Department for Levelling Up,
Housing & Communities

The Future Homes Standard

2023 consultation on the energy efficiency requirements of the Building Regulations affecting new and existing dwellings.

Consultation-Stage Impact Assessment

Signed by the responsible minister:  **Date**: 6 December 2023

Title: The Future Homes Standard: 2023 consultation on the energy efficiency requirements of the Building Regulations affecting new and existing dwellings	Impact Assessment (IA)
	Date: 13th December 2023
	Stage: Consultation
Summary: Intervention and Options	**RPC Opinion**: **N/A**

No Preferred Option (EANDCB in 2019 prices, 2020 PV base year, all other calculations in 2022 prices, 2025 PV base year). Brackets around figures show costs.

Total Net Present Social Benefit	Business Net Present Value	Net cost to business per year (EANDCB)	Business Impact Target Status
£7,217m- £5,611m	£(2,570)m - £824m	£(218)m - £13m	N/A

What is the problem under consideration? Why is government intervention necessary?

Climate change is a significant domestic and global challenge. Homes, both new and existing, account for 23% of greenhouse gas emissions in the UK[1], with an estimated 23.7 million dwellings in England.[2] Decarbonising UK's homes will help to mitigate the UK's contribution to climate change and support us in meeting the Government's legally binding target to achieve net zero emissions by 2050. There are a range of market failures, including negative externalities, which would not be addressed without government intervention. The Building Regulations 2010 ("the Building Regulations") represent a proven method for overcoming these market failures.

What are the policy objectives and the intended effects?

The objectives of the policy are to deliver (i) significant carbon savings; (ii) homes which are high-quality and affordable, protecting occupants from high bills; (iii) homes which are "zero-carbon ready" - In other words, because they use electric or other renewable energy sources, no work will be necessary to allow these buildings to achieve zero carbon emissions when the electricity grid is fully decarbonised; (iv) homes which are cost-effective, affordable, practical and safe.

[1]Department for Business, Energy & Industrial Strategy (2023). Final UK greenhouse gas emissions national statistics 1990 – 2021. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972606/final-greenhouse-gas-emissions-tables-2021.xlsx

[2] Department for Levelling Up, Housing & Communities (2022). English Housing Survey 2021 to 2022: headline report. Available at: https://www.gov.uk/government/statistics/english-housing-survey-2021-to-2022-headline-report/english-housing-survey-2021-to-2022-headline-report#introduction-and-main-findings

What policy options have been considered, including any alternatives to regulation (further details in Evidence Base)?

Option 0: Do nothing. Keep the existing 2021 energy efficiency standards for dwellings. This is the counterfactual option and so all costs and benefits are appraised relative to this situation, which means it has a baseline cost and benefit of zero.

Option 1: Deliver "zero carbon ready" homes with low bills. The standard uses heat pumps, efficient solar panels, wastewater heat recovery, and improved air tightness paired with decentralised mechanical extract ventilation (dMEV). By incorporating these measures, new homes can be future-proofed (i.e., no need for any retrofit measures to allow them to become zero carbon once the electricity grid has fully decarbonised) and have significantly reduced carbon emissions and household bills.

Option 2: Deliver "zero carbon ready" new homes, through the installation of heat pumps. This would reduce the carbon emissions of new homes and ensure they are future-proofed.

Is this measure likely to impact on international trade and investment?		No		
Are any of these organisations in scope?	**Micro** Yes	**Small** Yes	**Medium** Yes	**Large** Yes
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)		**Traded:** 0.4 - (1.3)	**Non-traded:** 43	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible minister: Michael Gove **Date**: 6 December 2023

Summary: Analysis & Evidence Option 1

Description: New homes target that delivers "zero carbon ready" homes with low bills. All figures are Net Present Values (NPVs) over 10 years of policy and a subsequent 60-year life of the buildings.

FULL ECONOMIC ASSESSMENT

Price Base	PV Base	Time Period	Net Benefit (Present Value (PV)) (£m)		
2022	2025	70	Low: £5,773m	High: £8,660m	**Best Estimate: £7,217m**

COSTS (£m)	**Total Transition** (Constant Price) Years		**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	£15.3m	1		£2,446m
High	£23.0m			£3,669m
Best Estimate	**£19.1 million**			**£3,058m**

Description and scale of key monetised costs by 'main affected groups'

The increased costs (present value) are £3,058m, of which £681m are through replacement and maintenance, plus transition costs of £19.1m. The initial capital costs of £2,358m will be borne by developers. The costs would fall with moderate efficiency gains through learning over time and through economies of scale for heat pumps. Over the medium-long term, development costs may become factored into land prices and therefore passed onto landowners. Higher costs may also lead to higher purchase costs of homes for buyers /higher rents for tenants.

Transitional costs are likely to fall on businesses and Local Authority building control who will need to train their employees to become familiar with the new standards. This includes employees such as contractors, architects, energy assessors and building control etc.

Other key non-monetised costs by 'main affected groups'

These changes may have a small impact on the demand and supply of new homes; however, this is not expected to be substantial. Consequently, this has not been monetised. Any increases in costs from grid reinforcement have not been monetised. This will be looked at for the final impact assessment.

BENEFITS (£m)	**Total Transition** (Constant Price) Years		**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low				£8,220m
High				£12,329m
Best Estimate	**£0**			**£10,274m**

Description and scale of key monetised benefits by 'main affected groups'

Non-financial benefits including CO_2 savings and air quality savings of £6,559m. The total CO_2 savings are 43 $MtCO_2(e)$. These will benefit society as a whole, with lower carbon emissions reducing the longer-term risks of climate change, and improved air quality leading to better health outcomes. The benefits (present value) include energy savings of £3,716m, which will be experienced by occupiers of new homes in the form of lower fuel bills.

Other key non-monetised benefits by 'main affected groups'

No allowance is made for fuel security benefits, employment opportunities from developing energy saving or low-carbon/primary energy products or spill-over benefits of innovation.

Key assumptions/sensitivities/risks	**Discount rate (%)**	3.5%

Consultants provided per-building estimates of the capital, maintenance and replacement costs, energy use, and carbon emissions. The analysis has taken a common set of assumptions on fuel prices, traded and non-traded carbon prices (sensitivity analysis in Appendix B), emissions factors and air quality damage costs from 2022 Green Book Supplementary guidance. The low and high estimates presented above are +/- 20% of the best estimate.

There are a number of assumptions in the counterfactual that will affect the impact of the policy and have significant uncertainty attached. These are set out in the *Analytical Approach* Section.

All calculations are in 2022 prices unless otherwise stated.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual, 2019 Prices, 2020 PV base year) £m:			**Score for Business Impact Target (qualifying provisions only) £m:**
Costs: £218m	**Benefits: £0m**	**Net: £(218)m**	N/A

Summary: Analysis & Evidence Option 2

Description: New homes target that delivers "zero carbon ready" homes. All figures are Net Present Values (NPVs) over 10 years of policy and a subsequent 60-year life of the buildings.

FULL ECONOMIC ASSESSMENT

Price Base	PV Base	Time Period	Net Benefit (Present Value (PV)) (£m)		
2022	2025	70	**Low: £4,489m**	**High: £6,733m**	**Best Estimate: £5,611m**

COSTS (£m)	**Total Transition** (Constant Price) Years		**Average Annual** (excl. Transition) (Constant Price)	**Total Cost** (Present Value)
Low	£11.5m	1		-£655m
High	£17.2m			-£983m
Best Estimate	**£14.3m**			**-£819m**

Description and scale of key monetised costs by 'main affected groups'

There are transition costs of £14.3m but a reduction in costs (present value) for **new homes** of £833m compared to the counterfactual. Although initial capital costs are higher than the counterfactual, the absence of replacement and maintenance costs of solar panels (with the exception of mid-high-rise flats) makes Option 2 cheaper over the appraisal period. Any cost savings would increase with moderate efficiency gains through learning over time and through economies of scale for heat pumps.

Transitional costs are likely to fall on businesses and Local Authority building control who will need to get their employees up to speed with the new standards. This includes employees such as contractors, architects, energy assessors and building control etc.

Other key non-monetised costs by 'main affected groups'

These changes may have a small impact on the demand and supply of new homes; however, this is not expected to be substantial. Consequently, this has not been monetised. Any increases in costs from grid reinforcement have not been monetised. This will be looked at for the final impact assessment.

BENEFITS (£m)	**Total Transition** (Constant Price) Years		**Average Annual** (excl. Transition) (Constant Price)	**Total Benefit** (Present Value)
Low				£3,834m
High				£5,751m
Best Estimate	**£0m**			**£4,792m**

Description and scale of key monetised benefits by 'main affected groups'

Non-financial benefits including CO_2 savings and air quality savings of £6,187m. The total CO_2 savings are 41 $MtCO_2(e)$. These will benefit society as a whole, with lower carbon emissions reducing the longer-term risks of climate change, and improved air quality leading to better health outcomes. There are disbenefits of increased energy costs of £1,395m, incurred by occupiers of new homes, including owner occupiers, as well as the PRS and SRS tenants.

Other key non-monetised benefits by 'main affected groups'		
No allowance is made for fuel security benefits, employment opportunities from developing energy saving or low carbon/primary energy products or spill-over benefits of innovation.		
Key assumptions/sensitivities/risks	**Discount rate (%)**	3.5%
Consultants provided per-building estimates of the capital, maintenance and replacement costs, energy use, and carbon emissions. The analysis has taken a common set of assumptions on fuel prices, traded and non-traded carbon prices (sensitivity analysis in Appendix B), emissions factors and air quality damage costs from 2022 Green Book Supplementary guidance. The low and high estimates presented above are +/- 20% of the best estimate. There are a number of assumptions in the counterfactual that will affect the impact of the policy and have significant uncertainty attached. These are set out in the *Analytical Approach* Section. All calculations are in 2022 prices unless otherwise stated.		

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual, 2019 Prices, 2020 PV base year) £m:			**Score for Business Impact Target (qualifying provisions only) £m:**
Costs: - £13m	**Benefits: £0m**	**Net: £13m**	N/A

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1. Introduction

Background and scope of the changes

1.1. This Impact Assessment (IA) accompanies a consultation on changes which are to be made to the energy efficiency requirements of the Building Regulations, the calculation of energy efficiency target rates and the accompanying Approved Document guidance. The consultation sets out proposals relating to both dwellings and non-domestic buildings. This Impact Assessment focuses on the proposals for dwellings. A separate Impact Assessment has been published focusing on the proposals for non-domestic buildings.

1.2. Specifically, and as defined in the legislation, the energy efficiency requirements relevant to new dwellings are those of regulations 23, 25A, 25B, 26, 26A, 26C, 28, 40 and 43 of and Part L of Schedule 1 to the Building Regulations[3]. We are proposing to repeal 25A and 25B.

1.3. The Building Regulations are a devolved matter and the changes in this impact assessment apply to England only. Enforcement of the Building Regulations is undertaken via the Building Control process.

1.4. The analysis which underpins this IA focuses on the costs and benefits associated with improving the energy efficiency of new dwellings at the point of construction. As such, the policies will have an impact on the construction industry, manufacturers of construction products, and the building owners and occupants. Analysis on changes to existing dwellings has also been included in the IA but has not been included in the main cost benefit analysis.

1.5. The proposed policy changes are set out in the Government's consultation document *The Future Homes and Buildings Standards: 2023 consultation on changes to Part 6, Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for dwellings and non-domestic buildings and seeking evidence on previous changes to Part O (overheating).* The consultation considers two options to uplift the current Part L energy efficiency standards for new dwellings.

2. Problem Under Consideration

2.1. In June 2019 the UK became the first major economy to legislate for net zero greenhouse gas emissions, a target the Government committed to meeting by 2050. In addition to this commitment to reach net zero, the UK has interim targets, which are set out in the Carbon Budgets and Net Zero Strategy. In 2021 the Government laid legislation for Carbon Budget 6, which will require a 78% reduction in emissions by 2035, relative to 1990 levels.

