

Decarbonising Britain's homes – Delivering growth and decarbonisation. Autumn Budget 2024 – Institute of Engineering and Technology submission.

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Recommendations:

- Deep retrofit of housing should be a priority for existing housing and not be considered purely from an energy efficiency and carbon emissions standpoint but should be fully integrated into the plans for a thriving and resilient economy that meets the current and future needs of citizens.
- Support the upskilling, reskilling and training of new engineers to plug the net zero skills gap and deliver the workforce needed to retrofit the UK housing stock.
- There should be a long-term budget similar to that promised for R&D, as well as a breakdown of projections for private investment leveraged through GB Energy for this scheme.
- Digital twins should be a key component of the Government's pledge to build 1.5 million homes over the next 5 years to support planning, resilience, decarbonisation and growth.

Retrofit

The budget presents the new government with a huge opportunity to deliver on its core goals of growth and decarbonisation whist saving working households money and creating high skill high paying jobs. The National Grid estimates that an additional 400,000 skilled workers will be required if the UK is to meet is commitment to net zero by 2050. We must ensure that skills in renewable energy installation, maintenance, retrofit, are available across the whole of the UK. In addition, 'non-technical' / generalist skills should not be overlooked. Building 1.5million new builds alone will not tackle the critical need for retrofit. New build housing, where vitally important to achieving our goals only represents 5% of the decarbonisation required in our homes, with retrofit of existing buildings representing 95%. Since 80% of the buildings standing today will still be in use in 2050, improving the energy efficiency of existing homes to the required standard is critical to reducing the UK's energy bills and reaching Net Zero. Increasing capacity through renewables alone will not be sufficient.

Quality and availability of housing has a direct impact on productivity and economic growth¹. Housing must be integrated into local infrastructure and be available at sufficient quality and

¹ IET report, Scaling up retrofit 2050, cited "Housing and Economic Development" Housing Corporation and Centre for Cities, 2008. <u>retrofit.pdf (theiet.org)</u>

cost to bring workers into the local economy. In the longer term, poor-quality housing has been shown to affect educational attainment, reducing the locally generated pool of talent². Deep retrofit of housing should not be considered purely from an energy efficiency and carbon emissions standpoint but should be fully integrated into the plans for a thriving and resilient economy that meets the current and future needs of citizens. It has been estimated that poor housing costs the NHS £1.4 billion per annum in additional treatment costs for conditions. At least £145 million of those costs arise directly from cold homes, whilst warmer housing could also prevent many of the 35,000 excess winter deaths recorded annually³.

Modifying homes for an ageing population not only reduces stress on the NHS, it also directly impacts care budgets. Adaptation and improvement of home quality reduces social care costs by between £1,700 and £4,500 per person per annum and can cut GP visits by almost $50\%^4$ freeing up NHS capacity.

The Government's warm homes plan has set a target of EPC-C rating for all homes that need it, saving working households money on their energy bills and reducing gas demand by $20\%^5$. 59% of the UK's 27 million homes have an Energy Performance Certificate rating of D or lower. On average, these households are paying an 'efficiency penalty' of £900 per year. Costings work produced by DESNZ estimates that hitting this target will require an additional £10bn- £13bn of capital investment per year. However, research by the Local Government Association has found that it will also provide savings of £1.5bn per year⁶.

The Government should recommit to the Warm Homes Plan, whilst:

- building on its ambitions,
- reflecting a whole systems approach,
- adding consumer engagement,
- unlocking the potential of technological innovation,
- introducing a new housing standard for new builds.

At this key moment in time, it is vital that the government provides the sector with certainty via a clear roadmap outlining costings and funding over the next Parliament.

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Retrofitting alone could remove 41% off the carbon cost of housing, shave billions from the UK's energy bills, and provide great social and welfare benefits to homeowners and tenants. We need a clear long-term policy commitment from the government that will incentivise investment in the deep retrofit industry⁷.

retrofit/#:~:text=Upgrading%20these%20homes%20to%20a,a%20household's%20annual%20energy%20bill.

