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## Review

# Minimum energy efficiency standards in the commercial real estate sector: A critical review of policy regimes

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## ABSTRACT

Given the significance of carbon emissions from the existing building stock, this paper aims to provide an international comparative analysis of pioneering policies on minimum energy efficiency standards in the Scottish, English/Welsh, Dutch and French commercial real estate sectors. These are the four national policy regimes to employ these policy instruments to date with varied timelines spanning from 2009 to 2050. The methodological approach employs a document review of policy texts produced by policy makers and other stakeholders. The four policy regimes are evaluated in terms of their policy design focussing on minimum performance standards, forward guidance, scope and exemptions. A key finding is that, given the range of intervening factors, side-effects and uncertainties, there are difficult choices in striking a balance between phasing implementation, providing forward guidance and adjusting policy in response to evaluation. Whilst it was initially expected that most European Union jurisdictions would default to an Energy Performance Certificate related standard, our findings show that there has been a shift towards standards that are linked to actual rather than modelled energy consumption. However, for leased stock where the owner may have limited operational control, the separation of owners' responsibility for compliance and the users' responsibility for operations makes designing consumption-based instruments more challenging. It is concluded that a central issue in policy design has been the trade-off between minimising the financial costs to property owners and occupiers of complying with performance thresholds and maximising reductions in energy consumption. There is growing recognition that regulatory economies of scale may be achieved by targeting large properties which allows for a large proportion of the total area of the stock to be covered whilst exempting a large proportion of transactions or properties.

## 1. Introduction

According to the [World Green building Council \(2019\)](#), buildings account for 39% of energy related global CO<sub>2</sub> emissions with 28% coming from operational carbon and 11% generated by the embodied carbon in energy used to produce building and construction materials. The influential IPCC Sixth Assessment Report estimated that the energy demand from buildings in 2019 was 128.8 EJ worldwide, accounting for 31% of global final energy demand. CO<sub>2</sub> emissions from buildings in the same year were 50% higher compared to the 1990 baseline value. Overall, 30% of the global final energy demand from buildings was

consumed by the non-domestic stock ([Cabeza et al., 2022](#)). In the European Union, it has been estimated that 75% of the building stock is energy inefficient ([European Commission, 2019](#)). The focus of this paper is on emerging policy instruments in Europe that target the reduction of operational carbon in non-domestic buildings. As part of the third revision of the Energy Performance of Buildings Directive, the European Commission has proposed to advance a phased introduction of mandatory minimum energy performance standards for existing buildings ([European Commission, 2021](#), see also [Economidou et al., 2020](#) for a review of the EPBDs). In the consultation exercises related to this revision, a number of surveys have found that MEPS<sup>1</sup> are the instrument

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<sup>1</sup> Minimum energy performance standards (MEPS) is a common term used to refer to regulations specifying requirements for products in terms of their design in order to limit energy consumption. It is also commonly used in the context of buildings. Minimum Energy Efficiency Standards (MEES) is the specific term used in the UK government's legislation to describe their minimum energy performance standards for existing buildings. Building codes normally specify minimum energy performance standards for new buildings and major renovations of existing ones.

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most strongly preferred by market participants (see [Vermaut, 2021](#); [Sunderland and Santini, 2020](#)).

This paper compares and evaluates four pioneering policy instruments for minimum energy efficiency standards (MEES) for the existing building stock in the commercial real estate sectors of England/Wales, Scotland, the Netherlands and, most recently, France. England/Wales and Scotland have actually implemented minimum standards whilst the Dutch have announced their intention to implement them in 2023. The French government passed legislation in 2020 detailing its minimum energy performance standards for non-domestic (*tertiare*) buildings. The UK (with very different policy instruments for Scotland compared to England and Wales)<sup>2</sup> has had the longest experience of designing and implementing policy in this area. Consequently, the comparative policy analysis inevitably draws a lot upon the UK experience and feedback from stakeholders. This feedback has been generated by various rounds of consultation initiated by policymakers and has resulted in changes to policy design.

Focussing on the underlying logic of each policy instrument, the paper provides the first international comparative analysis and critically evaluates the key components of the different policy designs of MEES in the real estate sector. The main focus of this paper is on evaluating policy design outcomes rather than analysing the policy formulation process. Comparative evaluation of policy design is particularly pertinent in this context since it is likely that other jurisdictions will adopt minimum energy performance standards. It has long been recognised that, due to the effects of decision heuristics, policy design outcomes are often influenced by similar policies in other locales ([Schneider and Ingram, 1988](#)). [Polsby \(1985, 66\)](#) concluded that policy innovation tends to come from “comparative knowledge ... of the ways in which problems have been previously handled elsewhere”. The analysis in this paper is particularly pertinent given the advocacy of Minimum Energy Performance Standards by the European Union.

In 2018, the review of the European Union's Energy Performance of Buildings Directive suggested to Member States that

“To further support the necessary improvements in their national rental stock, Member States should consider introducing or continuing to apply requirements for a certain level of energy performance for rental properties ...” ([European Union, 2018](#), paragraph nine).

There is an ongoing academic debate about the extent to which environmental regulation will be driven by top-down, supra-national political-regulatory integration relative to bottom-up, diffusion of regulatory instruments from national policymakers ([Driessen et al., 2012](#)). In practice the distinction may not be clear cut. For instance, in 2009 the nature of the interrelationships involved in policy formation were set out by the Scottish Minister for Transport, Infrastructure and Climate Change.

Officials work closely with Westminster because approximately—this is a broad-brush figure—one third of activity in Scotland that will matter to the climate change agenda is the responsibility of Westminster and two thirds is the responsibility of the Scottish Government. It is natural and necessary that we should work together, and indeed that we should work with Europe ([The Scottish Parliament, 2009](#) no pagination).

For minimum energy performance standards in the commercial real estate market, four national governments have been introducing environmental policy innovations often in reaction to or framed by supra-national policy initiatives. The Scottish, UK, Dutch and French governments have been pioneering these types of policy instruments. The

policy designs and early experiences of these countries provide an opportunity for lesson-drawing or policy learning. Hence, whilst there are good grounds to expect further adoption of MEES for the existing building stock, there has been limited comparison and evaluation to date of the four policy instruments announced or introduced. Drawing upon a document review of materials produced by policy makers and other stakeholders, this paper provides the international comparative policy analysis of MEES policy in the real estate sector.

The remainder of the paper is organised as follows. The first sections provide a discussion of background to the policies' introductions, the (implicit) policy theory and theoretical perspectives on policy strictness. This is followed by a discussion of the particular challenges in real estate markets created by the separation of ownership and use for rental properties and a review of the limited quantity of related academic literature on MEES policies in the real estate sector. The next section outlines the research method applied which is based upon a document review. Drawing upon the document review, a critical comparison of the different policy designs is presented. Finally, focussing on potential lessons for policy makers, conclusions are drawn.

## 2. MEES: an overview

### 2.1. Policy background and context

Initially driven by the oil shock in the 1970s and, more latterly, by growing concern about climate change, Minimum Energy Performance Standards (MEPS) have become increasingly prevalent for many consumer and production goods. Linked to actual or modelled performance, MEPS commonly command minimum energy efficiency performance. In England and Wales, it seems to have been market failure encapsulated in an ‘energy efficiency gap’ that has explicitly led to a ‘command-and-control’ policy intervention in the commercial and residential real estate sectors. The quotation below from the UK government's own impact assessment of the policy reflects its frustration at a perceived failure of market mechanisms.

“Various approaches have been tried in the past to improve the energy efficiency of the PRS.<sup>3</sup> These include voluntary approaches, information services, tax breaks for landlords, and subsidies for the installation of energy efficiency measures ... These approaches have been unsuccessful in overcoming the market barriers ...” ([Department for Energy and Climate Change, 2015](#)).

