Minimum Standards of Energy Efficiency in Private Rented Sector Housing

Partial Business and Regulatory Impact Assessment

April 2017

Scottish Government
Riaghaltas na h-Alba
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Contents

1. Purpose and intended effect

This partial Business and Regulatory Impact Assessment (BRIA) accompanies the Scottish Government consultation on minimum standards of energy efficiency in private rented sector housing.

The consultation proposes a minimum energy efficiency standard for homes in the private rented sector. From 1 April 2019, private rented properties will need to have an EPC rating of at least E at the point of rental (or have had an assessment done before rental and be improved within 6 months), and by a backstop date of 31 March 2022, all private rented properties will need to meet this standard. The consultation further seeks views on a trajectory which would see the standard increased over time; in particular, from 1 April 2022 the minimum standard at point of rental would be raised to a D, and all properties would need to have an EPC of at least D by 31 March 2025.

This document provides an assessment of the impact of the proposed regulation on various parties and sectors within the Scottish economy. The analysis and data provided will also help readers to assess the impact of varying the parameters of the regulation, which will help them in responding to the questions posed in the consultation document about the design of the regulations.

1.1 Context

The Scottish Government seeks to improve the energy efficiency of the Scottish housing stock. Minimum energy efficiency standards in the private rented sector support Scottish Government efforts to meet its climate change, energy efficiency and fuel poverty targets.

Furthermore, improvements in the energy efficiency in houses will help the Scottish Government to achieve broader objectives, which include supporting economic growth and jobs in the green construction industry and improving public health. In particular, it will support the following National Outcomes:[1]

- We live in well-designed, sustainable places where we are able to access the amenities and services we need.

- We reduce the local and global environmental impact of our consumption and production.

1.1.1 Climate Change targets

The Climate Change (Scotland) Act 2009 sets a target of an 80% reduction in greenhouse gas emissions on 1990 levels by 2050. Emissions from the residential sector represented 12.6% of total direct emissions in 2014.[2] Residential emissions

[1] The National Outcomes form part of the National Performance Framework, available at http://www.gov.scot/About/Performance/purposestratobjs
[2] Scottish Greenhouse Gas Emissions 2014, available at http://www.gov.scot/Resource/0050/00503570.pdf

have fallen by 26% between 1990 and 2014, although they can vary significantly from year to year as a result of fluctuating external temperatures.

The Scottish Government published its draft Climate Change Plan on 19 January 2017, setting out policies and proposals to reduce emissions during the period 2017-2032.[3] Reducing carbon emissions in the residential sector is one of the most cost-effective ways to reduce greenhouse gas emissions, and the draft Plan proposes that emissions in the residential sector, which are principally derived from space and water heating, be reduced by 75% in 2032 against 2014 levels.

1.1.2 Energy Efficiency targets

The Scottish Government published "Conserve and Save: The Energy Efficiency Action Plan for Scotland", in October 2010.[4] This set a target of a 12% reduction in final energy consumption across all sectors by 2020, as against a baseline averaged over the years 2005-2007. In 2014, final energy consumption was 15.2% lower than the 2005-2007 baseline.[5]

The Scottish Energy Strategy is currently out for consultation, asking for views on a variety of issues, including what targets for energy efficiency and renewable energy should be set out to 2030.[6]

1.1.3 Fuel poverty targets

In the Housing (Scotland) Act 2001, the Scottish Parliament set out the fuel poverty definition, as well as a requirement for a Fuel Poverty Statement to be made every four years to describe measures taken and progress made in tackling fuel poverty. The 2002 Fuel Poverty Statement set the following target: "The Scottish Government aims to ensure that by November 2016, so far as is reasonably practicable, people are not living in fuel poverty in Scotland." The Minister for Local Government and Housing advised Parliament in June 2016 that this would not be achieved by November 2016.[7]

A household is currently defined as being in fuel poverty if, to maintain a satisfactory heating regime, it would be required to spend more than 10% of its income on all household fuel use. However, we have accepted the recommendation from the short-life Fuel Poverty Strategic Working Group to review this definition as they believe that it may be unhelpful in targeting support at those who need it most.[8] We have commissioned an independent review of the fuel poverty definition, to ensure we are setting the correct policy objectives, and have the correct basis for targeting resources and measuring progress. We expect this review to be completed by late summer 2017. We will then consult on a new fuel poverty strategy, including a new fuel poverty target, before the end of 2017.

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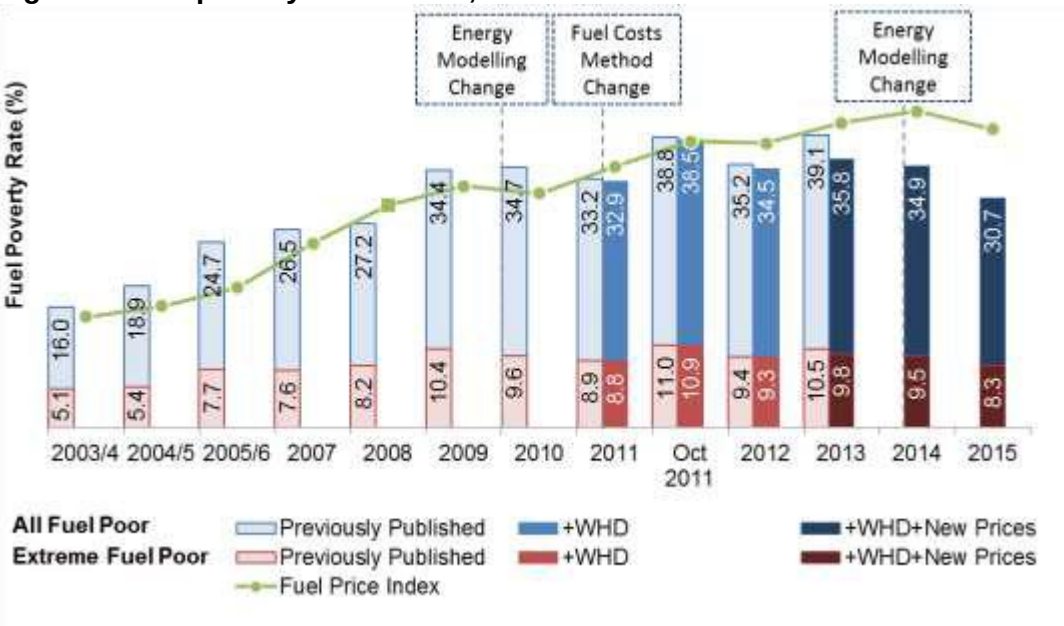
[3] Available at http://www.gov.scot/Publications/2017/01/2768
[4] http://www.gov.scot/Publications/2010/10/07142301/0
[5] See Energy Statistics Summary – September 2016, at http://www.gov.scot/Resource/0050/00507078.pdf
[6] Draft Scottish Energy Strategy: The Future of Energy in Scotland, available at http://www.gov.scot/Publications/2017/01/3414
[7] http://news.gov.scot/news/fuel-poverty-strategic-working-group
[8] https://beta.gov.scot/news/tackling-fuel-poverty/

Under the current definition, fuel poverty is determined by the energy demand for heat, household income and energy prices, although this may change as a result of the forthcoming review. Fuel poverty is distinct from income poverty in that, while low income is an important driver, it is not a prerequisite. Improving thermal efficiency of domestic properties addresses one of the key variables behind fuel poverty, reducing the energy demand for heat.

Fuel poverty rates are monitored through the Scottish House Condition Survey. The latest data indicates that an estimated 748,000 households (30.7% of all households) were in fuel poverty in 2015. This is almost 100,000 fewer households than in 2014, when 845,000 households (34.9%) were in fuel poverty. However, Figure 1 illustrates that this recent moderation in fuel poverty rates is in the context of a longer-term increase, the result of large increases in fuel prices which have more than offset improvements in energy efficiency and household incomes.

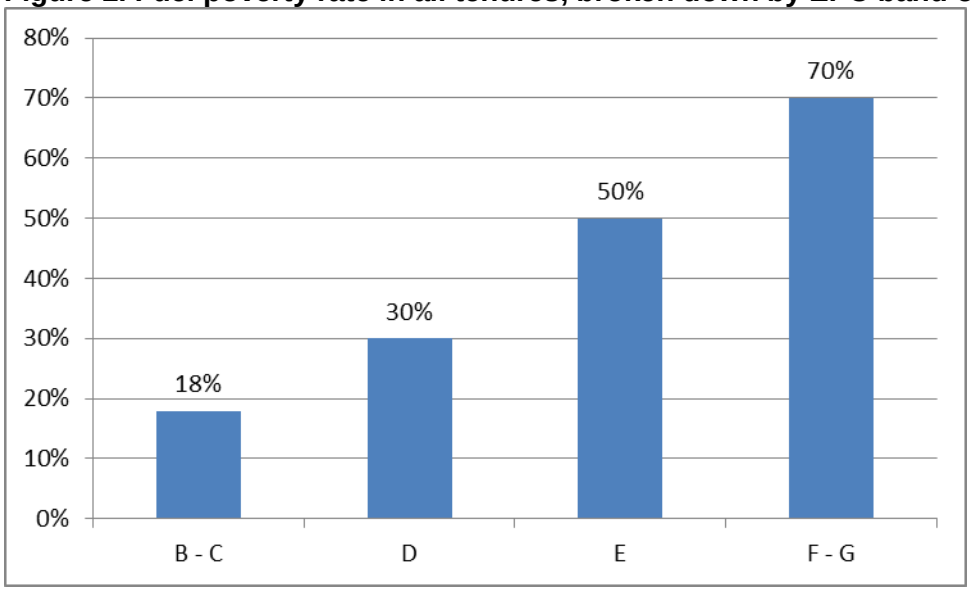
Figure 1. Fuel poverty in Scotland, 2003/4 to 2015



Source: Scottish House Condition Survey, 2015

As Figure 2 shows, the energy efficiency of their dwelling is strongly correlated with whether or not households are in fuel poverty. Thus, improvements to energy efficiency as a result of the proposed regulations can play an important role in mitigating fuel poverty in private rented properties.

Figure 2. Fuel poverty rate in all tenures, broken down by EPC band of dwelling, 2015



Source: Scottish House Condition Survey, 2015

1.1.4 Scotland's Energy Efficiency Programme (SEEP)

The Scottish Government has designated energy efficiency as a National Infrastructure Priority, and the primary delivery vehicle will be Scotland's Energy Efficiency Programme (SEEP). This is a long-term programme to improve the energy efficiency and reduce the environmental impact of Scotland's buildings in the residential, services and industrial sectors. It will build on our existing successful delivery programmes and include the development of a package of actions, spanning regulations and standards, financial incentives, advice and information, and delivery programmes. It is currently out for consultation on options for programme and policy design.[9] This consultation on minimum energy efficiency standards in the private rented sector forms part of SEEP.

1.2 Policy objectives

The private rented sector has grown significantly in recent years, rising as a share of the Scottish residential sector from 6% in 2003 to 14% in 2015. It has become increasingly important as a housing option for people at different points in their lifetimes, and not just for young, single people: for example, around a quarter of privately renting households have children.[10] It is crucial that tenants in the private rented sector have good-quality, energy-efficient homes and that landlords have a fair and workable market framework for them to be able to continue to maintain and expand the sector.

The Scottish Government's strategy for the private rented sector, "A Place to Stay, A Place to Call Home",[11] sets out a vision for "a private rented sector that provides good-quality homes and high management standards, inspires consumer

[9] http://www.gov.scot/Publications/2017/01/2195
[10] The housing chapter in the Scottish Household Survey, 2015, has a range of information on the households and properties in the private rented sector, see http://www.gov.scot/Publications/2016/09/7673/4.
[11] http://www.gov.scot/Publications/2013/05/5877

confidence, and encourages growth through attracting increased investment". Improving the energy efficiency of properties in the private rented sector will help to improve housing quality, which in turn will reduce the cost of heating these properties and improve tenant health and wellbeing.

In addition to improving the quality of the offer to tenants, improving energy efficiency in the private rented sector will help to achieve the climate change, energy efficiency and fuel poverty targets set out above.

1.3 Background: Energy efficiency in the Scottish residential sector

There are an estimated 2.4 million occupied dwellings in the residential sector in Scotland, 14% (around 350,000) of which belong to the private rented, 61% to the owner-occupied, and 23% to the social rented sectors.[12]

The average (mean) Energy Efficiency Rating (EER) in the residential sector, calculated using the Standard Assessment Procedure (SAP 2012), is 63.[13] The EER is measured on a scale of 1 to 100, with a higher score reflecting greater energy efficiency. For the purposes of Energy Performance Certificates, EER scores are divided into seven bands, labelled A to G. Band A (EER 92 to 100) represents the highest energy performance, while band G (EER 1 to 20) denotes the lowest energy performance. The average score of 63 for the residential sector falls into EPC band D.

