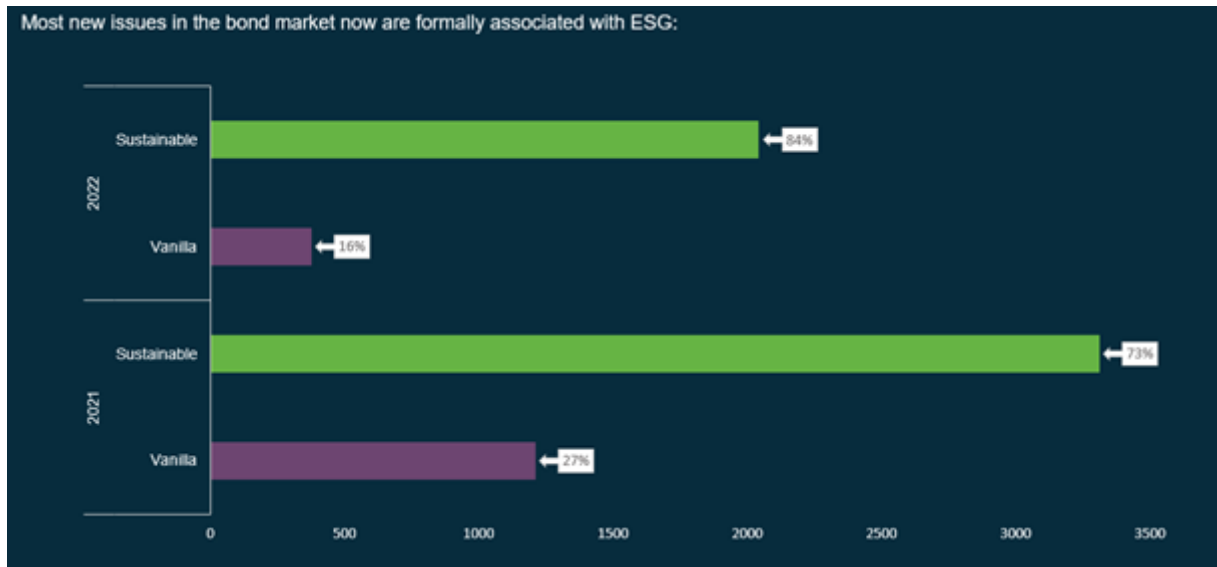
- [Buy to Let 5 year Fixed](#): 5.1%
- [Green home BTL 5 year fixed](#): 4.65%

# Part 1: Evidence Review

## Developer and operator perspective

### For housing associations

A lower borrowing rate reduction for Housing Association's maybe reflect the social purpose of housing associations, but the difference in volume between ESG and non-ESG funding is extreme. See below.



Source: Newbridge Advisors / Bloomberg: Public Issuance from the Social Housing sector in the UK. Sustainable includes bonds classified as Green, Social or Sustainable as well as Sustainability-linked bonds.

### Assumptions to take forward

Using the information above, the reduction in borrowing rates could be assumed as:

Assumptions	Baseline Scenario	Evolved Scenario	Notes/units
ESG investment interest rate discount	-	1%	Mid value, Less ambitious than Atelier or Octopus
Build cost	5.1%	4.65%	Ref. Barclay BTL mortgages

# Part 1: Evidence Review

## Developer and operator perspective

### Increased number of units

With an emphasis on active travel, developers can increase the number of units by allocating less parking space and creating more sellable area.

- Case study: BedZed – the dominance of the car was de-emphasised with parking placed at the edge of the community and pedestrianised areas in the centre. [BedZED - The impact of the UK's best known eco-village and its residents.](#)
- Case study: One Brighton – initially planning permission was for 70 units with underground parking, due to the sustainability commitment this was amended to 170 units with just 4 parking spaces – 2 car-share and 2 disabled.

### Increased sale velocity

#### Sustainable properties sell faster than conventional properties

The [Rightmove Green Homes Report](#) shows that speed of sale increases with EPC rating.



#### Sustainable properties sell faster than conventional properties

Research from PRDnationwide shows that sustainable buildings sell faster than their conventional counterparts. Not only this, but sustainable buildings outperform conventional buildings in all relevant areas – environmentally, socially and financially. Improving the speed at which new home projects are sold leads to greater returns.

Source: [Green homes can sell faster and for 16% more. BuyAssociation](#)

#### Speed and opportunity of scheme delivery

Sustainable projects can unlock opportunities through community engagement and planning (eg. Phoenix Project, Lewes and Flimwell Park, Wadhust, both East Sussex). Conversely, projects can be slowed down by lower levels of sustainability (eg. Cambridge and water stress, West London developments and electricity stress, and nutrient neutrality generally).

### Assumptions to take forward

Look into research, but maybe for now assume an average on month less time for borrowing costs.

# Part 1: Evidence Review

## Developer and operator perspective

### Assumptions to take forward

This needs further work to quantify this, but we could assume for now assume an average on month less time for borrowing costs.

Assumptions	Baseline Scenario	Evolved Scenario	Notes
Decreased time for borrowing period	0	1 month quicker	Using the idea of green homes sell quicker from Rightmove Green Homes Report

# Part 1: Evidence Review

## Developer and operator perspective

### Less risk, more opportunities

Less well performing property attracts risks of becoming 'stranded assets' and in need of retrofitting in the future.

