

BRIEFING



UP AGAINST THE (SOLID) WALL

WHAT CHANGES TO THE ECO MEAN
FOR ENERGY EFFICIENCY POLICY

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RICARDO-AEA

IDEAS to
CHANGE POLICY

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FOREWORD: A CHANGING LANDSCAPE FOR ENERGY EFFICIENCY POLICY

REG PLATT

Responding to intense public pressure on rising energy bills, the government announced a package of measures in December 2013 aimed at cutting domestic energy bills by £50 (HM Government 2013). The intention was for the majority of the reduction, between £30 and £35, to be delivered by changes to the Energy Company Obligation (ECO) energy efficiency policy (DECC 2014). The changes the government has proposed to the ECO will have wide-ranging implications.

The ECO places a legal obligation on the biggest energy suppliers to meet targets for funding or delivering energy efficiency improvements to people's homes, with the costs recouped by the suppliers through household energy bills. To achieve the targeted level of bill savings key changes the government wants to make to the policy are:

- The ECO as a whole will be extended so that the suppliers have obligations under the policy until 2017, two years more than is currently the case.
- Suppliers' obligations under the Carbon Emissions Reduction Obligation (CERO) ECO sub-target will be reduced by 33 per cent.
- Suppliers will be allowed to achieve their CERO obligations primarily through installation of low-cost efficiency measures, such as loft and cavity wall insulation, instead of expensive measures, particularly solid wall insulation, as was originally intended. The original ambition for 100,000 solid walls to be insulated each year via the CERO is to be cut to just 23,500.

As a result of the proposed changes, around £400 million less will be spent on residential energy efficiency improvements via the ECO every year, equivalent to 30 per cent of the previous total. The level of energy savings achieved by the policy will also be reduced. To attempt to make up for this shortfall in energy savings, the government is implementing a number of compensatory measures, including initiatives intended to boost the Green Deal programme, which centres on the provision of residential energy efficiency assessments and loans to householders (DECC 2013a). One initiative, a new 'cashback' incentive that will part-fund the costs of solid wall insulation for households, could offset to some degree the cut in support for the technology under the ECO. That said, the likely impact of this new incentive on consumer uptake is unclear.

Concerns about the proposed changes to energy efficiency policy

A well-functioning set of energy efficiency policies is vital for addressing consumer concerns about rising energy bills. This is because, by reducing a consumer's demand for energy while achieving the same level of comfort, energy efficiency can deliver an immediate bill reduction to that consumer. In addition, energy efficiency is generally a far cheaper way to reduce carbon pollution from the energy sector than investing in forms of low-carbon generation, such as wind turbines or nuclear power stations. There are, therefore, reasons to be concerned about the government's proposed reforms to this important policy area.

First, while the steps to boost the Green Deal are welcome, there is no guarantee that the new initiatives will generate high levels of interest in, and therefore energy savings from, the scheme. In fact, the proposal to enable obligated suppliers to deliver low-cost energy measures under the CERO could undermine the potential market for Green Deal loans, which are important for enabling householders to make 'whole-house' energy efficiency improvements. If consumers can get low-cost measures either highly subsidised or for free from a supplier through the CERO then what reason have they to take up a Green Deal loan to purchase the measures at full cost?

A second area of concern is that the proposed changes to the ECO emerged after concerted lobbying by some energy suppliers, who protested about the costs they were facing under the policy. In some cases, suppliers were failing to deliver on their obligations even as they were protesting about costs, as was revealed in a freedom of information request by IPPR to the energy markets regulator Ofgem (see Pickard 2014). By making the proposed changes to the ECO in line with the suppliers' wishes, the government risks setting a damaging precedent. The rationale for putting legal obligations on the energy suppliers is that this provides a strong level of certainty that the targeted outcomes will be achieved. This certainty is undermined if the obligated suppliers are able to protest about their targets and have them changed.

What role for solid wall insulation?

In addition to addressing the consequences of these two issues, there is a need for government to re-establish a clear vision about the role for solid wall insulation as part of its energy efficiency programme. It is striking that within just one year of the ECO

It is striking that within just one year of the ECO being launched with an explicit aim to substantially ramp up deployment of solid wall insulation, the proposed cut in support for the technology could see the rate of installations fall by 70 per cent compared to the year before the ECO was launched.

being launched with an explicit aim to substantially ramp up deployment of solid wall insulation, the proposed cut in support for the technology could see the rate of installations fall by 70 per cent compared to the year *before* the ECO was launched. Such an abrupt policy U-turn is not the way to support an efficient and sustainable solid wall insulation industry.

That said, it is true that estimates about the energy savings achieved by solid wall insulation have been downgraded by about half in recent years on the basis of measured evidence from in-situ installations (Element Energy and EST 2013). This downgrading

has reinforced the fact that solid wall insulation is an expensive way to achieve carbon emission reductions or bill savings from the housing stock, compared with other energy efficiency measures. However, the downgrading does not provide sufficient cause to slash the support for this technology as the government has proposed.

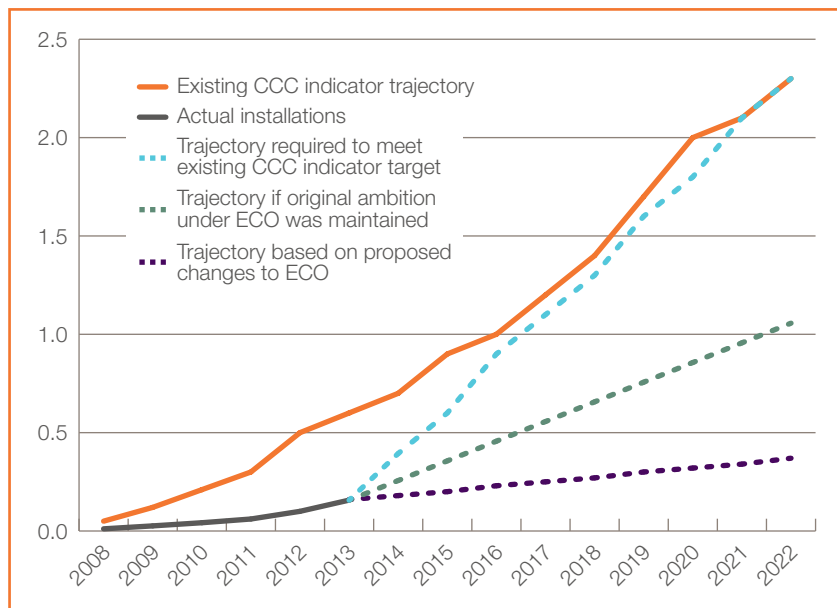
Critically, the government's policies on solid wall insulation must achieve a rate of installations that is commensurate with the requirements of the legally binding carbon budgets. Based on a system-wide analysis of the UK economy, taking account of factors such as how heat pump deployment will be affected by solid wall insulation deployment,¹ the Committee on Climate Change (CCC) has established an 'indicator' for the number of installations that it believes needs to be carried out. Currently, this indicator suggests that 2.3 million installations of solid wall insulation need to be carried out by 2022.

The committee is likely to revise down the indicator to take account of the new evidence on energy savings from the technology when it presents its annual report on the carbon budgets to parliament in the summer. However, the government's ambition for solid wall insulation is still likely to be below the new indicator level.

Figure F1 shows the number of installations of solid wall insulation carried out by 2013 and the rate of installations (around 240,000 a year) that would need to be carried out to achieve the existing CCC indicator by 2022. It also shows the rate of installations that would be carried out up to 2022 under the existing and newly proposed ECO targets.

¹ The efficiency of heat pumps is highly correlated to the thermal efficiency of properties. Heat pumps are unlikely to operate efficiently in solid walled properties without insulation.

