Ministry of Housing,
Communities &
Local Government

Response to the Consultation on Changes to The Energy Performance of Buildings (England and Wales) Regulations 2012, No. 3118

Summary and Analysis

November 2020
Ministry of Housing, Communities and Local Government

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Section 1: Introduction

1.1 The Energy Performance of Buildings Directive 2002/91/EC was implemented in England and Wales on 1 October 2008 through the Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007 and the Building and Approved Inspectors (Amendment) Regulations 2006.

1.2 A recast of the Directive was adopted by the European Parliament and the Council on 19 May 2010 and was implemented in England & Wales on 9 January 2013 through the Energy Performance of Buildings (England and Wales) Regulations 2012 ("The EPB Regulations 2012")[1] and amendments to the Building Regulations 2010.

1.3 On 30 May 2018, the European Parliament and the Council adopted Directive (EU) 2018/844, which amended the previous recast of the Directive.

1.4 The United Kingdom has left the European Union. As the transposition deadline falls within the Transition Period, the UK is required to transpose the amended Directive into domestic legislation

1.5 In May 2020, the Ministry of Housing, Communities and Local Government (MHCLG) consulted on options to transpose Article 15 of the Directive into domestic legislation.

1.6 The main amendment, which was consulted on was the requirement, to establish regular inspections of the accessible parts of air-conditioning systems and combined air-conditioning and ventilation systems with an effective rated output of more than 70kW, instead of 12kW.

[1] https://www.legislation.gov.uk/uksi/2012/3118/made

Section 2: The Consultation

2.1 The UK has set in law a target to reduce greenhouse gas emissions to net zero by 2050. Domestic and non-domestic buildings are estimated to account for 34% of the UK's total greenhouse gas emissions, and we must ensure that the requirements of the energy performance of buildings regime are ambitious enough to contribute to meeting this target.

2.2 The overall purpose of the proposal in the consultation was to implement provisions to align with current government policy not to go beyond the minimum requirements of EU Directives; to streamline the inspection regime; and to target systems with the greatest potential energy efficiency gains and carbon savings and the greatest potential level of compliance.

2.3 The consultation recognised that some carbon savings would be lost from smaller systems and that energy assessors would undertake fewer inspections.

2.4 The consultation sought views on:

- The proposed increase to the threshold of the current air-conditioning inspection regime to include only air-conditioning systems and combined systems with an effective rated output of more than 70kW; and
- Whether the assumptions used in the consultation Impact Assessment were fair and reasonable.

2.5 The consultation also asked consultees if they were able to provide any information on the number of combined air-conditioning and ventilation systems or combined heating and ventilation systems in buildings in England and Wales.

2.6 The consultation ran for 8 weeks from 19 May 2020 and closed on 14 July 2020. The consultation documents were available on the gov.uk website and responses could be submitted through the online survey or returned to the MHCLG by email or post.

Section 3: Summary of Responses

3.1 This section sets out a summary of the key comments and views expressed in the responsses to the consultation on the proposed changes to the EPB Regulations 2012.

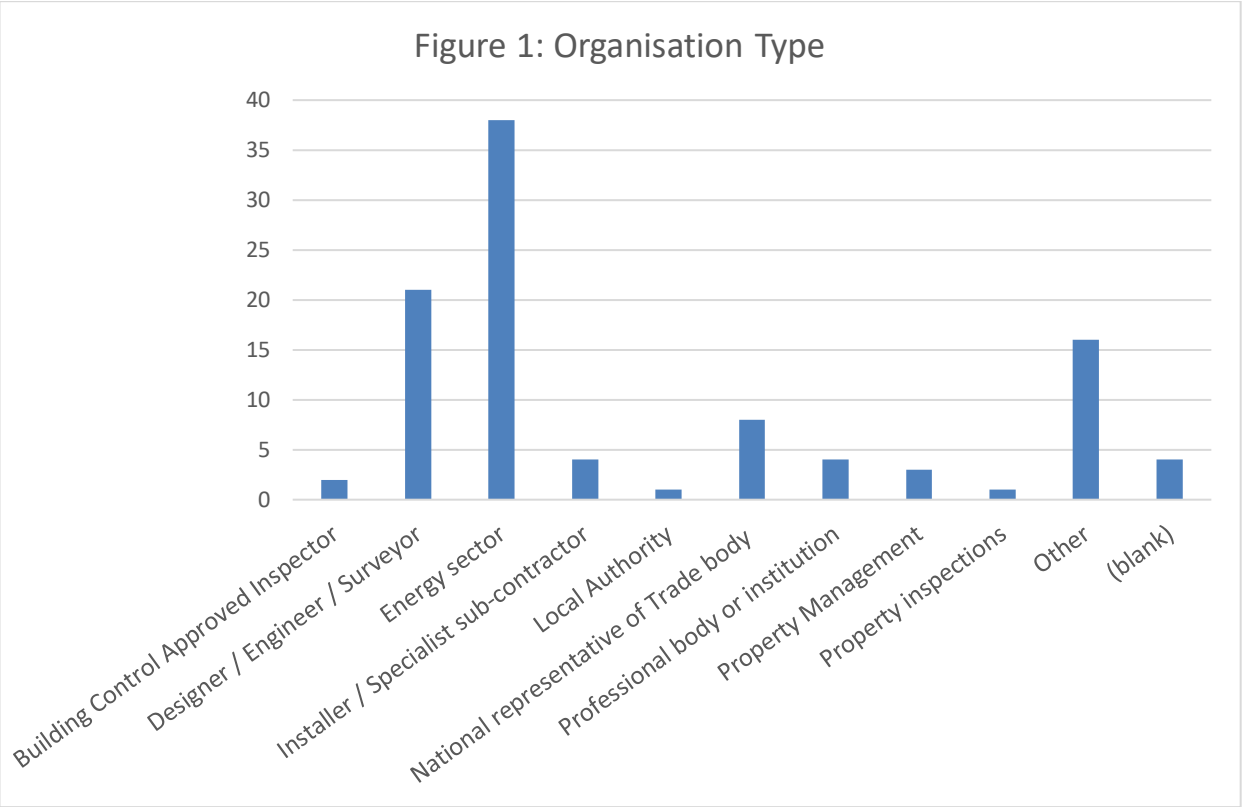
3.2 In total, 102 individuals/organisations responded to the consultation:

- 88 via survey monkey only;
- 8 via email only; and
- 6 via both survey monkey and email.

