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EFFICIENT ENERGY POLICY

How to encourage improvements in domestic energy efficiency

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About the Author

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Executive Summary

There is a clear case for improving the energy efficiency of UK homes. Improving energy efficiency can significantly reduce household energy bills, contribute to meeting decarbonisation objectives at low cost, and reduce fuel poverty and the associated health effects of living in a cold home. It can also improve the security of supply of energy by reducing the overall demand for electricity and gas, reducing the need to build new power stations, and reducing fossil fuel imports.

The UK has made great strides in improving energy efficiency and reducing energy consumption. Household consumption of electricity and gas fell by 23% over the period 2004-14 (or by 28% per person once the effects of population growth are taken into account).[1] Two thirds of the reduction in gas consumption over the period 2006-10 can be explained by improvements in energy efficiency.[2]

However, the UK still has amongst the least efficient housing stock and highest rates of fuel poverty in Europe.[3] Progress in improving energy efficiency is slowing: the Government is targeting 1 million homes to receive energy efficiency measures during this Parliament, compared to 4.5 million during the last Parliament.[4] There is still huge potential to improve domestic energy efficiency. Research shows that a more ambitious approach to energy efficiency could deliver carbon savings of 24 million tonnes of CO_2 per year by 2030 – equivalent to taking more than 10 million cars off the road – and save households a total of £8.6 billion per year in energy costs.[5]

The UK is now at a crossroads for energy efficiency policy. The failing Green Deal scheme has now been all but abandoned, having provided energy efficiency loans to just 16,000 households against the original ambition for it to support "millions of homes and businesses".[6] This leaves a major policy gap in terms of how to encourage energy efficiency in "able to pay" households. The current Energy Company Obligation is due to come to an end in 2017. The Government has committed to a future supplier obligation from 2018, focused on fuel poverty rather than carbon reduction, albeit with a reduced budget.[7] The Government recognises the importance of improving energy efficiency and reducing fuel poverty[8], but at present is not delivering against this ambition. There is clearly a need for new thinking in this area.

Against this backdrop, this report considers four policy proposals to encourage energy efficiency, in particular focusing on "able to pay" households (as opposed to fuel poor households which we considered in our previous report, *Warmer Homes*). These proposals were presented in an "Energy Efficiency Dragon's Den" held by Policy Exchange in November 2015[9], and have subsequently been tested and refined.

In assessing these proposals we were keen to identify proposals which use market mechanisms to encourage energy efficiency, and which can be delivered at low or zero cost to government. Research into consumer behaviour suggests that households are more likely to undertake energy efficiency improvements as part of a wider home renovation, rather than on a standalone basis. Indeed the failure of the Green Deal model is in part linked to the fact that households were not convinced to improve energy efficiency based on energy bill savings alone. Therefore we have focused on policies which structurally embed energy efficiency into the housing market by linking it to the process of purchasing and renovating a home, rather than promoting energy efficiency in isolation.

Policy Proposals

Based on our analysis, two policies which appear to offer significant potential are:

- **Linking the Stamp Duty system to the energy performance of a dwelling** to create an incentive for homebuyers to purchase a more efficient dwelling; and
- **Reforming mortgage affordability tests** to better reflect the energy performance of a dwelling, and to **encourage lenders to offer energy efficiency mortgages**.

These proposals are complementary, and could be taken forward in combination. The Stamp Duty proposal would operate across the entire housing market whenever a property is sold, whilst the reforms to mortgage affordability tests would apply to mortgaged properties, which make up one third of the housing market. The policies would influence purchasing behaviour by reducing the transaction costs and increasing the size of mortgage available for a more efficient home. This would feed through to an impact on house prices, with energy efficient homes attracting a premium. In turn, it is expected that this would encourage home-owners to invest in the energy performance of their home prior

to sale in order to increase its saleability and price. The proposed changes to mortgage affordability tests would also encourage mortgage lenders to offer energy efficiency mortgages to finance energy efficiency upgrades: a very low cost form of finance compared to the loans previously available under the Green Deal model.

The policies do not require any public subsidy, and the Stamp Duty reform can be designed to be fiscally neutral. The policies would be relatively straightforward to implement, although they would require a cross-Government approach involving DECC, HM Treasury, and the Financial Conduct Authority. All of the information required on the energy performance of a dwelling (for both policies) is available at the point of purchase through mandatory Energy Performance Certificates. Mortgage providers are likely to support the proposed changes to affordability tests, since they reduce their risk exposure. The reforms to Stamp Duty could be brought in gradually, initially setting a cap on the maximum adjustment in Stamp Duty.

Additional intervention to encourage energy efficiency in the private rented sector is likely to be required in addition to these policies – in particular due to the split-incentives between landlords and tenants. The Private Rented Sector Energy Efficiency Regulations (2015) go some way to addressing this by obliging landlords to achieve minimum energy efficiency standards by 2018. However, the regulations have been undermined by the removal of the Green Deal as a mechanism for financing improvements. **On this basis, the Government should also revisit and strengthen the Private Rented Sector Energy Efficiency Regulations.**

Barriers to Energy Efficiency

In considering potential policy options to promote household energy efficiency it is worth briefly considering the market failures and barriers which hold back households from improving energy efficiency. The case for government intervention in energy efficiency is typically made on the basis that left to their own devices, households would under-invest in energy efficiency. This is partly an argument about "externalities": households tend not to consider the environmental costs associated with energy use (e.g. greenhouse gas emissions) when choosing whether to invest in the energy performance of their home. However there are a range of other financial, non-financial and behavioural factors which may also inhibit investment in energy efficiency, and strengthen the case for government intervention (Table 1).

