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Mould or cold? Contrasting representations of unhealthy housing in Denmark and England and the relation to energy poverty

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ABSTRACT

Both mould growth and underheating in housing are widely recognised as health concerns, but the problematisation and handling of these issues varies greatly in different nations. In this paper we compare Danish and English understandings of mould and cold in homes. Drawing on Bacchi's 'What is the problem represented to be?' framework, we ask how mould is understood in the two national contexts by analysing how it is problematised in key national policy documents, uncovering the effects of these contrasting problematisations on the way in which mould is managed in rental housing. Following Bacchi's approach, we find that contrasting problematisations of mould lead to highly divergent management approaches, in turn shaping public health consequences for those living with mould and cold. While in Denmark mould is central to rental housing management, and considered an important issue in its own right, in England mould is seen as a by-product of under-heating as a result of fuel poverty. In Denmark, a discourse of poverty is suppressed, since mould is framed as a building issue rather than related to income inequality, while in England mould in buildings is not adequately addressed due to a strong focus on access to warmth. By showing how policy problematisations shape housing management, our work suggests the value of a critical approach to housing and energy policy, which has salience to contexts beyond the UK and Denmark. We finish by identifying the risks of these narrow problematisations, suggesting the productive possibility of tackling both mould and cold together.

1. Introduction

Challenges associated with domestic energy use have reached European media front pages, government agendas and have become a locus of concern in people's everyday lives. The "perfect storm" of climate crisis, gas crisis caused by the war in Ukraine, cost of living crisis and high levels of inflation brought on by war and the aftermath of the Covid-19 Pandemic, has left people struggling to afford their household energy bills [1,2]. This has brought on an increasing interest in research and policy regarding fuel and energy poverty and the health and inequality effects that these entail [3–6].

While the research presented in this paper took place in 2017–18 before the current Europe-wide energy crisis, it addresses topics that have only risen in relevance: the effect of cold and damp homes and how these issues are addressed by lawmakers and practitioners [3–7]. We focus on how different contexts produce very different ways of problematising cold, damp and mould infested housing, resulting in different effects on occupant health and building conditions. In focusing on how cold, damp and mould infested housing is framed and dealt with in different national contexts, we contribute to a growing interest in the politics of energy poverty. This emerging literature foregrounds the political conditions which give rise to experiences of energy poverty [8,9].

In this paper we explore the ways in which mould growth, dampness, and cold is problematised in rental housing in England compared to Denmark, looking at how representations of mould problems in the two nations affect problem management. We do this by undertaking a focused analysis of key policy documents addressing health risks in housing, drawing on a wider set of qualitative interviews with key stakeholders for context. Adopting Bacchi's critical policy analysis approach [10], we unpack the ways in which these nations problematize and manage cold, damp and mould infested rental housing. In doing so we find widely diverging approaches in these nations, which result in poverty being underplayed in Denmark, and mould being poorly managed in England. We conclude that a more cohesive view of mould and cold would allow for more effective policy, meaning that aspects of

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the problem currently ignored in each nation would be less likely to fall through the cracks.

2. Background

2.1. What is a mould problem?

The term "mould problems" actually covers a complex range of problems. Mould spores present in outdoor air come indoors through ventilation [11]. With water or humidity spores can grow indoors [12]. When mould grows indoors it becomes a problem because: it causes deterioration and discoloration of building material surfaces and furniture [13–15] and negative health effects in humans [16]. Mould growth in buildings is therefore a problem warranting research, policy, and remediation efforts. In 2009 the WHO published "WHO guidelines for indoor air quality – dampness and mould" [12] which identifies mould growth as a recognised health problem. Mould growth indoors is the object of research in several fields: mycology focuses on the mould fungi biology and relationships with the growth context and other mould species (e.g. [17]), building research focuses on the relationship between building and mould encompassing building physics (e.g. [18]), building materials (e.g. [14]), building defects (e.g. [13]) etc. sometimes also branching into occupant behaviour (e.g. [19]), while health research focuses on the relationship between human physiology and mould and which health effects are seen (e.g. [20]).

When it comes to the prevalence of mould problems in housing, most attempts at quantification take the form of surveys based on occupant self-assessment [21]. Eurostat's EU_SILC dataset on housing deprivation [22], for instance, pools mould issues under "leaking roof, damp walls, floors or foundation or rot in window frames or floor". Self-reporting mould is problematic because it assumes that people know what mould looks like, where to look for it and specifically how much mould constitutes a problem. There is no official threshold value for what constitutes a problem.

2.2. What is a fuel poverty problem?

Fuel or energy poverty is widely considered to mean the inability to access adequate energy services, including warmth, cooling, cooking, washing (of bodies and things) and more [23]. The problem was first identified in the UK in response to evidence linking energy inefficient dwellings and poor health outcomes associated with living in the cold [24]. The problem can be variously characterised as a health (inadequate access to warmth can exacerbate disability, circulatory, respiratory and mental health problems, and create excess winter deaths [25–29]), energy inefficiency (badly insulated homes are cold [30]), poverty (poor people have trouble affording adequate heat [6]), or, especially during the cost of living crisis, energy market problem (costs of energy are higher than people can afford [31]). These divergent characterisations of fuel poverty stem from an interdisciplinary area of study, with engagement from geographers, sociologists, social policy experts, engineers, public health researchers and more, including many contributions in this journal.

There are numerous ways of measuring fuel poverty, shaped by these different framings [32–34]. For instance, the current UK definition of fuel poverty problem is people on below average incomes in energy inefficient housing: a problematisation which foregrounds an energy efficiency framing [35]. Despite EU encouragement to member states to identify and support energy poor households through the energy transition, the Danish government do not define a fuel poverty problem [36]. Denmark is one of a group of countries that prefers to frame energy poverty as indistinct from general poverty, which in Denmark is widely considered to be addressed by a strong social security system [36]. The academic literature compares measures and experiences of energy poverty in different nations [5,29], and the EU governance system increasingly encourages reporting and actions on energy poverty through the National Energy and Climate Plan reporting systems. Although the current boom in energy prices across Europe has put unaffordable heating on the political agenda in Denmark, it was not there when this analysis was conducted.

There is also a small but growing body of work that looks at how politics shapes the experience of energy poverty. Broadly speaking energy poverty is seen as being shaped by structural determinants, some of which are themselves political choices [37]. Who is considered energy poor in specific national and local policies is a political choice about how to frame the problem which shapes people's access to additional help [32,33]. Recalde et al. identify the labour market, the condition of the welfare state, the regulation of the housing market, and the energy market as shaping energy poverty [38]. Others focus on levels of inequality (the more unequal a nation, the higher the energy poverty levels: [6,39,40]) and poverty (higher absolute and relative poverty results in higher energy poverty: [6]). Bouzarovski and colleagues consider the geographic and cultural differences that produce energy poverty in different parts of Europe [8,9].

2.3. What links mould and fuel poverty?

A common reason for mould growth in temperate climates is inadequate or non-uniform heating in cold seasons. If the walls, floors, and roof of a building are significantly colder than the indoor air, condensation occurs and persistent condensation is one cause of mould growth. Equally, if the building is insufficiently insulated, has defects leading to water penetration or if the heating system is undersized, the chances of mould growth increase [12]. These circumstances create a strong link between mould growth and energy inefficient buildings. The current energy crisis, in which all Europeans are asked to conserve energy for heating, makes it likely that more people will find themselves in fuel poverty and put themselves and their families at risk of adverse health effects caused by mould growth.

The link between mould growth and fuel poverty is not routinely recognised in research on either topic (see e.g. [41]). The EU_SILC dataset on living conditions measures the: "*Total population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor*" and both Denmark and the UK have a slightly higher percentage than the EU average (see Table 1) [22]. Note that mould itself is not mentioned here.