3.3 Of the 102 consultation responses, there were:

- 47 responses from individuals;
- 51 responses from organisations; and
- 4 responses where the respondent did not specify their status.

3.4 Respondents were asked to assign themselves to one of 10 broad organisational types. Figure 1 shows a breakdown of the 102 responses by organisational category.



3.5 The remainder of this section sets out, for each of the three questions in the consultation, the number of responses agreeing or disagreeing with the proposals along with a summary of the key comments and views expressed.

3.6 It should be noted that not all respondents answered or commented on each question, therefore, the percentages given for those who answered yes, no or don't know are based on the number of respondents to those questions.

3.7 It should also be noted that the SurveyMonkey responses to each question were limited to 250 words, whereas those who responded by email were able to submit comprehensive supplementary information. All supplementary information has been reviewed.

Analysis

Question 1

Do you agree that the threshold of the current air-conditioning inspection regime should be increased to include only air-conditioning systems and combined systems with an effective rated output of more than 70kW?

- 6% answered yes
- 87% answered no
- 7% did not provide a response
- The majority of respondents disagreed with this proposal.

3.8 Respondents provided evidence to demonstrate that whilst smaller systems are more prevalent, representing over 60%-80% of inspections of systems with an effective rated output of more than 12kW, the combined energy use of large systems was between 80%-90%[2] greater than all of the energy use by systems with an effective rated output of more than 12kW. The evidence provided demonstrated that larger systems present an opportunity for greater carbon savings.

3.9 However, overall, respondents thought that the majority of larger systems, such as those with an effective rated output of more than 70kW, will already be subject to checking and maintenance programmes. Regular checking and maintenance will be undertaken, because larger systems are more likely to be:

- Managed as part of a portfolio;
- Managed by specialists; or
- Have a connection to a Building Energy Management System (BEMS) or similar control system.

3.10 As such, respondents felt that a mandatory inspection regime targeted at larger systems would add little additional benefit. They did not believe that the monitoring and maintenance regimes that large systems often enjoy, which may support compliance, were reasons to target the regime at these systems. Indeed, stakeholders also provided evidence that compliance with the inspection regime is low across both large and small systems.

3.11 A high proportion of respondents thought that the majority of smaller systems (i.e. with an effective rated output of up to 70kW) are likely to be less well managed, checked and maintained, such that a mandatory inspection regime would be of more benefit because it could provide, for example, advice on the correct sizing of the system and help building owners to avoid 24/7 operation.

[2] Information provided by consultation respondents

3.12 Respondents indicated that, where a mandatory inspection had been undertaken under the existing regulations (requiring inspection of any system with an effective rated output of more than 12kW), typically 30%-40% energy savings were achieved if the whole package of recommendations were implemented. Implementing, just the lowest cost recommendations, such as changing the setting schedule of the system, can on its own achieve energy savings of between 10%-20%.[3]

3.13 The second most common point made by respondents concerned the potential loss of business to energy assessors if the system inspection threshold was increased to an effective rated output of more than 70kW. Respondents indicated that between 60% to 80% of current inspection work derives from systems with an effective rated output of up to 70kW.

3.14 Additionally, a number of respondents thought that the cost of surveys could increase if the threshold is raised because:

- Energy assessors may leave the profession;
- Inspections will take longer to complete for larger systems; and
- Competence requirements will be more demanding for larger, more complex systems.

3.15 Overall, increasing the system inspection threshold was felt to result in a lost opportunity to realise carbon and energy savings and to encourage the owners of buildings, with smaller air-conditioning systems, to maintain and improve energy efficiency and reduce carbon emissions.

3.16 A small number of respondents also suggested that the health benefits, associated with correct use of systems, would be lost. Reference was also made to increased risk from Covid-19. The Chartered institution of Building Services Engineers (CIBSE) published guidance in May 2020 on the operation of ventilation systems in the current circumstances. This guidance appears on the Health and Safety Executive (HSE) website.[4]

3.17 Some respondents noted that the mandatory inspection regime also indirectly helps achieve greater awareness of, and therefore compliance with, the F-gas (Fluorinated gas) Regulation[5]. It was argued that mandatory inspections have revealed that a high proportion of plant operators are unaware of the F-gas Regulation and that raising their awareness through the inspection process results in increased F-gas compliance. Ongoing use of Ozone Depleting Substances (ODS) was flagged as well, suggesting lack of awareness about the ODS Regulation too. As an example, R22 (an HCFC refrigerant banned for use in maintenance, repair and use in new air-conditioning systems) was still felt to be relatively prevalent, particularly amongst users of smaller systems (circa 40%).

3.18 There are around 50,000 engineers in the UK who are certificated in accordance with the F-gas regulatory requirements. We are also aware of significant moves towards the use of alternatives to F-gas refrigerants by industry in recent years as the HFC phase-down continues. Guidance[6] on F-gas and ODS arrangements for Great Britain and Northern

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[3] Information provided by consultation respondents

[4] CIBSE Covid Emerging from Lockdown- Safely Re-occuppying Buildings. https://www.cibse.org/coronavirus-covid-19/emerging-from-lockdown

[5] Link to The EU F-gas Regulation: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0517&from=EN and The Ozone-Depleting Substances and Fluorinated Greenhouse Gases (amended etc) (EU Exit Regulations 2019) 2019/583 https://www.legislation.gov.uk/uksi/2019/583/contents/made

[6] https://www.gov.uk/guidance/fluorinated-gases-and-ozone-depleting-substances-how-to-do-business-from-1-january-2021

Ireland from 1 January 2021 has also recently been published and has been shared directly with over key 500 businesses.

