SUSTAINABLE ENERGY ASSOCIATION

Proposal For a New Energy Efficiency Incentive

2025

Contents

Executive Summary

The Sustainable Energy Association (SEA) has developed a new proposal for a policy which can unlock greater investment in energy efficiency. This policy aims to incentivise energy bill savings by **rewarding in-use performance of energy efficiency measures**, in place of the current approach of up-front payment that features in the Warm Homes Social Housing Fund, the Warm Homes Local Grant, the Energy Company Obligation, and the Great British Insulation Scheme (GBIS).

The proposed **Energy Efficiency Incentive** will develop a predictable revenue stream for potential investors, as seen in other successful policies such as Contracts for Difference or Feed in Tariffs. The Incentive will also develop an offering for underserved market segments, particularly the able-to-pay and private-rented sectors, alongside tackling fuel poverty. The revenue-based nature of the incentive also lends itself better to those consumers who may not qualify under current scheme eligibility criteria, but who are nevertheless unlikely to be able to afford the up-front cost of many fabric energy efficiency measures.

This proposal presents a long-term policy providing security for the industry and consumers. It looks to serve all markets, whilst supporting ambitions to reduce fuel poverty. The policy presents a revenue-based reward, or subsidy mechanism, which incentivises the outcome of energy efficiency measures by measuring in-use performance through technologies such as Smart Meter Enabled Thermal Efficiency Ratings (SMETERs). In effect, it switches the incentive from being an up-front grant (or in the case of ECO / GBIS, a de-facto grant) to being a reward for delivered performance over several years. In turn, this is likely to drive up the quality of measures as the financiers of the measures will have a strong financial interest in ensuring diligence in ensuring quality of product and installation.

Evidence from research into the relative success of revenue-based incentive schemes suggests that this approach lowers the cost of capital for the industry delivering such schemes, and that this feeds directly through to lower delivery costs.

THE KEY FINDINGS OF OUR MODELLING ARE:

- The intervention of the Energy Efficiency (EE) Incentive subsidies represents a low cost and low regret option for government to bridge the narrow value gap and tip the incentive balance in favour of the rapid adoption target set up by the Climate Change Committee.

- A 7-year subsidy framework will be required for fast-yielding technologies such as cavity and loft insulation, and double glazing. A 25-year subsidy framework will be required for slow-yielding technologies such as solid wall insultation.

- The proposed EE performance-based incentives scheme is estimated to cost the Government £2.22 billion in net present value to fund over the 25 years period it is set to cover. The peak government spending is £285.94M around 2032, which is the half point between the start of the proposed incentive scheme (2028) and the 2034 target for the rollout of fast-yielding measures.

- It is estimated that a significant share of 26.2%, or around £445M, of the total spending will be directly funding households who are currently at risk of being fuel poor, supporting the overarching motivation behind the proposed incentive scheme to address fuel poverty in the UK.

- Around £1.37bn, or 62.9%, of the total budget of the incentive scheme's budget will go to the owner-occupied sector with the private rented sector following closely (26.3%).

- A performance-based EE incentive scheme automatically aligns the interests of installers/ investors for fabric measures with the objective of improving performance, thus reducing the risk of moral hazard associated with the quality of installation.

- The social value created by all four fabric measures that are installed through the incentive scheme is estimated to be at least 70-fold of the Government spending required (at net present value).

- Wider social benefits that are not covered in this report could be estimated by future studies, including job-creation, facilitation of technological progression and re-vitalisation of local economies via the injection of government spending.

Policy Background

The decarbonisation of the UK's building stock is not merely about meeting legislated targets to achieve net zero. It is fundamentally about creating warm, healthy, and low-carbon homes that are future-proofed. With 80% of the UK's existing buildings expected to still be in use by 2050[1] (the oldest building stock in Europe and some of the draughtiest properties too), there is a significant challenge to scale up both the demand for and delivery of high-quality retrofitting to ensure UK properties are fit for the future. If the UK is to meet its net zero objectives and become resilient to a changing climate, the Climate Change Committee estimates that the UK's 29 million existing homes will need to be retrofitted by 2050[2]. However, the challenge extends beyond achieving carbon targets; it also involves addressing fuel poverty.

Fuel poverty has been exacerbated by the UK's ongoing energy crisis, with the average fuel poverty gap increasing by 66% in real terms between 2020 and 2023[3]. National Energy Action (NEA) estimates that 6.5 million households were in fuel poverty during the winter of 2024[4], while the Institute of Health and Equity estimates that 9.6 million households—or 34% of all households—are at risk of living in a cold home, on a low income, and unable to afford insulation improvements[5]. Importantly, the implications of fuel poverty go beyond concerns about comfort; they also raise critical issues related to health and well-being. The spillover effects of poor health caused by fuel poverty are estimated to cost the NHS over £1.4 billion annually[6].

While the UK Government continues to play a role in mitigating these issues through various retrofit schemes, such as the Warm Homes: Local Grant and Social Housing Fund and the Energy Company Obligation (ECO), the rising fuel poverty statistics underscore the urgent need for more action to support those in need.

Ultimately, the delivery of high-quality fabric efficiency measures is key to addressing these concerns. Such measures will reduce exposure to cold, reduce energy demand, lower bills, and cut carbon emissions in the process. However, the challenge for the UK at present is that there is insufficient demand for energy efficiency measures to drive this transformation. So, what exactly is the current policy outlook for insulating the UK's building stock?

Policy Issues

THE LIMITED TIME HORIZON OF CURRENT ENERGY EFFICIENCY POLICY

With the Labour Government's election manifesto pledge of £13.2 billion over the next 5 years as part of its manifesto commitments under the 'Warm Homes Plan', the target of upgrading 300,000 homes in the 2025–26 fiscal year—and up to 5 million over the parliamentary term[7]—is a welcome first step. However, the challenge for both industry and consumers lies in ensuring that investments, whether into a company or a home, are the right decisions and yield a tangible return over a much longer timeframe. At the time of publication, we await the detailed announcement of the 2025 Warm Homes Plan and the Spring Spending Review. The current approach to policy remains fundamentally short-term in nature. This means the investment horizon is only ever secure for a single Spending Review period, which typically is a little shorter than the General Election cycle. This creates uncertainty for investors, who need confidence that their investments—which may take time to scale and deliver returns—will not be undermined by sudden policy changes in the near future.

As recently highlighted by the Climate Change Committee in it's Seventh Carbon Budget, clear and consistent long-term policy is essential to support market development and scaling[8]. Such policies provide businesses with the confidence to invest in the right solutions.

FUNDING STRUCTURE

A further issue lies in how existing schemes are funded. At present, demand is driven by upfront capital grant schemes, such as the Warm Homes: Local Grant for energy efficiency and the Boiler Upgrade Scheme for the installation of a select few low-carbon heating systems. Even initiatives like the ECO, while not explicitly structured as upfront capital grants, operate in a similar manner. Although these schemes have achieved relative success within their respective remits, the scale of the retrofit challenge ahead raises serious doubts about their collective ability to drive the nationwide market transformation required.

A recent example of this challenge can be seen in the low-carbon heating sector. In Europe, heat pump sales fell by 23% in 2024, partly due to a rollback in funding[9]. As a result, the sector is cutting jobs and reducing production—precisely when mass adoption is crucial to achieving net-zero goals.

A fundamental issue is the absence of a clear and consistent strategy for both industry and consumers. Rather than relying on short-term grant schemes that create vulnerability to 'boom and bust' cycles, a stable, long-term policy framework with consistent funding can drive sustained growth and widespread adoption of energy efficiency measures.

This challenge is further compounded by the funding structure of these schemes. Capital grants are subject to the Treasury's five-year spending reviews and short-term political intervention, creating instability that undermines confidence among both investors and consumers. As highlighted in the Climate Change Committee's Seventh Carbon Budget, the Government should act as a facilitator - creating the conditions for the private sector to serve as the primary capital allocator, directing investment towards the right solutions[10]. However, the current funding structure, with its exposure to short-term changes, makes achieving market-wide transformation and fostering a stable investment environment extremely difficult.

ACCOUNTING FOR THE PAST

Policy-supported demand for energy efficiency measures is not a new phenomenon in the UK. Historically, the insulation industry thrived under effective government policymaking, which provided the necessary consumer guidance and industry support to drive the widespread adoption of energy efficiency measures. As a result, installation rates remained consistently high, with government initiatives enabling an estimated 1.7 million loft, cavity wall, and solid wall insulation measures to be installed annually before the introduction of the Green Deal and ECO in 2013[11].

However, the policy changes introduced in 2013—despite serious concerns raised by industry stakeholders in the years leading up to their implementation—coincided with a sharp decline in the installation of loft and cavity wall insulation. This downturn led to the collapse of industry installation rates, including some of its largest companies, and caused supply chains to contract. The level of activity in the insulation and energy efficiency sector has never fully recovered, as evidenced in Figure 1 below.

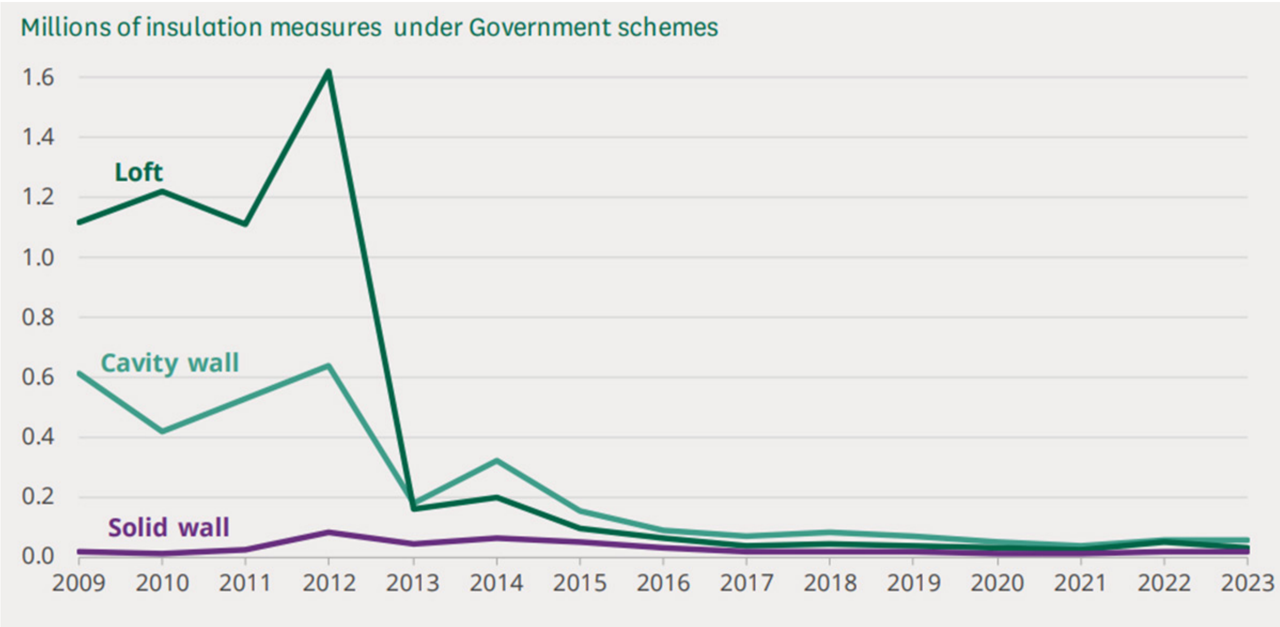


Figure 1: Household Energy Efficiency Statistics under Government schemes[12].

Even ECO, the Government's flagship energy efficiency scheme aimed at tackling fuel poverty and supporting decarbonisation, has faced persistent challenges. In every instance, the scheme has been implemented late and subject to delays. At its peak in 2014, ECO supported the installation of 0.75 million measures annually, yet by 2023, this figure had fallen to just 0.23 million[13].

Past Success of the UK's Renewable Energy Sector

While there are valuable lessons to take forward from the success of the energy efficiency industry and government support during its 'first wave' —prior to the collapse in 2013—there are also important insights to be gained from other areas of the UK's low-carbon sectors. Specifically, the success of the UK's offshore wind industry and the rapid scaling up of solar power deployment offer two notable examples from which lessons can be drawn.

THE UK'S SUCCESS IN OFFSHORE WIND

What began in 2000 as a nascent, high-risk, and expensive technology has evolved into a global success story. The UK has expanded its offshore wind electricity generation capacity from 0 TWh in 2000 to 50 TWh in 2023, making it the world's second-largest offshore wind energy producer, behind China. This remarkable growth is largely attributable to effective government policy support. Central to this success was the introduction of the Renewables Obligation, followed by the implementation of the Contracts for Difference (CfD) mechanism, which enabled the UK to scale its offshore wind industry efficiently.

WHAT WAS THE RENEWABLES OBLIGATION?

The Renewables Obligation was a government-mandated scheme that required electricity suppliers in the UK to source a specific and increasing percentage of their electricity from renewable sources. The obligation was set as a percentage of total electricity supplied, and this target increased annually. It was first implemented in 2002, before closing to all new generating capacity in 2017[14].

WHAT ARE CONTRACTS FOR DIFFERENCE?

CfD's were first introduced in 2014 to replace the Renewables Obligation. In aim of supporting deployment of large-scale renewable projects whilst reducing financial risks, CfD's are government-backed contracts with a guaranteed strike price. This strike price is allocated through a competitive auction, where developers bid for contracts. The competitive process is designed to help drive down costs over time.

LESSONS FOR GOVERNMENT FROM THE TONY BLAIR INSTITUTE

The Tony Blair Institute has reviewed the rollout of offshore wind in the UK and examined how the lessons learned could be applied to the development of other low-carbon industries[15]. A non-exhaustive list of key takeaways includes:

1. **Long-Term Political Commitment**
   The offshore wind sector benefited from sustained political commitment, which enabled the necessary investment in research and development, supply chains, and skills. This long-term certainty remains a critical requirement for investors today.