In this paper we take a novel focus on mould, energy poverty and rental housing [42]. Issues with mould or fuel poverty do not only occur in rental housing, however low-income areas and poor-quality housing are overrepresented both in regards to the occurrence of mould and dampness [12] and within both private and social rental sectors (see e.g. Severe housing deprivation by tenure status in the EU_SILC dataset, showing much higher rates in rental housing for both EU, UK and Denmark [43]). Further, the responsibilities for heating and moisture control in rental housing are split between landlord and tenant [44] in an unequal power dynamic [45]. A variety of legal frameworks (rental law, housing health and safety regulation etc.) are in place to establish and regulate the relationship between these responsibilities. These legal frameworks and guidelines are an essential part of our analysis.

Table 1
Population in dwelling w. leak, damp, or rot [22].

Data from 2016[a]	%
EU	15.4
Denmark	15.9
UK	16.4

[a] The last year where data is marked as reliable in dataset, before UK left EU.

2.4. Denmark and England, similarities, and differences

In many ways Denmark and England are similar; late stage or post-welfare states based on a mixture of social democracy and neoliberalism, located in north-western Europe in an often cold and wet climate. Despite differences in building typology, they have similar building stock consisting mostly of pre-1919 brick buildings [46,47] and newer cavity wall buildings of different typologies from 1950 to 1980 [48]. This makes the divergent framing of mould and cold particularly interesting. Fig. 1 details differences and similarities within housing, heating, and poverty that are relevant in the ensuing analysis.

The data shows clear similarities regarding percentage of owner occupiers, percentage of population in inadequate housing (leaky roof, lacking toilet/shower etc.), poverty gap and housing cost overburden. Major differences are seen in dwelling types, where Danes primarily live in detached houses or flats and Brits mostly live in semi-detached houses, and in domestic heat source where most Brits use gas and most Danes use either renewables, waste, or derived heat through district heating. The poverty rate is higher in England than Denmark and the average energy efficiency of dwellings is much lower in England than Denmark.

3. Methods

In this section we describe how we examine the ways in which damp and mould are represented and handled in Denmark and England. We describe our framework for analysis, the empirical material, and reflect on the strengths and limitations of the approach.

To examine the effects of the problematisations of mould in housing in Denmark and England, we have drawn on the "*What is the problem represented to be*"- approach (WPR) formulated by Carol Bacchi [49] which is based on Foucauldian and material semiotic theoretical perspectives. WPR is a method for analysing how policies act – how they create and alter the problems they are set out to address. Quoting Bacchi, we work from the premise that: "'*Problems' do not sit outside policy processes waiting to be solved. Instead, they are produced as problems of particular kinds within policies and policy proposals. That is, every policy proposal contains within it an implicit representation of what the problem is represented to be*" [49].

The WPR approach consists of a series of questions to ask when analysing policies [49]. Given our focus in this paper on analysing the contrasting representations of mould in two nations, we have chosen to adapt the first three of Bacchi's questions, to our focus on mould in housing, and to use these as a structuring device for presenting our results. Q1–3 are:

Q1. What is the problem of mould represented to be in one or more specific policies?
Q2. What deep-seated presuppositions or assumptions underlie this representation of mould problems?
Q3. How has this representation of mould problems come about?

Since the different ways of handling and talking about mould in Denmark and England are the ground for this paper, in the discussion we will use comparison to emphasise the effects of how a problem is represented, following Bacchi: "*comparisons can illustrate that certain ways of thinking about 'problems' reflect specific institutional and cultural contexts*." [10].

The forthcoming analysis is structured so that we answer the above questions for Denmark and England respectively, with one section answering Q1and Q2, and a second section offering tentative answers to Q3. These questions are applied to the key empirical material that is used in this paper. This includes, first, a series of semi-structured qualitative stakeholder interviews in Denmark and England conducted by the first author, providing background material essential for undertaking the document analysis. We approached experts in both countries from a range of organisations that hold responsibility for housing, in practical, policy and research roles, inviting them to interview. Respondents were therefore sampled for diversity of roles in relation to the mould problem. Given we were able to recruit a diverse sample, we would expect to see a range of opinions and perspectives on the field. In Denmark 22 interviews were conducted in 2017–18 with staff from municipalities, social housing organisations, private rental companies, research institutions and several tenants, for a thesis on Danish housing operation practice in relation to mould. In England 12 additional interviews were conducted in Jan.-May 2018 with municipal officers, NGO energy advisors, researchers, former housing association staff, a sustainability consultant, and a policy manager within environmental health. The smaller number of interviews in England were mitigated by the involvement of the second author, an expert on fuel poverty in the UK who has engaged with stakeholders in this field for the past decade.

Second, and indeed the key focus of the analysis here, was a series of documents – legislation and guidelines– from Denmark[1] and England respectively (listed in Table 2). The focus is on central texts concerning housing-related public health and municipal enforcement responsibilities. We also include official citizen-oriented guidelines. The documents selected for analysis (see Table 2.), represent the central pieces of legislation concerned with housing health and safety (see 'primary mould-related documents' in Table 2), and the central resource for citizen advice on Mould in the Danish case, and a similar instance of government produced advice in the English case. Note that the former were described by interviewees as being central in the governance and handling of mould in housing. The latter (citizen guidelines) were more challenging to identify in England, given that this is has not been such a high-profile issue in that nation.

Third, we draw on a range of additional material to support and account for our analytical conclusions, especially for Q2 and Q3: this includes research literature, legislation, national and European statistics (all of which are fully cited here).

As in any interpretative approach to document analysis, the interpretations are made by subjects (the authors) that are already involved in the world and have preconceptions about mould and cold problems. We use techniques associated with improving the validity of qualitative research to address this [55]. The comparative element of the study and the fact that the authors are Danish, and English respectively allow us to challenge our preconceptions through critical comparison. The extensive interview material with a variety of stakeholders also gives us insights into different representations of the issues of mould, damp, and under-heating. Supporting our analysis with existing research, when possible, also lends validity to the study, although some of our analytical claims are based on the generalised cultural experiences the first author had living in and conducting qualitative stakeholder interviews in both England and Denmark [56].

To obtain a level of involvement with the contexts we are analysing, we have had to limit our study to a narrow geographical area. We are aware that both mould growth in housing and energy poverty are global phenomenon, but also that these issues take on different shapes in different political, economic, and climatic contexts. By showing differences between two relatively similar countries, we hope to inspire more comparative research into the many different faces energy poverty can have in different cultural contexts.

The data used in this paper was now gathered some years ago (2017–18). This is a limitation of the paper, as discourses and policy priorities seem to have changed somewhat in intervening years. For instance, the winter of 2022–23 marked a rise in interest in mould as a side-effect of fuel poverty in the UK, and of the challenges of heating in Denmark. However, we still believe our analysis is of value. Specifically: understanding how two relatively similar nations come to a very different conceptualisation of mould and cold is important. Further,

[1] Danish language document titles and quotes are translated by the authors.

