



**BUSINESS AND REGULATORY IMPACT  
ASSESSMENT**

**THE BUILDING SCOTLAND (AMENDMENT)  
REGULATIONS 2022**

**Final Regulatory Impact Assessment –  
changes to energy standards and associated  
topics, including review of domestic ventilation  
and overheating risk.**

**BUILDING STANDARDS DIVISION**

**April 2022**

# Final Business and Regulatory Impact Assessment

## 1.0 Title of Proposal

Amendments to the Building (Scotland) Regulations 2004 and Technical Handbook Guidance to introduce changes to energy standards and associated topics, including review of domestic ventilation and overheating risk.

## 2.0 Purpose and Intended Effect

### 2.1 Background

Scottish building regulations<sup>1</sup> are made under The Building (Scotland) Act 2003<sup>2</sup>.

They set national mandatory building standards for the health, safety, welfare and convenience of persons in and around buildings, furthering the conservation of fuel and power and the achievement of sustainable development. These building standards are supported by guidance contained in the Building Standards Technical Handbooks<sup>3</sup>. The building regulations apply to new buildings and to buildings being converted, altered or extended.

Building Standards are expressed in functional terms and do not dictate the methods that should be used to meet requirements. The choice of how to comply with the standards lies with building owners and for this purpose Scottish Ministers issue 'Technical Handbooks' containing practical guidance illustrating how the requirements of the Building Standards may be met. The guidance may be relied upon in any proceedings as tending to negative liability for an alleged contravention of the Building Regulations. This does not however preclude the use of alternative approaches provided the designer can satisfy the local authority Verifier that the aim of the Building Regulations is being fulfilled.

The Building (Scotland) Regulations 2004 (as amended)<sup>4</sup> set minimum energy standards applicable to the construction of new buildings and where building work is carried out to existing buildings. Regulation 3 identifies the range of buildings to which the regulations do not apply. Where regulations apply, regulation 5 identifies both the need to comply with current standards and also where a building warrant is required before commencing work. Regulation 9 sets out the functional standards applicable to construction, including standards 6.1 to 6.10 which address the energy performance of buildings, with standard 6.1 also setting carbon dioxide emissions targets for new buildings.

Over recent years, staged improvements in energy standards within building regulations have been introduced in 2007, 2010 and, most recently, in 2015. Improvement to standards are delivered through amendment of the functional

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<sup>1</sup> <https://www.gov.scot/policies/building-standards/>

<sup>2</sup> <https://www.legislation.gov.uk/asp/2003/8/contents>

<sup>3</sup> <https://www.gov.scot/policies/building-standards/monitoring-improving-building-regulations/>

<sup>4</sup> <https://www.legislation.gov.uk/ssi/2004/406/contents>

standards and technical guidance on energy within the Building (Scotland) Regulations 2004 and Section 6 (energy) of the supporting Technical Handbooks.

Following the 2007 changes to energy standards, Scottish Ministers appointed an expert panel to review the way forward if buildings are to continue to contribute positively to Scottish and UK targets to reduce greenhouse gas emissions and respond to the risk posed by Climate Change. The recommendations of this expert panel were published in December 2007 as The Sullivan Report – ‘A Low Carbon Building Standards Strategy for Scotland’<sup>5</sup>.

This report made a range of recommendations to reduce carbon dioxide (CO<sub>2</sub>) emissions from new and existing buildings. A key recommendation was the staged improvement of energy standards for new buildings, where the following proposals are made:

- for 2010, a reduction in CO<sub>2</sub> emissions, from 2007 levels, of 30% for domestic buildings and 50% for non-domestic buildings;
- for 2013, a reduction in CO<sub>2</sub> emissions, from 2007 levels, of 60% for domestic buildings and 75% for non-domestic buildings;
- delivery, in 2016/17 of net zero carbon buildings (emissions from heating, hot water, lighting and ventilation), if practicable; and
- the aspiration of total life zero carbon buildings by 2030.

The original report was reviewed and updated in 2013<sup>6</sup>.

Following investigation into the recommendations of The Sullivan Report for 2010 and 2013 building standards, challenging new targets for limiting emissions were introduced in October 2010 and October 2015. These delivered a 30% reduction in emissions for both new domestic and non-domestic buildings in 2010, and a 45% reduction for new domestic buildings and 60% reduction in non-domestic buildings.

When compared to buildings constructed to 1990 standards, the baseline year for CO<sub>2</sub> emissions reporting, collective revisions to energy standards to date have delivered an aggregate reduction in building emissions of around 75% for new dwellings and 80% for new non-domestic buildings.

## 2.2 Objective

Buildings have significant implications for health, safety, the environment and our communities. Through the appropriate application of minimum building standards, set by regulations and supported by published guidance, the design and construction of Scotland’s built environment can benefit all owners, users and people in and around our buildings.

The aim of these proposals is to investigate the potential for amendment of energy standards set by building regulations to contribute to the Scottish Government’s

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<sup>5</sup><https://www.gov.scot/publications/a-low-carbon-strategy-scotland-sullivan-report/>

<sup>6</sup><https://www.gov.scot/publications/low-carbon-building-standards-strategy-scotland-sullivan-report-2013-update/>

Climate Change Programme<sup>7</sup>. This would be achieved through the introduction of revised standards and guidance to reduce greenhouse gas emissions and improve energy performance of new buildings and new building work, where such work is subject to building regulations.

In achieving the above, the following objectives are identified:

- To deliver levels of performance in new buildings and from new building work to existing buildings which results in buildings which have lower greenhouse gas emissions and are more economical to operate due to a reduced energy demand for heating, hot water, lighting, ventilation and other fixed services.
- To encourage the development and uptake of low carbon construction solutions, including improved building fabric insulation, efficient building services with effective controls and effective use of on-site generation of heat and power from renewable sources. All of these solutions will further the delivery of buildings with lower emissions and energy demand.
- To address risks associated with the delivery of better insulated new buildings and new homes in particular.

## 2.3 Rationale for Government Intervention

The Scottish Government is committed to reducing greenhouse gas emissions. The Climate Change (Scotland) Act 2009<sup>8</sup> introduced the most ambitious climate change legislation anywhere in the world. The Scottish Government has committed to stop contributing to climate change within a generation. The Climate Change (Emission Reduction Targets) (Scotland) Act 2019<sup>9</sup> includes a legally binding target of net zero greenhouse gas emissions by 2045 and interim targets to reduce emissions by 75% by 2030 and 90% by 2040.

Our recently published Climate Change Plan 2018-2032 Update<sup>10</sup> includes the commitment to investigate the potential for further, significant improvement on 2015 energy standards and also how building regulations can support other carbon and energy policy outcomes, including our decarbonisation of heat agenda.

The Update also sets out more detail on the 2019-20 Programme for Government<sup>11</sup> commitment to introduce a New Build Zero Emissions from Heat Standard, to commence from 2024. A scoping consultation<sup>12</sup> on this topic was launched in December 2020 and closed on 3 March. Review of building regulations at this time will support the intended action in 2024 by further reducing heat demand in new buildings and introducing provisions aligned with the future wider scale adoption of low or zero emissions heat solutions.

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<sup>7</sup> <https://www.gov.scot/policies/climate-change/>

<sup>8</sup> [http://www.opsi.gov.uk/legislation/scotland/acts2009/pdf/asp\\_20090012\\_en.pdf](http://www.opsi.gov.uk/legislation/scotland/acts2009/pdf/asp_20090012_en.pdf)

<sup>9</sup> <https://www.legislation.gov.uk/asp/2019/15/contents>

<sup>10</sup> <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/>

<sup>11</sup> <https://www.gov.scot/publications/protecting-scotlands-future-governments-programme-scotland-2019-20/>

<sup>12</sup> <https://consult.gov.scot/energy-and-climate-change-directorate/new-build-heat-standard/>

Ministers have set out a clear, long term vision and policy direction for heat in buildings in the draft Heat in Buildings Strategy<sup>13</sup>. A consultation was published on 5 February 2021 and sets out actions and proposals for transforming our buildings and the systems that supply their heat, ensuring all buildings reach zero emissions by 2045. Following review, the final Strategy was published on 21 October 2021

Scotland's commitment to reach net-zero greenhouse gas emissions by 2045 means a fundamental transformation of our economy. The document, 'A National Mission for a fairer, greener Scotland'<sup>14</sup> was published on 23 March 2021. The Report provides practical advice to Scottish Government Ministers, through 24 recommendations, on how to deliver on a Just Transition to a net zero future.