### Risk reduction and risk mitigation reduce insurance costs for the developer

Future-proofing assets, improving resilience and reducing risk is vital for the real estate industry. High insurance costs for vulnerable buildings provide a reason to invest in resilience and in climate change related risk mitigation.

Source: [The Business Case for ESG – Moving from 'Why?' to 'Why Not?', GRESB](#)

### Cost of retrofit

A [University of Nottingham Study](#) has estimated £69,000 cost for retrofitting a home, while the Government estimate is £30,000.

### Assumptions to take forward

Incorporating the cost of future retrofit.

Assumptions	Baseline Scenario	Evolved Scenario	Notes
Cost of retrofit	£30,000	£0	Government estimate
Timescale	20 years	Not needed	Assumption to meet UK net zero target
Preparing for forthcoming retrofit costs	£1500		£ per year set aside



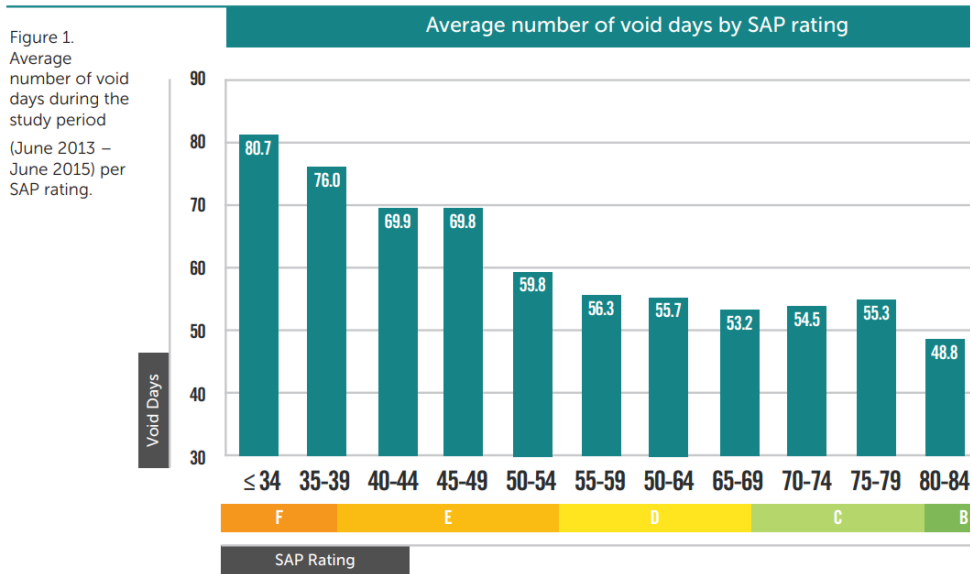
# Part 1: Evidence Review

## Developer and operator perspective

### Less voids

#### Rent arrears and voids are less likely

The [Touching the Voids](#) study from Sustainable Homes recorded fewer void days in more energy efficient properties. In this 2 year period, A rated properties were void for 31 days, compared to approximately 52 days per B and C rated properties



### Assumptions to take forward (from the Touching the Void study)

Assumptions	Baseline Scenario	Evolved Scenario	Notes
Voids per year	26 days	16 days	Ref table 1 of Touching the Void study
Percentage void	7.1%	4.3%	Assumption to meet UK net zero target

# Part 1: Evidence Review

## Landowner perspective

### Sale price of land

This is to start to quantify and added infrastructure and support needed for developers to create more sustainable homes more efficiently.

### Sustainability and ESG valuation guidance

Royal Institute of Chartered Surveyors (RICS) guidance for [valuing residential properties](#) recommends recognising the need for the majority of stock to be upgraded to meet carbon targets. There is also Guidance for [valuing commercial properties](#).

### Local authority land sale guidance and restrictions

Understanding of Land sale council requirements (Section 123) that allows social and environmental benefits, provided that any undervalue is only up to £2m less than market value.

Source:

- [Navigating Section 123 and land disposal duties Anthony Collins Solicitors](#)
- [Navigating section 123 and land disposal duties, Local Government Lawyer](#)

### Regeneration project calculations

Work in one regeneration project calculated that further improvements to sustainability, that also included a prediction of grant funding, would result in an approximate 2% uplift in the construction cost, and when this was aggregated over each home provided, this amounted to £4,022 per home.

### Assumptions to take forward

Assumptions	Baseline Scenario	Evolved Scenario	Notes
Site infrastructure uplift	0	£4022	£ per home

# Part 1: Evidence Review

## Landowner perspective

### Funding available

#### Public Borrowing Guidance

Local Government Association has Published their [Financing Green Ambitions](#) guidance that records the possible options for funding for public projects, some of which are aligned to Net Zero outcomes and are cheaper than the Public Works Loan Board (PWLb) – such as:

- UK investment Bank (UKIB)
- UK Municipal Bond Agency (UKMBA)
- Crowdfunding / Community Municipal bond (CMBs)
- Salix

#### Government Shared Prosperity Fund (UKSPF) - [UK Gov](#)

**Carbon Offset funding** - [GLA's](#) Carbon offsetting schemes operated by Local Authorities.

**Green bonds** - The London Mayor's £90m [Green Bonds](#), which will aim to unlock over £500 million for zero-carbon projects.