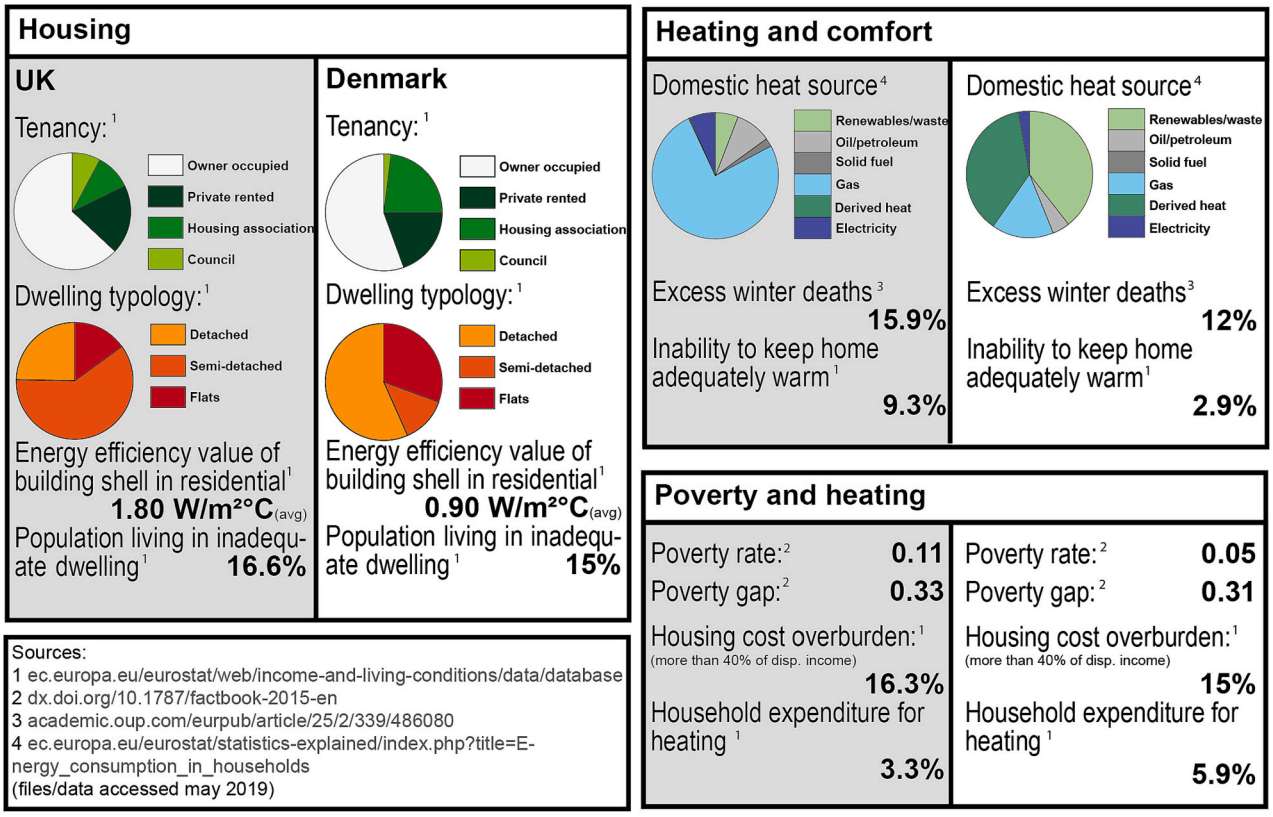

Fig. 1. Infographic with comparable data UK[1]-Denmark.
[1]The data used for this figure was only available for the whole of the UK (England, Wales, Scotland, and Northern Ireland). England covers 53 % of this area and houses 84 % of the population.

Table 2
Documents.

	Denmark	England
Primary mould-related document(s)	The National Board of Health: "*The Chief Medical Officer's guidance to the municipalities regarding dampness and mould*" [50] (henceforth "**SST08**"). The National Board of Health: "*Human use of and residence in buildings with dampness and mould fungi – recommendations for medical consultation*" [51] The Danish ministry of Transport and Housing: "*Guidance on the municipalities' ability to intervene against dampness and mould in homes and living spaces*" [52] (henceforth "**TB08**").	Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government: "*Housing health and safety rating system (HHSRS) operating guidance*" [53] (henceforth "**HHSRS**").
Citizen guidelines	www.skimmel.dk (translation: mould.dk)	www.nhs.uk/common-health-questions/lifestyle/can-damp-and-mould-affect-my-health/ "Condensation, damp and mould" [54]

legislation on either issue in the intervening years has not fundamentally challenged these conceptions.

4. What is mould in Denmark?

This section shows how problematisations of mould growth in housing are created through "*practical texts*" [10] in a Danish context. We analyse how three practical texts on municipal obligations represent mould problems, then examine how this is translated into guidelines on how tenants should act in relation to mould growth.

4.1. What is the problem of mould represented to be in Denmark?

In Denmark mould growth in housing is commonly perceived as a serious health hazard. This perception is apparent in policy and legislation, in peoples' fear of mould growth in their homes and in the amount of media coverage, research projects and official guidelines produced.

Looking at how mould problems are represented in "*Guidance on the municipalities' ability to intervene against dampness and mould in homes and living spaces*" [52] (TB08) and "*The Chief Medical Officer's guidance to the municipalities regarding dampness and mould*" [50] (SST08), the very existence of these documents, their focus on dampness and mould, and the way they oblige municipalities to take action, show a general governmental acceptance of mould being an issue of concern. Documents represent a collaboration between ministries of welfare, building, housing, and health, showing that the problem of mould is understood as interdisciplinary and a concern for all these areas of society.

The documents also clearly state that mould is considered an important and interdisciplinary issue because mould growth is a hazard for human health. The Building Act [57] states that buildings must "*afford satisfactory protection regarding fire safety, security, and health*" [57]. By officially stating that mould growth is a danger to the health and safety of occupants, as in [48], mould becomes a subject of prosecution and a subject of municipal obligation to supervise.

TB08 [52] describes the administrative procedures regarding the municipal "*duty to investigate*". The precise method of investigation is up to the municipal council, but the document suggests: "*inspection and technical examination including with the participation of special professional*

expertise" [52]. This formulation indicates that dampness and mould growth is considered a technical problem and that special professional expertise exists and is relevant to involve. Through a representation of mould as a technical and building related issue other representations are given less importance.

While dampness and mould are largely represented as technical issues related to building conditions, not all mould issues are represented equally. A group of mould issues are given the label "*trivial and therefore not demanding medical diagnosis*" [51]. This label singles out 'trivial' mould problems that are caused by occupant behaviour (e.g., drying clothes inside, failing to ventilate). The chapter on "*housing hygiene*" in the publication "*Human use of and residence in buildings with dampness and mould fungi – recommendations for medical consultation*" [51] mentions occupant behaviour. This chapter contains guidelines which health professionals can communicate to patients and a reference to the website www.skimmel.dk (mould.dk) presenting reader-friendly elaborations of the guidelines.

The chapter starts with the following: "*Damp problems are often caused by a combination of constructional issues and inappropriate user behaviour*" [51]. The chapter also contains a list of actions that the building occupants should practice to prevent mould growth (see Fig. 2.). While technical or constructional problems are mentioned, the list implies that the occupant or tenant should act and have agency in response to mould problems.

The representation of mould issues as caused by a combination of constructional or behavioural problems has been distorted into mould issues being caused by *either* constructional or behavioural problems. This distinction between the building being at fault or the occupant being at fault has resulted in the representation and handling of mould problems in Denmark revolving around establishing fault.

In rental housing, tenants' agency will depend on several socio-material arrangements: the condition, age, and design of the building, (power-) relations between tenant and landlord, the landlord's ability to invest in the property and the physical, mental, and socio-economic resources available to the tenant. While the list in Fig. 2 prescribes actions that can prevent dampness and mould growth, in practice landlords or operating staff might use these to apportion responsibility: if a tenant does not practice these actions, they bear the full responsibility for any mould growth. In reality, ventilation and exhausts, drying facilities, and furnaces or radiators are often only partially subject to the agency of tenants.

The only part of the list (Fig. 2) which is further elaborated in the chapter relates to heating:

> "*Sufficient heating is absolutely crucial, since the relative humidity (RH) is temperature dependant and rises drastically if the temperature is decreased below 18-20°C. If the moisture content in the room air exceeds a certain level, condensation occurs on cold surfaces. Condensation and the resulting mould growth can in this way also be caused by excessive conservation of heat in e.g., bedrooms or neighbouring apartments.*" [51]

This problematises "*excessive conservation of heat*" contradicting the common understanding - that conservation of heat is positive. Using the term *excessive conservation of heat* also emphasises conservation of heat as a personal choice compared to e.g., *inability to heat home sufficiently* where the cause of inability could be related both to properties of the building, the heating system, affordability etc. It also creates a direct relationship between underheating, condensation and mould growth.