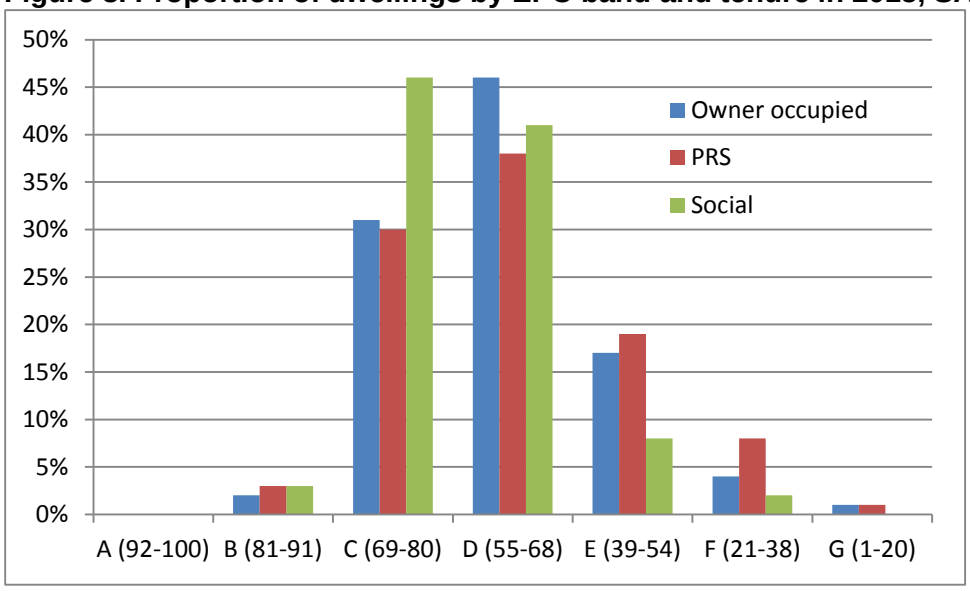
While energy efficiency across the domestic sector has been improving in recent years,[14] there are important differences across sectors. The average energy efficiency rating in the private rented sector is 61, as compared to 62 for the owner-occupied and 67 for the social rented sector. There are also significant differences in the distribution of dwellings between EPC bands in the different tenures, as set out in Table 1 and illustrated in Figure 3.

[12] Scottish Household Survey, 2015, available at http://www.gov.scot/Publications/2016/09/7673.
[13] Scottish House Condition Survey, 2015, available at http://www.gov.scot/Publications/2016/12/1539.
[14] SAP 2012, the most recent methodology, was first used in the reporting data in 2014, meaning that only two years of data are available, which show an increase in the mean EER from 62 to 63. However, data based on the previous methodology, SAP 2009, are available for 5 years, and show an increase from 60 in 2010 to 65 in 2015.

Table 1. EPC Band by Tenure in 2015, SAP 2012[15]

EPC Band	Owner-occupied		Private rented		Social rented		All Tenures	
	000s	%	000s	%	000s	%	000s	%
A (92-100)	-	-	-	-	-	-	-	-
B (81-91)	23	2%	12	3%	18	3%	53	2%
C (69-80)	460	31%	103	30%	274	46%	837	34%
D (55-68)	690	46%	131	38%	239	41%	1,061	44%
E (39-54)	258	17%	65	19%	45	8%	368	15%
F (21-38)	54	4%	26	8%	13	2%	94	4%
G (1-20)	17	1%	4	1%	-	-	20	1%
Total	1,502	100%	342	100%	589	100%	2,434	100%

Figure 3. Proportion of dwellings by EPC band and tenure in 2015, SAP 2012



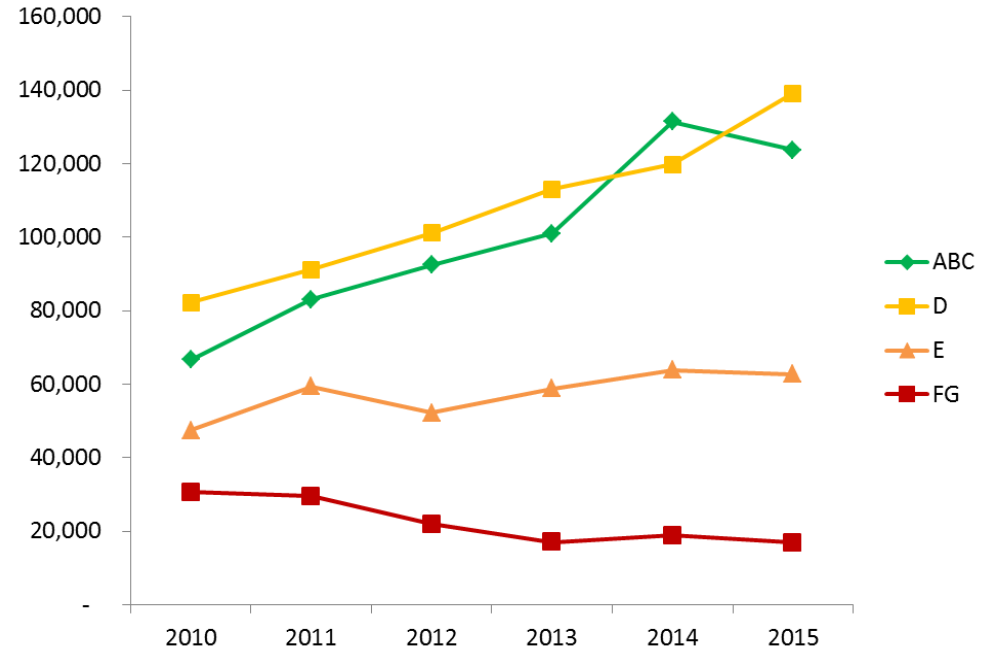
Source: Scottish House Condition Survey, 2015

In the private sector, the most common EPC band is D: 38% of private rented stock and 46% of owner-occupied stock fall into this band. In the social sector, however, band C has the largest share (46%). This relatively worse performance of the private rented sector is also reflected in the higher share of dwellings which fall into the lowest bands: 28% of private rented dwellings (95,000) fall into EPC bands E, F and G as compared with 22% (329,000) in the owner-occupied and 10% (58,000) in the social rented sector, while for the two worst EPC bands – F and G – the share is 9% (30,000 dwellings) in the private rented sector as compared with 5% (71,000 dwellings) in the owner-occupied and 2% (13,000 dwellings) in the social rented sector.

Figure 4 shows the trends in the number of dwellings in each EPC band in the private rented sector over the period 2010 to 2015.

[15] There are small differences in estimates of the number of dwellings in different tenures between the Scottish Household Survey and Scottish House Condition Survey due to the different weighting methodologies.

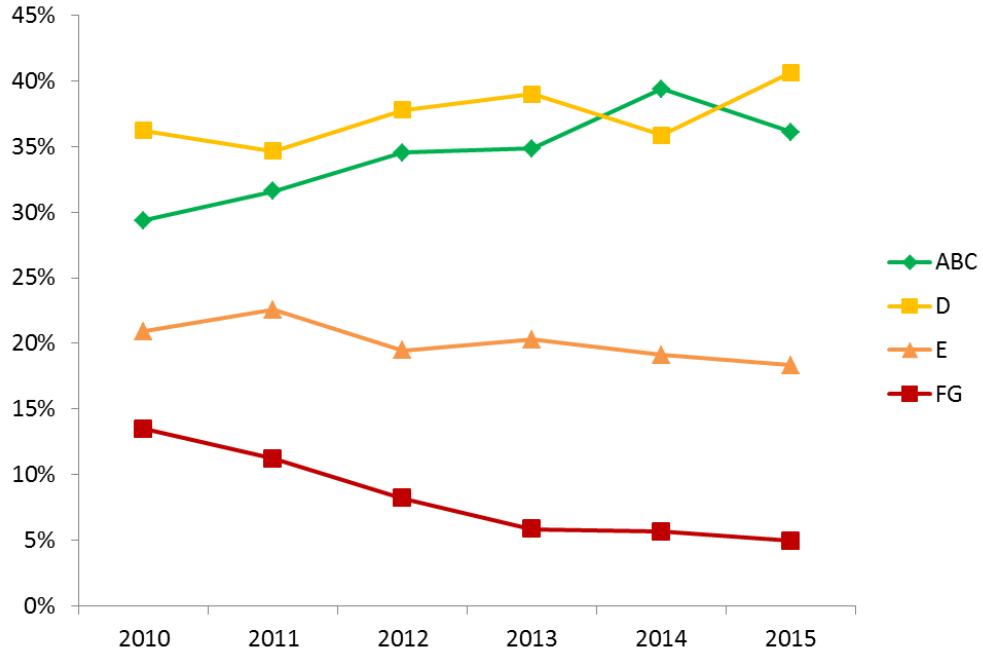
Figure 4. Number of private rented dwellings by EPC Band, 2010 – 2015, SAP 2009[16]



Source: Scottish House Condition Survey, 2010-2015

Since the total size of private rented sector grew over this period, Figure 5 also shows the trends in EPC bands as a proportion of all dwellings in this sector. While there was a downward trend in both the number and share of F and G-rated properties from 2010 to 2013, this has subsequently levelled off.

Figure 5. Proportion of private rented dwellings by EPC Band, 2010 – 2015, SAP 2009

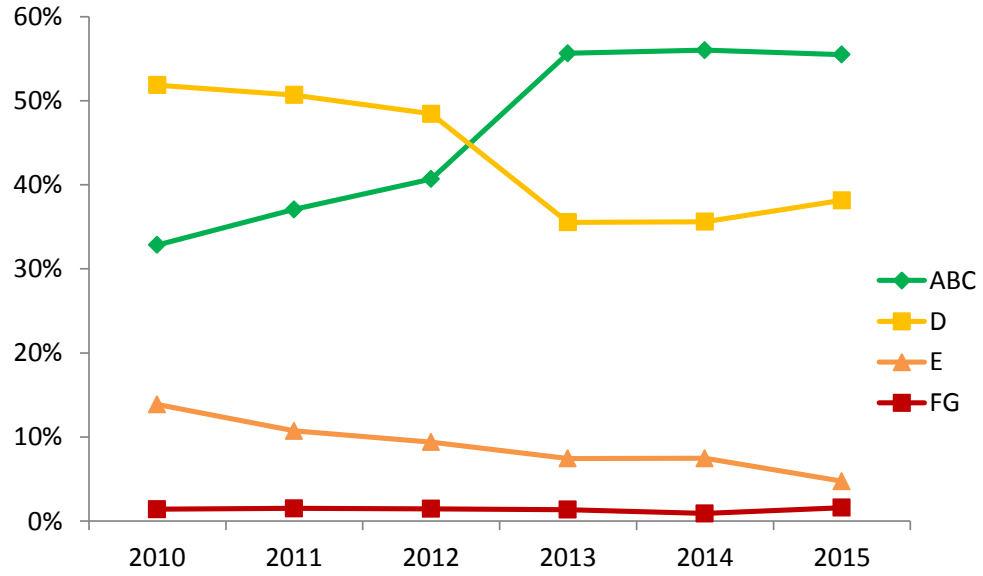


Source: Scottish House Condition Survey, 2010-2015

[16] SAP 2009 is used to give a longer time series, as data based on SAP 2012 is only available for 2014 and 2015.

Figure 6 provides a similar breakdown in the trends by EPC band for the social rented sector, and illustrates the much smaller proportion of F and G-rated properties in this sector. Within this, the number of properties in the worst band, G, is minimal (see Table 1). Furthermore, Figure 6 shows that over the period 2010 to 2015 the decline in the proportion of dwellings falling into band E was much stronger in the social than in the private rented sector (compare Figure 5).

Figure 6. Proportion of social rented sector dwellings by EPC Band, 2010 – 2015, SAP 2009

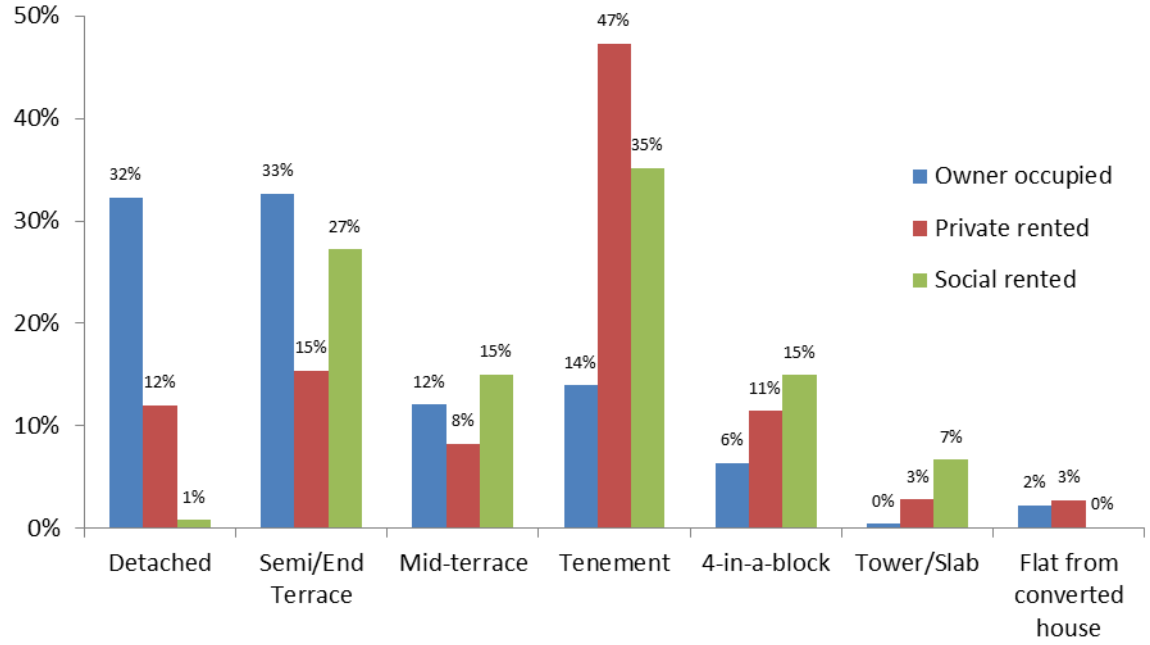


Source: Scottish House Condition Survey, 2010-2015

Key characteristics which determine the energy efficiency of a dwelling include the efficiency of its heating systems, as well as the amount of heat which is lost through exposed surfaces, which in turn is affected by the proportion of exposed surfaces, the construction form and material of its walls, windows, roof, etc. and the level of insulation that has been fitted to these surfaces. Since the Energy Efficiency Rating measures the costs of heating a property, the type of fuel used will also have an impact due to their different costs.

