Department of Finance
An Roinn Airgeadais
www.finance-ni.gov.uk

The Building Regulations (Northern Ireland) 2012 (as amended)

Public Consultation Document C.1

Consultation Proposals for amendment of Technical Booklet Guidance to Part F (Conservation of fuel and power)

October 2021

(Closing date for the receipt of responses is 23.59 PM on Sunday 19th December 2021)

Contents

Glossary of Terms

Air Tightness/Pressure Test	An on-site measurement on completion of construction to measure the air tightness/permeability of the building fabric
BER	The Building carbon dioxide Emissions Rate measured in $kgCO_2/m^2/yr$
DER	The Dwelling carbon dioxide Emissions Rate measured in $kgCO_2/m^2/yr$
EPC	Energy Performance Certificate
TBF1	Technical Booklet F1 Conservation of fuel and power in dwellings
TBF2	Technical Booklet F2 Conservation of fuel and power in buildings other than dwellings
DSM	Dynamic Simulation Modelling; used for calculating energy ratings in complex buildings other than dwellings currently approved for use in Northern Ireland
G98 / G99	NIE Networks application processes for new grid connections (G98 applies 16amp limits to the export capacity of any renewables fitted and provides a more straightforward assessment)
kWh	Kilo Watt Hour (a unit of energy)
kWp	Kilo Watt Peak (these units communicate the generating capacity from a renewable generating technology if operating at 100% efficacy)
LPG	Liquefied Petroleum Gas
MHCLG	Ministry of Housing, Communities and Local Government- (renamed Department for Levelling Up, Housing and Communities 19th September 2021)
MVHR	Mechanical Ventilation with Heat Recovery
NCM	National Calculation Methodology; the calculation methodology used to assess the

	energy performance of buildings and implemented using approved editions of relevant software (SAP and SBEM/DSMs)
NIBRAC	Northern Ireland Building Regulations Advisory Committee
NIE Networks	Northern Ireland Electricity Networks
NPV	Net Present Value (a value discounting the value of money in future years)
NZEB	Nearly zero-energy buildings
PV	Photovoltaic solar panels
RIA	Regulatory Impact Assessment
SAP 2009	The Government's Standard Assessment Procedure for calculating energy ratings in dwellings, currently approved for use in Northern Ireland
SBEM	The Simplified Building Energy Model, used for calculating energy ratings in non-complex buildings other than dwellings currently approved for use in Northern Ireland
TER	Target carbon dioxide Emission Rate measured in $kgCO_2/m^2/yr$
U-value	Measure of heat loss through a construction element, expressed in W/m^2K (the lower the U-value the lower the rate of heat loss)

1. BACKGROUND

Building Regulations

1.1 The Department of Finance ("the Department") has policy and legislation responsibility for maintaining the Building Regulations.

1.2 These apply to most building work and are made primarily to secure the health, safety, welfare and convenience of people in and around buildings and for the conservation of fuel and power. The current Building Regulations are The Building Regulations (Northern Ireland) 2012 (as amended) ('the Building Regulations'), and were made using powers provided in The Building Regulations (Northern Ireland) Order 1979 (as amended).

1.3 The Building Regulations set mainly functional requirements (i.e. they identify a reasonable standard that should be attained) and are supported by Technical Booklets giving guidance, including performance standards and design provisions, relating to compliance with specific aspects of the Building Regulations for the more common building situations. If the guidance in a Technical Booklet is followed, there will be a presumption of compliance with the requirements of those Building Regulations covered by that guidance.

Part F (Conservation of fuel and power) and NZEB

1.4 Part F (Conservation of fuel and power) of the Building Regulations sets minimum standards for building work with respect to carbon performance and energy conservation measures.

1.5 Article 9(1) (*Nearly zero-energy buildings*) of the Energy Performance of Buildings Directive 2010/31/EU (EPBD) has been transposed via regulation 43B (*Nearly zero-energy requirements for new buildings*) of Part F, to require that new buildings are 'nearly zero-energy buildings' (NZEB). The requirement applies to all newly erected buildings from 31 December 2020.

1.6 Regulation 38 (*Application and interpretation*) of Part F defines NZEB as *"a building that has a very high energy performance, as determined in accordance with the National calculation methodology, where the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby".*

1.7 Regulation 39 (*Conservation measures*) requires reasonable provisions for conservation of fuel and power by limiting heat losses and through use of efficient services with appropriate controls.

1.8 Regulation 40 (*Target carbon dioxide emission rate*) of Part F requires that a new building's rate of emissions does not exceed a Target carbon dioxide Emissions Rate (TER) when modelled in accordance with the National Calculation Methodology (NCM).

1.9 Regulation 43A (*Consideration of high-efficiency alternative systems*) of Part F requires that designers of new buildings consider "high-efficiency alternative systems", (e.g. decentralised renewables, district heating, combined heat and power systems, heat pumps etc.). The requirement is only to demonstrate that these options have been considered.

1.10 The Department issued an Information Note titled *"Nearly zero-energy buildings (NZEB) requirements in new buildings"* in December 2020, in order to clarify the implementation of the NZEB requirements of regulation 43B as it applied to all new buildings from 31 December 2020. The Note advised that the minimum level of compliance required to achieve NZEB could be provided by meeting the TER required under regulation 40 and noted that the Department was working to increase the standards required under Part F as soon as possible.

1.11 Continuation with the existing standards for a short period of time was intended to be consistent with the broad policy approach of the UK Ministry of Housing, Communities and Local Government (MHCLG) and the other devolved administrations. It also provides industry with some continuity and opportunity to stabilise in the light of the COVID-19 pandemic and any Brexit related uncertainty.

1.12 The UK government is developing a programme of amendments to the NCM software to reflect the latest scientific understanding of building physics, revised carbon, primary energy and cost factors for UK fuels, and to implement various technical adjustments necessary for compliance with Directive 2018/844/EU, which further amends the EPBD.

1.13 These changes will result in new software, a new Primary Energy (PE) target metric and revised cost and carbon factors, which will input to the calculation of a revised TER. The new software will apply alongside an uplift in Building Regulation requirements in each administration, rolling out from early 2022 onwards. However, the outworking of these revisions is complex and consequences need local consideration (e.g. reduced carbon and PE factors could encourage uptake of electric heating, which would be more expensive to operate than standard boilers). The Department and industry will need to consider these issues and proposals once the position in England has settled.

1.14 However, in light of concerns that energy efficiency standards here have been too low for too long and in consideration of the Assembly's declaration

of a climate emergency and commitments to address climate change in the *New Decade, New Approach*[1] proposals, the Department is keen to prioritise improved standards around NZEB and not to delay uplift further whilst we consider this, more complex, position. While some subsequent re-adjustment of standards and a potential further uplift will be necessary in consequence of the UK NCM development process, the Department is of the view that this should not delay action where possible.

1.15 The Department accepts that a fundamental in-depth review of Part F (Conservation of fuel and power) and Part K (Ventilation) will be required to take account of the position and proposals of the other administrations and that ongoing work will be required thereafter.

1.16 A provisional phased plan of uplifts was published in the *Energy Strategy for Northern Ireland Consultation on Policy Options*[2] detailed in Figure 1 below and feedback is being considered. We expect to consult further on this as part of Phase 2 Discussion Document, which will help further set the course of direction for industry. Phase 3 will consider recent and ongoing developments in other administrations and take on board the SAP 10/SBEM v6 software as part of an uplift planned for late 2022/23.

1.17 The Department is developing a Discussion Document for public consultation in the coming months, which will provide further input on the relevant issues and seek to outline pathways towards very high efficiency standards for new buildings in the medium term. The proposals within this current consultation are intended to provide an uplift to the requirements for new buildings as an interim "stepping stone" measure.

Q1: Do you agree that it is sensible to prioritise the proposed amendments to Technical Booklets F1 and F2 guidance in advance of awaiting outcomes around the development of new UK NCMs, software and proposed building regulations uplifts?