**Climate bonds** - Existing and past [Local Climate Bonds](#) documented by the Green Finance Institute.

**Net Zero Innovation Portfolio (UK BEIS)** – [BEIS](#).

**Smart and responsive systems** - Funding and support from:

- Energy Services Catapult
- Connected Places Catapult

**Philanthropic Investment** - Into low upfront carbon built environment from the [Laudes Foundation](#).

**National biodiversity credits scheme** - [DEFRA](#) Pilot projects have started.

**Thames Estuary Resilience** - The [TE2100](#) Plan – Flood and residence innovation fund- [£200m flood and coastal resilience innovation fund](#).

**UK Infrastructure Bank (UKIB)** loans for clean energy, waste, water, digital and transport projects at 60 basis points above 'gilts' and 20 basis points below Public Works Loan Board (PWLb). Note that PLWB is a very low rate not available to private borrowers, but it does not reflect any green discount.

**English Cities Fund (ECF)** – public / private joint venture between urban regenerators Muse Developments, Legal & General and Homes England – including the creation of a new 240-acre city district in Salford over the next 10 to 15 years. as development partner for the £2.5bn Salford Crescent masterplan

# Part 1: Evidence Review

## Investor / Funder perspective

Just as projects can reach net zero carbon, so can investment funds. As well as climate change can destroy cities with flooding, it can also destroy the global economy. While devastating for all living things, from an investment perspective, this is also terrible news. The emergence of Environmental, social and Governance (ESG) is a reaction to this, and its core aim is to direct investment towards projects that reduce climate risk and increase adaptation and resilience.

### Incentivised investment

The threat of undermining wealth on a massive scale focusses investors on the long term. This is also affected by government regulation, formalisation of standards and litigation. The [Net-Zero Banking Alliance](#) brings together signatories that represent over 40% of global banking assets, which are committed to aligning their lending and investment portfolios with net-zero emissions by 2050.

Its clear to many investors that companies that steer clear of the biggest problems, have low carbon roadmaps and be hostage to increasing climate regulation will be companies that will provide better returns in the long term.

The [Wilmington Trust](#) has a good overview of sustainability linked loans principles. In summary, if companies hit an agreed indicator, they get a preferential rate on their finance.

The [Net Zero Asset Managers initiative](#) has USD 59 trillion in assets under management and is an international group of asset managers committed to supporting investing aligned with net zero emissions by 2050 or sooner and in line with global efforts to limit warming to 1.5 degrees Celsius

This filters down to individual banks, such as [Lloyds Bank](#), committed to reducing carbon emissions we finance to net zero by 2050 or sooner.

Research revealed that one investment company was seeking a lower-than public borrowing return of between 1% and 3% as long as the social and environmental impact was ten times the financial investment.

# Part 1: Evidence Review

## Investor / Funder perspective

### The definition and principles of ESG for the built environment

#### Definition of ESG criteria for new buildings

The [EU Taxonomy](#) identifies “environmentally sustainable” economic activities to make sustainable investment decisions gives a definition ESG status regarding new buildings in their to [excel file](#), row 84:

*Constructions of new buildings for which:1. The Primary Energy Demand (PED)(290), defining the energy performance of the building resulting from the construction, is at least 10 % lower than the threshold set for the nearly zero-energy building (NZEB) requirements in national measures implementing Directive 2010/31/EU of the European Parliament and of the Council(291). The energy performance is certified using an as built Energy Performance Certificate (EPC).2. For buildings larger than 5000 m<sup>2</sup> (292), upon completion, the building resulting from the construction undergoes testing for air-tightness and thermal integrity(293), and any deviation in the levels of performance set at the design stage or defects in the building envelope are disclosed to investors and clients. As an alternative; where robust and traceable quality control processes are in place during the construction process this is acceptable as an alternative to thermal integrity testing.3. For buildings larger than 5000 m<sup>2</sup> (294), the life-cycle Global Warming Potential (GWP)(295) of the building resulting from the construction has been calculated for each stage in the life cycle and is disclosed to investors and clients on demand.*

The reference to the nearly zero-energy building in the above paragraph is described in this [directive](#), relates to nationally binding targets and puts responsibility to the Member States to set minimum requirement (paragraph 10)

It is thought that ESG definition will go beyond regulation, therefore if a regulation says x kg/m<sup>2</sup> then EU taxonomy will state 10% less than this, and this will increase over time.

While the EU taxonomy is in its first reporting cycle, the UK, is onshoring this in the [UK Green Taxonomy](#) and is considered a ‘fast follower’ and is likely to be broadly aligned with the EU approach. Its aim is to follow science based targets, combat green-washing, mobilise capital and consultation is due in later 2023 with the mitigation sections coming first.