Differences in energy efficiency between and within sectors can therefore be partly due to the prevalence of different types of dwellings and fuel use. Figure 7 shows that the owner-occupied sector has a much greater proportion of detached houses than other sectors, while the private rented sector has a high proportion of tenements, which are typically stone dwellings.

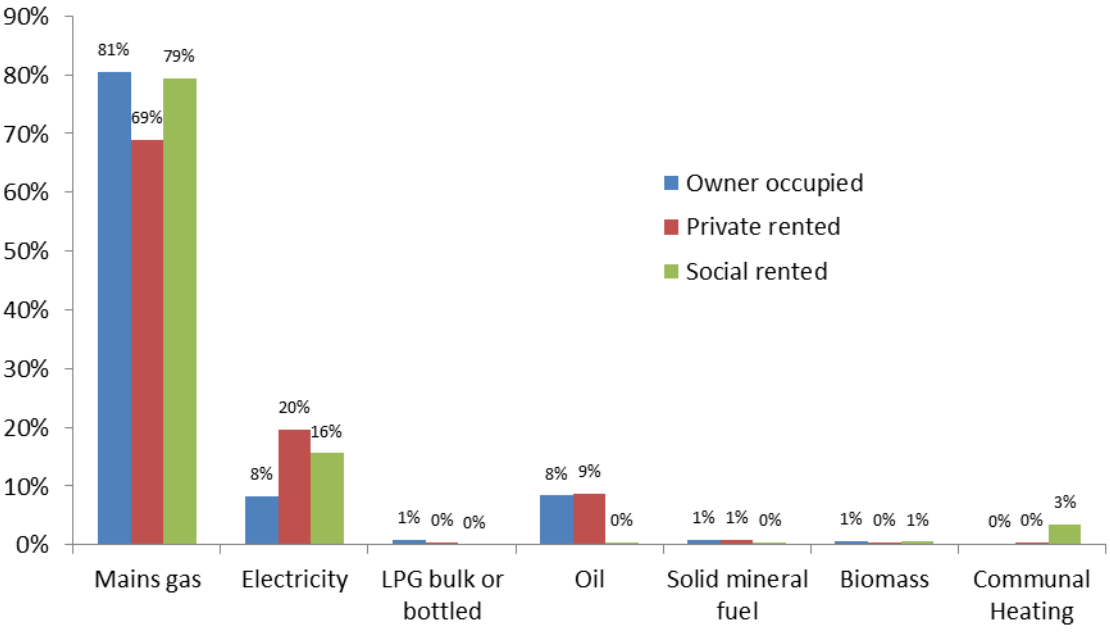
Figure 7. Share of dwelling type in each tenure, 2015



Source: Scottish House Condition Survey, 2015

Figure 8 shows that the private rented sector has a relatively smaller share of properties using gas as the primary fuel type, and a relatively larger share of dwellings using electricity, than the other sectors. The owner-occupied and private rented sectors also have a small but significant component of oil-fuelled dwellings. The social sector has the highest proportion of gas and lowest proportion of electricity, as well as a negligible share of oil-fuelled dwellings.

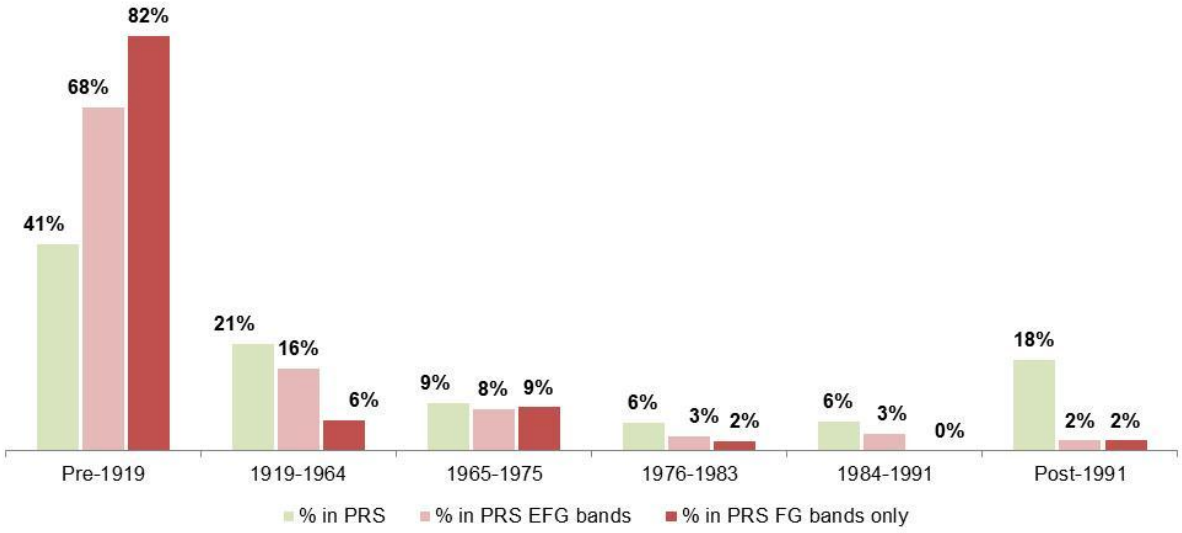
Figure 8. Share of primary fuel in each tenure, 2015



Source: Scottish House Condition Survey, 2015

Similar patterns can be found when looking at those dwellings within the private rented sector whose EPC rating falls in the lower bands. Figure 9 shows 82% of privately rented dwellings which have an EPC of F or G, and 68% of dwellings with an E, F or G, were built before 1919, as compared with 41% of all dwellings in this sector.

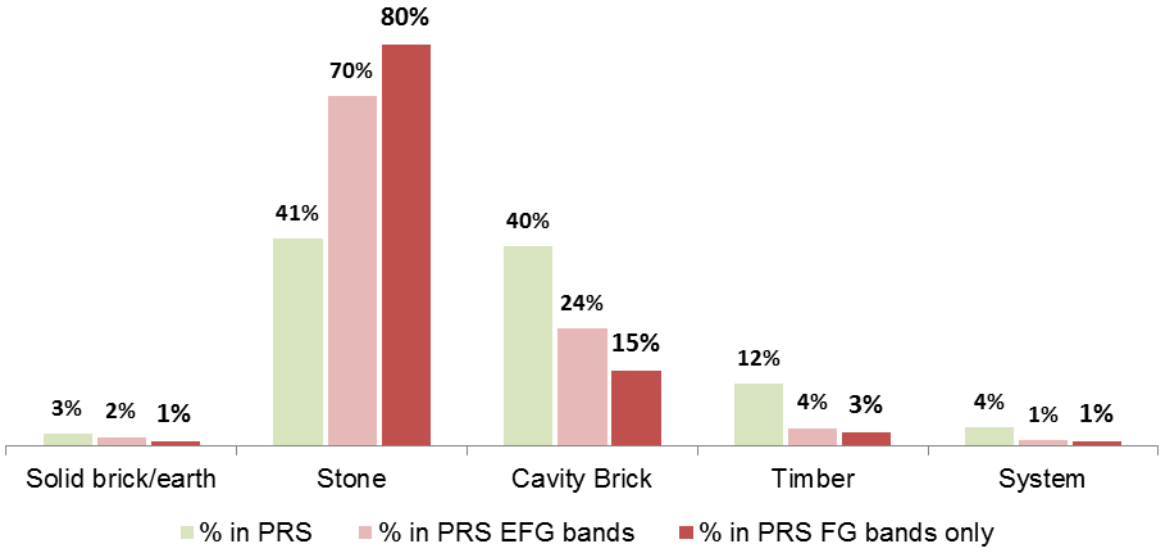
Figure 9. Distribution of private rented dwellings by age (SAP 2012)



Source: Scottish House Condition Survey 2014-15

This higher proportion of older dwellings in the lower EPC bands is reflected in the wall type of properties, with 80% of dwellings in bands F and G, and 70% in bands E, F and G, having stone walls, compared with 41% of all private rented dwellings.

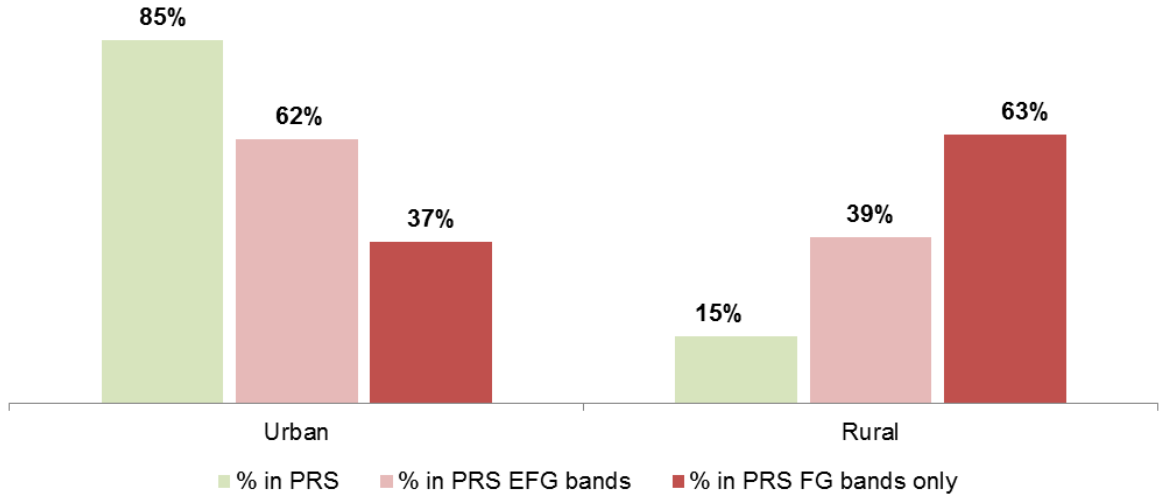
Figure 10. Distribution of private rented dwellings by age (SAP 2012)



Source: Scottish House Condition Survey 2014-15

A higher proportion of private rented dwellings with low EPC ratings are situated in rural areas. Figure 11 shows that 63% of dwellings with an EPC of F or G, and 39% with an EPC of E, F or G, are located in rural areas, as compared with 15% for the sector as a whole.

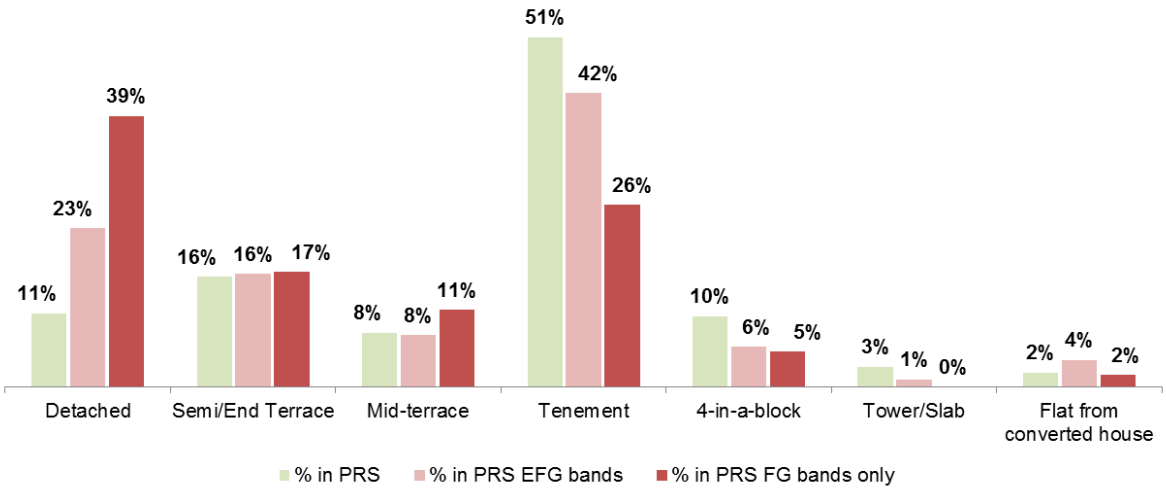
Figure 11. Distribution of private rented dwellings by urban-rural location (SAP 2012)



Source: Scottish House Condition Survey 2014-15

This greater rurality of the less energy efficient stock is correlated with certain key characteristics which affect the energy performance of buildings. The first is that rural dwellings are more likely to be detached houses and less likely to be flats, which means that they will have a proportionally greater external surface area leading to increased energy loss.