3.19 However, achieving the energy savings set out above requires compliance with the regulations. Further, it is not mandatory for building owners to implement the recommendations. Feedback on the rate of compliance is outlined in the response to question 2, below.

Question 2

Do you think the assumptions in the analysis of impact are fair and reasonable?

- 18% answered yes
- 73% answered no
- 9% did not provide a response

3.20 Respondents provided additional information including information on the benefits of inspections, the baseline estimates, the size of systems that have been inspected and the anticipated impact of the policy on inspection numbers. The 'yes' respondents offered no additional supporting information for their response.

3.21 The prevalent comment from those who answered 'no' to question 2 concerned the level of compliance, which is lower than that anticipated by the analysis. Respondents said that the actual number of inspections that have taken place (derived from the number of air-conditioning inspection reports lodged as shown in the Register Operator data) is lower than the expected number of inspections in the consultation impact assessment:

- The lodgement average over the last 5 full years (2015-2019) is equal to 12,585 inspections per annum;
- Stakeholders suggested that fewer than 20% of systems with an effective rated output of more than 12kW may have been inspected; and
- Some respondents are of the opinion that the current enforcement regime is insufficient, potentially leading to even lower compliance rates than the estimated 20%.

3.22 Further analysis by MHCLG indicated that a higher level of compliance would be required in order to realise the carbon saving benefits of a more targeted inspection regime for systems with an effective rated output of more than 70kW:

- Raising the inspection threshold to an effective rated output of more than 70kW (rather than retaining the existing regime) would yield higher carbon savings three years after being introduced, and only if compliance increased to 40%. An average of 367.6 MtCO2e would be saved in this scenario, compared to an average of 195.4 MtCO2e saved by raising the threshold and not achieving an increased level of compliance.
- This is lower than the savings gained by retaining the existing regime (291 MtCO2e). This means that retaining the current threshold provides a greater opportunity for carbon savings over the next three years

3.23 Many respondents suggested that the proposal to increase the size of the inspection threshold from systems with an effective rated output of more than 12kW to those with an effective rated output of more than 70kW, will result in a reduction in inspections of

between 60% and 80% or around 10,000 per annum.[7] Several respondents provided evidence of this based on a record of inspections of smaller systems undertaken by energy assessors.

3.24 Some respondents felt that the inspection cost estimated in the consultation Impact Assessment 'seemed low', suggesting that typical inspection costs were more likely to be between £150 and £800 (in addition to other costs associated with the inspection regime, such as travel costs and lodgement fees). Counter to this though, other respondents (particularly those identified as energy assessors), felt that the average inspection cost figure of £200 in the consultation Impact Assessment, was broadly correct.

Question 3

Do you have any information on the number of combined air-conditioning and ventilation systems; or combined heating and ventilation systems, in buildings in England and Wales?

- *28% answered yes*
- *63% answered no*
- *9% did not provide a response.*

3.25 Several respondents reported that an increased threshold may push buildings with combined systems out of scope: a third of buildings with air-conditioning have a combined air conditioning and ventilation system. This proportion is just over 10% for buildings that have combined air-conditioning and ventilation systems with an effective rated output of 70kW and under.[8]

[7] Information provided by consultation respondents

[8] Information provided by consultation respondents

Section 4: Government Response

4.1 The consultation proposed to increase the threshold of the current air-conditioning inspection regime to include only air-conditioning systems and combined air-conditioning and ventilation systems with an effective rated output of more than 70kW.

4.2 The objective of the consultation proposals was to:

- Implement the requirements of the Directive and to align with current government policy not to go beyond the minimum requirements of EU Directives;
- Streamline the inspection regime and target systems with the greatest potential energy efficiency gains and carbon savings; and
- Potentially achieve a more compliant regime by taking advantage of the additional system monitoring structures and support that larger systems tend to have.

4.3 The consultation was clear that the new regime would lead to savings for some building owners, but at some cost to energy assessor businesses. It also recognised that some carbon savings from smaller systems would be lost.

4.4 Given the rate of compliance, including for larger buildings, the anticipated carbon savings from targeting larger systems are unlikely to be realised. Our cost benefit analysis shows that in a low compliance scenario, the current inspection regime would yield the highest carbon savings.

4.5 We have also heard strong arguments around the extent of the lost opportunities for smaller systems to be replaced and improved, and the wider energy efficiency advice that building owners receive when inspections are undertaken.

4.6 Therefore, as a result of industry engagement, evidence from stakeholder responses and consideration of the cost benefit analysis, within the context of Government's wider climate change targets, the Government intends to diverge from the European Commission's proposal and to retain the existing threshold for the inspection of the energy efficiency of air-conditioning systems that have an effective rated output of more than 12kW.

4.7 In order to fully transpose the Directive, we will make an amendment to our existing regulations to ensure that, where appropriate, performance will be optimised under typical operating conditions.

4.8 The Directive requires the scope of inspections to be broadened to include combined air-conditioning and ventilation systems. Our view is that combined systems are already adequately covered by the EPB Regulations 2012.[9]

4.9 There is potential to undertake further policy development in this area to help to meet the Government's target of net zero carbon emissions by 2050. Whilst we are retaining the regime, we will want in the longer-term to look at the wider energy performance of

[9] Please see Energy Performance of Buildings (England and Wales) Regulations 2012 (2012/3118) Part 1 Regulation 2 'interpretation' definition of 'air-conditioning system'
https://www.legislation.gov.uk/uksi/2012/3118/regulation/2/made

buildings framework, including the compliance and enforcement regime, and consider ways in which to maximise the energy efficiency gains and reduction in carbon emissions from the inspection regime.