This review also contributes to delivery of the 2021 Bute House Agreement, in that all new buildings will have significantly higher energy efficiency standards. It also supports the proposal that, where a building warrant is applied for from 2024, new buildings must use zero emissions heating as the primary heating, and sought views aligned to the intent of explicit support for Passivhaus and equivalent standards.

Scottish Ministers have expressed a desire to 'keep pace' with EU law within areas of devolved responsibility, where this is practicable. The Energy Performance of Buildings Directive (2010/31/EU)<sup>15</sup> (EPBD) commits member states to review the energy performance requirements for buildings at intervals not exceeding 5 years. The 2018 amendment to EPBD (2018/844/EU)<sup>16</sup> introduced new requirements on Member States, some of which are still to be introduced in Scotland and were discussed within the recent consultation in changes to energy standards within building regulations.

## 2.4 Building Regulations

As noted in section 2.2, Scottish building regulations address the health, safety and welfare of persons in and around buildings and further both the conservation of fuel and power and the achievement of sustainable development. Building regulations set minimum standards for new buildings and where existing buildings are altered, extended or converted. Whilst buildings can be designed and built to higher standards, in the majority of cases, the mandatory minimum standards set through building regulations are adopted. Accordingly, it is important that these minimum standards are robust enough to address both the needs of Scotland's people and to support the wider policy objective of addressing Climate Change.

Experience has shown that voluntary 'best practice' measures cannot be relied upon to deliver greenhouse gas emissions reductions in the development of buildings except in situations where market forces either do not apply, or are moderated by additional conditions of development. For Government to reduce greenhouse gas emissions from the use of new buildings and from new building

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<sup>13</sup> <https://www.gov.scot/publications/heat-buildings-strategy-achieving-net-zero-emissions-scotlands-buildings/>

<sup>14</sup> <https://www.gov.scot/publications/transition-commission-national-mission-fairer-greener-scotland/>

<sup>15</sup> <https://www.legislation.gov.uk/eudr/2010/31/contents>

<sup>16</sup> <https://www.legislation.gov.uk/eudr/2018/844/contents>

work, national energy standards have to be set at a sufficiently demanding level. Scottish Ministers have therefore committed to periodic review of these standards.

## **2.5 The Risks to be addressed**

The action proposed within this review is the reduction of energy demand and greenhouse gas emissions from new building and new building work, to assist with the mitigation of Climate Change. Accordingly, the effect of building-related greenhouse gas emissions on Climate Change is the primary risk identified.

The reduction of emissions from new development continues to be an essential element in the development of the Scottish and UK Governments' Climate Change Programme. Failure to achieve improvements to energy standards for new buildings will have an adverse effect on these programmes.

In addressing this primary risk, there are subsidiary risks that must also be considered. Minimum energy standards applicable to new buildings should still:

- be proposed with an understanding of the potential cost of improvement to the delivery and operation of buildings;
- remain technically feasible;
- offer flexibility in the ways which standards can be achieved, to allow best value;
- ensure proposals do not conflict with or duplicate other regulatory requirements; and
- be implemented with consideration of wider societal issues related to the occupation and use of buildings.

## **3.0 Consultation**

### **3.1 Development Phase**

Before making or amending the building regulations, Scottish Ministers are required, under section 1(2) of the Building (Scotland) Act 2003<sup>17</sup>, to consult “such persons as appear to them to be representative of the interests concerned”.

Prior to public consultation on proposed changes to regulations, this duty is discharged through the development of proposals by a Departmental Working Group, comprising of officials and representatives of industry, together with communication with other parts of Government and bodies representing organisations of the construction industry. This is intended to provide assurance that proposals are proofed against the considerations identified in item 2.4 above.

In 2020, Scottish Ministers approved a Departmental Working Group to consider amendments to building regulations in respect of energy<sup>18</sup>. Along with government officials the Working Group included members from local authority verifiers, designers, building services engineers, building physicists, energy modellers, academia and private sector organisations representing the commercial and

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<sup>17</sup> <https://www.legislation.gov.uk/asp/2003/8/contents>

<sup>18</sup> <https://www.gov.scot/publications/building-standards-energy-review-2021/>

domestic sector, manufacturing industry and those with a direct interest in energy conservation.

Over five meetings between January and May 2021, this group shaped the development of proposals for consultation and discussion with Scottish firms and other stakeholders.

### **3.2 Within Government**

Building Standards Division has a network of stakeholder organisations with an interest in building regulations. Government organisations and departments with a policy interest in proposals are contacted in respect of these proposals and consultation documents made available to these bodies.

This includes direct contact and discussion with the following Divisions and Agencies during the development phase. This ensures that the implications of options on other policy areas is clearly understood and that proposals are developed with an awareness of similar work elsewhere within the UK.

- SG Planning and Architecture Division;
- SG Directorate for Housing and Social Justice;
- SG Directorate for Energy and Climate Change;
- SG Innovation, Investment and Industries Division;
- Historic Environment Scotland;
- Climate Change and Sustainable Buildings, Department for Communities and Local Government;
- Properties Division, Department of Finance, Northern Ireland; and
- Building Regulations, Ministry for Housing Communities and Local Government.

### **3.3 Public consultation**

A Partial Impact Assessment formed part of a package issued for public consultation. Consultation sought general comment on detailed proposals which include the option of amending building standards and guidance within section 6 (energy) of the Building Standards Technical Handbooks, to reduce energy demand and associated emissions from use of buildings.

In June 2018 the current review of energy standards commenced and a 'Call for Evidence' consultation was published. This consultation sought views from stakeholders on the impact the 2015 energy standards in designing and constructing buildings to meet the Scottish building regulations. The consultation also sought views on practical opportunities to further improve the energy performance of buildings. The consultation and published responses can be viewed at <https://consult.gov.scot/local-government-and-communities/building-standards-energy/>

A public consultation on the proposed changes ran from 26/07/2021 to 28/11/2021 and received a total of 176 responses. The consultation period was extended in

August to reflect the lack of initial availability of consultation versions of energy calculation tools and extended further in October in response to a request for more time for analysis from Scottish house builders. Of the 177 responses received, 157 were from organisations and 20 were from individuals.

Note that responses submitted from individuals are not categorised by organisation type, even where an organisation type is noted by the respondent. For information only, of the 20 responses by individuals, one respondent identified as 'Voluntary Organisation', two respondents identified as 'Local Authority' and 8 respondents identified as 'Designer/Consultant'.

<b>Category of Respondent</b>	<b>Number</b>	<b>Percentage</b>
Individuals	20	11%
Advisory Body/Committee	2	1%
Commercial Organisation (other)	8	5%
Contractor/Developer	24	14%
Designer/Consultant	13	7%
Housing Provider/RSL	4	2%
Industry Association/Manufacturer	45	26%
Local Authority	21	12%
NDPB/Agency	4	2%
Other (please specify below)	19	11%
Professional Body	7	4%
Voluntary Organisation	9	5%
<b>Total</b>	<b>176</b>	<b>100%</b>

22 Organisations chose 'Other'. Three of these were assigned to 'Industry Association/Manufacturer'. Of the remaining 19, declared organisation type is set out below:

- 4 of Charity/Third Sector;
- 1 each - Approved Organisation; Collaboration between Local Authority, Academic Body, Housing Provider/RSL & Contractor/Developer; Community and business group; Competent Person Scheme; Development Manager / Landowner; EV Advocacy Organisation; Fire and Rescue Service; Construction industry compliance and competence bodies; Membership body; National House Building Council; Not for profit organisation; Professional Body, Industry association/manufacturer and Advisory body/committee; Profit for purpose research organisation; Regulated Electricity Network; and Non-Governmental Organisation

Of the 177 responses received, 44 respondents instructed that their responses should not be published. Of these 44 responses, 5 were from individuals and 39 from organisations.