2. **Designing Markets Around Long-Term outcomes**
   As governments take on increasingly complex roles in market intervention to drive decarbonisation, comprehensive market reforms are vital. Effective incentives can ensure that future developments contribute to a flexible, cost-effective, and net-zero energy system.

3. **Tackling the Cost of Capital as a Central Policy Objective**
   While economic conditions and risk influence the cost of capital, well-designed policies can significantly reduce it. For example, the introduction of CfD's over the Renewables Obligation lowered investment risk for project developers, subsequently reducing the weighted average cost of capital. According to Arup, this reduction led to total project cost savings of between 10% and 21%.

4. **A healthy pipeline is key for competition and the supply chain**
   A robust project pipeline is essential for the stable rollout of key net-zero technologies. It fosters competition among developers—a key driver of price discovery—and provides forward certainty for supply chains, unlocking investment in manufacturing facilities and skills development.

   For other technologies, the absence of clear project pipelines is hindering investment in supply chains and skills. To address this, the government must create a coherent investment proposition through consistent messaging, policy implementation, and funding. This approach will minimise costs, maximise domestic benefits, and ensure the successful scaling of net-zero technologies.

UK SUCCESS IN THE MASS DEPLOYMENT OF SOLAR PV

The UK's solar PV industry has also experienced rapid and significant growth, initially driven by government incentives that encouraged consumers to adopt low-carbon technologies. Before 2009, the UK's solar PV capacity was estimated at around 14.6 MW, increasing to 30.3 MW by January 2010. By January 2025, total UK solar PV capacity had risen to 17.82 GW[16].

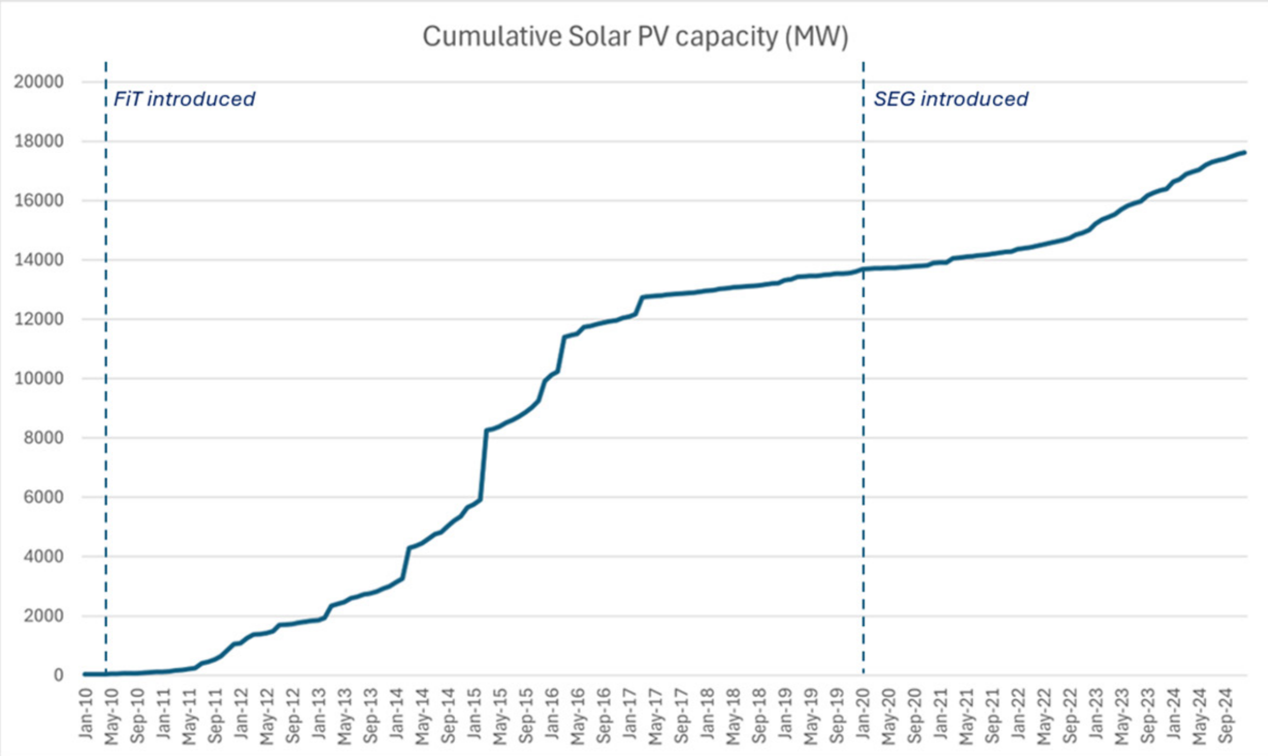


Figure 2: Cumulative Solar PV capacity[17].

Introduced in April 2010, the Feed-in Tariff (FiT) was a government policy designed to empower households, businesses, and communities to participate in the UK's transition to a low-carbon economy[18]. By offering financial incentives for generating renewable electricity, the FiT supported a range of technologies, including solar PV, onshore wind, hydropower, anaerobic digestion, and micro combined heat and power. Solar PV quickly became the most popular choice.

Before the introduction of the FiT, solar PV was considered prohibitively expensive, with high upfront costs and limited demand. However, the scheme transformed the market. The surge in demand it generated accelerated technological advancements, fostered a competitive installer market, strengthened the supply chain, and helped develop a more skilled workforce. These changes made solar PV more accessible, demonstrating how targeted policy can drive rapid growth in emerging or stagnant sectors.

The FiT not only reduced costs for consumers but also strengthened grid capacity, improved energy system flexibility, and increased public awareness of renewable energy. Its successor, the Smart Export Guarantee (SEG), continued the FiT's legacy, albeit in a slightly different way, by compensating households for electricity exported to the National Grid with no payment for electricity generated and used on-site.

With the SEG tariff still in place today, solar PV remains the most popular choice for consumers looking to benefit from energy exports. In its fourth year, solar PV accounts for 99.98% of registered installations and 99.93% of installed capacity under the SEG[19]. It can arguably be concluded that the Feed-in-Tariff therefore proved to be a transformative policy, given the permanent and regular demand that exists today, long after the policy ended.

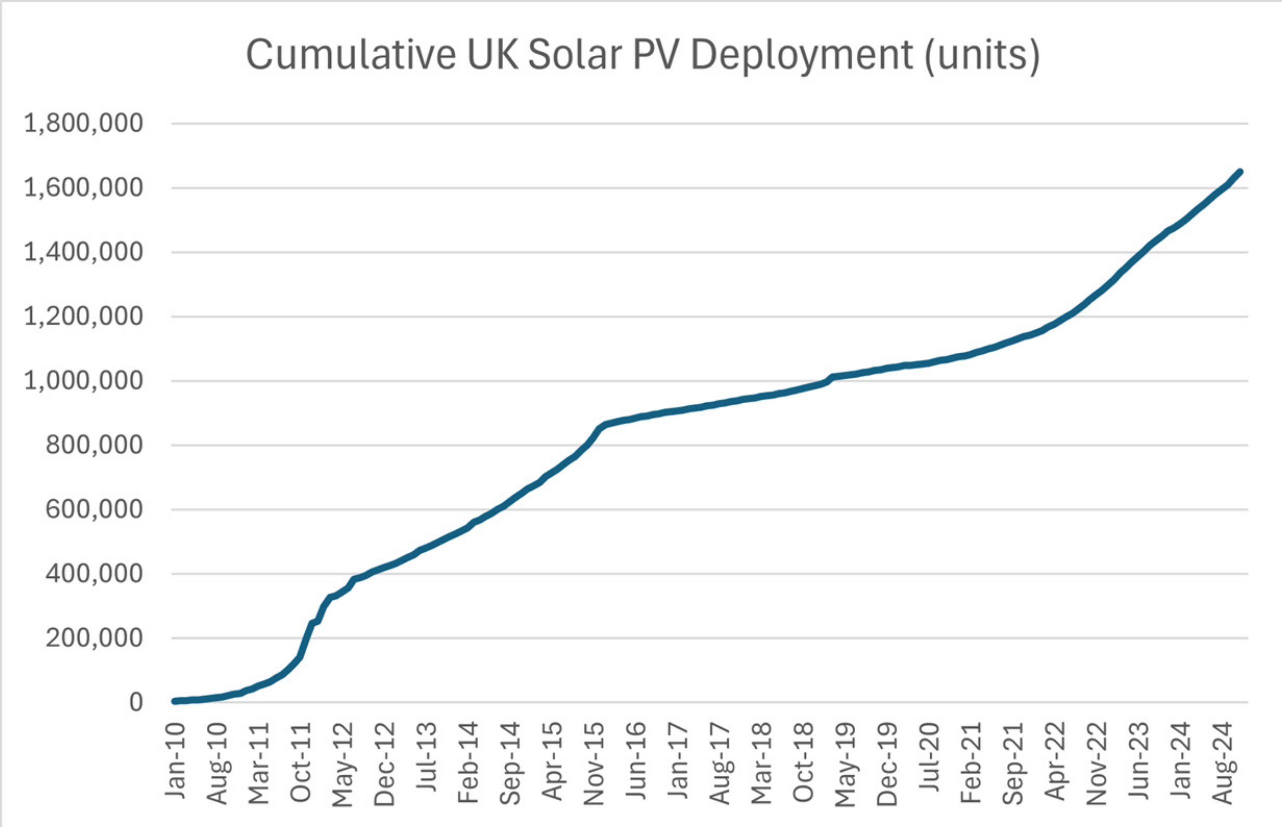


Figure 3: Cumulative solar PV deployment (2010 to 2024)[20].

WHAT IS THEREFORE NEEDED FOR THE ENERGY EFFICIENCY INDUSTRY?

Addressing the challenges in the energy efficiency sector requires recognising the scale of the task ahead.

The issue extends beyond tackling fuel poverty through fabric upgrades; it also includes the lack of sufficient demand for energy efficiency improvements across both the private rented sector and the able-to-pay market. As previously highlighted, the CCC suggests that 29 million properties need to be retrofitted by 2050. However, in its latest report, the Seventh Carbon Budget, projected installations across various measures highlight the critically low demand for fabric upgrades over the coming decades, based on current uptake[21].

Simultaneously, investor confidence has been repeatedly undermined by inconsistent government policies and scheme shortfalls. To revitalise the industry, the UK must learn from the successful deployment of offshore wind and solar PV. These sectors have demonstrated that long-term policy stability fosters investment, particularly when combined with incentives that appeal to both consumers and investors.

At the current pace of fabric upgrades, the UK risks falling short in tackling fuel poverty, reducing energy demand, ensuring warm and healthy homes, and meeting legally binding climate targets. A coherent, long-term strategy is urgently needed to drive meaningful progress.

An Overview of the Energy Efficiency Incentive

OBJECTIVE

The Sustainable Energy Association has developed a policy proposal to address long-standing challenges in the energy efficiency industry. This proposal builds on past successes, drawing lessons from the offshore wind and solar PV sectors, while harnessing recent technological advancements to ensure high delivery standards.

In line with the Climate Change Committee's position, government policy plays a crucial role in shaping markets—including the energy efficiency sector. By establishing a strong foundation, it can help tackle fuel poverty, achieve legally binding targets, regenerate the UK's housing stock, and drive nationwide growth and investment.

KEY MOTIVATIONS

While fabric improvements can reduce energy bills, retrofitting remains a complex and costly challenge. Despite the benefits of high-quality fabric upgrades, long payback periods often deter consumers from making the investment.

As a result, fabric upgrades through government-supported schemes progress slowly, while those in the 'able-to-pay' and private rented sectors struggle to justify the upfront costs, given the delayed financial returns.

With the urgency of insulating the UK's housing stock, the current slow progress and insufficient demand hinder supply chain growth and cost reductions. To break this cycle, the Government must adopt an alternative model—without which, fabric measure installation in the UK is unlikely to improve.

PROPOSED SOLUTION

The SEA proposes a long-term policy to drive demand for energy efficiency measures by rewarding in-use performance. This approach moves away from traditional grant-based schemes—such as ECO—towards a revenue-based model, where payments are tied to measurable outcomes, ensuring that high-quality installations are properly rewarded. The better the installation's improved performance, thy greater the tariff and bill reduction too.

By incentivising performance-based outcomes, homeowners with the means to invest upfront would be encouraged to retrofit their properties, benefiting from both a warmer home and a tariff linked to building improvements over a set payback period.

However, many households fall outside this category, including those in fuel poverty or lacking sufficient capital. A key aspect of this long-term policy is its potential to attract private investment. The Climate Change Committee highlights the private sector's critical role in this transition, with much of the necessary funding expected to come from private sources[17].

By providing long-term policy certainty, a tariff-based model would offer investors a secure return, while property occupants benefit from warmer homes and lower energy bills. This creates an opportunity for private finance to contribute to the regeneration of the UK's housing stock, ensuring a stable financial return.

From an investor's perspective, not only would they ensure that installations are delivered to the highest standards—as seen in the solar sector with stringent contracts—but they would also be incentivised to target the worst-performing homes to maximise their returns.

The following chapter explores how this policy initiative can be effectively delivered. It is important to note that this is not an exhaustive list of implementation routes, but rather an opportunity to provoke thought about how we can best ensure the effective delivery of this proposed policy.

Implementation

RESTRUCTURING GOVERNMENT'S APPROACH TO POLICY FINANCING

As it stands, the Labour Government's Warm Homes Plan is set to provide funding for Years 1, 2, and 3, while funding for Years 4 and 5 is to be announced at a later stage.

With Years 4 and 5 still open to the introduction of a new policy design, and potentially within Years 1-3, there is an opportunity to incorporate a pay-for-performance metric, which incentivises investment through a tariff-like return based on improved performance, as we propose.