Figure F1
Actual and projected solid wall insulation installations to 2022, against current CCC indicator and current and proposed ECO targets (m)



Source: IPPR analysis of CCC 2013, DECC 2013b, and DECC 2014

Note: Assumes linear installation trajectories under the ECO, with an equal number of installations occurring each year over the specified time period

The chart demonstrates that:

- Existing ECO targets for solid wall insulation would result in just over 1 million installations of solid wall insulation being carried out by 2022. The CCC would have to revise down its 2022 indicator for the technology by 1.2 million, or around 50 per cent, for this number of installations to be adequate.
- The government's proposed changes to the ECO will result in around 370,000 installations being carried out by 2022 (this figure does not include installations that might occur as a result of the new Green Deal cashback incentive). The CCC would have to revise down its 2022 indicator for the technology by 1.9 million, or 84 per cent, for this number of installations to be adequate.

While we must wait until the summer for the CCC to announce its new solid wall insulation indicator, it appears entirely possible that the new indicator could be broadly in line with the ambition for the technology under the *existing* ECO targets² or higher.

As well as taking account of the role for solid wall insulation in meeting carbon budgets, there are several other factors that the government should consider when determining its approach to the technology, several of which are the subject of this report.

First, policy design must be considered, especially with regard to the cost of solid wall insulation. IPPR has previously reported how an area-based approach to delivery could reduce the costs of installing solid wall insulation by as much as 10 per cent (Platt et al 2012). And if Green Deal loans were made attractive to consumers, including by reducing how much interest is charged – which IPPR has shown could be a highly cost-effective intervention for government (Platt et al 2013) – then more households might use a Green Deal to part-fund the costs of an installation.

² If the indicator is revised down by 50 per cent in line with how estimates of energy savings from the technology have been revised down, the existing ECO targets would be broadly adequate.

A second important consideration is the needs of fuel-poor households. More than 45 per cent of all fuel-poor households live in solid wall properties, most of them uninsulated, and almost one-fifth of all households living in solid wall properties are in fuel poverty (DECC 2012). These households will not have the savings required to benefit from the new cashback incentive, and are dependent on the limited support that is available via the ECO for insulating their walls.

Moreover, these households are already paying for the ECO through their energy bills. With the changes to the policy that the government has proposed, they will now be subsidising energy efficiency measures for wealthier households at the same time as potentially not being able to access support via the policy themselves. It may well be that for many of these fuel-poor households, it is more cost-effective for the government to provide them with direct financial assistance with their energy bills, rather than paying for their walls to be insulated. However, as IPPR has previously revealed, unless the policy approach for targeting fuel-poor homes is completely overhauled, many will receive no support (Platt et al 2013).³

Other factors that need to be taken into account when determining government policy on solid wall insulation are the wider benefits that arise from investing in the technology. A range of economic and wider social benefits from solid wall insulation investments are the subject of the technical note that follows this foreword. We present original analysis, carried out for IPPR by consultancy Ricardo AEA, showing that the benefits are substantial.

The technical note shows:

- Investing in solid wall insulation compares very favourably with investing in other energy sectors in terms of job creation impacts. The research shows that the employment impact of investing in energy efficiency is between two-and-a-half and four times larger than that for oil and natural gas. A programme supporting the insulation of 100,000 solid walls every year would support up to 29,340 jobs (direct and indirect). If support for solid wall insulation is cut in line with the government's plans, around 20,000 existing jobs would be lost.
- Investing in solid wall insulation can create substantial levels of revenue for the exchequer, from sources such as income tax, VAT and corporate tax. If this income is taken into account, the cost to government of solid wall insulation programmes is revealed to be offset by 50–100 per cent or more, depending on the funding option chosen. A loan scheme could even provide a net gain to the public purse.
- Investing in solid wall insulation creates benefits in terms of health, area regeneration and aesthetic improvements, as well as improvements to social capital, all of which should be factored into decisions about the design of energy efficiency policy.

A renewed approach to energy efficiency

This report builds on IPPR's growing evidence base about the benefits of energy efficiency, and it supports IPPR's previous proposals for new models of delivery. In the report *Help to heat* (Platt et al 2013), we set out how we believe the government should adopt an area-based model in which free energy efficiency assessments are provided on a house-by-house basis to drive interest in the Green Deal and to enable fuel-poor households to be accurately identified. This approach would reap savings in installation

³ In the report *Help to heat*, IPPR revealed how provisions for low-income households under the ECO are very poorly targeted because they use proxies for identifying households that are eligible for support. The report showed that only 47 per cent of fuel-poor households can benefit from ECO's provisions for low-income households, and 80 per cent of the funds allocated to low-income households (£433 million of £540million every year) go to households that are not fuel-poor.

costs, including for solid wall insulation, ensure far more resources reach fuel-poor homes, and create social norms around energy efficiency improvements that would lead to more people making improvements. Responsibility for delivering improvements would be taken away from the energy suppliers and local organisations would be given the opportunity to take a leading role.

In addition, we believe the government should make Green Deal loans cheaper in order to make them more attractive to consumers. *Help to heat* set out how this can be achieved by guaranteeing the borrowing of the Green Deal Finance Company and issuing top-up public subsidies. We set how these policies could be implemented in a cost neutral way through the reallocation of existing resources, and also how the policies could be scaled up through the allocation of additional resources (ibid).

Consumers are looking to politicians for long-term protection from rising energy prices. A greater focus on supporting energy efficiency, rather than on cutting ambition to grab short-term savings, is the only way to achieve this and simultaneously to reduce carbon pollution in line with the UK's legal obligations. And when the wider benefits of investing in energy efficiency – many of which are set out in this report – are taken into account, the argument for energy efficiency becomes even stronger.

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TECHNICAL NOTE: THE ECONOMIC AND WIDER SOCIAL BENEFITS OF INVESTING IN SOLID WALL INSULATION

JAN ROSENOW

1. HOW THE GOVERNMENT REDUCED ITS AMBITIONS FOR SOLID WALL INSULATION

Insulating solid walls can produce substantial energy bill reductions for households and is an important step in tackling carbon emissions from homes and reducing levels of fuel poverty. More than 45 per cent of all fuel-poor households live in solid wall properties, most of them uninsulated, and almost one-fifth of all households who live in solid wall properties are in fuel poverty, around twice as many as live in non-solid wall properties (DECC 2012a).

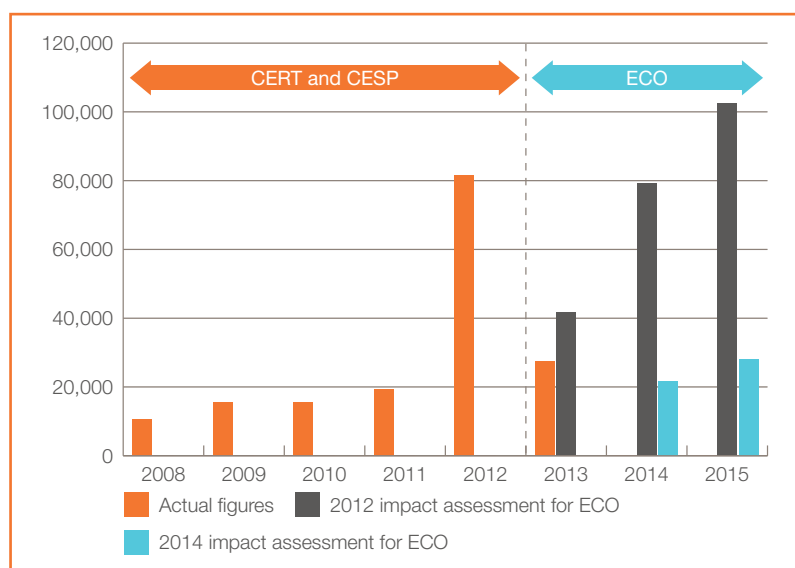
Despite the potential benefits, only a fraction of homes with solid walls have been insulated to date. There are 8 million homes in Britain with solid walls, but at the end of September 2013 less than 3 per cent of these properties had installed solid wall insulation (DECC 2013a).

The introduction of the Energy Company Obligation (ECO) energy efficiency policy in January 2013 was meant to herald a step-change in the rate of deployment of solid wall insulation. The largest energy suppliers would be obliged to fund or deliver installations and would recoup the costs of doing so through consumers' energy bills. The government predicted in June 2012 that the ECO would support the insulation, on average, of 100,000 solid wall properties a year until 2022 (DECC 2012b).