Accordingly 133 consultation responses will be published on the consultation webpage - Consultation webpage: <https://consult.gov.scot/local-government-and-communities/building-regulations-energy-standards-review>.

Island Communities were also consulted on the impact of proposed changes, resulting in publication of an Island Communities Impact Assessment on the consultation webpage.

### **3.4 Business consultation**

Whilst changes to building regulations affect any party who chooses to build a new building or carry out new building work to an existing building, such changes have the most significant impact on parties involved in the delivery of such building work - designers, developers, contractors and manufacturers of building products.

During the consultation period, discussions took place with a range of businesses that might be affected by the proposals set out in Options 2 and 3 (which would impose regulatory change). A series of stakeholder events with industry will be undertaken to reach a wider selection of affected and interested parties.

It is considered essential that this was undertaken only once proposals are published for consultation, to enable full discussion on the technical and financial implications of proposed changes on Scottish firms.

## **4.0 Options**

### **4.1 Option Development**

The main subject of this consultation is change to requirements for the energy performance of new buildings and new building works, as set out in the mandatory standards and guidance in Scottish building regulations.

A series of further changes are also proposed and these are set out under item 4.9

Research was commissioned to assess and identify potential improvements in energy and emissions performance for new domestic and non-domestic buildings and to evaluate the costs of improvement measures<sup>19</sup>. This was to inform the setting of targets within the next set of energy standards and introduce Primary Energy as a new metric for target setting whilst also maintaining the current emissions target.

#### **Domestic Buildings**

Cost and energy models were developed based on seven building sub-types derived from an analysis of an extract of the Energy Performance Certificate (EPC) database for new domestic buildings. Just under 54,000 EPC records were included in the analysis<sup>20</sup>.

In the current guidance a specification for the notional building is provided for each of the 5 main space heating system fuels; where the fuel for the actual building is the same as the notional building. The proposals for the next revision to energy

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<sup>19</sup> Publications listed at <https://www.gov.scot/publications/building-standards-energy-review-2021/>

<sup>20</sup> Scottish domestic EPC is published at <https://statistics.gov.scot/data/domestic-energy-performance-certificates>

standards simplify as well as tighten the requirements developing options for the revised notional building based on two fuel types; natural gas and electric (heat pump).

Following the identification of baseline levels of performance, options for the specification of a revised notional building were investigated, looking at delivering emission reductions and two potential levels of improvement, based upon a good and very good notional specification, drawing from available information on current construction solutions.

Options were developed on the basis of a range of achievable elemental specifications to deliver initial abatement, augmented, where necessary with the addition of low carbon equipment, in the proxy form of photovoltaic panels, as a means to usefully offset energy demand and further reduce emissions. Two notional building specifications were identified and consultation proposals are being taken forward using the two identified specification options. These specification options, when aggregated to a national profile as assessed at delivering a 32% and 57% reduction in initial annual greenhouse gas emission respectively.

### **Non-domestic Buildings**

Cost and energy models were developed for a range of archetypes comprising of seven building types, three heating fuels and three heating/ventilation strategies resulting in 12 sample buildings derived from an analysis of the EPC database for new non-domestic buildings<sup>21</sup>. These examples buildings are based upon the range of models used elsewhere in the UK for evaluation of energy standards within building regulations.

In current guidance, there are two specification categories for the notional building, determined by the zone conditioning strategy for the actual building; heated and naturally ventilated or heated ventilated/cooled. The heating fuel(s) for the notional building is based on the heating fuel(s) specified for the actual building. The proposals for the next revision to energy standards simplify as well as tighten the requirements developing options for the revised notional building based on two fuel types; natural gas and electric (heat pump) but no variation in specification in relation to the conditioning strategy.

Following the identification of baseline levels of performance, options for the specification of a revised notional building were investigated. Options were developed on the basis of a range of achievable elemental specifications to deliver initial abatement, augmented, where necessary with the addition of low carbon equipment (in the form of photovoltaic panels) as a means to offset energy demand and further reduce emissions. Three notional building specifications were identified and consultation proposals are being taken forward for the better two. These specification options, when aggregated to a national profile are assessed at delivering a 16% and 25% reduction in initial annual greenhouse gas emission

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<sup>21</sup> Scottish non-domestic EPC is published at <https://statistics.gov.scot/data/non-domestic-energy-performance-certificates>

respectively. The lower option investigated was discounted as it resulted in a low level of further abatement (<10%).

In considering the risk to be addressed (see item 2.5), three options are identified:

**Option 1** – Do nothing.

**Option 2** – Reduce energy demand and associated greenhouse gas emissions through building regulations, with revised performance measures for new buildings. Within this option, an ‘improved/medium’ range of measures is considered.

**Option 3** – Reduce energy demand and associated greenhouse gas emissions through building regulations, with revised performance measures for new buildings. Within this option, an ‘advanced/high’ range of measures is considered.

## 4.2 Sectors and groups affected

Sectors and groups affected can be categorised as:

- Persons procuring or occupying new buildings or building work, who may need to bear any additional costs associated with delivering buildings which have improved energy performance. Whilst this relates to a specific activity, the group who may be affected at one time or another can be considered to be the majority of the population.
- Developers who, in addition to the above, would have to review existing building specification, construction detailing and, potentially, methods of working. This might include, where relevant, seeking amended Scottish type approvals<sup>22</sup> for standard constructions, possibly sooner than otherwise intended.
- Building materials and component manufacturers, who may need to review and introduce changes to products and literature to address revised performance standards.
- Those involved with the energy aspects of building design and construction, who would have to familiarise themselves with any revised standards and methodologies.
- Building services contractors, who may need to invest to increase the capacity for commissioning and testing of buildings and engineering services.
- Local authority verifiers, who may need to arrange training of staff on changes to energy standards and guidance, to ensure these can be verified at design submission and during construction where necessary.

## 4.3 Benefits

### Benefits arising from policy objective

A reduction in energy demand and associated greenhouse gas emissions from new buildings and new building work:

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<sup>22</sup> The Scottish Type Approval System (STAS) operated by Local Authority Building Standards Scotland (LABSS, [www.sabssm.co.uk](http://www.sabssm.co.uk)) allows approved building types to be used throughout Scotland.

- supports the Government's agenda to tackle Climate Change and reduces the adverse effect of greenhouse gas emissions on the environment;
- as a sector where improvements are relatively straightforward to implement and to measure, provides a significant and positive contribution to Government targets set for the reduction in greenhouse gas emissions;
- reduces use of finite natural resources and promotes development and adoption of systems that incorporate renewable energy sources; and
- reduces energy costs arising from the operation of new buildings.

As is the case with current building regulations, improvements will also result in an increased benefit where buildings are altered, extended or converted and also where existing building elements and equipment are replaced, where this must be to current standards. It is considered that the costs and benefits arising from such work will be proportionate to those for new buildings.

### **Reducing Greenhouse Gas Emissions**

Today's new buildings are tomorrow's existing buildings. The number of new buildings per annum may account for a change in less than 1% of the entire stock, but by the year 2050, buildings built from this point onwards will account for a substantial percentage of our total building stock. It is therefore vital that new buildings continue to make a contribution to further reductions in energy demand and emissions. The Scottish Government's commitment to net zero emissions by 2045 means that future energy performance improvements to buildings, new and existing, will remain a strong review agenda.