While the analysis below explores government-committed funding in greater detail, in short, the introduction of a reward-based tariff paid over time—which would restructure the Government's approach to policy financing—would reduce its exposure to high upfront spending. Instead, it would involve smaller, more manageable payments distributed over a longer period.

MEASURING IN-USE PERFORMANCE

A key advantage of this approach is its alignment with the increasing emphasis on measured performance within both GBIS and ECO[22]. With ongoing discussions about the development of schemes that validate in-use performance, infrastructure is expected to be in later years. This would provide the foundation for a nationwide rollout of an energy efficiency incentive introduced by the Government.

For the Government to reward improved performance, it must be able to measure it accurately. As noted above, the emphasis on pay-for-performance within ECO and GBIS is a welcome first step, made possible by technological advancements such as SMETERs and other associated innovations currently available on the market. These technologies enable the true performance of a property to be measured with a high degree of certainty over the duration of the proposed payback periods and beyond.

There are multiple ways in which this proposed policy could be measured and implemented. This chapter does not provide an exhaustive list or a fixed framework for policy implementation and measurement but instead outlines potential approaches.

Two options the Government could explore for measuring performance are:

1. **Avoided Energy Use**
   This approach estimates the energy savings achieved by a retrofit by comparing it to a modelled version of the home before improvements were made. Since it is not possible to create a direct counterfactual—where the homeowner continues to live in the unrenovated property as before—this method builds a highly accurate model of the original home. By applying the existing occupancy profile to both the old and new home fabrics, it calculates the difference in energy use.

2. **2. HTC Measurement**
   This method focuses on standardised measurements of energy efficiency improvements, using the Heat Transfer Coefficient (HTC) as a key metric. Independent of occupant behaviour, HTC provides a reliable measure of a home's fabric efficiency before and after retrofit. By integrating HTC values into a SAP or HEM model, it is possible to generate a normalised energy demand per square metre (kWh/m^2). Energy savings can then be quantified by comparing the SAP-normalised heat demand before and after retrofit, calculating how many fewer kWh/m^2 are needed to maintain SAP-defined comfort levels. To ensure long-term performance, HTC can be remeasured once or twice a year. If a decline in HTC is detected—indicating a reduction in efficiency—the tariff should be adjusted accordingly.

ENFORCEMENT

The recent announcement by TrustMark regarding the suspension of 39 solid wall installers raises timely concerns about the need for high-quality installation[23]. Firstly, to ensure that delivered measures are effective, and secondly, to maintain public trust and support.

While the introduction of a pay-for-performance metric inherently enforces the need for high-quality installation, further audits have highlighted that concerns around installation standards predominantly relate to government-backed ECO schemes. In contrast, installations within sectors such as social housing have not faced the same issues. This highlights a crucial point: when investors or building owners have a direct financial stake in a project, they tend to apply greater scrutiny and due diligence to the work being carried out.

Within the ECO scheme, beyond the number of measures installed, there is currently little incentive or oversight regarding the quality of installations. This lack of oversight has led to vulnerabilities in the supply chain, creating opportunities for rogue installers to exploit available funding or for work to be outsourced to third-party contractors with insufficient quality control.

Under our proposed policy, where private capital is dependent on sustained performance over time, their own enforcement mechanisms would be introduced to ensure installation quality remains consistently high and that returns are safeguarded. A useful precedent can be found in institutional investments in solar panels, where strict contractual enforcement of installation standards—such as panel location and orientation—ensured optimal electricity generation and financial returns for investors.

Finance mechanisms

To expand on the topic of financing mechanisms—while this is not an exhaustive list—this paper has repeatedly highlighted the role of institutional investors. This focus aligns with the Climate Change Committee's assertion that private markets will contribute the majority of funding for the transition[24]. Additionally, we recognise the presence of an 'able-to-pay' market, where individuals can provide the upfront capital themselves and benefit from the tariff. Given this, it is important to outline the key players involved in this scheme and how it would operate for each respective party.

Able to pay and the private rented sector

A well-designed subsidy mechanism has the potential to unlock investment in both the able-to-pay market and the private rented sector, addressing key barriers to energy efficiency improvements. Under this model, the freeholder covers the upfront cost of retrofit measures and receives a return over time through the subsidy. Lessons from the Feed-in Tariff scheme for solar PV highlight how such incentives can drive innovative financing solutions, making upgrades more accessible. At the same time, this approach helps overcome a major barrier: the challenge many face in justifying high upfront costs when projected energy savings alone do not provide a sufficient financial incentive.

Fuel Poor and social housing

In this model, insulation and energy efficiency improvements would be provided free of charge, ensuring that vulnerable households benefit from lower energy bills without financial strain. Under an innovative financing model, banks or other financial institutions would cover the upfront cost, retain ownership of the installed measures, and collect the subsidy directly.

Worst-first

Fundamentally, this proposed policy incentivises investors across the UK's building stock by offering a secure, government-backed return on investment while maximising potential gains. Operating on a 'worst-first' principle, it creates a significant opportunity to improve the fabric of the poorest-performing buildings while ensuring investors benefit from these upgrades. Simultaneously, the outlined enforcement mechanisms ensure that even the most challenging properties can be revitalised and sustained at a high level of long-term performance.

Methodology

VALUE GAP AND INCENTIVE DESIGN

The main objective of the Energy Efficiency Incentive is to address the demand-side incentive gap between the perceived medium to long-term value of energy efficiency improvement and the immediate cost of measure installation that is bored by the individual households.

Discounted cashflow analysis is a typical method for economist and financial analysts to evaluate the perceived value of future income streams against the opportunity cost of forgoing current consumption or investment. In the context of this analysis, an average household must consider whether future savings in energy cost achieved by improving the energy efficiency of their dwelling justifies the spending on retrofit installation which they can otherwise invest for an internal rate of return (IRR) of 13% in the same timeframe, as specified by the formula below:

$$present\ value\ of\ future\ energy\ savings\ = \sum_{start\ year}^{end\ year} \frac{energy\ saving\ in\ year\ t}{(1+13\%)^t}$$

Whereby a value gap occurs if the cost of retrofit installation exceeds the present value of energy savings:

$$value\ gap\ = cost\ of\ retrofit\ installation\ - present\ value\ of\ future\ energy\ savings$$

In other words, although the total nominal value for the stream of energy cost savings that is achieved during the lifespan of the installed energy efficiency (EE) measures is likely to exceed the immediate cost of retrofit installation, the perceived value of said income stream in the present can be variably lower than the latter base on household's risk preference. In the present value calculation, this preference is reflected mainly by:

- a The IRR which the households compare and discount the future savings against. This is set at a deliberately high rate of 13% to incorporate both inflationary risk and investment (e.g. in index or pension funds) and to reflect the ostensible demand-side gap that still exists for measures like loft insulation despite their high medium-term yield against relatively low installation costs.
- b The timeframe or "end year" when the households expect to be compensated for the installation (i.e. the longer the households are willing to wait, the more savings are accumulated in the present value calculation). In this paper, households are assumed to have different "end year" expectations depending on the energy efficiency measure they are investing in.

To bridge the value gap specified above, the incentive framework must provide a nominal subsidy rate that can form an incentive stream with the same present value as the perceived value gap. Specifically:

$$value\ gap\ = \sum_{start\ year}^{end\ year} \frac{nominal\ rate\ required\ for\ the\ subsidy}{(1+13\%)^t}$$

$$nominal\ rate\ required\ for\ the\ subsidy\ = \frac{value\ gap}{\sum_{start\ year}^{end\ year} \frac{1}{(1+13\%)^t}}$$

The nominal rate requirement specified is then divided directly against every kWh of energy saving achieved by the relevant EE measures to form a p/kWh performance-based reward for efficient installation of EE measures:

$$subsidy\ (p\ per\ kWh) = \frac{nominal\ rate\ required\ for\ the\ subsidy\ (p)}{energy\ saving\ achieved\ (kWh)}$$

By calibrating the monetary incentives created by the subsidy on energy savings achieved instead of units of EE measures installed, the proposed framework ensures that the responsibility to achieve energy savings is internalised to the incentives structure of those participating in the scheme.

For example, under the proposed funding mechanism, where households are supported by private-financing stream that exchange payment to close the immediate value gap with claims on future subsidy stream, the performance-based incentive ensures that payout for investors hinges directly on the quality of measure installation. This creates an inherent interest for the latter to uphold the standard which EE measures are installed to safeguard and maximise their return on investment. The incentive alignment is illustrated in detail in the analysis section.

ARCHETYPE AND ASSUMPTIONS

BUILDING STOCK

As suggested by its design, the calibration of the proposed incentive framework (i.e. the subsidy payout to households) is directly based on the energy savings achieved by and the cost of installation for the EE measures in question. Both factors can vary for the same EE measure when installed on different building stocks.

As such, whilst the design and implementation of the proposed incentive framework is applicable across most building stocks in the UK, a post war terraced house based on the GB.TH05 archetype in the European Union's TABULA webtool is chosen to benchmark the following analysis[25].

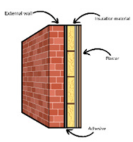
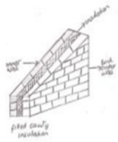
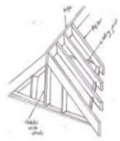
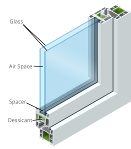
Building Type	Terraced House
Floor Area	75 m2
Wall Area	70 m2
Main Fuel Source	Gas
Heating Related Energy Consumption p.a.	10200 kWh (NEED, 2022 mean)

Note that the heating-related energy consumption for the terraced house archetype is based on the 2022 mean annual natural gas consumption for all terraced houses in the UK according to DESNZ's National Energy Efficiency Data-Framework (NEED)[26].

ENERGY EFFICIENCY MEASURES

With the dwelling archetype to benchmark the policy established, this report applies the proposed incentive framework on four common fabric measures to form its core policy proposal on the performance-based incentive scheme. These include: solid wall insulation, cavity wall insulation, loft insulation and double glazing.

Table 1: Performance for individual fabric measures

Fabric Measures	Solid Wall Insulation	Cavity Wall Insulation	Loft Insulation	Double Glazing
Percentage Savings	52%	24%	20%	53%
Associated Energy Savings	5,253 kWh	2,458 kWh	2,030 kWh	5,406 kWh
Expected Payback Period	25 years	7 years	7 years	7 years
NEED Test Data	Yes	Yes	Yes	No

It is important to note that the underlying incentive framework utilised by the scheme is by nature technology agnostic and can be applied to facilitate the adoption of other EE measures outside of the four selected fabric measures if the appropriate calibration variables, like those specified above, are provided. The pilot schemes proposed here is just one application of the proposed incentive framework that showcases how the performance-based incentives can impact the deployment of four frequently recommended fabric measures that are most likely to benefit from the new funding mechanism the incentive scheme enables.

In the case where it is applicable, the efficiency gain achieved by specific fabric measures is taken from the NEED's impact of measures test conducted in 2024[27], from which the selected fabric measures can be broadly divided into two categories:

FAST YIELDING MEASURES

Fast yielding measures like cavity wall, loft insulations and double glazing have relatively lower installation costs at around £900 - £5,000. Given the lower cost, households are expected to breakeven from the installation at a shorter timeframe even if the subsidy is kept at a lower nominal rate. Accordingly, this report set the breakeven point expected for the installation of these measures, with the aid of the subsidy payment, to fall around the 7 years mark.

In addition, given the lower financial risk/cost to invest in these fabric measures, this report expects the latter to be fully rollout in the short to medium timeframe, which aligns with the 2035 target (for cavity wall and loft insulation) set up by the CCC for the Seventh Carbon Budget. Consequently, this paper assumes performance of the relevant fabric measures to be set at the upper-quartile level observed in the NEED test results to represent performance improvement from both the better incentive structure supported by the proposed framework and technological progress during the corresponding short to medium term rollout period. (Note: since NEED test data does not cover double glazing, the cost and performance figures of glazing is calibrated separately via EPC data and reports from the US Department of Energy for this methodology. See Annex 1).

SLOW YIELDING MEASURES

Slow yielding measures like solid wall insulation tend to have higher installation costs that falls beyond the £10,000 mark, thus require higher subsidy and longer recovery periods for households to breakeven. This paper assumes households installing slow yielding measures to treat them as long-term investment with the breakeven point, with the aid of subsidy payment, set around the 25 years mark.

As installing slow yield measures require higher financial commitments, households are more likely to be wary of such investment. Consequently, this paper assumes a longer rollout period for these measures and take their performance benchmark at the 95% level of the NEED test results to reflect technological and performance improvement during the corresponding rollout periods.

DEMAND SIDE SIMULATION

Aside from assessing the impact the proposed incentive scheme can have on individual households; this analysis also attempts to simulate the demand-side response of the wider market with the introduction of the performance-based incentives scheme.

Using records from the national EPC database, this report filters out the number of terraced houses (the scheme's dwelling archetype) that are recommended with each fabric measured covered under the proposed incentive scheme.