While the ECO targeted 100,000 a year, the actual number of solid wall properties being insulated declined from a high of more than 80,000 in 2012 under the previous CERT and CESP schemes⁴ to less than 30,000 in 2013. This fall is largely due to teething issues with the ECO in its first year, with suppliers and clients having to adapt to a new set of rules and administrative procedures.

In December 2013, under pressure to take action on rising energy bills, the government announced a substantial change in its approach (DECC 2013b). It has recently consulted on proposals to alter the ECO so that only 100,000 installations of solid wall insulation will be required to be delivered over the entire period from January 2013 to March 2017, or around 23,500 installations a year (DECC 2014a). This equates to a reduction of more than 75 per cent in the overall ambition for solid wall insulation.

Figure 1.1
Solid wall properties insulated: actual and targeted, 2008–2013



Sources: CCC 2013; DECC 2012b, 2014b, 2014c

4 Respectively, the Carbon Emissions Reduction Target and Community Energy Saving Programme.

A key reason why support for solid wall insulation has been targeted for cuts is the high cost of delivering energy savings from this technology compared with other residential energy efficiency measures, such as installing boilers, loft insulation or cavity wall insulation. An individual installation of solid wall insulation costs around £9,000, and delivers energy savings of around 6,000–6,700kWh per year (Element Energy and EST 2013), meaning the technology pays for itself in around 28 years.⁵

However, schemes in which installations are carried out at scale across local areas, involving local authorities and community groups, have been shown to be capable of reducing the costs of installations by 10 per cent (Platt et al 2012).

As well as considering the costs of achieving energy savings when determining levels of support for solid wall insulation, the government should take account of other benefits that investment in this technology can bring. This report sets out these benefits, considering outcomes in terms of employment opportunities, exchequer revenues and wider community benefits. The findings contained in the report are based on a detailed literature review and original economic modelling.

⁵ Based on a UK average gas price of 4.86p/kWh (DECC 2013c).

2. EMPLOYMENT IMPACTS

In terms of creating jobs, investing in energy efficiency compares very favourably with investing in other energy sectors. Analysis by the Political Economy Research Institute at the University of Massachusetts, Amherst, evaluating different economic stimulus options, has shown that the employment creation from investing in energy efficiency is between two-and-a-half and four times greater than that for oil and natural gas (Pollin et al 2009). A similar study by the University of California, Berkeley has shown that the energy efficiency industry is about twice as labour-intensive as the fossil fuel-based energy supply sector per unit of energy saved/produced (Wei et al 2010). Investments in energy efficiency also compare favourably to renewable energy, as the investment costs are offset to some extent or even completely by the energy savings.

To analyse the job creation impacts of investing in solid wall insulation, and the implications of the government's decision to cut support for the technology, three forms of job creation must be taken into account.

1. **Direct impact:** people employed directly by solid wall insulation companies (including contractor staff) who receive wages and salaries.
2. **Indirect impact:** people employed in businesses which supply the goods and services used in the process of installing solid wall insulation.
3. **Induced impact:** income and employment generated by direct and indirect incomes spent within the economy.

The numbers of jobs created by investing in solid wall insulation across each of these three forms of job creation are substantial. The flipside of this is that considerable job losses will result if the proposed cuts to the ECO are implemented.

Direct job creation

Installing solid wall insulation is labour-intensive, compared with other types of energy efficiency work. A recent review of more than 20 sources concluded that for every £1 million spent on energy efficiency about 23 jobs are directly supported in the energy efficiency industry (Jansenn and Staniaszek 2012). Since most of these sources focused on building retrofits, it can be assumed that at least a similar number of jobs are supported through investment in solid wall insulation. This is a conservative estimate, however, since it does not take into account the high labour intensity of solid wall insulation. In its impact assessment for the ECO and Green Deal, the Department of Energy and Climate Change (DECC) stressed how solid wall insulation is 'more labour intensive than easy to treat cavity wall insulation and loft insulation' (DECC 2012b: 10).

Indirect job creation

A wide range of estimates exist for the number of jobs created indirectly through investments in solid wall insulation. For example, in its ECO/Green Deal impact assessment, DECC quotes evidence from the sector skills council for construction, Construction Skills, to estimate that for every £1 million spent on housing repair and maintenance 32.6 direct and indirect jobs are supported (DECC 2012b).

Industry evidence provided to IPPR broadly corroborates this figure. It shows that in 2012, the last year for which comprehensive data is available, 28,005 direct and indirect jobs existed⁶ based on 81,643 installations being carried out in that year (CCC 2013).

6 Data submitted by the Insulated Render and Cladding Association (INCA).

Based on the evidence for the number of jobs *directly* supported by investments in solid wall insulation (23, as above), the figure given by DECC and Construction Skills would suggest that 9.6 jobs are supported *indirectly* for every £1 million spent. If correct, this would mean that 0.4 indirect jobs are created in the supply chain for each direct job. However, as the authors of the report state, in many cases the direct jobs figure may include some indirect jobs, making it difficult to compare.

Other evidence suggests that a much higher ratio of indirect to direct jobs is generated by investment in solid wall insulation. Evidence from Innovas (2009), also quoted by DECC, assumes that for each direct job created in the solid wall insulation industry, 4.75 indirect jobs are created. Another report, focusing on the European energy efficiency industry, suggests that for each direct job there are two indirect jobs created (Impetus Consulting 2009). Research on behalf of the Energy Bill Revolution campaign assumed that for each direct job three indirect jobs could be supported (Camco 2012). Overall, a ratio for direct to indirect jobs of 1:3 is an approximate mid-point figure of the different sources reviewed.

Given the large discrepancies in the literature about the relationship between direct and indirect job creation from solid wall insulation investments, in the calculations presented below we have assessed the two elements together rather than separately, using the industry evidence quoted above.

Induced job creation

Official statistics of the Scottish government suggest that for every job directly created through investment in solid wall insulation, 1.8 indirect and induced jobs are created (Scottish Government 2013).⁷

However, there are more uncertainties involved in estimating induced jobs than there are in estimating direct and indirect jobs. If the economy is operating at a high level of activity, for instance, then there is unlikely to be a large employment gain beyond that which results from initial direct and indirect effects. Even though we would expect induced impacts to be significant at this point in time, this could change in the future should economic growth continue or increase. For this reason we assess the impact in terms of induced jobs separately from direct and indirect jobs in the analysis that follows.

Assessing the employment impact of proposed changes to the ECO

A linear extrapolation of the industry figures quoted above suggests that if the government was to keep with its original ambition of 100,000 solid wall insulation installations per year, installed through the ECO, this would mean 6,600 jobs being created in the solid wall insulation industry and supply chain compared to 2012.⁸ However, if the government implements its proposed cut in support for solid wall insulation this will put 19,900 direct and indirect jobs at risk (see table 2.1).

Combining the industry figures with evidence from the Scottish government suggests that a programme of 100,000 installations would create an additional 6,400 induced jobs compared to 2012. If support is cut in line with the government's proposals, around 19,400 induced jobs could be lost (see table 2.1).

⁷ The Office for National Statistics [ONS] does not produce employment multipliers for the UK.

⁸ While we do not have comprehensive job figures for the solid wall industry in 2013, we expect there already to have been some job losses from 2012, due to the number of installations carried out falling from around 80,000 in 2012 to around 30,000 in 2013. The calculation presented assumes a linear relationship between investment and job creation impacts.