4.10 Information provided by respondents to the consultation has contributed to a fuller Impact Assessment. This includes estimated levels of compliance with air-conditioning inspections; the number of inspected systems between 12kW and 70kW; potential carbon savings from air-conditioning inspection recommendations (if implemented); and the number of air-conditioning and combined air-conditioning and ventilation systems. Please see impact assessment at Annex A.

Annex A: Impact Assessment

Title: Energy Performance of Buildings: A consultation on changes to the Energy Performance of Buildings Regulations 2012, No. 3118. **Lead department or agency:** MHCLG	Impact Assessment (IA)
	Date: 15/09/2020
	Stage: Options
	Source of intervention: Domestic
	Type of measure: Secondary Legislation

Summary: Intervention and Options

What is the problem under consideration? Why is government action or intervention necessary?

In order to meet the Government's net zero emissions target, it is important to reduce carbon emissions from buildings. On 30 May 2018, the European Parliament and the Council agreed to amend the Energy Performance of Buildings Directive 2010/31 (EU).

EPBD was designed to help tackle climate change by achieving a highly energy efficient and decarbonised building stock by 2050. It requires inspections of air-conditioning systems to recommend energy or carbon savings; enabling consumers and businesses to make more informed choices to save energy and money. It is intended to correct market failure, where lack of information about energy efficiency opportunities limit potential for improvements.

What are the policy objectives of the action or intervention and the intended effects?

To reduce carbon emissions from buildings and building systems and to reduce energy costs for consumers and businesses by encouraging energy efficiency of building systems; and as the transposition deadline falls within the Transition Period, the UK is required to transpose the amended Energy Performance of Buildings Directive 2018/844(EU), into domestic legislation The amended Directive increases the threshold for inspections of air-conditioning systems with an effective rated output of more than 12kW to those systems with an effective rated output of more than 70kW. The Directive requires the scope of inspections to be broadened to include combined air-conditioning and ventilation systems. Our view is that combined systems are adequately covered by the Energy Performance of Buildings (England and Wales) Regulations 2012 already[10]

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

- **Option 1 - Increase the threshold for air-conditioning inspections for systems with effective rated output of more than 70kW**. This would meet directly with EU requirements. It would reduce the requirement on building owners with air-conditioning systems between 12kW and 70kW outputs to undertake inspections. It would provide for a focus on larger units with a potential for greater energy savings overall. Loss of inspections of systems between 12kW and 70kW would reduce opportunities to recommend energy/carbon savings for these systems.
- **Option 2 - Retain air-conditioning inspections for systems with effective rated output of more than 12 kW.** This would mean no change to the Energy Performance of Buildings Regulations for air-conditioning inspections concerning the threshold for air-conditioning inspection requirements. It would 'goldplate' (go further) than EU Directive requirements and provide divergence to meet the UK target of net zero carbon by 2050. **Policy option 2 is our preferred option.**

Does implementation go beyond minimum EU requirements?		Yes		
Is this measure likely to impact on international trade and investment?		No		
Are any of these organisations in scope?	**Micro** Yes	**Small** Yes	**Medium** Yes	**Large** Yes

[10] Please see Energy Performance of Buildings (England and Wales) Regulations 2012 (2012/3118) Part 1 Regulation 2 'interpretation' definition of 'air-conditioning system'
https://www.legislation.gov.uk/uksi/2012/3118/regulation/2/made

Summary: Analysis & Evidence

Policy Option 1

Description: Option 1 - Increase the threshold for air-conditioning inspections for systems with effective rated output of more than 70kW.

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -80.1	High: 9.5	Best Estimate: -38.6

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0	1		28.9
High	0			91.0
Best Estimate	0			**62.6**

Description and scale of key monetised costs by 'main affected groups'

Fewer inspections resulting in less carbon reduction and improvements in energy efficiency of equipment from uptake of measures resulting from inspection recommendations, with the low compliance rate meaning that there will be insufficient inspections above the 70kW threshold to compensate. These are estimated to be proportional the operational costs.

Energy savings from inspections are estimated, based on both consultation responses and consultants' reasonable estimates of potential low, medium and high savings.

Other key non-monetised costs by 'main affected groups'

Building occupant discomfort or damage to health of air pollutants.

Fewer air-conditioning inspections would result in a loss of business for energy assessors.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Benefit (Present Value)
Low		1		10.9
High				38.3
Best Estimate				**24.0**

Description and scale of key monetised benefits by 'main affected groups'

Reduced cost of inspections, which will affect building owners. This is calculated from consultation responses and the number of inspections taken from lodgements on the EPB Register, assuming a low compliance rate. The operational costs of equipment are based on consultation response estimates of equipment capacity and the Equivalent Full Load Hours (EFLH) from the BRE Study on Energy Use by Air conditioning: Final Report – June 2016

Other key non-monetised benefits by 'main affected groups'

Improvements in comfort.