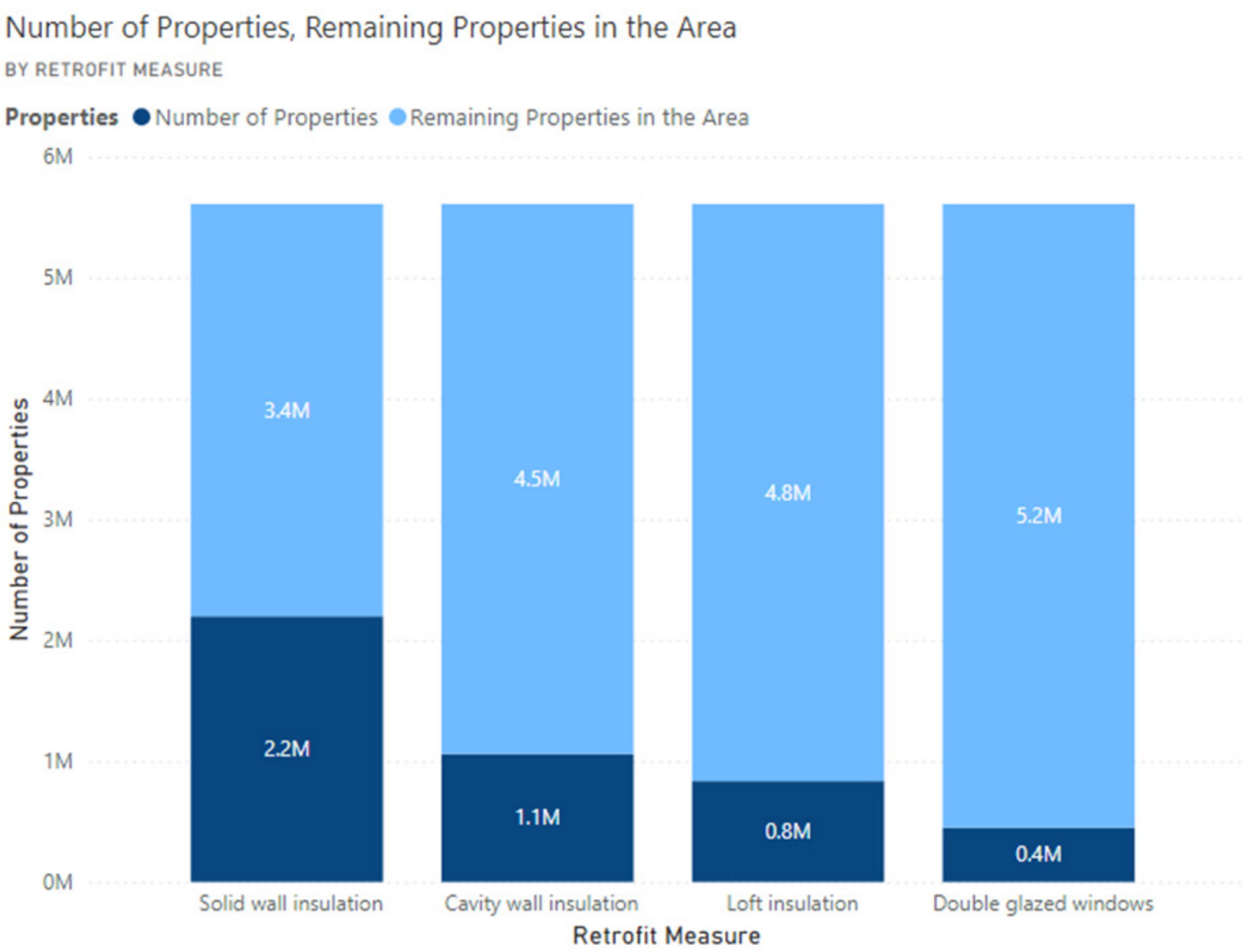


Figure 4: Number of terraced properties that require retrofit measures vs. total properties.

As shown by Figure 4 above, among the 5.6 million households with a valid EPC certificate, about 65% are recommended with slow yielding measures like solid wall insulation and about 20% are recommended with fast yielding measures like cavity wall insulation, loft insulation and double glazing.

The EPC record provide a realistic indication of the total for fabric measure demand that exist in the wider market, which can be used to project the likely market response towards the incentive scheme over time. In the balance scenario for the CCC Seventh Carbon Budget analysis, an S-shape growth curve is projected for the deployment of measures like cavity wall and loft insulation, highlighted by Figure 5 below.

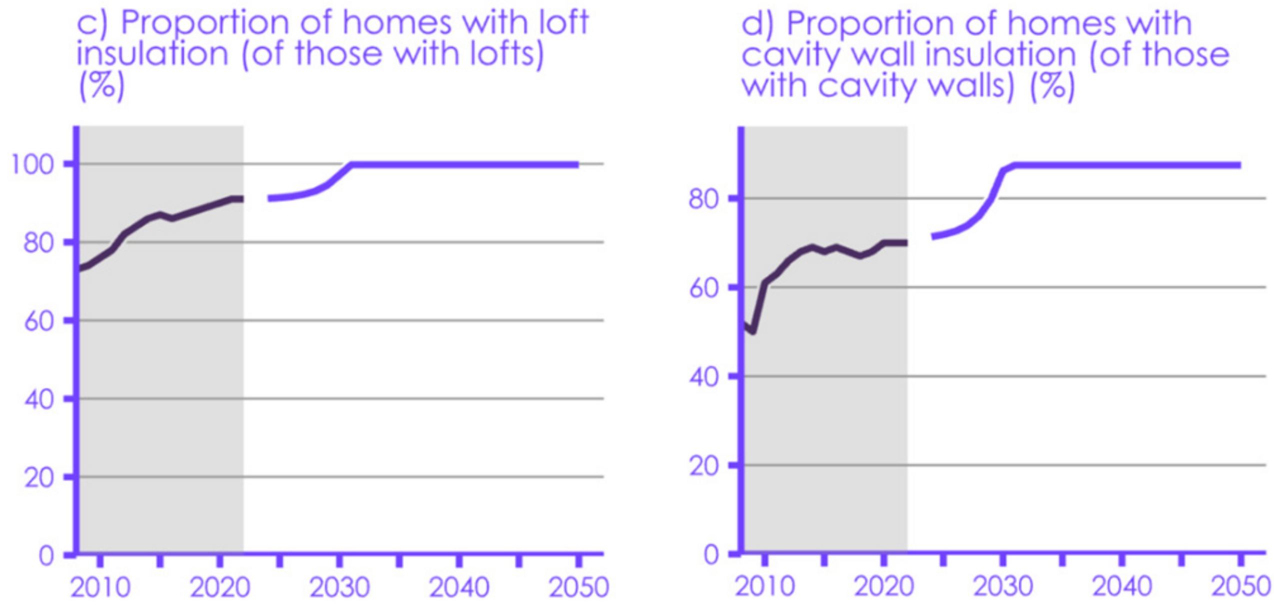


Figure 5: Key indicators for the residential buildings sector (CCC Seventh Carbon Budget, Figure 7.2.4)[28].

The balanced scenario suggests an exponential uptick in measure installation past 2028 as part of the Government's drive towards the 2050 net zero target, with most installations completed for the two selected measures by 2035. The proposed incentive scheme aims to facilitate the meeting of this target, hence simulating the market response accordingly.

It is important to note that the CCC does not have an assumed deployment curve for solid wall insulation or double glazing and in the same report it also assumes that solid wall insulation will only be cost effective for 15,000 houses.

In the case of glazing, this report has chosen to base its deployment/uptake curve on that of other fast-yielding measures (i.e. loft and cavity wall insulation, illustrated above). Based on the industry projection of half a million households per year for glazing installation, a figure higher than the current EPC projections, the short to medium term rollout that ends in 2035 suggested by the relevant deployment curve seems to be a good fit for window glazing.

In the case of sold wall insulation, this report assumes that this fabric measure will become more cost-efficient over time, thus expanding the number of households where solid wall insulation can be an effective EE solution. Nonetheless, this has scaled down the aggregate demand targeted by the pilot scheme according to the more modest 15,000 households the CCC assumed and map them to a longer deployment curve that go past the 2035 target, illustrated by Figure 6 below.

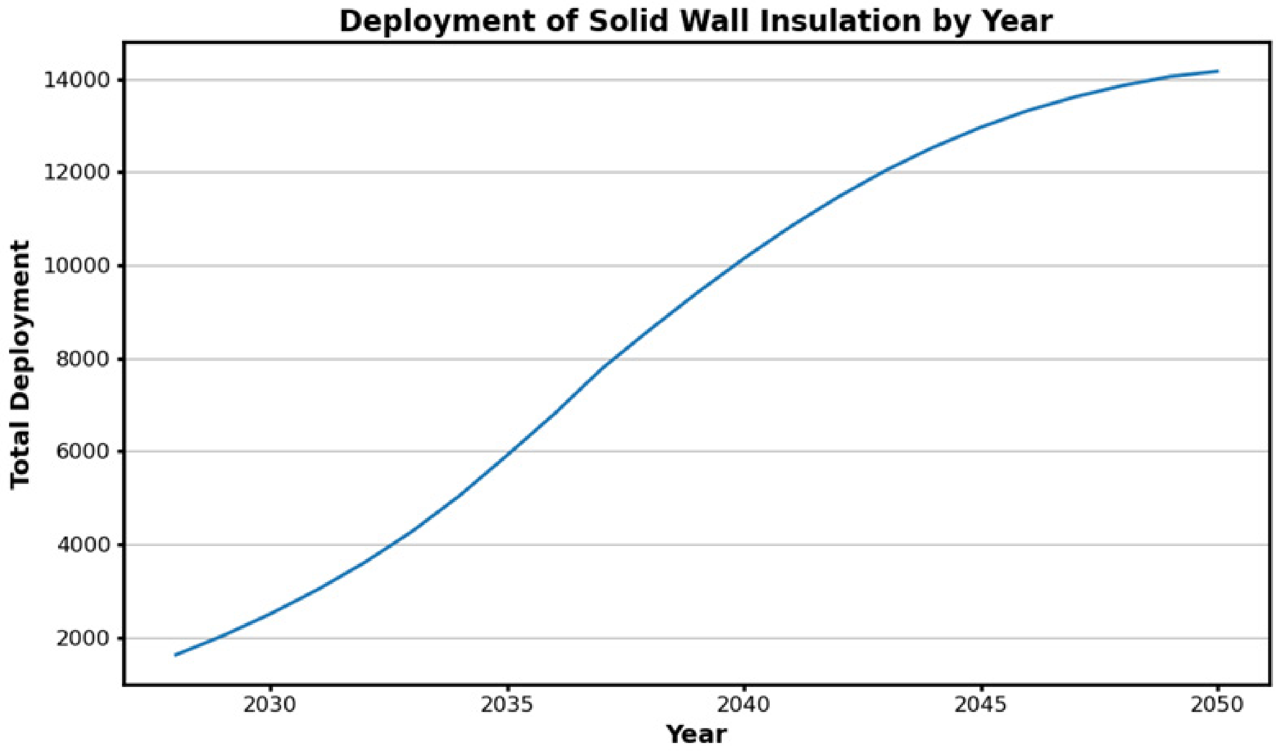


Figure 6: Deployment of solid wall insultation by year.

GOVERNMENT SPENDING

Aside from calculating the appropriate EE incentives for the targeted households in the form of the p/kWh subsidy, this report also estimates the likely cost for government to fund the proposed pilot scheme. At a rolling window of 7 years (for fast-yielding measures) and 25 years (for slow-yielding measures), this report simulates the entry and exit of households into the eligible cohort for incentive payments and calculate the corresponding annual government spending that is required.

$$government\ spending\ at\ year\ t = subsidy \times no.eligible\ households\ at\ year\ t$$

As with the case of individual households, future spending commitments taken by the Government under the proposed pilot scheme should also be contextualised to their present value. Since the Government are less affected by inflationary risk and market volatility, the discount rate used to calculate the present value of their future spendings is much lower than the household IRR used to estimate the demand-side value gap. Specifically, the Government's discount rate is set at 3.5% instead of 13% based on the guidance published by the Government's Greenbook[29]:

$$present\ value\ of\ government\ spending = \sum_{start\ year}^{end\ year} \frac{government\ spending\ at\ year\ t}{(1 + 3.5\%)^t}$$

In the analysis, the present value spending stream is further broken down based on the tenure of the corresponding households to estimate how the benefits injected via government spending on the EE incentive schemes are distributed across different sectors of the population.

Results

ANNUAL ENERGY SAVINGS PER HOUSEHOLD

By calibrating the performance-based EE incentives with the yield (savings) profile of the suggested fabric measures under the proposed pilot scheme, the analysis arrives at two distinct set of recommended subsidy rates that can bridge the gap between the present value of energy savings and the immediate cost of retrofit installation.

Table 2: Summary of subsidy rates for slow yielding and fast yielding fabric measures.

	Slow Yielding	*Fast Yielding*		
Fabric Measures	**Solid Wall Insulation**	**Cavity Wall Insulation**	**Loft Insulation**	**Double Glazing**
Energy Savings	5,253 kWh	2,458 kWh	2,030 kWh	5,406 kWh
Present Value of Energy Savings	£2,693.79	£815.02	£672.98	£1,792.36
Estimated Installation Cost	£15,661.00	£1,705.71	£1,078.68	£4,866.88
Value Gap	£12,967.21	£890.69	£405.70	£3,074.52
Implied Subsidy	27.91 p/kWh	6.51 p/kWh	3.59 p/kWh	10.22 p/kWh

FAST YIELDING MEASURES

As shown in Table 2 above, subsidy for fast-yielding measures, despite being paid out for a shorter timeframe (i.e. 7 years), can bridge the value gap between installation cost and PV energy savings at a relatively lower rate, typically around 4-10 p/kWh.

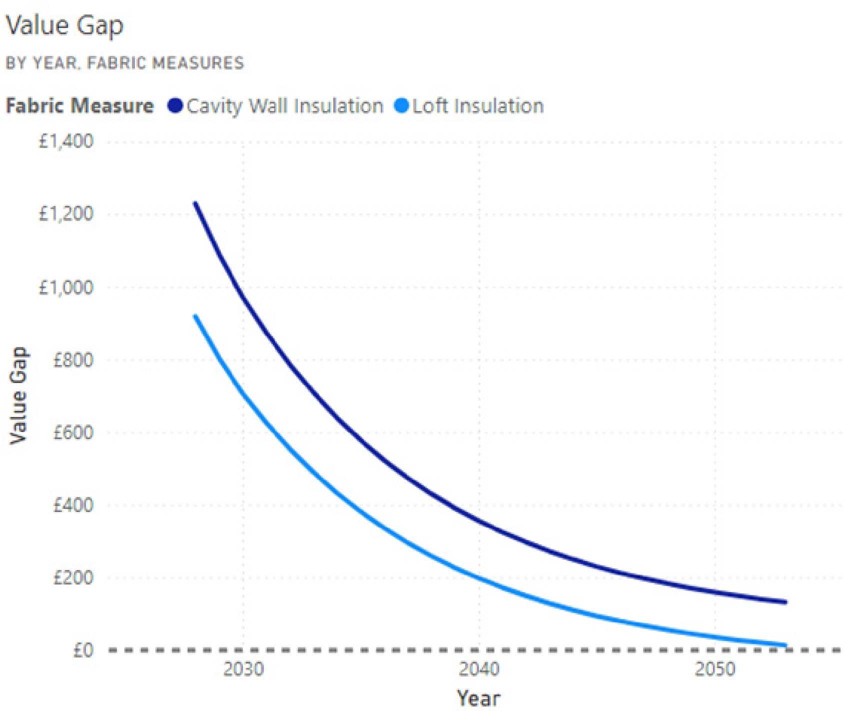


Figure 7: The observed value gap for cavity wall and loft insultation.