Table 2.1
Employment impacts
according to scale of
solid wall insulation
programme (rounded to
the nearest 100)

	Direct and indirect jobs based on industry figures from 2012	Induced jobs extrapolated from industry figures using evidence from Scottish government
Actual jobs in 2012 based on 81,643 installations carried out in the year	28,000	27,300
Reduced ambition: Future jobs based on 23,529 installations a year, as proposed by government	8,100	7,900
Reduced ambition: Job losses resulting from proposed cut in support for solid wall insulation	-19,900	-19,400
Maintained ambition: Future jobs based on 100,000 installations a year	34,600	33,700

3. IMPACT ON THE EXCHEQUER

Programmes supporting the installation of energy efficiency measures such as solid wall insulation typically incur a cost to the exchequer, both in the form of subsidies and in lost VAT income due to reduced energy consumption. Those costs are to some extent offset by tax receipts and other revenue streams generated as a result of the activities promoted under the programme, in this case the installation of solid wall insulation, as has been observed in Ireland (Curtin 2012). Depending on the design of the programme, the tax receipts and additional revenue streams can even exceed the costs of subsidising measures, as is the case in Germany (Kuckshinrichs et al 2013).

The following analysis shows how, if receipts from solid wall insulation investments are taken into account, the cost to government of supporting the technology is significantly lower than might otherwise be assumed.

A key factor affecting the level of exchequer revenues generated is the amount of subsidy the government provides towards the cost of an installation. Three distinct subsidy options have been defined and modelled for the purpose of this report.

- **Option 1 – private householder scheme:** For this scenario we have assumed a 2:1 funding ratio for the funds invested by government and private householders. This is equivalent to the level of subsidy the government makes available through the Green Deal cashback scheme, although it varies according to measure (DECC 2014d).
- **Option 2 – social housing scheme:** For this scenario we have assumed a 1:1 funding ratio for the funds invested by government and social housing providers. This is equivalent to the level of subsidy provided by energy suppliers, as has been the case under previous energy efficiency programmes (HM Government 2008).
- **Option 3 – loan scheme:** For this scenario we have assumed that government issues subsidies to a financial intermediary which provides low-interest loans, similar to the German KfW scheme, with a 1:4 funding ratio for the funds invested by government and private householders.⁹

Modelling exchequer impacts

To assess the impacts on the exchequer of these different subsidy options we have built a bespoke economic model. The model takes account of five distinct types of exchequer revenue:

- VAT paid when installing solid wall insulation
- corporate tax income paid by all companies involved in the solid wall insulation supply chain
- income tax generated by jobs directly and indirectly created (since estimates of induced jobs are inherently uncertain these are omitted from the assessment)
- avoided costs of unemployment, as job creation impacts lead to reduced social benefit payments
- savings for the NHS budget achieved due to improvements in the health of occupants of buildings receiving solid wall insulation, who require less health treatment.

The model does not include VAT impacts that occur due to reduced energy consumption. We can expect this to be net positive because it can be assumed that a large proportion of any cost savings will be reinvested by consumers and spent on goods and services with a higher VAT rate than the 5 per cent rate applied to domestic energy consumption (Consumer Focus 2012).

⁹ Calculated based on Kuckshinrichs et al 2009, Federal Ministry of Transport, Building and Urban Development 2011.

Our model assesses the impact of a scheme to support the uptake of solid wall insulation measures across the UK's domestic housing stock. Using a set of peer-reviewed and accepted assumptions, the model estimates the effects of a given subsidy scheme.¹⁰

For each of the three subsidy options we have modelled exchequer revenues against two scenarios. The first 'low revenue' scenario is conservative. It includes all of the subsidy cost. However, it excludes some of the revenue streams identified above, specifically the income tax from induced jobs, the avoided cost of unemployment from induced jobs and the reduced NHS spending due to health improvements, on account of their greater uncertainty. The second 'high revenue' scenario includes all of the cost and all of the revenue streams.

Crucially, our model shows exchequer revenues generated *in the same year that subsidy costs are paid out*. By doing so, it illustrates the net impact on the public finances in any single fiscal year.

The outcomes of the three subsidy options on exchequer revenues are presented below, starting with the option with the highest government costs (option 1 – private householder scheme) and concluding with the option with the lowest costs (option 3 – loan scheme). All figures quoted below are based on the assumption that 100,000 solid walls would be insulated in each year.

Option 1: private householder subsidy scheme

The private householder scheme assumes a 2:1 funding ratio for the funds invested by government and private householders – that is, two-thirds of the total cost would be covered by a non-repayable grant provided by government (to a total cost of £630 million a year). Beneficiaries would contribute the remaining third of the total cost (£315 million), which is a rate at which the benefits realised through energy bill savings comfortably exceed the householder's contribution. This is broadly in line with the current grants made available through the cashback incentive for Green Deal, although this is slightly more generous (see DECC 2014d).

Figure 3.1 (over) shows the results of the exchequer analysis for the private householder scheme. Depending on the revenue scenario, between 52 per cent / £325 million (low revenue) and 95 per cent / £597 million (high revenue) of the total subsidy cost would be offset by revenue streams. The most important revenue streams are income taxes generated through jobs supported and the avoided cost of unemployment in the form of reduced benefits payments to claimants.

Option 2: social housing subsidy scheme

Social housing providers have benefited from previous energy efficiency programmes, such as the Carbon Emissions Reduction Target (CERT), and have installed many of the lower-cost-efficiency measures, for which the remaining potential is increasingly limited. However, more than 80 per cent of solid wall properties (or around 700,000 homes) in the social housing sector remain uninsulated (DECC 2012c).

This option assumes a 1:1 funding ratio for the funds invested by government and social housing providers. Figure 3.2 shows the results of the exchequer analysis: between 69 per cent (low revenue scenario) and 126 per cent (high revenue scenario) would be offset by the revenue streams generated. That is, in a high revenue scenario a net gain could be achieved by the exchequer from investment in solid wall insulation.

¹⁰ Several assumptions and simplifications had to be made in order to assess the overall costs and benefits of the scheme – please see the annex to this paper for full details.

Figure 3.1
Impacts on the
exchequer, private
householder scheme
(£m)

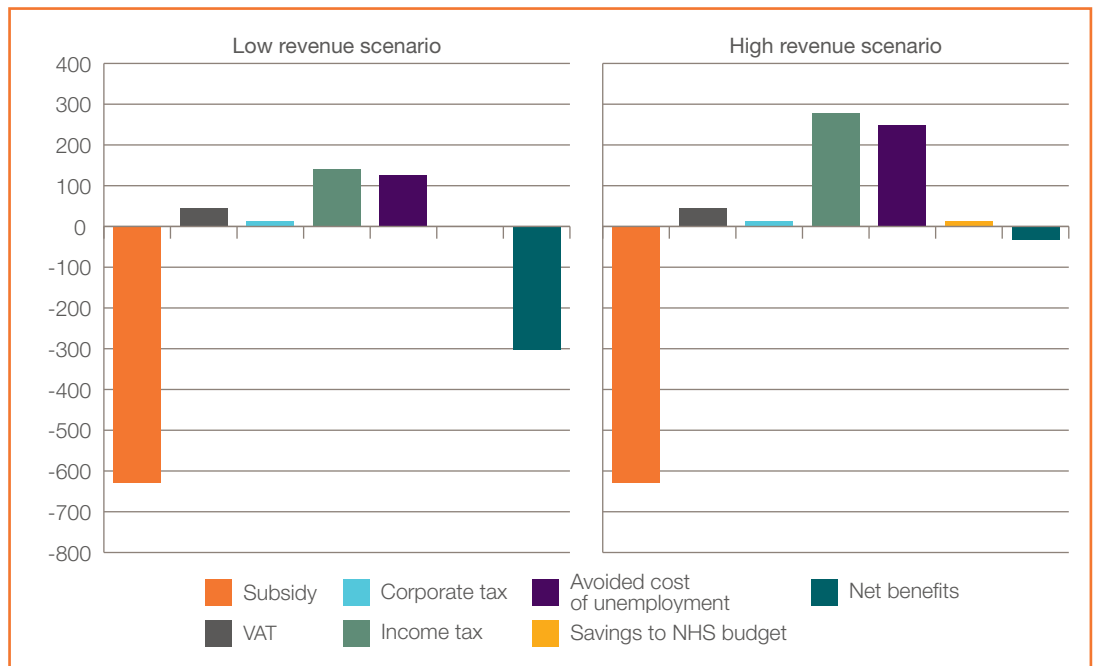
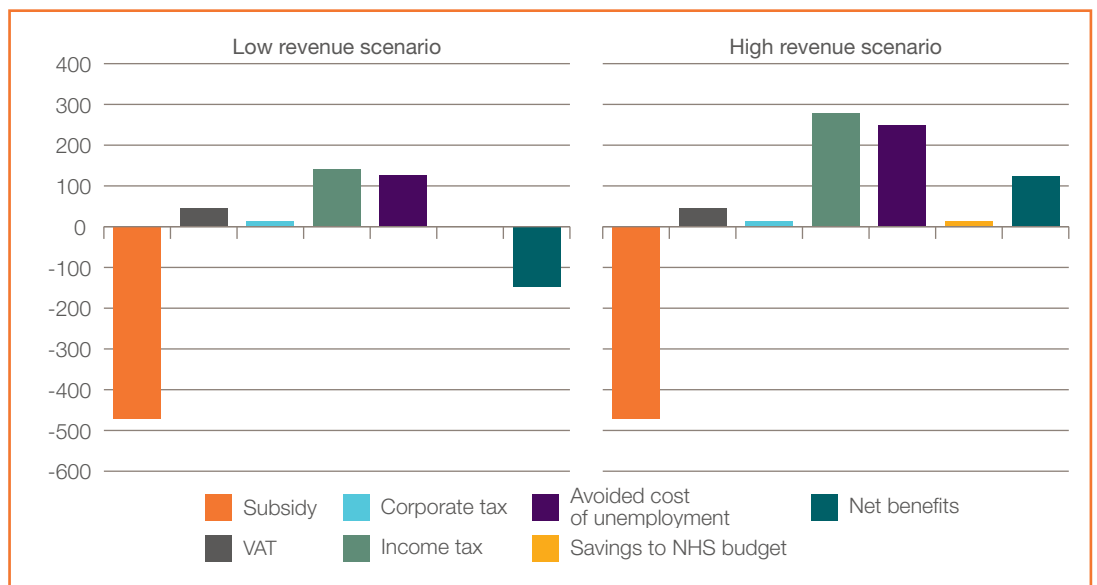