### **Reduced use of resources**

Reducing emissions and energy demand in buildings are only two measures amongst many that can be considered to contribute to the delivery of more sustainable communities. Where persons elect to carry out new building work, the outcome ought to place reasonable limits on emissions and energy demand when the building is in use to ensure that resources are used effectively. Adoption of renewable heat solutions and effective use of renewable generation on site can further assist in limiting use of resources. As energy standards are improved, the need to consider and implement such solutions is strengthened.

Other than in the case of conversion of buildings (where the use of a building is changed), current standards for construction are applied only to new building work and not to the remainder of a building. Separate measures to improve the performance of existing buildings, outwith the building standards system, are presently under development in response to sections 63 and 64 of the Climate Change (Scotland) Act 2009<sup>23</sup>.

### **Reduced fuel bills**

It is recognised that gains from reduced heating costs and attendant potential welfare savings can be relatively small given that current building standards already place significant limits on energy demand. However, gains are possible in

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<sup>23</sup> <https://www.legislation.gov.uk/asp/2009/12/contents>

many building types, dependent upon energy load profile, where good practice is adopted. Savings from reduced energy demand are identified, in summary within section 5.

However, it is noted that savings in energy costs made through improvement do not, in most cases, offset the additional cost of construction and maintenance of these buildings.

#### **4.4 Option 1 – Do nothing**

As noted under item 2.3, the Scottish Government is committed to the delivery of net-zero greenhouse gas emissions by 2045, with intermediate targets of at least 75% by 2030 and 90% by 2040. Whilst building regulations have reduced emissions from new buildings by approximately 75% since 1990, doing nothing offers no further contribution towards meeting national targets for emissions reduction. Accordingly, no benefits are identified which relate to the intended objective.

Doing nothing would result in new buildings which, whilst specified to a good standard, continue to produce emissions at current levels, creating a greater challenge for the future. This option would not support delivery of climate change targets and may lead to as yet-unbuilt buildings requiring a greater degree of retrofitting at a later date to improve their energy performance. Given the Scottish Government commitment to reducing greenhouse gas emissions, a potential reputational risk may also arise if this option was adopted.

#### **4.5 Option 2 – Reduce energy demand and associated greenhouse gas emissions through building regulations, with revised performance measures for new buildings. Within this option, an ‘improved/medium’ range of measures is considered.**

Options 2 offers meaningful benefit in respect of the objective of this review – to reduce CO<sub>2</sub> emissions and energy demand arising from new buildings and new building work whilst also introducing limited measures to improve existing building performance.

Research was undertaken on the basis of delivering a reduction in emissions against a 2015 baseline. These were:

- **Domestic**                      **32%**
- **Non-domestic**                **16%**

Benefits in adopting the improved range of measures proposed in Option 2, to reducing energy and emissions include:

- An established delivery method - setting standards within Scottish building regulations to limit emissions and energy demand has proved to be an equitable and robust way of improving the energy performance of new buildings. All new buildings which are to be heated (or cooled) or new building work within existing buildings will attract application of revised minimum standards.

- For both domestic and non-domestic buildings the proposals simplify as well as tighten the requirements for new buildings set via the Notional Building approach. Therefore, the proposed range of improvement applies across all building types regardless of servicing strategy, floor area and activity type.
- Certainty that reductions can be achieved - this approach is that, in addressing the performance of buildings, building regulations offer an established and proven delivery method which offers certainty that all new building work to new and existing buildings will result in improved performance, requiring that all new building work delivers reduced emissions with an associated reduction in energy demand. This allows a quantitative assessment of improvement, which will assist the Government in meeting its targets for carbon emission reductions.
- Delivering the most cost-effective solutions - where subject to building regulations and a mandatory need to address improved building performance, those persons commissioning building work have the incentive to meet the regulations in the most cost effective manner possible. This is supported and encouraged by the use of functional standards and supporting guidance within building regulations, which allows flexibility in solutions and value engineering.

**4.6 Option 3 – Reduce energy demand and associated greenhouse gas emissions through building regulations, with revised performance measures for new buildings. Within this option, an ‘advanced/high’ range of measures is considered.**

Options 3 offers significant benefit in respect of the objective of this review – to reduce CO<sub>2</sub> emissions and energy demand arising from new buildings and new building work whilst also introducing limited measures to improve existing building performance.

Research was undertaken on the basis of delivering a reduction in emissions against a 2015 baseline. These were:

- **Domestic**                      **57%**
- **Non-domestic**                **25%**

Benefits in adopting the improved range of measures proposed in Option 3, to reducing energy and emissions are the same as set out for Option 2. Noting that increased specification does affect the cost/benefit reported for the implemented change.

**4.7 Emissions reduction**

Based upon the range of emissions reductions identified in options 2 and 3, the potential annual abatement associated with the occupation and use of new buildings is assessed as follows:

**Table 2 - New buildings – projected annual emissions abatement - Proposed reduction.**

<b>New Dwellings</b>	<b>Improved - 32%</b>	<b>Advanced - 57%</b>
Annual abatement	7 kt CO <sub>2e</sub>	13 kt CO <sub>2e</sub>
<b>New Non-domestic</b>	<b>Improved - 16%</b>	<b>Advanced - 25%</b>
Annual abatement	1.7 kt CO <sub>2e</sub>	2.6 kt CO <sub>2e</sub>

- Assessment based upon projected build of 18,207 new homes per annum and projected non-domestic build of 672,000 m<sup>2</sup> per annum. Overall abatement is directly proportional to level of development occurring.
- Abatement is calculated as savings in CO<sub>2e</sub> (carbon dioxide equivalent). The UK calculation methodologies reports using emissions factors which include the impact of CH<sub>4</sub> and N<sub>2</sub>O in addition to CO<sub>2</sub>. Annual abatement of life of policy is lower due to projected changes in fuel emission factors.

The above figures are single year annual savings which will occur each year following the construction of a new building based upon emissions factors proposed for fuels within the UK energy assessment methodologies, SAP<sup>24</sup> and SBEM<sup>25</sup>.

In assessing overall cost/benefit (see items 5.4. and 5.5), for both Domestic and Non-domestic buildings the appraisal time period for estimating the impact of the policy is 10 years and an assumed 60 years building life from the year of construction, resulting in a total model period of 70 years.

#### **4.8 Monetised Benefits**

Potential savings achievable through implementation of options 2 and 3 are categorised as direct savings to building users and costs to Government from not taking action, as follows:

- Direct savings to building users through reduction in energy demand and reduced fuel costs.
- Emissions reductions from reduced fuel consumption are valued using the guidance provided by HM Treasury Green Book supplementary appraisal guidance on valuing energy use and greenhouse gas (GHG) emissions

The annual value of reduced emissions or energy use is calculated over 70 year period for both dwellings and non-domestic buildings, discounted at 3.5% for the first 30 years and at 3% thereafter to represent net present value. A summary of these benefits is given in the cost/benefit analysis table in items 5.4 and 5.5.

#### **4.9 Supporting action on ventilation and overheating risk.**

In support of the two proposed options for new domestic buildings, consultation proposals were put forward for consequential changes to current provisions for

<sup>24</sup> <https://www.bregroup.com/sap/sap10/>

<sup>25</sup> <https://www.uk-ncm.org.uk/>

ventilation in new homes and for a new requirement to assess and mitigate overheating risk in new dwellings and similar residential buildings.

### **Domestic ventilation provisions**

Following the commissioning of research into the impact of previous 2015 ventilation amendments to ventilation standards for new homes earlier this year, it is the intent to undertake a fuller review of ventilation provision for both domestic and non-domestic buildings from 2022.