# Part 1: Evidence Review

## Investor / Funder perspective

### Green Bond Principles

Published by the International Capital Market Association (ICMA), the [Green Bond Principles](#) seek to define which projects are eligible, for building projects to qualify, they must be “Green buildings that meet regional, national or

internationally recognised standards or certifications for environmental performance” (page 5 of Green Bond Principles - [Voluntary Process Guidelines for Issuing Green Bonds](#)), which then goes on to refer to “several current international and national initiatives to produce taxonomies and nomenclatures”

Clarity into ESG definitions will help provide rulings as lenders themselves [are facing scrutiny on their ESG credentials](#) from their own stakeholders, limited partners (LPs), regulators and non-governmental organisations. Virtually every large bank has made a commitment for their balance sheet to be net zero by 2050.

Barclay guidance to what is considered [Green Eligibility Criteria](#), that refers to LEED gold or BREEAM Excellent or EPC rating A or B

### Measuring a portfolio

**Global Real Estate Sustainability Benchmark (GRESB)** – works both for and development portfolio (such as [Lendlease](#)) and for an investment fund that invests in developments (such as [Cromwell Property Group](#))

Standard and Poor ([S&P](#)) and Dow Jones also provide [scoring](#) to a fund’s ESG performance

**Methodology for residential mortgage portfolio.** There is a strong methodology for linking emissions of homes to the extent of carbon in an investment portfolio, to help track progress – set out by the [PCAF Methodology for Mortgages](#)

### Assistance and Guidance

Big Society Capital in their report [‘Mapping the Market’](#) aims to support institutional investors and their advisers as they navigate the rapidly evolving social and affordable housing fund market. The pathway to net zero outlined by the CCC is focused on retrofitting all housing first, with the vast majority of fabric energy efficiency improvements being completed by 2035 (and all social homes reaching EPC C by 2028), aiming to bring all social housing up to Energy Performance Certificate (EPC) C by 2030.

# Part 1: Evidence Review

## Perspectives from all organisations

This area affects the perspectives of all stakeholder organisations. Apart from the issues around insurance, this does not directly affect the individual (the buyers and renters) so much.

### Overall guidance

Green Finance Initiative ([GFI](#)) and the Coalition for the Energy Efficiency of Buildings ([CEEB](#))

### Carbon Markets

#### Carbon markets and offsetting changing design and construction

The price of carbon is becoming more established for use in Carbon Offset Funds, Whole Life Carbon valuations and in strategic and operation decisions.

- \$600 to \$1000/tCO<sub>2</sub> from Direct Air Capture according to the International Energy Agency [IEA](#)
- £252/tCO<sub>2</sub> [valuation](#) by HM treasury and used in [Green book](#) and increasing every year
- £245/tCO<sub>2</sub> used in the Social Value Portal [2022 guidance](#) (page 7) Themes, Outcomes and Measures (TOMs), to bring it in line with Treasury valuation, updated from £70.
- £95/tCO<sub>2</sub> from London Plan, Energy statements and carbon offsetting
- €83/tCO<sub>2</sub> EU Carbon Permits – [Trading Economics](#)

### Law

**Climate Change Act** - [Climate Change Act 2008](#) provides overall net zero target for 2050, [78% reduction by 2035](#) compared to 1990 levels and a [legal duty to act](#).

### Policy

**Climate Change Act** - Policy Paper, [Powering up Britain](#), March 2023, followed on from the [Net Zero Review](#), led by Chris Skidmore

**Major projects and infrastructure** - [Transforming Infrastructure Performance](#) is a policy paper setting out a near term road map for how major projects and infrastructure transition needed to meet the UN Sustainable Development Goals and put the UK on the path to net zero emissions by 2050.

Source: [GLA](#)

### Insurance

Insurance premiums are affected by climate change, and an awareness climate adaption and resilience measures of homes and developments will be important to help keep premiums low. There are often specific adaptations that can be done within individual projects (eg. flood, drought and heat resilience).

Because of the built environment's contribution to climate change, achieving Net-Zero in new buildings as an industry will in turn affect global heating, and every development project plays a part in this, and climate risks will affect insurance accordingly. [Useful article here from KPMG](#).

# Part 1: Evidence Review

## Perspectives from all organisations

### Transparency and Data

**Task Force for Climate-related Financial Disclosure (TCFD)** - From [April 2022 many large businesses in the UK](#) will be required by law to include climate risks in their annual reporting.

**Sustainability Accounting Standards Board (SASB)** - set up by the International Financial Reporting Standards (IFRS) to respond to an urgent demand for transparent financial-related sustainability disclosures by companies.

**Corporate sustainability reporting Directive (CSRD)** – EU directive, as part of the European green deal, requires large companies and listed companies to publish regular reports on the social and environmental risks they face, and on how their activities impact people and the environment.

**Streamlined Energy and Carbon Reporting (SECR)** policy was implemented in 2019 for UK companies for large companies.

**GLA's Be Seen Energy monitoring guidance** - The 'Be Seen' energy monitoring guidance explains how developers and owners of new major developments should monitor and report actual operational energy performance to comply with London Plan Policy SI 2, i.e. the 'be seen' element of the energy hierarchy.

Source: [GLA](#)

### Climate transition plans

**Climate Transition Plans (CTPs)** are action plans that clearly outlines how a company will transform existing assets, operations, and business models to achieve net zero by 2050. [Climate transition plans](#) are expected from 2023 and the Transition Plan Taskforce ([TPT](#)) has been set up to provide guidance on these.