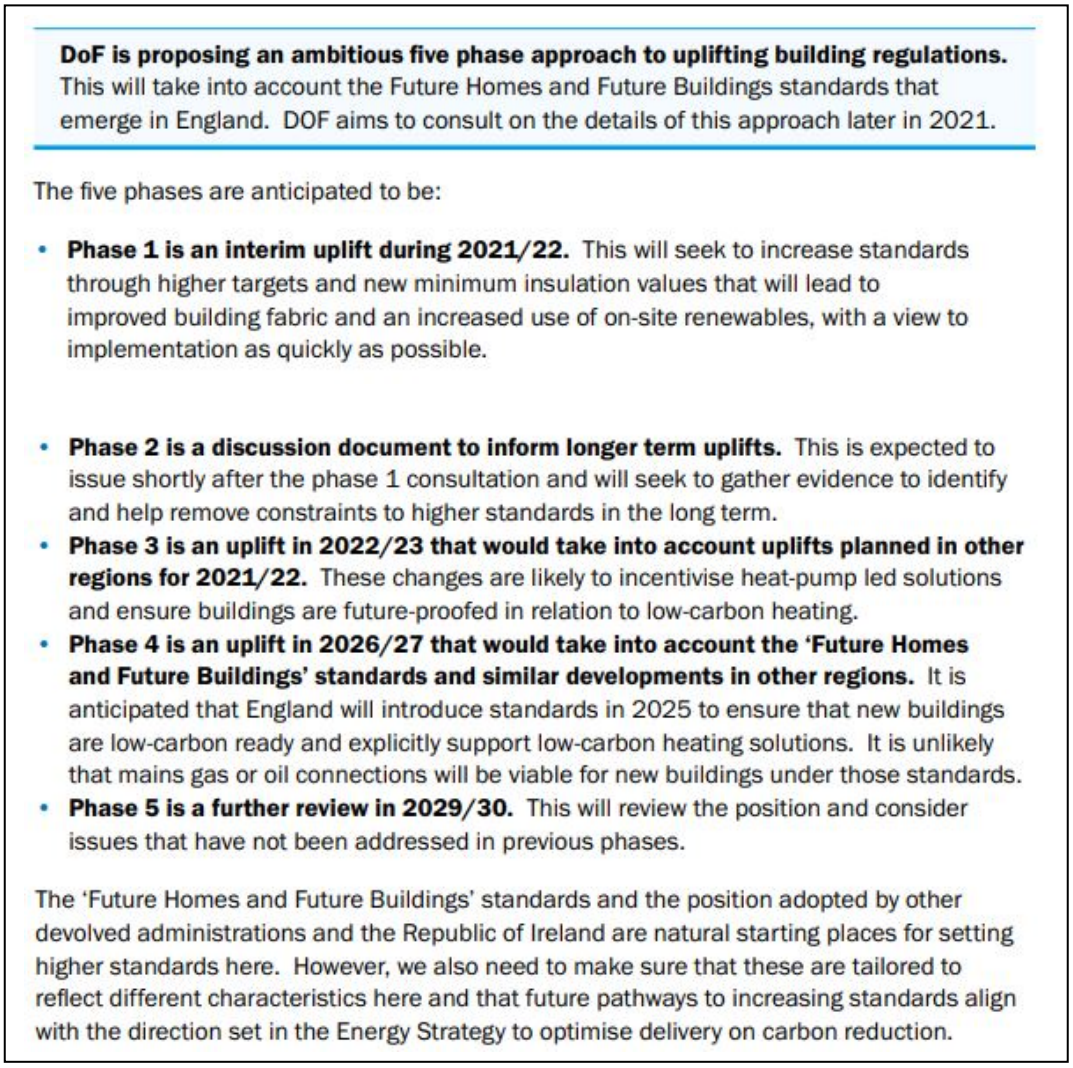
- **Yes**
- **No**

If no, please explain your reasoning.

1.18 The proposals for amendments to Technical Booklets F1 & F2 of the Building Regulations are included in principle form (see Sections 2 and 5). This will give consultees an overview of all the proposed alterations and additions to the current guidance.

[2] https://www.economy-ni.gov.uk/consultations/consultation-policy-options-new-energy-strategy-northern-ireland

1.19 In addition, “Consultation Version Only” drafts of the amended Technical Booklets are supplied and the Department would be keen to consider any specific amendments to wording or detail intended to improve clarity or address any concerns.



DoF is proposing an ambitious five phase approach to uplifting building regulations. This will take into account the Future Homes and Future Buildings standards that emerge in England. DOF aims to consult on the details of this approach later in 2021.

The five phases are anticipated to be:

- **Phase 1 is an interim uplift during 2021/22.** This will seek to increase standards through higher targets and new minimum insulation values that will lead to improved building fabric and an increased use of on-site renewables, with a view to implementation as quickly as possible.

- **Phase 2 is a discussion document to inform longer term uplifts.** This is expected to issue shortly after the phase 1 consultation and will seek to gather evidence to identify and help remove constraints to higher standards in the long term.
- **Phase 3 is an uplift in 2022/23 that would take into account uplifts planned in other regions for 2021/22.** These changes are likely to incentivise heat-pump led solutions and ensure buildings are future-proofed in relation to low-carbon heating.
- **Phase 4 is an uplift in 2026/27 that would take into account the ‘Future Homes and Future Buildings’ standards and similar developments in other regions.** It is anticipated that England will introduce standards in 2025 to ensure that new buildings are low-carbon ready and explicitly support low-carbon heating solutions. It is unlikely that mains gas or oil connections will be viable for new buildings under those standards.
- **Phase 5 is a further review in 2029/30.** This will review the position and consider issues that have not been addressed in previous phases.

The ‘Future Homes and Future Buildings’ standards and the position adopted by other devolved administrations and the Republic of Ireland are natural starting places for setting higher standards here. However, we also need to make sure that these are tailored to reflect different characteristics here and that future pathways to increasing standards align with the direction set in the Energy Strategy to optimise delivery on carbon reduction.

Figure 1: Extract from *Energy Strategy for Northern Ireland Consultation on Policy Options*

2 INTRODUCTION TO CONSULTATION PROPOSALS

2.1 The purpose of this consultation is to obtain comments and views of interested parties on proposals for changes to guidance to the Building Regulations with regard to NZEB.

2.2 No legislative amendments to Part F (Conservation of fuel and power) of the Building Regulations are currently proposed.

Outline of proposals

2.3 We are consulting on proposals to uplift the minimum energy efficiency standards for new buildings. Three options have been considered ─

- **Option 1**: do nothing;
- **Option 2**: require NZEB buildings to better the current Target carbon dioxide Emissions Rate (TER) outputs by 25%, in the case of new dwellings, and 15%, in the case of new non-domestic buildings; and
- **Option 3**: require NZEB buildings to better the current Target carbon dioxide Emissions Rate (TER) outputs by 40% in the case of new houses, 25% in the case of new flats, and 15%, in the case of new non-domestic buildings.

Options 2 and 3 also propose to uplift fabric standards for new buildings (see paragraph 2.5).

Option 3 is the preferred option with a better overall return on investment**.** It would deliver more carbon savings and better reductions in energy bills, albeit with higher build costs for developers.

2.4 The proposed variation in betterment between houses, flats and non-domestic buildings is proposed so that:

- in the case of dwellings, any on-site renewable generating technologies (e.g. photovoltaic panels), used to achieve the improved emissions performance, should normally be able to avail of the more straightforward (G98) grid connection processes; and
- in all buildings, to ensure that the uplift does not exceed the subsequent standards and software protocols likely to come forward as a result of the NCM and SAP development programmes underway by the UK government which are likely to set the framework for our own 'Phase 3' proposals.

Section 5 provides further detail on this (see paragraphs 5.28-5.42).

2.5 Options 2 and 3 set new limits on fabric standards (common to both options) to:

- require provision of building fabric with U-values and (in the case of dwellings, a glazing assessment), as specified within TBF1 and TBF2 (see paragraph 5.59). A whole building area-weighted U-value assessment provides an alternative approach, provided the overall U-values deliver the same level of performance; and

- encourage air tightness testing, including removing options on air permeability assessment for a default value of 15 $m^3/(h.m^2)$ to be submitted on small sites for untested dwellings and the similar 500 m^2 threshold currently permitted for non-domestic buildings.

2.6 All options retain the use of the existing SAP 2009 software, while the new NCM software is developed at UK level. Carbon factors in SAP 2009 do not reflect recent decarbonisation of the electricity grid supply. This means that where the 'betterment' is delivered with an electricity-led solution (e.g. with photovoltaic panels), the actual carbon abatement is likely to be significantly less than the betterment requirements.