Table 1: Market Failures and Barriers to Energy Efficiency Investment[10]

Categories	Examples
Financial	• High up front costs • Lack of finance / access to capital • High discount rates, potentially due to uncertainty about future savings • Risk of stranded investments - e.g. inability to recoup investment if you move house
Hidden costs / risks	• Transaction costs • Hassle factor (e.g. time spent clearing a loft in order to have it insulated) • Time taken to evaluate and implement energy efficiency investments • Performance risks, service and quality of workmanship
Information	• Lack of information or imperfect information • Lack of awareness or time to investigate opportunities
Misaligned incentives	• Split incentives between person responsible for making investment and person who benefits (e.g. landlord/tenant or builder/homebuyer) • Failure to internalise environmental or other external costs
Behaviour and motivation	• Traditions, sticking to 'defaults', reluctance to alter lifestyle • Values, preferences, social norms • "Bounded rationality" – households systematically underestimating benefits of energy efficiency, and ignoring small opportunities

A range of previous energy efficiency schemes have attempted to tackle one or more of these barriers, some more successfully that others. Many early schemes simply sought to provide information and guidance to consumers on energy efficiency opportunities in order to address an information failure. The Green Deal provided information in the form of energy efficiency assessments, and supplemented this with energy efficiency loans and grants to address barriers to finance. It was firmly rooted in the proposition that households would invest in energy efficiency if they could see that the financial benefits would outweigh the costs. However, as we have documented previously[11], the Green Deal loans turned out to be unattractive, as the loan rate was very high, and potential applicants were put off by the complexity and restrictive nature of the scheme.

Moreover, many energy efficiency experts have questioned the proposition that households will respond rationally to energy savings alone. The Behavioural Insights Team (2011)[12] argue that "the behaviours of individuals can deviate greatly from a standard rational choice model, in which people objectively weigh up the costs and benefits of investing time and money into 'greening' their homes and being more energy efficient." Research by Oxera (2006) found that a household's decision to undertake energy efficiency improvements is generally influenced less by the value of future energy savings than by the upfront cost of the energy efficiency upgrade.[13] The Energy Technologies Institute goes further, arguing that "the Green Deal pay-as-you-save type design is fundamentally flawed in that it assumes the main motivation for installing energy efficiency measures would be cost savings… [the] consumer has not been sufficiently excited and attracted by the proposition."[14] The UK Green Building Council (UKGBC) argues that the failure of the Green Deal was due to a "fundamental lack of demand" and that a "finance mechanism alone is insufficient to create a mass market for energy efficiency."[15]

So, if not energy savings, then what would motivate households to consider energy efficiency improvements? Wilson et al (2013) carried out research to answer this very question.[16] They found that energy efficiency improvements are rarely carried out in isolation and more commonly take place as part of wider home renovations. They also emphasise the potential for efficiency measures to address wider domestic challenges, such as improving warmth and comfort, and making better use of space. Similarly, Consumer Focus (2012)[17] suggests that energy efficiency should be presented to households on the basis of improving warmth, rather than reducing bills. Wilson et al (2013) recommend that energy

efficiency policies should seek to bundle energy efficiency in with wider home renovation opportunities, rather than presenting it as a discrete activity. There is also evidence that people are more likely to pursue energy efficiency investments at certain "trigger points" or "moments of change", such as moving home, or undertaking renovations in an existing home, since they are already prepared for disruption at these times.[18] In the case of heating systems, research has shown that most households only consider an upgrade when their existing system fails or starts to need considerable repairs, and are far less likely to consider a replacement based on cost savings alone.[19]

Related to this, there is mixed evidence on the extent to which energy efficiency influences home-buying behaviour. In a study by Laine (2011)[20] just 18% of homebuyers said that energy performance influenced their choice of home, with other factors such as price, size, location, outdoor space, parking and amenities tending to take precedence. However, more recent polling of home-buyers showed that 59% of people would reduce their offer for a house if they found out it had a poor energy efficiency rating, and a further 16% of people would walk away entirely from the purchase.[21] The same study suggests that energy efficiency is now a more significant factor in purchasing decisions than factors such as out of date kitchens and bathrooms, or a poor mobile phone signal, but remains less significant than other factors such as noisy neighbours, noise from aeroplanes, or poor security. Recent research also suggests that energy efficiency performance already has a bearing on house prices: prices per square meter are 14% higher for the most efficient properties across England, compared to the least efficient properties.[22] However, these trends may not be known or understood by homeowners, weakening the incentive to invest in energy efficiency. On this basis UKGBC (2015) suggest that "to drive a genuine market for energy efficiency, structural policy drivers are needed which…start to link energy efficiency to property prices."[23]

Overall these insights suggest that a change in emphasis is required. One of the failings of the Green Deal is that it presented energy efficiency as a standalone opportunity, with a value proposition based on energy savings alone. The evidence suggests that policies may be more successful if they are "structurally embedded in the housing market"[24], with a value proposition based on improving comfort and property values, and linking energy efficiency to trigger points such as purchasing or renovating a home. These concepts are picked up in the first two proposals we consider in this report.

Variable Stamp Duty

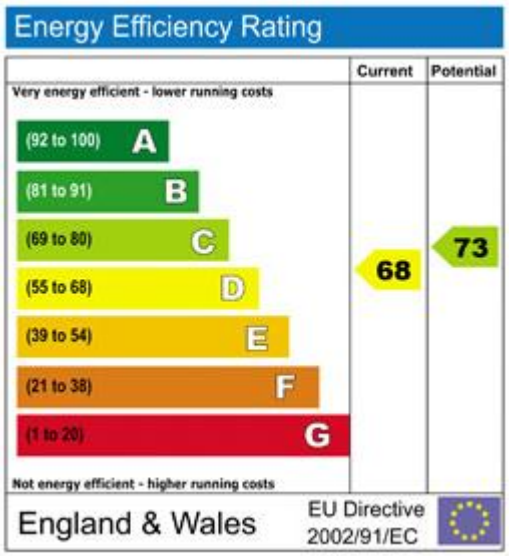
The first proposal we consider is to link the Stamp Duty Land Tax (SDLT) system to the energy performance of a home, creating a financial incentive for home-buyers to purchase a more efficient home, and for homeowners to improve the energy efficiency of their home. This idea has been discussed previously by the Energy Savings Trust (2002)[25], Dresner and Ekins (2004)[26], ACE (2011)[27], UKGBC (2013)[28], Willmott Dixon (2013)[29], and the Energy and Climate Change Committee (2014).[30]

