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Potential wider economic impacts of the Energy Efficient Scotland programme

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Key messages

Scenario: How might a 20-year programme of spending on residential energy efficiency impact the wider economy?

Based on a continuation of real spending on Scottish residential energy efficiency, but now in a new 20-year funding framework, we considered the impacts of £8billion in spending over 20 years on improving residential energy efficiency in Scotland. 20% of this is Scottish Government grants (all directed to low income households), a further 15% via the Energy Company Obligation (ECO) and 65% in household contributions (via interest free loans). Data compiled by the Scottish Government and the Energy Saving Trust suggest that this will lead to an average 9.6% reduction in energy required to run Scottish households by the end of the 20 year programme. And in the 20% of households with the lowest incomes, this rises to 13.2%.

Cumulative GDP impact: £7.8bn in real GDP over the next 30 years

We estimate that the combination of enabling energy efficiency gains, via the above spending, and the knock-on impacts of realising this gain on household spending power, could potentially deliver a cumulative boost of £7.8billion to Scottish GDP over the next 30 years (a timeframe that allows time for all loans on later spending to be paid off). This gain could be greater with more spending and/or realisation of efficiency gains, and vice versa.

Sustained rate of GDP expansion: 0.2% additional GDP over the long term

The GDP boost also equates to the sustained delivery of an additional 0.2% in Scottish GDP into the long term. This is estimated to be realised by the fifth year of the Energy Efficient Scotland programme, although it does fall back slightly for up to several years after the completion of the 20-year programme (and households are still paying off loans). This level of expansion in Scottish GDP (relative to what it would have been in the absence of the Energy Efficient Scotland programme) would be then largely sustained over the long term as the impacts of realising energy efficiency gains continue.

Real public spending multiplier: £5 GDP boost per £1 of public funds spent

If the estimated direct Government spending (grants) is taken as the key enabler of Energy Efficient Scotland activity, this suggests a 'multiplier' return of about £5 in GDP per £1 of public spending.

Jobs: 6,000 sustained jobs could be created

The GDP boost is estimated to be associated with around 6,000 sustained (full-time equivalent) jobs, realised in the fourth year of the programme and largely sustained into the long term, again with some contraction in the years following the end of the 20-year programme. During the programme itself, additional jobs (along with further peaks in GDP) would be associated with retrofitting activity etc., which we estimate would peak at just under 9,000 additional jobs in the sixteenth year.

The importance of realising energy efficiency gains to free up household spending

Over the long term, the sustained boost to jobs and GDP is driven by more energy efficient Scottish households having more spending power, rather than the (time limited) projects that enable this to happen. Overall, just under 64% of the estimated cumulative GDP impact of £7.8billion is associated with the impacts of Scottish households actually becoming more energy efficient and, thus, having more disposable real income freed up to spend on other things.

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The views expressed herein are those of the authors and not necessarily those of the International Public Policy Institute, University of Strathclyde.

I: Introduction: modelling the wider economic impacts of the Energy Efficient Scotland programme

The Centre for Energy Policy has previously blogged[1] and briefed[2] on how improving energy efficiency could potentially deliver a range of wider economic benefits. This includes our analysis of how an initial £20million spend (announced in autumn 2016) in the social housing and public sectors[3] may impact Scottish GDP, jobs and the public budget. Here we turn our attention to the new 20-year framework aimed at improving the energy efficiency of the wider housing stock that forms a core element of the newly launched Energy Efficient Scotland programme.

We use the multi-sector economy-wide AMOSENVI model to consider the impacts of a projected £8billion in spending over 20 years on improving residential energy efficiency in Scotland. Based on current real spending on residential energy efficiency, this total is likely to be composed of 20% (£1.56billion) in Scottish Government grants (all directed to low income households), 15% (£1.2billion) via the Energy Company Obligation (ECO) and 65% (£5.24billion) in household contributions (via interest free loans). These funds are to be spent on activities such as retrofitting, with the key sectors actually undertaking this work being the Scottish Construction industry and its up-stream supply chain. We label this the 'enabling' stage of the Energy Efficient Scotland programme.