2.2. Homes account for 23% of total greenhouse gas emissions in the UK[1], with an estimated 23.7 million dwellings in England[2]. Carbon emissions have high social costs such as more frequent extreme weather, flooding, high temperatures, water shortages and loss of ecosystems. Worsening air quality due to pollutants can also result in worse health outcomes. The UK has already made significant progress in this sector with overall emissions falling by 16.5% between 1990 and 2022, despite there being a quarter more homes[4]. Buildings however remain the second largest carbon emitter behind the transport sector, with HMG's Net Zero Strategy indicating that in order to meet Carbon Budget 6 targets, buildings must reduce annual emissions by more than half by 2035.[5] Improving the energy efficiency of new dwellings therefore represents a significant opportunity to reduce carbon emissions and support the Government in reaching its targets, whilst keeping energy costs down for consumers now and in the future.

2.3. The Heat and Buildings Strategy sets out the immediate actions and long-term signals proposed to reduce emissions from buildings. It recognises the need to do more to decarbonise the building stock by making buildings more energy efficient and by installing low-carbon heating systems. It sets out a commitment to increase standards for new-builds in the 2020s to ensure they are ready for net zero, including through the Future Homes Standard from 2025.

2.4. The 2021 uplift to Part L of the Building Regulations, which came into effect on 15 June 2022, has delivered significant improvements in this area already. Analysis, using 2022 Green Book supplementary guidance[6] emission factors, illustrates that new homes are now expected to produce significantly less CO_2 emissions than those built to the previous 2013 standards.

2.5. The Future Homes Standard is intended to build on the 2021 uplift, setting even more ambitious energy efficiency targets for new homes and acting as a key component of the UK government's efforts to meet its Net Zero targets. Introducing the Future Homes Standard will mean that the homes this country needs will be fit for the future and better for the environment, with low-carbon heating and high fabric standards.

[3] Legislation.gov.uk (2010). The Building Regulations 2010. Available at: https://www.legislation.gov.uk/uksi/2010/2214/contents

[4] Department for Energy Security & Net Zero (2023). 2022 UK greenhouse gas emissions, provisional figures. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147372/2022_Provisional_emissions_statistics_report.pdf

[5] HM Government (2021). Net Zero Strategy: Build Back Greener. Available at: https://assets.publishing.service.gov.uk/media/6194dfa4d3bf7f0555071b1b/net-zero-strategy-beis.pdf

[6] Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy (2023). Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal. Available at :https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

3. Rationale for intervention

3.1. The Building Regulations should be used to reduce carbon emissions and help achieve HMG's 2050 Net Zero Target only where it can be shown that the market would not make these changes of its own accord, or that other measures (regulatory or otherwise) are not already driving this change. The Building Regulations represent the primary tool for setting standards for new dwellings.

3.2. Several market failures exist which means that, in the absence of government intervention, the market would not make the changes necessary to decarbonise homes independently. In the absence of any intervention, the long lifetimes of buildings could lead to a lock-in of lower energy efficiency levels for many years to come. Uplifts to the Building Regulations can help to overcome the following market failures that act as a barrier to action:

- **Negative Externalities:** occupiers do not incur the true cost of the emissions they emit by heating and powering their homes. This is because the costs of increased greenhouse gas emissions and climate change, such as reductions in air quality and the subsequent impacts on human health, are not reflected in the price consumers pay for fuel. Thus, the private cost they incur via fuel bills do not cover the full social cost of heating and powering buildings. The cost is not fully accounted for by the market, leading to the external cost falling elsewhere. Even if appropriately high and sustained prices were applied to carbon emissions and air pollution, other market failures can act as a barrier to action.

- **Imperfect Information:** A lack of information on potential changes in energy prices can mean that home buyers, tenants and mortgage providers do not value energy efficient homes more highly than worse performing dwellings at the point of sale or rent. This is because if the benefits of a more energy efficient home are unknown (e.g., improved thermal comfort, lower fuel bills, positive health and environmental outcomes), then increased efficiency may not be reflected in the market price for homes, and hence homeowners have little incentive to upgrade their properties. Whilst there is growing evidence that consumer preferences are starting to shift to value higher energy performance in the housing market, this is not yet widespread. Therefore, locking-in higher energy efficiency of homes via uplifts to the building regulations is an effective intervention in reducing both tenants and homeowner's exposure to volatile energy prices, and behavioural inertia by lowering their energy demand from the outset.

- **Credit/Resource Constraints**: A failure to set standards at the point of build can lock a dwelling into higher energy consumption. There is limited scope for homeowners to improve energy efficiency later, as retrofitting is disruptive and expensive. Lack of capital, lack of information and a limited tolerance for disruption can all act as barriers to households who may want to renovate and improve existing dwellings, even if these works would be cost-effective over the medium or long term. The large upfront costs of energy efficiency upgrades can also take a long time to recover given the lengthy

payback periods resulting from lower fuel bills. Hence consumers who are credit constrained may lack the ability to refurbish their dwellings to higher energy standards. Locking buildings into higher energy efficiency standards at the point of construction removes the reliance on homeowners having enough capital to make the improvements themselves, and can also help improve longer term market prices, as developers building en masse can benefit from economies of scale.

- **Split incentives:** Developers have low incentives to build better-performing buildings as they do not enjoy the benefits. Lower energy bills and the additional income from energy generated by renewable technologies benefit the building occupant only. Meanwhile developers may not be able to sell a home for a premium to recover all the additional costs they accrue, despite the home being more energy efficient. These misaligned incentives mean that in the absence of higher standards set through the Building Regulations, homeowners and developers may fail to make improvements to the energy performance of dwellings.

- **Bounded rationality and behavioural inertia:** This occurs when people are satisfied with a sub-optimal outcome. The necessary incentives and information may be available, but this does not necessarily translate into change as people's decision making may be influenced by previous habits and wider social norms, or the hassle and transition costs attached to change. As a result, individuals may prefer to maintain the status-quo (for example, continuing to use and replace gas boilers with gas boilers) rather than adopt new technologies such as renewable energy or low-carbon heating, even if they are demonstrably cost-effective. The presence of inertia and bounded rationality means that in the absence of higher standards set through the Building Regulations, homeowners and developers may not make improvements to the energy performance of dwellings and remain locked into a high-carbon equilibrium.

- **Coordination issues**: A complex system like the construction industry can be held back from moving to a new, low-carbon equilibrium because of coordination failures. The costs of new low-carbon technologies such as heat pumps are often more expensive than existing fossil fuel dependent technologies and, as a result, low-carbon technologies can initially be non-price competitive, leading to lower demand. Economies of scale and increased investment are likely to bring down the capital costs of these technologies over time, but the costs to each individual actor of independently adopting a new technology may seem costly, preventing a socially optimal transition. Government intervention is justified in such a case to support a sector to transition from a high-carbon equilibrium to a low-carbon equilibrium, overcoming the coordination problem.

3.3. Building regulations and standards are widely recognised as an appropriate point of intervention to overcome these market failures. Action at the point of build or when relevant work is done has the advantage of 'locking in' low carbon technologies and energy efficient design, reducing overall energy demand of the building and avoiding the need to retrofit in the future. It also helps enable other government policies and objectives.

4. Policy Objectives and Changes to Energy Efficiency Standards

Policy objectives

4.1. The performance-based targets set through the Building Regulations and accompanying Approved Documents are an important means of reducing the carbon emissions from dwellings. Setting the right standards will ensure the Government is on track to meet its 2050 Net Zero target.

4.2. Full details of the proposed policy for the new energy efficiency standards for dwellings are set out in the Future Homes and Buildings Standards consultation document and associated documents, including the draft Approved Documents. A summary of the proposals and intended effects is provided below.

4.3. The policy objectives are to ensure that new homes are:

- Built to deliver significant carbon savings compared to homes built to current standards.
- High-quality and affordable, protecting occupants from high bills.
- "Zero-carbon ready". This means that, because they use electricity or other renewable energy sources for their heating and hot water, no future work will be necessary to allow them to achieve zero carbon emissions when the electricity grid is fully decarbonised.
- Cost-effective, affordable, practical and safe.

4.4. The consultation also explores the extent to which the above policy objectives can be achieved for homes created through a Material Change of Use (MCU).

4.5. The consultation also proposes changes to the ventilation standards for new and existing homes. The policy objective is to ensure that homes have ventilation systems that are installed and commissioned to a higher standard.

4.6. While there is a call for evidence on Part O of the Building Regulations within the consultation, no changes have been proposed and therefore no changes have been monetised in this impact assessment.

4.7. A summary of the key proposals and intended effects is provided below.

The 'Do nothing' option for new homes

4.8. Doing nothing in this context would mean maintaining the current standards of the Building Regulations as set in 2021. Under this option, some new dwellings would continue to be constructed with fossil fuel heating systems into the late 2020s and 2030s. Given the long lifetime of buildings, this option would therefore make the Government's legally binding Net Zero target extremely difficult to meet, possibly only with widespread retrofit at great expense.

4.9. All figures in the impact assessment are provided relative to the counterfactual *''Do Nothing'* Option. For new homes this is the 2021 notional building specification, which has a gas boiler, lower efficiency solar panels and wastewater heat recovery, or a home with a heat pump – see the *Routes to Compliance (*para 5.23 - 5.25*)* section. This is with the exception of mid-high-rise flats, which are compared to a ASHP and gas boiler hybrid communal heat network.

Performance requirements for new homes

4.10. **Option 1** includes:

- A notional building with:
  - a high-efficiency air-source heat pump
  - solar PV (photovoltaic) panels
  - a wastewater heat recovery system
  - increased airtightness
  - a decentralised mechanical ventilation (dMEV) system
- high fabric standards to minimise heat loss from windows, walls, floors and roofs (the same as the standards set in the 2021 uplift to Part L)
- a significant increase in performance standards for domestic hot water storage
- a separate notional building for new heat networks.

4.11. **Option 2** mirrors Option 1, except it does not include the following features in the notional building:

- solar PV panels
- a wastewater heat recovery system
- increased airtightness
- a decentralised mechanical ventilation (dMEV) system

4.12. Both options have been developed in line with the policy objectives set out in paragraph 4.3. The primary change under both options is the installation of low-carbon heating systems. The notional building approach allows for the choice of alternative technologies. We anticipate however that the standards will be met through heat pumps or heat networks. This change will mean that new homes have electric heating systems, which will create no direct carbon emissions – the only emissions will arise from the production of electricity elsewhere. These homes will therefore become zero-carbon as the electricity grid decarbonises between now and 2035, helping meet the Government's target for the UK to be Net Zero by 2050.

4.13. We consider the energy efficiency standards in both options to be achievable. Developers can meet the higher standards using materials, construction techniques and products readily available on the market. The notional building allows some flexibility in meeting the performance standards, allowing designs to be tailored to the circumstances of each building, thus supporting innovation.

Metrics for new homes

4.14. We have concluded that the existing metrics effectively support our policy priorities for the Future Homes and Future Buildings Standards. We therefore propose using the current metrics for setting performance requirements with no changes.

Minimum standards for fixed building services for new and existing homes

4.15. We propose various improvements to the minimum standards for fixed building services and controls. These changes relate to:

- heat pump efficiencies, controls, and operating and maintenance information
- continuous mechanical extract ventilation systems
- continuous mechanical supply and extract ventilation systems
- comfort cooling systems efficiency
- lighting efficacy and controls
- underfloor heating systems

4.16. We are also proposing other changes to facilitate the installation of low-carbon heating systems by limiting heat loss. These changes include:

- adding guidance on pipework insulation
- adding guidance for Heat Interface Units (used in heat networks)
- adding guidance on the placement of heat pumps to minimise heat loss
- new minimum standards for hot water storage vessel insulation

4.17. We do not propose changing the minimum building fabric standards for homes, provided through the Approved Document guidance, compared to the Part L 2021 standards. This is because we believe that the 2021 fabric minimum standards provide a good basis for the Future Homes and Buildings Standards.