Policy Proposal

Stamp Duty is a tax paid by homebuyers at the point of purchase, with the amount currently determined by the value of the property. The core of this proposal is to reform SDLT to link it to both the value of a property and its energy efficiency performance. In order to implement this, the Government would set a benchmark energy efficiency level on the basis of an Energy Performance Certificate SAP score (see Box 1). The amount of SDLT paid would be adjusted upwards for inefficient properties below the benchmark level, and downwards for more efficient properties above the benchmark level (alternatively the scheme could just provide discounts for more energy efficient properties, but this would imply a loss of tax receipts). This would create an incentive to encourage home-buyers to purchase a more efficient home, and for home-owners to improve their home (the impact is discussed further below).

Box 1: Energy Performance Certificates

Under the Energy Performance of Buildings Regulations (2007), it is a requirement when selling or letting a property to produce an Energy Performance Certificate (EPC), which scores the energy performance of a property. Performance is classified according to EPC Bands (A-G rating) and a SAP score (Standard Assessment Procedure). The average dwelling in England and Wales has a SAP score of 60, which is within EPC Band "D".



Below is an illustrative example of how the policy could work in practice for three homes of average value (we assume the median UK house price of £220,000)[31] but differing energy performance. This assumes a benchmark efficiency level set at a SAP score of 60, and an adjustment in the Stamp Duty liability of 1% per SAP point. As shown, this would create a difference in Stamp Duty liability of over £1,000 between a more and less efficient home. (Note: these parameters can be altered by Government to create a larger or smaller adjustment if desired)

Table 2: Illustrative Example of Variable Stamp Duty Calculation

Property Value	£220,000		
Current Stamp Duty liability	£1,900	£1,900	£1,900
SAP Score (EPC Band)	30 (F)	60 (D)	86 (B)
Deviation from benchmark (SAP points)	-30	0	26
Stamp Duty adjustment	+30%	0%	-26%
Adjusted Stamp Duty liability	£2,470	£1,900	£1,406

This proposal can be designed to be fiscally neutral relative to the existing SDLT system by setting the benchmark such that upward and downward adjustments in SDLT liabilities balance out. The benchmark level could be revised periodically to ensure that revenue neutrality is maintained as energy efficiency performance is improved across the housing stock. Alternatively the Government could indicate that the benchmark will be raised over time in order to encourage an improvement in energy efficiency.

A possible variant to this proposal would be to offer a rebate to buyers of less efficient properties if they undertake energy efficiency renovations within a certain period of time (e.g. 12 months) from the point of purchase. This would create an additional incentive for homebuyers to upgrade a home after purchase. The rebate amount would be determined by the level of improvement in energy efficiency, either on the basis of the formula above, or an amount per SAP point. The rebate policy could be taken forward either in combination with the core proposal to link Stamp Duty to energy performance, or on a standalone basis.

The revisions to the stamp duty system would be relatively straightforward to implement. The system could be operated via a secure online portal, in which conveyancing solicitors or home-buyers would input the property value and EPC reference number in order to calculate the adjusted SDLT liability or rebate. The information required to perform this calculation is already available at the point of sale for all properties.

Impact

This proposal could potentially have a significant effect, influencing consumer behaviour and property values across a large section of the housing market. It would apply across all housing tenures, whenever a property is sold. There were 1.2 million residential property transactions in 2014, of which 850,000 incurred stamp duty, with the remainder below the £125,000 threshold for SDLT.[32]

A variable stamp duty system would create a direct incentive for buyers to purchase a more efficient dwelling as they would pay a lower amount of stamp duty. This would lead to a change in pricing, with more efficient homes attracting a premium. As discussed in the previous section, there is some evidence of energy performance influencing purchasing behaviour, but this may not be sufficiently understood by homeowners, weakening the incentive to invest in energy efficiency. Linking stamp duty to energy efficiency would create a much clearer financial incentive, reinforcing the premium attached to more efficient homes.

This in turn would create an incentive for home-owners to invest in the efficiency of their home prior to sale. As discussed above, homeowners tend not to think about energy efficiency in isolation. Linking property values and transaction costs more explicitly to energy performance would increase the likelihood of homeowners pursuing energy efficiency alongside other upgrades during their occupancy. Over time this would lead to greater engagement by the likes of estate agents and builders, who would encourage householders to invest in energy efficiency and increase the value of their home. Overall, research suggests that this proposal could lead to between 135,000 and 270,000 households per year undertaking energy efficiency improvements.[33]

Potential Issues

The proposed reform to stamp duty would result in some buyers paying more tax and some less tax, according to the energy efficiency of the property they purchase. The Government would need to design the policy in such a way that it creates some difference between more and less efficient properties, but that these differences are not too extreme. For example, by making the adjustment in percentage terms rather than in absolute terms, the impact will vary with the value of the home and the ability of the purchaser to pay any additional stamp duty. Indeed, since stamp duty is not paid on properties below £125,000, there would be no impact on lower value properties at all. The adjustment in SDLT

could also be capped at a set level – for example such that the adjustment in Stamp Duty would be no more than +/- £2,500, regardless of the value of the property. The reforms could also be phased in gradually, initially setting a narrow band in the adjustments to stamp duty, and widening this once the new system has bedded down.

