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Policy Brief

Meeting the UK's energy efficiency goals: Securing greater wider economy benefits through longer term programmes

Summary

- We use an economy-wide computable general equilibrium (CGE) model to investigate how the implementation of residential energy efficiency programmes over different timeframes, targeted at different low income and/or more 'able to pay' households, may impact employment and GDP across the wider economy depending on the approach to funding. This involves simulating the impacts of first a 4-year programme involving a total of £4 billion of retrofitting spending, then a larger one, £68.5 billion, over 15 years (both starting in 2021).

- Energy efficiency improvement programmes can trigger sustained household income and economy-wide gains. Retrofitting programmes provide an important transitory boost to the economy, and more so the longer the programme is expected to last. But it is real household income gains from reduced energy bills that trigger a sustained expansion of the economy, with the key driver being the level of real spending power freed up.

What are the economy wide impacts of a 4-year energy efficiency programme?

- We consider the importance of real spending power in delivering wider economy gains by splitting simulation of 4 year programmes to consider more and less able-to-pay UK households separately.

- The greatest sustained GDP increase, of up to £86.7 million per annum is possible, along with 1,545 new full-time equivalent (FTE) jobs, could be realised if only higher income (HG2-5) households are retrofitted. However, where economic returns are a secondary policy concern, a key outcome is that even if funding is entirely focussed in retrofitting lower income (HG1) households, social objectives, such as reducing energy poverty, can still be delivered alongside sustained positive wider economy returns, on a scale of net per annum gains of £63.4 million GDP gains and 957 FTE jobs.

- In all cases, value-added gains are driven mainly by sectors like 'Wholesale and Retail trade', 'Accommodation and Food Service Activities' and more widely the service sectors where households spend their increased disposable income. There are losses in exporting manufacturing sectors due to price increases as the supply constrained economy expands.

- Not managing the expectations of UK sectors, where subsequent 4-year programmes will follow, can drive GDP and employment losses under all funding approaches and intensify gross periodic and/or sectoral losses occurring even in a more optimistic scenarios.

Summary continued overpage

> "We find that energy efficiency improvement programmes can trigger long-term household income and economy-wide gains. While income gains lead to expansion of the economy, the key driver is the level of real spending power freed up"

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Summary continued

What are the economy wide impacts of a 15-year energy efficiency programme?

- We also consider a longer term, 15-year programme that fully meets the UK target to raise most households to EPC C by 2035, which overcomes the expectation issues of a staged programme, and where funding is more evenly spread across different households. Here, we find that a sustained GDP increase of £1,285 million per annum is ultimately possible, along with 22,545 new full-time equivalent (FTE) jobs, regardless of the funding option used.

- The timing of the retrofitting activity plays a significant role on the labour requirements in the sectors that deliver the retro-fittings and the economy-wide impacts in general. Early action means that over 135,000 skilled workers will be necessary in year 1, while under late action the requirements are raised to over 137,000 skilled workers in year 15.

What are the key takeaway points on how wider economy constraints and responses impact outcomes?

- Whatever the timeframe and focus of programmes simulated, we find that price pressures due to increased labour costs are the main limitation on the magnitude of long-run gains.

- While long-run results indicate positive impacts on the wider economy, we find that every funding option will lead to some transitory GDP losses, but the magnitude of these losses and their duration depends on the specific funding mechanism used.

- A key takeaway message is that it is important for policymakers to choose the appropriate promotion mechanism that will allow any negative impacts to appear in a time period in which they could be mitigated/offset by other net-zero measures, or at the very least in a year(s) where there are limited additional negative impacts from other measures.

“The timing of the retrofitting activity plays a significant role on the labour requirements in the sectors that deliver the retro-fittings and the economy-wide impacts in general.”