No tapering for taller buildings

2.7 The Department did consider tapering for flats and taller non-domestic buildings on the basis that roof area may limit the extent of PV or other renewables that could be provided. However, modelling of the 25% uplift proposed for flats suggested that the available roof area only became an issue at or above eight storeys and only if a G99 connection (i.e. a larger array than 11.04 kWp), was accepted. We, therefore, no longer think that tapering reductions for taller buildings should be required.

Renewable Generating Technologies

2.8 New guidance is proposed to deal with circumstances where the local electricity network cannot accommodate export from on-site renewables that generate electricity (e.g. photovoltaic panels, small wind turbines etc.) which cannot be directly used in the building. It is unclear if this will be a long-term issue as increasing use of electricity and smart systems developments may facilitate more renewables in the medium term. Future uplifts and a revised NCM should also look to deal with this again in future uplifts.

Minor Amendments

2.9 Other amendments are intended to clarify, or rectify, previous guidance to reflect the current working and enforcement practices. The changes include re-wording to promote an expectation of air-tightness testing and to clarify provisions in relation to thermal bridge assessments.

3 CONSULTATION PACKAGE – CONTENTS AND RESPONSE

3.1 This consultation has been issued by the Department of Finance, which has responsibility for maintaining the Building Regulations for Northern Ireland. This document, together with the other consultation documents, is available online at:

https://www.finance-ni.gov.uk/consultations

The consultation documents are:

- Consultation Document (C.1);
- Regulatory Impact Assessment (Draft for Consultation) (C.2);
- Technical Booklet F1 (Draft for Consultation): Conservation of fuel and power in dwellings (C.3);
- Technical Booklet F2 (Draft for Consultation): Conservation of fuel and power in buildings other than dwellings (C.4);
- Rural Needs Impact Assessment (Draft for Consultation) (C.5); and
- Equality Impact Assessment Screening (C.6);

Draft Technical Booklets F1 and F2 are being issued as part of this package to demonstrate to the reader the proposed changes to those booklets, for consultation purposes only. The intention is to publish revised and consolidated Technical Booklets F1 and F2 prior to the changes coming into operation.

3.2 We look forward to receiving your comments and views concerning any of the proposals contained in this consultation. We ask you to exercise care and refrain from the inclusion of any potentially defamatory material as it is our intention to publish responses on the Department's website. We will not publish the names or contact details of respondents, but will include the names of organisations responding.

We would encourage you to respond to the consultation using the on-line facility on Citizen Space, accessible via NI Direct.

Your opinions are valuable to us. Thank you for taking the time to read this document and respond.

3.3 If you require a hard copy of this consultation document or have any other enquiries, please email your request to info.bru@finance-ni.gov.uk or you can write to us at:

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Department of Finance
Building Standards Branch
6th Floor
Goodwood House
44 - 58 May Street
Belfast
BT1 4NN

The Department will consider all the responses to this consultation received on or before **the closing date, which is Sunday 19th December 2021.**

Submissions made after this date cannot be considered.

Next Steps in the Consultation Process

3.4 Where respondents have given permission for their response to be made public, and after we have checked that they do not contain personal information or product names, responses will be made available to the public at https://www.finance-ni.gov.uk/publications. If you use the consultation hub, Citizen Space, to respond, you will receive a copy of your response via email.

3.5 We may also wish to make responses to this consultation available to the Northern Ireland Assembly and for public inspection at the Building Standards Branch office.

3.6 Following the closing date, all responses will be analysed and the Department will publish a summary of responses to the consultation.

3.7 All information will be handled in accordance with the General Data Protection Regulations.

Confidentiality and Data Management

3.8 If you ask for your response to be regarded as confidential and not to be published, you will be asked to explain to us why you regard the information you have provided as confidential.

3.9 Information provided in response to this consultation, including personal data (see Annex A), will be published or disclosed in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 2018 (DPA), the EU General Data Protection Regulation, and the Environmental Information Regulations 2004). If we receive a request for disclosure of confidential

information, we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances.

3.10 The Department of Finance will process your personal data in accordance with the law and, in the majority of circumstances, this will mean that your personal data will not be disclosed to third parties. A full privacy notice is included at Annex A.

Are you satisfied that this consultation has followed the Consultation Principles? If not or you have any other observations about how we can improve the process, please contact us via the complaints procedure at:

https://www.finance-ni.gov.uk/publications/dof-customer-service-standards-and-complaints-procedure.

4 PROPOSED IMPLEMENTATION PLAN

Amendments Overview

4.1 Substantial and more involved, legislative amendments will be required in the next uplift proposed as 'Phase 3' in the Department's provisional plan. With this in mind, and to aid delivery at pace, no legislative amendments to Part F (Conservation of fuel and power) of the Building Regulations are proposed at this stage. Instead, it is proposed that new guidance relevant to the requirements of regulation 43B (*Nearly zero-energy requirements for new buildings*) and other Part F regulations should be inserted into Technical Booklets F1 (Conservation of fuel and power in dwellings) and F2 (Conservation of fuel and power in buildings other than dwellings) ('TBF1' and 'TBF2').

Ongoing Use of Current Software

4.2 Given the urgency of the position and a likely need to accommodate new software soon, the proposed uplift has been developed on the basis that the existing software (e.g. SAP2009/SBEM v4) could continue to be used. A further uplift to SAP 10/SBEM v6 will be part of the fundamental review to take into account developments in other regions under Phase 3 proposals.

4.3 The proposals are designed so that the new NZEB checks could be carried out manually, based on the detail received on the normal output report that the current software already provides for building regulations compliance checks. This will avoid software development costs and implementation delays, although software developers would be free to adjust their products to provide for the new requirements, should they wish (the Department would encourage this).

Q2: Do you agree that additional manual checks of current software reports will be manageable in practice to demonstrate compliance in relation to the new requirements for:

a) the betterment of the TER;

b) an air-tightness performance no greater than 10 $m^3/(h.m^2)$ at 50Pa; and

c) new U-value limits for building fabric (see paragraph. 5.59 on this below)?

- **Yes**
- **No**

If no, please explain your reasoning and provide supporting evidence or alternative solutions on what alternative assessments should be introduced.

Timescale for Implementation

4.4 Given the long-standing notice of an NZEB requirement and the lack of substantive change to Part F requirements since 2012, the Department considers that industry should be well placed to respond to an uplift of this scale and nature. The intention is, therefore, to implement the new guidance as soon as possible with a view to coming into operation some three months after publication. The Department is aiming for the new guidance to apply to new plans applications from as early in 2022 as practicable.

4.5 The new proposed requirements would apply on the basis of the date of a building regulations application. In keeping with the application of all other building regulations applications requirements, the current NZEB requirements will continue to apply to any applications submitted prior to the coming into operation of the new guidance.

Q3: Do you agree that the new guidance should apply from three months of publication of the guidance and from as early in 2022 as practicable?

- **Yes**
- **No**

If no, please explain your reasoning and provide evidence for an alternative timescale.

5 PROPOSALS FOR AMENDMENT OF TECHNICAL BOOKLETS F1 AND F2

5.1 New "Consultation Version Only" drafts of TBF1 and TBF2 are provided alongside this consultation and the Department would be keen to consider any specific amendments to wording or detail intended to improve clarity or address any concerns.

Overview of Proposals

5.2 We are consulting on proposals to uplift to minimum energy efficiency standards for new buildings. Three options have been considered:

- **Option 1**: Do nothing;

- **Option 2**: uplift limiting fabric standards and provide a DER/BER betterment of 25% for new dwellings and 15 % for new non-domestic buildings on the TER used for compliance with regulation 40 (*Target carbon dioxide emission rate*); and

- **Option 3**: uplift limiting fabric standards and provide a DER/BER betterment of 40% for houses, 25% for flats and 15% for non-domestic buildings on the TER used for compliance with regulation 40 (*Target carbon dioxide emission rate*).

5.3 Option 2 and 3 uplift guidance with new fabric standards (common to both options) to:

- require provision of building fabric with U-values and, in the case of dwellings, a glazing assessment, as specified in proposed new Tables within TBF1 and TBF2 (see paragraph 5.59). A whole building area-weighted U-value assessment provides an alternative approach, provided the overall U-values deliver the same level of performance; and

- remove options on air permeability assessment for a default value of 15 $m^3/(h.m^2)$ to be submitted on small sites for dwellings and the similar 500 m^2 threshold exemption permitted for non-domestic buildings.