Another potential issue with the variable stamp duty proposal is the opportunity it creates for fraudulent activity, specifically the risk that EPC assessors produce a more favourable assessment in order to trigger a financial reward (or reduce a financial penalty). In order to mitigate this, random independent audits would need to be carried out on a sample of EPC assessments, with sanctions for assessors who produce inaccurate assessments.

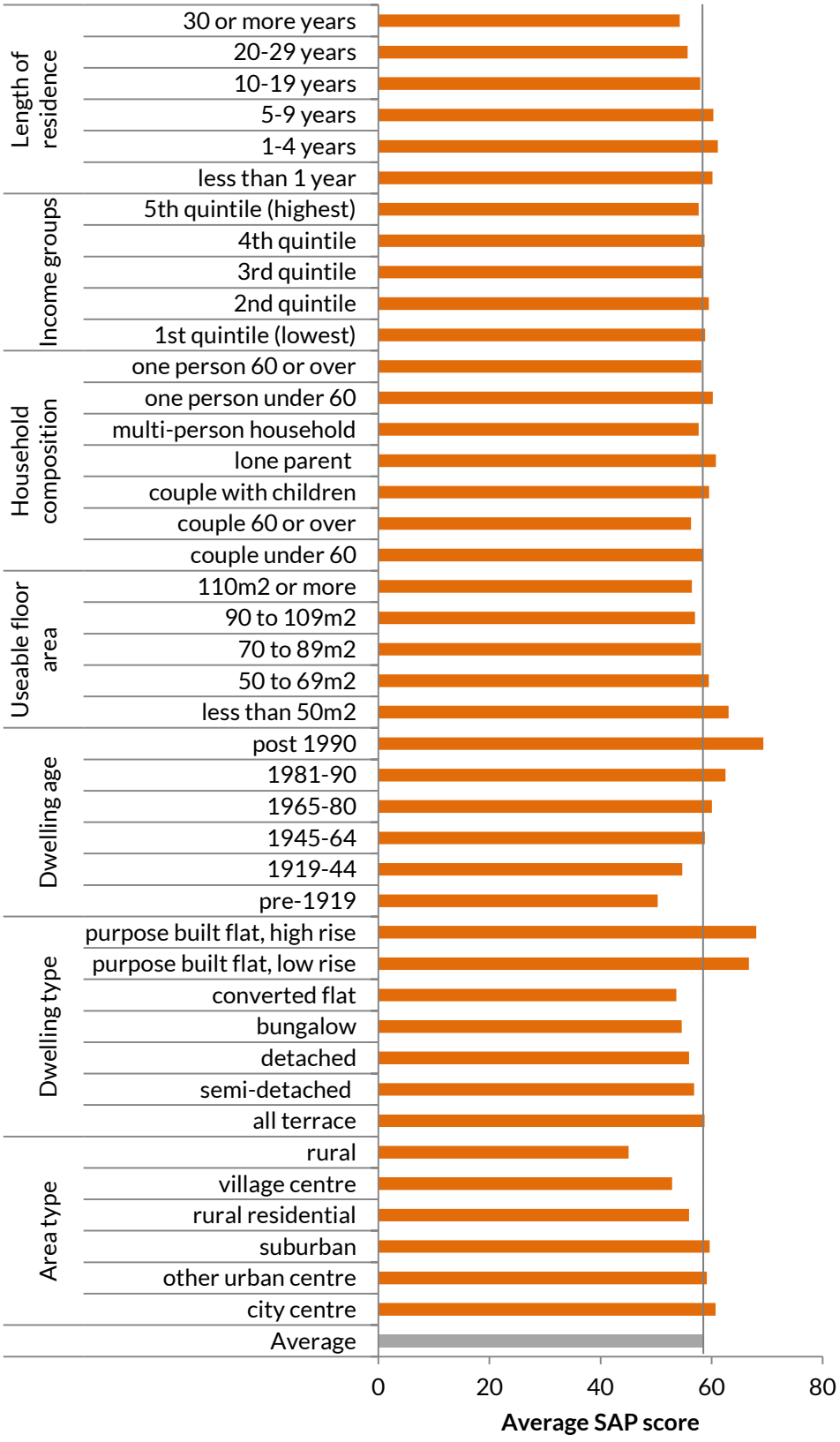
Finally, in implementing this policy, the Government would need to ensure that it does not give rise to unacceptable distributional impacts or impacts on specific groups of people. Data from the English Housing Survey (2013) shows that there is a significant variation in energy efficiency according to dwelling age and type, but that energy efficiency is not linked to social demographics such as household income or household composition (Figure 1). Therefore it appears unlikely that a stamp duty system which reflects energy efficiency would in fact give rise to significant distributional effects.

Summary

Overall the proposal to link Stamp Duty to the energy efficiency of a home has significant merit. It can be used to create new incentives for homebuyers to purchase more efficient properties, and for homeowners to upgrade the energy efficiency of their property both before and after a sale. There are a number of variations possible, for example creating a Stamp Duty rebate mechanism for homeowners who improve the energy efficiency of a property after a purchase.

The scheme would apply across the entire housing market whenever a property is sold. The proposal is relatively straightforward to implement, and can be designed to be fiscally neutral versus the current SDLT system. Whilst there are a number of potential issues, these can be mitigated through policy design. This proposal was tested at Policy Exchange's "Energy Efficiency Dragons Den" and was identified as by far the most popular proposal.

Figure 1: Average SAP Score by Dwelling and Household Characteristics



Green Mortgages

The second proposal involves changes to residential mortgage products and regulations in order to stimulate and finance investments in energy efficiency by households. It has been proposed by the UKGBC (2015)[34], as well as the Wales Low / Zero Carbon Hub (WLZCH, 2015).[35]

Context

When assessing the affordability of a mortgage, lenders historically used "income multiples" to set maximum borrowing levels. In response to high-risk lending practices observed in the lead up to the financial crash in 2008, the then Financial Services Authority undertook a Mortgage Market Review (MMR) which brought in a series of reforms to lending practices. As a result, lenders are now required to undertake a detailed assessment of income and expenditure in order to assess the affordability of a mortgage, considering all major household expenditure items including utility bills.