**The Future Homes Hub**, bringing together the homebuilding sector with the wider circle of supply chain, infrastructure, finance and government organisations have created a [Delivery Plan](#) for the Housebuilding sector



# Part 2: Illustration and analysis

## Overall Assumptions for the illustration

For this illustration, several parameters have been chosen, consistent with each other but specific to this case. However, they will be very different to when other examples are illustrated, and to real life case studies.

Assumptions	Baseline Scenario	Evolved Scenario	Notes / units
Location	An outer London Borough		
Number of homes	1000 homes: 500 for sale, 500 for rent		
Type of development	Medium and High rise flats		Ref: TNZC study
Area of home	80m <sup>2</sup>		
Specification	London Plan 2021, Building Regs (Part L 2021) and existing Local plans	Proposed Local Plans, RIBA 2030 climate challenge, the UKGBC framework, LETI guides and targets, and the emerging work on the Net Zero Carbon Building standards, Meridian Water Environmental Sustainability Strategy 2030	
Fabric, ventilation and PV	Building control compliant fabric and gas boiler	Ultra low energy, high efficiency heat pump, with PV	Ref: TNZC study
EPC rating	B/C	A/B	One EPC band apart

# Part 2: Illustration, analysis and conclusion

## Land owner / Master developer perspective

### Assumptions used

The land is prepared by the Land owner / Master developer, and then sold to a developer.

Assumptions	Baseline Scenario	Evolved Scenario	Notes
Site infrastructure uplift	0	£4022	£ per home

### Outcome

Land owner / Master developer		
Provision of sustainable infrastructure	4022	£/home
Additional grant funding (included in above)	0	£/home
Increase in land sale price from more sustainable facilities provided	4022	£/home
Makes sense for land owner?		
If they can pass on costs to Developer		✓

The diagram shows a blue double-headed arrow between the 'Land owner / Master developer' header and the 'Evolved Scenario' column of the table above. A yellow arrow points from the 'Evolved Scenario' column down to the 'Increase in land sale price' row, and another yellow arrow points from that row back up to the 'Provision of sustainable infrastructure' row.

£4022 per home is included as a cost of the land, which includes grant funding within this figure.

### Assessment criteria

From a cost only point of view, this does not make sense for the landowner. However, if the landowner can pass on these costs onto the developer, then it makes sense to do this uplift.

### Discussion

There have been many discussions regarding if increased cost reduces the residual price of the land, and in so doing engage with Local Authority land sale requirements (Section 123). However, in this illustration, the site is prepared before sale and so would affect all bids equally.

If the uplift was to be left to the bidder, then the council could undervalue this for the [improvement of environmental well-being](#) up to £2m. As shown in this illustration, additional cost should reflect a higher sale price of the homes and therefore a higher residual land value.

Regarding risk, this is with the landowner as not all developers and operators will see the future incentives in the same way.

# Part 2: Illustration, analysis and conclusion

## Developer perspective

### Assumptions

For this particular case, we are going to use a [2 bed reference home](#) on an outer London regeneration project.

Assumptions	Baseline Scenario	Evolved Scenario	Notes
<b>Sale price increase limit</b>			
Percentage uplift of house price	0	1.8%	Ref. Halifax research for band B to A
Example sale price	£420,000		Ref. Reference home
Potential uplift in sale price	£0	£7,560	1.8% increase
<b>Build cost</b>			
Build cost change	0	4.7%	From TNZC study (mid rise, highest performing option)
Build cost comparison	3500	3665	£/m <sup>2</sup>
Reduction in carbon offset payment	£962	£0	Enfield example per home.
<b>Development funding assumptions</b>			
ESG investment	6.55%	5.55%	Mid value discount, Less ambitious than Atelier or Octopus
Borrowing period	3.08	3.00	In years, using a 1 month reduction for quicker sale times
Borrowing costs	£56,547,722	£47,700,252	From above calc

We are assuming that developers are not putting an additional premium on top of this, and any overheads on top of the construction cost are covered by their ESG policies, rather than applying an additional cost.

# Part 2: Illustration, analysis and conclusion

## Developer perspective

### Outcome

Developer		
Increase in land price	4022	£/home
Home building construction cost increase	10488	£/home
ESG finance borrowing rate reduction	8040	£/home
Carbon offset payment decrease	962	£/home
Increase in land sale price from more sustainable facilities provided	5508	£/home
Makes sense for developer?		
Yes, house prices research shows they can pass on increased costs (less than 1.8%)		✓

### Assessment

Shows that an increased land price and construction cost, can be partly offset by lower ESG borrowing rates and lower carbon offset payments.

The residual effect on the cost of the home is less than 1.8% assumed by Halifax, so we can assume that this can be passed onto the buyer and housing association.

So, the question is, will buyers be willing to pay this additional price?

### Discussion

Again, there is a risk that some buyers see do not see, appreciate or believe the financial initiatives that are available.