By looking at how these policy documents represent mould problems, and their underlying assumptions, we shown how mould problems are conceived in a Danish context. Mould issues are taken quite seriously warranting both legislation and technical expertise. The described causes of mould growth are multiple and complex which complicates the placing of responsibility.

- Air out and ventilate, especially in bathroom and kitchen, where there is a large production of water vapour
- Use cooking hood when cooking
- Dry clothes outdoors or use tumble dryer with condenser effect or exhaust to the outdoors. No clothes drying in living rooms.
- Heat sufficiently
- Clean regularly
- If dampness and mould growth is present:
  - Find and alleviate the cause of the damp issue
  - Wash off visible mould growth with suitable disinfectant […]
  - Avoid sleeping in rooms with dampness and mould growth.

Fig. 2. Housing hygiene advice [51].

4.2. How might this representation of mould in Denmark have come about?

We have found 5 circumstances we consider of interest here. First, for dampness and mould growth to become an issue of high concern a prerequisite is that the quality and energy efficiency of the building stock is relatively high. Buildings must have a certain level of airtightness and insulation for dampness to accumulate and mould to grow, and other – more obviously dangerous - hazards must be eradicated or infrequent – pests, rot, lack of plumbing and amenities etc. A simple way of looking at the standard of building stock, is to look at the U-value, a scale describing heat transmission, of the average building shell in housing. The lower the U-value, the more heat stays inside the building. The average U-value of Danish residential buildings is 0,90 compared to the UK average of 1,8 (see Fig. 1). It might seem counterintuitive that better buildings lead to more mould, but high levels of insulation and airtightness can have this effect [58].

Second, for mould growth in housing to become a public concern, the state needs to decide that they have a responsibility for the health and safety of citizens in their own homes. Denmark has one of the most extensive welfare states in the world [59]. Danish housing policy has led to substantial provision of non-profit rental housing[2] and a regulated rental sector with a high degree of tenant protection [60]. In the rental sector, tenants can access easy redress for inadequate housing through rent control boards and other municipal bodies [61].

Third, and related to both the general condition of the rental housing stock and the welfare state housing policy, maintenance plans are mandatory for both social housing associations and for private landlords wishing to charge market rent in Denmark, securing high maintenance standards in most parts of the rental sector.

Fourth, is a high public awareness of mould. Through information campaigns, media coverage etc. Danes know that mould is dangerous. An annual survey - "The Danes in the built environment" asks a representative segment of the Danish population what their biggest worry regarding their home is. For the last three years "rot and mould" and "rising energy prices" have alternated between first and second place [62].

[2] Danish social housing consists of heavily regulated non-profit housing associations with tenant democracy and cost-related rents. Estates are built through municipal loans, and municipalities have assignment rights to 25 % of the (vacant) dwellings for people in housing need.

Public awareness can lead to pressure on governments to act, but also plays a part in the recording of mould issues. In the Eurostat dataset "European Union Statistics on Income and Living Conditions" (EU-SILC [22]) the question of whether leaks, dampness or rot is present in the dwelling is based on self-reported incidence. For people to report that they have mould, they must both have awareness of how it looks and that it is a matter of concern.

The graph above (Fig. 3) [22] shows self-reported instances of leaks, damp, or rot – the jump in the Danish graph around 2011, coincides with an extreme rain event in July 2011 leading to many flooded basements and people experiencing mould for the first time. This event likely increased public and media awareness of mould growth in homes.

Finally, experts – including those researchers, consultants, and technicians that we interviewed - also reported playing a central part in creating a representation of mould issues. They do this by supplying knowledge to legislators, but they also work to create a market for their knowledge, often turning it into services to be sold – mould testing, building surveys, dehumidifiers, fungicides - leading to an industry selling mould solutions and consultancy services. An example mentioned in the stakeholder interviews were the advanced testing methods for mould samples from Danish homes including DNA sequencing, which were not familiar to the English stakeholders.

5. What is mould in England?

This section mirrors the previous section on Denmark and shows how particular problematisations of the phenomena of mould growth in housing are created through "*practical texts*" [10] in an English context. It takes its' point of departure in a text describing housing hazards and the assessment and enforcement guidelines for local authorities.

5.1. What is the problem of mould represented to be in England?

While mould growth in housing in England is quite common and very much a part of language, everyday life, and culture, it is not widely recognised as a separate topic of research or legislation. In England chapter 34 of the Housing Act 2004 brings into legislation a method for enforcing housing standards by compiling a variety of housing related hazards into an elaborate framework for assessing severity and options for legal action called The Housing Health and Safety Rating System (HHSRS). The HHSRS focuses on producing numerical ratings about hazards rather than explaining how and why these hazards are dangerous.

Annex D of the HHSRS describes housing related hazards in terms of potential for harm, causes, and how to prevent and assess each hazard. The introductory description of mould reads: "*This category covers threats to health associated with increased prevalence of house dust mites and moulds or fungal growths resulting from dampness and/or high humidities*" [53]. Mould growth is represented as one of many potential hazards in housing, and even within its "own" chapter, mould is described as secondary to house dust mites. The paragraph on health effects compounds this by stating: "*Although less significant statistically in health terms, spores of many moulds and fungi (including timber attacking fungi) can be allergenic.*" [53].

While the HHSRS represents mould growth as a lesser health risk than, for instance, the WHO or the Danish guidelines, an area neither of these cover is mentioned:

> "*The mental and social health effects of dampness and mould should not be underestimated. Damage to decoration from mould or damp staining and the smells associated with damp and mould can cause depression and anxiety. Feelings of shame and embarrassment can lead to social isolation.*"
>
> [53].

Linking mould with adverse mental health effects suggests a cultural norm that mould is something people are ashamed of. For mould to be shameful for the person living with it, mould must be understood as at least somewhat their fault, either because of poor housekeeping or the lack of means to remedy the problem.

As mentioned earlier, high levels of humidity in a dwelling are a prerequisite for mould growth and also an issue in itself. The HHSRS represents the cause of humidity as follows:

> "*Moisture production is influenced by the design, construction, and repair of the dwelling, and on occupant density and activity. Moisture is produced by occupants through their normal biological and domestic activities. Relatively low levels of moisture are generated through breathing and are spread out over the twenty-four hours. However, there are higher levels produced in peaks from cooking, clothes drying and bathing (or showering).*"
>
> [53]

While building-related aspects are mentioned first here, they take up significantly less space in the section on causes than the aspects related to occupant "*density and activity*", instead they are relegated to the section on "preventive measures and the ideal". In Denmark the building-related aspects would be identified as causes.

The HHSRS also deals with 'excess cold' and the widely recognised fact that deaths can be directly attributed to cold (excess winter mortality[3]) results in the hazard of 'excess cold' being written in more certain terms. In extensive research on fuel poverty conducted in the UK, some researchers note the way excess cold and mould growth are intertwined: "*The issue of mould, whilst a significant risk to health and related to cold homes, does not always come under the remit of fuel poverty and energy efficiency research that focuses on cold homes.*" [41].

The HHSRS prioritises cold homes as a hazard as seen in one of the preventive measures listed for dampness and mould: "*There should be sufficient and appropriate means of ventilation to deal with moisture generated by normal domestic activities without the need to open windows. Opening windows can result in heat loss, noise, and may be a security risk.*" [53]. Here ventilation is recognised as necessary to avoid accumulation of moisture indoors, but an easy form of ventilation (opening windows) is discouraged because it might result in loss of heat.