5.4 It is also proposed to update the reference on the *Non-Domestic Building Services Compliance Guide* (NDBSCG) to the 2013 edition[3], rather than retaining the 2010 edition[4], which applies currently.

[3] https://www.uk-ncm.org.uk/filelibrary/NCM_Modelling_Guide_2013_Edition_20November2017.pdf
[4] https://www.uk-ncm.org.uk/filelibrary/NCM_Modelling_Guide_2010_Edition_21October2016.pdf

Option 1

5.5 Option 1 is a ‘do nothing’ proposal. This would mean the construction industry could continue to build to the current standards, which have been in place since 2012.

5.6 Industry groups and NIBRAC have indicated that this is not an acceptable position as we currently have the least onerous energy efficiency requirements for new buildings in the UK and Ireland.

5.7 Option 1 would mean that new buildings would not be transitioning at this stage to lower carbon performance standards as recommended by the Climate Change Committee (CCC) and as is required to meet our climate change commitments. There are also concerns that a more robust position in relation to regulation 43B (*Nearly zero-energy requirements for new buildings*), is needed to support more energy efficient construction and accommodation of on-site renewable technologies.

5.8 Industry skills and expertise would be likely to fall further behind other regions under Option 1.

5.9 Option 1 would mean that measures, such as improved fabric and photovoltaics, or other renewable generating technologies, would be less likely to be implemented in common construction. Part F exists, in the main, because the market is not successfully reflecting the whole life costs or longer-term impacts of less energy efficient construction.

5.10 The Department is mindful of the scale of the change progressing in other administrations and notes that the impacts of an uplift similar to that proposed for England’s Part L 2022 are likely to be significant here, given our, on average, larger dwellings and much greater reliance on oil boilers. Option 1 does not help industry make progress to address these challenges.

5.11 The Department, therefore, considers that Option 1 is not an acceptable position for even the short term. Instead, we consider that a short-term set of proposals (Option 2 or, preferably, Option 3) needs to be implemented as quickly as possible to improve new building standards where it is straightforward to do so and to help introduce subsequent uplifts.

Q4: Do you agree that Option 1 should be dismissed?

- **Yes**
- **No**

If not, please provide the evidence and basis for why the current standards are appropriate and should be retained.

Options 2 and 3

Overview

5.12 Option 2 and 3 propose to amend guidance, principally in relation to Regulation 43B (*Nearly zero-energy requirements for new buildings*), to:

- require a general BER/DER betterment of 25% for new domestic and 15% for new non-domestic buildings (Option 2) or 40% for houses, 25% for flats and 15% for non-domestic buildings (Option 3) on the TER used for compliance with regulation 40 (*Target carbon dioxide emission rate*) (see paragraphs 5.14-5.47 for further detail);

- require provision of building fabric with U-values and, in the case of dwellings, a glazing assessment as specified in a proposed new Table (see paragraph 5.59). A whole building area-weighted U-value assessment provides an alternative approach, provided the overall U-values deliver the same level of performance (see paragraphs 5.52-5.65 for further detail); and

- remove the option on air permeability assessment for a default value of 15 $m^3/(h.m^2)$ to be submitted on small sites for dwellings and the similar 500 m^2 threshold exemption currently permitted for non-domestic buildings (see paragraphs 5.68-5.72 for further detail).

5.13 Designers remain free to adopt whatever mix of technologies best suits their circumstances to satisfy the requirements of the regulations.

Q5: Do you agree that the above proposals provide an appropriate interim step, which can be implemented quickly?

- **Yes**
- **No**

If no, should they be more onerous or less onerous? Please explain your reasoning and provide supporting evidence for alternative suggestions, taking into account that further review is planned for 2022/23.

Betterment of TER

5.14 Two options are provided for the extent to which the BER/DER must better the TER:

- Option 2 proposes a betterment of 25% for all dwellings and 15% for buildings other than dwellings; and

- Option 3 proposes a betterment of 40% for houses, 25% for flats and 15% for non-domestic buildings (the Department's preferred Option).

5.15 These options are intended to provide a meaningful level of improved performance while we move to consider the more complex outcomes of the latest proposals and software coming through in GB as well as the Executive's *Green Growth* and *Energy Strategy* positions.

5.16 The manually adjusted betterment of the TER proposals are supported by Regulation 43B (*Nearly zero-energy requirements for new buildings*). This means that this element of the proposals can only apply to new buildings and not to other situations, such as relevant non-domestic extensions of more than 100 m^2 and 25% of the total useful floor area of the building or extensions, where the TER can be used to demonstrate compliance.

5.17 We have taken the local build mix and larger size of homes constructed here into account when assessing Option 2 and 3 costs.

Houses; Option 2 vs Option 3

5.18 The principal difference between Options 2 and 3 rests in the treatment of new houses. EPC data suggests that houses account for some 90% of the new build dwellings (95% by dwelling floor space), so improved performance in this area will be more significant than other sectors.

5.19 A 25% betterment factor is proposed under Option 2 and a 40% factor is proposed under Option 3 using the SAP 2009 assessment methodology. Where the energy savings are electrical these factors will not be achieved in practice, as the carbon factors used for electricity in SAP2009 do not reflect recent grid decarbonisation. This will be rectified with the new NCM software under development by the UK government.

5.20 Under Option 2, the Department's modelling estimates the costs to developers to be £2219/average dwelling house, with annual energy bill savings of £127/year. This takes into account the local build and fuel mix (oil and gas solutions only), but there is a wide range of costs and

assumptions within this. For example, we estimate that a gas-fuelled mid-terrace would cost £1998 more to build, whereas a large oil-fuelled detached house will have increased costs of some £3295. Please refer to the associated Impact Assessment for further details.

5.21 By comparison, under Option 3, the Department's modelling estimates the costs to developers to be £2711/average dwelling house with annual energy bill savings of £205/year. The gas-fuelled mid-terrace costs £2397 and the oil-fuelled detached house in this case costs £4317 more.

5.22 Heat pump led solutions are significantly more costly. For example, our modelling indicates that a detached house would have an increased construction cost of £6390, with little or no energy running cost savings over the current compliance standard. The heat pump led solutions, however, would significantly exceed the revised emissions targets.

5.23 Option 3 therefore, provides better value as larger renewable generation technologies installations are likely to be more cost-effective than small installations. However, this comes at increased upfront cost to developers, although land prices may adjust to take account of the increased construction costs to some degree at lease. Wider benefits such as employment benefits in delivering the extra materials and services are not included.

5.24 Option 3 provides greater carbon savings: 908 kilo-tonnes from 10 years of construction over 60 subsequent years, rather than 740 kilo-tonnes under Option 2 (both Options assume ongoing maintenance and replacement of renewables over the 60 year life of the buildings). Note - this does not factor in 'embodied carbon' in the additional materials used.

Q6: Do you prefer Option 3 (40% betterment of the TER for houses, 25% for flats and 15% for new non-domestic buildings), or are the standards outlined in Option 2 (25% betterment of the TER for all dwellings and 15% for buildings other than dwellings) preferred?

- **Preference is for Option 1 (do nothing)**
- **Preference is for Option 2**
- **Preference is for Option 3**
- **None of the above**

If answering 'None of the above', please take into account and advise if proposals described here should be delayed or halted, in order to progress in line with your suggestions.

5.25 We have assumed that Option 3 will marginally increase the extent to which technology, such as mechanical ventilation and heat recovery (MVHR) and/or heat pumps, will be adopted. Significantly greater uptake of these

technologies will be required through subsequent uplifts, but initial engagement has highlighted concerns that the supply chains and skills may not yet be sufficiently embedded for routine application. Heat pumps also seem to have higher running costs than equivalent gas or oil-fuelled strategies when assessed under the NCM software. MVHR and heat pump technologies are, nonetheless, included in the assessment methodologies and would help solutions comply or exceed the betterment required under both Option 2 or Option 3.