Key assumptions/sensitivities/risks	Discount rate	3.5%

Assumptions: Uptake and cost of inspections; potential energy savings

Risks: Low compliance rates for an inspection regime, changes in costs relating to changes in threshold equipment sizes for mandatory inspection.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 6.4	Benefits: 2.8	Net: -3.6	

Summary: Analysis & Evidence

Policy Option 21

Description: Option 2 - Retain air-conditioning inspections for systems with effective rated output of more than 12 kW

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: 0	**High:** 0	**Best Estimate: 0**

COSTS (£m)	Total Transition (Constant Price)		Average Annual (excl. Transition)	Total Cost (Present Value)
Low	0	1	Optional	
High	0		Optional	
Best Estimate	0			**0**

Description and scale of key monetised costs by 'main affected groups'

Cost of inspections, which will affect building owners. This is calculated from consultation responses and the number of inspections taken from lodgements on the EPB Register. The operational costs of equipment are based on consultation response estimates of equipment capacity and the Equivalent Full Load Hours (EFLH) from the BRE Study on Energy Use by Air conditioning: Final Report – June 2016

Other key non-monetised costs by 'main affected groups'

Building occupant discomfort or damage to health of air pollutants.

BENEFITS (£m)	Total Transition (Constant Price)		Average Annual (excl. Transition)	Total Benefit (Present Value)
Low		1		
High				
Best Estimate				**0**

Description and scale of key monetised benefits by 'main affected groups'

Improvements in energy efficiency of equipment from uptake of measures resulting from inspection recommendations are proportional to the operational costs.
Energy savings from inspections are estimated, based on both consultation responses and consultants' reasonable estimates of potential low, medium and high savings.

Other key non-monetised benefits by 'main affected groups'

Improvements in comfort.

Key assumptions/sensitivities/risks	**Di scount rate (%)**	3.5%

Assumptions: Uptake and cost of inspections; potential energy savings.
Risks: Low compliance rates for an inspection regime.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m:
Costs: 0	**Benefits: 0**	**Net: 0**	

Evidence Base (for summary sheets)

Background and scope of the proposal

1 This impact assessment informs Energy Performance of Buildings: a consultation which looked at proposed changes to the Energy Performance of Buildings Regulations 2012, No. 3118. It considers options to amend the regime for energy inspections of air-conditioning systems from the present requirement for systems with effective rated output of more than 12kW, to an increased threshold for inspections of systems with effective rated output of more than 70kW. The Government's preferred option is to maintain the 12kW threshold for inspections.

Future work outside the scope of this impact assessment

2 This impact assessment relates to the requirement in the Energy Performance of Buildings Directive 2018/844 (EU) which allows for an increase in the threshold for air-conditioning energy assessments from the present effective rated output of more than 12kW systems to more than 70kW. Following the completion of the transposition of this aspect of the EPBD 2018/844 EU Directive and the ending of the EU withdrawal Transition Period, further consideration of the energy performance of buildings framework is expected.

Rationale and evidence to justify the level of analysis used in the IA (proportionality approach)

3 Reducing carbon emissions from the building stock is essential for the UK to meet its policy target of net zero carbon buildings by 2050. A number of market failures exist such that the market would not make these changes of its own accord, these include:

4 Externalities caused by climate change: polluters (builders and building occupiers) do not incur the true cost of their emissions. Even if an appropriately high and sustained carbon price were applied, the mix of other market failures can act as a barrier to action.

5 Building buyers/tenants/mortgage providers do not have information on long term energy price rises, and therefore cannot accurately value an energy efficient building system. In particular for most businesses' energy costs are at present too small a percentage of their operating costs to make energy efficiency a material consideration in the choice of building they occupy.

6 The Energy Performance of Buildings Regulations would help resolve these market failures by bridging the information gap through inspections of air-conditioning systems. Nevertheless, there is still a number of limitations/uncertainties in assessing the impact of increasing the threshold for air-conditioning inspections:

   a. Complete information on the total number of buildings with air-conditioning systems and the effective rated kW output of each of those systems is not held, and therefore has been estimated using available data.

b. Existing data from air-conditioning inspection reports was used to provide effective rated output of systems, however this was an estimation since this data did not cover all the air-conditioning systems that require an inspection.

c. The scenarios used to assess the cost of fewer inspections were estimates based on expected energy use of systems and the effect of air condition inspection report recommendations being implemented.

d. Recommendations provided by air-conditioning inspection reports are not required to be implemented so any estimates of energy and carbon saving are based on modelling best information from industry analysts.

e. Detailed information from air-conditioning inspection reports and industry energy assessors does not include all buildings that should have had an inspection.

f. Detailed information was also extrapolated to cover the estimated numbers of buildings with air-conditioning systems, with estimates from industry in response to the consultation used as part of the scenarios in the cost benefit analysis.

7 Despite these limitations, compliance with the Energy Performance of Buildings Regulations is still the main route at present for improving the energy efficiency of air-conditioning systems in buildings. Recommendations for energy and carbon savings from required inspections alleviates information asymmetry and enables the consumer and business to make more informed choices to save energy and money.

Policy Objectives

8 The consultation document provides full details of the policy objectives. A summary of these policy objectives is provided here.

9 The policy objectives are to ensure effective transposition of Energy Performance of Buildings Directive 2018/844 (EU) for air-conditioning inspections into UK regulations to meet with UK's obligations under the withdrawal agreement, to improve the energy efficiency of air-conditioning systems in buildings and reduce carbon emissions from buildings.

10 The key consideration of the consultation and this impact assessment is at what level the effective rated kW output threshold should be set for air-conditioning energy efficiency inspections. There are two main options: to retain the present inspection requirement threshold of an effective rated output of more than 12kW or increase the threshold requiring inspection to an effective rated output of more than 70kW.

11 **Option 1 - Increase the threshold for air-conditioning inspections for systems with effective rated output of more than 70kW.** This would meet directly with EU requirements during the Transition Period. It would reduce requirement on building owners with air-conditioning systems between 12kW and 70kW outputs to undertake inspections. As set out in the consultation, it would focus the regime on

systems which potentially have the greatest overall efficiency gains and carbon savings; but removing inspections of systems between 12kW and 70kW would reduce opportunities to recommend energy/carbon savings for these systems. This would cause a loss of income to energy assessors many of whom are micro and small businesses.