While the existence of the HHSRS indicates an awareness of the many health issues related to poor housing standards, the rating system is complex and difficult to implement, as noted by Carr et al.: "*The law relating to health and safety in people's homes is piecemeal, out-dated, complex, dependent upon tenure, and patchily enforced.*" [63].

There is no official translation of the HHSRS into guidelines for occupants, the texts are targeted at local authorities, landlords, and housing professionals. The National Health Services website has a short web text [64] linking to the pamphlet "Condensation, damp, and mould" [54] about avoiding mould in your home, created by the NGO Centre For Sustainable Energy. That this pamphlet is published by a charity offering energy advice in itself shows how closely mould problems are represented as linked to energy, positioning mould growth as secondary to fuel poverty.

The pamphlet is two pages and consists of a short introduction, recommendations to reduce condensation at home (see Fig. 4), tips on removing mould and half a page of tips for lower energy bills.

There is a clear focus on representing "*condensation*" as the primary cause of mould: "*Some damp is caused by condensation. This can lead to a growth in mould that appears as a cloud of little black dots.*" [54] In the pamphlet image captions the term "condensation mould" is used consistently, representing condensation and mould as completely intertwined. Avoiding condensation dampness is represented as something within the building occupant's control.

In our reading of the HHSRS and the citizen guideline, mould is represented as an issue less severe than e.g., house dust mites or low

[3] Reported annually by the Office for National Statistics (see: https://www.ons.gov.uk/search?q=excess+winter+mortality).

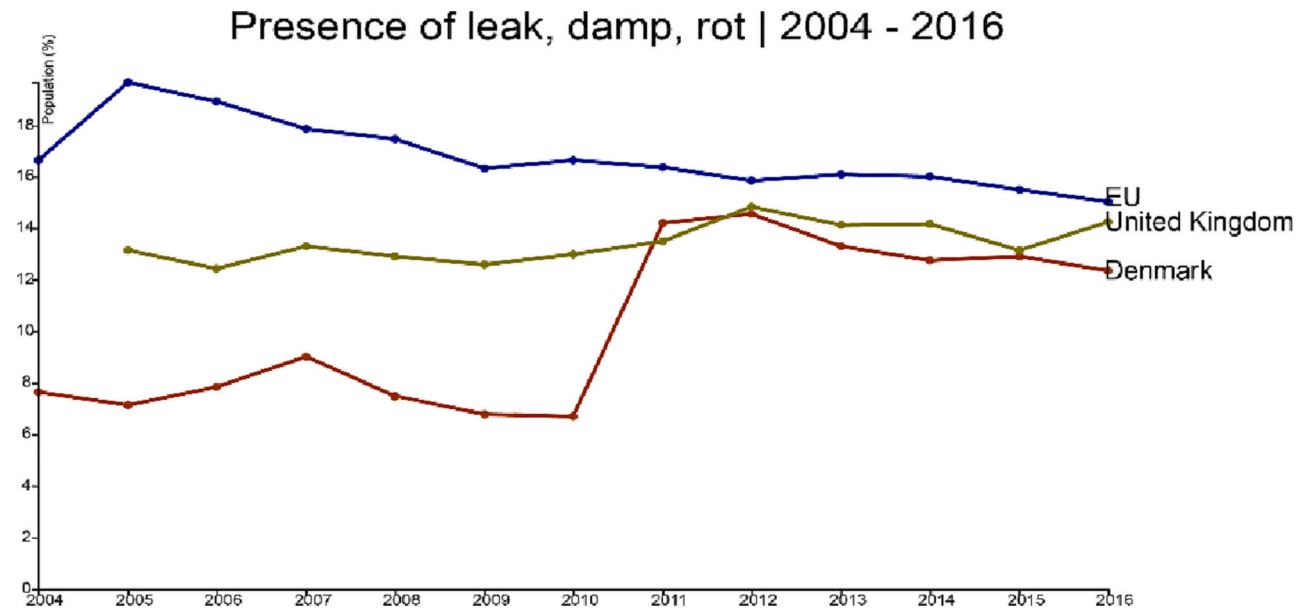

Fig. 3. Percentage of the population indicating having leaks, damp or rot in their home.
From EU_SILC [22].

1. Produce less moisture
2. Let the damp air out and the fresh air in
3. Insulate and draught-proof your home
4. Heat your home a little more

Fig. 4. How to reduce condensation at home [54].

temperatures, although the interrelation of cold, damp, mould growth and dust mites is recognised. Condensation is presented as within the control and responsibility of tenants while landlord responsibility for maintaining buildings is downplayed. The following section will offer possible explanations of how this representation of mould issues has come about.

5.2. *How might this representation of mould in England have come about?*

The history leading up to the current representation of relationships between housing, health, mould, and poverty in England is long and complex. In the late 1800s and first half of the 1900s government took responsibility for health issues related to housing, through slum clearances and the building of council housing estates [65]. Later on, and especially during the Thatcher era in the 1980s housing was increasingly individualised through encouragement of self-sufficiency and home ownership and the selling of council housing through "right to buy" schemes [65]. Thatcherism also contributed to a liberalisation of the private rental sector leading to higher rents and less tenant protection [65].

Presently, estates – tower blocks, terraced housing etc. - which were previously managed and maintained by the council are often in different types of ownership, one block of flats or series of terraced houses can contain both owner occupiers, private sector tenants and council tenants [66]. This situation leads to buildings being more expensive and difficult to repair and update without the economies of scale, leading to outdated, poorly maintained and mould growth prone buildings [66].

Some homeowners who bought through "right to buy" ended up with negative equity and had no savings to assure continuous upkeep of their homes, leading to the homes ending up in the hands of private landlords and the private rental sector has grown from 8.5 % of homes in 1991 to 18 % in 2014 [65].

The link between private landlords and mould is not a given, but a for-profit rental market can lead to a higher consideration for profit, than for investment in maintenance of the properties [67], and poorly maintained properties are more likely to have mould growth. A large proportion of private landlords in England are not professionals, a report by Shelter concludes [68], meaning that many landlords have little to no experience or qualifications in building maintenance. In the interviews undertaken for this project, it was also clear that British rental laws mainly function as protection for landlords, and the larger cities in the south of England have an extremely high demand for housing [69], all leading to many rental homes being in disrepair and tenants being powerless to demand repairs. The fact that there are tenant guidelines on how to react if you are evicted because you ask for repairs – so called "revenge evictions" [70] – clearly show the risks that tenants with mould issues face.[4]

Moving beyond the private rental sector to the whole of the rental sector, *repairs,* not maintenance, was the term used most frequently in stakeholder interviews. *Operation* or *maintenance* means continuously keeping a building fully functional, while *repairs* indicate only acting when something in the building is broken or damaged. This wording may represent a cultural understanding that landlords are neither obliged or expected to act until building conditions reach a state where something is fully broken, not "just mouldy" or with a poor energy performance.

An essential aspect of both mould issues and the development of the concept of fuel poverty in England is the infrastructure and practices related to heating. In relation to heating, the high number of excess winter deaths – 15,9 % as shown in Fig. 1. - as well as the sustained interest in fuel poverty as a policy issue in the UK has placed cold homes as a more severe problem than mould and led to a range of policies as noted by Liddell et al. [71]. The average energy efficiency of UK homes is poor. In Fig. 1, we saw that average British homes lost twice as much

[4] To have necessary repairs done, tenants might have to take landlords to small claims court (repairs up to £1000) or to court, which requires a solicitor (https://england.shelter.org.uk/housing_advice/repairs/legal_action_if_your_landlord_wont_do_repairs).

heat through the building shell as average Danish homes. In the beginning of this section, we described an increasingly individualised housing market, an individualisation that can also be seen in the heating infrastructure, three quarters of homes have central heating with gas (see Fig. 1), often individual boilers, where repairs and maintenance is an individual responsibility. In the rental sector it is not uncommon to have prepayment meters installed, which does not distribute the payments evenly across the year but makes paying for heating an extraordinary expense in the cold months [72]. These infrastructures combined with poor energy efficiency, affect heating practices, both in general and among the fuel poor.

