Invisible energy policy and schools: how energy issues feature in the policies and documents of a UK secondary school

Joshua Lait (ORCID)

Abstract There is a growing research literature focused on 'invisible energy policy' that explores the complex links between policies in non-energy sectors and energy demand. Invisible energy policies are those that do not include energy as a visible policy objective but still pose implications for energy demand that are largely unrecognised in non-energy organisational settings. Within this innovative area of analysis, to date, little attention has been paid to how 'energy' features in the discourse of non-energy contexts. This paper makes a distinctive contribution by examining how energy issues, such as energy demand, travel, and energy skills, do or do not feature in the policy and wider strategy of a non-energy policy setting. The research focuses on the content of policies and other documents in the non-energy policy context of UK secondary schooling, using a case study approach. It aimed to identify how energy surfaces and/or remains absent in different types of documentary evidence at the school. The textual analysis shows how openings for energy to surface as a concern at the school are often heavily bounded in specific policy areas, such as sustainability and education. It also foregrounds the lack of recognition in the sample for how school operations and strategy can produce demand for energy more fundamentally. It argues that these openings for energy to surface can provide points of negotiation to discuss the more fundamental energy impacts of policy. The paper concludes by reflecting on the analysis' implications for research on 'invisible energy policies' and low-carbon transitions.

Introduction

The increasing use of energy in everyday life has inspired a growing body of research on energy demand reduction and energy efficiency (D'Oca et al., 2018; Hampton, 2019; Pereira & da Silva, 2017). This broad body of research looks at the 'human dimensions' (such as social, economic, and organisational factors) driving increases in energy consumption. Authors identify opportunities to improve energy efficiency and reduce energy demand as a way to support low-carbon transitions in different policy contexts, like offices, hospitals, schools, and homes.

'Invisible energy policies' have recently emerged as an interest in this body of literature on the 'human dimensions' of energy systems (Butler et al., 2018; Cox et al., 2019; Royston et al., 2018). An 'invisible energy policy' (IEP) refers to a non-energy policy that inadvertently shapes energy demand. For example,

J. Lait (✉)
Amory C360, Geography Department, University of Exeter, Stocker Road, Exeter EX4 4PY, UK
e-mail: jl1118@exeter.ac.uk

in the context of education a recruitment policy that aims to attract overseas students to a university may increase energy use by encouraging international travel (Royston, 2016). Empirical IEP research has primarily examined the links between non-energy policies and energy demanding practices.

Therefore, IEP research to date has principally focused on the 'energy issue' of demand. An 'energy issue' is understood here as a topic that speaks to a feature of the overall energy system. However, authors in this space have also identified the links between non-energy policies and other energy issues (such as energy poverty, energy supply, and energy skills) (Butler, 2022; Cox et al., 2019). In doing so, they foreground how non-energy policies pose wider implications for the energy system. This signals that it could be useful to take a broader and more contextual look at how energy surfaces as an issue in a non-energy policy setting.

The following article seeks to add to this small but growing field by looking directly at policies themselves rather than their relations to energy demand. As such, the empirical research builds on previous work in this space by taking inspiration from the 'invisible energy' thesis to conduct a textual analysis of a non-energy policy area. It uses the thesis in a slightly different way and examines how 'energy' surfaces or remains absent as an issue in a UK secondary school's policies and strategy.

Previous empirical research on energy and schooling in this journal has examined a wide range of issues, including school energy use, energy performance indexes, indoor environmental quality, energy efficiency and energy-related education, and behavioural interventions (Chen et al., 2015; Cornelius et al., 2014; Derenski et al., 2018; Dias Pereira et al., 2019; Jota et al., 2017). Other studies have looked at energy use in relation to home-to-school transport patterns (Li & Zhao, 2015; Marique et al., 2013). However, overall, schools as sites of empirical energy research have been less examined than other settings, such as offices. Moreover, little consideration has been given to the nature of policy and strategy in shaping these areas of energy use and wider energy challenges.

In the UK, recent research has highlighted the potential influence of human dimensions of energy use in new schools related to post-occupancy behaviour and changing building use patterns (Burman et al., 2018; Jain et al., 2020; van Dronkelaar et al., 2016). School procurement in the UK has also been identified as an area with implications for energy (Badi, 2017; DfE, 2022; Nolden & Sorrell, 2016). Added to this is recognition of multiple areas of everyday energy use that are shaped by school policies and procedures, such as requirements for computing and travel (BEIS, 2016; Easton & Ferrari, 2015). Finally, the UK's Department for Education has recently outlined its Sustainability and Climate Change strategy, which seeks to advance net-zero transitions in schools (DfE, 2022). Taken together, this marks UK schooling out as of particular interest as a context for exploring how energy topics do or do not surface in non-energy policies, documents, and materials.