Standards for homes created through a Material Change of Use

4.18. A Material Change of Use (MCU) is a conversion of a building from one purpose to another. The minimum standards set for a dwelling created under a MCU are lower than those for a new dwelling and are regulated separately to those of newly built dwellings.

4.19. The consultation discusses and proposes illustrative ways of uplifting MCU standards. The new proposed MCU standards aim to protect consumers from high bills and reduce emissions as far as practical, while capitalising on building work already being done. The standards will achieve this aim by setting better fabric and building service standards, whilst also allowing suitable scaling back of these standards where there are suitable mitigating circumstances.

Real-world performance of homes

4.20. We are proposing changes to improve the commissioning of centralised mechanical ventilation systems, hot water storage and on-site electricity generation. Ensuring that buildings and building services perform as designed will help to lower energy bills, improve housing quality, and increase consumer confidence in new homes. We are also clarifying the routes to certification and enforcement for heat pumps and centralised mechanical ventilation systems.

4.21. We are also seeking evidence around proposed measures to improve building performance in new homes against expected energy use through the introduction of fabric performance testing and a Future Homes Standard Brand. There are improvements proposed to the Home User Guides and we are seeking evidence on how to improve their longevity.

Existing heat networks

4.22. We are proposing to support the expansion of heat networks where they are making demonstrable steps to decarbonise. We are proposing to link the ability for new homes to connect to existing heat networks to the nature and quantity of low-carbon heat generation supplying the network. This means that, at a minimum, the heat required by any additional homes connected to an existing heat network, should match the low-carbon heat generation capacity of the network. We propose that a 'sleeving' system is used to implement this principle. More detail on the sleeving proposal is set out in the consultation.

Smart meters

4.23. We propose to reference a guide in the Approved Document for developers to use, to design homes for successful smart meter installation.

Accounting for exceptional circumstances

4.24. We are conscious that as energy efficiency requirements become stricter, there may be a small number of dwellings that cannot be designed to meet the standards. We are therefore proposing to remove the restriction on relaxing or dispensing with the requirement to meet the target CO2 emission rate. This would mean (if regulations 25A and 25B are repealed as proposed) that developers could apply to their local authority, with appropriate evidence, to relax or dispense with any of the energy efficiency requirements, and the local authority would be required to judge whether the requirement is "unreasonable" in the circumstances.

Legislative changes to the energy efficiency requirements

4.25. We propose various changes to the Building Regulations to reduce unnecessary regulatory burden, and to reflect that reducing carbon emissions is a central aim of the Future Homes and Buildings Standards.

A review of the approach to setting standards

4.26. As outlined in the Future Homes and Buildings Standards consultation document, we are proposing to adopt the new Home Energy Model and are proposing improvements to our current 'notional building' approach to setting energy efficiency standards. This includes proposing changes to standardised assumptions, weather, buildings containing multiple dwellings, secondary heating, window and door U-value calculations and thermal bridging.

Transitional arrangements

4.27. The changes will be implemented through secondary legislation and updates to the Approved Document. We are proposing two options for implementation:

- A 6-month period between (i) the laying date of the Future Homes and Buildings Standards' regulations and publication of full technical specification and (ii) the regulations coming into force.
- Up to 12 months between (i) the laying date of the Future Homes and Buildings Standards' regulations and publication of full technical specification and (ii) the regulation coming into force.

4.28. There is not a preferred option. Both options would be followed by a 12-month transitional period.

4.29. The transitional arrangements will only apply to new homes where a building notice, initial notice, or application for building control approval accompanied by appropriate plans has been submitted prior to the regulations coming into force, and where work has then commenced on that individual home within 12 months of the regulations coming into force.

5. Analytical Approach

Assumptions applicable to all analysis

5.1. To assess the impact of these uplifts to the energy efficiency requirements of the Building Regulations, a cost benefit analysis has been undertaken. This Impact Assessment (IA) refines some of the assumptions used in the 2021 final-stage IA, reflecting improvements in the evidence base on the latest market positions, as well as most recent data. In other areas there is less detailed analysis, as this is a consultation-stage IA which we are seeking input into through this consultation. Following this, DLUHC will further refine analytical assumptions for the final IA.

5.2. This IA follows the approach set out by the April 2023 update Green Book and the accompanying supplementary guidance on the valuation of energy use[7]. This was the latest available update at the time of analysis, meaning we were unable to incorporate the latest data tables and emission factors from the November 30th 2023 update. We do not expect that this would change the main conclusions from the cost benefit analysis. For the final stage IA, the latest version available of the Green Book will be used.

5.3. Energy savings are valued at the variable rate in macroeconomic calculations in accordance with the supplementary Green Book guidance. This is appropriate for social analysis and assumes that the retail energy savings, enjoyed by the consumer occupying an energy efficient building, do not fully reflect the social benefit. For Solar export prices, a weighted average of Solar Export Guarantee rates[8] from Ofgem were used, with this being extrapolated forward to future years, using retail and LRVC price ratios.

5.4. A discount rate of 3.5% has been used for the first 30 years of the building's life and 3% for subsequent years.

5.5. Prices and estimates shown below are in 2025 base year and 2022 prices. This is with the exception of the EANDCB, which is calculated using 2020 base year and 2019 prices as per official guidance.[9]

5.6. All figures in the Impact Assessment are presented in terms of the two options considered at consultation: Option 1 (heat pumps, efficient solar panels, wastewater heat recovery (WWHR),improved air tightness and dMEV) and Option 2 (heat pump). These are compared to the counterfactual 'Do Nothing' Option.

[7] HM Treasury (2022). The Green Book. Central Government Guidance on Appraisal and Evaluation. Available at: https://assets.publishing.service.gov.uk/media/623d99f5e90e075f14254676/Green_Book_2022.pdf

Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy (2023). Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal. Available at: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

[8] Ofgem (2022). Ofgem Smart Export Guarantee (SEG) Annual Report 2021-22, Available at: https://www.ofgem.gov.uk/publications/smart-export-guarantee-seg-annual-report-2021-22

[9] Department for Business and Trade (2023). Impact Assessment Calculator User Guide. Available at: https://www.gov.uk/government/publications/impact-assessment-calculator--3

Appraisal time and asset life

5.7. The appraisal period for estimating the impact of the policy is 10 years which is consistent with other IAs associated with the construction industry. This includes the impact assessment undertaken for changes to the energy efficiency requirements in 2013 and 2021.

5.8. For the analysis of new dwellings, an asset life of 60 years is assumed. The total period for the IA is therefore 70 years, so that the full 60-year impact of a building constructed in Year 10 is assessed. This helps to ensure there is a full appraisal of the 'lock in' impact of higher fabric standards. For building fabric insulation (external walls, floors, roofs) the assumed asset life is 60 years, except for external windows and doors which have an assumed asset life of 30 years. This is comparable with indicative values provided in Annex E of *BS EN 15459 Energy performance of buildings – Economic evaluation procedure for energy systems in buildings*.

5.9. Gas boilers and heat pumps have assumed asset lives of 15 years, with hot water stores having a lifespan of 20 years. This is comparable with indicative values provided in *CIBSE Guide M – Maintenance engineering and management*. The asset lives of wastewater heat recovery systems were taken to be 50 years for vertical systems.

5.10. Only the elements of lifecycle costs that differentiated from the costs incurred in the counterfactual were considered. For example, general repair and decoration costs were excluded from the analysis, as these would be common to all new constructions, irrespective of the energy performance options presented in this document.

5.11. Replacement costs were assigned to specific components within a specification and avoided replacements of components that would be expected to have a longer lifespan. For example, boiler replacements did not include the replacement of a hot water tank or the gas or water supplies. The replacement costs included an additional allowance for the disposal of the end-of-life components.

5.12. Consequently, the ongoing costs associated with maintenance and replacement along with the benefits from energy, air quality and carbon savings have been estimated over a 60-year period for each new building, which provides a sufficiently long period to capture the benefits of fabric 'lock-in'. Given the 10 years of policy being assumed, the total period for the IA is therefore 70 years so that the full 60-year impact of a building constructed in year 10 is assessed. Learning rates have been applied to account for reductions in costs for less mature technologies.

Phase-in assumptions and transitional arrangements

5.13. The following phase-in assumptions about the lead-in, build and completion times (Table 1 below) have been made for the proportion of dwellings which will be built to the proposed 2025 standards instead of the 2021 standards. These assumptions take into account discussions with industry experts, and the effect of an illustrative 12-month implementation period. The first year of the policy has been revised down from the 5% assumed for Part L 2021 to 0%, given emerging internal evidence on the number of new builds being built to the new standard during the transitional period. We will continue to

monitor this data and revise these assumptions for the final impact assessment following consultation. DLUHC have not analysed the impacts of the other 6-month implementation option, but would expect this to have a negligible impact on the overall costs and benefits of the policy.

5.14. New-build projections have been broken down between detached, semi-detached, mid-terraced houses, four-storey and ten-storey apartment blocks. These estimates are indicative, should be used for appraisal purposes only and do not represent an official forecast of changes in housing supply. For more details, please see Appendix A.

Table 1: Phase-in assumptions (% of works captured by 2025 requirements)

	2026	**2027**	**2028**	**2029**	**2030 onwards**
New domestic	0%	50%	95%	100%	100%

Closing Transitional Arrangements

5.15. The proposals for the 2025 regulations and statutory guidance will apply to all buildings that have not commenced development within 12 months of the regulations coming into force. We think that it is unlikely that any planning consents will need to be amended due to the impact of these proposals. With similar fabric standards and solar panels already present in the Part L 2021 standard there is limited change of concern to Local Planning Authorities.

5.16. We are proposing to close previous transitional arrangements. This would mean homes not commenced before the end of the transitional period, regardless of whether they previously benefited from historic transitional arrangements, would need to build to current standards. It is expected that this will incur costs to developers. Given data limitations we have been unable to analyse any potential costs at consultation stage, but we will use the consultation process to gather any evidence or data from industry. We will then review this for the Final IA.

Counterfactual

Energy efficiency requirements

5.17. To estimate the overall costs and benefits of the proposed policy options, we have modelled the changes in construction and installation costs, energy use and related CO_2 emissions using the standards proposed in the Future Homes and Buildings Standards consultation. These are then compared with a counterfactual baseline of costs and energy use under the 2021 energy efficiency requirements. Some local authorities require construction to a higher standard which will reduce or negate the impact of the policy change in those areas.

5.18. The counterfactual does not include the impact of future potential Net Zero policy measures which are not yet committed to in legislation or funded by government. This

includes the ambition publicised in the 2021 Heat and Buildings Strategy to phase out gas-boiler installations by 2035[10].

5.19. In the counterfactual it is assumed that any gas boiler fitted will be replaced with another gas boiler when it reaches the end of its asset life. Sensitivity analysis in Annex B explores the impact on the estimated costs and benefits of assuming gas boilers are replaced with heat pumps in the counterfactual from 2035 onwards. This is to reflect the impact of any future scenarios where such policies were implemented.

Local Authority Approach and other 'Net Zero' Routes

5.20. The Building Regulations set energy efficiency performance standards for new dwellings nationally. In certain circumstances plan-makers can set standards beyond the national requirements. Additionally, some organisations commit to certain standards ('*Net Zero' routes)* that go beyond current Building Regulations or LA guidance. In these cases, an adjustment needs to be made to the counterfactual, as some of the costs and benefits attributed to the FHS 2025 uplift will already be incurred due to these specific commitments.

5.21. Consequently, DLUHC have taken forward preliminary analysis to account for this, using some of the approach set out in the Part L 2021 Final Impact Assessment. This analysis will be updated for the final FHS IA, as more data and information on Local Plans become available. In addition to LAs setting standards equal to or beyond the national regulations, there are also '*Net Zero'* routes which may lead housebuilders to do the same, which can be a part of, or separate to, Local Plans. Whilst these routes are uncertain, DLUHC has worked with industry consultants to identify these possible routes and account for them in the counterfactual.