In addition, Figure 7 above shows the value gap that is required to be bridge by the subsidy for cavity wall and loft insulation narrows (falls to 0) rapidly as time progresses but doesn't fully close until well past 2050. This narrow value gap could explain why a significant number of households remain reluctant to invest in and install the two suggested measures – as can be observed via the plateauing growth (grey) curve for existing installations in the earlier CCC figure (Figure 5).

Consequently, the intervention of the EE incentive subsidies represents a low cost and low regret option for government to bridge the narrow value gap and tip the incentive balance in favour of the rapid adoption target (purple curve) set up by the CCC.

SLOW YIELDING MEASURES

On the other hand, slow yielding measures, represented by solid wall insulation, require high upfront installation costs of around £15,661 that cannot really be bridged by the expected future savings in energy costs, which at present value are worth around £2,694. Figure 8 below shows that even if households are willing to wait for decades, the value gap between the present value of energy saving and the immediate installation cost remains well above the £10,000 mark, and appropriate market interventions are likely required to incentivise households to take part in the relevant retrofit projects.

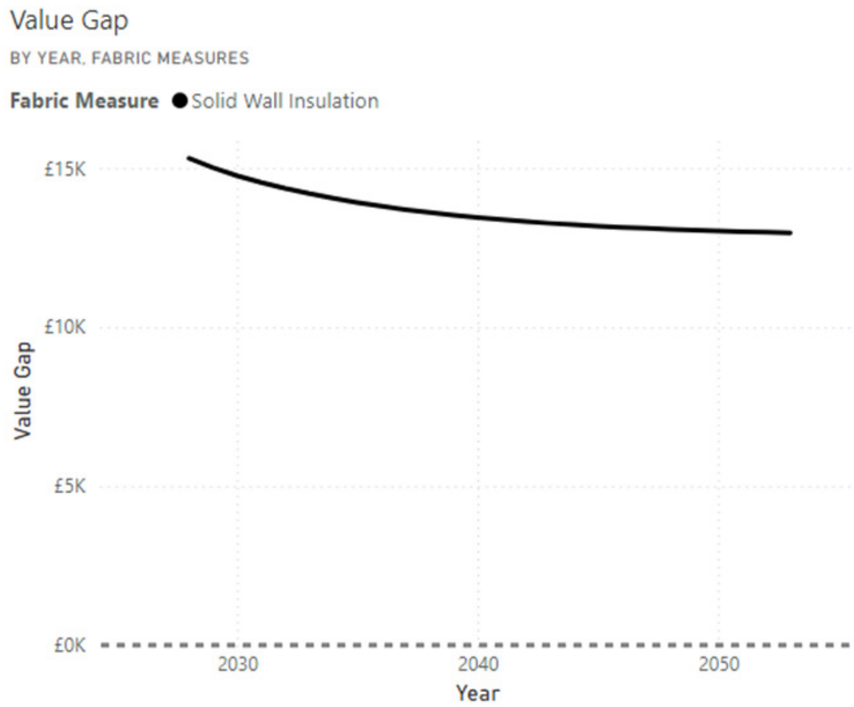


Figure 8: The observed value gap for solid wall insulation.

The proposed EE Incentive allow government and the private market to step in and create alternative funding streams that can bridge the high value gap that hinders the adoption of slow-yielding EE measures. Specifically, the promise of future subsidy stream, creates room for market investor to collaborate with households on measure installation, with the former sharing parts of the high upfront cost in exchange for claims on future subsidy streams generated by the EE measure. This effectively spreads the cost and risk associated with measure installation into more manageable sizes between households, private investors and the Government subsiding the installation, creating a more sustainable funding structure to facilitate the installation of slow-yielding EE measures.

It is important to note that unlike upfront subsidies per unit installation, the proposed framework also allows the Government to spread the cost and risk of funding installation over time, subsidising each project at a more palatable rate of 27.91 p/kWh (i.e. £1,466 p.a. if the hypothetical performance improvement is achieved) instead of funding the £12,967 gap outright.

QUALITY OF INSTALLATION

As highlighted in the methodology, one of the core assumptions underpinning the analysis is the high-performance of the fabric measures installed under scheme (upper quartile for fast-yielding measure and 95 percentiles for slow-yielding measure) when it comes to achieving energy efficiency improvements. This is not only on the account of technology progression that is expected from the present to the commence and deployment period of the scheme, but also on the firm basis that under the scheme's participating installers, households and investors have an active interest in installing the measures at the highest quality possible.

As highlighted in the recent TrustMark suspension of installers[30], there are significant concerns over the quality of retrofit installations facilitated by existing funding streams like ECO, where the per unit basis of subsidy payment incentivises installers to complete installation projects without necessarily encouraging high quality installation. By tying the subsidy rewarded for installation directly with the performance of the installed fabric measures, the performance-based incentives under the proposed pilot scheme ensure that the installers have not only an ethical but monetary incentive to safeguard high quality installation.

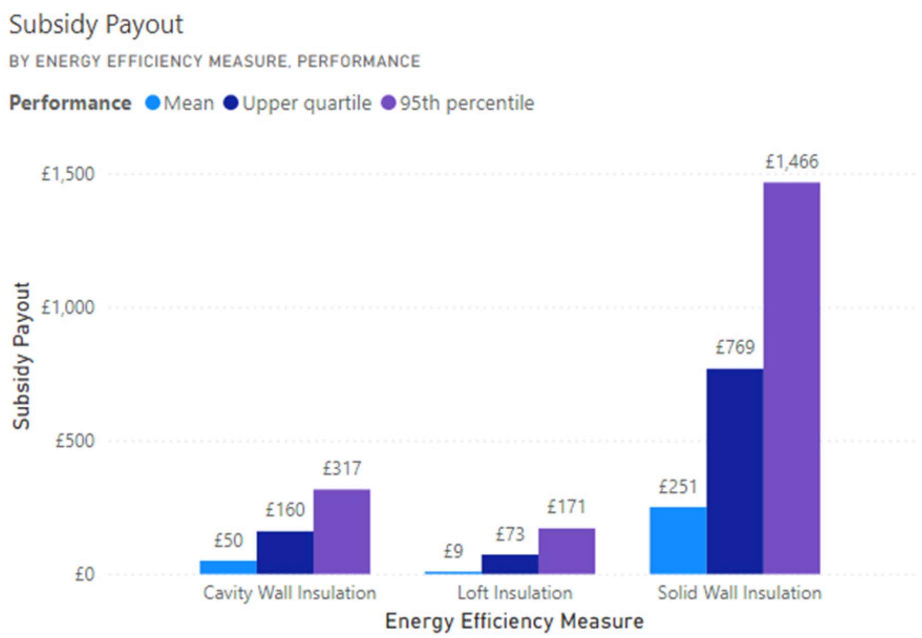


Figure 9: subsidy payouts to installers based on the quality of installation.

Figure 9 above shows the possible payout installers can receive under the new funding streams separated by the quality of installation they provide. As shown by Figure 9, a performance improvement from the upper quartile to the 95th percentile level recorded in the NEED test data implies an increase of roughly £100 in subsidy payout per fast-yielding measure installed and an increase of roughly £700 in subsidy payout per slow-yielding measure installed.

As installers/private investors are essentially bearing the risk of bridging the value gap for upfront spending on measure installation, drops in the fabric measure performance not only reduces the payout they are receiving but risk the profitability of their involvement in the installation process to start with. By entering a performance-based EE incentive scheme, the installers/investors for fabric measures inadvertently align their interest with the objective of improving EE performance, thus reducing the risk of moral hazard associated with the quality of installation.

DEPLOYMENT: SUSTAINABLE FUNDING STREAM WITH LASTING IMPACT

With the profile, savings and subsidy rate required for each measure instalment (for individual household) covered by the proposed incentive scheme established, this report then simulates how the deployment under the scheme is rolled out year-by-year under the growth curve and EPC-based targets described in the methodology.

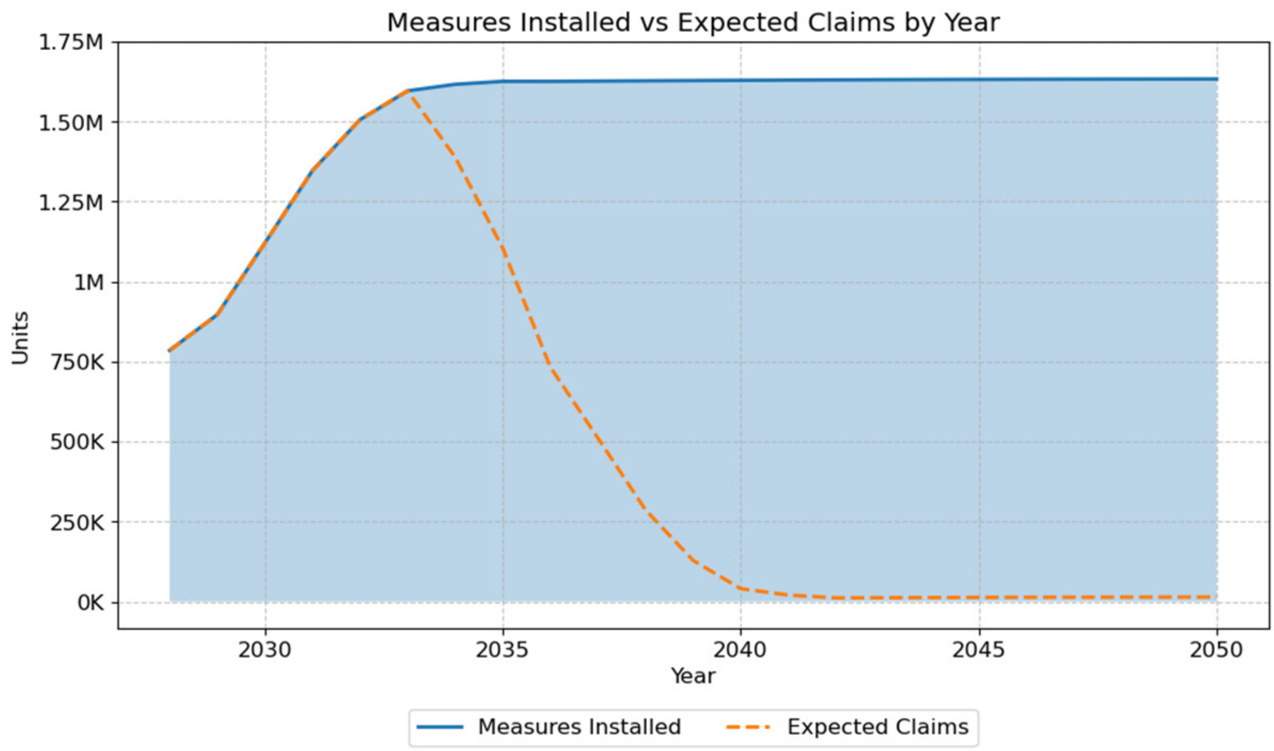


Figure 10: Measures installed vs. expected claims.

As seen in Figure 10 above, both measured, installed and expected claims rise sharply at the initial exponential growth phase of the scheme. Growth in measure deployment begins to slow down once most of the fast-yielding measures (i.e. glazing, cavity wall and loft insulation) are deployed, at which point the expected claims on the subsidy stream (i.e. the number of measures that are eligible for application) begins to drop as most applicants (for fast yielding measures) begin to move past the 7 years mark payment period and exit the payment stream.

Note that whilst the payment stream, thus the relevant government spending, only covers a fraction of the selected fabric measures' lifespan (i.e. 7 years for fast-yielding measures), the benefits of these measures in terms of energy cost savings and emission reduction can last for decades. As shown by the blue area in Figure 10, the measures installed can potentially generate benefits for households and society alike decades after the proposed incentive scheme ended, which perhaps is the best explanation for the disproportionate benefit to cost ratio one will observe in the subsequent discussion.

GOVERNMENT FUNDING STREAMS

OVERVIEW

Before discussing the wider social and environmental impact of the scheme, this report will first establish the implied government spending required for the performance-based EE incentives. This includes how the spending will be split among different measures, stakeholders and communities.