5.26 Our impact assessment assumes a small increase in uptake of these technologies where other solutions may not be viable. Option 2 assumes some 3.8% of houses (perhaps where PV might not be permissible under planning restrictions) might adopt a heat pump led solution or an alternative with similar cost outcomes. Option 3 assumes 5.8% may adopt a heat pump led solution. Heat pump led solutions will lead to higher capital costs for developers and running costs and occupants, but with significantly reduced carbon emissions than would otherwise be the case. Annex B to the Regulatory Impact Assessment (C.2) provides examples of modelled outcomes and we are open to comment on the assumptions we have made in this area (see Questions 9 and 19).

5.27 Option 3 relies on the definition of 'flat' from regulation 2 of Part A of the Building Regulations to determine when the 25% betterment applies, rather than the standard 40% betterment applicable to houses. Regulation 2 defines a flat as *"a dwelling on one or more storeys forming a part of a building from some other part of which it is divided horizontally and includes a maisonette".* This has provided sufficient clarity in respect of other parts of the Building Regulations for some time, e.g. for Part E (Fire safety).

Q7: Do you agree that the definition of 'flat' in regulation 2 provides a sufficiently clear discrimination of the building types to enable the different betterment rates to be applied to houses (40%) and flats (25%)?

- **Yes**
- **No**

If no, please explain your reasoning.

Why is the proposed uplift less for other buildings?

5.28 Mindful of the NZEB requirements, Options 2 and 3 are intended to encourage installation of on-site renewables and improved fabric standards. Photovoltaic (PV) arrays would be a common renewables solution (in part due to the carbon factors in the current software) and we have assumed their use in Impact Assessment modelling.

5.29 However, NIBRAC engagement raised concerns around the current electrical grid capacity limitations. Export capable connections using single-phase power are limited to 3.68 kWp output and three-phase power to 11.04 kWp, under NIE's G98 application processes. The alternative G99 application process tends to lead to more onerous assessment, which may be less likely to result in export capable connection. As the NCM methodologies do not yet fully consider export issues, the betterment proposals have been limited to consider a G98 assessment route. We have also proposed guidance amendments to TBF1 and TBF2 (see paragraphs 5.73-5.76).

5.30 Options 2 and 3 have limited the extent of uplift in relation to flats and non-domestic buildings, in part, in consideration of this. Additional issues apply in the case of buildings other than dwellings (see paragraphs 5.38-5.47).

Flats - 25% betterment

5.31 The Department is mindful that wider sustainability issues, such as transport and city regeneration benefits tend to come with flats and that there will be other cost issues, such as the use of only non-combustible materials in some blocks of flats.

5.32 In terms of energy efficiency, flats generally have a better form factor (i.e. they have a more compact surface area to floor space ratio). This is not reflected in the current SAP targets, which are based on a Notional Dwelling of the same size and shape as the Actual Dwelling. This makes

uplifting requirements for flats more difficult, as there can be limited benefits from improved fabric elements (as there is less wall area per m^2 of floor area) than in a house.

5.33 In the case of flats, NIBRAC input emphasised that communal PV arrangements are more common than individual arrays. The acceptability of wiring for PVs from individual flats to individual roof top arrays was also considered to be an issue. With this in mind, we have assumed blocks of flats could be limited to a landlord array no greater than the 11.04 kWp limits of G98 connections for cases with a three phase electrical supply. Our modelling suggests that this size of array can be used in a block of 16 flats, and still achieve a 25% uplift with minor improvements to fabric beyond the new limiting U-values. This would not be supportable if a 40% level of uplift was required.

5.34 It is possible that sub-blocks, if discrete from other parts of the building, may be able to each have their own supply connection and, therefore, each sub-block could operate its own 11.04 kWp array. Alternatively, some top floor flats or wall-mounted arrays may permit individual connections to flats, whilst the rest of the block benefits from the common landlord array.

5.35 The 'block average' route to compliance allows a whole multi-dwelling building assessment, rather than requiring each individual dwelling to comply. This will allow blocks of flats to be constructed using similar fabric (e.g. insulation thicknesses etc.) throughout the block's construction, albeit that an individual dwelling within the building may not meet the full level of performance. This flexibility provides opportunity for larger schemes to comply both in relation to the DER and limiting fabric assessments.

5.36 With these issues in mind, we are suggesting that the 25% uplift can be straightforwardly achieved in 90% of flats using a balance of reasonable fabric, gas (or LPG) boiler and PV arrays. We are presuming less conventional solutions, such as heat pump led proposals, may be required in the remaining larger developments blocks, where developers should have some additional resource and expertise to consider alternative options. These percentages and impact costs would seem likely to change significantly if we go beyond this 25% betterment rate for flats.

5.37 We have estimated the additional construction impact to be £1137/flat in capital costs for both mains gas and LPG led solutions, which we expect to be viable for 90% of flats. We have costed the 'alternative' 10% on the basis of a heat pump led solution, as a reasonable proxy for other situations (i.e. perhaps in large mono-blocks of flats, or, again where photovoltaics are not viable). Alternative solutions, such as district or communal block heating, may be equally possible but are more difficult to assess. We have estimated that a heat pump led solution would cost an

additional £4303/flat or £67/m^2. This is, in part, due to the need for a hot water tank, which is an additional cost item in the smaller dwelling types.

Q8: Do you agree that the proposed DER requirement for a 25% betterment of the TER should be applied to flats?

- **Yes**
- **No**

If no, should they be more onerous or less onerous? Please explain your reasoning and provide supporting evidence for alternative suggestions, taking into account that further review is planned for 2022/23 and that other building regulation proposals are likely to impact some flats.

Q9: Do you agree with the heat pump costing assumptions (see Annex A in the Regulatory Impact Assessment (RIA)), the 10% incident rate estimate for flats and the proposed level of uptake for heat pumps in houses, used in our modelling (see Annex C in RIA), appropriate?

- **Yes**
- **No**

If no, please provide the basis for an alternative rationale, which should apply.

Buildings other than dwellings

5.38 The proposed non-domestic building uplifts have been calibrated to take into account the 2013 uplift in England and mindful of the current Part L 2022 proposals (under review ref: *The Future Buildings Standard Consultation*[5]).

5.39 Each new version of the UK's NCM software normally provides a new Notional Building for the TER, which impacts different building types differently. For example, wall improvements impact tall buildings more than low rise, and services improvements impact more highly serviced buildings. However, a general percentage betterment proposal, of the type proposed here, applies an across-the-board uplift on all building types irrespective of size, shape or services (although our proposals do make some exception for non-domestic buildings heated with heat pumps).

[5] https://www.gov.uk/government/consultations/the-future-buildings-standard

5.40 Table 5.1 below shows the Part L (Conservation of fuel and power) uplifts as they affected various non-domestic building types in England.

Note: The below table is based on an assessment of typical forms. In reality, a particular building may have quite a wide range of outcomes depending on its particular size and shape.

Table 5.1 – Non-domestic uplifts in England[6]

BUILDING TYPE	2013 9% average (as implemented) [%]	2013 20% average (not implemented) [%]	2021 Future Buildings Option 1 (22% average) [%]	2021 Future Buildings Option 2 (27% average) [%]	LOWEST Combined 2013 + 2021 FB OPT 1 [%]	HIGHEST Combined 2013 + 2021 FB OPT 2 [%]
Distribution warehouse	4.00	18.00	21.00	21.00	24.16	24.16
AC office (deep plan)	12.00	24.00	28.00	34.00	36.64	41.92
Retail warehouse	8.00	16.00	36.00	36.00	41.12	41.12
Office (shallow plan AC)	13.00	26.00			36.49	43.45
Office (shallow plan NV)			27.00	35.00		
Hotel	12.00	15.00	0.50	4.00	**12.44**	**15.52**
School	9.00	23.00	26.00	38.00	32.66	43.58
Small warehouse	3.00	14.00	Not provided	Not provided		
Photovoltaics	0.00	5.4% of floor area	20% - 40% of roof[7],	20% - 40% - of roof [8],		
Simple average	9.30	20.30	23.60	29.00	30.60	35.00

5.41 England's proposals suggest an overall average uplift of 25-40% could be viable, but not via an across-the-board 'betterment' approach. Uplifts applied this way at 25% or 40% would 'overshoot' the proposals emerging from England for some building types, (notably hotels or similar buildings; perhaps those with a high hot water heat demand). In such a case, it may be difficult to rectify the position and integrate future proposals with the new software subsequently. There is also some potential complexity if a new 'primary energy' metric is introduced, as is likely to be proposed if our Phase 3 uplift replicates England's current proposed changes. It is

[6] Part L 2013 Final Stage Impact Assessment, Table 2.11; The Future Buildings Standard Consultation 2021, Figure 3.1;
[7] 40% of roof in toplit buildings, 20% in side lit buildings – ref. para 82-84 of draft NCM 2021;
[8] As above – Option 2 includes improved fabric and U-values (Option 2 Wall at 0.18, Floor 0.15, Roof 0.15, Windows 1.40 W/m^{2}K) and air tightness is reduced to 3.00 m^3/(hm^2);

therefore, proposed to limit the non-domestic proposals to 15% to mitigate this risk.