Accordingly, changes proposed in support of revision of energy standards were focussed on domestic ventilation and limited to those which are considered to be directly relevant to the introduction of improved energy standards and, in response to published research<sup>26</sup>, would better address the delivery of expected levels of ventilation and good indoor air quality:

- The expectation of further trends on reducing infiltration rates and increasing application of mechanical extract or supply/extract systems in lieu of natural ventilation.
- Reinforcement of the need for ventilation design to be properly considered and evidenced, systems designed and performance verified and recorded, post-commissioning.
- For dwellings, action to support proposals to require assessment and response to overheating risk in new residential buildings.

Proposals were set out in detail within section 4 of the 2021 consultation, supported by a revised draft of ventilation standard 3.14 and supporting guidance. Key changes proposed were:

- expansion of core guidance on ventilation provision, including clearer information on suitable ventilation solutions for dwelling design infiltration levels;
- more detailed information on minimum dwelling ventilation levels;
- revised guidance on the use of openable ventilators for purge ventilation;
- reinforcement of the need for continuous extract solutions to be whole house systems;
- emphasis on the need for design, commissioning and testing of systems; and
- incorporation of a separate domestic ventilation guide into the Technical Handbooks.

### **Assessment of overheating risk**

Overheating in homes occurs when conditions in excess of those acceptable for human thermal comfort or those that may adversely affect human health occur in

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<sup>26</sup> Such work includes: [The effect that increasing air-tightness may have on air quality within dwellings](#) (BRE, 2012); [Research Project To Investigate Occupier Influence On Indoor Air Quality In Dwellings](#) (MEARU/ABC/ASSIST/ESRU, 2014); [Ability of decentralised mechanical ventilation to act as 'whole-house ventilation systems in new-build dwellings](#) (MEARU/JGA/ABC/ESRU, 2018); and [Ventilation and Indoor Air Quality in New Homes](#) (AECOM Ltd, 2019).



the internal building environment. Overheating in buildings has been highlighted as a key concern for the health and welfare of people across the UK.

Within the Climate Change Committees (CCC) report 'UK Housing: Fit for the future' reference is made to there being around 40 heat related deaths per year in Scotland which is projected to potentially rise to between 70 – 280 deaths. The CCC recommend that the Scottish Government, along with the rest of the UK, introduce a new standard that requires the overheating risk to be assessed for new housing and ensure that passive cooling measures are installed at build stage where a risk of overheating is identified.

There is currently no direct requirement for buildings to be designed and constructed to avoid the risks of overheating. Standard 6.6 within the building regulations aims to reduce the need for buildings to have active cooling/ventilation systems installed to address periods of high internal temperatures. However, this is set in the context of minimising energy use within the building as opposed to protecting the occupants from the health risks associated with overheating which occurs in buildings.

That methodology employed uses an approach set out within Appendix P of SAP 2012 which provides only a simplified check of whether the home will have an overheating problem. The SAP methodology does not predict the severity of the overheating risk and the effectiveness of remedial solutions and does not consider individual rooms at higher risk from overheating.

In common with other UK administrations, proposals were put forward for a separate assessment process to address this risk. Noting also that overheating risk assessment was to be removed from the SAP methodology from 2022.

Proposals were set out in detail within section 5 of the 2021 consultation, supported by a draft of a new overheating standard 3.28 and supporting guidance.

This proposed that a new dwelling should be assessed and measures put in place to mitigate the risk of summer overheating. This can be achieved through adopting one of the following two methods.

- A simple method which specifies measures to adequately mitigate the risk of summer overheating by limiting solar gain through glazing and providing adequate ventilation to assist in effective cooling.
- An option of Dynamic Thermal Analysis modelling and dwelling characteristics to calculate the risk of overheating, modelling the impact of the build form and any mitigation measures applied.

Guidance also covered the need for mitigation measures to be practical and for the provision of written information to occupants on how the design and use of the dwelling will reduce overheating risk.

## **5.0 Costs**

This section quantifies the costs of each of the options identified. The three options identified are as follows:

### 5.1 Option 1 - 'Do nothing'.

This option presents no implementation costs

### 5.2 Option 2 – Reduce energy demand and associated greenhouse gas emissions through building regulations, with revised performance measures for new buildings. Within this option, an 'improved/medium' range of measures is considered.

See reporting for Option 3 in 5.3 below.

### 5.3 Option 3 – Reduce energy demand and associated greenhouse gas emissions through building regulations, with revised performance measures for new buildings. Within this option, an 'advanced/high' range of measures is considered.

Cost for options 2 and 3 include capital construction costs, ongoing maintenance costs and lifecycle replacements over their lifetime. Costing research which informed this review and which forms part of the consultation package is published online and can be found at:

- [Domestic research](#)
- [Non-domestic research](#)

This research was commissioned to assess the additional costs arising from the construction of buildings to improved energy standards, based upon the range of percentage emissions reductions. These were:

- **Domestic**                    **32% and 57%**
- **Non-domestic**            **16% and 25%**

The following cost/benefit assessment is based upon the findings within these reports. Costs identified are non-recurring construction costs, incurred where a new building is created. Accordingly, emissions savings will accrue during the life of the building with no further cost aside from those associated with building and system maintenance.

Any assessment of additional capital cost must be necessarily broad and approximate, resulting in a range. It is proposed that potential costs specific to redesign of building to revised standards should be recognised but not quantified as addition of these costs will not significantly affect the range identified. These costs are minimised by the practice of only reviewing building standards at regular, defined intervals and introducing all changes arising at the same time.

The potential for improved energy standards resulting in a small increase in building footprint, particularly in housing development, is recognised. The cost of construction is assessed within published research. However, any effect on site layout and the potential reduction in the number of units that can be accommodated is not quantified as this is dependent upon solutions employed.

#### **Life cycle costing and payback periods**

Research identifies that most of the improvement scenarios investigated have a very long payback period in terms of annual energy cost savings and some, due to

the high capital costs or short replacement cycles, may not pay back the original investment. However, reduction of running costs is only one consideration within an overall policy objective and it should be recognised that, for Climate Change to be addressed, actions that do not result in a direct financial benefit to building users must be considered.

### Capital costs

The capital cost estimates are based on a 'central belt' price level. In other areas of Scotland prices may be different reflecting the availability and costs of materials and labour. The following adjustments on the base (central belt) costs were considered reasonable to reflect the additional costs of working in more remote parts of the country.

- Central Belt (Glasgow, Edinburgh etc) – 100
- Borders / Dumfries and Galloway - 103
- Grampian (Aberdeen) - 103
- Highland - 110
- Orkney and Shetland - 125
- Western Isles – 130

## 5.4 New Domestic Buildings

### National impact – annual capital cost.

Assessment is based upon an analysis of an extract of the Energy Performance Certificate (EPC) database for new domestic buildings. A total of just under 55,000 EPC records were included in the analysis and for derivation of the national build profile the most common sub-types were used as these allow sufficient determination of the impact of any changes to Building Standards. A projected build rate of 18,207 completed new dwellings per annum was projected based on seven sub-types.

In order to allow compilation of the national impact assessment, it has been necessary to extrapolate the data from this study to include dwelling types other than those used as baseline dwellings. It should also be noted that by its nature, the national impact assessment requires generalisations to be made, for example regarding dwelling sizes and configurations, and that there will inevitably be a margin of error with such an approach.

**Table 3** - New domestic buildings – capital cost - national impact (single year build)

Emissions reduction	Annual cost – private sector	Annual cost – public sector	National annual cost – total
Option 1 - 32%	£ 52.3M	£ 30.8M	£ 83.1M
Option 2 - 57%	£ 88.0M	£ 51.7M	£ 139.7M

Notes: Assessment based upon projected build of 18,207 new homes per annum. Based on SG data, the public sector accounted for 37% of the total number of new

dwellings completed in 2011-12. Whilst the proportion of each dwelling type constructed by the public and private sector differs slightly, this percentage is used above.