Figure 12. Distribution of private rented dwellings by dwelling type (SAP 2012)

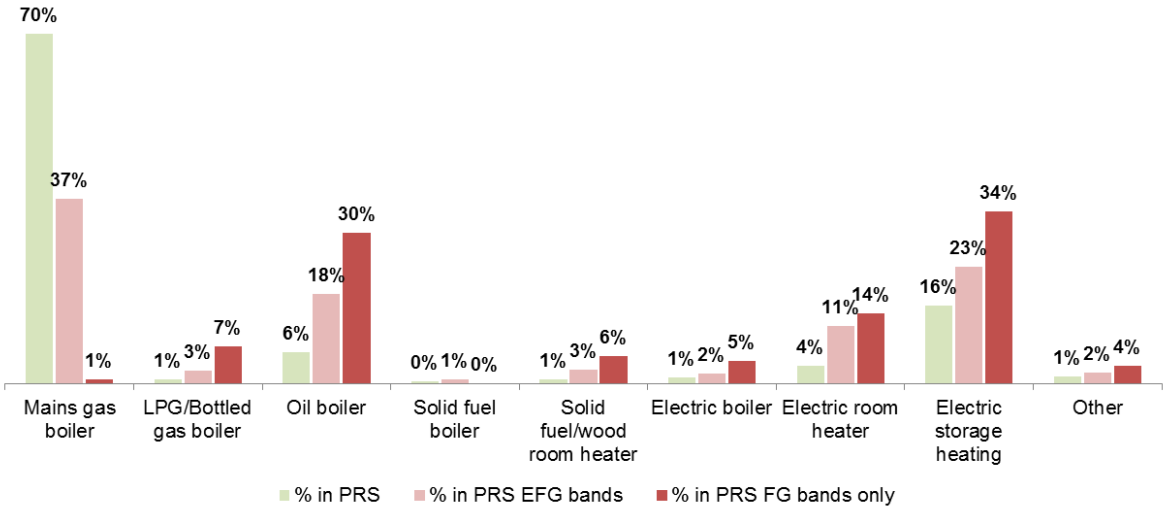


Source: Scottish House Condition Survey 2014-15

A further impact from the greater rurality of dwellings in low EPC bands is that proportionately fewer are connected to the gas grid, and therefore a greater proportion are on more expensive fuels. As illustrated by Figure 13, only 1% of

dwellings with an EPC of F or G, and 37% of dwellings with an EPC of E, F or G, use mains gas, as opposed to 70% for all private rented dwellings.

Figure 13. Distribution of private rented dwellings by dwelling type (SAP 2012)

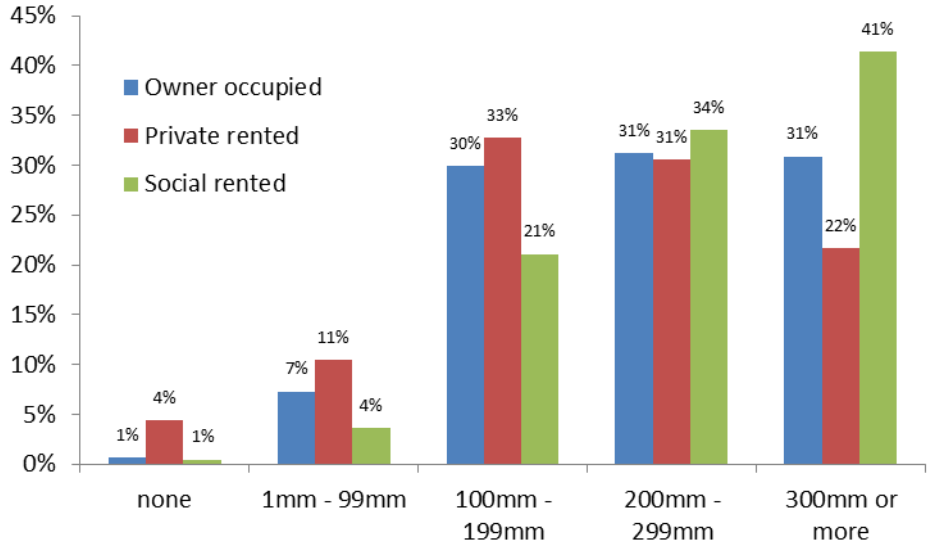


Source: Scottish House Condition Survey, 2014-15

However, it is important to note that it is not just the prevalence of different built forms that varies between sectors. In addition, the degree to which retrofit activity to improve the energy efficiency of dwellings has been undertaken varies across the sectors.

Figure 14 shows that the share of lofts which have no or low levels of insulation is higher in the private rented sector than in other tenures. The social sector has the greatest share of lofts which have been insulated to 300mm or more.

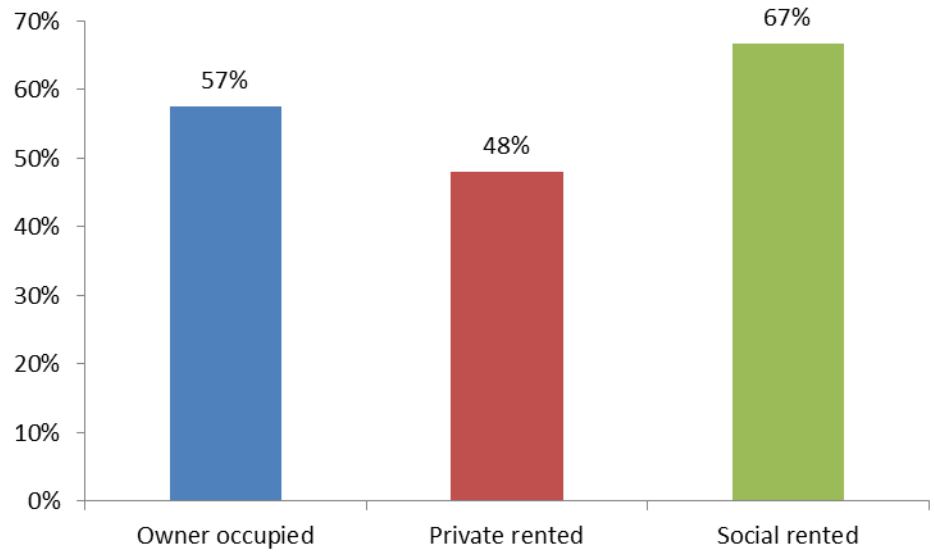
Figure 14. Insulation of loft spaces by tenure, 2015



Source: Scottish House Condition Survey, 2015

Furthermore, the proportion of cavity walls which have been retrofitted is lowest in the private rented sector. Again, the highest rates of insulation are to be found in the social sector.

Figure 15. Proportion of cavity walls insulated by tenure, 2015[17]



Source: Scottish House Condition Survey, 2015

The stronger regulatory framework applying to the social rented sector, with the energy efficiency elements of the Scottish Housing Quality Standard, which had to be met by 2015, now superseded by the higher requirements of the Energy Efficiency Standard for Social Housing, which sets out minimum EPC ratings to be met by 2020, is likely to have played an important role in the higher degree of retrofit activity in this sector.

1.4 Rationale for government intervention

This section considers why the presence of market failure means that government intervention can help improve the functioning of the private rented sector with respect to energy efficiency upgrades, with potential benefits not only for parties in the private rented sector, but also for wider society.

The first type of arguments consider various forms of market failure which mean that energy efficiency upgrades may not be installed even when the private net benefit is positive. The second type of arguments broaden the discussion to consider why market failures relating to wider factors such as greenhouse gas emissions and health mean that upgrades whose social net benefit is positive may not be installed. Distributional issues, i.e. the impact on the less well-off in society, further strengthen these arguments.

[17] Dwellings built after 1982 are presumed insulated when built due to building regulations, and therefore do not require retrofitting. The proportions in the graph are therefore expressed in relation to all pre-1982 cavity wall dwellings.

1.4.1 Misaligned incentives

In the private rented sector, landlords generally are responsible for paying for improvements to the dwelling, while tenants are responsible for fuel bills. This can result in a misalignment of incentives in relation to energy efficiency upgrades since the landlord is directly responsible for the cost while the benefits from reduced fuel bills flow directly to tenants. As a result, energy efficiency measures may not be installed even if the fuel bill savings over the lifetime of the upgrade would more than compensate for the capital costs of the upgrade.

However, the economic impact on parties is often not identical with who pays for particular items.[18] In this case, the potential misalignment of incentives from parties being responsible for different financial elements can be mitigated if the landlord is able to capture some of the benefit to the tenant from lower fuel bills by being able to charge a higher rent for a property with a higher quality. Where the expected fuel bill savings over the lifetime of an upgrade are higher than its cost, it is possible for both landlord and tenant to be better off from installing the upgrade – the landlord from being able to receive an additional rent which more than covers the cost of the upgrade, and the tenant because the increase in their rent is less than the decrease in their fuel bills, reducing their total expenditure.

However, there are a number of factors set out below, such as imperfect information relating to the impact of energy efficiency measures and the difficulty which people experience in assessing a varying stream of benefits over time, which mean that in the absence of regulation the market will fail to provide the optimal level of energy efficiency upgrades. The more difficulty tenants have in valuing the benefits of energy efficiency, the smaller the incentive that landlords have to retrofit their properties.

1.4.2 Imperfect information

The market in energy efficiency measures in the residential sector may be hampered by imperfect information about the benefits of installing measures. To some extent, these can be mitigated by the availability of standardised reports such as EPCs. However, the savings from an upgrade also depend on the way that a given household uses fuel in a particular property – the energy savings in the same dwelling will vary depending on how many people are in the household, how long they spend in the house, which rooms they prefer to heat and to what temperatures, etc. Thus, apart from the issue of whether households are able to understand EPC reports so that they take the EPC rating into account when choosing a property to rent, there is the further issue that it may not be easy for them to know on the basis on an EPC – which uses standardised occupancy and use assumptions – what their actual fuel bill will be.

This effect is compounded by relatively short tenure in the private rented sector: as evidenced in section 3.2, around half of tenancies end within two years. Thus tenants are often moving into new properties, and it may take them some time to

[18] For example, buyers may be the party who directly pays for a tax on goods and services, but the economic impact depends on the price elasticity (sensitivity) of buyers relative to sellers for each particular good or service.

learn what their fuel bills will be in a particular house, especially as there is significant seasonal fluctuation in fuel use.

As a result, when comparing two properties, one with a lower rent but with worse energy efficiency, and another with a higher rent but with better energy efficiency, households may focus on the more visible and certain extra rent they will have to pay for the second property, as against the less visible and more uncertain savings from lower fuel bills in the first property, even if fuel bill savings are potentially significantly larger.

1.4.3 Failures of rationality

Empirical evidence suggests that people can have particular difficulties when weighing up the impact of factors which are spread over time. In the case of the benefits of energy efficiency upgrades, adding to the complexity is that the savings can be quite different over different points of time, due to the strong seasonal pattern of fuel use. The fact that savings will also depend on future trends in fuel prices may further increase the complexity of the calculation that the household must make.

1.4.4 Economies in the installing market

The introduction of regulation can help guarantee minimum levels of demand for energy efficiency upgrades. This can give installers confidence to invest in equipment and training to meet the demand, and a larger market may also provide efficiencies through economies of scale and learning-by-doing effects. If a trajectory is set to a D, somewhere in the region of 100,000 dwellings will ultimately need to be upgraded due to regulations.

1.4.5 Securing permission from multiple owners

The introduction of regulations in the private rented sector may also make it easier to obtain agreement for the installation of energy efficiency measures which affect communal elements, where the approval of more than one owner is required. In particular, this may assist social landlords who are attempting to reach the Energy Efficiency Standard for Social Housing, although the proposed minimum EPC ratings for the private rented sector are below those for the social sector, at least in the first phase of regulation.

1.4.6 Greenhouse gas emissions

The case for regulation is further strengthened by taking into account the costs imposed on society from the greenhouse gas emissions produced by fuel use. Since the costs to society from climate change caused by greenhouse gas emissions are not fully reflected in the price of carbon-intensive fuels, the social benefits from energy efficiency upgrades are even larger than the private benefits from lower fuel bills.[19]

Furthermore, even for dwellings where due to their particular characteristics the net private payoff from upgrades may be marginal or even negative, from a social point

[19] In the economics literature, this is referred to as a negative externality, which is a type of market failure which arises when there are costs to society which are not reflected in the market transaction.

of view the upgrades required by regulation can still have a positive net benefit once the benefits from reduced emissions are taken into account.

The analysis undertaken for the draft Climate Change Plan indicates that conservation measures in the residential sector form part of the least-cost path to society for achieving the greenhouse gas emissions reductions required by legislation.

1.4.7 Distributional impacts

The amount of energy consumed is a relatively fixed component of households' monthly spend, and accordingly expenditure on energy bills typically consumes a greater percentage of income for lower-income households than for higher-income households. This can result in these households facing a trade-off between paying for adequately heating their homes and spending on other basic goods and services.

By increasing the energy efficiency of homes and reducing fuel bills, regulation can help improve the well-being of some of the more vulnerable households in Scotland.

1.4.8 Health impacts

In the private rented sector, around 7% of households report that their heating never keeps them warm in winter and a further 20% that it only sometimes does. The corresponding rates for all Scottish households are 5% and 18%.[20]

Living in these low indoor temperatures may pose a risk to health due to the range of negative morbidity and mortality impacts associated with exposure to the cold. The 2011 Marmot Review Team report,[21] the 2012 Hills Fuel Poverty Review[22] and the 2013 Cochrane Systematic Review[23] set out the strong body of evidence linking low indoor temperatures to these poor health outcomes.