We then go on to model the impacts of Scottish households actually realising energy efficiency gains, which are projected (based on estimated data provided by the Scottish Government and Energy Saving Trust) to manifest in a growing reduction in the spending on the energy required to run homes. We label this the 'realising' stage and model stepped year-on-year increases in energy efficiency enabled by the continued programme. The headline figure used to inform the model is an anticipated 9.6% reduction in energy required to run Scottish households by the end of the 20 year programme. In the 20% of households with lowest incomes, the equivalent figure is 13.2%.

II: The Enabling Stage: a large scale retrofitting programme in the Scottish residential sector

First, we consider the economy-wide impacts of the spending and retrofitting activity during the enabling stage outlined above. Before any efficiency gains are realised, activity in this stage is likely to impact the wider economy via what is a significant mid-range boost to activity in Scottish construction and other sectors on the production side of the economy. This boost in activity would involve increased employment and, in turn, enable more spending by workers and households. We estimate that the enabling stage of Energy Efficient Scotland's residential energy efficiency element

1 https://www.strath.ac.uk/research/internationalpublicpolicyinstitute/ourblog/january2017/thescottishgovernmentsenergyefficiencyprogrammepublicorprivatespending/
2 https://strathprints.strath.ac.uk/57955/
3 https://strathprints.strath.ac.uk/60669/

will deliver a cumulative (undiscounted) boost of £2.8billion to Scottish GDP over the next 30 years. Associated with this is a period of increased employment (relative to what we would observe in the absence of the Energy Efficient Scotland programme) that peaks at just under 5,000 additional jobs in the fifth year of the programme.

That there is a peak is important to note. Following this, the wider economic boost from the enabling stage alone loses power. This is partly because an increasing number of Scottish households are paying back the loans that finance their contributions (and, we assume, also paying indirectly for the ECO contribution through their energy bills). This will in turn limit the 'multiplier' effect of increased wage income and the consumption it supports.

However, the main reason the economic boost wanes after a peak is that the enabling stage does not really outlive the projects. Indeed, as the 20-year period of spending on retrofitting draws to a close, producers will begin to make other plans for their equipment and workers, which may lead to a gross contraction in economic activity for a few years at the end of the enabling stage. However, we would flag up at this point that this is likely to be offset by gains from the simultaneous positive impacts of actually realising energy efficiency gains (the 'realising stage', discussed below).

Nonetheless, it is important to consider how sectors of the economy may adjust at the end of a period of significant spending via a programme such as Energy Efficient Scotland. In this regard, the fact that the Scottish Government is pre-announcing a relatively lengthy 20-year framework to enable funding of energy efficiency gains *now* is important. Our research based on the earlier Home Energy Efficiency Programmes for Scotland, HEEPS – which we will report on in a separate CEP Policy Brief in the early summer – finds large differences in estimates of GDP and employment impacts depending on what we assume about just how long actors on the supply side of the economy expect the programme to last.

III: The Realising Stage: improving energy efficiency means that Scottish households will have more money to spend on other things

The realising stage is the source of any real long term and sustained boost to the Scottish economy. This is when households actually improve the efficiency with which they use energy. For example, installation of insulation enables households to use less energy to heat their homes to a given temperature for a given number of hours. The realising stage involves households adjusting their heating systems to benefit from this, thereby reducing energy bills and freeing up income to spend on other things. It is important to note that this is not just a reallocation of fixed real incomes. Rather, the fact that more energy efficient households can receive the same energy services as they did before at lower cost also means that there will be a positive boost in real income and, thus, purchasing power.

This is the real trigger for an anticipated sustained boost in economic activity: the boost to household spending power would be expected to deliver a direct demand boost to the sectors where people spend their money, which will ripple up supply chains and across markets. The more money is spent within Scotland, the bigger the boost will be. Note that the increased demand is likely to cause prices to rise, which in turn may cause some negative competitiveness effects in other sectors (for example export industries). Here, any impacts of this type are temporary while investment and the labour market adjust.

Our focus here is on headline indicators. Our key finding is that, over the long term, a sustained boost to jobs and GDP would principally be driven by more energy efficient Scottish households having more spending power. The enabling stage - the time-limited projects that enable this increase in spending power - is expected to have a smaller impact and one that is largely confined to the 20-year timeframe of the Energy Efficient Scotland programme.

We model the realisation stage using data compiled by the Scottish Government and the Energy Saving Trust. These data allow us to build up the size of the anticipated efficiency gain as more households improve their efficiency via the

Energy Efficient Scotland programme. The data suggest that by the end of the 20 year programme there will be an average 9.6% reduction in energy required to run Scottish households. In the 20% of households with lowest incomes, this rises to 13.2%.