**Table 4** - Illustration of additional capital cost for proposed levels of improvement - Percentage Uplift on 2015 Cost.

Dwelling Type	2015 Cost (Gas)	32% Gas	32% ASHP	57% Gas	57% ASHP
Detached house	£ 168,960	4%	3%	6%	5%
Semi-detached house	£ 97,106	4%	3%	7%	6%
Mid-terrace house	£ 88,662	4%	3%	7%	6%
Average flat	£ 84,114	3%	4%	5%	7%
Semi-detached house, ASHP	£ 95,938	N/A	4%	N/A	7%

This would indicate an average additional cost of approximately £4,560 per dwelling for Option 1 and £7,670 for Option 2. Assessment of national impact was carried out as part of the domestic research and the mitigation of these costs over the policy period of 10 years is discussed below.

**National impact – total cost/benefit across policy period.**

Based on the build/fuel mix, capital and lifetime costs, benefits and transition period applied, the national costs and benefits for Option 1 and Option 2 ‘with fossil fuel’ (no fuel switching assumed) cases compared with continuation of the existing 2015 standards are shown in the Table below. The analysis is based on the HM Treasury Green Book standards and the accompanying supplementary guidance on the valuation of energy use. Relevant assumptions include:

- Energy savings are valued at the variable rate in accordance with the supplementary Green Book guidance. This is appropriate for social analysis and assumes that the retail energy savings enjoyed by the consumer occupying an energy efficient building does not fully reflect the social benefit.
- The appraisal time period for estimating the impact of the policy is 10 years with a consistent build rate and mix in each year equivalent to that forecast for 2021. We assume a 60 building life from the year of construction resulting in a total model period of 70 years.
- A discount rate of 3.5 per cent has been used for the first 30 years of building life and 3 per cent for subsequent years.
- Construction costs are in 2020 prices energy and carbon prices and costs are in 2019 prices, all results being presented in line with a 2021 policy implementation year.

**Table 5** - Summary (cost)/benefit assessment, including fuel and lifecycle costs – total over the appraisal period

<b>New Dwellings (annual build)</b>	<b>Option 1 - 29%</b>	<b>Option 2 - 54%</b>
Energy savings (£M)	417	483
Incremental costs (£M)	(609)	(1,171)
<b>Total financial benefit/(cost) (£M)</b>	<b>(192)</b>	<b>(688)</b>
Carbon savings - non-traded (£M)	153	346
Carbon savings - traded (£M)	36	31
Total carbon savings (£M)	189	377
Air quality savings (£M)	50	61
<b>Net benefit/(cost) (£M)</b>	<b>46</b>	<b>(250)</b>
Amount of gas saved (GWh)	9,647	24,122
Amount of electricity saved (GWh)	12,087	10,621
Amount of CO <sub>2</sub> saved - non-traded (MtCO <sub>2e</sub> )	2	5
Amount of CO <sub>2</sub> saved - traded (MtCO <sub>2e</sub> )	1	0
Cost effectiveness – non-traded (£/tCO <sub>2</sub> )	50	125
Cost effectiveness – traded (£/tCO <sub>2</sub> )	(19)	594

## 5.5 Non-domestic buildings

### National impact - capital cost.

Assessment is based upon analysis of an extract of the Energy Performance Certificate (EPC) database for new non-domestic buildings. A total of 1,800 EPC records were included in the analysis and for derivation of the national build profile the most common sub-types were used as these allow sufficient determination of the impact of any changes to Building Standards.

**Table 6** - New non-domestic buildings – capital cost - national impact (single year build)

<b>Emissions reduction</b>	<b>National annual cost – total</b>
Option 1 - 16%	£ 34.1M
Option 2 - 25%	£ 49.4M

Note: An estimated build rate of 672,100 m<sup>2</sup> per annum was projected based on 12 sub-types.

**Table 7** - Illustration of additional capital cost for proposed levels of improvement - % Uplift on 2015 Cost.

Building Type	2015 Cost (£/m <sup>2</sup> )	Option 1 Gas + PV	Option 1 Heat Pump	Option 2 Gas + PV	Option 2 Heat Pump
Deep Office AC; Gas; AC	3,250	1%	2%	1%	2%
Deep Office AC; Elec; AC	3,266	N/A	N/A	1%	1%
Hospital; Gas; NV	4,185	1%	2%	2%	2%
Hotel; Gas; NV	2,603	2%	3%	3%	4%
Hotel; Gas; AC	2,789	1%	2%	2%	3%
Primary School; Biomass; NV	2,232	0%	1%	1%	2%
Primary School; Gas; MV	2,511	2%	3%	3%	4%
Primary School; Gas; NV	2,325	3%	4%	4%	5%
Retail; Gas; AC	3,500	2%	3%	2%	3%
Retail; Elec; AC	3,500	N/A	N/A	2%	2%
Shallow Office NV; Gas; NV	2,325	2%	3%	3%	4%
Warehouse Distribution; Gas; NV	1,579	4%	5%	5%	7%

Note: Information taken from non-domestic research (see links in item 5.3)

The cost associated with uplift in standards varies across modelled building types. This is noted as up to 5% for Option 1 and between 1% and 7% for Option 2. Assessment of national impact was carried out as part of the non-domestic research and the mitigation of these costs over the policy period of 10 years is discussed below.

**National impact – total cost/benefit across policy period.**

To assess the costs and benefits over the complete policy period, the total new build rate of 672,100 m<sup>2</sup> per annum was assumed. Based on the build/fuel mix, capital and lifetime costs, benefits and transition period applied, the national costs and benefits for Option 1 and Option 2 ‘with fossil fuel’ cases (no fuel switching assumed) compared with continuation of the existing 2015 standards are shown in the Table below. The analysis is based on the HM Treasury Green Book standards and the accompanying supplementary guidance on the valuation of energy use. Relevant assumptions include:

- Energy savings are valued at the variable rate in accordance with the supplementary Green Book guidance. This is appropriate for social analysis and assumes that the retail energy savings enjoyed by the consumer occupying an energy efficient building does not fully reflect the social benefit.

- The appraisal time period for estimating the impact of the policy is 10 years with a consistent build rate and mix in each year equivalent to that forecast for 2021. We assume a 60 building life from the year of construction resulting in a total model period of 70 years.
- A discount rate of 3.5 per cent has been used for the first 30 years of building life and 3 per cent for subsequent years.
- Construction costs are in 2020 prices energy and carbon prices and costs are in 2019 prices all results are presented in line with a 2021 policy implementation year.

**Table 8** - Summary (cost)/benefit assessment, including fuel and lifecycle costs – Percentage Improvement.

<b>New Non-domestic buildings (2021-2031)</b>	<b>Option 1 - 16%</b>	<b>Option 2 - 25%</b>
Energy savings (£M)	245	264
Incremental costs (£M)	(366)	(497)
<b>Total financial benefit/(cost) (£M)</b>	<b>(121)</b>	<b>(234)</b>
Carbon savings - non-traded (£M)	(4)	22
Carbon savings - traded (£M)	24	24
Total carbon savings (£M)	20	46
Air quality savings (£M)	78	80
<b>Net benefit/(cost) (£M)</b>	<b>(23)</b>	<b>(107)</b>
Amount of gas saved (GWh)	(467)	1,492
Amount of electricity saved (GWh)	6,684	6,746
Amount of CO <sub>2</sub> saved - non-traded (MtCO <sub>2e</sub> )	0.0	0.4
Amount of CO <sub>2</sub> saved - traded (MtCO <sub>2e</sub> )	0.4	0.4
Cost effectiveness – non-traded (£/tCO <sub>2</sub> )	(335)	424
Cost effectiveness – traded (£/tCO <sub>2</sub> )	129	356

## 5.6 Cost impact assessment of supporting action – ventilation and overheating

Based upon discussion with the authors of the domestic research report, a separate assessment of the cost impact of proposed changes to ventilation and introduction of overheating risk assessment in domestic buildings was undertaken. This drew from information already considered within the national profile developed for that research report.