² IET report, Scaling up retrofit 2050, cited "Good Housing – Better Health" The Academic – Practitioner Partnership, 2016. <u>retrofit.pdf (theiet.org)</u>

³ IET report, Scaling up retrofit 2050, cited "Good Housing – Better Health" The Academic – Practitioner Partnership, 2016. <u>retrofit.pdf (theiet.org)</u>

⁴ IET report, Scaling up retrofit 2050, cited "Housing our Ageing Population" Local Government Association, 2017 retrofit.pdf (theiet.org)

⁵ UKGBC, "Home Retrofit". <u>https://ukgbc.org/our-work/home-</u>

⁶ Local Government Association, "Understanding the costs and benefits of energy efficiency retrofitting fuel poor households in council areas". <u>https://www.local.gov.uk/understanding-costs-and-benefits-energy-efficiency-retrofitting-fuel-poor-households-council-areas</u>

⁷ IET, Labour National Policy Forum Consultation 2023: A green and digital future response, cited "Green Alliance, Reinventing Retrofit 2021" <u>s1194-a-green-and-digital-future.pdf (theiet.org)</u>

A Digital Opportunity

Alongside wider benefits to meeting net-zero targets digital technologies can be central to delivering the Government's goal for growth and decarbonisation. Although the term digital twins may be new to many people, it is a common occurrence in every day life, for example, predicting the weather forecast. It is already being used in many cities around the UK.

A Digital Twin is a group of technologies such as AI, machine learning and robotics (amongst others)⁸ that provides a realistic digital representation of assets, processes or systems⁹. Digital twins are essentially an information management system that helps to provide real time data from a physical object to increase efficiency, productivity and security. **Digital twins should be a key component of the Government's pledge to build 1.5 million homes over the next 5 years and retrofitting existing housing stock.**

Through greater use of digital twins, the UK can make homes more efficient, cost effective to run, healthier and more sustainable. A study by KMPG found that every £1 of direct productivity gain (2021) in the design, construction and maintenance of built assets could potentially translate into £3.70 in annual UK GDP in 2051¹⁰.

Greater information management of new homes through use of digital twins brings not only greater resilience, security and sustainability but also supports the economy. In an analysis of 11 case studies found that the use of information management could potentially secure between £5.10 and £6.00 of direct labour productivity gains for every £1 invested, and between £6.90 and £7.40 in direct cost savings (from reductions in delivery time, labour time and materials).¹¹ There is also evidence of costs savings at various stages of the asset lifecycle, ranging from 1.6% to 18% depending on the lifecycle stage.

Digital twins are already supporting sustainability, resilience and productivity in the construction sector. For example, Birmingham's smart city digital twin¹² supports urban planning and allows for real-time decision making to improve the city's resilience and growth. Likewise, Siemens' city of London digital twin tracks energy consumption in buildings and can simulate the impact of potential changes, thereby increasing the future resilience of the city.¹³

The global digital twin market was valued at USD \$3.8bn in 2019 and is expected to reach USD \$35.8bn by 2025. Half of all large industrial companies are predicted to be using them in some form by 2021, which is expected to result in a 10% increase in effectiveness. Through collecting the right data, setting standards and sharing data securely for the public good, the UK could release an additional £7bn in benefits per year across the infrastructure sector. This is equivalent to 25% of the total UK infrastructure spend.¹⁴

Increasing the resilience of new homes will ensure that the UK can mitigate potential costly climate change impacts in future and optimise energy consumption. With improved

 ⁸ IET, Digital Twins for the built environment, 2019. <u>digital-twins-for-the-built-environment.pdf (theiet.org)</u>
⁹ University of Cambridge, "Gemini Principles", 2018. <u>Gemini Principles | Centre for Digital Built Britain completed</u> <u>its five-year mission and closed its doors at the end of September 2022 (cam.ac.uk)</u>

¹⁰ KPMG, "The value of Information Management in construction", 2021. <u>The value of information management in</u> <u>the construction - KPMG UK</u>

¹¹ KPMG, 2021. The value of information management in the construction - KPMG UK

¹² University of Birmingham, "Development of a Digital Twin for East Birmingham", 2023. <u>Development of a Digital</u> Twin for East Birmingham - University of Birmingham

¹³ Siemens, "Hybrid city – shaping a future society". Digital City Twin - Siemens Global

¹⁴ IET, Digital Twins for the built environment, 2019. <u>https://www.theiet.org/media/8762/digital-twins-for-the-built-environment.pdf</u>

measurement of outcomes, comes better value for the whole-life pound of investment in new homes. There is less disruption, less waste and therefore greater ultimate value to the taxpayer from higher performing and resilient infrastructure.¹⁵ It also provides greater cyber security resilience through enhanced information security, which is increasingly important for the UK and globally.

¹⁵ University of Cambridge, "national Digital Twin Programme". <u>National Digital Twin Programme | Centre for</u> <u>Digital Built Britain completed its five-year mission and closed its doors at the end of September 2022 (cam.ac.uk)</u>