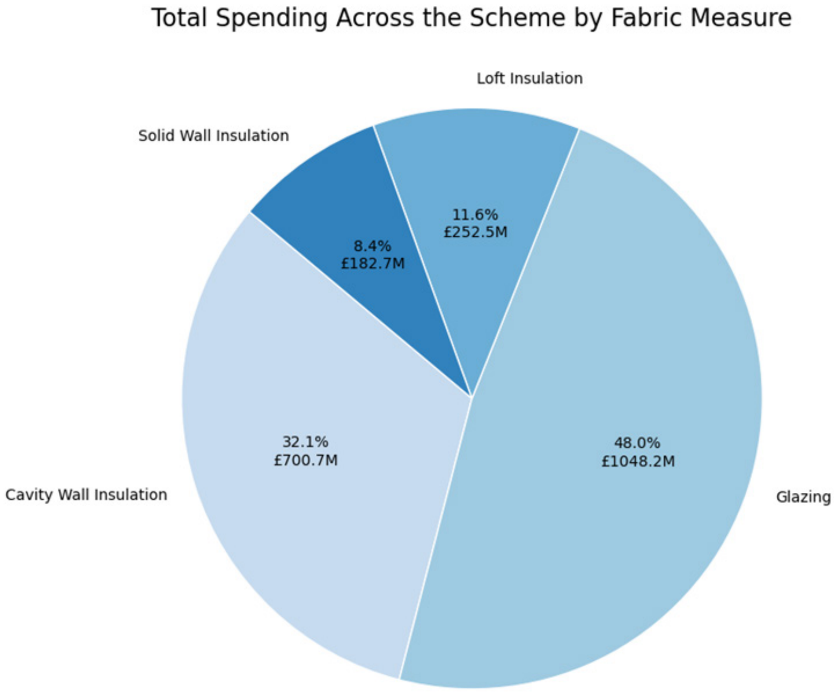
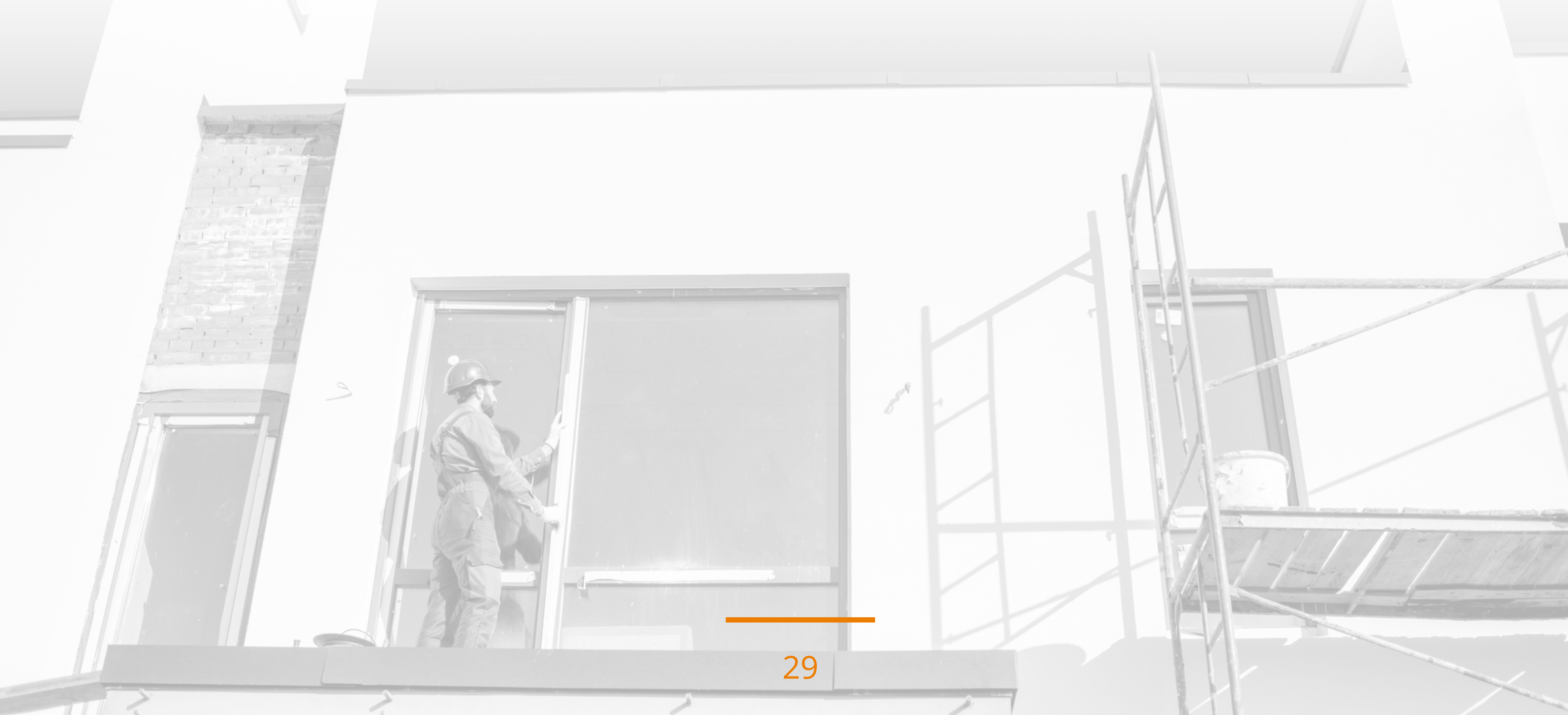


Figure 11: Total spending across the EE Incentive by fabric measure.

Between the four fabric measures, the proposed EE performance-based incentives scheme is estimated to cost the Government £2.22 billion in net present value to fund over the 25 years period it is set to cover (i.e. 7 years for fast-yielding measures and 25 years for slow-yielding measures). Around half (48%) of the funding will be going towards double glazing which is likely caused by the higher cost per whole house glazing project (replacing every window in the house) compared to other measure installation that is completed under the proposed incentive scheme.



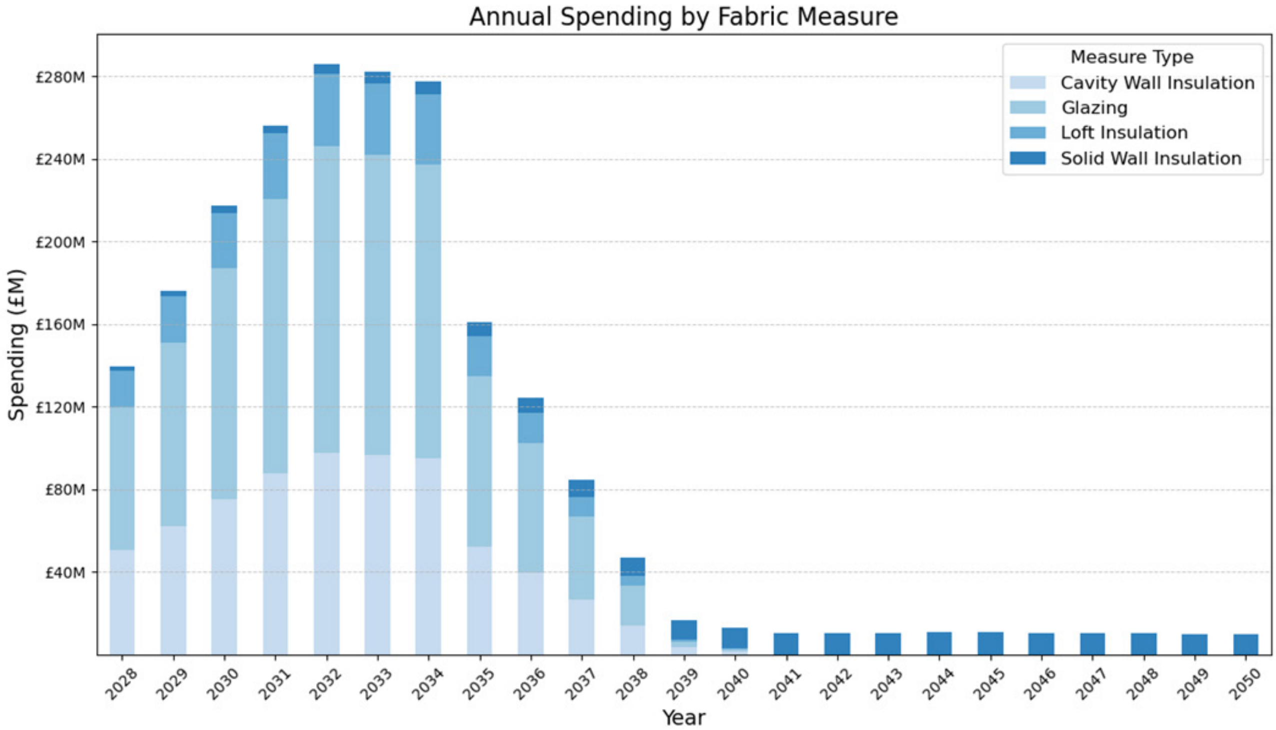


Figure 12: Annual spending for each fabric measure.

Spreading out the funding stream to the full 25 years policy period which the scheme covers, the peak government spending can be identified at £ 285.94M around the year 2032, which is the half point between the start of the proposed incentive scheme (2028) and the 2034 target for the rollout of fast-yielding measures (i.e. glazing, loft and cavity wall insulation). As slow-yielding measures (i.e. solid wall insulation) contribute to only 8.4% of the scheme's total budget, its longer payout period of 25 years doesn't significantly change the skew of the total payment curve.

HOUSING SECTOR AND FUEL POVERTY

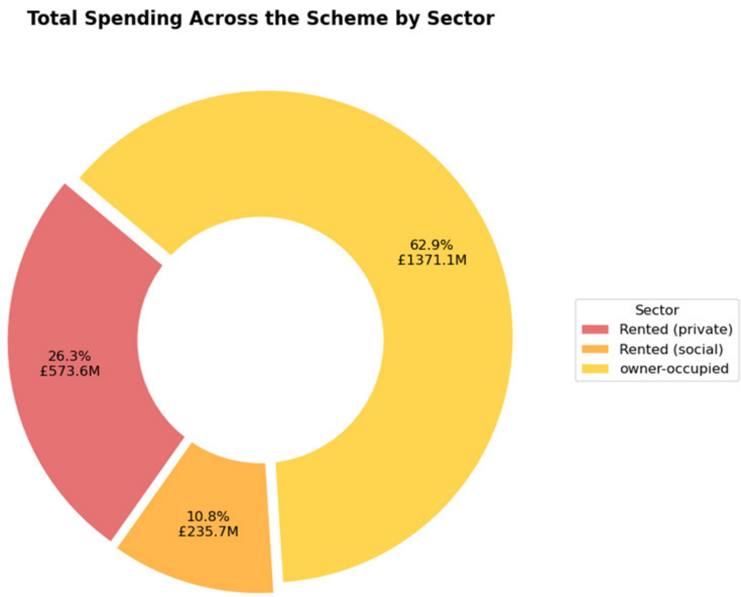


Figure 13: total spending across the EE Incentive by housing sector.

By breaking down the total government spending further by housing sector, one can observe that the majority (around £1.37 bn or 62.9% of the total budget) of the incentive scheme's budget will go towards the owner-occupied sector with the private rented sector following closely (26.3%).

Table 3: EPC rating vs. proportion of households in fuel poverty[31].

EPC Band	Proportion not fuel (%)	Proportion fuel poor (%)
A, B and C	100.0	-
D	74.3	25.7
E	73.1	26.9
F and G	67.0	33.0

Using the EPC rating of the targeted dwelling under the scheme as well as DESNZ's estimation on the likelihood of fuel poverty under each EPC band, this report also isolates the funding streams under the proposed EE Incentive that are going into the fuel poor sector.

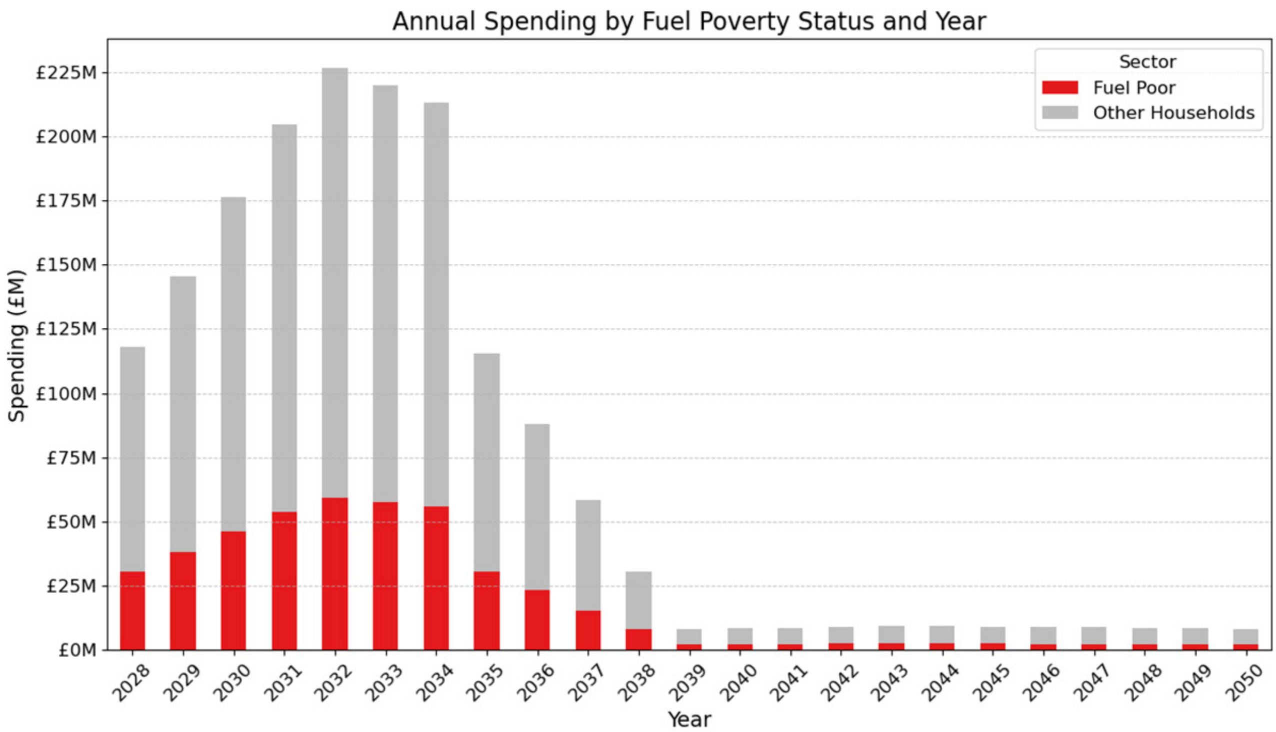


Figure 14: annual spending by fuel poverty status up to 2050.