One of the main purposes of MEPS is to remove the most environmentally harmful products from a market. MEPS avoid the information failures that the energy efficiency gap indicates are prevalent in energy markets and their simplicity can be attractive to market participants (see [Deloitte, 2014](#) for a survey of stakeholders in the real estate sector). In the Netherlands, the introduction of MEES for the office sector seems to have been triggered by a relatively sudden perceived urgency to meet climate change targets embedded in national and supra-national agreements. The Dutch Ministry of Interior and Kingdom Relations' (*Ministerie van Binnenlandse Zaken en Koninkrijksrelaties - Min. BZK*) report<sup>4</sup> on the consultation roundtable before the announcement of the legislation stated that

“... the urgency of taking additional measures in relation to the agreements in the *Energieakkoord*<sup>5</sup> is growing because progress monitoring shows that savings are too low. The target is 100 PJ of

<sup>3</sup> Private Rented Sector.

<sup>4</sup> This document is not in the public domain and was obtained from the Ministry of Interior and Kingdom Relations upon request.

<sup>5</sup> Reference here is to the *Energieakkoord voor duurzame groei 2013* – ([Sociaal Economische Raad, 2013](#)).

<sup>2</sup> Within the UK there are three devolved administrations for Scotland, Wales and Northern Ireland. Energy is a devolved policy matter for Scotland whilst the UK Government is responsible for energy policy in England and Wales.

**Table 1**  
Timeline of key policy events across the four regimes.

Key dates	Key policy event
2009	Scotland introduces MEES policy in Climate Change Act 2009).
2011	England and Wales MEES policy introduced in 2011 Energy Act.
2015	England and Wales introduced the energy efficiency (private rented property) regulations.
2016	The Netherlands MEES policy is added as Article 5.11 of the 2012 Building Code ( <i>Bouwbesluit</i> ).
2016	Scotland implements MEES policy.
2018	England and Wales implement MEES policy.
2019	France introduces MEES policy in Decree 2019-771.
2020	England and Wales confirms in the Energy white paper that the future trajectory for the non-domestic minimum energy efficiency standards (MEES) will be EPC B by 2030.
2021	European Commission proposes a phased introduction of mandatory minimum energy performance standards for existing buildings in its third revision of the EBCPD.
2021	England and Wales consultation on government's proposals to introduce a national performance-based policy framework for commercial and industrial buildings above 1,000m <sup>2</sup> .
2023	The Netherlands implements MEES policy.
2023	England and Wales coverage extended to all leased stock.
2030	France first phase cut-off date for MEES compliance
2040	France second phase cut-off date for MEES compliance
2050	France third phase cut-off date for MEES compliance

energy savings by 2020 whereof 28 PJ will be saved from office properties.<sup>6</sup> This figure is now 10–12 PJ.” (2016, 1)

However, despite this perceived urgency, only the office sector was covered by the MEES policy in the Netherlands. In contrast, the more recently announced French instrument targets all buildings in which activities of the tertiary economic sector are being carried on. Table 1 below shows the timeline indicating each policy regime's key events including announcement and implementation dates.

In this context, the introduction of MEES into the energy efficiency policy mix is framed as a policy innovation. The introduction of MEES into energy efficiency policy formation seems to fit comfortably into a rationalist policy formulation model such as the ‘Rationale → Objectives → Appraisal → Monitoring → Evaluation → Feedback’ cycle. Albeit, for the UK specifically, it could be argued that wider policy instability and inconsistency in the energy efficiency sphere sometimes more closely reflects Lindblom's (1959) depiction of *ad hoc*, incremental, policy evolution by a ‘muddling through’ process of trial-and-error. It is also worth acknowledging that there can often be hidden or private policy venues or deliberative arenas where selected (sometimes expert) stakeholders have prioritised access to government. If undocumented or confidential, it can be particularly challenging to identify the rationale for specific choices in policy design. Evidently, policy formation is also a dynamic process. Howlett and Rayner (2007) analyse the complex development of policy mixes over time in terms of layering (adding new goals and instruments to existing ones), drift (changing policy goals without changing policy instruments), conversion (changing instruments without changing goals) and replacement (fundamentally restructuring both goals and instruments in a deliberate and coherent manner). Aspects of these concepts can be seen in the formation and evolution of MEES policies.

## 2.2. Policy theory of MEES instruments

Mainly implicit, for the commercial real estate sector the broad policy theory of market transition seems to be that the prohibition of the supply of the least energy efficient commercial buildings will result in

decreased greenhouse gas (GHG) emissions. It is expected that the owners and/or users of affected buildings will be forced to replace, improve or simply not operate them. Improvements in energy performance are then expected to result in reduced GHG emissions. However, multiple outcomes and side-effects may also be theorised. Expected improvements to the building stock will self-evidently lead to a better (but potentially more valuable and/or more costly) building stock which, in turn, may lead to lower energy costs and better business performance/productivity for the users. Depending on presence and levels of subsidies, owners and/or users will inevitably incur some short-term direct and indirect costs associated with required works. In the wider market, the quantity of product (commercial real estate) supply and demand is expected to be affected which should, in turn, affect availability and prices. The range of intervening factors and side-effects are summarised in Fig. 1. The list of potential co-benefits associated with higher energy efficiency is extensive including future-proofing, increased occupier and investor demand, improved indoor environmental quality and the subsequent enhanced user satisfaction, among others (see IEA, 2019 for a detailed overview).

The extent to which the policy is effective will depend on intervening factors related to detailed policy design e.g., the scope of the stock affected, the robustness of the metric for energy performance and the policy implementation mechanisms. It will also be affected by the specific market and institutional context. If buildings are upgraded to comply with a MEES policy instrument, it may not necessarily be the case that energy consumption will be reduced. For instance, a key intervening factor will be the extent of rebound effects.

Whilst the choice between regulatory policy instruments and economic policy instruments is not mutually exclusive with numerous possible policy mixes, the regulatory approach can be a last resort (see also Bertoldi, 2022 for a summary of additional policy mechanisms). However, the risk from command-and-control instruments is government failure. A range of potential problems has been identified; regulatory capture, over-regulation, inappropriate standards, weak enforcement and potential high costs compared to alternative policy instruments (see Sachs, 2012 for a discussion). Kivimaa and Kern (2016) describe command-and-control policy instruments as (creatively) destructive, disruptive and the strongest form of regulatory pressure. However, the extent of any creative destruction and/or disruption will ultimately depend on the strictness of the policy instrument. If minimum standards are too strict, resources may be allocated in a highly economically inefficient manner compared to alternative policy instruments. If they are too permissive, significant environmental and economic benefits may be foregone.

A key issue then in MEES policy design is the ‘strictness’ of the proposed policy. Policy makers are faced with the problem of designing policies that achieve an optimal level of policy ‘strictness’. The UK government's explicit policy priority seems to have been to minimise the costs of MEES policy. In a government response to a policy consultation in 2014, it was stated that the regulations will ensure that only “... cost effective improvements are required under the regulations” (Department for Energy and Climate Change, 2015). In terms of policy design, due to market imperfections there can be a high degree of uncertainty about the level of marginal costs and benefits.

The basic trade-off between different levels of policy strictness and patterns of marginal costs and benefits is illustrated in Fig. 2. MC1 represents a scenario where the rate of increase in marginal costs from implementing improvements in energy efficiency is high. MB1 represents the scenario where the rate of decrease in marginal benefits from improvements in energy efficiency is also high. PS1 represents a relatively lax policy regime since it is economically inefficient to increase policy strictness beyond this point. In contrast, MC2 and MB2 represent a scenario where the stock displays slower rates of change in the marginal costs and benefits from improvements in energy efficiency. An increased level of policy strictness is now optimal with higher energy efficiency gains for the same level of initial investment (point I). For a

<sup>6</sup> We have received feedback that this figure is likely to represent the total for all non-domestic buildings rather than just the commercial office sector.