5.22. This leads to a combined initial estimate of 35% of homes meeting the FHS standard in absence of the policy (in the counterfactual), with proportions gradually increasing up to 2035. Proportions were then applied to DLUHC's live data tables[11] on housing supply, with the impacts of the policy of these homes set to 0.

Routes to Compliance

5.23. The 2021 energy efficiency requirements are performance-based standards requiring dwellings to achieve targets of regulated primary energy, CO2 emissions and fabric energy efficiency. Consequently, there were many ways in which a housebuilder could comply with the regulations. For the Part L 2021 IA, it was assumed that the most likely means of compliance to the 2021 Part L requirements was a specification with a high level of energy efficiency, a gas boiler, solar panels and wastewater heat recovery. This is still believed to be the most likely means of compliance because it requires the least

[10] HM Government (2021). Heat and Buildings Strategy. Available at: https://assets.publishing.service.gov.uk/media/61d450eb8fa8f54c14eb14e4/6.7408_BEIS_Clean_Heat_Heat___Buildings_Strategy_Stage_2_v5_WEB.pdf

11 Department for Levelling Up, Housing & Communities (2022). Live tables on housing supply: net additional dwellings. Available at: https://www.gov.uk/government/statistical-data-sets/live-tables-on-net-supply-of-housing

change from current building practices, and for many housebuilders is the lowest-cost solution in the short run.

5.24. The main alternative route to compliance for housebuilders was assumed to be with a heat pump. This was seen as appealing for some to start transitioning to the Future Homes Standard and for areas that do not have a natural gas supply. For the purposes of the Impact Assessment and cost benefit analysis, these two routes to compliance have been modelled as part of the counterfactual.

5.25. The routes to compliance profile for the central estimate in the main cost benefit modelling is shown in Table 2. It is based on both internal expertise, views of consultants and engagement with industry.

Table 2: Routes to Compliance: Central Estimate

Route to Compliance	2022	2023	2024	2025 onwards
BR2021 Gas boiler and solar panels	90%	77%	63%	50%
BR2021 Air source heat pump (ASHP)	10%	23%	37%	50%

Source: DLUHC and AECOM

5.26. Due to a variety of reasons, including differences in the estimated capital costs between developers, there is still some uncertainty over what proportion of housebuilders will choose which route to compliance. We will continue to monitor emerging internal data and, if possible, revise these assumptions for the final Impact Assessment following consultation. We would welcome any views on this.

Compliance

5.27. In some buildings, there is a gap between the designed and as-built performance, known as the 'performance gap'. Buildings that appear to fully meet the energy performance standards through the paperwork submitted can fall short in reality due to several reasons. Buildings may not be built to design, for example because of poor build quality or materials being substituted, or occupants may use buildings in different ways to those assumed at the design stage.

5.28. For the purposes of modelling, 100% compliance is assumed as this is standard practice in estimating the impact of a regulation. Issues causing any non-compliance are complex and, whilst some evidence has been produced, overall there remains insufficient evidence to provide a sufficiently robust estimate of the size of non-compliance or how widespread the problem is. Measures were brought in to reduce possible non-compliance in the Part L 2021 uplift.

5.29. The lack of evidence applies equally to the counterfactual and the 2025 proposals. If the modelling underestimates the energy use of all buildings by the same proportion, the

estimates of the percentage reductions in energy use are not affected. However, our analysis would underestimate the absolute savings from the change.

5.30. We would welcome evidence on the performance gap that could help inform sensitivity analysis for the final Impact Assessment.

Standing charges

5.31. Green Book long run variable costs (LRVC) have been used for modelling energy costs to capture the social value of energy use. In addition to this however, occupiers in dwellings pay standing charges, which are fixed daily charges that cover the cost of supplying gas and electricity to a home. Given the FHS is fully electric, any occupiers in a new FHS home will no longer have to pay a standing charge for gas, due to there being no gas supply to the home. Therefore, this cost is removed, which means an energy saving increase for both Option 1 and 2 compared to the gas boiler compliance route of the counterfactual. Some of this gain is dampened as homes on a single fuel normally pay a higher electricity standing charge than those on both electric and gas. Looking at the five-year average of Quarterly Energy Prices[12], this is estimated to be around a 7% uplift.

Comfort taking

5.32. Comfort taking is when a reduction in the cost of heating bills leads to some occupiers choosing to heat their homes to higher temperatures or for longer. It was considered whether comfort taking should be included in the models for new homes. Given there is no improvement in the fabric of the home in the new standard compared to Part L 2021, it is not expected that there would be substantial comfort taking as a result of this uplift. Therefore, no comfort taking has been applied to new dwellings.

[12] Table 2.24 of Annual Domestic Energy Prices, Available here: https://www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics

6. Estimated Costs and benefits

Overview

6.1. The policy changes in the main cost benefit analysis will affect all new dwellings in England. The impact of the policy will be felt both at the point of new construction and over the life of the building, during which energy savings will be achieved. As such, the policy will have an impact on manufacturers of construction products, the construction industry and building owners and occupants. Given the long lives of the buildings affected, there is considerable uncertainty about future values. Therefore, for this assessment, it is assumed that there is an indicative ±20% uncertainty on the central estimate.

6.2. To estimate the overall costs and benefits of the policy changes, we have modelled the changes in construction costs, replacement and maintenance costs, energy use and consequent CO_2 emissions using the proposed energy efficiency requirements for 2025. This is then compared with a baseline of costs and energy use implied by the energy efficiency requirements for 2021 which are currently in place, along with counterfactual adjustments to best capture current industry practice.

6.3. The principal policies that have been included in the Impact Assessment (IA) are:

- Improved energy efficiency requirements for new homes – see '*Improved energy performance requirements for new dwellings'.*
- Standards for homes created through a material change of use - see *'Improved energy performance requirements for Material Change of Use'*. Analysis has been produced but has not been included in the main cost benefit analysis.
- Real world performance of homes: commissioning ventilation systems - see '*Part F of the Building Regulations: Improved commissioning'.* Analysis has been produced but has not been included in the main cost benefit analysis.
- A review to our approach to setting standards: most of these costs relating to updates to the Home Energy Model have been captured - see '*Transition costs'*.
- Transitional arrangements – see '*Transitional arrangements'*.

6.4. All other policies not included in the list above are either small or moderate changes in the regulations, or are there to clarify and advise on existing guidance and policy. These are expected to have either no or small impacts on the costs and benefits of the policy. Consequently, it was deemed disproportionate to take forward cost benefit analysis for them. Please see Section 4 for a full list of the policies being consulted upon, including those which have not been included in the cost benefit analysis. If there are policies that are expected to have larger impacts than first assumed, we will look to do further analysis for the final impact assessment.

6.5. The figures in the following analysis are based on central estimates.

Headline Results

6.6. A summary of the impacts considered under this Impact assessment (IA) is provided below in Table 3, relative to the counterfactual – the counterfactual is the 2021 notional building specification, which has a gas boiler, lower efficiency solar panels and wastewater heat recovery, or a heat pump (see *Routes to Compliance (*para 5.23 - 5.25*)* section). This is with the exception of mid-high rise, which is an ASHP and gas boiler hybrid communal heat network. Broadly, Option 1 is a home with a heat pump and more efficient solar panels. Option 2 meets our public commitments through the use of heat pumps only. All figures are Net Present Values (NPV) over 10 years of policy and a subsequent 60-year life of the buildings. Negative NPVs are given in parenthesis and represent costs. The figures represent the aggregate impact across the building mix.

6.7. Prices and estimates shown in the summary table are in 2025 base year and 2022 prices.

6.8. Overall, both options are expected to deliver a multi-billion-pound net benefit to society, with Option 1 delivering higher benefits through energy savings. Both options deliver similar carbon and air quality savings due to heat pumps (Option 1 delivers ~£370m more due to the additional electricity savings made from solar panels). However, the costs and benefits fall quite differently across both options.

6.9. Looking at energy savings, Option 1 delivers greater benefits to households than Option 2, saving £3,716m through reducing gas use and the introduction of more efficient levels of solar. Conversely, Option 2 increases energy bills relative to the counterfactual gas boiler and solar panel dwelling, costing households £1,395m more, as electricity is more expensive than gas, and there are no solar panels to offset usage or export to the grid. This is a net ~£5,110m difference between the options.

6.10. This gain in energy bill savings comes at a greater capital cost to developers and other parties paying for the initial work, driven by the cost and installation of more efficient solar panels. Option 1 costs £3,039m whilst Option 2 saves £833m, due to the lack of maintenance and replacement costs compared to the counterfactual and capital cost savings associated with gas grid connections. These savings would accrue to society. This equates to an estimated £3,872m total cost difference between policy options. In 2022 prices, on a per-home basis (3-bed semi-detached), Option 1 leads to a ~£6,200 (4%) increase in upfront capital costs, whereas Option 2 only leads to a ~£1,000 (1%) increase.

6.11. Broadly capital and installation costs will be split between private developers, Private Rented Sector (PRS) landlords and Housing Associations (HAs), with the majority being incurred by private developers. Historically costs have been factored into land prices and passed onto landowners; this is corroborated by stakeholder engagement. Private developers over the medium-long term may pass on costs to buyers in the form of higher house prices, at least in areas of high demand, or development costs may become factored into land prices and therefore passed onto landowners. In the short term, however, this is unlikely.

6.12. Some or all of the costs incurred by the PRS may be passed onto consumers/occupiers in the form of higher rent prices. For HAs, it is unlikely businesses will be able to pass on the

costs due to social rented sector rent levels being set by HMG. In this case, costs may be passed onto HMG through HAs demanding higher grants to cover additional costs to build social rented sector accommodation.

6.13. Whilst most of the costs for any replacements or maintenance will sit with the occupier, some costs will sit with PRS landlords and HAs. PRS landlords in the short term would absorb the cost due to rent prices being locked in by tenancy agreements. Over the longer term however, at the point of renewal, these costs could be passed on to the occupier in the form of higher rent prices.

6.14. All benefits will be experienced by the occupiers in the form of lower fuel bills (only for Option 1) and by society through better air quality and reduced carbon emissions.

Table 3: Central Estimate, Summary of Costs and Benefits (£m)

(Brackets) = Cost/Negative figure	**Option 1**	**Option 2**
Transition costs (£m)	(19.1)	(14.3)
Energy Savings (£m)	3,716	(1,395)
Capital, Maintenance and Replacement (£m)	(3,039)	833
Total Financial benefit/(cost) (£m)	**658**	**(576)**
Carbon Savings - non-traded (£m)	6,340	6,340
Carbon Savings - traded (£m)	82	(281)
Total Carbon Savings (£m)	6,422	6,060
Air Quality Savings (£m)	136	128
Comfort Taking (£m)	0	0
Total Carbon and Air Quality Savings	6,559	6,187
Net Benefit/(Cost) (£m)	**7,217**	**5,611**
Amount of Gas Saved (GWh)	234,223	234,223
Amount of Electricity Saved (GWh)	44,167	(132,648)
Amount of CO_2 Saved - non-traded ($MtCO_2e$)	43	43
Amount of CO_2 Saved -traded ($MtCO_2e$)	0.4	(1.3)
Cost Effectiveness – non-traded (£/tCO_2e)	(20)	17
Cost Effectiveness – traded (£/tCO_2e)	N/A	N/A

Equivalent Annual Net Direct Cost to Business (EANDCB) Summary

6.15. The EANDCB and Business Net Present Cost are shown below in Table 4. The EANDCB is calculated over 10 years, and is presented in 2019 prices, 2020 PV year. This shows that Option 1 has an EANDCB cost of £218m, whilst Option 2 provides a net annual saving to business of £13m. Further information is in the *Direct Cost to Business* section.