In most English homes, heating is not on all day, many use a thermostat with average heating periods being e.g., 6.30–8 and 16.30–21, in the remaining time heating will be turned off or lowered substantially [73,74]. These heating practices can lead to increased condensation in poorly insulated homes, especially if particular rooms are unheated. When heating is also individualised and something you pay for when you need it, it can become something you economise on, as described here: "*Pre-payment meters are relied upon by many households to manage fuel costs and avoid fuel debt. Higher tariffs may exacerbate unhealthy practices such as under-heating*" [75]. When combining individualised heating infrastructure and a cultural practice of only partial heating, the focus on fuel poverty is warranted. That fuel poverty is in focus and mould is considered a secondary issue, does leave areas untreated, both in relation to the health effects of mould and mould as a sign of poor building conditions.

6. Discussion and conclusion

Here we summarise where there are major differences in representation in Denmark and England, with a focus on how these influence the experiences of mould and fuel poverty. We also reflect on how these differences might affect how the current energy and cost of living crises are felt and handled.

6.1. How representation shapes mould problems and experiences

We have shown above that Denmark has extensive research and policy positioning mould in housing as a societal issue, including the obligation of the municipality to act, while the representation in England is more hesitant, with mould described as less hazardous compared to cold. This has led to the vastly different ways in which mould problems are represented in Denmark and England, which in turn has consequences for the management, and by extension experience of living with mould. Whether mould growth is seen as an issue warranting expert assessment and sometimes extensive renovations in Denmark as seen in both legislation and described in stakeholder interviews or needing 'proper' housekeeping and painting over with fungicidal paint as the stakeholders in England described as the common reaction, leaves very different options for tenants as to what they can expect from their landlord. Some types of mould can be alleviated through housekeeping and other types demand building repairs and improvements. The key lies in finding the right balance between individual housekeeping action and minimum standards for housing, affordable heating, and healthy homes as a human right.

We have shown that policy on mould in Denmark puts an emphasis on the landlords' responsibility to supply quality buildings where the focus on fuel poverty in England emphasises the tenants' inability to afford adequate heating. This results in a situation in which the Danish municipal stakeholders interviewed told of tenants who might report mould problems to the municipality as a form of 'revenge' on their landlord if they had an unrelated dispute, whereas in England we see 'revenge evictions' of tenants [70] in response to any complaints about the property. This leads us to another area with major differences, namely the representation of fuel poverty.

6.2. How representation shapes (fuel) poverty problems and experience

England has been the centre of research on fuel poverty for decades and has extensive policy, targets, and definitions in place, while the topic is almost untouched in a Danish context. A survey in 2013 showed that 42 % of Danes did not believe real poverty existed in Denmark [76] and several politicians[5] are quoted making the same statement. While Denmark is a rich country, with a well-developed social security net, it has seen a rising GINI index recently [6]. In Denmark there is an awareness that many mould issues occur in homes with "social problems" [77] a euphemism for the poorest and most vulnerable populations in Denmark, but the particular vulnerabilities that creates fuel poverty are not used as a lens to address these problems.

The UK has almost double the (relative) poverty rate of Denmark (see Fig. 1), which helps explain a clearer representation of poverty in an English context. The absence of policy on fuel or energy poverty in Denmark is somewhat substantiated by differences in infrastructure such as a higher degree of affordable district heating and better insulated properties (see Fig. 1), but it does neglect the issue of cold homes as a health hazard and the relation to poverty.

A recognition of fuel poverty can lead to an awareness of the populations who need help, even if they do not consider themselves fuel poor. A heightened awareness among housing and health professionals, municipalities, and NGOs of both indicators of fuel poverty and aid schemes can ensure that investments are made where there is the greatest need.

6.3. Mould and fuel poverty in the current plethora of crises

In the current inflation and energy crisis, during which the price of gas has risen rapidly, a much larger part of the population in Europe risk being unable to afford to heat their home. Many public and private actors offer advice about lowering temperatures and other measures to use less heat. In Denmark advice on heating is increasingly converging with English advice on less and intermittent heating [78], which may result in elevated mould risks. Meanwhile in England, advice on heating the body not the home [79] is likely to further entrench the challenges English households face with mould and damp. The types of advice given by media and official agencies reflect representations of problems caused by the energy crisis which have practical effects.

Even in a shared and Europe-wide energy crisis, we see how different representations of mould and fuel poverty create different lived experiences of similar crises. While the need for energy conservation is acute, both to survive the current crises and to alleviate the climate effects, we need to raise awareness of health effects of both mould growth and cold homes, so the poorest populations do not pay for the energy crisis with their limited funds and their health. This includes raising awareness among policymakers of the effects of how they problematise the energy crisis, including the neglect of the health effects of cold, damp, and mould infested housing.

The contrasting approaches to the governance of mould and cold between these two nations suggest the potential for learning across borders, to ensure that the experience of mould and cold can be better alleviated. In countries where the interrelatedness of mould and fuel poverty is not recognised, a combined focus on mould and fuel poverty could perhaps pave the way for policies that take fuel or general poverty into account when handling mould issues in rental housing. Likewise, in countries that (like England) have a stronger focus on fuel poverty, this could benefit from being combined with a substantive attention to mould as a building related issue and not just a behavioural issue.

In general, comparative studies of the policies surrounding fuel and energy poverty and health effects of cold, mouldy, and otherwise

[5] E.g., MPs Ole Birk Olesen (LA) and Søren Pape Poulsen (C) (prime minister candidate in the 2022 election).

substandard housing can be an eye opener for the diverse ways cultural norms and preconceptions act through policies in ways that affect the daily lives, health, and well-being of vulnerable groups. We would love to see further work on this in both the global north and the global south.

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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References