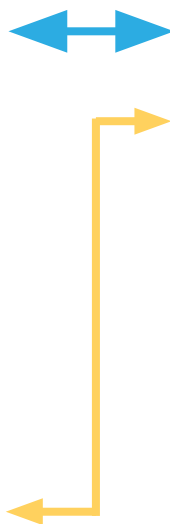
# Part 2: Illustration, analysis and conclusion

## Buyer perspective

### Assumptions

Assumptions	Baseline Scenario	Evolved Scenario	Notes
Interest rates for mortgage	5.67%	5.14%	Barclay Standard vs Barclay Green
Amount Borrowed	£270,000	£270,000	Pure assumption
Monthly interest repayment	£1689	£1600	
Time considered	5 years	5 years	1.8% increase
Effect on Mortgage	£101,340	£96,000	Over 5 years
Reference home price	£420,000		From vistry website
Limit to uplift in sale price	£0	£16,900	From Rightmove 4% uplift for 1 EPC band
Using Toward Net Zero Carbon (TNZC) study			
Annual energy costs	£850	£700	

### Outcome



Buyer		
Affect on sale price of home	5508	£/home
Interest difference on mortgage	-5439	£(5 years)
Change in heating costs	-750	£(5 years)
Saving to household over 5 years	-582	£(5 years)
Makes sense for buyer?		✓
Yes, savings are achieved over 5 years		

### Assessment criteria

The criteria here would be if the increase in the sale price for the buyer is offset by the green mortgage and a reduction in running costs over a 5 years period.

# Part 2: Illustration, analysis and conclusion

## Operator / Housing association perspective

### Assumptions

Assumptions	Baseline Scenario	Evolved Scenario	Notes
<b>Preparing for retrofit costs</b>			
Cost of retrofit	£30,000	£0	Government estimate
Timescale	20 years	Not needed	Assumption to meet UK net zero target
Preparing for forthcoming retrofit costs	£1,500		£ per year set aside
<b>Increase in voids</b>			
Voids per year	26 days	16 days	Ref table 1 of 'Touching the Void' study
Percentage void	7.10%	4.30%	
Rent per month assumption (only to calculate cost of voids)	£1,600		<a href="https://www.rightmove.co.uk/property-to-rent/Tottenham-Hale/2-bed-flats.html">https://www.rightmove.co.uk/property-to-rent/Tottenham-Hale/2-bed-flats.html</a>
Rental Voids cost	£1,363	£826	From calculation
<b>Finance for asset purchase</b>			
Number of home bought	500	500	homes
Mark-up	20%	20%	
Purchase price	168,000,000	175,896,000	
Borrowing period	10	10	years
ESG Borrowing	5.10%	4.65%	%
Borrowing cost	85,680,000	81,791,640	£

# Part 2: Illustration, analysis and conclusion

## Operator / Housing association perspective

### Outcome

The diagram shows a table with several rows. A blue double-headed vertical arrow is positioned above the table, pointing to the 'Operator / Housing association' header row. A blue double-headed horizontal arrow is positioned to the right of the table, pointing to the right. A yellow arrow starts from the right side of the table, pointing to the right, then turns downwards, then turns left, and finally points to the 'Affect on annual rent of home' row (the one with the value -840).

Operator / Housing association		
Affect on cost of homes	5508	
ESG finance borrowing rate reduction	-9052	
Retrofit preparation	-1500	
Resultant difference	-5043	
Affect on annual rent of home	-303	
Annual rental void saving	-538	
Affect on annual rent of home	-840	£/year
Viewer voids		
Makes sense for operator / HA?		✓
If they can pass on residual costs		

### Assessment criteria

With these assumptions, the Operator / Housing association can accommodate the increase in asset price and offer the tenant a saving or be cost neutral. They could even offer the tenant a saving.

# Part 2: Illustration, analysis and conclusion

## Renter perspective

### Assumptions

Assumptions	Baseline Scenario	Evolved Scenario	Notes
<b>Using Toward Net Zero Carbon (TNZC) study</b>			
Annual energy costs	£850	£700	

Renter		
Affect on rent price of home	-840	£(1 year)
Change in heating costs	-150	£(1 year)
Saving to household over 1 year	-990	£(1 year)
Makes sense for renter?		✓
Achieves annual saving		

### Assessment criteria

The rent from the operator is not increased, the energy savings increases the savings on rent of the home.

### Investor / funder perspective

The investor, and those who have put money into the investment fund, with their ESG discounts, have used their funds to achieve a decarbonised project.

Investor / Funder		
Investment to Developer (1% discounted rate)		
Investment to Operator / Housing association (0.5% discounted rate)		
Makes sense for investor?		✓
Yes, input into fund seeks decarbonised projects		