5.42 The 15% betterment is considered an appropriate interim position as we await clarity on the Future Buildings review by England. It is still some way further than the current position operating in England when averaged across all non-domestic building types.

Heat pumps in buildings other than dwellings

5.43 England's Part L 2021/22 proposals also provide a different Notional Building for new non-domestic buildings where space heating is provided with a heat pump. In these cases, the extent of PV provision anticipated is reduced in proportion of the space heating provided by heat pumps. Options 2 and 3 both reflect this position by similarly discounting the betterment where a heat pump is used to provide the building's space heating.

5.44 The position adopted on this relaxation for heat pumps may, therefore, be further informed by any outcome that emerges from England. The Department is conscious that reversible heat pumps are often installed with a primary focus on cooling loads, but then may subsequently be used to provide heating.

Q10: Do you agree that the Department should make any necessary adjustment to attend to replicating the treatment of heat pumps proposed under Part L revisions in England for non-domestic buildings?

- **Yes**
- **No**

If no, how should the Department avoid overshooting England's requirements in this regard?

Tapering of betterment requirements for taller buildings

5.45 Consideration has been given to a tapered reduction of the betterment requirements for taller buildings, where there may be less space to accommodate renewables on the roof. This would have reduced the betterment levels for taller buildings, as the height increased. However, as the betterment requirements for these building types have subsequently been limited to 25% and 15% respectively, this was not considered necessary.

5.46 Our own modelling suggests that the G98 11.04 kWp limit might apply to buildings built with fabric at the limiting U-values when the floor space area is, perhaps, 3300 m^2 or so in buildings other than dwellings. Larger developments of this scale should be well placed to build in alternative solutions such as heat pumps.

5.47 A similar position applies to larger blocks of flats – (see paragraphs 5.31-5.37).

Costs for buildings other than dwellings

5.48 Costs for non-domestic construction are much more difficult to establish than in the domestic sector, but the Department considers that an additional cost of £5-10/m^2 for fabric measures in non-domestic buildings and £4-7/m^2 for provision of renewable technologies (we have again assumed photovoltaic arrays) would be reasonable. This is based on approximations from England's recent Part L assessments pro-rata rated by population. There is an alternative view that fabric costs may be lower, or even negligible, as buildings are already typically achieving this level of performance. The new standards would ensure that the worst performing fabric would be brought up to this level. The Department would welcome any modelling or local cost review data responders may be able to provide on this.

Q11: Do you have any data or modelling that would be useful in helping to assess the likely cost impacts on specific building types under the proposals?

- **Yes**
- **No**

If yes, please provide a summary of the information and if/how the Department may contact you to engage further.

Q12: Do you support the overall proposals for buildings other than dwellings, including proposed BER requirement for a 15% betterment of the TER for new non-domestic NZEB buildings?

- **Yes**
- **No**

If no, should the proposals be more onerous or less onerous? Please explain your reasoning and provide supporting evidence for

alternative suggestions, taking into account that further review is planned for 2022/23.

Services in buildings other than dwellings

5.49 It is proposed to amend the references in the "Publications referred to" section of TBF2 so that the 2013 edition of the *Non-domestic Building Services Compliance Guide* (NDBSCG) would apply. This change would be most relevant to replacement or upgrade situations but would also impact the backstop services efficiencies in new non-domestic buildings.

5.50 Minimum efficiencies of the following services to non-domestic buildings are increased under the 2013 guide:

- Minimum cooling efficiency of chillers increases from 2.5 to 2.7;
- Initial luminaire efficacy increases from 55 to 60 lamp lumens per circuit watt; and
- Minimum fan coil unit (FCU) specific fan power is reduced from 0.6 to 0.5 W/l/s.

5.51 These amendments applied in England in 2013, Wales in 2014 and Scotland from 2015 and are well established in practice and via the EU's Ecodesign regulations. The Department is of the view that the change would be of negligible cost as these performance levels are now embedded in the product supply chain and product advice.

Note: Unlike SAP 2009, the current SBEM v4 software does not automatically check performance in relation to the 2010 edition of the NDBSCG; instead, designers and building control officers make their own checks. This practice (for both dwellings and buildings other than dwellings) would continue with the updated guide.

Q13: Do you agree that adopting the 2013 edition of the Non-Domestic Building Services Compliance Guide is worthwhile and would be at negligible cost to current practice?

- **Yes**
- **No**

If no, please provide evidence to explain where this would be difficult or how cost assumptions should be revised.

Improvements to fabric

5.52 It is proposed that the new standards should drive progress on a 'fabric first' approach which will improve the building's energy efficiency and avoid 'green-washing' with excessive onsite renewable generating technologies. At a minimum, the proposed standards should ensure that no reduction in today's fabric standards occurs as a result of the emissions benefits that installing photovoltaics or other renewables could provide.

5.53 Heat losses occur through three main mechanisms around building fabric:

- heat transfer through surfaces (e.g. walls, roof, floors and windows);
- heat transfer at junctions (linear transmittance / thermal bridging); and
- air changes (arising from uncontrolled drafts and gaps)[9].

5.54 Offsetting allowances between these three mechanisms is possible under England's Fabric Energy Efficiency Standard (FEES) assessment processes applicable to dwellings only. Other regions (Scotland, Wales and the Republic of Ireland), along with England's non-domestic position, do not permit this approach and instead rely on assessment of U-values to control heat transfer through surfaces only.

5.55 England was proposing to remove FEES under its original *Future Homes Standard* consultation proposals[10], but it has changed that position and has recently consulted on the level at which they should be retained. The Department will consider FEES as part of the next uplift but does not consider that it would be viable to implement them at this stage as new legislation and software would be required.

Heat transfer at surfaces

5.56 The Department proposes to address heat transfer through surfaces with improved limiting U-value requirements for walls, roofs, floors and openings in new buildings under the new guidance.

5.57 Data from the Register of Energy Performance Certificates ('the EPC Register') provided the following average U-values for newly constructed dwellings: Walls - 0.22 W/m^{2}K, Floors - 0.15 W/m^{2}K, Roofs - 0.13 W/m^{2}K. There is some suggestion that this is somewhat better than what may be required for minimum compliance purposes currently. We have assumed the following values in the Impact Assessment for compliance currently: Walls - 0.28 W/m^{2}K, Floors - 0.16 W/m^{2}K, Roofs - 0.15 W/m^{2}K.

[9] Controlled ventilation is sealed in air-tightness testing arrangements.
[10] https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings

5.58 There are less clear-cut statistics in the non-domestic sector as EPC data on non-domestic EPCs could not be readily extracted, but reports from building control suggest average U-values for new non-domestic buildings as follows: Walls - 0.21 W/m^{2}K, Floors - 0.21 W/m^{2}K, Roofs - 0.16 W/m^{2}K, Windows - 1.6 W/m^{2}K.

5.59 With the above figures in mind, the Department is proposing new U-values in the tables below (replicated from Table 2.2 of the draft edition of TBF1 and Table 2.3 of TBF2). These are similar to the equivalent limiting values currently used in the Republic of Ireland.

Table 5.2 - Limiting U-values (W/m^{2}K); See Table 2.2 of Draft TBF1

Elements	(a) Area weighted average U value	(b) Maximum U value at any point
Wall	0.18	0.60
Floor(1)	0.18	0.60
Roof	0.16	0.30
Party wall	0.00	0.60
Windows, roof windows, glazed rooflights, curtain walling and pedestrian doors	1.40	3.00

Note:
(1) Where the source of space heating is underfloor heating, the maximum floor u-value should be 0.15 W/m^{2}K.