[1] European Council, Energy prices and security of supply. https://www.consilium.europa.eu/en/policies/energy-prices-and-security-of-supply/, 2023. Retrieved 2/6 2023.
[2] N Eyre, T Oreszczyn, The energy price crisis – issues for energy use, CREDS Policy Brief 023,.
[3] B. Tonn, B. Hawkins, E. Rose, M. Marincic, Income, housing and health: poverty in the United States through the prism of residential energy efficiency programs, Energy Res. Soc. Sci. 73 (2021), 101945.
[4] S. Bouzarovski, S. Petrova, A global perspective on domestic energy deprivation: overcoming the energy poverty–fuel poverty binary, Energy Res. Soc. Sci. 10 (2015) 31–40.
[5] V. Ballesteros-Arjona, L. Oliveras, J. Bolívar Muñoz, A. Olry de Labry Lima, J. Carrere, E. Martín Ruiz, et al., What are the effects of energy poverty and interventions to ameliorate it on people's health and well-being? Energy Res. Soc. Sci. 87 (2022), 102456.
[6] R. Galvin, Letting the Gini out of the fuel poverty bottle? Correlating cold homes and income inequality in European Union countries, Energy Res. Soc. Sci. 58 (2019), 101255.
[7] N. Willand, Opportunity, ideal or distraction? Exploring stakeholder perceptions of tackling energy poverty and vulnerability among older Australians, Energy Res. Soc. Sci. 94 (2022), 102852.
[8] S. Bouzarovski, Energy poverty in the European Union: landscapes of vulnerability, Wiley Interdiscip. Rev. Energy Environ. 3 (2014) 276–289.
[9] S. Bouzarovski, S. Tirado Herrero, Geographies of injustice: the socio-spatial determinants of energy poverty in Poland, the Czech Republic and Hungary, Post-Communist Econ. 29 (2017) 27–50.
[10] C. Bacchi, Why study problematizations? Making politics visible, Open J. Polit. Sci. 2 (2012) 1–8.
[11] S.N. Baxi, J.M. Portnoy, D. Larenas-Linnemann, W. Phipatanakul, Exposure and health effects of fungi on humans, J Allergy Clin Immunol Pract 4 (2016) 396–404.
[12] WHO Regional Office for Europe, WHO Guidelines for Indoor Air Quality: Dampness and Mould, World Health Organization, Copenhagen, 2009.
[13] S. Gravesen, P.A. Nielsen, R. Iversen, K.F. Nielsen, Microfungal contamination of damp buildings-examples of risk constructions and risk materials, Environ. Health Perspect. 107 (1999) 505–508.
[14] K.F. Nielsen, G. Holm, L.P. Uttrup, P.A. Nielsen, Mould growth on building materials under low water activities. Influence of humidity and temperature on fungal growth and secondary metabolism, Int. Biodeterior. Biodegrad. 54 (2004) 325–336.
[15] H. Viitanen, J. Vinha, K. Salminen, T. Ojanen, R. Peuhkuri, L. Paajanen, et al., Moisture and bio-deterioration risk of building materials and structures, J. Build. Phys. 33 (2010) 201–224.
[16] M.J. Mendell, A.G. Mirer, K. Cheung, M. Tong, J. Douwes, Respiratory and allergic health effects of dampness, mold, and dampness-related agents: a review of the epidemiologic evidence, Environ. Health Perspect. 119 (2011) 748–756.
[17] J.C. Frisvad, B. Andersen, U. Thrane, The use of secondary metabolite profiling in chemotaxonomy of filamentous fungi, Mycol. Res. 112 (2008) 231–240.
[18] T. Isaksson, S. Thelandersson, A. Ekstrand-Tobin, P. Johansson, Critical conditions for onset of mould growth under varying climate conditions, Build. Environ. 45 (2010) 1712–1721.
[19] U. Gehring, J. Douwes, G. Doekes, A. Koch, W. Bischof, B. Fahlbusch, et al., β(1→3)-glucan in house dust of German homes: housing characteristics, occupant behavior, and relations with endotoxins, allergens, and molds, Environ. Health Perspect. 109 (2001) 139–144.
[20] B. Jacob, B. Ritz, U. Gehring, A. Koch, W. Bischof, H.E. Wichmann, et al., Indoor exposure to molds and allergic sensitization, Environ. Health Perspect. 110 (2002) 647–653.
[21] U. Haverinen-Shaughnessy, Prevalence of dampness and mold in European housing stock, J Expo Sci Environ Epidemiol. 22 (2012) 654.
[22] Eurostat, Total population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor - EU-SILC survey. https://ec.europa.eu/eurostat/databrowser/view/ilc_mdho01/default/table?lang=en, 2021. Retrieved 2/6 2021.
[23] N. Simcock, G. Walker, R. Day, Fuel poverty in the UK: beyond heating? People Place Policy Online. 10 (2016) 25–41.
[24] B. Boardman, Fuel Poverty - from Cold Homes to Affordable Warmth, Belhaven Press, 1991.
[25] J.D. Healy, Excess winter mortality in Europe: a cross country analysis identifying key risk factors, J. Epidemiol. Community Health. 57 (2003) 784–789.
[26] G. Mohan, The impact of household energy poverty on the mental health of parents of young children, J. Public Health (Oxf). 44 (2022) 121–128.
[27] D. Ivanova, L. Middlemiss, Characterizing the energy use of disabled people in the European Union towards inclusion in the energy transition, Nat. Energy 6 (2021) 1188–1197.
[28] The Marmot Review Team, The health impacts of cold homes and fuel poverty. http://www.instituteofhealthequity.org/projects/the-health-impacts-of-cold-homes-and-fuel-poverty, 2011. Retrieved 10/13 2022.
[29] H. Thomson, C. Snell, S. Bouzarovski, Health, well-being and energy poverty in Europe: a comparative study of 32 European countries, Int. J. Environ. Res. Public Health 14 (2017) 584.
[30] C.N.B. Grey, S. Jiang, C. Nascimento, S.E. Rodgers, R. Johnson, R.A. Lyons, et al., The short-term health and psychosocial impacts of domestic energy efficiency investments in low-income areas, BMC Public Health 17 (2017) 140.
[31] L. Middlemiss, Energy poverty: Understanding and addressing systemic inequalities, in: R. Galvin (Ed.), Inequality and Energy - How Extremes of Wealth and Poverty in High Income Countries Affect CO2 Emissions and Access to Energy, Academic Press, 2020.
[32] L. Middlemiss, A critical analysis of the new politics of fuel poverty in England, Crit. Soc. Policy 37 (2017) 425–443.
[33] N. Kerr, R. Gillard, L. Middlemiss, Politics, problematisation, and policy: a comparative analysis of energy poverty in England, Ireland and France, Energy Build. 194 (2019) 191–200.
[34] M. Feenstra, L. Middlemiss, M. Hesselman, K. Straver, S. Tirado Herrero, Humanising the energy transition: towards a national policy on energy poverty in the Netherlands, Front. Sustain. Cities. 3 (2021) 1–11.
[35] Department for Business Energy & Industrial Strategy, Sustainable Warmth. Protecting Vulnerable Households in England, 2021.
[36] Danish Ministry of Climate Energy and Utilities, Denmark's Integrated National Energy and Climate Plan. https://ens.dk/en/our-responsibilities/energy-climate-politics/eu-energy-union-denmarks-national-energy-and-climate, 2019. Retrieved 4/8 2020.
[37] L. Middlemiss, Who is vulnerable to energy poverty in the Global North, and what is their experience? Wiley Interdiscip, Rev. Energy Environ. 11 (2022) e455-n/a.
[38] M. Recalde, A. Peralta, L. Oliveras, S. Tirado-Herrero, C. Borrell, L. Palència, et al., Structural energy poverty vulnerability and excess winter mortality in the European Union: exploring the association between structural determinants and health, Energy Policy 133 (2019), 110869.
[39] R. Galvin, M. Sunikka-Blank, Economic inequality and household energy consumption in high-income countries: a challenge for social science based energy research, Ecol. Econ. 153 (2018) 78–88.
[40] K. Großmann, A. Kahlheber, Energy Poverty in an Intersectional Perspective Energy Poverty and Vulnerability, 1st ed., Routledge, 2018, pp. 12–32.
[41] A.C. de Chavez, J. Gilbertson, A.M. Tod, P. Nelson, V. Powell-Hoyland, C. Homer, et al., Using environmental monitoring to complement in-depth qualitative interviews in cold homes research, indoor, Built Environ. 26 (2017) 937–950.
[42] R.A. Sharpe, C.R. Thornton, V. Nikolaou, N.J. Osborne, Fuel poverty increases risk of mould contamination, regardless of adult risk perception & ventilation in social housing properties, Environ. Int. 79 (2015) 115–129.
[43] Eurostat, Severe housing deprivation rate by tenure status - EU-SILC survey. https://ec.europa.eu/eurostat/databrowser/bookmark/1763bd17-30a5-48b1-9f81-906ab5f76666?lang=en, 2022. Retrieved 2/3 2023.
[44] B. Wright, Breaking the Mould: Should Landlords Be Doing More?, 2018.
[45] T. Zimmer, Gentrification as injustice, Public Aff. Q. 31 (2017) 51–80.
[46] Department for Communities and Local Government, (UK), Age of housing units in England in 2021, by tenure (in 1,000s) [Graph]. Statista. https://www.statista.com/statistics/292252/age-of-housing-dwellings-in-england-uk-by-tenuree/, 2022. Retrieved 2/6 2023.
[47] Statistics Denmark, BOL101: Boliger efter område, beboertype, anvendelse, udlejningsforhold, ejerforhold og opførelsesår. www.statistikbanken.dk/BOL101, 2023. Retrieved 2/6 2023.
[48] IEE Project TABULA, TABULA Building Typologies - Country Pages. https://episcope.eu/building-typology/country/, 2016. Retrieved 2/6 2023.
[49] C. Bacchi, Problematizations in health policy, SAGE Open 6 (2016), 215824401665398.
[50] Sundhedsstyrelsen, Orientering fra Sundhedsstyrelsen: Embedslægernes rådgivning til kommunerne om fugt og skimmelsvampe. https://stps.dk/da/sundhedsprofessionelle-og-myndigheder/miljoemedicin-og-hygiejne/indeklima-og-skimmelsvamp/fugt-og-skimmelsvamp/~/media/5A17A5FDDC9C4B0F99E1DCF186D484DB, 2008. Retrieved 4/7 2019.