Table 4: Central Estimate, Equivalent Annual Net Direct Cost to Business and Business Net Present Value (£m)

	Option 1	Option 2
EANDCB	£218m	-£13m
Business Net Present Cost	£2,570m	-£824m

Additional Capital Costs

6.16. The increase in capital costs from the proposed 2025 standards, compared with the continuation of existing 2021 standards (gas boiler and solar pv home), are shown in Table 5. Further breakdown of the costs of the different elements is provided in Appendix C.

Table 5: Additional Capital Costs* relative to 2021 Gas Boiler and Solar PV Counterfactual (£)

	Option 1	Option 2
Detached house	£6,390	£-200**
Semi-detached house	£6,170	£950
Mid-Terraced house	£5,960	£740
Low Rise Flats (<11m)	£4,460	£2,760
Mid-High Rise Flats (>11m) (same for both option)	£190	£190
Weighted Average (based on assumed build mix)	**£4,360**	**£640**

*Gross Undiscounted Costs in 2022 prices, excluding gas asset value cost in counterfactual. If included this would lead to the costs presented in table 5 falling.
** a minus equals a cost saving.

6.17. Over the longer-term, Currie & Brown estimate that the costs associated with both heat pumps and solar PV will fall, as supply chains mature and become more integrated, and learning rates take effect. By the end of the policy appraisal period (10 years), it is assumed that the cost of a heat pump will be around 70% of the initial cost, whilst for Solar PV they will be around 60% of the initial cost.

Capital Costs and Gas Asset Value

6.18. One issue raised by industry during the Part L 2021 consultation was the costs associated with the gas supply asset. The supply of utilities to a home has a capital cost attached with putting in the necessary infrastructure and any associated civil engineering works. The required works are likely to have a cost to society. On completion, this utility supply has a value as an asset, which the developer can decide to sell on to a third-party

investor/supplier. The costs and sale prices of the asset will vary depending on a wide range of factors, including the size of development and how much work has been required to put in the infrastructure.

6.19. From discussion with industry, views were mixed on the expected value of the asset. Some developers reported that they could make revenue from selling on the asset over the initial capital costs, whilst some developers expected to make a loss. Speaking to utility providers, they expected that on average, the asset value would be equivalent to the initial capital costs, and therefore expected developers to recoup most or all the costs. There was also no view given over whether the longer-term price of the gas asset would fall. Given the mixture of views across industry and lack of other available evidence, for the purposes of modelling it was assumed that installing the gas supply would involve little or no cost to business, as the cost is recovered on sale of the asset. Therefore, the estimated additional capital cost by dwelling type presented above excludes the gas connection capital costs. This means that the cost of the policy options in table 5 are higher than if it had been included.

6.20. In the case of the counterfactual, which has gas supply for a new gas heated home (gas boiler and PV route to compliance), there is a social cost attached. This is because it is expected that any costs the supplier experiences from purchasing the gas asset, could be passed on to society. However, for both policy positions with a heat pump, these will no longer require a gas supply. This means there is no cost being passed on to the occupier from the gas supplier, meaning a saving to society. As homes will already be connected to an electrical supply, the only change needed for each option will be a higher-capacity electrical supply. This will partially offset the savings to society in the form of higher fuel bills. For housebuilders, there will be a small increase in costs from connecting to a higher capacity electrical supply, which again may be part or fully recovered. This has been captured in the cost benefit analysis in the development costs.

Improved energy performance requirements for new dwellings

6.21. For the uplift of energy efficiency requirements for new homes, the costs and benefits have been assessed across five building types. The building types are summarised in Table 6.

Table 6: Dwelling Types and sizes

Dwelling Type	**Floor Area (m2)**	**Number of units (for flats)**
Low- rise block of flats: a Small, 1 bed single aspect apartment & a Large, 2 bed corner apartment	43 – 66 per unit	Total for Low-Rise, 32 units
Mid – High-rise block of flats: A Small, 1 bed single aspect apartment & a Large, 2 bed corner apartment	43 – 66 per unit	Total for High-Rise, 80 units
Mid-Terrace House	76	
End-Terrace/ Semi-Detached House	76	

Detached House	117

6.22. To assess the cost and benefits of the uplift of energy efficiency standards for new dwellings, we have modelled estimates of energy consumption and build costs for each of the five archetypes. These have been done for both a 2021 compliant position, which forms the counterfactual, and the two 2025 compliant positions, which form Option 1 and Option 2. Blocks of flats have been split up into a Low-Rise model with a similar compliance route to the specifications set out in Table 7 below, whilst for Mid-High rise a communal heat network solution has been modelled. Further information on this is the *'Heat Networks for Mid-High Rise Flats'* section in this chapter.

6.23. The changes in energy use were assessed by using the new Home Energy Model. The new carbon emission and primary energy factors in the Home Energy Model were used to rebase the 2021 standard and used to calculate the effect of the proposed 2025 standards. These carbon emission and primary energy factors are in Appendix D.

Transition/Familiarisation Costs

6.24. There are transition costs incurred by businesses to familiarise their employees with the new technical requirements. The overarching methodology has changed: businesses will now use the Home Energy Model to assess compliance for new homes. Both of these changes will require a variety of professions to familiarise themselves with these new regulations/methodology. DLUHC analysts and consultants considered whether the training of heat pump installers might also represent a transition cost of the Future Homes Standard. The Government has a suite of polices in place to support the supply and installation of heat pumps. We expect that the costs of training engineers to become heat pump installers would be covered by those policies.

6.25. It is assumed that training is necessary for; developers and associated professional services to design buildings to the new standards and procure the appropriate building components; for the supply chain to be ready to meet this demand, and; for building control to assess the building applications and work.

6.26. Familiarisation costs have been estimated by Adroit Economics through the following process:

- Types of business/organisations that will be affected were identified. These included energy consultants, HEM assessors, contractors, architects, engineers, energy modellers and building control.
- Types of familiarisation activity were identified. These included preparing training course material, self-study, CPD, and formal training courses.
- Industry Consultants then estimated the time/cost likely to be incurred by different professions.
- The costs were then scaled up across the industry based on the number of businesses/organisations.

Table 7: Number of hours spent per profession to familiarise with new requirements and new SAP/HEM (hrs)

Professional Category	New Energy Efficiency Requirements		SAP/HEM
	Option 1	Option 2	
Energy Consultant	10	6	9
SAP Assessor	26	11	44
Designers - Architects	15	8	35
Designers - Engineers	26	16	44
Heat pump Commissioning	26	11	0
Ventilation Commissioning	26	0	0
Principal Contractors	99	52	2
Sub-Contractors	4	1	0
Developers	438	438	0
Building Control	8	2	1
Planners	1	1	1

6.27. In addition to the time for familiarisation, it is anticipated that some of the changes will also involve attendance at external training courses. These are included in cost estimates.

6.28. Table 8 shows the estimated number of individuals that will need to become familiar with the changes.

Table 8: Estimated number of individuals need to become familiar with the regulation changes, by profession

Professional Category	Estimated number of individuals
Energy Consultant	11,290
SAP Assessor	3,470
Designers - Architects	15,230
Designers - Engineers	8,760
Heat pump Commissioning	4,520
Ventilation Commissioning	220
Principal Contractors	41,740
Sub-Contractors	31,350
Developers	122,500
Building Control	5,630
Planners	20,850
Total	**265,560**

6.29. Table 9 then shows the total estimated familiarisation costs by change for all professions.

Table 9: Estimated Total Familiarisation and training costs, by measure of change and option (£m)

Familiarisation & Training Categories	Option 1	Option 2
New Energy Efficiency Requirements	£13.6m	£8.8m
SAP/HEM	£5.5m	£5.5m
Total	**£19.1m**	**£14.3m**

6.30. The total cost of both the new energy efficiency requirements including reading time, internal and external training, as well as SAP/HEM familiarisation, are £19.1m and £14.3m for Options 1 and 2 respectively. Note that these estimates should be treated with caution, as the scale and process for training and dissemination may be different for this set of standards. This will also be reviewed for the final impact assessment.

Heat networks for Mid-High Rise Flats

6.31. Two options have been proposed for concurrent notional buildings for dwellings connected to community heating systems and district heat networks. Heat networks are highly likely to be the main route to compliance for many mid-high rise blocks of flats (differing from low-rise flats which may use heat pumps). The mid-high rise Option 1 uses fabric, improved airtightness, dMEV, wastewater heat recovery, and an improved PV specification. Option 1 is then split up by height, with buildings up to 15 stories having solar panels and those above 15 stories having no solar panels. Given less than 10% of new dwellings are in buildings above 15 stories, it was considered proportionate to only model the below 15 story mid-high rise notional building for the consultation IA. This means both the capital costs and energy savings of 10% of flats are being overestimated, as these would not have solar PV fitted. If required, this will be incorporated into the analysis for the final Impact Assessment.

6.32. Option 2, which is a low carbon heat network, has not been modelled for this Consultation stage Impact Assessment. This also means that for the mid-high rise and therefore the total Option 2 analysis, both the costs and benefits of the policy are overestimates, again due to no solar PV being fitted.

Heat Networks with connections to both new and existing buildings

6.33. The above options have been modelled assuming a single, newly built district heating network for a mid-high rise block of flats. For other heat networks where there are connections to both new and existing buildings, the proposal is that district heat networks connecting to new dwellings will deliver a proportionate amount of low carbon heating capacity, to match the low carbon heating demand of the new dwellings. This is as defined by the concurrent notional building for dwellings connected to a heat network. The Department for Energy Security and Net Zero will consult shortly on new rules for heat network zoning which will impact the delivery of this policy. Therefore, the impacts of these heat networks will be analysed further for the final IA. Broadly, it is expected that the carbon impacts will be similar to the new heat network modelled for the mid-high rise notional building, as heat delivered to new buildings through existing networks are expected to be the same high standard of low carbon heat sources. The main difference is that the distribution loss factor may be higher for an existing network, which would mean slightly

lower carbon benefits than currently modelled. Given the cost benefit analysis in this IA has captured the cost of building a new heat network, it is expected that taking into account existing heat networks would lower the current estimated costs.

Improved energy performance requirements for Material Change of Use

6.34. A material change of use (MCU) is a conversion of a building from one purpose to another. In 2021-22, approximately a net 28,000 homes were created through changes of use, about 12% of total net additions.

6.35. For this consultation, two types of typical MCU have been modelled; office to flats and a terraced home into flats. The conversion is assumed to be to a reasonable mid-market specification. In practice, conversion costs could differ due to a wide range of project specific, market and local factors.

6.36. These MCU flats have been modelled on a single dwelling basis, showing the additional capital costs, energy bill savings and annual carbon savings by conversion type and by floor level. This accounts for the difference in costs between floor levels. Due to significant data limitations on the annual number of specific MCU's, the costs and benefits have not been scaled up to a full social analysis. Therefore, the analysis below has not been included in the full cost benefit analysis presented in this IA.

6.37. Costs include the removal and replacement of materials to make the building appropriate for residential occupancy. Any estimates do not account for any potential cost savings due to economies of scale, which may be experienced by developers doing larger office change of use developments. Therefore, aggregating the costs shown below will not truly reflect the capital costs to developers when delivering an MCU from a larger office block.

6.38. Further, these figures do not account for the creation of communal spaces, including entrance lobbies, fire escapes and hallways. These types of spaces are likely to be more prevalent in the office to flat scenario. Any attached costs are however outside of the scope of the regulation change and are therefore not included in the analysis.

Low Rise Residential to Residential

6.39. The Low-rise, residential to residential conversion counterfactual is with a gas boiler. The new, proposed notional buildings can be seen in the consultation document and include an improvement to all building fabric; an airtightness standard; the use of an ASHP; and have high efficiency solar PV panels. For the purpose of this assessment 2kWp per flat was modelled.

6.40. Table 10 shows the expected capital cost uplift, average annual energy bill and carbon savings per dwelling of the proposed policy option. The energy bill savings are calculated using Green Book retail prices to show the private average annual saving to the occupier over 15 years. Savings are discounted at 3.5% per year. Capital costs show only the upfront costs and do not include maintenance and replacement costs.