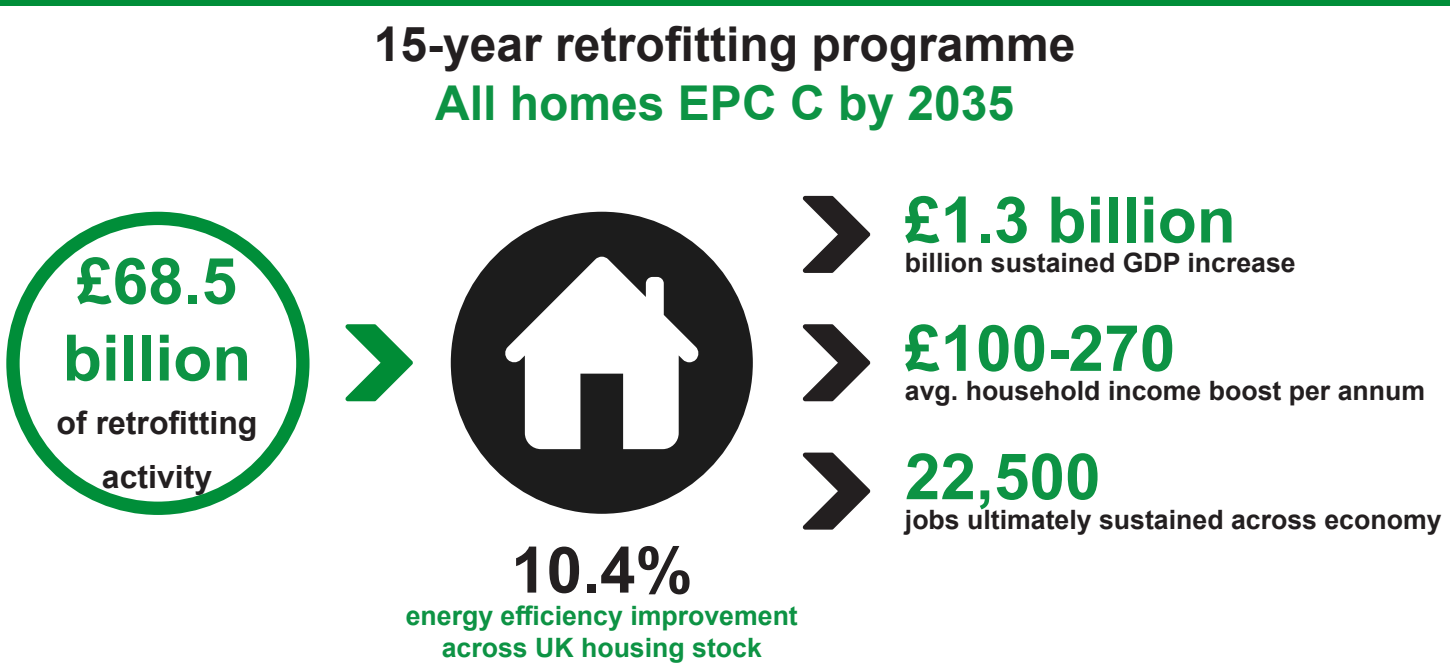
Scenarios modelled

We consider two broad policy approaches to address the question of whether greater GDP and employment gains could be achieved by supporting more substantial, specifically targeted and longer-term retrofitting programmes aimed at fully delivering the UK Government’s Clean Growth Strategy aspiration for as many homes as possible to reach EPC Band C by 2035. This involves simulating the impacts of

1. A short-term 4-year programme involving a total of £4 billion of retrofitting spending.

2. A long-term 15-year programme involving a total of £68.5 billion of retrofitting spending.

In all cases, the CGE modelling approach allows us to consider expansionary processes triggered by real income gains from reduced energy bills redirected to spending that stimulates other sectors of the economy. This, in turn, leads to a wider demand driven economic expansion that is reflected in sustained net gains in key variables such as GDP, employment demand and earnings from employment. It builds on more transitory expansion fuelled by delivering retrofitting projects to deliver macroeconomic gains that offset initial funding requirements.



Key Findings

1. Even short-term energy efficiency improvement programmes can trigger long-term household income and economy-wide gains

Our analysis of the 4-year programmes shows that improving the energy efficiency of households can drive positive outcomes in a range of economy-wide variables of policy interest, regardless of the focus between able to pay (HG2-5) and fuel poor (HG1) households. We consider the importance of real spending power in delivering wider economy gains by splitting simulation of 4-year programmes to consider more and less able-to-pay UK households separately. Under our central assumptions we find that:

- In the extreme case where energy efficiency improvements are focused in HG2-5 households, these lead to average income boosts between **£10.36 per household per year (HG2) and £19.3 per household per year (HG5). When funding is concentrated in supporting HG1 households to retrofit they experience income gains of £25.58 per household per year.**
- **Income gains lead to an expansion of the economy but the key driver is the level of real spending power freed up**. In the extreme, a sustained GDP increase of up to £86.7 million per annum is possible, along with 1,545 new full-time equivalent (FTE) jobs, when HG2-5 households are retrofitted. However, even if funding were entirely focussed in retrofitting HG1 households, this would generate net per annum gains of £63.4 million GDP gains and 957 FTE jobs, demonstrating the potential to deliver across climate, social and economic policy objectives.
- Our splitting of recipient groups in the simulations allows identification of potential lower and upper boundaries on the potential wider economy gains. That is, societal returns of 4-year £4 billion programmes range between **0.24 FTE jobs per £million spent or 1,574 FTE jobs per % unit of efficiency gains when only HG1 households are retrofitted and 0.39 FTE jobs per £million spent or 2,541 FTE jobs per % unit of efficiency gains when HG2-5 households are retrofitted.** The long-run societal returns only depend on the focus of the retrofitting activity, though the funding option adopted will affect the transition path, and societal returns generated by retrofitting activity alone.
- Sustained value-added gains are driven mainly by sectors like '**Wholesale and Retail trade', 'Accommodation and Food Service Activities' and more widely services,** i.e. sectors where households spend most of their income. **There are losses in exporting manufacturing sectors due to price increases as household demand drives expansion in constrained economy conditions,** where greater gains would be realised in the absence of price pressures driven by increased wage demands.