As seen in Figure 14 above, it can be observed that funding streams for the fuel poor sector largely follows that of the rest of the households, peaking at £59.32M around 2032. This is to be expected given that the majority of the household participating in the scheme will fall between the EPC rating of D-E (shown in Annex 3), meaning that measure deployment and spending under the scheme will be largely driven by fuel poor households or households that at least satisfy one of the two fuel poor criteria (i.e. EPC rating below C).

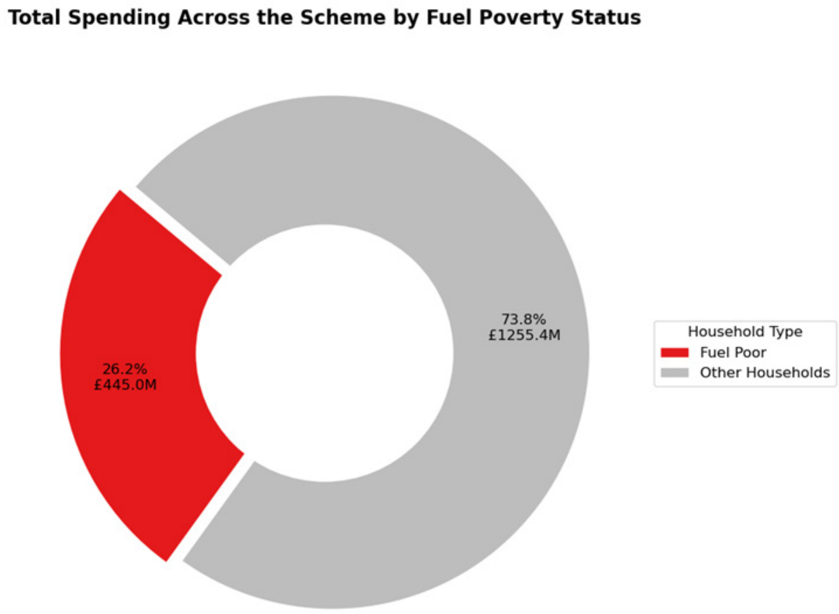


Figure 15: total spending across the EE Incentive by fuel poverty status.

Across the whole 25-year period covered by the EE Incentive, it is estimated that a significant share of 26.2%, or around £445M, of the total spending will be directly funding households who are currently at risk of being fuel poor, supporting the overarching motivation behind the proposed incentive scheme to address fuel poverty in the UK.

FABRIC MEASURES

Aside from looking at the funding stream from a scheme wide perspective, this report also examines the granular difference between the funding stream for fast-yielding and slow-yielding measures. Fo the ease of comparison, the following segment examines the difference in funding stream profile between the two types of fabric measure by using cavity wall insulation to represent the fast-yielding profile and solid wall insulation to represent its slow-yielding counterpart. The spending structure for other fabric measures covered by the scheme can be found in Annex 2.

FAST YEILDING MEASURES

As seen in Figure 16 below, the funding profile of fast yielding fabric measures under the incentive scheme is similar to that of the overarching EE Incentive. The peak spending year, as in the case of the entire scheme, falls around the year 2032 (representing a peak spending of £97.35M in the case of cavity wall insulation). This is perhaps unsurprising given that fast-yielding measures constituted roughly 92% of the total spending, thus serve as a strong driving force behind the profile/shape of the scheme's spending curve.

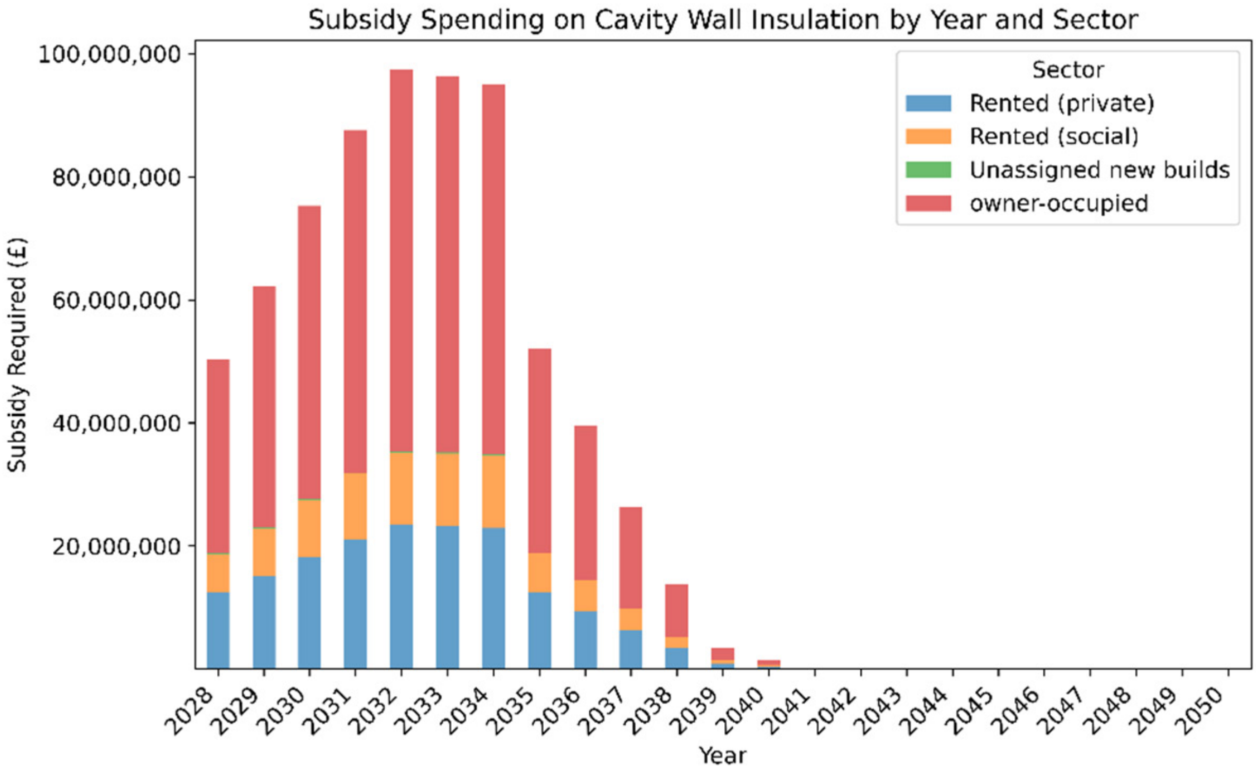


Figure 16: spending on cavity wall insultation by year and sector.

It is worth noting that after peaking around 2032, the Government spending on fast-yielding measures under the scheme initially follows a slow descend but drops sharply at around 2035. The explanation for this is two-fold.

Firstly, as illustrated by Figure 16 above, the deployment of fabric measures under the scheme follows an S-shaped curve. Uptake accelerates as the scheme progresses but begins to slow after reaching its midpoint year in 2032. As a result, growth in nominal cashflows slows, and by the early 2030s, this slowdown is compounded by the effect of the Government discount rate of 2.5% per annum, which is applied from the perspective of the scheme's start year of 2028. Together, these factors explain the gradual decline in cashflows observed between 2032 and 2035.

Secondly, in 2035, the first cohort of households that were retrofitted in 2028 begin to reach the end of their seven-year payout period and subsequently drop out of the eligible payment cohort. This pattern continues with each successive annual cohort: households that retrofitted in 2029 exit in 2036, those from 2030 in 2037, and so on. The cycle continues until the year 2042, when the final payments are made to households that were retrofitted in 2035. It is worth noting that prior to 2039, the decline in spending follows an exponential trend, reflecting the rapid growth in retrofit activity prior to 2035. After 2039, as households who joined at the scheme's midpoint in 2032 begin to exit, the rate of decline diminishes, mirroring the plateau phase of the S-shaped growth curve that previously drove deployment (i.e. the higher/lower number of households joining seven years prior means higher/lower decline rate now).

SLOW YEILDING MEASURES

Compared to fast yielding measures and the scheme as a whole, the funding profile for slow yielding measures under the scheme does not feature a sharp drop but a slow and plateauing growth up until the year 2050, when the UK Government aims to meets its net zero target, as seen in Figure 17 below.

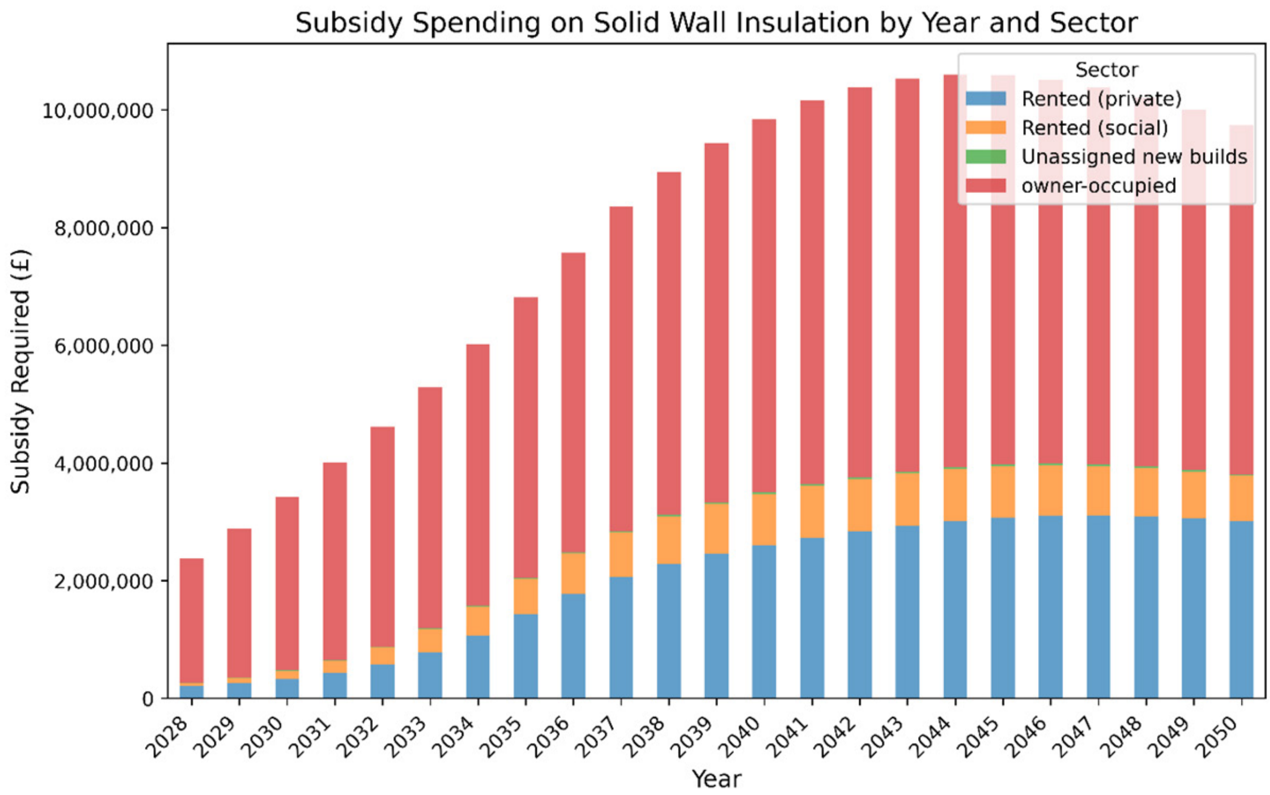


Figure 17: spending on solid wall insulation by year and sector.

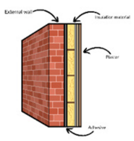
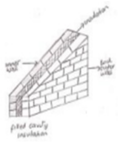
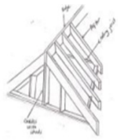
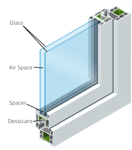
As shown in Figure 17 above, government spending on slow-yielding measures under the scheme follows an S-shape growth with a sharper plateau that peaks around the year 2044 at an expense of £10.6M. While the S-shape growth in budget is likely driven by the S-shape growth in deployment as in the case for fast-yielding measures, the sharper plateau and the eventual decline in spending required can be attributed to the 2.5% p.a. government discount rate that is applied to spending past the policy start year of 2028.

It is also worth noting that, since the payout timeframe is set at 25 years, payments are expected to continue beyond 2050 — extending, in theory, until the final payment is made in 2075 to households that retrofitted around 2050.

ENVIRONMENTAL AND WIDER SOCIAL IMPACT

Aside from energy cost savings achieved and the Government spending required, this report also analysed the environmental and wider social impact of the proposed incentive scheme. This is broken down by the fabric measure covered in Table 4 below.

Table 4: environmental impact of the four fabric measures.

Fabric Measures	Solid Wall Insulation	Cavity Wall Insulation	Loft Insulation	Double Glazing
Total Projects Completed	15 K	1M	820 K	440 K
Total Emission Savings	190 K tCO2e	7.0 M tCO2e	4.6 M tCO2e	6.7 M tCO2e
PV Emission Savings	£ 16 M	£ 760 M	£ 500 M	£ 730 M
PV Energy Cost Savings (HHs)	£ 1.5 bn	£ 74 bn	£ 48 bn	£ 70 bn
PV Fundings Required	£ 180 M	£ 700 M	£ 250 M	£ 1 bn

As shown in Table 4 above, the social benefits of both loft and cavity wall insulation created through the proposed incentive scheme will exceed the Government spending required on carbon costs savings alone. More importantly, accounting for the present value of energy cost savings across all households, the social value created by all four fabric measures that are installed through the incentive scheme is estimated to be at least 70-fold of the Government spending required (at net present value).