Table 10: Material Change of Use, Low Rise Residential to Residential Summary Analysis

Flat Level	Capital Cost Uplift (£)	Average Annual Energy Bill Savings (£)	Average Annual Carbon Savings (tCO2e)
Top Floor	£6,700	£200	1.67
Mid Floor	£6,700	£220	1.61
Ground Floor	£8,000	£230	1.85

High Rise Office to Residential

6.41. The high-rise office to residential counterfactual uses storage heating as the primary heating source. The new proposed notional building for mid and high rise conversions include an improvement to all building fabric; an airtightness standard; the use of storage heaters with a direct electric immersion hot water vessel or heat networks; and high efficiency solar PV panels. For the purpose of this assessment storage heaters and 2kWp per flat was modelled.

6.42. Table 11 shows the expected capital cost uplift, average annual energy bill and carbon savings per dwelling of the policy option.

Table 11: Material Change of Use, Office to Residential Summary Analysis

Flat Level	Capital Cost Uplift (£)	Average Annual Energy Bill Savings (£)	Average Annual Carbon Savings (tCO2e)
Top Floor	£6,500	£410	0.30
Mid Floor	£4,500	£380	0.28
Ground Floor	£5,100	£510	0.36

6.43. To note, the low-rise conversion shows significantly higher carbon savings than the high-rise conversion due to the change from a gas to electric heating system, whereas the high-rise counterfactual uses an electric, but less efficient heating system. Energy bill savings are conversely higher for high-rise, which reflects that the energy bills for a flat from an office conversion are typically much higher than a flat from a house conversion.

Material Change of Use: Home User Guides and Familiarisation

6.44. DLUHC are proposing to extend the application of Home User Guides, the BREL and airtightness testing to include properties that have undergone a Material Change of Use (MCU). Home User Guides provide owners with necessary information about how to operate and maintain the building effectively. The BREL and airtightness testing gives assurance that the standards of the home have been built to, providing important information to Building Control to aid sign-off. These moves aim to further address the discrepancies in quality and performance between MCU dwellings and new builds, ensuring that buyers have accurate information at their disposal. DLUHC welcome views on these proposals in the consultation and, if required, will analyse the potential impacts for the final IA.

6.45. The proposal to introduce whole building standards means that energy assessors will need to be employed to do whole building assessments. This change has not been monetised at this stage and will be investigated further for the final stage impact assessment.

Part F of the Building Regulations: Improved commissioning

6.46. The design and/or the installation of ducted ventilation systems is often poor and results in the fans operating at near maximum fan speed to achieve the design air flow rates. The impact of this is increased fan noise and thus nuisance for the residents, reduction in fan life due to wear on the motor bearings and an increase in fan running costs.

6.47. The impacts of these have not been included in the main cost benefit analysis presented in this IA, due to the fact that these changes are predominantly for centralised mechanical ventilation systems (cMEV), and cMEV systems have not been used in the notional building. We will look to assess the magnitude of impact from cMEV installations in the final impact assessment.

6.48. Currently, Approved Document F, Volume 1: Dwellings says that people commissioning centralised mechanical ventilation systems should conduct a visual inspection and air flow rate testing. We propose the following key changes – this applies to both new and existing buildings:

- When installing centralised mechanical extract ventilation (cMEV) or centralised mechanical ventilation with heat recovery (cMVHR), static pressure and total power consumption should be measured. People who install centralised ventilation systems will typically need to purchase new equipment to meet these testing requirements. Using current costs to give an estimate, this would typically be a one-off cost of around £300 for the commissioning engineer to purchase new equipment (around £280 for a single channel differential pressure gauge and £20 for a power meter). There would also be an additional annual cost of around £100 to keep the differential pressure gauge calibrated. However, if the commissioning engineer also conducts air permeability tests, they will already have equipment suitable for conducting pressure testing. We also estimate a small amount of additional time taken to carry out the tests and to record the results.

- When conducting air flow rate testing, cMEV and cMVHR systems should be tested and commissioned using calibrated powered flow hoods instead of rotating vane anemometers with hoods. Using current costs to give an estimate of costs for a commissioning engineer, calibrated powered flow hoods cost around £2800, while rotating vane anemometers with hoods cost around £650: a capital cost uplift for commissioning engineers of around £2150, incurred on average every 10 years but heavily dependent on frequency of use and care taken. The annual calibration cost for calibrated powered flow hoods is also £175 for commissioning engineers, an uplift of £40 compared to the calibration cost for rotating vane anemometers. However, industry is already transitioning towards using powered flow hoods: we estimate that around 25% of commissioning engineers have already upgraded, and that this number would rise through time regardless of this policy.

6.49. We have proposed that rigid or semi-rigid ductwork should be used in dMEV systems or for intermittent extract ventilation fans instead of flexible ducting. We have also proposed for dMEV that duct runs should be kept short (less than 2 metres). Both of these measures are intended to improve system performance. This is expected to be a minimal cost, but we would welcome any views on this.

6.50. All of these changes would apply to mechanical ventilation systems installed in new and existing homes. We also intend to extend Regulation 42 to work in existing dwellings. This means that air flow rate testing would have to be conducted as part of the commissioning process for cMEV and cMVHR systems in existing homes, as well as new homes. It is expected that only a small number of existing homes would have a centralised ventilation system installed, therefore it was deemed disproportionate to analyse.

7. Business impacts

Equivalent Annual Net Direct Cost to Business (EANDCB)

7.1. The changes to the energy efficiency requirements of the Building Regulations for new homes will result in increased costs to business of £218m per year over the 10-year policy period for Option 1, and a cost saving of £13m per year for Option 2. As per the HMG's official impact assessment Calculator, the EANDCB has been calculated in 2019 prices, 2020 PV base year.

7.2. The direct costs determined to be in scope of the EANDCB are transition costs, upfront capital costs, installation costs, some maintenance costs and some replacement costs. Most of these costs are the capital costs incurred by developers. Other costs are borne by Housing Association and Private Rented Sector Landlords.

7.3. The 10-year policy appraisal period was used in line with Green Book Guidance. This captures the majority (over 90%) of costs incurred by business from the regulation uplift, as many of the bigger costs, particularly capital and installation, occur in the first 10 years of the policy. However, this does mean that replacement or maintenance costs incurred in the following 60 years have not been included in the EANDCB calculation.

7.4. The alternative approach would be to include all costs but calculate the EANDCB over 70 years rather than 10. This would bring the EANDCB down substantially as the costs are spread over a much longer time horizon, which could be misleading given that most of the costs happen in the first 10 years of the policy. Furthermore, the only replacement and maintenance costs that would be incurred by business would be for those homes that are either in the Private Rented Sector or owned by Housing Associations (amounting to less than 10% of the overall costs). The remaining costs would fall to the occupiers of the home. Due to this, and to remain consistent with Green Book guidance, it was therefore decided to still appraise the EANDCB over the 10-year policy period.

7.5. There are no direct benefits to business of the new requirements, as the benefits of greater energy savings will be experienced by the occupants, whilst reduced carbon emissions and improved air quality are societal benefits. Option 2 presents cost savings to developers due to decreased installation costs. There may be some benefits for developers if prospective buyers find new, more energy efficient homes more attractive over existing homes (built pre-FHS). This is, however, hard to identify and quantify, therefore no analysis has been taken forward to assess the possible impacts.

7.6. Table 12 shows the equivalent annual net direct cost to business and business net present value associated with both options.

Table 12: Equivalent Annual Net Direct Cost to Business and Business Net Present Cost

	Option 1	Option 2
EANDCB	£218m	-£13m

Business Net Present Cost	£2,570m	-£824m

Capital, Transition and Installation Costs

7.7. For new dwellings the capital, transition and installation costs will be paid by business. This is split between private developers, Private Rented Sector (PRS) landlords and Housing Associations (HAs), with the majority being incurred by private developers. Using English Housing Survey (EHS) data on new build completions by tenure[13], it is estimated that 18% of costs will sit with PRS landlords and 17% will sit with HAs. Private developers over the longer term may pass on costs to owners in the form of higher house prices, at least in areas of high demand. Over the medium-long term, development costs may become factored into the land prices and therefore passed onto landowners, however in the short-term this is unlikely.

7.8. Some or all of the costs incurred by PRS may be passed onto occupiers in the form of higher rent prices. For HAs, it is unlikely businesses will be able to pass on the costs due to social rented sector rent levels being set by HMG. In this case, costs may be passed onto HMG through HAs demanding higher grants to cover additional costs to build social rented sector accommodation.

7.9. All benefits will be experienced by the occupants of the dwellings in the form of lower regulated energy bills and by society through better air quality and reduced carbon emissions.

Maintenance and Replacement Costs

7.10. Whilst most of the costs for any replacements or maintenance will sit with the occupier, some costs will sit with PRS landlords and HAs. For the maintenance costs of a new home, costs occurring in the first 10 years of the policy for PRS and HA have been included. No replacement costs for new homes have been included in this calculation, as none of these costs will occur in the first 10 years (see paragraph 7.3 and 7.4).

7.11. For the PRS it is likely that these costs could be passed on to the occupier in the form of higher rent prices. For HAs, it is unlikely businesses will be able to pass on the costs due to social rented sector rent levels being set by HMG. In this case, costs may be passed onto HMG through HAs demanding higher grants to cover additional costs to build social rented sector accommodation.

7.12. All benefits will be experienced by the occupant of the dwelling in the form of lower regulated energy bills and by society through better air quality and reduced carbon emissions.

13 Department for Levelling Up, Housing and Communities (2023). Table 213 House building: permanent dwelling started and completed, by tenure, England (quarterly). Available at: Department for Levelling Up, Housing and Communities

Small and Micro Business Assessment (SaMBA)

7.13. Small and micro businesses (SMBs) in the housing sector principally comprises of developers/constructors, architects, and other technical specialists. The impacts of a change in building standards are likely to be most significant for developers as any change in costs will affect their cost of business, and for heating engineers, who are moving from gas to low temperature, low carbon heating systems. For other parties, impacts are most likely to comprise of a short term need to understand and revise practices to reflect the new requirements, however this is unlikely to be above the level that would be typically expected as part of ongoing professional development.

7.14. The number of small (10-49 employees) and micro (0-9 employees) businesses in the affected sectors are detailed below. These figures are from the ONS UK Business Counts dataset, broken down by employment band and 5-digit SIC code[14], rounded to the nearest 5. Given data limitations, some of the businesses included below may not be domestic specific – equally there will be other professions that we have been unable to identify that are in the development of new dwellings. Therefore, figures should be treated with caution and should only be used as indicative of the order of magnitude. For builders and developers, 99.6% of the 92,990 enterprises are small or micro businesses. For architectural practices 98.8% of the 13,185 businesses are small or micro businesses.

Table 13: Number of Small and Micro Businesses in scope of the Regulation Changes

Business (5-digit SIC code)	Micro businesses	Small businesses	Total number of businesses	SMBs as % of total
Builders and developers	89,385	3,215	92,990	99.6%
Architects	12,130	895	13,185	98.8%

Mitigating the impact on small and micro businesses

7.15. The industry-led Future Homes Hub is a key tool in supporting SMBs to understand and meet the new regulations. With the support and input of government (DLUHC, DESNZ, Defra and Homes England) the Hub will support industry by coordinating pilot developments and prototypes, identifying technical and operational solutions, carrying out research and analysis into delivery challenges and producing technical guidance. Of particular use to SMBs will be the specialist guidance that the Hub will produce, which will focus on the practical ways in which SMBs can meet the regulations.

7.16. We have committed to publish the full technical specification in 2024 ahead of regulations coming into force in 2025. We expect that this will give sufficient time for SMBs to review and adjust to new regulations.