It was noted that proposed changes to ventilation provision are primarily reinforcement of already published guidance excepting two elements of proposed guidance that do result in modification of ventilation designs. It was noted that the

move to specific guidance on minimum ventilation rates for dwellings may result in a 5-10% increase in minimum capacity for continuous extract solutions. Similarly, the change in guidance on minimum operable areas for apartments for purge ventilation from 1/30<sup>th</sup> floor area to 1/20<sup>th</sup> floor area may affect window design.

The move to a separate assessment of overheating risk and a specific focus on the characteristics of window openings on risk elevations combined with adequate provision for ventilation. Whilst such issues should commonly be considered as part of assessment under standard 6.6, the new prescription within proposal would result in greater consideration of both design elements. Consultation proposals emphasised that application of the new standard should not simply reduce window size. Accordingly an assessment was made of the impact of an improved glazing specification to a proportion of dwellings where defined solar gain limits would be exceeded. Similarly, an allowance was made for an increase element of openable windows within single/adjacent aspect flats to accommodate an increase in purge ventilation above that sought under standard 3.14.

Modelling of these outcomes against Option 1 (improved) was undertaken and the results are noted below.

**Table 9** – Amended summary (cost)/benefit assessment, including fuel and lifecycle costs – total over the appraisal period (with ventilation & overheating).

<b>New Dwellings (annual build)</b>	<b>Option 1 - 29%</b>
Energy savings (£M)	417
Incremental costs (£M)	(659)
<b>Total financial benefit/(cost) (£M)</b>	<b>(242)</b>
Carbon savings - non-traded (£M)	153
Carbon savings - traded (£M)	36
Total carbon savings (£M)	189
Air quality savings (£M)	50
<b>Net benefit/(cost) (£M)</b>	<b>(3)</b>
Amount of gas saved (GWh)	9,647
Amount of electricity saved (GWh)	12,087
Amount of CO <sub>2</sub> saved - non-traded (MtCO <sub>2e</sub> )	2
Amount of CO <sub>2</sub> saved - traded (MtCO <sub>2e</sub> )	1
Cost effectiveness – non-traded (£/tCO <sub>2</sub> )	74
Cost effectiveness – traded (£/tCO <sub>2</sub> )	72

The above assessment is based upon an illustrative and necessarily conservative (larger) allowance for costs and does not seek to assess the benefits derived from the small improvements to ventilation or the more specific assessment and mitigation of overheating risk.

Advice was also provided on the costs associated with use of the Dynamic Thermal Analysis option for dwelling design, indicating an average modelling cost per dwelling type of £475. This cost is not represented above as it is asserted that



only a small proportion of cases may be modelled and the process is likely to also result in consequential savings through a more informed approach to design.

## **6.0 Scottish Firms Impact Test**

### **Impact on small businesses**

The Scottish firms' impact test regards all firms with fewer than 50 full time employees as being small businesses. The majority of small firms have fewer than 10 employees and guidelines state that a concerted effort should be made to consult them over policy proposals.

As stated in section 3.4 above, discussions with businesses took place during the public consultation period. There is familiarity in the change process but a significant change in building regulations will always offer a challenge to business.

The key issues and outcomes from those discussion are set out below.

- Views expressed that smaller businesses are adept at preparing for change and generally more agile.
- Some concerns remain over preparedness for 2022 and over access to useful information on better construction solutions (and how this can be improved).
- Concern over the interaction of proposed changes with pending changes around heat solutions (the New Build Heat standard) in 2024.
- A need for clarity on what further changes are intended over the next few years, particularly from product manufacturers.
- There is a need to recognise the impact that change has on the many small works projects that are undertaken, which commonly do not need a building warrant.
- Lead-in time for change is more critical for smaller projects. Larger developments can often plan ahead and accelerate or delay programme.
- A need for better means of engagement on the change process and communication from government.
- From manufacturers, a call for 'backstop' values for thermal performance to remain achievable, particularly for elements which are products rather than constructions.

Many of these themes were also expressed by others contributing to engagement sessions and in responses to the consultation. Specific concerns were also expressed in relation to development in remote, rural and island communities, where the proportion of small firms delivering development is significantly higher. These are recorded in the companion Islands and Communities Impact Assessment.

In March 2022, a further industry engagement forum was brought together. Facilitated by the Construction Scotland Innovation Centre, the purpose of this group is to provide a forum for discussing and developing action to support both the implementation of the 2022 standards and provide a more comprehensive industry input into the development of future review proposals. Initial outputs

sought include proposals for the development of a knowledge hub to assist those delivering very low energy buildings. The issues identified through consultation and engagement noted above will be examined as part of that process.

In developing such resources, a key element will be the willingness of those organisations with either greater resources or greater expertise in development and innovation to develop and innovate to share information.

### **Technical Barriers to Trade**

An assessment of the impact of these proposals was undertaken on impacts to international trade and also in respect of trade within the UK. The measures proposed relate to the function or performance of construction work. They do not prescribe measures which:

- have the potential to affect imports or exports of a specific good or service, or groups of goods or services;
- affect trade flows with one or more countries; or
- include different requirements for domestic and foreign businesses.

The proposals do not define technical regulations or conformity assessment procedures for which a relevant standard does not exist. Accordingly, proposals do not require submission of a TBT notification to the WTO.

## **7.0 Competition Assessment**

Having reviewed the four competition filter questions provided within the Office of Fair Trading document 'Completing competition assessments in Impact Assessments - Guidelines for Policy Makers', it is considered that proposals set out in this consultation will not result in a significant impact on competition within the market place.

In support of the above, it is noted that:

- The manner in which standards for new buildings are set allows flexibility in the solutions adopted which reduces the emphasis on performance of individual products or solutions;
- The level at which performance standards are set on an elemental basis in support of overall levels of performance is heavily influenced by the practicality of delivery;
- Improved standards are a recognised driver to product improvement and to innovation and as such, an element of challenge to all parties involved in delivering products and services is expected.

No significant areas where issues of competition, restriction or imbalance will arise have been identified. However, some concerns would benefit from commentary and further investigation prior to any decision on action following consultation. This includes the impact of standards on the technical capacity of less well-resourced organisations to deliver buildings and place construction products on the market. This is investigated through direct discussion within the small firms impact test.

## **8.0 Consumer Assessment**

Building regulations exist to set minimum standards applicable to construction work, to deliver outcomes which are in the public interest and contribute to assurance that such work will meet reasonable standards. Where review increases the level of performance sought by regulation or expands the scope of the application of regulations, this will bring with it attendant costs and benefits which are subject to public consultation and set out, in summary, in this impact assessment.

The proposals may have an adverse impact on consumers as changes will result in increased construction costs, of which at least some, if not all, could be passed onto the purchaser/owner of a building (who may in turn pass this onto any tenant, if applicable). In relation to the subject of this review, increased capital costs are partially defrayed by savings accrued from reduced operational costs due to lower energy demand and a reduction in utilities bills. In summary, proposals do not:

- adversely affect quality, availability or price of goods or services in a market;
- affect the essential services market
- involve storage or increased use of consumer data;
- increase opportunities for unscrupulous suppliers to target consumers;
- negatively impact the information available to consumers on either goods or services, or their rights in relation to these; or
- affect routes for consumers to seek advice or raise complaints.

In summary, the proposed changes do not create any adverse impact on consumers beyond what may be reasonably expected by a regulatory regime of this type (application of minimum standards to a process).

## **9.0 Test run of business forms**

There are no new business forms proposed within any of the options identified.