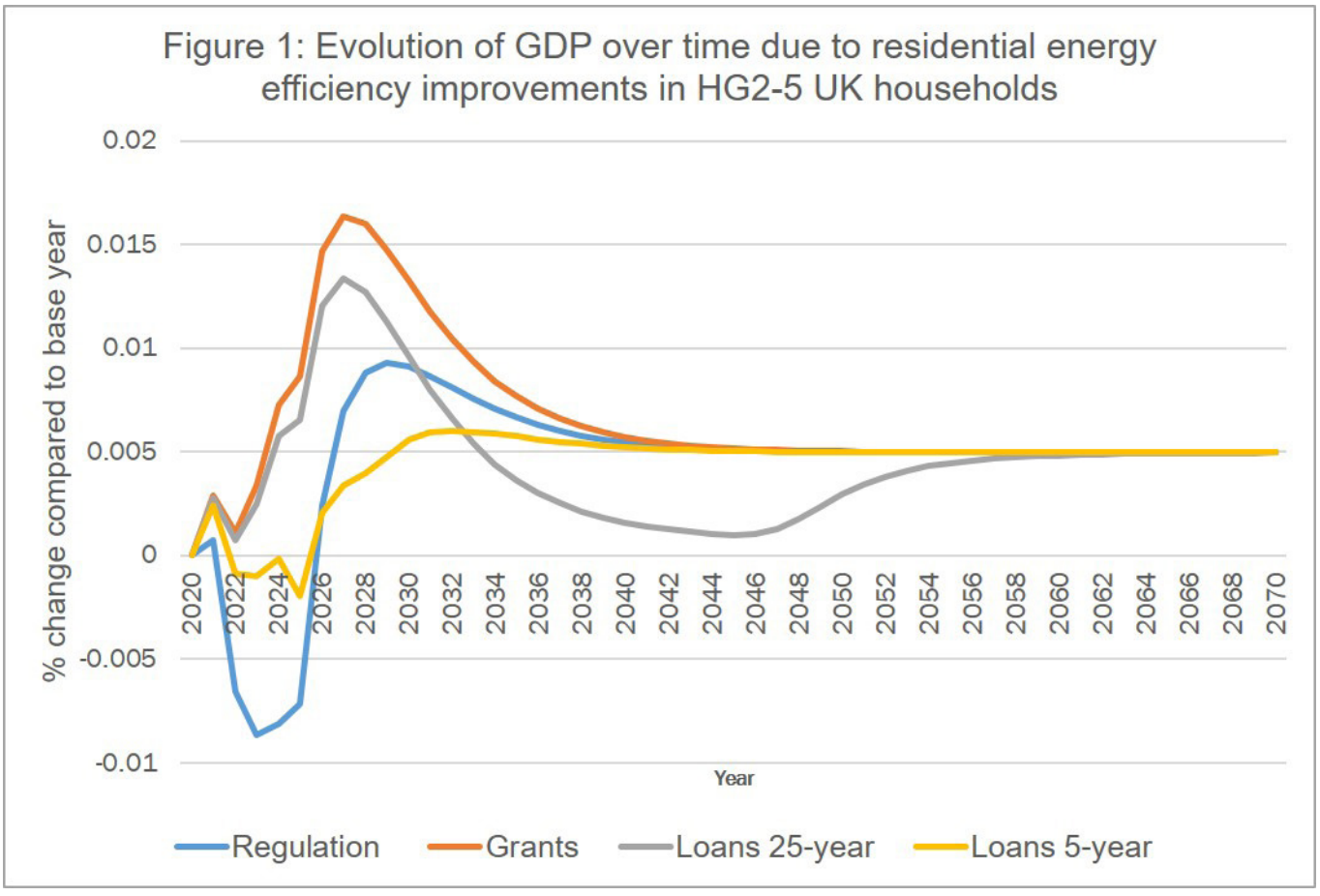
Key Findings

2. The funding option used can lead to a range of transitory impacts

The outcomes set out above are long-term outcomes, fully transpiring only after the economy has adjusted to the linked 'shocks' of retrofitting spending and realising residential energy efficiency gains. The shorter-term outcomes, and the transition pathway depends very much on how retrofitting programmes, and the efficiency gains enabled, are funded, and on the impact of the retrofitting activity itself.

Crucially, the choice of funding model affects the timing and both the duration and magnitude of some potential temporary negative impacts that may manifest, particularly during the enabling stage of the programme when the retrofitting activity takes place (See Figure 1). Such temporary losses are largely due to real household spending being dampened by the need to contribute to retrofitting costs combined with impacts arising in other sectors as prices rise in an expanding but constrained economy. In summary we find that:

- Using **Regulation and 5-year Loans** to promote efficiency improvements may lead to **transitory GDP and employment losses** during and following the enabling stage.
- **Not managing the expectations of UK sectors** where subsequent programme are likely to follow the end of the initial 4-year one (e.g. considering how the Energy Company Obligation (ECO) has operated in the past), **can drive GDP and employment losses** under every funding option and intensify the ones observed in central case.
- Efficiency improvements enable small long-run budget savings. **However, there are also transitory budget deficits under all funding options. The timing, magnitude and duration depends on the option taken forward.**



Key Findings

3. Shifting to more substantial longer-term programmes to meet the 2035 EPC C policy target could increase energy efficiency and wider economy gains

One route to removing any uncertainty over the future of the short-term programmes, particularly where Government has large-scale and longer term energy efficiency targets, is to announce a long-term plan that guarantees the achievement of the 2035 EPC Grade C goal for residential energy efficiency. Given the ambition, this naturally equates to a more costly programme over all and per annum, requiring a £68.5 billion plan spanning over 15 years. Crucially this reaches households across all income quintiles, thereby addressing fuel poverty concerns while exploiting the expansionary potential of freeing up spending power in more able-to-pay households.

Our analysis of the 15-year programmes shows, as with 4-year programmes, improving the energy efficiency of households can drive positive outcomes in a range of economy-wide variables of policy interest. The larger scale of the 15-year programmes means that their impacts will also be greater compared to the 4-year ones. Under our central assumptions we find that:

- The implementation of a **15-year programme can lead to average income boosts between £100.52 per household per year (HG1) and £271.58 per household per year (HG5).** The differences are driven by the amount of activity directed to each household group and also the differences in absolute residential energy consumption across different household groups.
- The household income gains, and most importantly the real spending freed up, trigger an expansion of the economy. **We find a sustained GDP increase of £1,285 million per annum (0.07% p/a) is possible, along with 22,545 (0.077% p/a) new full-time equivalent (FTE) jobs,** regardless of the funding option used.
- **A 15-year programme can achieve societal returns of 0.33 FTE jobs per £million spent or 2,167 FTE jobs per % unit of efficiency gains.** These returns are between the ones we found for the 4-year programmes as we have a mixed focus on household groups rather than the extremes we considered for the 4-year programmes.
- **As in the 4-year programmes, the absence of any price pressures due to increased labour cost can lead to significantly higher long-run outcomes.**
- Every funding option will lead to some transitory GDP losses but the magnitude of these losses and their duration depends on the specific funding mechanism used.
- Despite some funding option leading to a transitory government budget deficit, the efficiency gains enabled through a 15-year programme can lead to **sustained budget savings of £195 million per annum**.
- **The timing of the retrofitting activity plays a significant role on the labour requirements** in the sectors that deliver the retrofitting's and the economy-wide impacts in general. Early action means that over 135,000 skilled workers will be necessary in year 1, while under late action the requirements are raised to **over 137,000 skilled workers in year 15.** Steady action smooths out the labour requirements and the wider economic impacts. **The funding option can also influence the labour needs during the enabling stage, however, the impact of timing is far greater.**