Figure 3.2
Impacts on the
exchequer, social
housing scheme (£m)



Option 3: loan subsidy scheme

One option to increase the leverage of government subsidies is to provide support through a loan scheme rather than providing non-repayable grants. Loans could be made accessible to both private households and social housing providers.

The existing Green Deal loan scheme is currently designed to focus mainly on lower-cost measures, such as loft and cavity wall insulation, but could be adapted to focus on solid wall insulation. Indeed, IPPR's recent report *Help to Heat* set out how, by guaranteeing the borrowing of the Green Deal Finance Company and issuing top-up subsidies, the

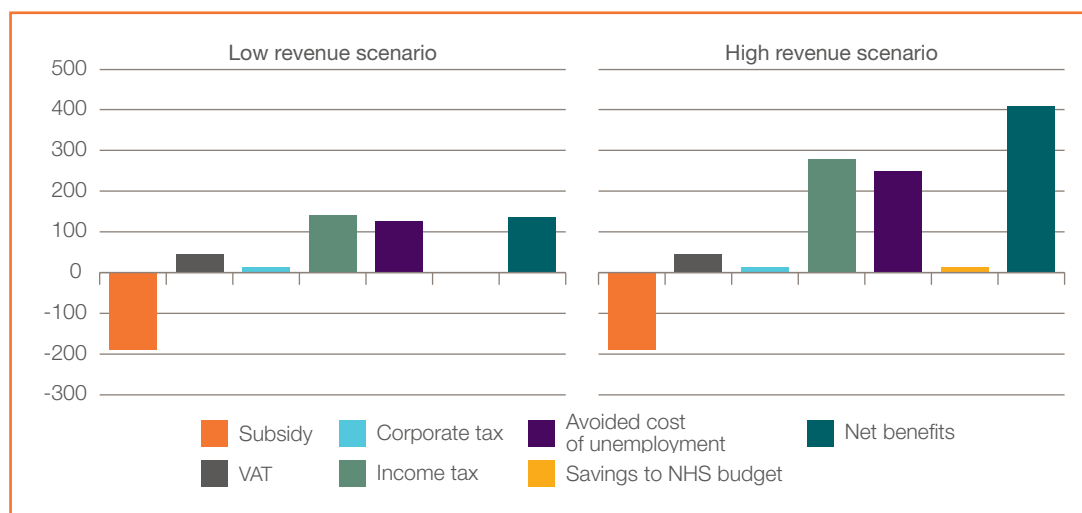
government could enable households to fund more expensive measures under the Green Deal while substantially increasing the leverage of its spending in this area (Platt et al 2013).

The most prominent loan scheme in Europe for building retrofits targeted at high-performance measures is the German CO2 Building Rehabilitation Programme run by the KfW bank. The scheme focuses mainly on high-performance measures, including solid wall insulation, worth up to €75,000 per property and therefore is a suitable example to reference in the context of this report.

The German federal government funds the loan scheme and enables the KfW to issue loans with below-market interest rates. The ratio of federal funding to loan volume achieved is about 1:4.¹¹ This means that every £1 of funding provided triggers £4 of private investment covered by low interest loans. The government funding paid to KfW covers the cost of reducing the interest rate over the whole lifetime of all loans issued in a given year.

We have assumed a similar ratio for the purpose of assessing the exchequer impacts of a loan scheme in the UK. Figure 3.3 shows the results of the modelling: total benefits, in the form of increased tax revenue and savings due to reduced unemployment, substantially exceed the cost to the exchequer (by 72 per cent in case of the low revenue scenario). Indeed, our analysis suggests that such a scheme has the potential to earn back 200 per cent of the initial cost in total net benefits.

Figure 3.3
Impacts on the exchequer, loan scheme (£m)



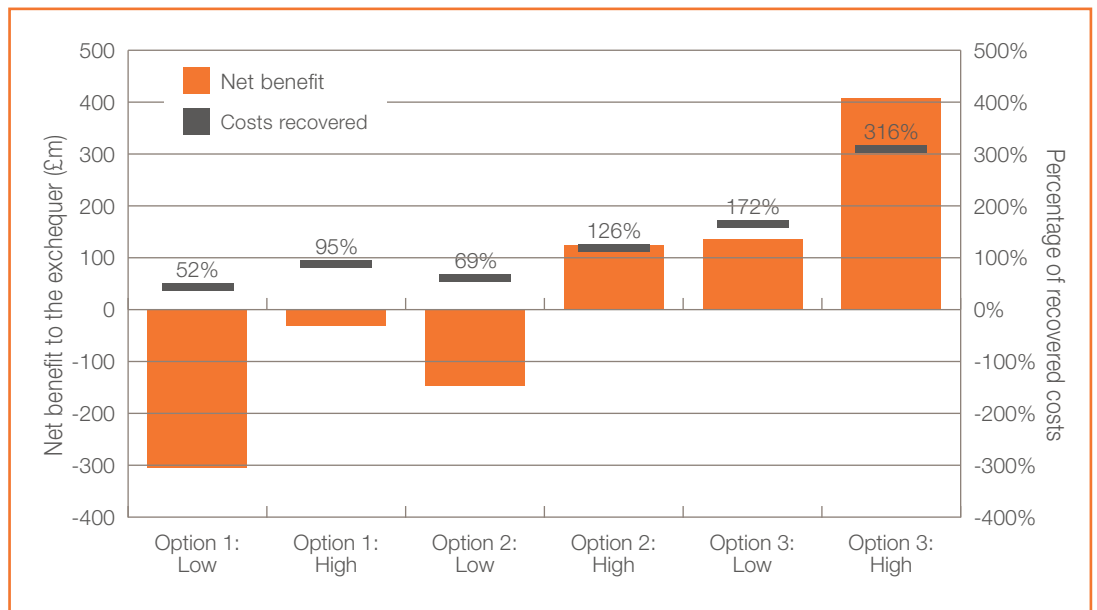
These results are supported by evidence from Germany. Analysis of the German KfW loan programmes for building retrofits shows that, in the years 2005 to 2007, investments undertaken with support from these programmes had a positive effect on public budgets, even after programme costs are deducted (Kuckshinrichs et al 2013). Not only were the programme costs completely offset, the programme generated additional revenues and savings for the exchequer that exceeded the cost of the subsidies by 45–92 per cent, which is in line with our low revenue scenario (induced jobs are not considered in the evaluation of the German loan scheme).