The low cost to high benefit ratio observed here can be largely attributed to the lasting impact of fabric measures that carry on after, in the context of the total lifespan of the measure, a relatively short payment periods under the proposed incentive scheme. For example, subsidy payments calibrated for fast-yielding measures are set via a cost and benefit analysis that assumes benefit cut-off at the 7-year mark. Despite the shorter timeframe that households are willing to wait for them, benefits/energy cost savings from the measures continues for decades past the cut-off point when the households expect to breakeven. This creates a stream of additional income that is not accounted for when scaling the subsidy, in other words, net benefits with no cost from government spending attached.

In the context of this report, most measures are assumed to generate value up to the end of the initial 25-year period (2028-2053). This is likely to be an underestimate for the benefits generated by the proposed incentive scheme. Specifically, with the performance and quality improvement that is facilitated by the proposed incentive scheme, the measures that are installed are likely to have a longer lifespan that can generate benefits past the 2053 cut-off point used in the calculation.

In addition, the benefit calculation in Table 4 only covers factors directly related to energy consumption and immediate monetary support received by households. In reality, the injection of government spending into the economy can generate wider market benefits including job-creation (FTE), technological progression and re-vitalisation of local economic activities. Further studies to fully quantify these factors will likely place the full social benefit at a much higher level than that which is proposed in this report.

Conclusions

This paper proposes an Energy Efficiency Incentive for the UK retrofit market, instead of the current grant scheme approach that only promotes up-front payments. The Incentive rewards in-use performance of energy efficiency measures, supporting actual energy savings of buildings and high-quality installations. Borrowing success and lessons from offshore wind and others, this proposal presents a long-term policy providing security for the industry and consumers. The Incentive would also develop an offering for underserved market segments, particularly the able-to-pay and private-rented sectors, alongside tackling fuel poverty.

The key findings from this paper are that:

- The intervention of the Energy Efficiency Incentive subsidies represents a low cost and low regret option for government to bridge the narrow value gap and tip the incentive balance in favour of the rapid adoption target set up by the CCC.

- A 7 year subsidy framework will be required for fast-yielding technologies such as cavity and loft insulation, and double glazing. A 25 year subsidy framework will be required for slow-yielding technologies such as solid wall insulation.

- The proposed EE Incentive is estimated to cost the Government £2.22 billion in net present value to fund over the 25 years period it is set to cover. The peak government spending can be identified at £ 285.94M around 2032, which is the half point between the start of the proposed incentive scheme (2028) and the 2034 target for the rollout of fast-yielding measures.

- It is estimated that a significant share of 26.2%, or around £445M, of the total spending will be directly funding households who are currently at risk of being fuel poor, supporting the overarching motivation behind the proposed incentive scheme to address fuel poverty in the UK.

- Around £1.37bn, or 62.9%, of the total budget will goes towards the owner-occupied sector with the private rented sector following closely (26.3%).

- A performance-based EE incentive scheme automatically aligns the interests of installers/investors for fabric measures with the objective of improving performance, thus reducing the risk of moral hazard associated with the quality of installation.

- The social value created by all four fabric measures that are installed through the EE Incentive is estimated to be at least 70-fold of the Government spending required (at net present value).

- Wider social benefits that are not covered in this report could be estimated by future studies, including job-creation, facilitation of technological progression and re-vitalisation of local economies via the injection of government spending.

The SEA believes this Incentive would provide long-term clarity for the energy efficiency market, generating stable incomes for manufacturers, installers and wider stakeholders. Consumers will benefit from this long-term scheme by receiving financial payback, high-quality energy efficiency measures and reduced energy bills.

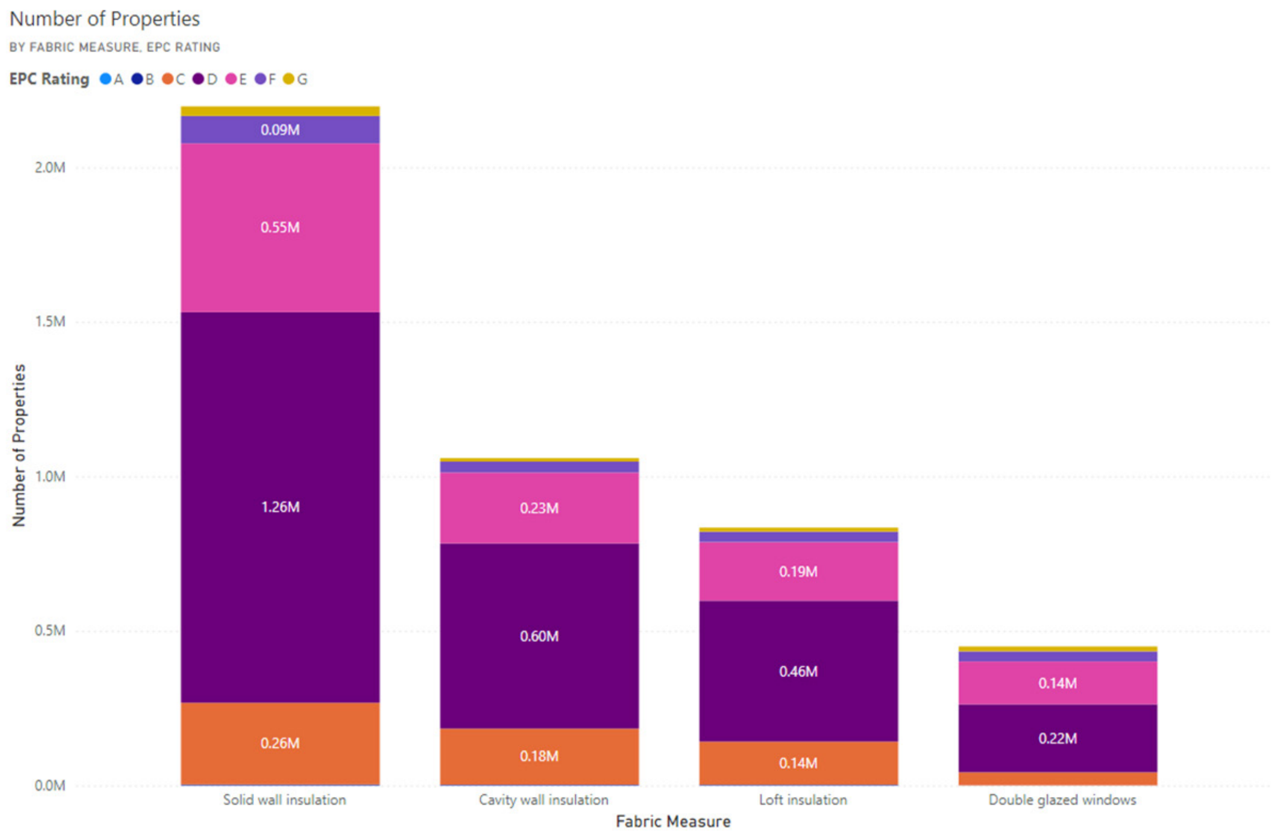
We therefore recommend to the Government that the Energy Efficiency Incentive should be adopted, to assist with market certainty, decarbonisation, bill savings and improving the quality of retrofit measure installations.

Annexes

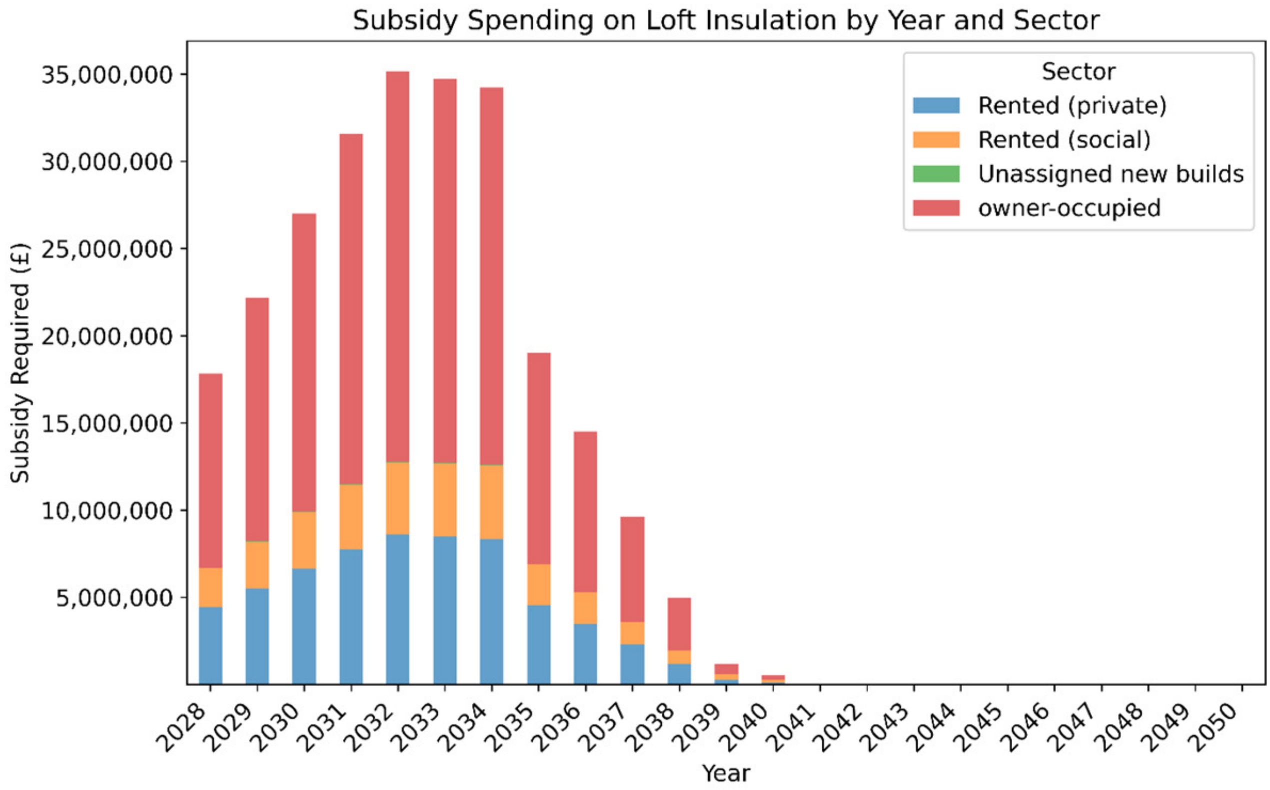
ANNEX 1: ADDITIONAL ASSUMPTIONS ON GLAZING

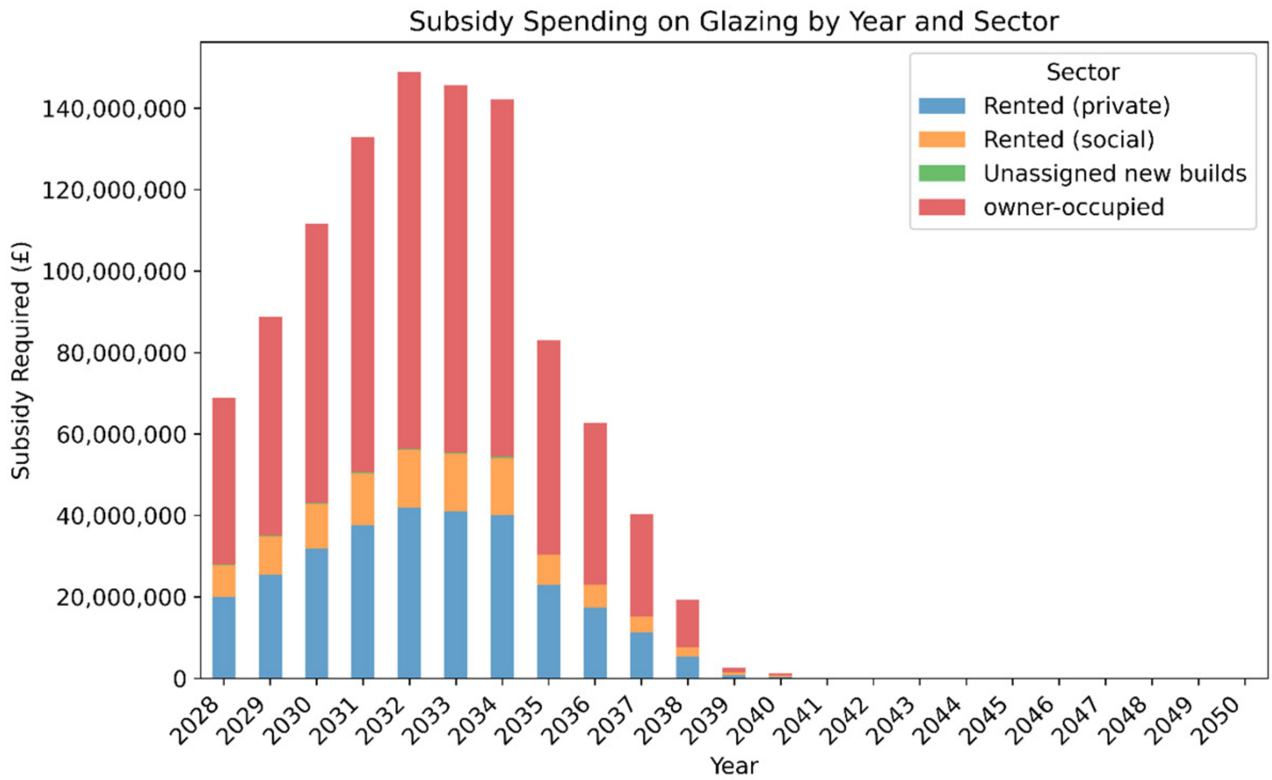
Average Cost of Installation per EPC Data	£ 4866.88
Implied U-Value[32]	2.7
Counterfactual (i.e. single glazed) U-Value[33]	5.7

ANNEX 2: EPC OF HOUSEHOLDS RECOMMENDED WITH FABRIC MEASURES



ANNEX 3: GOVERNMENT SPENDING BREAKDOWN ACROSS FABRIC MEASURES





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