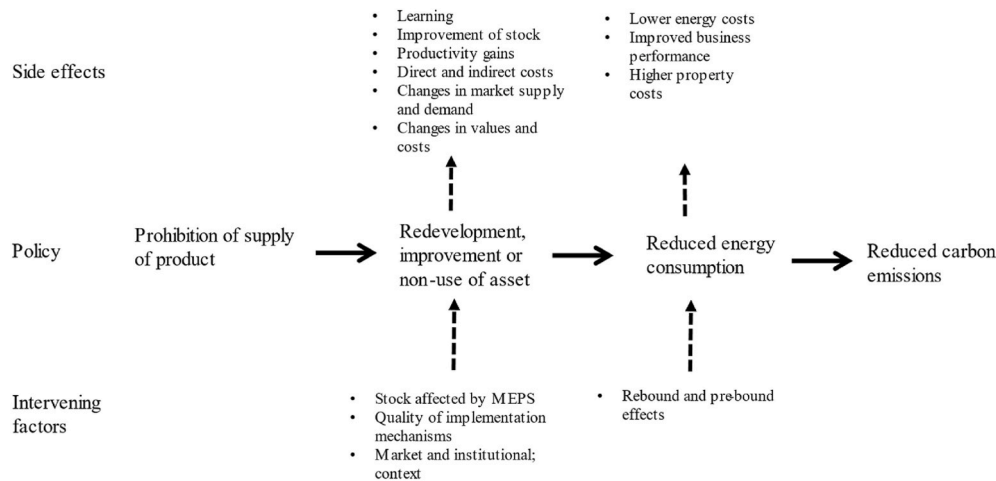


Fig. 1. MEES in commercial real estate: a framework of market transition.

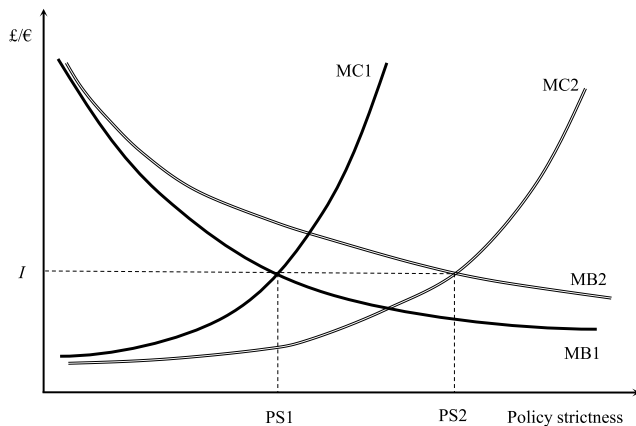


Fig. 2. Trade-offs between different levels of policy strictness and patterns of marginal costs and benefits.

given level of initial investment the optimal level of policy strictness varies with the rates of change in the marginal costs and benefits. In reality, for every individual asset there will be variation in the cost of compliance with a policy regime. At the aggregate level, the rates of change in the marginal costs and benefits are subject to substantial uncertainty.

Given that costs of policy compliance may vary significantly between individual properties, a cost-linked exemption may be used to target properties where the cost-benefit trade-off of energy efficiency improvements is poor. As a result, it is expected that there will be a decrease in the total cost of compliance if the policy is able to target properties where the marginal costs of abatement are relatively low. In order to reduce disruption costs, compliance can also be linked to events that enable property upgrades where indirect costs are minimised. Alternatively, subsidies and/or other financial incentives may be offered to reduce marginal costs and increase marginal benefits. In a market characterised by imperfect information and significant uncertainty about levels of marginal benefits and costs, policymakers may phase the introduction of MEES regulations in order to test these levels and modify instruments as new information is generated.

It is important to emphasise the interconnectedness of the different aspects of the MEES policy design in this context. A strict minimum energy performance standard is likely to be largely immaterial if only a small proportion of the stock is affected and/or exemptions are straightforward to obtain. In turn, if enforcement procedures and penalties are weak, then even if the proportion of the total stock affected is

high, the policy may have little impact. Alternatively, if income streams are interrupted and direct and indirect costs of building modification are high, an apparently undemanding minimum energy performance standard may impose relatively large costs on some market participants. A range of variants of these approaches to policy design can be observed in the experience of the Scottish, English, Dutch, and French MEES instruments.

### 2.3. The commercial real estate sector: separation of ownership and use

An important feature of the commercial real estate sector is that a substantial proportion of the stock is leased. According to BEIS<sup>7</sup> (2021) estimates, rented buildings make up 61% of the total non-domestic stock in England and Wales, and account for 37.5% of the total emissions from non-domestic buildings. The Dutch Association of Real Estate Brokers and Valuers<sup>8</sup> estimates that rented office space of 500 m<sup>2</sup> or larger made up 65% of the total stock in 2011 and 64% in 2020 (Nederlandse Coöperatieve Vereniging van Makelaars En Taxateurs in Onroerende Goederen, 2021). Given that compliance with MEES is usually the responsibility of the owner, the fact that ownership and use are separated for a substantial proportion of the stock creates a range of issues. Fundamentally, the owner typically wishes to maximise the investment returns from the asset and the user wishes to maximise the contribution of the building to the performance of their business or other activity. Arguably, one consequence of the sometimes divergent interests of owner and user is a highly contractualised (and often conflictual) relationship with the owners' and users' respective 'musts' and 'must nots' set out in lease agreements.

The prevalence of leasing may partly explain the focus of the limited amount of previous academic research on landlord and tenant issues. During the lease period, there is essentially joint (but usually not equal) control of and responsibility for the building structure and services between the owner/landlord and the occupier/tenant (see Patrick et al., 2018; Mulliner and Kirsten, 2017). Moreover, the allocation of control and responsibilities is variable between different types of building and lease. Given that typical lease agreements differ between national markets, there are also international variations in the control of and responsibility for buildings and their operation. A well-known misalignment is that owners may have little incentive to invest in energy saving improvements to buildings or their operation that will mainly benefit users (see Castellazzi et al., 2017 for further detail). In

<sup>7</sup> Department of Business, Energy and Industrial Strategy.

<sup>8</sup> Nederlandse Coöperatieve Vereniging van Makelaars En Taxateurs in Onroerende Goederen in Dutch, widely known with its acronym NVM.

turn, users may not be incentivised to invest in energy saving technologies since their expected length of occupation may not be sufficient to justify investment.

In the UK, for buildings occupied by a single tenant, it is standard for the occupier to be responsible for the maintenance of the building and its services, the operation of the building and the operations in the building. The occupier then determines the consumption of energy and jointly controls with the owner what can happen to and in the building – subject to the terms of the lease agreement. Typically, whilst there can be tests of reasonableness and complex legal frameworks, owners and occupiers cannot modify buildings without mutual consent. The owner commonly receives little information about energy consumption over which they have minimal control. One longstanding issue with the operation of introduction of Energy Performance Certificates (EPC)<sup>9</sup> has been that they are based on buildings' attributes before they are occupied by users who tend to modify them before and during actual occupation. A lot of these issues for commercial properties are alluded to in the Better Buildings Partnership's Climate Commitment framework that refers to the wide-ranging ownership structures, leasing models and management control throughout their life cycle. Landsec, one of the largest commercial real estate landlords in the UK, estimate that indirect emissions (caused by their activities but not controlled by them) account for nearly 90% of their total emissions (see Landsec, 2020).