Conclusions and policy implications

- Our analyses show that when energy efficiency is considered in the wider societal net zero context, there are important trade-offs that need to be taken into account before choosing the appropriate approach, be it a promotion mechanism or how to spread the activity across the duration of a longer-term programme. With some negative economic impacts manifesting in some timeframes and for some sectors in most cases, it is important for policymakers to choose the appropriate promotion mechanism that will allow negative impacts to appear in a timeframe in which they could be mitigated/offset by other net-zero measures, or at the very least in one where there are limited additional negative impacts by other measures.
- Crucially, though, when considering long-term programmes, policymakers need to carefully think whether to act early, late or with a steady pace. Constraints on the skilled labour required to deliver retrofitting at scale could effectively rule out acting in certain timeframes. But with long-term programmes also exceeding multiple parliamentary terms, policymakers need to carefully consider and identify the most viable approach in terms of securing ongoing support both in parliament and across society. Lack of support at any point can reduce the interest for retrofitting and lead to the loss of necessary financial resources, both of which can lead to a long-term programme delivering less efficiency improvements, and therefore economy-wide benefits, than those anticipated during the policy's design.

Further reading

- 'Meeting UK's 2035 energy efficiency goals: Securing greater wider economy benefit through longer-term programmes' by A. Katris, K. Turner and J. Stewart, Centre for Energy Policy Research Summary, June 2021. https://doi.org/10.17868/76997
- 'Can different approaches to funding household energy efficiency deliver on economic and social policy objectives? ECO and alternatives in the UK' by A. Katris and K. Turner, Energy Policy, 155, August 2021. https://doi.org/10.1016/j.enpol.2021.112375
- 'The need for a net zero principles framework to support public policy at local, regional and national levels' by K. Turner, A. Katris and J. Race, Local Economy, 35 (7), November 2020. https://doi.org/10.1177%2F0269094220984742
- 'Laying the Foundations for a Net Zero Society: Principles and Infrastructure for a Climate Resilient and Economically Sustainable Recovery' by K. Turner, A. Katris, J. Stewart, O. Alabi, C. Calvillo, J. Race, K. Swales, T. Mitchell and J. Andreas, Centre for Energy Policy and Bellona Foundation working paper, July 2020. https://doi.org/10.17868/72953
- 'Nudging policymakers: a case study of the role and influence of academic policy analysis' b K. Turner, O. Alabi and J. Race, Journal of European Public Policy, 8, 1270-1286, April 2020. https://doi.org/10.1080/13501763.2020.1742774
- 'Can the composition of energy use in an expanding economy be altered by consumers' responses to technological change?' by K. Turner, G. Figus, K. Swales, L. Ryan, P. Lecca and P. McGregor, The Energy Journal, 40 (4), 235-253. https://doi.org/10.5547/01956574.40.4.ktur
- 'Making the case for supporting broad energy efficiency programmes: impacts on household incomes and other economic benefits', by G. Figus, K.Turner, P. McGregor and A. Katris, Energy Policy, 111, 157-165, December 2017. https://doi.org/10.1016/j.enpol.2017.09.028

Method

- For detail on the methods and explanation of results, see 'Meeting UK's 2035 energy efficiency goals: Securing greater wider economy benefit through longer-term programmes'. In summary, we use a multi-sector economy-wide computable general equilibrium (CGE) model – UKENVI - to conduct dynamic scenario simulations to investigate how the implementation of residential energy efficiency programmes over different timeframes, targeted at different low income and/or more 'able to pay' households, may be expected impact employment and GDP across the wider economy depending on the approach to funding. The approach allows us to examine how outcomes in different timeframes are likely to be affected by different assumptions regarding responses and adjustment in all markets and all sectors of the UK economy.
- The results should be understood as scenario simulations to isolate the impacts of both enabling (through retrofitting of UK homes) and realising energy efficiency gains (less physical energy required to run people's homes), assuming that nothing else is acting to change activity across the economy, with our baseline data reflecting the real state of the economy prior to the implementation of energy efficiency actions. Note that our model database (based on 2016 UK analytical input-output data produced by ONS) predates the current COVID slump so that near term outcomes in particular may be regarded as conservative in terms of just how, and to what extent, capacity constraints may impact.

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