However, the MMR legislation is not prescriptive about *how* energy and other utility bills should be assessed. Research by UKGBC[36] shows that mortgage lenders currently take only the most basic details into account when assessing energy costs, despite the fact that energy costs are one of the largest items of household expenditure (at 6% of the average household budget and over 11% for the poorest households).[37] Lenders generally do not take into account the energy costs or energy efficiency of the property being purchased, despite the fact that this information is available at the point of sale through the EPC (which is required for all property sales).

The implications of this are significant in terms of how lenders calculate maximum borrowing levels, and their exposure to risk. The current methods for assessing affordability do not provide an accurate assessment of likely energy expenditure, which means that maximum borrowing levels may be set too high or low for individual mortgages. Lenders could be offering mortgages to purchasers of less efficient properties which are too large, by underestimating the true running costs of the property. This could impact on purchaser's finances, and at the extreme could contribute to a higher default rate against these mortgages. Conversely, a household purchasing a more efficient property should be able to afford a larger mortgage than is currently offered, since their actual energy costs

are likely to be lower than lenders' estimates. Analysis by WLZCH (2015) suggests that owners of more efficient properties have energy bills £1,000 lower per year on average than owners of less efficient properties (comparing a property with a SAP score of 80 against a SAP score of 40). This difference in available income should allow the owner of the more efficient property to afford to borrow an additional £15,600 (assuming a typical repayment mortgage with 5% repayment rate), but as it stands this would not be picked up through a mortgage affordability assessment. In both cases it is in the lender's interest to factor in a more accurate assessment of energy costs into mortgage affordability calculations, yet it appears that this is not common practice.

Policy Proposal

UKGBC has proposed that lenders should be encouraged to adopt more energy conscious lending practices.[38] Their research has shown that if mortgage providers were to consider additional variables such as the EPC rating, and dwelling type, age and size, then this would significantly improve the accuracy of mortgage affordability calculations.[39] This would allow purchasers of more efficient homes to borrow a larger amount, as well as reducing risk exposure for mortgages against less efficient properties.

In order to implement the proposal, the Government would need to work with lenders to improve mortgage affordability calculations, with changes made either on a voluntary or mandatory basis. The proposal could be implemented through minor amendments to the Mortgage Market Review (MMR) legislation, requiring lenders to factor in an accurate assessment of energy costs. The existing MMR rules already allow "known positive changes" to be considered in a mortgage affordability assessment, and specifically cite the example of where "energy efficient work has been undertaken to significantly reduce energy bills on the mortgaged property".[40] However the legislation could go further than it does at present.

Green Mortgage Extensions

An extension of the proposal would be for lenders to provide mortgage extensions for households to invest in improving the energy performance of their home. Many lenders offer mortgage extensions for existing customers, but there is only one product currently available which ties this to energy efficiency specifically - the "Green Additional Borrowing Service" offered by Nationwide

Building Society. This product allows existing mortgage customers to take out a loan of up to £20,000 to undertake energy efficiency improvements at a discount of 0.5% below the normal rate for mortgage extensions.

If mortgage affordability checks were linked to the energy efficiency of the property, then logically a mortgage extension could be offered conditional on the household spending some or all of the money on improving the energy performance of their home. By using a mortgage extension to pay for energy efficiency upgrades, the householder would be able to reduce their energy costs, and therefore maintain or improve the overall affordability of their mortgage, whilst also creating a more comfortable and energy efficient home. Research by WLZCH (2015) suggests that a mortgage extension of £15,600 could be justified in the case of a household making significant improvements in the energy efficiency of their dwelling (e.g. from a SAP score of 40 to a SAP score of 80). To date this type of product has not become widespread, but the proposed changes to mortgage affordability tests may spur lenders to innovate in this area.

Impact

The impact of these proposals could potentially be significant due to the number of households affected. The most immediate effect would be on households taking out a new mortgage (or re-mortgage) of which there are around 850,000 per annum.[41] Improving mortgage affordability checks would force lenders and purchasers to pay more attention to the energy running costs of a property, and would allow purchasers to borrow a larger amount against a more efficient property. This would encourage purchasers to buy a more efficient property, which as with the Variable Stamp Duty proposal described above, would feed through to an impact on house prices. This in turn is likely to spur households to improve the energy efficiency of their home prior to sale in order to make it more attractive to potential buyers.

The roll-out of energy efficiency mortgage extension products would have a direct impact on investment in energy efficiency; providing an extremely low cost way of households financing energy efficiency investments, and linking energy efficiency improvement to wider home renovation. One of the criticisms of the failed Green Deal mechanism was that loans were offered at a relatively unattractive rate of around 8% APR.[42] Financing energy efficiency improvements through a mortgage extension would allow households to borrow at much lower rates – for example Nationwide's Green Additional Borrowing Service is currently

available at an initial rate of 1.49%, reverting to the standard variable rate of 3.99% after two years.[43] This type of product could be offered to all existing mortgage customers, significantly expanding the potential scope and impact, since there are around 7.8 million households with a mortgage in England and Wales alone (or 33% of all households).[44]

Potential Issues

A potential barrier to the adoption of new mortgage affordability tests is simply the additional complexity involved for lenders and purchasers. The proposal requires property details to be fed into the mortgage affordability calculation. This could be problematic, since it is common practice for lenders to make an "agreement in principle" offer before details of the property have been confirmed. One way around this would be for lenders to make a conditional offer, for example to lend up to £200,000 for an 'A' rated property, £195,000 for a 'C' rated property, £190,000 for an 'E' rated property, and so on. This would reinforce the incentive for buyers to consider more efficient properties. The mortgage affordability test would need to be finalised once property details have been confirmed.