For multi-tenanted buildings with common areas and some shared services, owners tend to have a much greater degree of responsibility for and operational control of buildings. However, across the investigated countries it is typical that most costs associated with the maintenance and operation are recovered from the users through a service charge. The separation here is between responsibility for supply of services and responsibility for payment for services. This separation has been a common source of conflict between owners and users. Users often argue that owners do not have sufficient incentives to operate buildings efficiently and have counterincentives to try to recover as much funds as possible from occupiers (see Eccles, 2020). The situation is further complicated by the fact that a large proportion of institutional owners outsource the operational management to a network of third-party fund, asset, property and facilities managers who may, in turn, use third party specialist contractors themselves (see Baum and Hartzell, 2012). This dispersed authority for building operations exacerbates the separation of responsibility for compliance with MEES from responsibility for operating the building. In contrast, for the owner-occupied properties, the owner and the users are the same entity with the same party being responsible for operational performance and compliance with energy regulations.

#### 2.4. Previous research on MEES policy evaluation

There are a number of publications by non-governmental organisations providing international overviews of MEES for existing buildings (see Hinge and Brocklehurst, 2021; Sunderland and Santini, 2021). However, their emphasis is mainly on description rather than evaluation of the various policy instruments some of which are at a city/regional scale and/or applied to residential markets only. A common theme in the literature is concern about the suitability of EPCs as an appropriate performance benchmark. EPC or equivalent has been the basis of the minimum performance standard in the Netherlands and England/Wales. Organ (2021) rather narrowly focuses on some of the technical

limitations of EPCs for MEES in the UK context. However, the main problem is an energy performance gap between energy ratings based on hypothetical performance (such as the EPC) and actual energy consumption in use. Better Buildings Partnership (2021) find that, in the UK, offices rated C and D have slightly lower energy consumption than offices rated B. Research by Innovate UK found that, when comparing modelled Building Emissions Rates (BER) based on the specification with actual rates, only one building out of 50 produced emissions similar to those predicted.

The rest produced from 1.8 to 10 times the emissions rate used to show compliance with Building Regulations. The average was carbon emissions 3.8 times higher than the BER design estimate ... (Innovate UK, 2016, 20)

A significant number of studies have found a negative correlation between hypothetical and actual consumption (Jones Lang LaSalle, 2012). In 2014, this concern was raised in a Green Construction Board report. It was argued that policy design should be based on sound analysis of building performance to increase confidence that forecasted energy, cost and carbon savings are achieved in practice. There was concern that calculated savings may not be realised due to consumption patterns changing, modelling errors or a design/performance gap (Green Construction Board, 2014).

Rebound effects are a common issue for policy design in this area. Potential energy savings due to modifications to buildings' structures and services that occur because of new minimum standards may be absorbed by improvements in thermal comfort or lighting rather than producing reduced energy consumption. Sunikka-Blank and Galvin (2012) identify prebound effects as another problematic issue. A prebound effect is characterised by average energy consumption in older buildings being consistently lower than their calculated energy ratings. Since energy that is not being consumed cannot be saved, this may provide part of the explanation of why energy savings from building upgrades are often not as high as expected. There is a possibility of perverse effects and there is growing calls for policy instruments to target actual rather than hypothetical consumption. It is notable that the Department for Energy and Climate Change's Impact Assessment of MEES for England and Wales had minimal reference to rebound effects.

Given the timescales, it is perhaps not surprising that there has been limited academic research on the introduction of MEES. Focussing on the London office market and on buildings which had improved their EPC rating from F and G, McAllister and Nase (2019) attempted to identify the impact of the proposed introduction of MEES in the period prior to their implementation in 2018. They found little evidence of additionality with a very low proportion of London office property owners taking action prior to policy implementation. It was concluded that a Department for Energy and Climate Change (2015) prediction of 2% of total carbon savings being achieved in 2013–2017 was optimistic. Reporting on an interview survey with market participants, Patrick et al. (2018) categorised investors' strategies as falling into 'active', 'protective' and 'avoidant'. However, even for investors categorised as active, the main intervention was to identify rather than execute actions prior to implementation. Similar to Mulliner and Kirsten (2017), they focussed on the effects of MEES on owner and occupier rights and responsibilities such as rights of access to carry out works, provisions in service charge clauses for cost recovery, potential impacts of tenants' alterations, rent review negotiations *inter alia*. This focus on landlord and tenant issues illustrates the complex mechanisms in which the policy is transmitted to operational management in leased properties.

Most policy evaluation in the UK has taken place after the announcement that the government intended to introduce minimum performance standards and before actual implementation. Most policy evaluation in the pre-implementation stage involved a blend of government impact assessment, impact assessment by industry and professional bodies and consultation exercises. Prior to implementation of the English/Welsh MEES instrument, a Working Group was set up as

<sup>9</sup> Energy Performance Certificates (EPC) are commonly used across the EU to provide information of energy performance. It is likely that they will become the basis for MEPS in buildings in jurisdictions where MEPS are currently not present or planned i.e., most countries in the European Union. It is worth noting that different assessment methodologies are used across different, usually national, jurisdictions (see Sample and Jenkins, 2020). As a result, EPC ratings are not comparable across the different jurisdictions.

part of a consultation exercise<sup>10</sup>. The main concerns emerging related to disruption costs due to compliance triggered works and uneven distribution between landlord and tenant of the costs and benefits of, and control over, energy use. Many issues were raised about the problems with existing lease contracts. Whilst quite a lot of analysis was provided around these issues, the Government's response to the Working Group's report was fairly dismissive. Reasonably, they pointed out that, since there was a proposed exemption for a requirement to comply if the tenant refused consent for modification works, then the implications for owners should be minimal. Many of these issues were identified in more recent academic research based on interviews with market participants who identified increased awareness of energy efficiency matters as the main impact of MEES policy in the UK (Sayce and Hossain, 2020).

### 3. Methodology

#### 3.1. International comparative analysis

The international comparative analysis of the four policy regimes presented here is based upon a formative, process evaluation of the proposed or actual introduction of MEES in the Scottish, English/Welsh, Dutch and French commercial real estate markets. Evaluation of the different policy instruments and the perceptions of stakeholders provides an opportunity for policy learning from these MEES policy pioneers. Given that the instruments have only been introduced or announced relatively recently, there is limited scope to quantify policy outcomes in terms of observed improvements in the energy performance of the building stock. Consequently, due to the long-medium term horizon of the policy objectives, at this stage any evaluation is inevitably formative rather than summative. Perhaps inevitably, much of the available literature draws upon the experience of England and Wales. This is likely due to a combination of early adoption, a relatively large real estate research community and a significant group of industry associations engaged with policy makers.

The approach to policy evaluation in this context is 'realist' in that the objective is to establish what it is about the policy instruments or specific aspects of them that work (or do not work), for whom and in what circumstances? Typically, formative, process evaluations do not prove that a policy is effective, nor can they reliably quantify the size of any impacts and, even if a binary distinction were appropriate, the criteria for success and failure are rarely made explicit. Usually, process policy evaluations are based on qualitative research focussed on the views and experiences of stakeholders. Essentially, they investigate how a policy is being implemented and assess perceptions of its effectiveness. The four MEES policy regimes that are evaluated here have been subject to some initial assessment by policy makers themselves, market participants, industry/professional bodies and, to a lesser extent, by academic researchers. As noted in the introduction, the UK and Scottish governments' MEES instruments have been in place for longest and have been subject to more evaluation than the Dutch and French ones. However, at least within jurisdictions there seems to have been different degrees of policy learning by policy makers, researchers, industry bodies, owners and occupiers. It is this material that provides the basis for these policy comparisons and evaluations.

<sup>10</sup> The Working Group was initiated by the Department of Energy and Climate Change. Co-operating with a number of property professional/lobbying organisations, Miles Keeping was asked to form the group. The process is described on the website of Miles' company. "I was asked to chair the commercial property group and, with significant support from Patrick Brown at the British Property Federation, populated the group with a range of environmental, commercial, legal and technical specialists. The group worked hard, efficiently and openly to support DECC officials." (See Keeping, 2017; no pagination).