12 **Option 2 - Retain air-conditioning inspections for systems with effective rated output of more than 12kW.** This would mean no change to the Energy Performance of Buildings Regulations 2012 for air-conditioning inspection threshold. It would continue to provide data on air-conditioning systems with an effective rated output of more than 12kW and the opportunity for advice and recommendations to be provided to building owners to improve energy efficiency. It would not disrupt the air-conditioning assessment industry and provide the basis for future policy development in this area following the end of the EU Withdrawal Transition Period. It would go further than the Directive requirements and thereby diverge from the EU to meet the UK target of net zero carbon buildings by 2050.

13 **Our preferred option is option 2.** This option is a change from the recommended option put forward in the consultation document.

14 The consultation noted that 'current Government policy is that the UK should not go beyond the minimum requirements of European Directives, unless there are exceptional circumstances, justified by a cost benefit analysis and consultation with stakeholders.'

15 Following analysis of the responses to the consultation and additional information provided by respondents, the assumptions on which the recommended option is based in the consultation were reviewed:

- It was noted by consultation respondents that whilst many larger air-conditioning systems would have ongoing system monitoring and dedicated system management that should support ongoing energy efficiency, compliance is low. The low compliance rate demonstrates that the greater potential savings from an inspection regime focussed on larger systems may not be realised.

- The potential benefit of being able to focus inspections on systems with effective rated output of more than 70kW where it was considered greater carbon savings could be made was also unclear, as feedback from consultation responses indicated that it is more difficult to identify systems with an effective rated output of more than 70kW for air-conditioning energy assessors and enforcement agencies. This is because greater technical expertise is required to identify if a building system needs to be assessed without a site visit. There is also no requirement for building owners to hold kW cooling capacity information on asset records. This would have a particularly negative impact on realising policy objectives where the systems in question do not have ongoing system monitoring or management to encourage energy efficiency.

16 In addition, and in line with the original consultation assertion:

- It was considered that there would be a detrimental impact to small and medium sized businesses providing air-conditioning energy assessments as respondents indicated that the potential loss to them would be 60% - 80% of the assessments market. This could make it unviable for some assessors to continue providing assessments for only larger systems.

- It was noted that smaller output systems may not have automated monitoring or dedicated facilities management so would be more likely to be running inefficiently. Eliminating inspections of systems between 12kW and 70kW removes the opportunity for assessors to provide energy efficiency recommendations, which will result in 460GWh in lost energy savings and 95.7MtCO2(e) in lost carbon savings.

17 Changes during the Transition Period indicated that, although UK government policy is not to go beyond the minimum requirements of European Directives, if there were circumstances where it would be beneficial to UK government policy to diverge from the minimum requirement then these could be considered.

Summary and preferred option with description of implementation plan

18 The preferred option would be given effect through secondary legislation and as this legislation is already in place there would be no need for any regulatory amendment to be made concerning the threshold for air-conditioning inspection requirements. We intend making a minor amendment to the Energy Performance of Buildings 2012 Regulations for inspections to include consideration of the capabilities of the air-conditioning system or of the system of combined air-conditioning and ventilation, to optimise its performance under typical or average operating conditions. Our technical guidance already requires inspection to include this. Therefore, there will be no changes in the costs to businesses as the current system will not change under this option.

19 Retaining the threshold for inspections at effective rated output of more than 12kW would be in line with government policy of diverging from EU Directives where this is to meet UK government objectives and in this case the Government commitment to net zero carbon buildings by 2050 requires all opportunities for carbon saving to be encouraged.

Implementation plan

20 The arrangements for the inspection of air-conditioning systems with an effective rated output of more than 12kW are already in effect through the Energy Performance of Buildings Regulations.

21 The enforcement body for these arrangements is Local Government Local Weights and Measures Authorities.

22 Following the transposition of the Energy Performance of Buildings Directive 2018/844 EU into UK regulations and following the end of the EU Withdrawal

Transition Period, further changes could be considered to improve the energy performance of buildings regime.

Monetised and non-monetised costs and benefits of each option (including administrative burden)

23 The costs and benefits of two policy options were assessed:

- Option 1: Only inspect all systems with an effective rated output of more than 70kW
- Option 2: Inspection of all systems with an effective rated output of more than 12kW (Counterfactual)
- As the counterfactual, Option 2 is considered to have no relative costs and benefits since it is a continuation of the current system. As such, all costs and benefits of Option 1 are relative to Option 2.

24 Costs and benefits for each option were assessed as follows:

- The primary costs were those of inspection. Inspection costs were estimated by multiplying the assumed number of inspections likely under each policy option, by the assumed average cost per inspection.
- The primary benefits were derived from estimated energy savings resulting in (i) reduced energy use by firms and hence energy cost savings and (ii) reduced carbon emissions.
- Costs and benefits were assessed over a 10-year policy period, with values adjusted to net present values, applying a 3.5% discount rate.

25 The analysis necessarily relies on a number of assumptions. To reflect the uncertainty regarding some of the assumptions, low, medium and high scenarios were modelled:

- The low scenario reflects high inspection cost assumptions and low energy cost saving and avoided carbon emission assumptions.
- The high scenario reflects low inspection cost assumptions and high energy cost saving and avoided carbon emission assumptions.
- When not specified, all costs and benefits are taken from the medium scenario.

Summary of results

26 Table 1 shows estimated costs of inspections for Option 1, relative to the counterfactual. Increasing the threshold to 70kW reduces the number of required inspections and therefore reduces the costs incurred by businesses to comply with

the regulations by £24m over the 10-year appraisal period. This figure differs from the consultation estimate due to a change in the estimated number of buildings with air-conditioning systems and the rate of compliance.