The Scottish Government recently commissioned an evidence review from Aether covering the potential wider impacts of climate change mitigation in the built environment, which was published alongside the Draft Climate Change Plan in January 2017.[24] The review highlighted the impact which a range of building fabric improvements can have upon the health of residents of the building. Notably, studies have found that "improvements in insulation can result in direct effects on winter mortality and potentially morbidity as well as indirect effects e.g. through reductions in mould growth (Wilkinson, 2009[25]).[26]

[20] Figure 4, Scottish House Condition Survey, 2015.
[21] Marmot Review Team (2011). "The Health Impacts of Cold Homes and Fuel Poverty". Available at: http://www.instituteofhealthequity.org/projects/the-health-impacts-of-cold-homes-and-fuel-poverty
[22] Hills (2012). "Getting the measures of fuel poverty, Final Report of the Fuel Poverty Review". Available at: https://www.gov.uk/government/publications/final-report-of-the-fuel-poverty-review
[23] Cochrane Systematic Review (2013). Available at: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008657.pub2/abstract
[24] "Evidence Review of the Potential Wider Impacts of Climate change Mitigation Options: Built Environment Sector", available at http://www.gov.scot/Publications/2017/01/3358
[25] "Public health benefits of strategies to reduce greenhouse-gas emissions: household energy", available at http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)61713-X/abstract

In addition to physical health benefits, the evidence review by Aether highlighted research showing that fabric improvements to improve energy efficiency can offer a range of mental health benefits. These mental health benefits are often related to reduced stress from a reduction in fuel bills as a result of increased energy efficiency.

These potential health benefits, both physical and mental, further support the case for regulation, particularly since market failures relating to imperfect information (section 1.4.2) and failures of rationality (section 1.4.3) are particularly likely to apply to a household's ability to assess these long-run health impacts. Health impacts also strengthen the arguments based on distributional impacts (section 1.4.7) because they are most likely to be significant for vulnerable households. Finally, the costs to society resulting from greater demand for public sector services such as the NHS are analogous to the types of costs to society from greenhouse gas emissions discussed in Section 1.4.6, and offer a further argument in favour of regulation.

2. Consultation

2.1 Scottish Government and government agencies

The following Scottish Government and government agencies were consulted in the development of the proposals:

- Historic Scotland (now Historic Environment Scotland) – Discussions on how minimum standards of energy efficiency might affect traditional buildings.
- Building Standards Division – Input to modelling and technical discussions. Discussions on EPCs and registers. Comparisons with non-domestic regulations.
- Legal services – Discussions and advice on legislation, scope of the legislative powers.
- Registers of Scotland – Landlord registers and access for local authorities to these.
- Civil Law and Legal System Division – Discussions on the role of tribunals
- Better Homes Division – Discussions with the Housing Services Policy Unit on the implementation of the proposals for regulations and policy supporting the Private Housing (Tenancies) (Scotland) Act 2016.

2.2 Business/stakeholders

Consultation with stakeholders was primarily through the Regulation of Energy Efficiency in Private Sector Housing (REEPS) working group over a period of two

[26] In order to obtain the health benefits from energy efficiency upgrades, the measures must be installed, operated, and maintained correctly, e.g. to avoid issues such as mould growth arising due to insufficient ventilation when insulation is applied.

years to develop the policy.[27] The group had representatives from environmental groups, landlord organisations, local authorities, the fuel poverty sector, consumer organisations and Scottish Government.

We also met with:

- Local authorities to discuss options for regulation and their potential role in monitoring and enforcing minimum energy efficiency standards.
- The Royal Institution of Chartered Surveyors (RICS) to discuss the impact of minimum standards on both assessors and letting agents.
- Energy Savings Trust (EST) to discuss the Energy Performance Certificate Register.
- Scottish Land and Estates (SLE) to discuss the possible impacts of regulation on rural landlords and tenants.

We will consult further with businesses during the consultation phase.

2.3 Public Consultation

During the consultation period we will hold events to raise awareness of the consultation and to explore specific issues in more detail. We expect a wide range of audiences at these events, including local authorities, landlords, tenants and businesses such as installers and assessors, to explore particular issues in more detail.

3. Policy options

This section presents the policy options presented in the consultation document, and compares them to the do-nothing, or business-as-usual, option. Before doing so, the methodology used to assess the impact of upgrading dwellings from their current EPC to various target minimum EPCs is discussed. The results of this modelling, together with turnover rates presented in Section 3.2, can then be used to calculate the impact of different options for regulation. Once the final form of the regulations is determined in the light of feedback from the consultation process, the associated costs and benefits will be analysed in the final Business and Regulatory Impact Assessment.

3.1 Modelling methodology

The Scottish Government commissioned independent researchers to model the costs and benefits of regulation to inform the deliberations of the REEPS Working group.[28] The research covered both the private rented sector and the owner-

[27] https://beta.gov.scot/groups/reeps-working-group/
[28] The research, undertaken by Ipsos MORI Scotland and Alembic Research, is available at http://www.gov.scot/Publications/2015/11/4536.

occupied sector, using data from the Scottish House Condition Survey.[29] Using SAP 2012, the researchers applied a variety of upgrades to each housing archetype to work out which combination of upgrades would achieve various target minimum EPCs at least cost, as measured by the upgrade cost for the initial installation of the measures. Costs for upgrades were derived from the Product Characteristics Database File (PCDF), which contains the costs that are used in EPCs. Where PCDF costs are expressed in terms of ranges, the mid-point or averages were used in the modelling. The benefits of upgrading the dwellings, in terms of reduced energy usage, fuel bills and emissions, were derived from the outputs of SAP.[30]

For the purposes of this consultation, the outputs of the research have been applied to the latest (2015) Scottish House Condition Survey estimates of the total number of dwellings in the private rented sector which have an EPC of E, F and G, as set out in Table 1.[31] This change in the estimated size of the target stock, as well as the fact that the consultation relates only to the private rented sector, accounts for the difference in the numbers reported here and in the research.

In addition to the costs and benefit presented in the research, further costs have been included in the analysis in this impact assessment, namely:

- An allowance for "hidden costs" has been made. These are costs relating to upgrading the property other than the cost of installing the measure itself. These could be ancillary monetary costs such as the costs of clearing lofts, redecorating, etc., but can also cover the hassle factor, e.g. time spent researching energy efficiency measures, any disruption caused during installation, etc. A factor of 10% of the upgrade cost has been used.[32]

- Where the dwelling falls below the rating required by regulations, the landlord will be able to obtain a minimum standards assessment report which will set out the least-cost, technically appropriate way of meeting the required improvement rating. An allowance of £140 has been made for the cost of this assessment report. It is assumed that each dwelling which is below the relevant standard will obtain such a report.

- Once the property has been upgraded, the owner will need to provide proof that the property meets the required standard. We have assumed that this is done through a post-upgrade EPC lodged on the EPC register. Given a plausible range

[29] Data was combined from the 2010, 2011 and 2012 surveys in order to obtain a more fine-grained representation of dwelling types present in the housing stock.
[30] The version of SAP used was SAP 2012 version 9.92, the latest version of SAP which also forms the basis of the proposed minimum EPCs proposed in this consultation.
[31] It is assumed that, within a particular EPC band, the percentage share of each housing archetype is the same as in the dataset used in the independent research.
[32] This assumption is in line with the UK Government approach (see https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/401379/150202_PRS_Final_Stage_Revised_For_Publication.pdf, which draws on a 2009 report by Ecofys, "The hidden costs and benefits of
domestic energy efficiency and carbon saving measures", available at http://webarchive.nationalarchives.gov.uk/20121217150421/http:/www.decc.gov.uk/assets/decc/what%20we%20do/supporting%20consumers/saving_energy/analysis/1_20100111103046_e_@@_ecofyshiddencostandbenefitsdefrafinaldec2009.pdf)

of EPC costs for different dwelling sizes between £40 and £100, an average cost of £70 has been used.

- Some households who have been underheating their homes to economise on their fuel bills may choose to take the savings from greater energy efficiency partly in lower fuel bills and partly in greater thermal comfort, by heating their home for longer or to a higher temperature. The benefit to the household from a warmer home can be quantified as the portion of their fuel bill for energy used to heat their home above its previous level. Therefore, even if the actual fall in the fuel bill is less than the modelled fall, the full amount of the modelled fall represents the benefit to the tenant, since the difference is the value attributable to comfort taking. Comfort-taking behaviour would though mean that fuel use, and therefore emissions, do not fall as much as modelled. In line with previous Scottish Government and UK Government practice, it is assumed that 15% of the benefit of modelled fuel bill savings is instead taken as greater thermal comfort.

- Results are presented both before and after applying in-use factors, which are designed to account for differences in performance of retrofit energy efficiency improvements in-situ as compared to laboratory testing.[33] The factors used are those provided by the UK Government for the Green Deal and Energy Company Obligation (ECO).

Since the benefits of the upgrades are received over the lifetime of the upgrades, net present values have also been calculated. The assumptions underlying the net present value calculations are:

- The costs and benefits are calculated over a period of 40 years. This ensures that the upgrades with the longest lifetime, such as cavity or solid wall insulation, are appropriately represented: since these upgrades often have higher capital costs, if they are valued over a period significantly shorter than their lifetimes, all of their capital costs but only some of their benefits would be captured.

- Since the lifetime of other measures is less than 40 years, replacement costs have been included in the costings, based on the lifetime of each particular measure. As a result, some measures may be replaced more than once over the 40-year period. The original capital cost of installation is used as the replacement cost.

- The prices of upgrades, EPCs, minimum standard assessments and fuels are assumed to be constant in real terms over time, i.e. to grow at the same rate as inflation.

[33] These differences can arise due to factors such as imperfect installation, obstructions to insulating parts of walls (e.g. due to garages or conservatories), and natural variations in the thermal performance of structural and fabric elements that cannot be fully determined by the assessment, e.g. the u-values of uninsulated walls.

- Costs and benefits in the future have been discounted using the rates provided in HM Treasury's Green Book: a real rate of 3.5% for the first 30 years, and then 3% for years 31 to 40.[34]

3.2 Turnover

Since it is proposed that regulation is linked to the point of rental, the rate at which tenancies turn over will affect the number of dwellings that are upgraded each year. Analysis based on the Scottish House Condition Survey, set out in Table 2, shows that tenancy length is relatively short in the private rented sector, with around 60% of tenancies lasting less than two years in the sector as a whole. The data also suggest that tenancy length is somewhat longer in dwellings with a lower EPC.

Table 2. Length of time at current address in the private rented sector, as a proportion of each EPC band

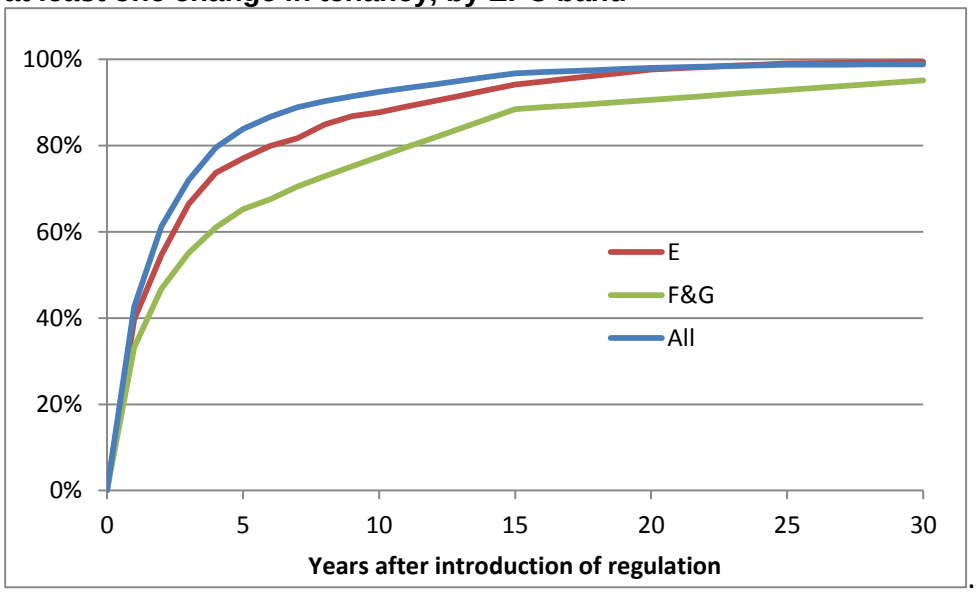
	A-C	D	E	F-G	All
<1 year	48%	42%	40%	33%	43%
1<2 years	21%	20%	15%	14%	19%
2<3 years	10%	11%	12%	8%	11%
3<4 years	9%	7%	7%	6%	8%
4<5 years	5%	4%	3%	4%	4%
5<6 years	1%	4%	3%	2%	3%
6<7 years	1%	3%	2%	3%	2%
7<8 years	1%	1%	3%	2%	1%
8<9 years	1%	1%	2%	2%	1%
9<10 years	0%	1%	1%	2%	1%
10<15 years	2%	3%	6%	11%	4%
15<20 years	0%	1%	3%	2%	1%
20<25 years	0%	1%	1%	2%	1%
25<30 years	0%	0%	0%	2%	0%
30+ years	0%	1%	1%	5%	1%

Source: Scottish House Condition Survey, banded 2011-2013 data

Assuming that past tenure length is a reasonable guide to future tenancy length, Figure 16 illustrates what proportion of dwellings would have experienced at least one change in tenancy by the end of each year after a fixed date (such as the date of introduction of regulations).

[34] Annex 6 of the Green Book, Appraisal and Evaluation in Central Government, available at https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-govement.