¹¹ Calculated based on Kuckshinrichs et al 2009, Federal Ministry of Transport, Building and Urban Development 2011.

Assessing impact on the exchequer of proposed changes to the ECO

Our analysis shows that a significant amount of the cost of a scheme funding solid wall insulation would be offset by increased revenues and savings. A loan scheme, due to the high leverage, not only achieves budget neutrality but also generates additional revenue for the exchequer. A summary of the findings is provided in figure 3.4.

Figure 3.4
Summary of exchequer impact analysis, net benefit (£m, left) and recovery of costs (% , right)



If the government cuts its ambition on solid wall insulation by 75 per cent, as proposed, this would lead to an equivalent drop of 75 per cent in the exchequer revenues it receives from its solid wall insulation investments.

4. WIDER COMMUNITY BENEFITS

In addition to producing economic benefits, investing in solid wall insulation creates benefits in terms of health, area regeneration and aesthetic improvements, and improvements to social capital that should be factored into decisions about policy design.

Health benefits

It is widely recognised that people in fuel poverty cannot heat their homes to acceptable comfort levels. It is also recognised that living in a consistently underheated property poses health risks, partly through increased incidence of damp and mould (Gladwin 2013). In underheated properties, much of the benefit of solid wall insulation will be gained in the form of increased comfort, with the living environment being maintained at higher temperatures. This outcome results in lower levels of admission to hospital and fewer days off school and work (Chapman et al 2004).

Analysis of the built environment sector shows that inefficient and poor-quality housing costs the government around £760 million a year through impacts on the NHS (Piddington et al 2013). Investment in energy efficiency measures such as solid wall insulation installations can go some way towards reducing these costs.

Approximately £85 per capita per annum is spent through the NHS on treating respiratory diseases and a further £147 on treating circulatory problems (NHS 2012). As part of the package of measures that goes into retrofitting a solid wall property, the insulation element may account for 25 per cent of the resulting improvement in temperature. If 5 per cent of respiratory and circulatory diseases nationwide are directly caused by low living temperatures specifically in solid walled buildings (assumed purely for the purposes of illustration), then the total health cost benefit from insulating the walls of all solid walled properties successfully could be estimated at £183 million per annum.¹² This calculation also assumes that the full improvement in comfort is taken in all cases – that is, that dwellings are actually heated to a higher temperature post-insulation, rather than being underheated but at a reduced cost.

This estimate may be compared with that derived by BRE in *The Health Costs of Cold Dwellings*, produced for the Chartered Institute of Environmental Health (Mason and Roys 2011). The report identifies a small risk to respiratory and cardiovascular health once a dwelling's indoor temperature drops below 19°C and substantially increased risks to health when the indoor temperature drops below 16°C. It concludes that the cost to the NHS of not improving properties with EPC ratings of F and G is estimated at £192 million. Of course, solid wall insulation is only one of a range of thermal improvements to properties, so only a proportion of this cost should be attributable to the thermal performance of the walls. It should also be noted that there is a wide range of values used in the BRE report, and that values used are highly dependent on the exact energy efficiency rating of the property and occupancy.

While there are some risks to health from poor installations of solid wall insulation that must be mitigated against, the effective installation of appropriate solid wall insulation into a property will avoid the risk of moisture building up within the wall matrix, which can otherwise have a negative impact on residents' health (Hopper et al 2011). It is also essential to ensure adequate ventilation following an installation of solid wall insulation, to avoid a reduction in air quality (Wilkinson et al 2011).

¹² Annual per-capita cost of respiratory and circulatory diseases (£232) x population of the UK (63 million) x 0.25 x 0.05.

Regeneration and aesthetic improvements

Solid wall insulation can significantly improve the appearance of some properties and housing estates. As it demonstrably makes the environment look and feel different, it may be one of the most visible aspects of local regeneration schemes. There have been good examples of successful solid wall insulation schemes on estates where councils and residents now value the appearance of their estates more following installation (see the Basildon case study below).¹³

The decision to install solid wall insulation also acts as a catalyst for other long-overdue repairs on properties, as any building defects (such as faulty rainwater systems, glazing or masonry) should be remedied prior to an installation being carried out. Some of the most successful solid wall insulation schemes have been on previously neglected or even abandoned property, so this benefit is not to be underestimated.

Valuing regeneration and aesthetic benefits is difficult, but it is inarguable that the effects are generally very positive. Much external solid wall insulation is likely to take place in the social housing sector, where properties can be retrofitted in groups, so schemes can be implemented more cost-effectively and finished properties can take on a consistent appearance.

It may be possible to use house prices as a proxy for the valuation of property improvements. For an average home in the country, improving its EPC rating from band G to E, or from band D to B, could mean adding more than £16,000 to the sale price of the property. In the North East of England, improving energy efficiency from band G to E could increase the property's value by over £25,000, while the average home in the North West could see £23,000 added to its value (Fuerst et al 2013). Of this increase, 25 per cent could be attributable to solid wall insulation, although not all solid walled homes are band G and buildings which receive solid wall insulation are not likely to be the most expensive.

Taking all this into account, for properties in regeneration areas, the contribution of solid wall insulation to increased property values could be estimated to be in the order of £1,000 per property, even if those properties are in social ownership. Regeneration only applies where communities are significantly deprived. Based on achieving improvements to a possible 10 per cent of the 8 million solid wall dwellings in the UK, the total regeneration and aesthetic benefit from retrofit could therefore be estimated at £800 million (800,000 x £1,000).

While in some instances external solid wall insulation can diminish the appearance of buildings, by covering up culturally significant building fabric (Licciardi and Amirtahmasebi 2012), this risk can be minimised by focusing on solid wall buildings that are acknowledged to be an eyesore, are of little significance and already rendered, or are in a poor state of repair such that the alternative would be to demolish and rebuild. Internal solid wall insulation also covers up historic fabric, so here risks can be minimised by selecting properties where these features (skirting boards, architraves, cornicing) are absent or not significant.

¹³ See also the case of Stockton-on-Tees: <http://www.stockton.gov.uk/news/localnews/year2013/may/gowarm>

Case study – Basildon Borough Council

A group of 1940s solid wall properties were selected by Basildon Borough Council to receive insulation due to their poor energy efficiency levels. To help reduce the costs to the council of making these improvements, a substantial level of ECO funding was secured through Scottish Power.

The scheme was felt to have produced substantial benefits in terms of regenerating the area and improving the aesthetics of the buildings.

‘The recent installation of the [external solid wall insulation] system and replacement of the windows and doors to the properties on this project not only improve efficiency values of these homes but have had a significant cosmetic effect on the area.’

Clint Borley, programmed works surveyor, Basildon Borough Council

Source: Anglian Building 2013

Improvements to social capital

There is good evidence to suggest that solid wall insulation projects, if correctly handled, can increase social capital in communities. Solid wall insulation, particularly where it is applied externally to buildings, is a major intervention that can change the appearance of entire communities. As a result, it can become a topic that residents have in common, leading to conversation where perhaps there was little or none before, and in some cases providing a forum for interaction and the exchange of ideas.

In addition, if local training and job opportunities are created, it is possible to re-establish a sense of ownership and pride in areas that suffer from antisocial behaviour (Family Mosaic 2013). The costs of crime are experienced in communities themselves and also by society as a whole, through the costs of the policing, judiciary and penal systems. There is no attempt here to evaluate these costs or the contribution of solid wall insulation to the regeneration process in these terms. Nonetheless, improved social capital certainly delivers a better quality of life for residents, and solid wall insulation is a major element of thermal retrofit, which in turn plays a significant role in community regeneration.