Table 5.3 - Limiting U-values (W/m^{2}K); See Table 2.3 of Draft TBF2

Element	(a) Area weighted average U value	(b) Maximum U value at any point
Wall	0.21	0.60
Floor – ground and exposed	0.21	0.60
Roof - pitched	0.16	0.30
Roof - flat	0.20	0.30
Party wall	0.20	0.60
Windows, roof windows, rooflights	1.60	3.00
Curtain walling	1.80	3.00
Pedestrian doors	1.60	3.00
Vehicle access and similar large doors	1.50	4.00
High-usage entrance doors	3.50	6.00
Roof ventilators (including smoke vents)	3.50	6.00
Swimming pool basin (walls and floor)	0.25	-

5.60 As an alternative to the elemental assessment, a whole-building area weighted U-value calculation assessment could be used. This allows a U-value for an individual element or element type to be worse than the values in the relevant table, provided it is sufficiently compensated for with improved U-values elsewhere in the building. Thus, a wall U-value of 0.21 or 0.22 W/m^{2}K may still be acceptable in a new dwelling, if sufficient compensatory U-value improvements have been achieved elsewhere in the construction. This provides room for more cost-effective construction and we have used this option in our impact assessment assumptions. Industry engagement suggests that the ability to have some flexibility with walls is particularly important and the proposals should permit 150 mm cavity wall construction to remain practicable in most cases.

5.61 Industry should be on notice, however, that the next Phase 3 uplift is likely to require more substantial fabric improvements.

5.62 The whole-building assessment approach is similar to that already in place in the Republic of Ireland and is commonly used by local industry today in respect of extensions to buildings.

5.63 In dwellings, a 25% glazing limit is proposed in order to prevent excessively glazed constructions. If additional glazing is required, improved U-values

for the windows or elsewhere in the building would be required to compensate. This has been standard practice in relation to glazing and U-value calculations for extensions for many years.

5.64 This glazing limitation is not built into the Republic of Ireland standards, but the Department is concerned that excessive glazing in dwellings can lead to undue heat losses and/or summer gains and needs to be considered when a whole-building area-weighted U-value approach is adopted. The limitation is also expected to support uptake of window systems with improved U-value performances, particularly where more highly glazed designs are being developed.

5.65 The glazing limitation is not applied to non-domestic buildings, as there is a much greater range of considerations at play in these buildings. For example, certain building types will typically be more highly glazed than others, or a lower overall U-value may be appropriate where cooling loads are a dominant factor.

Q14: Do you agree that the guidance revising the limiting U-values is worthwhile and workable for industry and enforcement?

- **Yes**
- **No**

If no, please explain your reasoning.

Heat transfer at junctions

5.66 Thermal bridging losses are a significant part of a building heat loss characteristics. These are already considered in the emissions ratings assessment so good detailing that provides continuity of insulation will help meet the overall betterment of the TER that the proposals require.

5.67 The proposed guidance on thermal bridging has been amended to reflect that the Accreditation Schemes anticipated under the 2012 guidance have not emerged in practice. Schemes have emerged to provide third party oversight of manufacturers' calculations of performances only and not the on-site inspection aspects anticipated at the time the guidance was developed. The draft wording points to this and is intended to reflect the reality of current practices.

Q15: Do you agree that the revisions to guidance on thermal bridging are a helpful clarification of current processes?

- **Yes**
- **No**

If no, please explain your reasoning.

Air permeability and ventilation

5.68 The Department is proposing to remove the option for a default value of 15 $m^3/(h.m^2)$@50Pa being submitted on small sites for dwellings and the similar 500 m^2 threshold exemption permitted for non-domestic testing. A value of 15 $m^3/(h.m^2)$@50Pa is likely to be an unrealistic assessment of actual performance, and given the onerous default, it is likely that increased costs for testing could be offset with construction savings elsewhere. Our review of EPC data suggests that these default value options are nonetheless being used on approximately 5.5% of assessments.

5.69 The Department acknowledges that a full review of Part K (Ventilation) is required, particularly in light of guidance coming forward from other administrations and to help deal with air-borne transmission of infection.

5.70 Revised ventilation guidance can have particular consequences where air-tightness performance of less than 3.0 $m^3/(h.m2)$@50Pa is achieved, as natural ventilation is increasingly regarded as inappropriate. The Department therefore, intends to retain the maximum permissible building air tightness at 10 $m^3/(h.m^2)$ at 50Pa with a view to substantially reducing this limit in subsequent uplifts alongside Part K (Ventilation) revisions to attend to these issues.

5.71 Our review of EPC data suggests that the average air-permeability for new dwellings of 4.4 $m^3/(h.m^2)$@50Pa is currently being achieved locally and that this reduces to 3.8 $m^3/(h.m^2)$@50Pa where a test has been carried out. Fewer than 1% of new buildings had an air-permeability rating of >8.0 $m^3/(h.m^2)$, (excluding buildings where a default value was entered). The draft guidance has been revised to acknowledge that designers will normally aim for an assessed air permeability of 5 $m^3/(h.m^2)$ at 50Pa or less and to encourage a default expectation of testing, rather than the sample testing basis encouraged in the current guidance.

5.72 The re-drafted guidance also suggests that where an air permeability of less than 3 $m^3/(h.m^2)$ at 50Pa is a likely outcome, designers are encouraged to consider alternatives to natural ventilation, such as a continuous mechanical extract ventilation system, or to seek specialist

advice in order to ensure adequate indoor air quality. Heat recovery will further improve energy performance on mechanical systems.

Q16: Do you agree with the removal of the default values for air-permeability of 15 $m^3/(h.m^2)$ currently permitted?

- **Yes**
- **No**

If no, please explain your reasoning.

Q17: Do you agree that the overall proposed changes on fabric standards are helpful to support a 'fabric-first' approach?

- **Yes**
- **No**

If no, please explain your reasoning and what should be done, taking into account that any significant review may delay implementation.

Other considerations

New guidance on renewable generating technologies

5.73 The proposed uplift under Option 2 or 3 is expected to stimulate an increase in on-site renewable generating technologies.

5.74 The current software assumes that all the electricity that could be potentially generated by a renewable generating technology on a building will be used usefully, either within the building, or exported. However, on some sites NIE Networks has required that new renewable generating installations should be prevented from exporting to the grid (i.e. a non-export connection) when it has not been feasible to upgrade the infrastructure to accept the excess generation. The proposed uplifts have been calibrated to be consistent with G98 export limits to help mitigate this risk and the Department is highlighting this issue to the UK government in relation to the proposed NCM and SAP software coming forward.

5.75 In the meantime, the draft guidance provides lines to alert designers of the need to engage with NIE Networks at an early stage and to provide notice to the building owner and district council on whether the connection is on an export or non-export basis.

5.76 The Department will continue to engage on this issue with the UK administrations and with other departments and agencies.

Q18: Do you agree that the guidance on non-export connections is helpful?

- **Yes**
- **No**

If no, please explain your reasoning.

6 DRAFT REGULATORY IMPACT ASSESSMENT-SUMMARY

6.1 A consultation stage Impact Assessment is published alongside this consultation paper. The Department has, so far, concentrated efforts on dwelling impacts as this sector accounts for the majority of new build construction and emissions. We are seeking to further develop the non-domestic assessment, which may be regarded as a relatively early stage assessment in comparison with the domestic position.

Methodology

6.2 Impacts are calculated on the basis of ten years' worth of building, with benefits accruing over the subsequent 60 years, to ensure the estimated life time benefit of building fabric measures is fully accounted for. Build rates are phased in over three years and fuel use mixes are assumed (see Regulatory Impact Assessment (C.2) for further details).

6.3 The assessment makes a high number of assumptions (including build rates, construction prices, a lack of 'rebound' comfort taking, modelling, future energy prices etc.) which are all highly sensitive to fluctuations in reality. Nonetheless, it attempts to provide a consistent basis for comparison of options.

6.4 Additional photovoltaics are the predominant compliance route in our impact assessment assumptions and their maintenance and replacement expenditure anticipated over the 60 year life time assessed are included as well as construction costs increases arising directly as a result of the measures.