Figure 16. Projected proportion private rented dwellings in which there will have been at least one change in tenancy, by EPC band



3.3 Groups affected by regulations

The costs of upgrading the property, as well as of the minimum standards assessment report and any post-improvement EPC, will be payable by the landlords, while the reduced fuel bill costs, or greater thermal comfort, will benefit the tenants. However, the extent to which rents rise to reflect the improved energy efficiency will ultimately determine how the impact of regulations is spread between landlords and tenants. Section 1.4.1 discussed how it may be difficult for landlords to obtain higher rent for a more energy efficient property if tenants find it hard to value accurately the benefit in terms of lower fuel bills. However, regulation which requires all landlords to meet minimum energy efficiency standards may make it easier for landlords to benefit from higher rents for better properties, because landlords who want to invest to provide a more energy efficient dwelling will be less concerned that they will be undercut by competitors who offer a worse overall product to the tenant. In the modelling relating to raising the EPC to E or D, set out below, the overall net present value of upgrading the stock is positive, indicating that in many cases it will be possible in principle for both landlord and tenant to be better off.

Other parties affected include local authorities, in terms of the enforcement action they will be required to undertake (discussed further below), installers of energy efficiency measures, who may benefit from the additional upgrades installed as the result of the introduction, assessors, who may benefit from demand for EPCs and the minimum standards assessment, and wider society from the reduced harm from greenhouse gas emissions.

3.4 The do-nothing option

The do-nothing, or business-as-usual option, refers to what will happen if the regulations proposed in this consultation are not introduced. Under this option, existing energy efficiency regulations will continue to have an impact. For example, when less efficient light bulbs and boilers reach the end of their lifetimes, their

replacements will have to meet the higher energy efficiency levels laid down by these existing regulations.[35] But, on their own, these types of upgrades would be insufficient to bring most properties up to an EPC of E, let alone D.

Therefore, the number of dwellings in the private rented sector with a low energy efficiency rating will only fall under the do-nothing scenario if landlords voluntarily install energy efficiency measures in addition to those required by existing regulations. However, as set out in section 1.4, there are a number of market failures which reduce the likelihood of this happening. Furthermore, even if these market failures did not exist, voluntary action cannot be relied on where the private net benefit from upgrades is negative, but the social net benefit is large.

Current funding available from relevant Scottish and UK Government energy efficiency programmes mitigates this barrier to an extent, but even with access to funding not every landlord makes an effort to improve the energy efficiency of their properties. Therefore, regulation is required if all privately renting tenants are to benefit from a minimum level of energy efficiency, and the level of carbon abatement required by society is to be delivered.

The conclusion that a combination of existing regulations and voluntary action by landlords is insufficient to produce the required level of improvement is supported by the trends shown in Figure 5, which shows a slowing in the downward trend in the proportion of E-rated properties, and a levelling off in the downward trend in the proportion of F and G-rated properties in the private rented sector. This can be contrasted with the trends for the social rented sector in Figure 6, which show a continuing strong downward trend in the proportion of E-rated properties, coupled with minimal levels of F and G-rated properties. The higher uptake of loft (Figure 14) and cavity (Figure 15) insulation in the social rented sector suggests that the stronger regulation of energy efficiency in this sector has played an important role. In particular, the Scottish Housing Quality Standard, which was introduced in 2004 with full compliance required by 2015, contained specific energy efficiency elements. These have now been superseded by the requirement that the higher standards set by the Energy Efficiency Standard for Social Housing be met by 2020.[36]

Apart from the higher final level of energy efficiency that regulation can help achieve, it will also help accelerate upgrades that would have taken place at some stage. This too is an important benefit from regulation because it brings forward in time the associated fuel bill savings and greater thermal comfort for tenants, and it also reduces the total stock of greenhouse gases in the atmosphere.

3.5 Options for regulation

The consultation proposes that the regulation sets the following trajectory for improving energy efficiency in the private rented sector:

- From 1 April 2019, at the point of rental all dwellings must have a minimum EPC of E, or if the rating is lower, a minimum standards assessment must have been

[35] For example, minimum boiler efficiencies for replacements are set through building regulations – Standard 6.3 in the Domestic Technical Handbook.
[36] https://beta.gov.scot/policies/home-energy-and-fuel-poverty/energy-efficiency-in-social-housing/

carried out ahead of rental and the dwelling improved to the required level within 6 months of the assessment, and all dwellings must have achieved this rating by 31 March 2022.

- From 1 April 2022, dwellings must have a minimum EPC of D at the point of rental (or an assessment must have been carried out and the dwelling improved within 6 months), and all dwellings must have achieved this rating by 31 March 2025.

The impact of each step in this trajectory, relating to a specific minimum EPC, is examined in turn below.

The size of target stock that will be subject to regulation is based on estimates from the 2015 Scottish House Condition Survey for the number of dwellings in each EPC band for the private rented sector, as set out in Table 1. The further into the future projections, the greater the possibility that the stock could differ from the 2015 estimates, due to movement of stock from one tenure to another,[37] demolitions and voluntary improvements in energy efficiency prior to a particular EPC being required by regulations. New build will not have an impact on the number of dwellings with an EPC below D due to the energy efficiency requirements laid down in building regulations.[38] Nevertheless, the 2015 Scottish House Condition Survey data should give a good indication of the scale of dwellings which could be affected by regulations set at different EPC bands.

3.5.1 EPC of E

3.5.1.1 Costs and benefits

The costs and benefits of raising all private rented dwellings to an EPC of E are reported in Table 3, applying the methodology set out in section 3.1. These summary results are reported on the basis that all dwellings are upgraded in the base year. Depending on the final trajectory chosen, upgrading of dwellings will in fact be staggered over time. This will somewhat reduce net present values due to discounting effects, and mean it will take a few years until the full annual carbon savings are achieved.[39]

[37] There has been a significant increase in the share of the private rented sector over the last decade, combined with a decline in the share of the owner-occupied sector. The impact of tenure change on the number of low EPC dwellings in the private rented sector in the future depends not only on whether this trend continues, but also on the energy efficiency characteristics of stock that moves between sectors. Scottish Ministers intend to consult from Winter 2017/18 on energy efficiency in the owner-occupier sector, and should this ultimately lead to the introduction of minimum standards in that sector in future, then any effect from the movement of dwellings between tenures will be reduced.
[38] Although new build regulations do not prescribe a minimum EPC, the carbon emission targets that they set mean that it is highly unlikely that a dwelling with an EPC below D would be in compliance with the regulations.
[39] Because it is assumed that costs and benefits will grow in line with inflation, in real terms it will not make a difference to average costs and benefits measured in today's prices if upgrades are modelled as taking place in the future. It will, though, affect the net present value, reducing these values purely because the discount rate reflects the assumption that a cost or benefit in the future is given less weight than the same cost or benefit today.

Table 3. Costs and benefits of raising all stock to an EPC of E

	Total	Average
Dwellings below EPC E	30,000	
Cost and benefits within private rented sector		
Upgrade cost	£33.2m	£1,110
Hidden cost	£3.3m	£110
Assessment costs	£4.2m	£140
Post-upgrade EPC cost	£2.1m	£70
Annual fuel bill savings before in-use factors	£12.8m	£430
Annual fuel bill savings after in-use factors	£9.6m	£320
Net present value before in-use factors	£226.8m	£7,560
Net present value after in-use factors	£155.6m	£5,190
Net present value of cost of having EPC by Sep 2021	£0.2m	
Net present value after in-use factors and having EPC by Sep 2021	£155.4m	
Emissions abatement (CO2e)		
Annual carbon savings before in-use factors	0.06Mt	2.2t
Annual carbon savings after in-use factors	0.05Mt	1.6t
Annual carbon savings after in-use factors and comfort taking	0.04Mt	1.3t
Annual non-traded carbon savings after in-use factors and comfort taking	0.03Mt	1.1t

The results indicate that the average cost of upgrading stock currently below an E is around £1,100. On average, these upgrades produce substantial savings in fuel bills, of around £320 per year even on the more conservative basis of applying in-use factors. As result, when valuing the various costs and benefits over a 40-year period, the average net present value is estimated at £5,190, even after applying in-use factors and allowing for hidden, assessment and EPC costs. Thus, for dwellings which start with these very low energy efficiency levels, the fuel bills savings will typically comfortably pay back the upgrade costs, producing a net benefit from the regulations even without taking wider social benefits from emissions reduction into account.

The most common measures that the modelling recommends as part of the least-cost, technically appropriate package to meet an EPC of E are loft insulation (48% of dwellings), replacing the secondary heating with a more efficient system (13%), cavity wall insulation (11%), room-in-the-roof insulation (10%), and low energy lighting (10%). See Appendix A for a full list of measures.

Table 3 also includes a cost relating to the proposal that by 30 September 2021 all properties in the private rented sector which still have an EPC below E would need to have had a minimum standards assessment carried out and lodged, so that completing the required works within the allowed 6-month period will ensure that they are at a minimum of E by the backstop date of 31 March 2022. The cost of this

minimum standards assessment for properties with an F or G is included in the assessment costs row in Table 3. However, in some cases there will be an additional cost related to the fact that landlords will need to aware of the EPC rating of their dwelling in order to know whether they must lodge a minimum standards assessment by 30 September 2021.

In the majority of cases, rented properties will already have a valid EPC due to the Energy Performance of Building (Scotland) Regulations 2008, which since 4 January 2009 have required landlords to provide an EPC at the point of rental. For those properties where the tenancy in place on 4 January 2009 has not ended by 30 September 2021, the landlord may need to commission an EPC. Alternatively, if, as is proposed in the consultation, the first stage in a minimum standards assessment would be to calculate the property's current EPC rating when it does not have an EPC under the current methodology, landlords may wish simply to commission a minimum standards assessment, particularly if they believe that their property is likely to fall below an E. In this way, landlords of dwellings below E can minimise their costs by not commissioning both a pre-upgrade EPC as well as a minimum standards assessment.

The impact on landlords from this element of the proposed regulations is that the cost of an EPC will be brought forward from the date on which they would have experienced a change in tenancy to 30 September 2021. The total cost of this requirement has been estimated by applying the data on tenancy length set out in Table 2 to the stock of dwellings in the private rented sector in 2009. [40] For dwellings where the tenancy in place in 2009 is only expected to end after 2021, the difference in net present value terms between incurring the cost of an EPC in the year in which it is estimated that there will be a change of tenancy and incurring it in 2021 is estimated at £0.2 million.

3.5.1.2 Turnover and backstop date

The consultation document proposes that the minimum standard of an EPC of E will initially apply to properties where there is a change in tenancy as from 1 April 2019. Table 4 shows the estimated number of dwellings that would need to be upgraded each year due to the tenancy which was in place on 31 March 2019 coming to an end. In practice, the profile of upgrades may be somewhat lagged from that presented in Table 4 since the landlord will have 6 months from the point of the minimum standards assessment (which should be completed before rental) to bring the property up to an E. However, many landlords may choose to undertake the upgrades relatively quickly while the property is vacant before the next tenancy starts.

[40] The data in Table 2 relating to the turnover profile for all dwellings is used, since this provision will apply to dwellings regardless of their EPC. It is assumed that all dwellings obtain an EPC, although as was discussed above, landlords who believe that their dwelling is below an E can just commission a minimum standards assessment. The Scottish Household Survey estimates that the number of dwellings in the private rented sector in 2009 was around 240,000.

Table 4. Estimated turnover of private rented dwellings with an initial EPC of F or G

Years after regulation in force	Proportion of initial tenancies terminating during year	Cumulative proportion of initial tenancies terminated by year-end	Dwellings upgraded during year	Cumulative dwellings upgraded by year-end	Dwellings still to be upgraded by year-end
<1 year	33%	33%	9,960	9,960	20,040
1<2 years	14%	47%	4,070	14,030	15,970
2<3 years	8%	55%	2,510	16,540	13,460
3<4 years	6%	61%	1,760	18,300	11,700
4<5 years	4%	65%	1,270	19,570	10,430
5<6 years	2%	68%	700	20,270	9,730
6<7 years	3%	71%	880	21,150	8,850
7<8 years	2%	73%	710	21,860	8,140
8<9 years	2%	75%	710	22,570	7,430
9<10 years	2%	77%	650	23,220	6,780

The number of initial tenancies coming to an end is at its highest level in the first year after regulations are introduced, with around 10,000 dwellings estimated to require upgrading. The annual turnover rate then declines steeply. The lead-in period to the regulations may help mitigate this first-year spike. It is proposed that the regulations come into force two years after this public consultation, and with nearly half of tenancies in the target dwellings expected to be shorter than two years, landlords will have vacant access to a substantial proportion of properties to undertake energy-efficiency improvements ahead of the introduction of the regulations if they so wish.

Table 4 also allows the impact of various backstop dates to be considered. The consultation proposes that all properties must have an EPC of at least E by 31 March 2022, i.e. three years after the regulations come into force. At this stage, it is estimated that around 13,500 dwellings will still need to be upgraded. Again, if landlords take advantage of the two-year period before regulations come into force on 1 April 2019, this could help reduce not only the first-year spike but also any spike at the backstop date.

Table 4 illustrates the role played by the backstop date. Although most tenancies turn over relatively rapidly, there is a small but persistent proportion of tenancies that remain in place for long periods of time – for example, around a quarter of tenancies in privately rented dwellings with an EPC of F or G are estimated to last for more than 10 years. The backstop date will also ensure that situations which may otherwise fall outside the regulations, e.g. houses in multiple occupation (HMOs), are covered. If tenants in these various situations are to enjoy the same minimum levels of energy efficiency as other private renters, it is vital to have a backstop date.