27 However, the lower number of inspections will mean that there are fewer energy savings being achieved as a result of assessor recommendations. Therefore, increasing the threshold leads to £56.7m in lost energy savings and £5.9m in extra carbon emissions relative to the counterfactual. Option 1 therefore has a net cost of £38.6m.

Table 1: Summary of costs and benefits	
	Option 1
Reduction in inspection costs (£m)	24.0
Total benefits (£m)	24.0
Reduction in energy savings (£m) Reduction in CO_2 savings (£m)	(56.6) (5.9)
Total cost (£m)	(62.6)
Net benefit/(cost) (£m)	**(38.6)**
Equivalent annual net benefit/(cost) to businesses (£m)	**(3.6)**
Amount of gas saved (GWh)	**-**
Amount of electricity saved (GWh)	(460)
Amount of CO_2 saved - non-traded (MtCO2(e))	-
Amount of CO_2 saved - traded (MtCO2(e))	(95.7)
Cost effectiveness – non-traded (£/tCO2)	-
Cost effectiveness – traded (£/tCO2)	(341)

Cost of inspections

28 Increasing the threshold to 70kW for air-conditioning systems reduces the number of necessary inspections that are carried out. This is turn results in lower costs to businesses as many will no longer have to pay for an inspection if they have an air-conditioning system with an output between 12kW and 70kW.

29 The number of landmark TM44 lodgements in previous years suggests there are approximately 12,500 inspections carried out each year, with responses to the previous consultation suggesting that of these inspections, 71% were for systems between 12kW and 70kW and only 29% for systems above 70kW. This means that increasing the threshold would lead to 8,900 fewer inspections each year.

30 This translates to a 20% compliance rate, with an estimated 330,000 buildings with an air-conditioning system.

31 The consultation responses also offered a wide range of costs per inspection, which resulted in a mid-range estimate of £313 to inspect an air-conditioning system between 12kW and 70kW and £625 to inspect a system above 70kW.

32 The change in inspection costs for Option 1 relative to the counterfactual can be found in Table 2.

Table 2: Change in Inspection Costs over 10-year appraisal period	
Number of systems inspected (12kW-70kW) Number of systems inspected (70kW+)	89,355 36,497
Total systems currently inspected (12kW+)	125,852
Cost of inspections (12kW-70kW) (£m) Cost of inspections (70kW+) (£m)	24.0 19.6
Total cost of inspections (12kW+) (£m)	43.7
Net benefit/(cost) of Option 1 from inspection costs (£m)	**24.0**

33 The current cost to businesses inspecting systems with outputs between 12kW and 70kW is £24m. Increasing the inspection threshold will remove the need to carry out these inspections and so creates a £24m benefit for Option 1 relative to the counterfactual.

Energy Usage and Carbon Savings

34 Reducing the number of inspections, as Option 1 does, decreases the number of opportunities for energy assessors to identify resolvable issues with systems that could yield energy and carbon savings.

35 Based on responses to the consultation we estimate that on average an air-conditioning system between 12kW and 70kW will use 68.6 kilowatt-hours (kWh) in a year and a system above 70kW will use an average of 858kWh annually.

36 The results of this analysis can be seen in Table 3.

Table 3: Change in Energy Savings over 10-year appraisal period	
Total energy usage of small systems (12kW-70kW) (GWh) Total energy usage of large systems (70kW+) (GWh)	6,133 31,314
Total in scope energy usage (12kW+) (GWh)	37,448
Total energy savings from inspections (12kW-70kW) (GWh) Total energy savings from inspections (70kW+) (GWh)	460 939
Total energy savings from all inspections (12kW+) (GWh)	1,399
Value of energy savings from inspections (12kW-70kW) (£m)	56.6
Value of energy savings from inspections (70kW+) (£m)	115.7
Value of energy savings from all inspections (12kW+) (£m)	172.3
Net benefit/(cost) of Option 1 from energy savings (£m)	**(56.6)**

37 Raising the inspection threshold would mean that all the energy savings achieved as a result of the inspection regime for systems between 12kW and 70kW would no longer be realised. This would lead to 460GWh fewer energy savings, which would forfeit the owners of these systems £57m in reduced energy costs.

38 This reduction in potential energy savings also reflects a missed opportunity to decrease carbon emissions from these air-conditioning systems. Lowering the usage of air-conditioning systems would lead to less CO_2 emissions, which would help the government achieve its target of being net zero by 2050.

39 Table 4 shows carbon savings as a result of the inspection regime and the effects of Option 1 relative to the counterfactual over the 10-year appraisal period.

Table 4: Change in carbon emissions over 10-year appraisal period	
Avoided carbon from inspections (12kW-70kW) ($MtCO_2e$) Avoided carbon from inspections (70kW+) ($MtCO_2e$)	95.7 195.4
Total avoided carbon from inspections (12kW+) ($MtCO_2e$)	291.0
Value of avoided carbon (12kW-70kW) (£m) Value of avoided carbon (70kW+) (£m)	5.9 12.1
Total value of avoided carbon (12kW+) (£m)	18.1
Net benefit/(cost) of Option 1 from carbon emissions (£m)	**(5.9)**

40 The lower amount of energy savings caused by Option 1 raising the threshold would result in 95.7$MtCO_2e$ fewer carbon savings resulting from inspections. This is valued at a cost of £5.9m relative to Option 2, the counterfactual.

Sensitivity Analysis

41 It is possible that for Option 1 the higher inspection threshold will lead to a greater rate of compliance with the air-conditioning regime. A more narrow, targeted inspection approach may lead to more inspections of systems with an effective rated output of more than 70kW, with significant spare capacity for inspections given the removal of 12kW to 70kW systems from the regime.

42 Table 5 shows the results of increasing the air-conditioning inspection threshold to 70kW with the compliance rate increasing to 40% after 3 years of the new system across the 10-year appraisal period.