6.5 Benefits are calculated over the 60 years subsequent to build and are monetized to include

- Energy savings;
- Air quality benefits; and
- Carbon saving benefits.

All of these are valued in accordance with *BEIS Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal.* Other costs and benefits, such as avoidance of future retro-fit, or wider health benefits have not been assessed. (This is in keeping with other regions.)

6.6 For energy savings, the BEIS guidance requires savings to be valued at the discounted variable rates, rather than full savings that might be assumed to accrue to bill payers normally. This discounts 'fixed' costs which should continue to apply, such as maintaining a supply grid and tax losses (see Regulatory Impact Assessment (C.2) for further detail).

6.7 Values for costs and benefits are also subjected to Net Present Value (NPV) discounts in accordance with *HMT Green book*, to adjust for future value and opportunity losses. This discounts costs and benefits by 3.5% for the first 30 years, and 3.0% thereafter.

6.8 Construction cost will normally be borne by developers, but may be taken into account in land values, particularly where there is limited capacity for house price increases to be afforded. Maintenance and replacement costs are expected to fall to building owners (or industry leaseholders). Energy saving benefits will be accrued by bill payers, while air and carbon benefits will accrue to society generally.

SUMMARY OUTCOMES

6.9 Table 1 provides a summary of the outcome of the Impact assessment analysis, with a significant overall Net Present Value PV of £122M benefit over the 70 year assessment period the preferred Option 3 and £32.6M for Option 2.

6.10 Typical outcomes for generic dwelling types are provided within Annex B of the Regulatory Impact Assessment (C.2).

Table 6.1: Summary of total costs and benefits

Item	Option 2 (£M)	Option 3 (£M)	Accrual years	Impacts who?
Transition costs	£0.15	£0.15	year 1	industry and enforcement
Construction costs	£164.9	£196.3	years 1-10	developers
Replacement and maintenance costs	£233.3	£278.1	years 5-70	building owners
Total costs (undiscounted)	£398.4	£474.1		
Total costs (discounted Net Present Cost)	£221.5	£253.4		
Energy savings	£508.1	£812.5	years 1-70	bill payers
Carbon savings (traded)	£12.1	£20.0	years 1-70	society generally
Carbon savings (non-traded)	£165.0	£213.1	years 1-70	society generally
Air quality savings	£42.6	£54.7	years 1-70	society generally
Total benefits (undiscounted)	£727.8	£1,100.0		
Total benefits (discounted Net Present Benefit)	£245.5	£375.4		
Total value (NPV discounted)	**£32.6**	**£121.9**		
Total value (NPV discounted) to industry only	-£154.0	-£185.3		

BUSINESS SECTORS AFFECTED

6.11 The amendments impose additional burdens on developers of £165M (option 2) or £196M (option 3 - preferred) over the ten year build period.

6.12 Some of this will accrue back to industry from subsequent energy savings, and, if NPV rate are applied, the total cost to industry is £154M (option 2) or £185M (option 3 - preferred) over the 70 year assessment period. (Note - energy savings from dwellings are not savings for industry, whereas savings in non-domestic buildings are likely to assist another sector of industry.) These costs include the additional maintenance and replacement burdens falling to building owners (33% of new homes are assumed to be for rent).

6.13 Further benefits to industry, from increased activity rates in supplying and installing additional fabric and services in all sectors are not included in the assessment.

6.14 Energy efficiency improvements tend not to attract a sufficient premium in building sale prices to enable costs to be fully passed on to building purchasers, although this may occur to some degree. The increased construction costs are therefore likely to be taken into consideration in land price offers made by developers over the medium term. Indeed, it is possible that some of this has already occurred, as an uplift has been long anticipated (given the provision of regulation 43B in 2014) and the last meaningful uplift in the energy efficiency standards occurred some time ago in 2012. An alternative analysis would be that the construction price increase will be passed on, at least in part, in new-build price or housing supply pressures.

Q19: Do you have any comment on our impact assessment and its key assumptions?

- **Yes**
- **No**

If yes, please explain your reasoning and suggest alternative calculations.

7 OTHER IMPACT ASSESSSMENTS

Rural impact assessment

7.1 Rural buildings are likely to be off gas-grid and reliant on more carbon intensive fuels (predominantly oil and LPG). For example, oil fuels currently generate approximately 30% more carbon emissions per kWh than gas. The current methodologies adjust for this and raise the TER where the more carbon intensive fuel is proposed to the extent that an oil fuelled home is currently likely to be able to be built to a standard similar to a gas fuelled home.

7.2 This is unlike other regions, where the 'fuel factors' which adjust the TER are set to require a better specification to take some significant account of the increased carbon content of the fuel. England's Part L 2021/22 standard proposes removing these factors altogether, making oil boilers very difficult to install. This issue will need to be confronted in future uplifts and if moving to the new software under development by the UK government.

7.3 The current 'fuel neutral' approach currently operating is largely retained in the proposals as this is embedded within the current software. However, as the TER for the oil or LPG building will be larger, the 15%, 25% or 40% reduction will also be commensurately larger and therefore, marginally more costly to achieve. This is illustrated in the tables in Annex B of the Regulatory Impact Assessment (C.2), where the oil home requires a slightly larger PV array to obtain the 'betterment' reduction required funded by approximately £300 of additional capital costs per house.

7.4 These cost impacts are considered acceptable in the context of the overall construction costs and will also apply in urban situations where the higher carbon fuel is proposed. Measures to more thoroughly address the use of higher carbon fuel factors are expected in future uplifts and this marginal step will help mitigate this later adjustment to some degree.

Small business impacts

7.5 The cost impacts, as a percentage of current build costs, are expected to be reasonably equal in all sectors (small, medium and large developers). The uplifts have been set with a view to balancing improved performance with the evolution of widespread and commonly used technologies, with an appropriate balance in mind. Smaller developers may have less capacity to invest in adopting emergent technologies and systems, whilst developers of larger buildings and blocks of flats may need to invest in more innovative solutions where a G98 level of export application is of minimal benefit.

Equality impact screening

7.6 A section 75 Equality Impact Assessment is included in the consultation package, with no negative impacts envisaged.

8. TIMING AND NEXT STEPS

8.1 The Department proposes that these amendments to the guidance in Technical Booklets should come into operation as soon as possible.

8.2 We hope to be in a position to publish final editions of the Technical Booklets by the end of the year, with a view to coming into operation from early in 2022, or as soon as possible thereafter.

8.3 See Section 4 for question on timing of proposals coming into force.

Final question: General suggestions and observations

Q20: Have you any suggestions or observations that do not fit into the preceding questions?

- **Yes**
- **No**

If yes, please provide them with this response.

Annex A - Personal Data

The following is to explain your rights and give you the information you are entitled to under the Data Protection Act 2018.

Note that this section only refers to your personal data (your name, address and anything that could be used to identify you personally), not the content of your response to the consultation.

1. The identity of the data controller and contact details of our Data Protection Officer
The Department of Finance (DoF) is the data controller. The Data Protection Officer can be contacted as follows:

Data Protection Officer
Department of Finance
Room 23, Dundonald House
Upper Newtownards Road
Belfast
BT4 3SB

Tel: 028 9052 4961
Email: dataprotectionofficer@finance-ni.gov.uk

2. Why we are collecting your personal data
Your personal data is being collected as an essential part of the consultation process, so that we can contact you regarding your response and for statistical purposes. We may also use it to contact you about related matters.

3. Our legal basis for processing your personal data
The Data Protection Act 2018 states that, as a government department, DoF may process personal data as necessary for the effective performance of a task carried out in the public interest, i.e. a consultation. In addition to the statutory requirement in the Building Order to consult on building regulations matters, there is an expectation of appropriate public consultation on substantive changes to the Building Regulations.

4. For how long we will keep your personal data, or criteria used to determine the retention period
Your personal data will be held for two years from the closure of the consultation.

5. Your rights, e.g. access, rectification, erasure
The data we are collecting is your personal data, and you have considerable say over what happens to it. You have the right:

a. to see what data we have about you;
b. to ask us to stop using your data, but keep it on record;
c. to ask to have all or some of your data deleted or corrected; and

d. to lodge a complaint with the Independent Information Commissioner (ICO) if you think we are not handling your data fairly or in accordance with the law. You can contact the ICO at https://ico.org.uk/, or telephone 0303 123 1113.