Another potential issue with this proposal is the impact it could have on the provision of mortgages for less efficient properties. The implication of UKGBC's analysis is that banks may be over-lending against less efficient properties. If affordability tests are refined then this could mean that lenders reduce the amount they are willing to lend against less efficient properties - indeed this is the rational response for lenders from a risk management perspective. To an extent this is an appropriate feature of the proposal, since it would encourage lenders and prospective buyers to factor in energy running costs when considering the affordability of their mortgage. However at the extreme it may drive buyers away from the least efficient properties, negatively impacting on the value of these properties. As with the Stamp Duty proposal discussed above, this would create an incentive for owners of less efficient properties to improve their property prior to sale.

Finally, there may be an issue related to the accuracy of EPC assessments. UKGBC (2015) points out that whilst EPCs provide a better indication of likely energy costs than current assessment methods, they are still far from perfect. Indeed UKGBC is now leading a follow-up project to further test the use of EPC data in estimating energy costs for mortgage purposes.[45]

Summary

Improving mortgage affordability tests to better reflect the energy running costs of a property could encourage purchasers to consider more efficient properties. This would also encourage home-owners to improve the energy efficiency of their property in order to improve its saleability and price. The creation of energy efficiency mortgage extensions would create a low-cost financing route for households to invest in energy efficiency improvements. A key strength of these proposals are that they require no ongoing investment by government, and can be achieved relatively simply through changes to lending practices under the Mortgage Market Review. Moreover, it would be in the interest of lenders to accept these changes as it would reduce their risk exposure.

Demand Reduction Obligation

The third proposal is to place a new obligation on energy suppliers to reduce their customers' energy consumption over time. It has been proposed by the Centre for Sustainable Energy (CSE)[46] and has been referred to either as the "Average Customer Consumption Reduction Obligation", or more simply as the "Demand Reduction Obligation" (DRO).

Context

Over the last twenty years or so, Government has created a number of different policies and regulations which oblige energy suppliers to provide energy efficiency measures to customers. The current energy supplier obligation is known as the Energy Company Obligation (ECO), and has been in place since 2012. Previous supplier obligations include the Carbon Emissions Reduction Target (CERT) and the Community Energy Saving Programme (CESP). The objectives of these policies have been either to provide energy efficiency measures to fuel poor households, to achieve carbon savings across all households, or a mix of both.

ECO has three distinct targets focusing on improving energy efficiency in fuel poor households, deprived areas, and "hard to treat" properties such as those with solid walls. ECO generally focuses on more expensive energy efficiency

measures such as boiler replacement and solid wall insulation, whereas previous schemes focused on lower cost measures (e.g. loft and cavity wall insulation, and lighting).

The ECO scheme is due to come to an end in April 2017. The Government recently signalled its intention to create a new supplier obligation for a period of five years from 2018, which would focus on fuel poor households, but has to date provided only limited details about the new policy. [47]

Policy Proposal

CSE has carried out several pieces of research to consider the future of energy efficiency policy beyond the current ECO scheme.[48] They argue that there is still a sound justification for placing an obligation on energy suppliers to deliver energy savings, as long as the efficiency measures pursued are cheaper than other methods of reducing carbon emissions.

CSE proposes that Government creates a Demand Reduction Obligation, which requires all energy suppliers to reduce the average demand for gas and electricity of their customers over time. A baseline would be set for each energy supplier, based on the average energy use of their customers. Government would set a demand reduction target for all suppliers, either in the form of a percentage reduction per year or an overall reduction over say a five year window. Suppliers would then be obliged to reduce the energy use of their customers over time by helping customers identify energy saving opportunities, or investing directly in implementing these opportunities. For example, suppliers could provide free insulation or lighting upgrades to their customers, or simply provide information on how customers can save energy.

As with previous supplier obligations, this policy would be funded through charges on energy bills rather than from Government funds. This has advantages from a fiscal point of view, avoiding reliance on public spending, although since the costs still fall to households they would still be monitored in public finances in a similar way to tax and spend, and there would be distributional effects (discussed further below).

CSE proposes that the DRO policy would focus on the most cost effective energy savings measures across all households, rather that targeting fuel poverty reduction explicitly. They suggest that an additional intervention would be

required to target fuel poverty, with funding coming from a number of sources including general taxation and potentially a levy on suppliers, but that energy suppliers should not necessarily be involved in delivery of the policy.[49]

Impact

Under the DRO policy, suppliers would be measured in terms of actual savings in energy, rather than the number of measures installed (as is the case with ECO and previous supplier obligations). This means that the impact of the obligation would be pre-determined by the reduction targets set by Government, as long as these are delivered. Government could set more or less ambitious targets, taking into account cost and deliverability; although the target setting process itself is far from straightforward, as explored further below.

Under previous supplier obligations the Government has determined which technologies were eligible and should be supported by suppliers. By contrast, under the DRO proposal it is up to the suppliers to develop their own strategies and solutions to reducing energy demand. CSE suggests that the DRO policy would lead suppliers to refocus their business offering around providing an "energy service", rather than simply providing units of electricity and gas, since both the supplier and customers would be aligned around the need to reduce energy consumption (albeit that many suppliers are already moving in this direction). Suppliers could offer a range of products and services including traditional energy efficiency measures (e.g. insulation, heating and lighting upgrades), as well as more innovative products and services such as new tariffs and behavioural 'nudges' to encourage energy demand reduction. Energy suppliers are well placed to make use of smart meter data to offer new products and services to customers to reduce/manage their demand. Over time these products and services would become more central to energy suppliers' strategies for marketing and customer retention. For example a supplier could market itself not only on the energy prices it offers, but on the amount of energy it is saving its customers.

Since the cost of meeting the obligation would fall to energy suppliers, it is expected that they would seek to identify the lowest cost routes to meeting the obligation, in order to maintain their competitive position against competitors.