To model the impact on the wider economy, we use a 30 year time frame (set to allow the households involved in the final years of the programme to pay off all loans). Overall, we estimate that the 'realising stage' will deliver a cumulative boost of around £5billion to real Scottish GDP and a long term sustained boost in Scottish GDP of 0.23% above what it would otherwise be (in the absence of any Energy Efficient Scotland activity).

It is also in realising the energy efficiency gains that a sustained boost to Scottish employment is likely to be delivered. As the realising and enabling stages interact from the outset (as efficiency gains start to spread), around 6,000 additional (full-time equivalent jobs) are generated by the fourth year of the Energy Efficient Scotland programme. It is only because of the lasting impact of the realising stage that this net gain (although not necessarily all the same types of jobs) is sustained into the long term - i.e. beyond the end of the 30-year timeframe we focus on. There are years where employment is likely to be higher, as the impacts of the enabling stage are maximised and the realising stage gains pace. Our simulations suggest a peak in additional employment that is estimated to reach just under 9,000 FTE jobs in the 16th year of the 20-year programme.

IV: So what may Energy Efficient Scotland's overall macroeconomic effects be?

To understand the overall picture, we modelled the two stages simultaneously. The headline result is that the combined effect of 'enabling' activity and the knock-on 'realising' impacts is estimated to deliver a gross undiscounted cumulative boost of £7.8billion to real Scottish GDP over the next 30 years. If we discount future GDP returns based on time to realisation, as may be the case in Government appraisal of public projects, the figure would be £4.8billion. Here, as we are working with undiscounted real spending estimates, we do not discount the returns in the headline results reported.

The sustained boost to the economy would also be expected to deliver additional revenues and we estimate that cumulative savings of around £0.7billion could be delivered to the public budget. While this figure is less than half of the estimated initial Government outlay (£1.56billion), how the outcome is viewed in terms of 'value' for public money depends on the perspective taken.

For example, suppose we take the perspective that the direct Government spending (grants), despite being directed to support only low income households, acts as the key enabler of all of the Energy Efficient Scotland activity modelled here (i.e. stimulating the ECO and household contributions). This may be particularly appropriate given the 20-year commitment to the programme being made by Government now. Then the estimated cumulative real GDP boost of £7.8billion set against the projected £1.56billion public spending commitment suggests a 'multiplier' return of about £5 in GDP per £1 of public spending. Depending on how we view GDP as a measure of Scottish economic well-being and prosperity this may or may not be viewed as a healthy return to public money.

Similarly, the sustained (full-time equivalent, FTE) jobs boost of around 6,000 suggests creation of around 4 jobs per £1million of public money spent. Is this a price worth paying? Of course we need to set this against the wider range of benefits that are likely to be delivered by the Energy Efficient Scotland programme. The analysis reported in this Policy Brief has not considered any benefits to health or, in turn, any implications for health spending. Nor have we considered benefits in terms of greenhouse gas emissions reductions.

Our results did extend to consider impacts on household groups with different income levels. Our simulation results suggest that, due to a combination of lower energy bills and the economy-wide expansion, all households will enjoy real income gains. Our initial findings suggest that the 20% of households with lowest incomes will ultimately benefit from a 3.9% reduction in spending on energy coupled with a 0.8% boost in real incomes. Thus, the Energy Efficient Scotland programme can be expected to contribute to

reducing fuel poverty.

For reasons of simplicity and ease of reporting, our modelling work at this stage focusses on the impacts of the Energy Efficient Scotland programme in the absence of complicating factors such as whether the Scottish Government may need to adjust the Scottish Rate of Income Tax to pay for the programme. Similarly, we did not attempt to model against a baseline that may be complicated by rapidly changing economic circumstances (as may be expected, for example, in the context of Brexit). Finally, we do not attempt to incorporate any further changes in technology or configuration of the energy system. These are issues that we aim to return to in future research.

More generally, a key point to note is that economic models - such as the one we've used here and those used in Government to appraise the impact of programmes like Energy Efficient Scotland - can only ever generate estimates based on projections about how the programme should work. Here, the outcomes reported depend on ECO and household financial contributions following those of the Scottish Government, and households successfully working with retrofit technology to reduce their energy requirements.

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