# Part 2: Illustration, analysis and conclusion

## Assessment of each of the stakeholder relationships

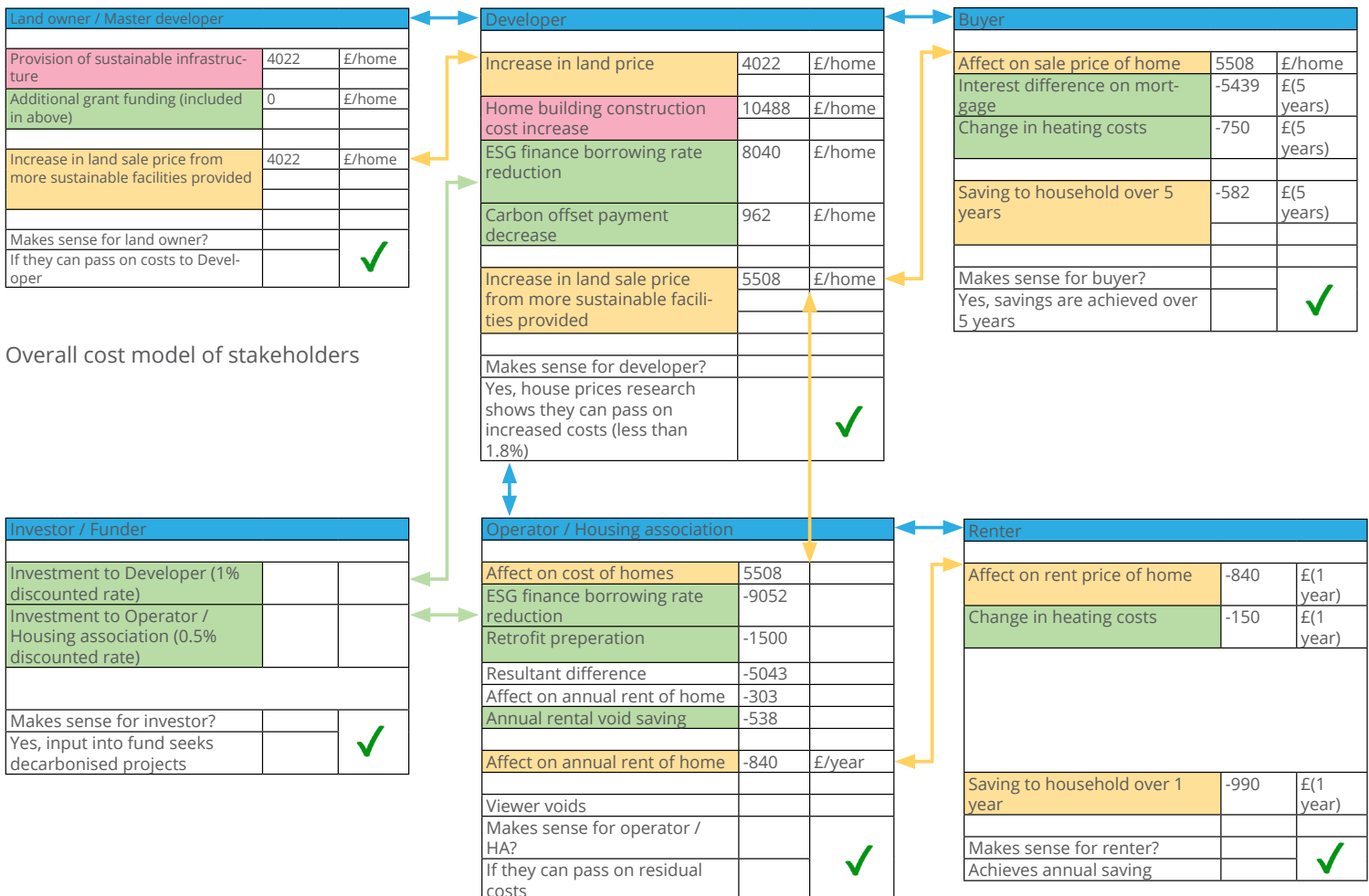
**Funding to landowner, developer, operator, buyer and renter** - The investor, who wants their funds to be used for decarbonised projects, have achieved their aims by producing net zero homes for buyers and renters.

**Land sale to developer** - This would make sense for the landowner if they can pass costs onto the Developer. This is how the landowner gets paid for providing the additional infrastructure

**Home sale to buyer** - The increase in sale price makes financial sense to the buyer, benefitting from a green mortgage and reduced energy costs, and showing that this link between landowner, developer and buyer is financially viable for increased sustainable performance

**Asset sale to operator** - The asset sale of the homes makes sense in itself to the operator, with these assumptions particularly of the discounted lending.

**The lease to renter** - The lease in the evolved scenario would makes sense to the renter, where there is less rent to pay, even before the reduction in energy costs is taken into account. This illustrates the link between the landowner, developer, operator and renter is financially viable for increased sustainable performance.



# Part 3: Conclusion

## Summary of financial appraisal of this illustration

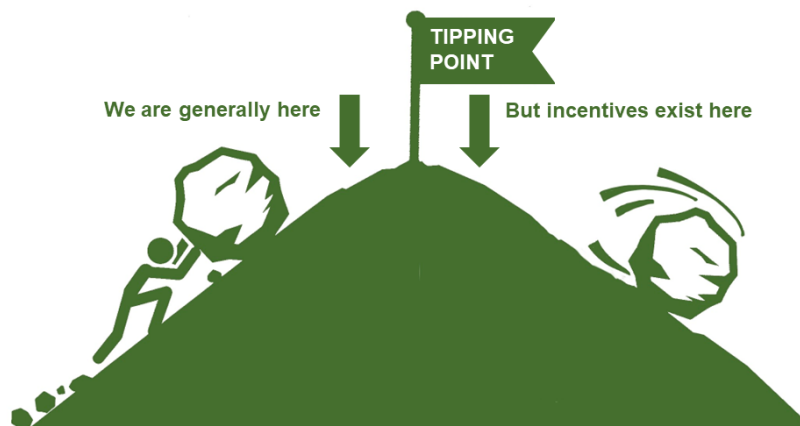
The evidence documented in Part 1 shows the products and mechanisms available, while Part 2 shows the interconnections between the stakeholders and the impact of the incentivised funding and financial incentives in an illustrated example.