[14] The consensus at the ONS is that the 3 digit SIC code is the optimum level in terms of sample size and confidence in estimates. However, given this assessment is specifically about the construction of dwellings, this requires a more specific SIC code hence the reason for using SIC 5.

8. Other wider impacts

8.1. The Impact Assessment (IA) has set out the direct costs to businesses and society, such as capital, replacement and maintenance costs, as well as setting out the wider societal benefits, such as lower fuel bills, better air quality and lower emissions. There are, however, several considerations that may be indirectly affected by the uplift in standards, or indeed indirectly affect the potential impacts of the Building Regulations. These are explored below.

Economic and financial impacts

Inflationary pressures and the cost of living

8.2. Since the end of 2021 the UK economy has experienced inflationary pressure, with high wholesale energy prices a key driver. Although this has fallen from its peak of 11.1% in October 2022 to 4.7% (CPIH) in October 2023, inflation still remains high, above the Bank of England's target 2%. This has increased costs of production for businesses, with the OBR estimating that this has led to the largest fall in real living standards for households since records began in the 1950s.[15]

8.3. The Bank of England does expect the level of inflation to continue to fall over 2024, with current estimates that the economy will return to the 2% inflation target by 2025.

8.4. The Future Homes Standard is expected to come into force in 2025. Depending on how the transitional arrangements are accounted for, this means the first impacts of the FHS will be felt in either 2026 or 2027, when the majority of businesses start to build to the new standards. Although developers will see a small increase in capital costs (0.6- 4.3% of total build costs), given the timings of the FHS we do not expect the policy to compound the current pressures experienced by developers. Moreover, the long lead in time between publishing the standard (2024) and the end of the transition period will allow developers to adjust to new standards, limiting the impact from the regulation.

8.5. Similarly for households, given timings we do not expect the FHS to compound cost of living pressures. In the case of Option 1, the FHS could ease future energy price pressures on households, through reducing energy bills for consumers. Moving to electric heating also means that as the grid decarbonises and becomes less reliant on gas for production, households should be better protected against any future volatility in the international wholesale energy market.

[15] Office for Budget Responsibility (2023). OBR Economic and Fiscal Outlook November 2023. Available at: https://obr.uk/docs/dlm_uploads/E03004355_November-Economic-and-Fiscal-Outlook_Web-Accessible.pdf

Competition

8.6. The principal markets affected by the Future Homes Standard are the markets for the development of new dwellings along with the supply chains to produce construction materials used in those developments.

8.7. As a result of higher standards for new dwellings from 2025, building developers would have to comply with the more stringent targets and as a result would see costs rise. The increased costs are expected to affect developers with similar house designs and developments in similar ways. Therefore, any competitive effects in the market for building development are likely to be negligible.

Innovation

8.8. There should be the potential for new firms to enter the market due to the setting of higher standards and the flexibility for developers to choose building technologies to meet these standards. This should encourage innovation among manufacturers.

8.9. The standards will result in an increased use of low/zero carbon heating technologies. There is competition in the supply of such technologies with a mix of large and small suppliers. As the cumulative production of such technologies rises, learning effects coupled with competition should bring down the unit cost. This learning effect has been built into our modelling of costs in the main cost benefit analysis.

International Trade

8.10. The more stringent energy efficiency standards for 2025 are set out in the Approved Guidance standards for a range of products across the new and existing stock, including solar PV, heat pumps and wastewater heat recovery (depending on the option). Performance based standards are set through the notional building specification and approved methodologies, which do not mandate the specific technologies or products to be used.

8.11. However, given that many businesses will decide to follow the Approved guidance, this decision could lead to an increase in costs where the suggested standard is set above the current market level, leading to businesses needing to produce more efficient products. If these firms are unable to absorb the costs and are actively engaged in international trade, then this could lead to exports falling as these goods become less competitive. However, this depends on a wide range of factors, including; whether the market is predominantly domestic or international; if England has a comparative advantage/disadvantage in these goods; what overseas standards there are, and; the price of goods on the international market. HMG also has a suite of polices in place to support businesses and consumers to bring more heat pump manufacturing to the UK[16].

[16] HM Government (2023). Heat Pump Investment Roadmap. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1166439/heat-pumps-investment-roadmap.pdf

8.12. There could also be some indirect economic impacts, particularly by encouraging innovation. If product innovation occurs, particularly in lower carbon forms of heat, this could lead to the development of new products and higher demand in clean growth/ renewable markets. If there is global demand for these goods then businesses will be incentivised to sell their products abroad, thus increasing international trade. This could also lead to benefits for key UK sectors, such as manufacturing, if innovation takes place in a market where the UK holds a comparative advantage.

Housing supply

8.13. For Housing viability impacts, given there are cost increases arising from the policy, it is expected that where developers cannot absorb these costs or pass them onto landowners, there might be some negative viability impact on housing supply.

8.14. Areas in London and the south might be expected to be able to cope better with cost impacts given the larger gap between development cost and sale prices when compared with areas with lower sale prices, for example in the North West of England. Brownfield sites with high land remediation costs are also expected to be a less viable from cost increase arising from the policy.

8.15. In the short-term it is unlikely that house prices will be able to fully absorb the cost increase arising from this policy as broader market drivers are likely to dominate. However, as we move to the long-term, we are likely to see developers passing the costs onto land owners through lower land prices, because the regulation sets a level playing field. They may also be able to offset higher costs through higher sales prices in areas of high demand, where consumers are willing to absorb a higher price for these homes.

Health and well-being impacts

8.16. The Part L uplift in 2021 provided uplifts to fabric efficiency and encouraged the use of solar panels. The fabric uplifts may have led to beneficial improvements in health and quality of life from the effect of increased energy efficiency on thermal comfort, as lower running costs mean households are more able to achieve comfortable indoor temperatures. These comfort taking impacts were taken into account in the Part L 2021 impact assessment. Given there is no improvement in the fabric of the home in the new standard compared to Part L 2021, it is not expected that there would be substantial comfort taking as a result of the FHS 2025 uplift. Therefore, no comfort taking has been applied to new dwellings, which means health and well-being have also not been included in the impact assessment. It is worth noting, however, that if people move from a home built prior to the Part L uplift in 2021 to a home built to the proposed standards, they will experience a considerable improvement in thermal comfort, which may have some positive health and well-being impacts.

Environmental impacts

8.17. The environmental impacts are central to this policy and are therefore covered in the main body of this impact assessment.

Administrative burdens

8.18. Administrative burdens are identified as the costs to businesses of requirements and standards to provide information.

8.19. Administrative burden will be reduced as a result of the proposal to repeal regulations 25A and 25B. Regulation 25A requires people carrying out building work to consider whether it would be feasible to use “high-efficiency alternative systems” during construction. Regulation 25B stipulates that new buildings must be “nearly zero-energy" buildings. We are proposing to repeal these regulations since, in our view, they will become redundant once the Future Homes and Buildings Standards have been introduced.

8.20. The proposals for Material Change of Use includes standards for the developer to provide information to the Building Control Body. The information being provided is a compliance report: The Building Regulations England Part L report (BREL). The compliance report will be produced from HEM software. There may be costs associated with collating, emailing and printing; but these are believed to be minimal, in the order of <£10 per dwelling. The benefits of improved compliance would likely outweigh the costs significantly. We will further analyse any additional familiarisation costs attached to this for the final IA.

9. Equalities assessment

9.1. Under the Equalities Act 2010, all public authorities are required to have due regard to the need to:

a. Eliminate unlawful discrimination, harassment and victimisation and other conduct prohibited by the Act.
b. Advance equality of opportunity between people who share a protected characteristic and those who do not.
c. Foster good relations between people who share a protected characteristic and those who do not.

9.2. This means there is a statutory duty to consider the impacts of the policy changes in this impact assessment on people with the protected characteristics of age, disability, gender reassignment, marriage or civil partnership, pregnancy and maternity, race, religion or belief, sex, and sexual orientation.

9.3. As part of *The Future Homes and Buildings Standards: 2023 consultation on changes to Part 6, Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for dwellings and non-domestic buildings and seeking evidence on previous changes to Part O (overheating),* we are seeking feedback on any potential impacts of the proposals on persons who have a protected characteristic. The responses we receive will be carefully analysed and where appropriate, the final policy will be amended and mitigating measures put in place. In addition to the consultation responses, further sources will also be used during the final policy development process to identify any potential impacts on persons who have a protected characteristic. This includes extensive engagement with a wide range of stakeholders and a review of correspondence that has been received in relation to the proposals.

10. Monitoring and evaluation

10.1. The need for a statutory review clause to monitor and evaluate the impacts of the policy after 5 years will be determined once the final policy has been agreed. Rationale for the decision and full details of the monitoring and evaluation strategy will be set out in the final impact assessment. It is likely that engagement with industry through forums such as the Future Homes Hub will form a key part of the strategy.

Appendix A – Net Completions Projection

Table A1 below sets out an estimate for the number of new domestic dwelling completions in England between 2026-2035. This estimate is used in cost benefit modelling to assess the impact of changes to the energy efficiency requirements of the Building Regulations.

These estimates are indicative, should be used for appraisal purposes only and do not represent an official forecast of changes in housing supply.

Please note, these projections are not an estimate of 'net additions', which is the figure usually used to calculate changes in housing supply. They do not account for change of use or conversions, which are a significant element of net additions but are outside the remit of this impact assessment; nor does it capture the impact of policy interventions that could changes industry's capacity to build new houses. Although the range of available data sources provide a reasonable basis to estimate future trends, there inevitably are uncertainties and hence the projections should be treated with caution.

Table A1: New domestic dwelling completions used in cost benefit analysis

Net Completions	Total
2026	176,400
2027	182,800
2028	197,100
2029	200,200
2030	203,200
2031	206,300
2032	209,400
2033	212,500
2034	215,600
2035	218,700

Appendix B – Sensitivity Analysis

Sensitivity Analysis 1: Carbon Values Sensitivity Analysis

Sensitivity analysis was taken forward using the higher and lower estimates of carbon values, using Table 3 in the April 2023 Green Book Supplementary Guidance[17] (see below):

Table B1: Green Book Carbon Values (£/tCO2e)

Year	Low	Central	High
2026	132	264	396
2027	134	268	402
2028	136	272	408
2029	138	276	414
2030	140	280	420
2031	142	285	427
2032	144	289	433
2033	147	293	440
2034	149	298	447
2035	151	302	453

The range of values are used to portray potential changes in the valuation of carbon used in appraisal. Lower carbon values result in lower monetary benefits associated with the carbon saved, and so may reduce the net benefits of the policy options. Higher carbon values increase the value of carbon saved in the policy options, and so may appear as a larger net benefit. The results for new dwellings are as follows:

Table B2: Carbon Value sensitivity analysis, estimates for New Dwellings

New Dwellings	Low		Central		High	
	Option 1	Option 2	Option 1	Option 2	Option 1	Option 2
Transition costs (£m)	(19.1)	(14.3)	(19.1)	(14.3)	(19.1)	(14.3)
Energy savings (£m)	3,716	(1,395)	3,716	(1,395)	3,716	(1,395)
Capital, Maintenance and Replacement Costs (£m)	(3,039)	833	(3,039)	833	(3,039)	833
Total financial benefit/(cost) (£m)	658	(576)	658	(576)	658	(576)
Carbon savings - non-traded (£m)	3,170	3,170	6,340	6,340	9,511	9,511
Carbon savings - traded (£m)	41	(140)	82	(281)	123	(421)
Total carbon savings (£m)	3,211	3,030	6,422	6,060	9,634	9,089

[17] Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy (2023). Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal. Available at: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

Air quality savings (£m)	136	128	136	128	136	128
Comfort Taking	0	0	0	0	0	0
Total carbon and air quality savings	3,348	3,158	6,559	6,187	9,770	9,217
Net benefit/(cost) (£m)	**4,006**	**2,581**	**7,217**	**5,611**	**10,428**	**8,641**
Amount of gas saved (GWh)	234,223	234,223	234,223	234,223	234,223	234,223
Amount of electricity saved (GWh)	44,167	(132,648)	44,167	(132,648)	44,167	(132,648)
Amount of CO_2 saved - non-traded ($MtCO_2e$)	43	43	43	43	43	43
Amount of CO_2 saved - traded ($MtCO_2e$)	0.4	(1.3)	0.4	(1.3)	0.4	(1.3)

Sensitivity Analysis 2: Replacement of Gas Boilers to ASHP Counterfactual

Sensitivity analysis 2 considered the scenario where homes originally built with a gas boiler in the counterfactual had this heating system replaced with an ASHP at the replacement cycle (after 15 years). From this point the home would continue to rely on heat pumps for heating and hot water supply. As well as changing the energy consumption by fuel type, this scenario also accounted for the higher costs of switching from a gas boiler to an ASHP in comparison to a like for like replacement. This broadly results in the costs of both options falling, and the carbon and energy savings also falling, relative to the counterfactual. The results are shown in Table B3.