3.5.1.3 Cost cap

The consultation proposes that if the total cost of the measures required to bring the dwelling up to the minimum EPC exceeds a certain level, the landlord will only have to install upgrades up to the value of the cap. Table 5 sets out the estimated distribution of upgrade costs across the target stock to allow the impact of setting the cost cap at different levels to be considered. Note that Table 5 relates only to the cost of the measures in the least-cost upgrade package, i.e. it does not include assessment, hidden or other costs.

Table 5. Distribution of upgrade costs to upgrade dwellings with a current EPC of F or G to an EPC of E

Upgrade cost	Dwellings with cost in band	% of dwellings with cost in band	% of dwellings with cost above band	Dwellings with cost above band
£0 - £1,000	17,980	59.9%	40.1%	12,020
£1,000 - £2,000	5,430	18.1%	21.9%	6,580
£2,000- £3,000	5,260	17.5%	4.4%	1,320
£3,000- £4,000	910	3.0%	1.4%	410
£4,000- £5,000	210	0.7%	0.7%	210
Over £5,000	210	0.7%	0.0%	0
Total dwellings	30,000			

The consultation document proposes that the cost cap be set at £5,000. This will apply to an estimated 200 dwellings, or less than 1% of stock.

3.5.2 EPC of D

3.5.2.1 Costs and benefits

The modelling work undertaken by the independent researchers, updated for the 2015 Scottish House Condition Survey data, also produces estimates for the costs and benefits of raising all private rented stock from its initial level of an EPC of E, F or G directly to an EPC D, as set out in Table 6.

Table 6. Costs and benefits of raising dwellings with an initial EPC of E, F and G directly to an EPC of D

	Total	Average
Dwellings below EPC D	95,000	
Cost and benefits within private rented sector		
Upgrade cost	£203m	£2,140
Hidden cost	£20m	£210
Assessment costs	£13m	£140
Post-upgrade EPC cost	£7m	£70
Annual fuel bill savings (before in-use factors)	£35m	£370
Annual fuel bill savings (after in-use factors)	£27m	£280
Net present value before in-use factors	£449m	£4,730
Net present value after in-use factors	£264m	£2,780
Emissions abatement (CO2e)		
Annual carbon savings before in-use factors	0.19Mt	2.0t
Annual carbon savings after in-use factors	0.14Mt	1.5t
Annual carbon savings after in-use factors and comfort taking	0.12Mt	1.3t
Annual non-traded carbon savings after in-use factors and comfort taking	0.10Mt	1.0t

Given the trajectory proposed by the consultation, a related question that arises is: what are the additional costs and benefits of raising the stock to an EPC of D, once the stock has already been raised to an EPC of E? This issue was not specifically modelled in the independent research. Nevertheless, a good approximation can be derived by subtracting the costs and benefits of raising the stock to E from the costs and benefits of raising the stock to D.

The results are set out in Table 7, and two features of these results should be noted:

- The least-cost, technically appropriate package of measures of raising the dwelling to an E first, and then the least-cost, technically appropriate package of measures of raising the dwelling from an E to a D subsequently, may differ from the package of measures which moves directly to a D at least cost using technically appropriate measures. Thus, if landlords chose to upgrade in two stages, in some cases their total cost of raising their stock to a D may be somewhat higher than set out here. However, an advantage of setting a clear trajectory is that it gives landlords an opportunity to upgrade directly to a D in the least cost manner, minimising their overall costs.

- The costings in Table 7 do, however, assume that landlords pay for a minimum standards assessment, as well as a post-upgrade EPC to demonstrate compliance, at both the first stage to E and in the second stage to D. But if landlords go directly to D in light of the trajectory, then they will only need to incur the cost of a minimum standards assessment and any post-upgrade EPC once.

Table 7. Additional costs and benefits of raising dwellings to an EPC of D after they have already been raised to an EPC of E

	Total	Average
Dwellings below EPC D	95,000	
Cost and benefits within private rented sector		
Upgrade cost	£170m	£1,790
Hidden cost	£17m	£180
Assessment costs	£13m	£140
Post-upgrade EPC cost	£7m	£70
Annual fuel bill savings before in-use factors	£22m	£240
Annual fuel bill savings after in-use factors	£17m	£180
Net present value before in-use factors	£216m	£2,280
Net present value after in-use factors	£102m	£1,070
Emissions abatement (CO2e)		
Annual carbon savings before in-use factors	0.13Mt	1.3t
Annual carbon savings after in-use factors	0.09Mt	1.0t
Annual carbon savings after in-use factors and comfort taking	0.08Mt	0.8t
Annual non-traded carbon savings after in-use factors and comfort taking	0.06Mt	0.7t

The most common modelled measures when moving from an EPC E to an EPC D are low energy lighting (installed in 26% of dwellings), hot water tank jacket (19%), floor (17%) and cavity wall insulation (16%).

3.5.2.2 Turnover and backstop date

The consultation proposes that after the backstop date of E is reached (before 1 April 2022), the minimum EPC will be raised to a D for new tenancies as from 1 April 2022.

Again an important consideration relates to the behaviour of landlords whose dwellings have an initial EPC of either F or G, and who therefore must upgrade their dwellings to an E in the first stage of regulation. These landlords could respond either by raising the EPC in stages, i.e. first to an E and then to a D only when the second stage of regulation comes into effect, or they could upgrade their dwelling immediately to a D in the first stage of regulation.

We start by assuming that all dwellings below an E are upgraded straight to D, and thus it is only dwellings with an initial EPC of E which need to be upgraded when the minimum EPC is raised a D at point of rental from 1 April 2022. The profile of upgrades based on this assumption is set out in Table 8.

Table 8. Estimated turnover of private rented dwellings with an initial EPC of E

Years after regulation in force	Proportion of initial tenancies terminating during year	Cumulative proportion of initial tenancies terminated by year-end	Dwellings upgraded during year	Cumulative dwellings upgraded by year-end	Dwellings still to be upgraded by year-end
<1year	40%	40%	25,780	25,780	39,220
1<2 years	15%	55%	9,740	35,530	29,470
2<3 years	12%	66%	7,650	43,180	21,820
3<4 years	7%	74%	4,710	47,890	17,110
4<5 years	3%	77%	2,190	50,080	14,920
5<6 years	3%	80%	1,890	51,960	13,040
6<7 years	2%	82%	1,140	53,100	11,900
7<8 years	3%	85%	2,100	55,200	9,800
8<9 years	2%	87%	1,220	56,420	8,580
9<10 years	1%	88%	600	57,020	7,980

Table 9 sets out the data when the opposite assumption is made, i.e. that all dwellings with an EPC of F and G are only upgraded to an EPC of E during the first regulatory stage. This means that all dwellings with an initial EPC of E, F or G have to be upgraded when the minimum EPC of D comes into force.

Table 9. Estimated turnover of private rented dwellings with an initial EPC of E, F or G.

Years after regulation in force	Proportion of initial tenancies terminating during year	Cumulative proportion of initial tenancies terminated by year-end	Dwellings upgraded during year	Cumulative dwellings upgraded by year-end	Dwellings still to be upgraded by year-end
<1year	38%	38%	35,750	35,750	59,250
1<2 years	15%	52%	13,810	49,560	45,440
2<3 years	11%	63%	10,160	59,720	35,280
3<4 years	7%	70%	6,470	66,190	28,810
4<5 years	4%	73%	3,460	69,650	25,350
5<6 years	3%	76%	2,590	72,240	22,760
6<7 years	2%	78%	2,020	74,250	20,750
7<8 years	3%	81%	2,800	77,060	17,940
8<9 years	2%	83%	1,930	78,990	16,010
9<10 years	1%	84%	1,250	80,240	14,760

Therefore, depending on the behaviour of landlords, the number of dwellings needing to be upgraded in the first year of the EPC D coming into force is estimated to be between 26,000 and 36,000. This illustrates the role the trajectory can play in minimising any bottlenecks by giving a clear direction of travel which allows landlords

to upgrade ahead of time where that makes sense. Moreover, landlords of a property with an E could choose to upgrade to a D during the first stage of regulation, or landlords with an EPC of E, F or G could choose to upgrade in the period between this consultation and 1 April 2019 when the first stage of regulations comes into effect. All of these responses could further smooth the trajectory.

The consultation proposes that a backstop date for reaching a minimum EPC of D is set at 31 March 2025, i.e. 3 years after the requirement for an EPC of D at the point of rental comes into force. At this point, it is estimated that around 35,000 dwellings will need to be upgraded, assuming properties with an F or G are only upgraded to an E in first stage of regulation, or 22,000 dwellings if all properties with an initial F or G are upgraded directly to D in the first stage of regulation. The proposed backstop date for D of 31 March 2025 is 8 years after this consultation, or 6 years after 1 April 2019 when the first stage of regulation comes into effect. Thus, potentially even fewer than 22,000 dwellings will need to be upgraded at the backstop date if landlords take advantage of periods of vacant access to upgrade dwellings ahead of the regulatory requirement coming into force.

3.5.2.3 Cost cap

The consultation proposes that the same exceptions apply at the stage to D as in the first stage of the regulations to E, including the cost cap of £5,000. Thus, where dwellings are already at an E, they will not be required to spend more than £5,000 to raise their EPC to a D.

However, there may situations where even after the backstop date for E of 31 March 2022, the property only has an EPC of F or G, either because the minimum standards assessment recommended a lower level, or there was an exception allowing a lower level than E by 31 March 2022 (under the technical, legal or excessive cost provisions), or because the property has come into the private rented sector since 1 April 2022. In these situations we propose that the cost cap would be cumulative, i.e. it would include the £5,000 allowed for bringing the property up to E. This would mean that, where the property's EPC is F or G, the exception to the D standard for excessive cost would only apply where the total cost of works (including any works previously done towards the E standard following a minimum standards assessment) is in excess of £10,000.

The analysis of the impact of the cost cap at the D stage of regulations is therefore broken down into two parts. Table 10 sets out the distribution of the upgrade costs of dwellings which currently have an EPC of E, on which landlords would have to spend no more than £5,000 in trying to raise them to a D. It is estimated that the proposed cost cap would apply to 2.2% of these 65,000 dwellings, i.e. around 1,400 dwellings.

Table 10. Distribution of upgrade costs to raise dwellings with a current EPC of E to an EPC of D

Upgrade cost	Dwellings with cost in band	% of dwellings with cost in band	% of stock with cost above band	Dwellings with cost above band
£0- £1000	46,360	71.3%	28.7%	18,640
£1,000- £2,000	9,170	14.1%	14.6%	9,470
£2,000- £3,000	3,940	6.1%	8.5%	5,530
£3,000- £4,000	80	0.1%	8.4%	5,450
£4,000- £5,000	4,020	6.2%	2.2%	1,430
£5,000- £6,000	580	0.9%	1.3%	840
£6,000- £7,000	0	0.0%	1.3%	840
£7,000- £8,000	0	0.0%	1.3%	840
£8,000- £9,000	840	1.3%	0.0%	0
Total dwellings	65,000			

Table 11 then presents the impact of the cost cap on dwellings which currently have an EPC of F or G. Over the two stages of regulation, it is proposed that no more than £10,000 be spent on raising these dwellings to an EPC of D. It is estimated that the cost cap will apply to 14.9% of these 30,000 dwellings, i.e. around 4,500 dwellings.

Table 11. Distribution of upgrade costs to raise dwellings with a current EPC of F or G to an EPC of D[41]

Upgrade cost	Dwellings with cost in band	% of dwellings with cost in band	% of stock with cost above band	Dwellings with cost above band
£0- £1,000	2,300	7.7%	92.3%	27,700
£1,000- £2,000	3,420	11.4%	80.9%	24,280
£2,000- £3,000	8,030	26.8%	54.1%	16,240
£3,000- £4,000	3,980	13.3%	40.9%	12,270
£4,000- £5,000	2,920	9.7%	31.1%	9,340
£5,000- £6,000	2,550	8.5%	22.7%	6,800
£6,000- £7,000	350	1.2%	21.5%	6,440
£7,000- £8,000	1,070	3.6%	17.9%	5,370
£8,000- £9,000	210	0.7%	17.2%	5,170
£9,000- £10,000	690	2.3%	14.9%	4,480
£10,000- £11,000	1,750	5.8%	9.1%	2,720
£11,000- £12,000	310	1.0%	8.1%	2,420
£12,000- £13,000	1,330	4.4%	3.6%	1,090
£13,000- £14,000	920	3.1%	0.5%	160
£14,000- £15,000	70	0.2%	0.3%	90
Over £15,000	90	0.3%	0.0%	0
Total dwellings	30,000			

It is therefore estimated that the cost cap will apply to 6.2% of the 95,000 dwellings which currently have an EPC below D. These 5,900 dwellings will still have to install energy efficiency upgrades which fall within this cost cap.

4. Scottish Firms Impact Test

If the energy efficiency of their dwellings falls below the standard set by regulations, landlords in the private rented sector will be expected to obtain a minimum standards assessment report which sets out the required upgrades, carry out these upgrades, and provide proof to the local authority of compliance (for example by lodging a post-upgrade EPC to show their dwelling's rating). This obligation will arise at either the point of rent or the backstop date, whichever is the sooner. The potential costs for landlords have been set out above, although the final cost will also depend on any impact on rent levels.