## **10.0 Digital Impact Test**

The proposals put forward relate to the provision of physical systems within newly created buildings. These requirements are set through national regulation and implemented as part of construction work. As such, there are no direct implications or unintended consequences identified in relation to the impacts of digital technology and technological advances

Of indirect relevance, it can be noted that digital technology is implemented widely within the construction and housing sectors in the management of information and to improve productivity and outcomes. Correspondingly, the Scottish Government has an improvement agenda that include the increased use of digital solutions in the management of the building standard process. For the building standards system, this includes an online portal for the submission of application and approval of building warrants required for the construction of new dwellings.

Ongoing development of this digital strategy is a workstream being progressed under the Building Standards Futures Board<sup>27</sup>.

## **11.0 Legal Aid Impact Test**

Proposals within this consultation that would be the subject of regulation follow established process and premise. It is not anticipated that there will be any greater demands placed on the legal system by this proposal. Accordingly, it is not considered that there will be any effect on individuals' right of access to justice through availability of legal aid or on possible expenditure from the legal aid fund.

## **12.0 Enforcement, Sanctions and Monitoring**

### **12.1 Background**

The proposed changes within Options 2 and 3 will require amendment to published material forming the Building (Scotland) Regulations 2004 and the modification of the supporting guidance given within the Technical Handbooks (issued by the Building Standards Division of the Scottish Government) that support the Regulations. The Technical Handbooks list the mandatory functional standards set out under regulation 9 of the Regulations and give guidance on ways of complying with these mandatory functional standards.

All matters relating to enforcement, sanctions and monitoring will be carried out under the existing processes, which form the building standards system in Scotland, as set out under the Building (Scotland) Act 2003. Parties responsible for operation of this system are currently the 32 Scottish local authorities, appointed as verifiers under the Act, and the Building Standards Division, on behalf of Scottish Ministers.

### **12.2 Enforcement and sanctions**

Work subject to the Building (Scotland) Regulations 2004 generally requires that a building warrant must be obtained before work commences and to have a completion certificate accepted once works are finished. Whether or not such work requires a building warrant is set out under Regulation 5 of the Regulations, the person responsible for the building or works, the 'relevant person' as defined in section 17 of the Building (Scotland) Act 2003, is required to ensure compliance with building regulations.

Where a building warrant is required, proposals are subject to the scrutiny of verifiers prior to approval of building warrant or acceptance of a Completion Certificate. Local authorities have enforcement powers under the Act to ensure compliance with approvals and the Regulations. Cases of non-compliance can be referred to the Procurator Fiscal and persons found guilty of offences in terms of the Act are liable on summary conviction to a fine not exceeding level 5 on the standard scale (currently £5,000).

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<sup>27</sup> <https://www.gov.scot/groups/building-standards-futures-board/>

## **Monitoring**

The objective of this exercise is to deliver reductions in energy demand and greenhouse gas emissions in new buildings through changes to building regulations. Building regulations are applied within a legislative framework summarised above. In line with Scottish Government policy, any implemented changes which address this issue should be subject to review within a 10 year period. Any such review shall be accompanied by a further Impact Assessment.

### **13.0 Implementation and delivery plan**

On publication of amendment regulations and illustration of the extent of changes in the standards and guidance within revised Technical Handbook, designers, contractors and verifiers will have four months to familiarise themselves with the changes as the date of enforcement / introduction will be 1 October 2022.

#### **13.1 Dissemination**

The Building Standards Division has carried out numerous seminars and presentations over the past six months and intend to carry out full programme of dissemination events from June 2022. As changes to provisions already well understood within the building standards system as a long-term vehicle for regulation, it is anticipated that the changes will be implemented following an established pattern. Onward thematic engagement with the construction sector is also underway to discuss and develop solutions to support effective implementation of these changes.

#### **13.2 Post-implementation review**

Review will be carried out by the Building Standards Division considering the implementation of the change made to building standards legislation and supporting Technical Handbook guidance. This review will monitor the effectiveness of the changes and ensure that subsequent reviews can be made on an informed basis. This will be done through engagement from June 2022 through contacts with bodies representing trades, designers, verifiers and the industry in general. With further related changes programmed for 2024/25, this engagement and analysis will be essential to support onward work.

## 14.0 Summary and recommendation

Option	Total benefit - economic, environmental, social (10 year policy period)	Total cost - economic, environmental, social policy, administrative (10 year policy period)
<p><b>Option 1</b> - 'Do nothing'</p> <p><b>Option 2</b> – Reduce energy demand and associated greenhouse gas emissions through building regulations, with revised performance measures for new buildings. Within this option, an 'improved/medium' range of measures is considered</p>	<p>Nil</p> <p>Policy benefits arising from reducing energy demand and emissions assessed at:  <b>Domestic - £ 656 Million</b>  <b>Non-domestic - £ 343 Million</b>  <b>Environmental</b> – will deliver a reduction in carbon dioxide emissions and energy demand and a more sustainable built environment.  <b>Economic</b> – will deliver buildings that are more energy efficient and reduce running costs and continue to assist in the development of a construction industry focussed on net zero ambitions. Direct and indirect economic benefits are marginally outweighed by implementation costs. Primary objective of proposal is not economic, but environmental.  <b>Social</b> – Reduction in energy demand will deliver lower fuel bills, contributing to both fuel poverty and security of energy supply agendas. Proposals will reduce carbon dioxide emissions as part of the government's Climate Change Agenda which has a wider, long-term social remit.</p>	<p>Nil</p> <p>Implementation costs based upon 2020-21 levels of construction assessed at:  <b>Domestic - £ 659 Million</b>  <b>Non-domestic - £ 366 Million</b></p>
<p>b – Reduce energy demand and associated greenhouse gas emissions through building regulations, with revised performance measures for new buildings. Within this option, an 'advanced/high' range of measures is considered</p>	<p>Policy benefits arising from reducing energy demand and emissions assessed at:  <b>Domestic - £ 921 Million</b>  <b>Non-domestic - £ 390 Million</b>  <b>Environmental</b> – will deliver a reduction in carbon dioxide emissions and energy demand and a more sustainable built environment.  <b>Economic</b> – will deliver buildings that are more energy efficient and reduce running costs and continue to assist in the development of a construction industry focussed on net zero ambitions. Direct and indirect economic benefits are outweighed by implementation costs. Primary objective of proposal is not economic, but environmental.  <b>Social</b> – Reduction in energy demand will deliver lower fuel bills, contributing to both fuel poverty and security of energy supply agendas. Proposals will reduce carbon dioxide emissions as part of the government's Climate Change Agenda which has a wider, long-term social remit.</p>	<p>Implementation costs based upon 2020-21 levels of construction assessed at:  <b>Domestic - £ 1,221 Million</b>  <b>Non-domestic - £ 497 Million</b></p>

## 14.1 Recommendation

It is recommended that Option 2 is confirmed and that this comprises the following key changes to current provisions:

- Implement a new 'delivered energy' target for all new buildings
- Implement an increase in performance standards for new homes at the **'improved' level**, with attendant changes to treatment of on-site generation and heat networks. Costs and benefits noted above are presented as per this option.
- Implement an increase in performance standards for new non-domestic buildings at an **intermediate level** which lies between the two options proposed in consultation, with attendant changes to treatment of on-site generation and heat networks.
- Introduce provisions which exempt new buildings from emissions targets where heating uses no 'direct emission heating system'; require information to be provided to enable simple retrofit to replace a 'direct emission heating system' where such a system is installed in a new building.
- With minor variations, implement the recommended minimum provisions for elements of building work in proportion to the actions identified above.
- With minor variation, implement the proposed change to domestic ventilation provision and introduce a new overheating standard for new homes and similar non-domestic residential buildings.

## 15.0 Declaration and Publication

I have read the Business and Regulatory Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) that the benefits justify the costs. I am satisfied that business impact has been assessed with the support of businesses in Scotland.

Signed by the accountable Minister . . . Patrick Harvie . . . . .

Patrick Harvie, Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights

Date: 20 April 2022

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