#### 3.2. Document search strategy

Following from the above discussion, the literature review is predominantly narrative in nature focussing on a clearly defined topic namely MEES policy in the commercial real estate sector (Shank and Villella, 2004; Rhoades, 2011). Consequently, the document search strategy has two main pillars drawing upon academic papers employing specific keywords and an online search for relevant policy documents. Given the policy implementation timelines, there is limited scope in the use of backward snowballing techniques in document search and most sources were identified via forward snowballing. For the academic literature, these were identified from an initial list of 'seed' sources. For the policy documents sources were identified from the initial four policy texts and contacts with experts involved. These experts were identified via their publications and convenience sampling. Fig. 3 details the document search process.

Relevant academic literature was identified by searching two of the most prominent websites Scopus and Web of Science for the keywords 'minimum energy efficiency standards' – MEES, 'energy performance of buildings directive' – EPBD and 'energy efficiency'. The latter two keywords yielded a very high number of papers due to their broader context. Given the focused nature of our review and recently published reviews on overarching/supranational energy policies (Economidou et al., 2020; Bertoldi, 2022) the academic literature pillar reports outcomes only from the first keyword search. Across the two search engines a total of seven 'seed' articles were identified that focus on MEES for buildings.<sup>11</sup> Based on the MEES timeline across the four regimes (Table 1), we find that the 'seed' documents were published during the period from 2017 to 2021. These papers were cited 23 times and, after excluding cross-citations, a total of 19 related academic studies were identified. Following a careful review five relevant studies were retained for further analysis. Most of the excluded papers do not fall within the scope of this review by, for example, having a broader energy efficiency focus rather than a MEES policy focus and/or concentrating on residential properties.

Many of the policy documents reviewed were created or commissioned by government departments responsible for policy formulation and by non-government organisations seeking to influence policy formulation. The documents included policy impact studies prepared by civil servants (and/or prepared at the behest of civil servants by consultants or research bodies), responses to policy consultations from stakeholders such as industry bodies, summaries of consultation meetings written by civil servants and reports by parliamentary committees overseeing government legislation. All of the documents are in the public domain<sup>12</sup> and were obtained through an online search for relevant materials.

The starting list of policy document search comprises of the four 'seed' national MEES to date. The document search was done in English, Dutch and French and, due to its targeted nature, it proved generally straightforward to identify the relevant material.<sup>13</sup> Given the MEES policy timelines described in the previous section, this search and

<sup>11</sup> The majority of the papers focus on minimum standards for electric appliances, cars etc. and tend to appear on the list due to the interchangeability of the terms MEPS and MEES (see also Footnote 1).

<sup>12</sup> A notable exception is a Dutch industry consultation roundtable report which we obtained via contact snowballing.

<sup>13</sup> In the Netherlands, for example, the MEES policy is detailed in article 5.11 of the 2012 Building Code (*Bouwbesluit*) under the name 'Mandatory labelling for office buildings' and is more commonly referred to as 'Label-C for offices' with reference to the EPC rating threshold (*Ministerie van Binnenlandse Zaken en Koninkrijksrelaties*, 2018). The respective French instrument is outlined in Decree 2019-771 and widely referred to as 'The tertiary decree' (*Décret tertiaire*) with reference to the economic sector activities covered (*Ministère de la Cohésion des Territoires et des Relations avec les Collectivités Territoriales*, 2019).



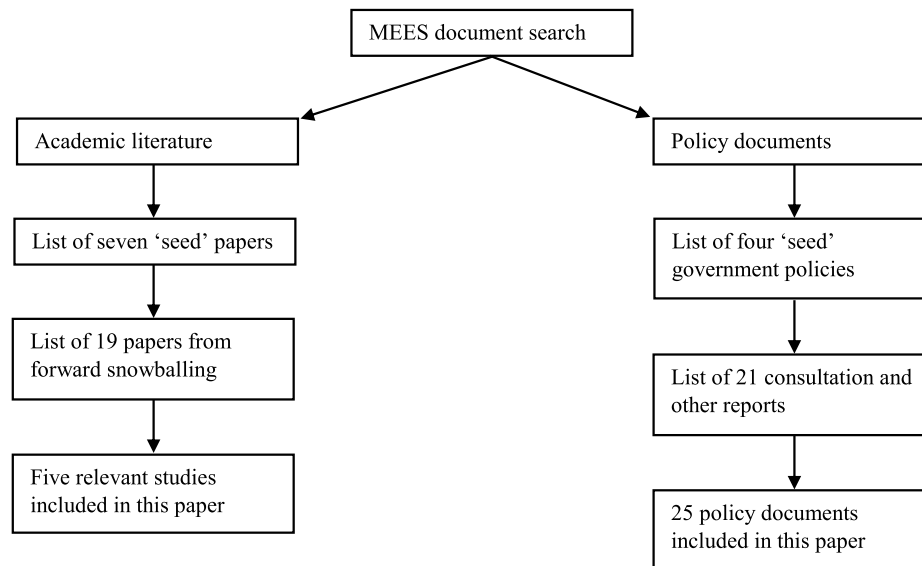


Fig. 3. Document search process.

subsequent forward snowballing yielded 21 key documents. Five had a focus on Scotland, six on the Netherlands another six on England and Wales, and three were international comparative reviews. This resulted in a total of 25 relevant policy documents analysed in this paper. Acknowledging [Bowen's \(2009\)](#) caution to researchers about simply lifting words and passages from available documents to be thrown into a research report, meaningful and relevant passages of text or other data were identified in the documents. In a small number of cases, where specific individuals close to the policy-making process could be identified, contact was made to seek additional clarification or context on some of the issues raised in the documents.

#### 4. MEES policies in practice: A comparative critique

##### 4.1. Chronology

Evaluation of the four policy regimes is based on a set of key policy design features namely time of announcement, notice period, forward guidance, compliance trigger, type of action required, staged progression of policy strictness, the affected sectors, transaction and tenure type covered, and exempted stock. As illustrated across [Tables 1 and 2](#), the Scottish government were the first to announce the introduction of MEES in 2009. This was closely followed by the UK government's Energy Act in 2011 which announced that MEES would be introduced in 2018 for England and Wales. Like England and Wales, the Scottish government had approximately a seven-year notice period and the MEES regime was implemented in September 2016 in Scotland. Around the same time, the Dutch government announced that they would introduce MEES for the office sector in 2023. Again, there was a seven-year notice period. The French government has allowed for a slightly longer notice period of 10 years which is probably because compliance actions must be undertaken before the cut-off date. In terms of forward guidance, the Scottish government have not announced any specific plans to increase the strictness of the policy. In contrast, the UK government announced that the proportion of the stock affected would increase in 2023 and the minimum standard would increase in 2025 and 2030. We have been informed by one of their advisors that the Dutch government intends to increase the minimum standard in 2030. Having notably opted for standards based on actual energy consumption, the French instrument is the most explicit of the four about forward guidance. Requirements are for 40% reduction in energy consumption by 2030 followed by a further 10% reduction per decade up to 2050,

relative to a reference year which cannot be prior to 2010. Alternatively, French stakeholders responsible for compliance can opt for a level of final energy consumption fixed in absolute value based upon the energy consumption of new buildings in their category.

##### 4.2. Policy instrument design

There are different approaches between the four MEES regimes in terms of compliance trigger, timing of compliance requirement, the affected sectors, transaction and tenure type covered, and exempted stock. Whilst the Dutch and English have linked the minimum standard to the EPC rating, in Scotland compliance is related to the 2002 Scottish Building Standards. It should be borne in mind that there are variations in EPC calculation methodologies between all four jurisdictions ([Semple and Jenkins, 2020](#)). It is also notable that there is no clear relationship between a specific EPC rating and compliance with the 2002 Scottish Building Standards. For instance, approximately 23% of properties that complied with the 2002 Scottish Building Standards had an EPC rating of F, F+ or G post MEES implementation (estimated from data obtained from Scottish EPC Register for the period September 2016–September 2022).