We had discussions with landlords, assessors and businesses in the supply chain while developing the options for regulation. During the consultation phase, we plan to have further discussions with them on the form of regulation proposed in the consultation document. This will help us to obtain feedback as to whether the

[41] As discussed above, for dwellings with an initial EPC of F or G, the costs could be somewhat higher if landlords choose to upgrade in stages, rather than choosing the least-cost package of raising their dwellings directly to a D.

regulations have any impacts on them that have not been identified in this Business and Regulatory Impact Assessment.

5. Competition Assessment

The assessment of the impact on the regulations on competition set out below focuses on the impact on landlords. In addition, the regulations may create more demand for assessors and installers. Since the impact on these suppliers will be positive, no adverse impact on competition in the installer/assessor market is anticipated. On the contrary, as discussed in section 1.4.4, regulation could give suppliers greater confidence that there will be demand for their services, and this could support investment in these markets, including by new entrants, thus increasing competition.

The proposed regulations will set a minimum standard of energy efficiency in the sector for all landlords in the private rented sector. While the main impact of the regulations will fall on the sub-set of dwellings which are below the required level, this will only be to bring them more in line with the energy efficiency of other properties in the sector.

For each dwelling in their portfolio which falls below the required standard, the landlord will be liable for the costs relating to an assessment report and, potentially, a post-upgrade EPC for that dwelling, as well as the costs of upgrading it. These costs vary in proportion with the number of dwellings in the landlord's portfolio. Since they are not fixed costs which can be spread over a number of dwellings, they do not give larger landlords an advantage. Thus, the proposed form of regulation will not penalise smaller landlords relative to larger landlords.

Larger landlords who are upgrading a portfolio of dwellings may have some advantages due to economies of scale, such as being to negotiate a better price per unit from an assessor/installer. However, to the extent that such economies of scale exist, they are part of the normal operation of the market and are not in themselves the result of the proposed regulations.

The regulations may discourage some "accidental landlords", e.g. people who temporarily rent out their former home before selling it, if they see minimum standards as too onerous. However, it is important that any prospective landlord is prepared to meet the professional standards required by tenants. Furthermore, if, following the consultation on the owner-occupied sector which will take place from Winter 2017/18, minimum energy efficiency standards are applied to this sector as well, there will be no or less of a differential between the private rented and the owner-occupied sectors due to energy efficiency regulations.

Minimum standards will make things fairer, ensuring that all tenants in the private rented sector are guaranteed a minimum level of energy efficiency. By giving prospective tenants greater confidence in the quality of the offer provided by the private rented sector, the regulations may help make the sector more attractive, potentially boosting demand and creating opportunities for good landlords to enter the sector.

The questions required by the competition assessment are as follows:

- Will the measure directly or indirectly limit the number or range of suppliers?
- Will the measure limit the ability of suppliers to compete?
- Will the measure limit suppliers' incentives to compete vigorously?
- Will the measure limit the choices and information available to consumers?

For the reasons set out above, our view is that the answer to all of these questions is "no".

6. Test run of business forms

We will use the consultation phase to determine whether there is any need for a test run of any business forms.

7. Legal Aid Impact Test

Local authorities will be able to issue a civil fine against owners who do not comply with the regulations, and can pursue this through the courts if the owner does not pay. Owners will also be able to ask for a review of local authority decisions to issue a penalty notice and will ultimately be able to appeal to the courts.

We have proposed that there should be a civil penalty of up to £1,500 for non-compliance. Most of the required improvements will cost less than this. We therefore think that this will encourage the majority of landlords to improve their property rather than risk a fine, which would minimise the likelihood of appeals to the courts by landlords.

We therefore do not think it is likely that there will be a significant impact on the legal aid fund from tenants or landlords.

8. Enforcement, sanctions and monitoring

As set out above, the costs of measures that need to be installed in order to meet the standard are generally relatively modest. They will also result in a more attractive product for landlords to offer to tenants. Furthermore, the minimum standard assessment will only propose measures which are appropriate, and we have proposed exceptions where the work cannot be completed due to technical, legal or excessive cost reasons. We also propose some situations where the landlord will have a longer period of time to bring the property up to standard. Phasing the regulations in at point of rental ahead of the backstop date also means that most of the works can be done during periods of vacant access. For these reasons, we expect that in the vast majority of cases the minimum energy efficiency standard will be met without local authorities having to take enforcement action.

8.1 Enforcement

We think that local authorities should be responsible for enforcing the minimum energy efficiency standards. This partial Business and Regulatory Impact

Assessment does not assess the cost of monitoring and enforcing the minimum standards, as we will be exploring the costs of this with local authorities during the consultation. This will be included in the final Business and Regulatory Impact Assessment.

8.2 Sanctions

We propose that local authorities issue fines where owners do not comply with minimum standards (without valid evidence for an exception). We propose that there should be a civil penalty of up to £1,500 for not complying with minimum standards – £500 for failing to have a minimum standards assessment when required, and £1,000 for failing to carry out the improvements within 6 months of the assessment.

8.3 Monitoring

As part of the monitoring process, local authorities may wish to record the compliance of properties with the minimum standards, including where the rating identified by the assessment is lower than E or D, or where there are exceptions, to help assist with local housing stock condition work (for example Local Housing Strategies, etc.).

9. Implementation and delivery plan

There will be a two-year lead-in period between the start of this consultation and 1 April 2019, when the regulations are proposed to come into force. There will be a shorter lead-in time from when the regulations are laid to when they come into force.

9.1 Post-implementation review

The Scottish Government will monitor the implementation of new energy efficiency standards, and review their initial and potential future contribution to the Climate Change Plan as part of Scotland's Energy Efficiency Programme. The timescales for this will be driven by the design of the programme's monitoring and review framework, which will be informed by the outcome of the current SEEP consultation, as well as any feedback from this consultation.

10. Summary and recommendation

The recommended policy option is to introduce regulations at the point of turnover coupled with a backstop date, as well as setting a trajectory so that the minimum EPC is raised over time from an E to a D. In the absence of such regulation, the required retrofitting of low energy efficiency dwellings in the private rented sector is unlikely to happen, or will only happen more slowly than is required for purposes of the delivering the Scottish Government's objectives relating to climate change, energy efficiency, fuel poverty, and delivering a high-quality private rented sector.

The combination of point of rental and backstop date, coupled with setting the trajectory with an initial E and only raising it subsequently to a D, will allow the regulations to be introduced in a phased approach so as to reduce any disruption to

landlords and tenants, while ensuring that within a reasonable time period all tenants in the private rented sector are assured of minimum standards of energy efficiency.

The key summary costs and benefits were set out above in Table 3 and Table 7, which are reproduced below.

Costs and benefits of raising all private rented dwellings to a minimum EPC of E

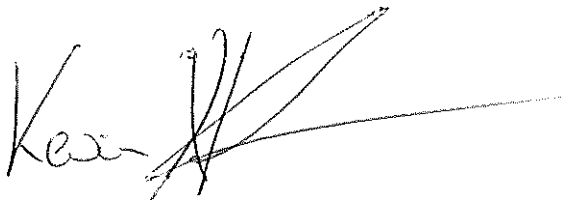
	Total	Average
Dwellings below EPC E	30,000	
Cost and benefits within private rented sector		
Upgrade cost	£33.2m	£1,110
Hidden cost	£3.3m	£110
Assessment costs	£4.2m	£140
Post-upgrade EPC cost	£2.1m	£70
Annual fuel bill savings before in-use factors	£12.8m	£430
Annual fuel bill savings after in-use factors	£9.6m	£320
Net present value before in-use factors	£226.8m	£7,560
Net present value after in-use factors	£155.6m	£5,190
Net present value of cost of having EPC by Sep 2021	£0.2m	
Net present value after in-use factors and having EPC by Sep 2021	£155.4m	
Emissions abatement (CO2e)		
Annual carbon savings before in-use factors	0.06Mt	2.2t
Annual carbon savings after in-use factors	0.05Mt	1.6t
Annual carbon savings after in-use factors and comfort taking	0.04Mt	1.3t
Annual non-traded carbon savings after in-use factors and comfort taking	0.03Mt	1.1t

Costs and benefits of raising the minimum standard from an EPC E to an EPC D:

	Total	Average
Dwellings below EPC D	95,000	
Cost and benefits within private rented sector		
Upgrade cost	£170m	£1,790
Hidden cost	£17m	£180
Assessment costs	£13m	£140
Post-upgrade EPC cost	£7m	£70
Annual fuel bill savings before in-use factors	£22m	£240
Annual fuel bill savings after in-use factors	£17m	£180
Net present value before in-use factors	£216m	£2,280
Net present value after in-use factors	£102m	£1,070
Emissions abatement (CO2e)		
Annual carbon savings before in-use factors	0.13Mt	1.3t
Annual carbon savings after in-use factors	0.09Mt	1.0t
Annual carbon savings after in-use factors and comfort taking	0.08Mt	0.8t
Annual non-traded carbon savings after in-use factors and comfort taking	0.06Mt	0.7t

11. Declaration and publication

"I have read the Business and Regulatory Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options. I am satisfied that business impact has been assessed with the support of businesses in Scotland"

Signed: 

Date: 31/3/2017

Minister's name: Kevin Stewart MSP
Minister's title: Minister for Local Government and Housing

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12. Appendix A – Measures used in modelling

Table 12. Measures to raise dwellings from EPC of F or G to EPC of E

	Number	% of total measures	% of dwellings receiving measure
loft insulation (virgin and top up)	14,535	31%	48.5%
replace secondary heating with one more efficient	3,816	8%	12.7%
cavity wall insulation	3,349	7%	11.2%
room in the roof insulation	3,061	6%	10.2%
low energy lighting 100%	3,046	6%	10.2%
fan electric storage heaters with auto charge control	2,886	6%	9.6%
quantum storage heaters	2,747	6%	9.2%
hot water tank jacket 80mm	2,686	6%	9.0%
baffle / damper to open fire	1,700	4%	5.7%
room thermostat	1,546	3%	5.2%
floor insulation	1,537	3%	5.1%
draught proof windows and doors	1,486	3%	5.0%
switch to E24 tariff	1,044	2%	3.5%
TRVs	854	2%	2.8%
replace oil boiler with condensing boiler 90%	715	2%	2.4%
replace gas boiler with condensing boiler 88%	513	1%	1.7%
flat roof insulation	492	1%	1.6%
Auto charge control	461	1%	1.5%
full controls package (r/stat, programmer and TRVs)	270	1%	0.9%
insulated external doors	233	0%	0.8%
secondary glazing to 2.4	198	0%	0.7%
full oil central heating system inc controls	174	0%	0.6%
solid wall insulation	91	0%	0.3%
full biomass central heating system inc controls	14	0%	0.0%
double glazing to 1.8	0	0%	0.0%
triple glazing to 1.4	0	0%	0.0%
full gas central heating system inc controls	0	0%	0.0%
full electric radiator system inc controls - off peak tariff	0	0%	0.0%
air source heat pump	0	0%	0.0%
ground source heat pump	0	0%	0.0%
programmer for heating system	0	0%	0.0%
Solar thermal 4m2	0	0%	0.0%
PV 2kWp	0	0%	0.0%
2m diameter wind turbine on roof	0	0%	0.0%
5m wind turbine on stand-alone mast	0	0%	0.0%
Cylinder stat for hot water cylinder	0	0%	0.0%
Air to Air heat pump	0	0%	0.0%
electric CPSU with radiators and controls on E18 tariff	0	0%	0.0%

Table 13. Measures to raise dwellings from EPC of E to D

	Number	As % of total measures	% of target dwellings receiving measure
low energy lighting 100%	24,282	15%	26%
hot water tank jacket 80mm	17,772	11%	19%
floor insulation	15,930	10%	17%
cavity wall insulation	15,154	9%	16%
loft insulation (virgin and top up)	15,140	9%	16%
replace secondary heating with one more efficient	10,680	6%	11%
quantum storage heaters	8,303	5%	9%
room in the roof insulation	7,874	5%	8%
room thermostat	7,377	4%	8%
solid wall insulation	5,584	3%	6%
replace oil boiler with condensing boiler 90%	5,435	3%	6%
switch to E24 tariff	5,296	3%	6%
fan electric storage heaters with auto charge control	4,672	3%	5%
TRVs	4,539	3%	5%
draught proof windows and doors	4,151	2%	4%
Cylinder stat for hot water cylinder	3,223	2%	3%
insulated external doors	2,268	1%	2%
secondary glazing to 2.4	2,147	1%	2%
2m diameter wind turbine on roof	1,442	1%	2%
baffle / damper to open fire	1,245	1%	1%
Auto charge control	1,113	1%	1%
full oil central heating system inc controls	1,066	1%	1%
replace gas boiler with condensing boiler 88%	905	1%	1%
flat roof insulation	523	0%	1%
double glazing to 1.8	198	0%	0%
full controls package (r/stat, programmer and TRVs)	109	0%	0%
Solar thermal 4m2	75	0%	0%
full gas central heating system inc controls	66	0%	0%
triple glazing to 1.4	-	0%	0%
full biomass central heating system inc controls	-	0%	0%
full electric radiator system inc controls - off peak tariff	-	0%	0%
air source heat pump	-	0%	0%
ground source heat pump	-	0%	0%
programmer for heating system	-	0%	0%
PV 2kWp	-	0%	0%
5m wind turbine on stand-alone mast	-	0%	0%
Air to Air heat pump	-	0%	0%
electric CPSU with radiators and controls on E18 tariff	-	0%	0%

This publication is available at **www.gov.scot**

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