### General conclusions

The evolved scenario, with the assumptions taken, does make sense from a purely financial point of view for all the stakeholders to increase the environmental sustainability of building homes.

Some of the stakeholders will not be able to balance the extra costs within their individual price but will need to pass on the increase to another stakeholder who will then recoup it. Because of this, all the stakeholders have to know about these initiatives and have the resources to apply them.

In conclusion, this illustrates the tipping point has been reached for these knowledgeable early adopters, those who have the understanding, openness, motivation and are connected to likeminded stakeholders to make this connected ecosystem work. However, these incentives are not widely distributed yet to reach most stakeholders to transform developments for financial reasons on their own. Therefore, for many, the most effective lever will currently be increasing regulations.



### Viability Assessments

For Local plans that look to increasing sustainable performance of new build, it is clear from this that the financial viability is not a barrier to increased performance. The barrier is the roll out of these incentives and the connection between the stakeholders.

### Business planning

We hope the evidence cited here can feed into business plans, financial models and business justifications for any of the stakeholders, and public value appraisals incorporating many stakeholders.

# Part 3: Conclusion

## Summary of financial appraisal of this illustration

### Recommendations

There is a long way to go, but what exists for the early adopters is starting to work. Below are some recommendations that would support these initiatives and help them grow further to have a larger effect.

- **Greater knowledge of these incentives** - so it's not just the early adopters who know and understand the incentives available, but everyone involved.
- **Consistency** – keeping and building on these initiatives will extend their trustworthiness and adoption.
- **Stronger incentives** - would scale this more rapidly
- **Connecting stakeholders** - As some of the costs and value are passed between stakeholders, there needs to be more understanding between stakeholders. This is enhanced by working groups, conferences and forums that include individuals from across the stakeholder groups.
- **Creating a market of stakeholders** – a market that is large enough to form a competitive marketplace of knowledgeable and motivated ESG and net-zero organisational and individual stakeholders.
- **Clearly defined ESG guidance** – well defined criteria using widely adopted metrics set at a level beyond regulatory minimums will help drive the industry forward.
- **Green Mortgage communication** – More marketing and advertising would increase awareness and strengthen the value of higher EPCs.
- **Stronger regulation** – working in tandem with these incentives would get closer to achieving building net zero at scale.

# Part 4: Next steps

## Next steps for this project

Considerations for the next step for this are:

- Engaging with the stakeholders and increasing the accuracy of the evidence, particularly housing associations, investors and viability experts such as BNP Paribas. Explore collection of evidence through more surveys or other more efficient means.
- Reaching other stakeholders such as product manufacturing, contractors, utilities, energy providers, electrical grid operators and insurers
- Impact of new regulations
- Incorporating the wider definition of value, to include public value, social and environmental value rather than just financial.
- Explore a forum to connect all the stakeholders in these matters
- Expanding this to work for retrofit.
- Expanding this work to incorporate other tenures such as social rent, intermediate rent, shared ownership, help to buy etc
- Look at further scenarios – possibly a more extreme prototype one that follows science-based targets for embodied carbon achieving 11 kgCO<sub>2</sub>/m<sup>2</sup>, a reduction of 98% of current benchmarks
- Explore if this could be a live document, and incorporate an online tracker
- Explore if this could be a sponsored annual review, tracking the progress of environmental progress over time.
- Brainstorm ideas of how economics and currencies may develop over time in response to doughnut economics, public value and triple bottom line accounting.

Please get in touch with your comments and suggestions to this version of the discussion paper and becoming involved in the next steps

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# About Build Net Zero Now

The [Build Net Zero Now](#) campaign, led by the Good Homes Alliance, aims to empower progressive local authorities, housing associations and housebuilders, and their supply chains, by providing them with the knowledge and tools to deliver net zero housing. Following a year-long series of topical events and targeted outputs, including new and freely available net zero [case studies](#) and [design briefs](#), phase one of the campaign concluded at the [GHA Build Net Zero Now Conference](#) in October 2021.

For phase two, three new working groups on net zero finance, energy solutions and planning & placemaking have been launched and tasked with delivering a targeted and much-needed output that will help accelerate the delivery of net zero housing.

Outputs include comprehensive guidance on energy solutions, a 'mini manifesto' and report on how the finance sector should adapt to accelerate the delivery of net zero homes, and a new web portal showcasing the progressive work of local authorities in setting net zero and Passivhaus planning policies.

The campaign outputs have proved vital for the 30+ members of our fast-growing [Vanguard](#) (Local Authority), [Pathfinder](#) (Housing Association) and Net Zero Developer (SME developer) networks from across the UK, who collectively represent 350,000 existing homes and 120,000 new build homes to be developed in the next 10 years.

Despite the success of the campaign to date, the need to accelerate the delivery of net zero housing is more urgent than ever.

To find out more about the campaign and phase 3 outputs, please visit <https://goodhomes.org.uk/campaign/build-net-zero-now> or contact Richard Broad: [richard@goodhomes.org.uk](mailto:richard@goodhomes.org.uk).



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