Table B3: Replacement of Gas Boiler to ASHP within the counterfactual

	Central Scenario (for reference)		**Replacement of Gas Boiler to ASHP within the counterfactual**	
	Option 1	Option 2	Option 1	Option 2
Transition costs (£m)	(19.1)	(14.3)	(19.1)	(14.3)
Energy savings (£m)	3,716	(1,395)	2,716	(1,820)
Capital, Maintenance and Replacement Costs (£m)	(3,039)	833	(2,354)	1,643
Total financial benefit/(cost) (£m)	**658**	**(576)**	**343**	**(191)**
Carbon savings - non-traded (£m)	6,340	6,340	2,559	2,599
Carbon savings - traded (£m)	82	(281)	98	(238)
Total carbon savings (£m)	**6,422**	**6,060**	**2,657**	**2,321**
Air quality savings (£m)	136	128	69	61

Comfort Taking	0	0	0	0
Total carbon and air quality savings	6,559	6,187	2,726	2,382
Net benefit/(cost) (£m)	**7,217**	**5,611**	**3,069**	**2,191**
Amount of gas saved (GWh)	234,223	234,223	71,873	71,873
Amount of electricity saved (GWh)	44,167	(132,648)	88,040	(77,221)
Amount of CO_2 saved - non-traded ($MtCO_2e$)	43	43	13	13
Amount of CO_2 saved - traded ($MtCO_2e$)	0.4	(1.3)	0.5	(1.1)

Sensitivity Analysis 3: Counterfactual Routes to Compliance Sensitivity Analysis

As described in chapter 4, the 2021 energy efficiency requirements are performance-based standards requiring significantly less emissions than 2013 levels, aggregated across the build-mix, based on performance-based targets for primary energy, CO_2 emissions and fabric energy efficiency. Consequently, there are several ways in which a housebuilder can comply with the regulations. The most likely means of compliance is the specification which has a high level of energy efficiency, a gas boiler, solar panels and wastewater heat recovery. The main alternative means of compliance for housebuilders is with a heat pump.

Given the uncertainty over what proportion of housebuilders will choose which route to compliance under the 2021 regulations, sensitivity analysis has been taken forward to test this. In addition to the central scenario that has been modelled for the main cost benefit analysis, two illustrative sensitivity scenarios have been used to show the possible range in costs and benefits. A comparison of the costs and benefits of the overall policy changes are based on a low, central and high heat pump take up scenario. The central scenario can be seen in the *Counterfactual: Routes to Compliance* section (Paragraph 5.23-5.25), with the low and high scenarios shown in the table below.

Table B4: Routes to Compliance, sensitivity analysis scenarios

	Route to Compliance	**2022**	**2023**	**2024**	**2025 onwards**
Scenario 1: Low ASHP Estimate	BR2021 Gas boiler and solar panels	90%	85%	80%	75%
	BR2021 ASHP	10%	15%	20%	25%
Scenario 2: High ASHP Estimate	BR2021 Gas boiler and solar panels	90%	70%	50%	30%
	BR2021 ASHP	10%	30%	50%	70%

SOURCE: DLUHC and AECOM

In the low heat pump take-up scenario, both the costs and benefits of the policy options increase, resulting in higher net benefits to society. Costs are £3,245m (£3,039m in central) and net Benefits are £8,919m (£7,217m in central), with 61 MtCO2e (43 MtCO2e in central) saved under Option 1. For Option 2, there are cost savings of £631m (£833m in central) to society, and net benefits of £7,329m (£5,611m in central). In the high heat pump take-up scenario, both the costs and

benefits of the options fall, still resulting in a multi-billion-pound net benefit to society. Costs are £2,874m (£3,039m in central) and net benefits are £5,855m (£7,217m in central) with 29 MtCO2e (43 MtCO2e in central) saved under Option 1. For Option 2, there are cost savings of £992m (£833m in central) and net benefits of £4,284m (£5,611m in central). The lower carbon savings in the high option is because more heat pumps are used in the counterfactual, which means gas consumption/non-traded emission savings are considerably lower. In either case, this still leads to a multi-billion-pound benefit to society. Both tables B5 and B6 below show the difference in the costs, benefits and savings of both the Low and High ASHP take-up scenarios, with the Central heat pump take-up scenario in the neighbouring columns in each table to allow for comparison.

Table B5: Routes to compliance, Low ASHP uptake compared to Central Scenario

	Option 1 **Central estimate**	Option 2 **Central estimate**	Option 1 **Low estimate**	Option 2 **Low estimate**
Transition costs (£m)	(19.1)	(14.3)	(19.1)	(14.3)
Energy savings (£m)	3,716	(1,395)	3,025	(2,074)
Capital, Maintenance and Replacement (£m)	(3,039)	833	(3,245)	631
Total financial benefit/(cost) (£m)	658	(576)	(238)	(1,458)
Carbon savings - non-traded (£m)	6,340	6,340	9,017	9,017
Carbon savings - traded (£m)	82	(281)	(50)	(412)
Total carbon savings (£m)	6,422	6,060	8,967	8,605
Air quality savings (£m)	136	128	190	181
Total carbon and air quality savings	6,559	6,187	9,157	8,787
Net benefit/(cost) (£m)	**7,217**	**5,611**	**8,919**	**7,329**
Amount of gas saved (GWh)	234,223	234,223	333,105	333,105
Amount of electricity saved (GWh)	44,167	(132,648)	(18,451)	(195,015)
Amount of CO_2 saved - non-traded ($MtCO_2e$)	43	43	61	61
Amount of CO_2 saved - traded ($MtCO_2e$)	0.4	(1.3)	(0.2)	(0.2)

Table B6: Routes to compliance, High ASHP uptake compared to Central Scenario

	Option 1 **Central estimate**	Option 2 **Central estimate**	Option 1 **High estimate**	Option 2 **High estimate**
Transition costs (£m)	(19.1)	(14.3)	(19.1)	(14.3)
Energy savings (£m)	3,716	(1,395)	4,268	(894)
Capital, Maintenance and Replacement (£m)	(3,039)	833	(2,874)	992
Total financial benefit/(cost) (£m)	658	(576)	1,375	83

Carbon savings - non-traded (£m)	6,340	6,340	4,199	4,300
Carbon savings - traded (£m)	82	(281)	188	(185)
Total carbon savings (£m)	6,422	6,060	4,387	4,115
Air quality savings (£m)	136	128	93	87
Total carbon and air quality savings	6,559	6,187	4,480	4,201
Net benefit/(cost) (£m)	**7,217**	**5,611**	**5,855**	**4,284**
Amount of gas saved (GWh)	234,223	234,223	155,118	158,653
Amount of electricity saved (GWh)	44,167	(132,648)	94,261	(84,792)
Amount of CO_2 saved - non-traded ($MtCO_2e$)	43	43	29	29
Amount of CO_2 saved - traded ($MtCO_2e$)	0.4	(1.3)	0.9	(0.9)

Appendix C – Cost Breakdown

The developed costs are based on the expert view of Currie & Brown's cost specialists, drawing on evidence from their internal cost datasets, recent published cost data and information provided by suppliers.

The cost analysis is intended to reflect typical national costs from Q3 2023[18] that might be incurred by a housebuilder completing more than 1,000 homes per year using traditional (i.e., masonry) construction methods. The analysis assumes reasonably efficient supply chain, design development and construction processes but recognises that delivery of technologies such as heat pumps are still to be fully developed due to relatively low historic deployment levels. Costs incurred by individual organisations will vary according to their procurement strategies, the location of their activity (e.g., costs will be higher in London and the South East of England) and the detail of their housing product. These variations in design, location and delivery method could result in a cost range of +/- c.30% or more. Notwithstanding these variations, the proportional uplifts associated with moving from one specification to another are likely to be similar across different market segments [19].

To provide context to the cost variations assessed in the study an indicative overall build cost (£ per m^2) for each building archetype was estimated using Currie & Brown internal data. This figure is indicative of the level of cost that might be expected for a home built in accordance with the requirements of the FHS 2025. The build cost should be taken as indicative only as it is sensitive to a wide range of design and specification variables in addition to the economies of scale and regional variations discussed previously.

Base costs for future years are those for the 2022 price year, and subject to adjustments for learning for technologies that have not yet reached a mature market position. It should be noted that construction costs can vary considerably and rapidly with market conditions, particularly where activity levels result in a change in the availability of skills and materials. In these situations, it is not unusual to see quite large (several percentage points) change in overall costs over a period of months.

Table C1 and C2 includes details of the cost information used for each specification option. Table C1 shows costs that are consistent across the counterfactual and policy options. Table C2 includes any variations between the counterfactual and Option 1/Option 2 notional building specifications. These do not include expected learning rates.

18 Cost analysis was reviewed in Summer 2023 and some elements updated to reflect changes in market rates and new information. Changes principally affected the variable costs of photovoltaic panels and heat pumps.

19 Costs increases may be outside the described range for highly bespoke designs; however, these homes are typically more expensive to build and so the relative impact on build costs may be similar or potentially smaller than for more typical homes built in higher volumes.

Table C1: Cost data for fabric elements that are consistent across the selected specifications for new dwellings and the counterfactual 2021 specification

Element	Specification	Unit	New cost (£ per unit)
External Wall – plasterboard, blockwork, mineral wool brick, lintels, ties and cavity trays/closers	0.18 W/m².K	m²	£250
Ground / Exposed Floor	0.13 W/m².K	m²	£179
Roof – mineral wool insulation at joist level			
	0.11 W/m².K	m²	£207
Windows uPVC			
	1.2 W/m².K	m² glazed area	£370

Table C2: Cost data for fabric elements that vary between the selected specifications for new dwellings and the counterfactual 2021 specification

Wastewater Heat Recovery	Vertical pipe system (houses and upper floor flats)	Nr	£443
	Tray system (ground floor flats)	Nr	£1330
Roof mounted - photovoltaic panels	Fixed costs for systems <4kWp	Per installation	£1,219
	Variable costs for systems <4kWp	Per kWp installed	£665
	Variable costs for systems >4kWp	Per kWp installed	£665
Heating plant	Gas boiler system and hot water cylinder (detached home)	Nr	£2,615
	Gas boiler combi (other house types)	Nr	£1,450
	Air Source Heat Pump (5-8kW) including hot water cylinder	Nr	£5,460-£6,353
	Hybrid communal heating system combining ASHP (1kW per home) and gas (2 kW per home) with associated distribution and heat interface units	Nr	£4,780
	Communal heating system using ASHP (2kW per ohme) with associated distribution and heat interface units	Nr	£5,019
Gas connection	10 or more homes	Nr	£1,095[20]
Enhanced power supply	Additional 1.5 kVa capacity to support use of heat pump	Nr	£94
Enhanced airtightness	Airtightness of 4m3m2hr when tested at 50Pa.	m2	£5-11 depending on house type.

20 The cost of a gas connection is included within the overall societal cost benefit analysis but is excluded from cost to business calculations (see para 7.47 onwards)