Potential Issues

Whilst the Demand Reduction Obligation appears to be conceptually simple and offer significant benefits, it also raises a number of significant challenges and risks. The main issues with the policy are that it could fail to achieve its stated objective of reducing energy demand; it could create perverse incentives for energy suppliers; and it could lead to unintended distributional issues.

The DRO would most likely be implemented as a regulation under the energy supplier licence (e.g. by Ofgem), underpinned by a set of baseline information, performance targets, and sanctions for non-compliance. However, the process of setting and monitoring performance targets is far from straightforward. Performance against the DRO target would need to be measured in terms of actual energy use, rather than estimated savings. However this is complicated by a range of factors such as the impact of other policies, energy prices, and even the weather. A whole host of policies such as building regulations, product standards, Smart Meters, and subsidies for small scale renewables, all reduce the demand for grid energy. It is very difficult to disentangle the impacts of each policy. Energy consumption is also influenced by energy prices, with impacts changing over the short term and long term. The weather also has a significant influence on energy consumption, for example energy use increased by more than 10% in the cold winter of 2012/13 compared to the relatively mild winter of 2011/12.[50] Performancecould in theory be measured against weather-corrected energy consumption data, but this introduces a degree of subjectivity into how suppliers will be judged.

The combined effect of these factors makes it practically impossible to separate out the impact of supplier actions to reduce energy consumption versus the impact of other factors. Therefore the only possible route is to set the target including both the effects of supplier actions and other factors combined. However this creates risk both for the Government and for suppliers if assumptions on external factors do not turn out as expected. Suppliers would be held responsible for their customers' energy demand, even though this is influenced by a host of factors outside their control. From a supplier point of view this would not only create significant risk, but potentially also undermine the case for investment, since the demand reduction target may simply be met by factors outside their control.

Even if an appropriate demand reduction target could be set, it may create some perverse or unintended consequences in terms of supplier behaviour. Suppliers are unlikely to make any significant investments in the energy efficiency of any particular customer, since there is a risk that this customer could switch to a new supplier in the future, in which case the reduction would contribute to the new supplier's demand reduction target. Suppliers are therefore likely to pursue demand reduction opportunities which provide a limited benefit to a large number of customers, and are unlikely to pursue more expensive measures even if they are in the consumers' interest. Worse still, suppliers may simply respond with a strategy of attempting to replace high consuming customers with low consuming customers. In other words, they may attempt to meet the DRO target simply by managing their customer base, rather than making any actual improvements in energy efficiency – which across the industry represents a zero sum game. The baseline setting process may also create perverse incentives for suppliers to acquire high-energy use customers prior to the baseline being fixed, such that they can more easily meet the obligation in the future (although this particular issue could be avoided if Government set the baseline retrospectively based on historic data).

Another set of issues relates to the potentially significant distributional effects of the DRO policy. Whilst the overall impact of the policy may be beneficial (i.e. the sum total of all the savings made versus the total cost), there will inevitably be winners and losers, as all consumers will ending up paying and only some will benefit from energy efficiency measures. An inherent issue with funding energy programmes through supplier obligations and levies on energy bills is that it is regressive: poorer households spend a far greater proportion of their income on energy bills than richer households.[51] This has been less of an issue for previous supplier obligations which have specifically focused on helping poorer households. But the DRO is not intended to focus on fuel poor households *per se*. In fact the benefits are more likely to accrue to wealthier customers who are likely to use more energy and therefore have greater potential to reduce demand. There is also evidence that vulnerable households are less engaged in the energy market,[52] and therefore may not be targeted by energy suppliers looking to identify easy energy saving opportunities. Overall there is a risk that the cost falls disproportionately on poorer households, and the benefits on richer households.

CSE has responded to this criticism[53], arguing that it was never the intention of the DRO policy to address fuel poverty, and that a separate fuel poverty policy

would be required, funded out of general taxation. However, given the general squeeze on public finances it is unlikely that separate funding could be made available for a fuel poverty programme; and the Government has already indicated that the next supplier obligation *will* focus on fuel poverty.[54]

Summary

On face value the Demand Reduction Obligation proposal presents many advantages: it requires no public expenditure, and would set a simple objective for suppliers to reduce the energy demand of their customers. However, our analysis shows that the proposal also presents some significant issues. It has the potential to create some perverse incentives and unintended changes in supplier behaviour. The implementation of the policy could be extremely challenging, particularly the process of setting the demand reduction target itself. The policy could also lead to significant distributional effects, and there is a potential conflict between this proposal and the need to address fuel poverty.

Overall we do not recommend that the Government proceeds with the DRO proposal in its current form. However, there are elements of the proposal which could still be developed further. A possible variant to the DRO proposal (which CSE has itself raised) would simply be to benchmark the suppliers against each other in terms of their average energy use per customer. This would still provide greater transparency for Government and customers on how suppliers are helping to reduce energy demand, whilst avoiding many of the issues associated with setting this in regulation.

Energy Efficiency Feed in Tariff

The final proposal is to create a feed in tariff to support investments in energy efficiency, similar to the incentives used to support deployment of small scale renewables such as rooftop solar. It has been proposed by Green Alliance[55] as well as by the Liberal Democrats in their 2015 manifesto.[56]

Context

Many European countries, including the UK, have created feed in tariffs to support the deployment of small scale renewable energy. These provide subsidy

payments to households and businesses that install renewable energy technologies such as solar, wind, biomass, and hydro-electric. The UK feed in tariff scheme has been running since 2010, and to date has supported 4.3 GW of renewable energy capacity to be deployed, the vast majority of which is solar photovoltaics (3.6GW).[57]

However, despite the fact that energy efficiency offers cheaper decarbonisation opportunities than renewable energy, to date there are no feed in tariff mechanisms for energy efficiency, which has tended to be incentivised by other means. Analysis of a range of energy efficiency schemes in the US shows that they achieve reductions in energy at an average cost of £30/MWh.[58] Similarly, Policy Exchange found that the cost of the existing Energy Company Obligation in the UK has been around £33/MWh. By comparison, Policy Exchange estimated that the cumulative cost of the renewables feed in tariff scheme is £230/MWh[59], and even the cheapest form of renewable energy, onshore wind, has a lifetime cost of £75/MWh.[60] In theory energy efficiency is significantly cheaper than renewable energy as a route to decarbonisation.