[51] A. Fabricius, J. Blands, Personers ophold i bygninger med fugt og skimmelsvamp Anbefalinger for sundhedsfaglig rådgivning, Sundhedsstyrelsen. https://www.sst.dk/~/media/D0A34D0DE0E241568C725D49A22C84BE.ashx, 2009. Retrieved 5/7 2019.
[52] Transport- og Boligministeriet, Vejledning om kommunernes mulighed for at gribe ind over for fugt og skimmelsvamp i boliger og opholdsrum, Transport- og Boligministeriet. https://www.retsinformation.dk/eli/mt/2008/47, 2008. Retrieved 27/1 2021.
[53] The Office of the Deputy Prime Minister, Housing Health and Safety Rating System - Operating Guidance, The Office of the Deputy Prime Minister. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/15810/142631.pdf, 2006. Retrieved 15/2 2022.
[54] Centre for Sustainable Energy, Condensation, damp and mould, Centre for Sustainable Energy. https://www.cse.org.uk/downloads/file/advice_leaflet_condensation_damp_mould.pdf, 2017. Retrieved 15/2 2022.
[55] C. Seale, The Quality of Qualitative Research, 1. publ. ed., Sage, London [u.a.], 1999.
[56] A. Coffey, P. Atkinson, Beyond the Data Making Sense of Qualitative Data: Complementary Research Strategies, Sage, Thousand Oaks [u.a.], 1996.
[57] Transport og Boligministeriet, Bekendtgørelse af byggeloven. https://www.retsinformation.dk/eli/lta/2016/1178, 2016. Retrieved 3/7 2019.
[58] A. Brambilla, A. Sangiorgio, Mould growth in energy efficient buildings: causes, health implications and strategies to mitigate the risk, Renew. Sust. Energ. Rev. 132 (2020), 110093.
[59] OECD Statistics, Sizing up Welfare States: How do OECD countries compare?. https://oecdstatistics.blog/2023/02/02/sizing-up-welfare-states-how-do-oecd-countries-compare/, 2023. Retrieved 2/6 2023.
[60] S. Alves, Poles Apart? A comparative study of housing policies and outcomes in Portugal and Denmark, Hous. Theory Soc. 34 (2) (2017) 221–248.
[61] Social- Bolig- og Ældreministeriet, Huslejenævn og klagemuligheder (Rent control boards and avenues of complaint). https://sm.dk/arbejdsomraader/byggeri-boliglovgivning-og-landdistrikter/private-lejeboliger/fremleje-overdragelse-og-opsigelse/huslejenaevn-og-klagemuligheder, 2017. Retrieved 2/6 2023.
[62] Videnscenteret Bolius Realdania, Danskerne i det Byggede Miljø, 2020, Realdania og Videnscenteret Bolius. https://realdania.dk/publikationer/faglige-publikationer/danskerne-i-det-byggede-miljoe-2020, 2020. Retrieved 1/4 2021.
[63] H. Carr, D. Cowan, E. Kirton-Darling, E. Burtonshaw-Gunn, Closing the Gaps: Health and Safety in Housing, University of Bristol, University of Kent, Shelter, 2017. https://england.shelter.org.uk/professional_resources/policy_and_research/policy_library/policy_library_folder/report_closing_the_gaps_-_health_and_safety_at_home (Retrieved 5/3 2019).
[64] NHS, Can damp and mould affect my health?. www.nhs.uk/common-health-questions/lifestyle/can-damp-and-mould-affect-my-health/, 2021. Retrieved 1/13 2022.
[65] B. Lund, Understanding Housing Policy, 3rd ed., Policy Press, 2017.
[66] R. Kleinhans, M. van Ham, Lessons Learned from the Largest Tenure-mix Operation in the World: Right to Buy in the United Kingdom, Cityscape (Washington, D.C.) 15, 2013, pp. 101–117.
[67] A.R. Ambrose, Improving energy efficiency in private rented housing: why don't landlords act? Indoor Built Environ. 24 (2015) 913–924.
[68] Shelter, Research report - Survey of private landlords, Shelter. https://england.shelter.org.uk/professional_resources/policy_and_research/policy_library/research_report_survey_of_private_landlords, 2016. Retrieved 15/2 2018.
[69] S. Heath, Housing demand and need (England), House of Commons - Social Policy Section. https://acash.org.pk/wp-content/uploads/2018/12/housing_demand_and_need.pdf, 2014. Retrieved 2/6 2023.
[70] Shelter, Revenge eviction if you ask for repairs. https://england.shelter.org.uk/housing_advice/repairs/revenge_eviction_if_you_ask_for_repairs, 2022. Retrieved 10/13 2022.
[71] C. Liddell, C. Morris, H. Thomson, C. Guiney, Excess winter deaths in 30 European countries 1980–2013, J. Public Health (Oxf). 38 (2016) 806–814.
[72] C. Snell, H. Lambie-Mumford, H. Thomson, Is there evidence of households making a heat or eat trade off in the UK? J. Poverty Soc. Justice. 26 (2018) 225–243.
[73] Department for Business, Energy & Industrial Strategy, Energy Follow Up Survey: Heating patterns and occupancy, Department for Business, Energy & Industrial Strategy. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1018727/efus-heating-patterns-occupancy.pdf, 2021 (Retrieved 2/6 2023).
[74] G.M. Huebner, M. McMichael, D. Shipworth, M. Shipworth, M. Durand-Daubin, A. Summerfield, Heating patterns in English homes: comparing results from a national survey against common model assumptions, Build. Environ. 70 (2013) 298–305.
[75] A. Ambrose, L. McCarthy, J. Pinder, Energy (in) Efficiency: What Tenants Expect and Endure in Private Rented Housing, Sheffield Hallam University, CRESR. https://www.shu.ac.uk/-/media/home/research/cresr/reports/e/energy-inefficiency-private-rented-housing-research-summary.pdf, 2016 (Retrieved 12/3 2018).
[76] K. Frandsen, Fire ud af ti danskere: Ingen fattigdom i Danmark, Altinget. https://www.altinget.dk/artikel/fire-ud-af-ti-danskere-ingen-fattigdom-i-danmark, 2013. Retrieved 10/13 2022.
[77] S. Bonderup, Forebyggelse af skimmelproblemer i lejeboliger: driftspersonalets rolle, praksisser og værktøj, Aalborg University, 2021.
[78] Energistyrelsen, Spar energi i din lejlighed. https://sparenergi.dk/forbruger/spar-energi-i-din-lejlighed?, 2022. Retrieved 10/18 2022.
[79] MoneySavingExpert, Heat the human not the home. https://www.moneysavingexpert.com/utilities/heat-the-human-not-the-home-save-energy/, 2022. Retrieved 10/18 2022.