The positive effects of solid wall insulation schemes on social capital also help to generate buy-in to the schemes themselves, thereby increasing the overall impact in terms of job creation and wider benefits. It is important to recognise the contribution that increased social capital makes to the success of insulation schemes. In the paper *Valuing the Benefits of Regeneration*, the ‘property betterment and social benefits’ of regeneration are estimated to exceed the cost by a factor of between 1.3 and 2 (CLG 2010).

5. SUMMARY AND CONCLUSIONS

The UK has 8 million solid walled properties and less than 3 per cent of these are insulated. Less than one year after launching the ECO, the government has announced major changes to the policy that could result in annual installations of solid wall insulation falling from a target of 100,000 a year to just 23,500 a year.

Energy efficiency is the only long-term solution to rising energy costs, and the government needs to re-establish a clear vision of the role it sees for solid walled insulation.

By saving energy without reducing comfort, the technology can make an important contribution to policy objectives, including limiting rising energy costs, meeting the country's legally binding carbon emission reduction targets, and tackling fuel poverty.

In this report we have sought to inform debates about the future for solid wall insulation by demonstrating a variety of benefits beyond energy cost savings that arise from investing in the technology.

Our research has shown:

- **Employment impacts:** Solid wall insulation investments create a large number of jobs, because the technology is more labour-intensive than other energy efficiency measures. A programme supporting the insulation of 100,000 solid walls every year would support up to 29,340 jobs (direct and indirect). The plans to reduce the ambition of the ECO mean that 20,000 jobs are at risk.
- **Exchequer revenues:** If exchequer revenues created by solid wall insulation investments are taken into account, the cost to government of solid wall insulation programmes is revealed to be offset by 50–100 per cent or more, depending on the funding option chosen.
- **Wider community benefits:** Solid wall insulation programmes generate a number of wider community benefits, with important impacts on health, regeneration and social capital.

The changes the government has proposed to the Energy Company Obligation are dramatic, with major implications for the delivery of energy efficiency. It is vital that the government moves quickly to establish a consistent approach in its support for solid wall insulation, one that takes the full range of costs and benefits of this technology into account.

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ANNEX: MODELLING METHODOLOGY

The model assesses the impact on the exchequer of a scheme to support the uptake of solid wall insulation measures across the UK's domestic housing stock. Using a set of peer-reviewed and validated assumptions, the model estimates the effect of a subsidy scheme implemented according to the following input values:

1. Subsidy as a percentage of the capital cost of completing the insulation works: variable, depending on funding option
2. Number of properties insulated per year: 100,000

Several assumptions and simplifications had to be made to assess the overall costs and benefits of the scheme. The investment to be financed includes the cost of labour and materials plus VAT and it will be covered by:

- private finance: percentage of costs that private households are expected to pay directly (options 1 and 2) or through a loan (option 3)
- subsidy: percentage of costs covered by the exchequer in the form of a non-repayable grant (options 1 and 2) or through a loan (option 3).

Table A1
Options modelled: split of funding sources

	Funding source	
	Private finance	Subsidy
Option 1: Private householder scheme	33.3%	66.6%
Option 2: Social housing scheme	50%	50%
Option 3: Loan scheme	80%	20%

This annex provides sources for the modelling assumptions and details of how they have been combined to model the three scheme options.

The total benefits that will flow to the exchequer do not vary with each option as they are not related to how the insulations measures are funded.

Scenarios

For each option we have modelled low and high revenue scenario, with the low revenue scenario being very conservative and the high revenue scenario including revenues associated with greater uncertainties. The table below lists the parameters included and excluded in each scenario.

Table A2
Revenues included/excluded, high and low revenue scenarios

	Low revenue scenario	High revenue scenario
Costs		
Subsidy required	Included	Included
Lost VAT income	Excluded	Excluded
Benefits		
VAT paid on labour and materials	Included	Included
Corporation tax (installers and supply chain)	Included	Included
Income tax (installers and supply chain)	Included	Included
Income tax (induced jobs)	Excluded	Included
VAT paid due to increased household spending	Excluded	Excluded
Avoided cost of unemployment (installers and supply chain)	Included	Included
Avoided cost of unemployment (induced jobs)	Excluded	Included
Reduced NHS spending due to health improvements	Excluded	Included

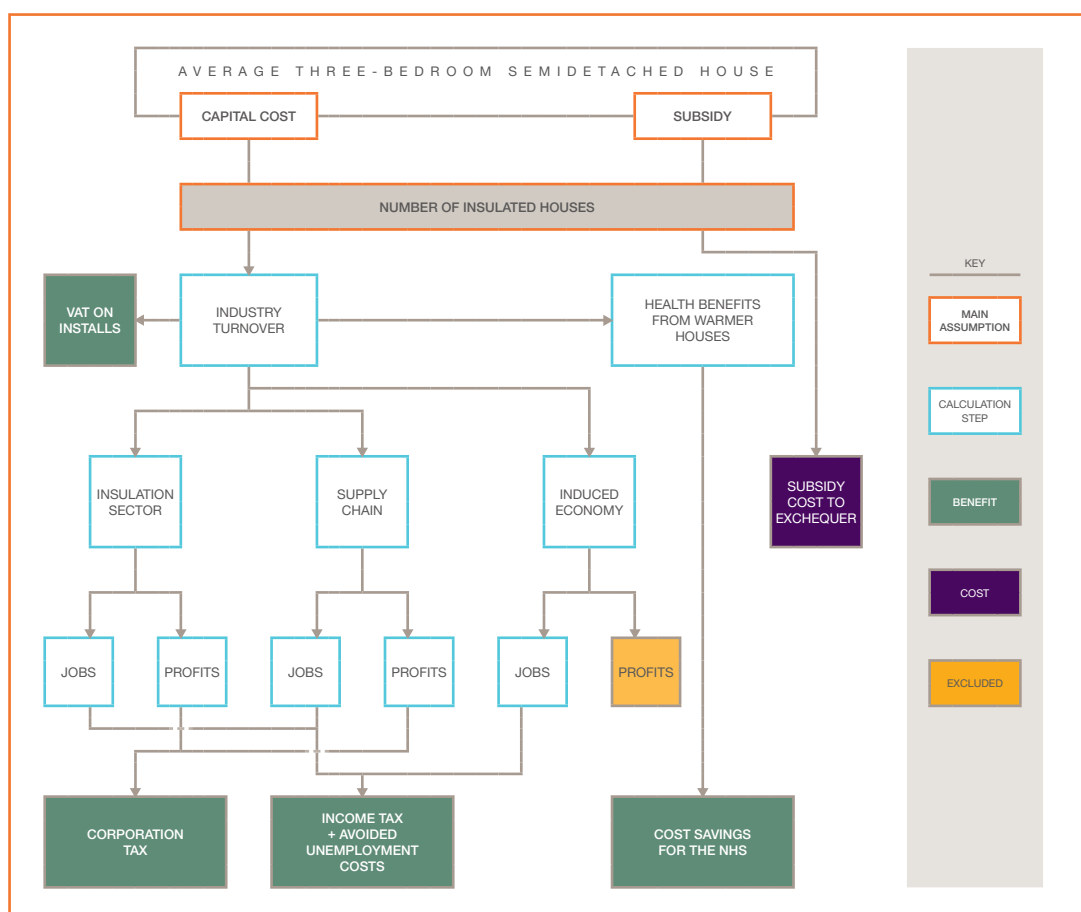
Sources and assumptions

The following sources and assumptions have been selected as bases for modelling calculations.