Whilst there are no examples of an energy efficiency feed in tariff, there are examples from several US regional energy markets of capacity payments being made for electricity demand reduction, although these tend to incentivise demand reductions at peak times only, rather than permanent demand reduction. In the UK, the Government has trialled an Electricity Demand Reduction (EDR) scheme as part of the wider Capacity Mechanism, which offers payments for large energy users to reduce energy consumption at peak times (i.e. 4-8pm on weekdays in Winter). However, the scheme has not lived up to expectations, with limited competition to secure contracts, and only £6 million of the £20 million allocated budget being spent in the first two auction rounds. Critics argued that the scheme failed as it was overly restrictive and complex.[61] In any case, this model is likely to work only for larger energy users rather than individual households – the EDR pilot phase 2 is limited to schemes delivering a minimum of 50kW of peak demand reduction (e.g. the equivalent of replacing 600 street lights with low energy equivalents).

Policy Proposal

Green Alliance proposes that a new feed in tariff should be created to support investment in energy efficiency measures by households, businesses and local

authorities. This would provide payments for those installing energy efficiency measures at an agreed level per MWh of energy saved.

Green Alliance suggests that feed in tariff agreements should be allocated through an auction mechanism, whereby potential participants bid for the subsidy they require in order to proceed with their energy efficiency project. This is an important feature of the proposal which would improve cost control compared to the existing renewables feed-in tariff (where costs have spiralled to more than double the original budget due to unexpectedly high take-up).[62]

In the most simple form of the proposal it would be available only for electricity demand reductions, but Green Alliance suggests that the scope could also be extended to achieve reductions in heat demand - either with two separate tariffs for electricity and heat, or one combined scheme. This would improve cost-effectiveness, since it is generally cheaper to achieve reductions in heat than electricity. However this would add complexity, in particular since it would be a levy-funded policy, and other existing levies relate to electricity only.

The feed in tariff proposal by the Liberal Democrats would have offered payments for households installing solid wall insulation only. Limited details were provided, but we assume that it would otherwise have been similar to the Green Alliance proposal.

Impact

The impact of an energy efficiency feed in tariff is essentially determined by the budget made available for it. As explored below, the lack of budget availability is likely to be the main stumbling block for this proposal. However, Green Alliance calculate that in theory there is potential for 6.4GW of electricity demand reduction by 2030, which would not only yield net savings to consumers (of £2.4bn per year by 2025) but would also remove the need for new power generation capacity to be built.[63]

Potential Issues

As noted above, the main issue with this proposal is that of funding. A feed in tariff could in principle be funded through a levy on bills (as per the renewables Feed-in Tariff) or from general taxation (as per the Renewable Heat Incentive). However both sources of funding are already extremely stretched. The Levy Control Framework (LCF) sets an overall limit on the levy costs placed on consumer

energy bills. The LCF budget has been breached in all of the past three years, and forecasts show that the budget to 2020/21 has already been fully allocated.[64] In fact, despite the Government's recent efforts to control costs, the latest forecasts show that the LCF budget will still be breached by around £1.4bn in 2020/21.[65] Similarly, DECC's departmental budget is also facing a squeeze, with the recent Comprehensive Spending Review requiring DECC to make resource savings of 22% by 2019-20. It is therefore difficult to see how an energy efficiency feed in tariff programme of any significance could be paid for. There may be scope beyond 2020 once the Levy Control Framework has been extended, but this is several years away.

Aside from that, the other main challenges associated with an energy efficiency feed in tariff are related to measurement and verification. Under the renewables feed in tariff, payments are made based on the actual amount of electricity generated, which can easily be monitored through a generation meter. However, it is far more complicated to measure the actual savings from an energy efficiency measure, as described in the previous section in relation to the Demand Reduction Obligation. It is almost impossible for the energy savings associated with the measures to be separated from other factors such as prices, the weather, or other changes in policy or behaviour. The alternative is for energy savings to be "deemed", in which case Government would set the demand reduction associated with each measure. Whilst this is simpler in administrative terms, it makes it much more difficult to establish whether the policy is having its intended effect. There is a risk that deemed or estimated savings are offset by other changes in energy consumption patterns - a phenomenon known as the "rebound effect". For example someone insulating their home may choose to heat their home to a higher standard rather than reducing their energy consumption.

An added complication relates to the question of who is responsible for delivering, monitoring and verification of energy savings. In the proposal put forward by Green Alliance the energy efficiency feed in tariff would be allocated through an auction mechanism. It is unlikely that individual households would transact themselves in this way; so instead they would need to be brought together by an aggregator. This is possible, as demonstrated by examples of energy efficiency schemes in the US, but adds to the complexity of the scheme. As in the case of the Electricity Demand Reduction pilot programme described above, if the scheme becomes to complex then this may deter participation.

Summary

The concept of an energy efficiency feed in tariff has merit in that it offers a cheaper route to achieving decarbonisation than other low carbon options, and a cheaper way of providing capacity than even gas power generation. However, the reality is that DECC does not have the financial scope to put this concept into practice at present – whether the scheme is funded from general taxation or additional levies on bills. There is scope to open up the Capacity Mechanism to support electricity demand reduction, but the attempts to do this to date have not been altogether successful. In any case, the Electricity Demand Reduction scheme is likely to be relevant mainly for large-scale users of energy, rather than individual households.

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