In England and Wales, the MEES policy covers all *leased* commercial and residential stock.<sup>15</sup> In contrast, the more recent French MEES covers the building stock where all tertiary<sup>16</sup> economic activities are performed whereas the Dutch MEES targets only the office sector. We understand from informal discussions with experts close to the policy making process that the retail sector was excluded in the Netherlands due to potential complications arising from tenant fit-outs. Retail premises often tend to be subject to fit-out works *after* the EPC has been assessed. These fit-out works by the tenant can change the energy performance of the building. Indeed, this has been a criticism of the operation of MEES policy in England and Wales when applied to the retail sector (BEIS, 2021). The Dutch retail sector has a relatively large proportion of energy inefficient properties. According to [EIB \(2016\)](#), 30% of retail premises in the Netherlands are EPC G rated, whilst for offices the corresponding figure is 20%. On the other hand, 37% of shops are EPC A rated,

<sup>15</sup> Whilst the MEES policy instruments for residential and commercial rented property are broadly similar for England and Wales, there are some significant differences in policy design.

<sup>16</sup> This excludes primary and secondary sectors (agriculture and industry) and domestic buildings.

**Table 2**  
An overview of the implementation of MEES for existing buildings.<sup>141</sup>

Criteria	Countries			
	England & Wales	Scotland	Netherlands	France
<b>Date introduced</b>	Introduced in 2011 Energy Act	Introduced in Climate Change (Scotland) Act 2009	Added in 2016 as Article 5.11 of the 2012 Building Code (Bouwbesluit)	Introduced in Decree 2019-771
<b>Date of implementation</b>	1 April 2018	1 September 2016	1 January 2023	1 January 2030
<b>Minimum energy performance standard</b>	EPC E	2002 Scottish Building Standards	EPC C	Phased reduction in required energy consumption
<b>Affected stock</b>	All leased stock	Non-domestic buildings sold and leased over 1000 square metres	All office property	All properties classified as tertiary over 1000 square metres.
<b>Estimated proportion of affected stock below MEES</b>	Approximately 20%	Approximately 50%	Approximately 50%	Not applicable given current policy design
<b>Compliance trigger</b>	Compliance required at point of letting (includes lease renewals and assignments)	Compliance required at point of sale or new letting (not lease renewals)	Compliance required immediately following date of implementation	Compliance required before or at target date
<b>Action required</b>	Modify building (or EPC if inaccurate) to meet minimum standard	Modify building to meet minimum standard or prepare Action Plan and carry out works within 3.5 years or monitor energy consumption with Display Energy Certificate	Modify building (or EPC if inaccurate) to meet minimum standard	Modify building and/or operations
<b>Responsibility for compliance</b>	Owner	Owner	Owner	Owner/tenant
<b>Enforcement</b>	By local authorities	By local authorities	By local authorities	By local authorities
<b>Notable exemptions</b>	<ul style="list-style-type: none"> <li>- Payback period for works greater than seven years.</li> <li>- Consent for works refused by certain third parties.</li> <li>- Works reduce value of asset by more than 5%</li> </ul>	Buildings under 1000 m <sup>2</sup>	<ul style="list-style-type: none"> <li>- Payback period for works greater than ten years</li> <li>- Buildings smaller than 100 m<sup>2</sup></li> <li>- Buildings with less than 50% office use</li> </ul>	<ul style="list-style-type: none"> <li>- Buildings smaller than 1000 m<sup>2</sup></li> <li>- Various payback thresholds for different categories of building improvements</li> </ul>
<b>Penalties</b>	Fines of £5000 or up to 10% of the rateable value of the property for a breach of three months or less, to a maximum of £50,000; or £10,000 or 20% for a breach of three months or more, to a maximum of £150,000	Local authorities can impose a penalty of £1000	Not yet specified	-‘Name and Shame’ -Fines up to €7500
<b>Forward guidance</b>	<ul style="list-style-type: none"> <li>- From April 1, 2023 MEES will apply to all leased commercial properties</li> <li>–2027: Proposed that all leased properties will be required to reach minimum EPC C</li> <li>–2030: Proposed that all leased properties will be required to reach EPC B</li> </ul>	The Scottish government intends to introduce a new regulatory regime in 2025 following consultations	Intention that EPC A will be minimum standard from 1 January 2030	Relative to a reference year: 40% reduction in energy consumption by 2030 50% reduction in energy consumption by 2040 60% reduction in energy consumption by 2050

compared to approximately 25% of office properties. As a result, a large proportion of energy inefficient – as measured by building specification – non-domestic real estate is not covered by the policy. In Scotland, the policy covers all non-domestic properties with a separate regime for residential property. Drawing upon data from the Scottish EPC register, we estimate that approximately 50% of the properties affected by the policy were non-compliant. Out of a total of 6955 properties over 1000 m<sup>2</sup> for which EPCs were lodged for the period September 2016–September 2022, 3390 were non-compliant.

The Dutch and French governments have opted for a ‘hard start’ approach to policy implementation. As of 1 January 2023, it will be prohibited to occupy or use an office building in the Netherlands without an EPC C rating or better. In 2015, it was estimated that approximately 50% of the office stock was non-compliant (EIB, 2016). More recent industry and government-commissioned reports estimate this proportion to be in the range of 45–50% indicating very little proactive action (Colliers International, 2021; EIB, 2021). The respective French MEES ‘cliff edge’ date to meet the minimum requirements detailed above is 1 January 2030. In contrast, in England and Wales a ‘soft start’ approach to policy implementation has been adopted. Until 2023, compliance was only required at the point of a leasing transaction. In England and Wales, a lower proportion of properties is affected with approximately 20% of the stock being non-compliant (McAllister and Nase, 2019). In contrast to the UK government’s policy for England and Wales, the Scottish government has excluded lease renewals but included sales transactions as a compliance trigger. A criticism of the UK government’s phased approach has been the inclusion of lease renewals as a compliance triggering leasing transaction (BEIS, 2021). In this type of transaction, the continuity of occupation by the same tenant increases the disruption costs associated with the landlord carrying out required improvement works. However, this is mitigated by the fact that tenants can refuse to give their consent for landlords to undertake works.

Scotland has adopted a radically different approach to compliance requirements. A key distinction is that there is an ‘operational route’ to compliance. When a building is non-compliant, then owners have three options.

- Either to physically modify the building,
- or to produce an Action Plan outlining a programme of works,
- or to provide a Display Energy Certificate<sup>17</sup>

Discussions with a senior policy maker in Scotland indicated that the inclusion of alternatives to physical modifications was in response to a request from industry to enable them to deliver increased energy efficiency through operational change instead of through building modifications. It was recognised that the practical opportunities to undertake improvement work can be curtailed by the circumstances that exist around the trigger transaction and the limits of what can be reasonably imposed upon a tenant under a lease where the responsibility sits with the owner. It was acknowledged that, when the standards were introduced in Scotland, they were quite ‘soft’ and likely to have limited impact. One commentator concluded that, given the alternatives to building modifications, the ease of exemptions and the low penalties for non-compliance

“... the enforcement provisions do seem, in our opinion, to be very soft. We would not be surprised if a number of asset owners elect to take the risk of a fine, rather than comply with their legal obligations. Time will tell how the market responds, and indeed what moves the Scottish government might make in the future, if any, to address ineffectual aspects of the regulations as they are observed.” (Lovell, 2016)

Whilst the operational route was appreciated, the owners’ lack of operational control was identified as a problem. On behalf of a professional association, in response to the policy consultation in 2013, the operational ratings approach (which, it was claimed, had long been campaigned for by a trade association and colleagues in England and Wales) was welcomed. However, it was noted that it would require both landlords and tenants to agree to implement it with potential problems emerging where “some tenants may be reluctant to engage with operational ratings even if their landlord is” (Scottish Government, 2014).