Table 5: Summary of costs and benefits for Option 1 with a 40% compliance rate	
	Option 1
Reduction in inspection costs (£m)	6.2
Increase in energy saved (£m Increase in CO_2 avoided (£m)	49.1 5.7
Total benefits (£m)	54.8
Net benefit/(cost) (£m)	**61.0**
Equivalent annual net benefit/(cost) (£m)	**7.1**
Amount of gas saved (GWh)	**-**
Amount of electricity saved (GWh)	417
Amount of CO_2 saved - non-traded (MtCO2(e))	-
Amount of CO_2 saved - traded (MtCO2(e))	76.5
Cost effectiveness – non-traded (£/tCO2)	-
Cost effectiveness – traded (£/tCO2)	722

43 With compliance rates increased to 40% for systems above 70kW, there is still a reduction in the number of inspections from the counterfactual, however this reduction is lower than Option 1 under normal compliance rates, with a saving of £6.2m.

44 The increased rate of compliance leads to greater reductions in energy used and carbon emissions than the counterfactual, despite there being less inspections overall. This is because due to the higher output of these systems, the potential energy saving for a larger system is greater than for a smaller one.

45 This leads to 417GWh of less energy used and 76.5 MtCO2(e) in lower carbon emissions valued at a total benefit of £54.8.

46 Overall, Option 1 with a 40% compliance rate leads to a net benefit of £61m over the 10-year appraisal period.

Risks and assumptions

47 The calculations depend on a number of assumptions. Some are supported by a fairly good evidence base, but some are not, and the analysis relies on a number of significant assumptions regarding these. The assumptions for which there is greatest uncertainty are:

- Number of inspections p.a. – there are data on historic inspections but compared to the estimate of the number of buildings with systems that are in scope, compliance appears very low. It is not clear whether this is due to a lack of awareness of the requirement or a conscious decision to avoid inspections due to the low chance of being caught. The analysis uses a range for number of annual inspections –this is based on the high/low annual historic figures, rather than assuming any change in the level of compliance.

- Cost per inspection – the consultation suggested a number of different inspection costs. To reflect this, the analysis uses a broad range provided by consultees.

- Benefit of inspections – there is no clear evidence of how building owners have acted on the advice they receive following an inspection. Consultees suggested a relatively wide range of potential improvements. The analysis uses a range reflecting this to model the benefits. This is the most uncertain element of the calculations.

Wider impacts (consider the impacts of your proposals)

Economic and Financial Impacts

Small Businesses

48 Small businesses within the energy assessment of buildings industry include the accreditation schemes that manage the accreditation of energy assessors and lodgement of certificates, energy assessors undertaking the inspections, air-conditioning maintenance and installers and building owners with air-conditioning systems. The most significant impact of a change to the threshold requiring an air-conditioning inspection report for energy efficiency would be to energy assessors, particularly sole traders/micro/small businesses. Their market would be significantly reduced, and this would make many businesses unviable. Accreditation schemes would also be affected, particularly those that specialise in air-conditioning assessments.

49 The reduction in the numbers of assessments and assessors would reduce the skills base of air-conditioning professionals at a time when emphasis is set to increase on the energy efficiency of buildings due to the UK government commitment to net zero carbon buildings by 2050.

50 This impact on micro/small businesses and potential loss of skills at a point where energy efficiency of buildings is considered a requirement to address carbon emissions and climate change, was a reason for maintaining the air-conditioning energy assessment threshold at an effective rated output of more than 12kW.

Compliance impact

51 The present Energy Performance of Buildings Regulations provides for air-conditioning systems with an effective rated output of more than 12kW to be subject to an energy efficiency Air-conditioning Inspection Report once every five years. These inspection reports are to be stored on a national register. The number of air-conditioning inspection reports produced is lower than the expected numbers of buildings in England and Wales that should require an inspection.

52 We aim to consider the energy performance of buildings regime in the future, potentially including ways in which to improve compliance with these regulations, ensuring that building owners receive advice and opportunities to improve the energy efficiency of more air-conditioning systems.

Social Impacts

Health and wellbeing impacts

53 Improvement in the energy efficiency of air-conditioning systems in buildings to reduce energy use and carbon emissions could contribute to reducing the effects of climate change. As temperatures increase the numbers of smaller air-conditioning systems and heat pumps that are installed in buildings for heating and cooling, are likely to increase in newly constructed buildings and retrofitted to existing buildings. They may be increasingly provided in domestic buildings. Increasing use of air-conditioning systems in buildings to maintain the comfort and wellbeing of occupants would likely in future increase the energy usage overall of air-conditioning systems unless the energy efficiency of systems is improved. It is therefore important to maintain and increase the focus on improving the energy efficiency and reducing the carbon emissions from air-conditioning systems in order to meet the UK government target of net zero carbon emissions by 2050.

54 Ventilation of buildings is a key health issue at present due to the ongoing Covid-19 pandemic. Advice from air-conditioning system professionals and the Health and Safety Executive highlight that air-conditioning systems should be set up to improve outside ventilation for indoor spaces to best prevent/reduce the spread of the Covid-19 virus within buildings. Requirements to maintain air-conditioning systems to ensure their efficient operation have added importance beyond reducing energy use. Reducing the requirement to have air-conditioning inspections for smaller kW output systems may send the wrong signal that maintenance and effective operation of these systems is a key issue for health, not only for improving energy efficiency of systems and comfort of building occupants.

Monitoring and Evaluation

55 There is potential to undertake further policy development in this space to help to meet the Government's objective of net zero carbon emissions target by 2050. Whilst we recommend retaining the regime, we need to look at the most effective approach to improving the energy efficiency of cooling systems, including through better compliance and enforcement, as part of wider work to consider the future of the energy performance of buildings regime.