Table A3
Modelling sources and assumptions

Item	Value	Source	Link
A Cost of insulating a three-bed semidetached property	£9,000	Purple market research: Solid wall insulation supply chain review, 2009 David Lawrence, managing director, Lawtech, 2014 INCA (Insulated Render and Cladding Association)	http://itsacoastthing.com/pdf/solid%20wall%20insulation%20chain%20review.pdf personal communication communication to DECC
B VAT on home insulation materials and labour	5%	HMRC, 2014	www.hmrc.gov.uk/vat/sectors/consumers/energy-saving.htm
C Proportion of labour costs	50%	INCA (Insulated Render and Cladding Association)	communication to DECC
D Energy savings per year following insulation of a three-bed semidetached property	6,700kWh/year	Element Energy and EST, 2013	http://www.theccc.org.uk/wp-content/uploads/2013/12/Review-of-potential-for-carbon-savings-from-residential-energy-efficiency-Final-report-A-201213docx.pdf
E Heating fuel type share	gas: 85% electricity: 8% oil: 4% solid fuel: 1%	GOV.UK, 2013	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267320/qep_december_2013.pdf
F Heating fuel price projections up to 2030 (pence/kWh)	2014 price: gas: 4.8 electricity: 15.9 oil: 6.1	DECC, 2013	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254831/Annex-f-price-growth-assumptions-2013.xls
G Average net profits/turnover construction industry	3.45%	Building UK, 2013	http://www.building.co.uk/top-european-contractors-and-housebuilders-european-league-tables-2013/5048253.article
H Average tax rate	21%	HMRC, 2014	http://www.hmrc.gov.uk/rates/corp.htm
I Pre-tax profit/turnover ratio	$G/(1-H) = 4.37\%$	Calculation	–
J Direct job impact (direct job creation per £1m spent)	23/year	Janssen and Staniaszek, 2012	http://www.euroace.org/LinkClick.aspx?fileticket=3R8RB3xG_YU%3D&tabid=69
K Sector jobs impact (direct + indirect job creation per £1m spent)	32.6/year	DECC, 2012	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42984/5533-final-stage-impact-assessment-for-the-green-deal-a.pdf
L Induced jobs multiplier (supply chain and induced jobs created for each direct job)	2.8	Scottish government, 2013	http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/Multipliers
M Average pay – skilled trades occupations	£465.70/week	ONS, 2012	http://www.ons.gov.uk/ons/rel/ashe/annual-survey-of-hours-and-earnings/2012-provisional-results/stb-ashe-statistical-bulletin-2012.html#tab-Earnings-by-occupation
N Average income tax (annual)	£4,819	Calculated based on HMRC, 2014	http://www.hmrc.gov.uk/rates/it.htm
O Indirect jobs	K-J = 10/year	Calculation	–
P Induced jobs	J*L-K = 31.5/year	Calculation	–
Q Cost to exchequer of 1 unemployed person	£4,307	Institute for Fiscal Studies, 2012	http://www.ifs.org.uk/bns/bn13.pdf
R Health impact	1–2% (used 1.5%)	Liddell, 2008	http://eprints.ulster.ac.uk/26173/1/FP.costbenefitsonweb.pdf

Figure A1
Model framework



House type used

The model assesses energy savings and associated costs of insulating the average three-bedroom semidetached house. Following consultations with various stakeholders (Lawtech, INCA) and market research reports (Purple Market), the average investment was set at £9,000 (A) plus VAT at 5 per cent (B). Capital expenses would pay for materials and labour with a 50 per cent split (C), therefore half of the initial income would be passed to the supply chain. The investment would deliver 6,700kWh (D) energy savings to each property, which amount to £386 savings on bills in 2014, considering the current heating fuels mix of UK’s housing stock (E) and the relative fuel price (F).¹⁴

Costs to the exchequer

We assume that a subsidy would be awarded to households and reduce the initial investment by a portion as set according to the three options. The following table provides the corresponding amount of subsidy awarded in each option modelled.

Table A4
Options modelled:
subsidies as share and
total amount

	Subsidy	
	Share of investment	Amount
Option 1: Private householder scheme	66.6%	£629,370,000
Option 2: Social housing scheme	50%	£472,500,000
Option 3: Loan scheme	20%	£189,000,000

¹⁴ Weighted average price in 2014 is 5.76 pence/kWh.

The scheme is estimated to encourage 100,000 properties to be insulated each year, representing 1.25 per cent of the 8 million solid wall properties that may be eligible for such an intervention.

The exchequer would also have to consider the loss from VAT income due to reduced energy consumption, a loss worth £1.93 million a year. However, we have excluded this lost revenue from our model because it can be assumed that a large proportion of any energy cost savings will be reinvested by consumers and spent on goods and services with a higher VAT rate (as domestic energy consumption is subject to a reduced 5 per cent rate) (Consumer Focus 2012). Therefore, from the benefits to the exchequer we have also excluded increased VAT paid due to increased household spending.

Benefits to the exchequer

It is possible to identify various streams of income to the exchequer deriving from the intake of the scheme. Some of these benefits are direct and straightforward, while others are associated with more uncertainties. As a general simplification, it was assumed that solid wall insulation investments would be additional to other building works – that is, they would not displace other investments – and that therefore they would generate only additional income, jobs, and tax revenues.

The benefits associated with the low and high revenue scenarios developed under these assumptions are as follows.

- **Corporate tax:** Solid wall insulation installers and supply chain companies would pay corporation tax based on their profits. We have used the average profitability of the UK's building sector¹⁵ and applied the same profit/turnover ratio (4.37 per cent) to calculate profits for installers (**I**). Corporate tax from installers would deliver £8.26 million to the exchequer. With the addition of supply chain companies (assuming 50 per cent of total investment would be passed to them (**C**)), total corporation tax would amount to £12.4 million.
- **VAT:** The reduced rate of VAT applied to energy efficiency (**B**) levied on capital costs (labour and materials) would generate £45 million.
- **Income tax from direct and indirect jobs:** DECC estimates that for each £1 million spent 32.5 direct and indirect jobs (**K**) would be supported. These jobs, at the average pay for the 'skilled trade employee' (**M**) of £465 per week, would generate £4,819 per capita per year in additional income tax. For a programme supporting 100,000 solid wall insulations per year, we estimate that £141 million will be paid to the exchequer in the form of income tax from direct and indirect jobs created.
- **Income tax from induced jobs:** The Scottish government provides the induced job multiplier by sector (**L**): each job gained in the construction sector (direct jobs) creates 2.8 additional jobs, both in the supply chain (indirect jobs) and in the induced economy (the income spent by installers and supply chain workers would generate new jobs in the local economy). Combining this data with the sectorial job creation estimate provided by DECC (**K**), we expect that every £1 million invested would generate 31.5 induced jobs.

The income tax impact of induced jobs is included only in our high revenue scenario. We have excluded from both scenarios the potential benefit from additional jobs created due to increased consumer spending resulting from bill savings. Research

15 Published by Building, available at <http://www.building.co.uk/top-european-contractors-and-housebuilders-european-league-tables-2013/5048253.article> after subscription.

has shown that increased consumer spending following reduced energy bills can create employment of up to 25 per cent of the jobs created by the financial stimulus itself (Consumer Focus 2012). However, the amount of additional consumer spending depends on the contributions from consumers to the capital cost, which varies across the three options analysed.

- **Avoided cost of unemployment:** Keeping people in work and creating new jobs generates savings in the budget of the Department for Work and Pensions due to the avoided cost of paying benefits. In 2011/12, 1,199,000 claimants received a total of £5,164 million (unemployment benefits only), at an average of £4,307 (**Q**).

In our low revenue scenario, unemployment costs avoided are considered only for direct and supply chain jobs. The high revenue scenario also includes unemployment costs avoided related to induced jobs.

There are other costs to the exchequer associated with unemployment, such as funding for training schemes, which have not been included. We therefore consider this to be a conservative estimate.

- **Health impacts:** According *Estimating the health impacts of Northern Ireland's Warm Homes Scheme 2000–2008* (Liddell 2008), the NHS would save between 1 per cent and 2 per cent a year in treatment costs for each £1 million invested in housing insulation improvements, due to the better living environment provided by well-insulated homes (**R**), providing additional benefits to the exchequer of around £13.5 million.

This benefit is included in the high revenue scenario only.