The Dutch instrument seems to have appreciated the problem of the timing of aligning building modifications works with ‘natural moments’ which minimise the costs (e.g., loss of rental income, disruption to business operations) for owners and occupiers. The consultation report on the Dutch MEES legislation acknowledged that

“Natural moments to take energy saving measures are maintenance moments and major renovations. Changes (other tenant, investment transaction, contract extension)<sup>18</sup> are not natural moments to make [energy saving] investments” (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2016)

The panel that was consulted identified a set of potential problems in a future staged progression of the instrument deriving from the ‘softer’ approaches to implementation.<sup>19</sup> Subsequently, most of the participants involved in the consultation considered that a ‘cliff edge’ approach was optimal. In personal communications<sup>20</sup> with panel participants, this ‘advice by the majority of the stakeholders’ was indicated as the rationale for the ‘cliff edge’ style implementation of MEES in the Netherlands. Despite this ‘hard’ implementation, the sentiment across the Dutch commercial real estate investors seems to have been similar to the Scottish one. There is evidence that, anticipating weak enforcement, some investors are considering non-compliance with the regulations (Colliers International, 2019).

#### 4.3. Policy lessons

Having been first to implement MEES in the commercial real estate sector in 2016 using a strikingly different policy design compared to England and Wales, there has been some convergence in Scotland with the UK government’s approach to MEES for the residential private rented sector. From April 1, 2022, for new tenancies an EPC of at least band D is required and from 2025 all tenancies will need to meet this standard. However, for non-domestic properties the Scottish government seems to be signalling a more wide-ranging approach of the policy regime aiming to introduce new MEES standards in 2025. The Scottish Government is requesting evidence from stakeholders regarding three models to

<sup>14</sup> Scotland: <https://www.gov.scot/policies/energy-efficiency/energy-efficiency-in-non-domestic-buildings/>; Netherlands: <https://rijksoverheid.bouwbesluit.com/Inhoud/docs/wet/bb2012/hfd5/afd5-3/art5-11> France: <https://www.legifrance.gouv.fr/download/pdf?id=vQhycwR0PlwJxQK8QpQMgFHoaK4qmFCHHU-cCiiWNSI> England/Wales: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/824018/Non-Dom\\_Private\\_Rented\\_Property\\_Minimum\\_Standard\\_-\\_Landlord\\_Guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/824018/Non-Dom_Private_Rented_Property_Minimum_Standard_-_Landlord_Guidance.pdf).

<sup>17</sup> A Display Energy Certificate indicates how much energy is actually being used to operate a building based on meter readings and is then benchmarked against similar buildings.

<sup>18</sup> Changes (*mutaties* in Dutch) are with reference to contracts/leases. The terms listed in parentheses are direct translations from Dutch terms *andere huurder*, *beleggingstransactie*, *contractverlenging* which refer to lease transactions, sales and lease renewals respectively.

<sup>19</sup> In the original document (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2016) these are found under the header ‘Consequences of making Label C (the widely accepted name of the Dutch MEES instrument) compulsory at times of change’.

<sup>20</sup> As noted earlier, in a small number of cases the researchers had made contact with individuals involved in policy formulation. No formal protocols were put in place to systematically structure these communications which were sometimes by email or in-person.

regulation for energy efficiency in existing non-domestic buildings namely mandating specific changes to building fabric and services, EPC-based standards and, operational ratings approaches based on actual energy consumption (Scottish Government, 2021).

Since the policy implementation in 2018 in England and Wales there has been growing dissatisfaction with policy instruments based on EPC ratings. There have been calls for a shift towards performance benchmarks based on actual consumption. The Select Committee for the Department of Business, Energy and Industrial Strategy (BEIS) concluded that

“... the current regulatory framework for buildings focuses on how they are modelled to perform, rather than how they really perform ‘in operation’. The MEES regulations only focus on the design of a building and do not assess how a building performs in use which can be demonstrably worse than compliance with Building Regulations would imply. We are concerned that the continued strengthening of the MEES regulations, if in isolation, will not bring about the full energy efficiency potential available for commercial buildings. Rather, it risks perpetuating a “design-for-compliance culture” where buildings are designed to meet the required compliance standard, with negligible attention paid to how the building actually performs.” (BEIS, 2019)

The Select Committee argued that there is strong evidence that mandatory operational ratings can successfully reduce energy use. They recommended that the Government move to the public disclosure of operational energy data for the commercial sector and the use of rating tools that focus on performance outcomes (BEIS, 2019).

The Environmental Industries Commission (a non-governmental body) have also been somewhat disapproving of the current UK policy instrument’s reliance on the EPC rating. They focus on the weaknesses of the EPC as a reliable indicator of energy performance. It is argued that, whilst EPCs may be useful in theory to indicate the potential energy performance of a building, during the operational stage of its lifecycle, the accuracy of the EPC is significantly reduced. They also maintain that the ease of exemptions significantly undermines the regulations (Environmental Industries Commission, 2018). Consequently, it is recommended that the government aim to extend the use of Display Energy Certificates (an operational rating instrument used mainly for public sector buildings) to all commercial properties with a total floor area of over 250m<sup>2</sup>.<sup>21</sup> A similar recommendation was also made in 2018 by the high profile Committee for Climate Change to “put in place a performance-based labelling scheme for commercial properties” (Committee for Climate Change, 2018).<sup>21</sup>

Further initial evidence on the impact of the policy can be seen from English/Welsh EPC lodgement data published in late 2019. Fig. 4 shows the trends in EPC lodgements per quarter from 2008 until the third quarter of 2019. In total, 912,070 EPC lodgements for non-domestic properties were recorded. Bearing in mind that there would be expected to be some ‘natural’ reduction in non-compliant (EPC F and G rated) lodgements due to the cyclical refurbishment, redevelopment and new development, there is a relative decline in non-compliant EPC lodgements from 2012. The proportion of stock rated as non-compliant peaked at c20% of all lodgements in 2012 falling c13.5% in 2016. As policy implementation became imminent, the proportion fell to just under 10% in 2017. Since the implementation of the policy, typically 3%–3.5% of lodgements have been non-compliant. This proportion should represent stock where exemptions are in place due to historical importance, cost of works, lack of third-party consent etc. Perhaps

unsurprisingly, the sharpest improvements in compliance have been in the two years leading up to implementation and the period immediately after implementation.

In 2021, the UK government published a consultation setting out proposals to introduce a new performance-based framework for improving the energy efficiency of private non-domestic buildings above 1,000m<sup>2</sup>.<sup>22</sup> It is proposed that owners and single tenants will have to get their buildings rated on an annual basis and publicly disclose the rating. This was described as a ‘first step’. In the consultation document, the government sent a strong signal that it was expected that these large buildings should be consuming on average around 30% less energy in 2030 compared to 2015 (BEIS, 2021). Unlike in France, given the consultation stage of this proposal, there are as yet no requirements to achieve these reductions in the England and Wales. Although the government acknowledges that it *could* (authors’ emphasis) set minimum standards through the performance-based framework, it seems currently unwilling to do so. Instead, it aims ‘for building recommendations and improvements to be market driven and market led’ (BEIS 2021 p.49). Whilst there are clear similarities to the French instrument, the rating process will draw upon the Australian NABERS model which is heavily cited in the consultation document. In 2022, the voluntary certification by NABERS UK was introduced for offices which rates the base building energy efficiency. Nevertheless, in the two largest commercial real estate markets that have adopted MEES instruments there seems to be evidence of policy convergence. Both policies emphasise performance-based measures, target buildings over 1,000m<sup>2</sup> and have similar targets for emissions reductions.

Given the separation in control of and responsibility for energy consumption, and fabric and equipment consuming energy in leased buildings, the proposed minimum standards in France stress the importance of the lease contract in determining responsibility for compliance. Indeed, an “*annexe obligatoire*” to commercial leases setting out responsibility for compliance is a part of the relevant legislation (*Décret Tertiaire*). The overriding principle is of joint responsibility for compliance that is linked to the operations under the control of either the owner or the occupier(s) which, in practice, will require negotiation, agreement and co-ordination “to co-construct the action plan” (see Enoptea, 2022). Undoubtedly, there will be lessons to be learned from the implementation of this performance-based policy instrument to buildings where both the different parts of the building and its operation can be in the control or are the responsibility of multiple parties.

## 5. Conclusions

Given that buildings are a major source of greenhouse gas emissions, policy interventions to reduce these emissions are likely to increase with minimum performance standards becoming an increasingly important part of the policy mix. One of the main results of this comparative evaluation of MEES policy instruments is the substantial scope for diverse policy designs. For the policy regimes evaluated, there have been different policy choices in terms of the minimum performance threshold, stock affected, level of forward guidance and criteria for exemptions *inter alia*. Another key finding concerns the inevitable trade-offs between minimising the financial costs to property owners and occupiers of complying with performance thresholds and maximising reductions in energy consumption. The range of intervening factors and side-effects identified, and the uncertainty about the costs and benefits has highlighted the challenges of finding a balance between phasing the introduction of policy instruments, providing reliable forward guidance and adjusting policy strictness in response to evaluation.

This policy evaluation has established that, although all regimes have had similar lead-in times following policy announcement, there have been variations of ‘hard’ and ‘soft’ approaches to implementation. The Netherlands have gone for a ‘hard start’ by taking a ‘cliff-edge’ approach to implementation. In contrast, Scotland has made a comparatively ‘soft start’ with England and Wales somewhere in

<sup>21</sup> In recent Correspondence with an adviser to Dutch policy makers it was indicated that in the Netherlands there is discussion about having a building driven part of the MEES (the energy label) and using the Environmental Management Act (*Wet Milieubeheer*) to provide a basis for a user-driven part of MEES.

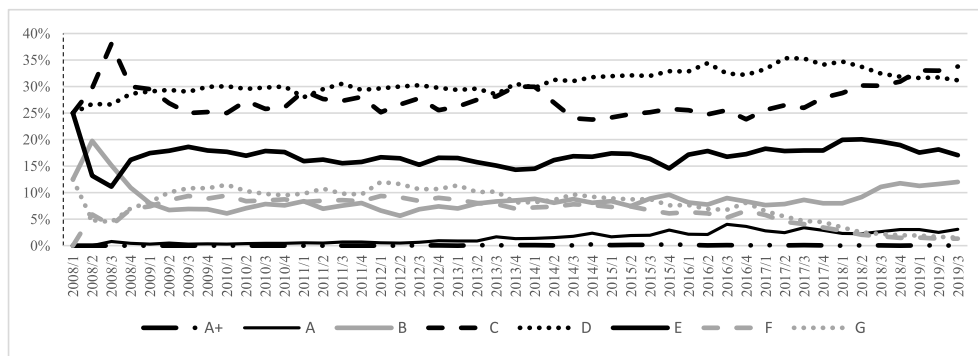


Fig. 4. Proportion of lodgements by label per quarter in England and Wales.

between. France has a similar lead-in period to the other regimes and, like the Netherlands, a ‘cliff-edge’ approach to implementation. To minimise costs to owners and users, there has been an emphasis by the Scottish and UK governments on ensuring that compliance is triggered when there is a lease event that is expected to produce a gap in occupation providing a ‘window’ for building modifications. In England and Wales, the fact that lease renewals (with the associated continuity of tenant occupation) trigger compliance has been regarded as problematic by stakeholders. A notable feature of the French approach has been the introduction of pre-implementation requirements for annual data provision on buildings and energy consumption on a new national platform. This is presumably to provide robust data to support policy implementation and evaluation and to ‘nudge’ owners and occupiers to engage in advance of required compliance.

Some clear lessons have been identified from this critical review of the initial experience of the different policy regimes. Whilst Scotland opted not to use EPC ratings as a performance threshold, it was initially expected that most EU jurisdictions would default to an EPC related standard. The EPC has the advantage of being widely used and providing relative simplicity as a rating. However, given that there is a significant body of research suggesting that the link between energy consumption and EPC rating is unproven, it is far from clear that the EPC provides an appropriate performance standard. The French example, as a recent policy regime, is a signal of growing recognition that the priority should be on reducing actual energy consumption rather than simply renovating buildings. In both the Netherlands and England and Wales, there has been growing pressure to shift towards MEES that are linked to actual rather than modelled energy consumption. Given their experience in implementing and evaluating MEES, the UK government has concluded that shifting to an operational performance-based policy framework is the right approach. However, the experience of Scotland suggests that standards based on actual consumption are not a panacea. The separation between ownership and use raises fundamental challenges to designing policy where standards are based on operational performance.

Another key conclusion is that, for leased stock where the owner may have limited operational control of the asset, the separation of owners’ responsibility for compliance with minimum standards and the users’ responsibility for operations creates challenges in introducing minimum performance thresholds based on actual energy consumption. For a proportion of leased stock, owners have limited opportunities to modify the building, to modify how the building is operated and to modify the operations in the building. In sectors where users tend to modify buildings and change the energy efficiency attributes significantly, compliance with a minimum EPC rating assessed prior to such building modifications is likely to be ineffective. Certainly, MEES based on actual energy consumption are likely to be more suitable for owner-occupied stock and for leased stock where the owner retains a high degree of operational control. The proposed French and UK policies for buildings over 1,000m<sup>2</sup> have now recognised this problem and specified where

owners and/or tenants will be responsible for policy compliance. However, potential solutions remain untested.

The analysis suggests that different approaches in policy design can be taken to minimise compliance costs that substantially exceed potential environmental benefits. Regulatory economies of scale may be achieved, and the economic costs of policy implementation may be reduced by targeting large properties and exempting small properties. Such exemptions can allow for a large proportion of the total area of the stock to be covered by a policy whilst exempting a large proportion of transactions or properties. Even though focussing on large buildings fails to capture large scale corporate occupiers of numerous small premises, the recent experience of the French and UK policy designs indicates that the 1000m<sup>2</sup> threshold may become standard. Similarly, exempting assets with high costs of compliance should increase the economic efficiency of policy implementation. Albeit the minimum threshold is not demanding, the early experience of England and Wales suggests that the proportion of non-compliant stock that is automatically exempt or applied for exemptions after policy implementation is low. In reducing disruption costs to the building user, most problems associated with potential owner-user conflict can be avoided by permitting the user to refuse consent for works.

Looking forward, there is relatively little empirical evidence on the contribution of MEES to an effective energy transition as part of a co-ordinated broader environmental policy mix. More evidence is needed on how to optimise the mix of ‘command and control’ policy instruments such as MEES with other market-oriented approaches involving subsidies and incentives. Evidence-based policy formation will benefit from better information and data on policy effects on consumption and emissions. Given the nascency of the various MEES instruments, it is not surprising that there remain major knowledge gaps on the impacts on market prices, the scale and nature of any resulting building modifications, and stakeholders’ behaviours. There is a need for improved understanding of how to design MEES frameworks that resolve problems in rental properties due to the differences in the allocation of authority and responsibilities to ensure stakeholder cooperation. Whilst this comparative study provides a source of analysis for policy makers, little is known about interaction in policy design across different jurisdictions.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Data availability

No data was used for the research described in the article.



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