The overall aim of the research was to explore how energy issues surfaced in the content of secondary school policies. It sought to identify the different ways 'energy' was present as an issue in a non-energy policy setting. It also considered the cases when 'energy' is only partially present or absent entirely in the document sample. A discourse analysis of documents published by a secondary school was conducted to address these aims. The document review included different types of documentary evidence (such as policies, inspection reports, newsletters, and other promotional outputs) to gain a range of insights and perspectives on different areas of school policy and school life. This document-based methodology is suited to examining non-energy policies themselves and represents a novel approach in the IEP literature to date.

The paper finds that 'energy' surfaces as an issue in a limited number of ways in the sample. In particular, the analysis focuses on how 'energy' does or does not surface in two school discourses: (1) sustainability; (2) energy-related education. It reflects on the implications of how energy features in this policy area for low-carbon transitions. The paper argues that the presence of different energy concerns in a non-energy policy setting, like a school, does not necessarily translate into deeper forms of policy response to managing energy consumption. The work's novel textual approach contributes to the efforts of other IEP scholars in developing a deeper understanding of the blurred lines between energy and other areas of policy and practice.

The following section situates the research presented here by reviewing the core IEP concepts and

key areas for their empirical application. 'Methodology and method' section outlines the paper's case study, methodology, and approach to discourse analysis. 'Revealing how energy issues feature in the life of a UK secondary school' section presents the results of the discourse analysis ('Academy policy and energy' section) and discusses the results in relation to sustainability ('Sustainability' section), education ('Education' section), and IEP research ('Discussion and implications for IEP research' section). 'Conclusion' section presents the paper's conclusions, implications for future IEP research, and recommendations ('Recommendations' section).

Invisible energy: core concepts and applications

Research on 'invisible energy policies' (IEP) has been informed by social practice theory and has explored the ways in which everyday practices constitute energy demand (Labanca & Bertoldi, 2018; Reckwitz, 2002; Shove & Walker, 2010). Related studies have analysed the evolving relationships between 'non-energy' policies, energy demanding practices (such as travel, heating, and lighting), and energy demand (Butler, 2022; Butler et al., 2018; Gormally et al., 2019; Greene & Fahy, 2020; Nicholls & Strengers, 2018). This growing body of empirical research is helping to foreground these largely overlooked interactions between non-energy policy and demand.

The following work seeks to contribute to this discussion by taking inspiration from the IEP concept to look at how energy surfaces and/or remains absent as a priority within non-energy policymaking. As such, it departs from previous work in this space, which has engaged primarily with the relationships between non-energy policy and energy demanding practices. The rationale for this approach will be developed throughout the subsequent review of the core IEP concepts and key areas of application.

'Energy' versus 'non-energy' policy

In setting out the IEP agenda, Royston et al. (2018) define an 'energy policy' or 'energy policy objective' as one which explicitly aims to influence different aspects of the energy system (such as energy supply, energy efficiency, or energy demand). Both energy policies and energy objectives are implemented at different decision-making levels (such as organisational, institutional, and national) and in different policy areas. The documents sampled for this research did not include an energy policy per se. However, energy did emerge as a policy objective in a handful of the documents that were sampled.

A 'non-energy policy' or a 'non-energy policy objective' is not designed to target energy, but may inadvertently influence energy demand, nonetheless. For example, Nicholls and Strengers (2018) work in the Australian context foregrounds the largely unacknowledged links between health documents detailing safe temperature ranges for infant health and the uptake and potential dependence on home air conditioning instead of other more sustainable methods of cooling, such as opening windows.

Royston et al. (2018) use the common distinction between policy as 'objective' and 'process' to emphasise two different approaches to looking at non-energy policies. Broadly speaking, the first approach ('objectives') looks at the substantive content of documents. The second approach ('processes') examines changes in governance and organisational arrangements. In both cases, IEP research seeks to identify the links between (non-energy) policy 'objectives' or changes in policy 'processes' and energy demand. While the document sample here includes wider governance documents, there was insufficient documentary evidence to examine changes in processes. As a result, this paper adopts the first approach focusing on policy objectives as they are articulated within school policy and strategies to investigate how energy concerns do or do not feature within them and explore the consequences for goals of low-carbon transitions in energy systems.

The analysis does not look at the actual links between non-energy policy objectives and resulting practices that have implications for energy demand. Instead, it contributes to the IEP literature by looking at how links between energy and non-energy objectives (or issues) are embedded in the content of school documents and how this shapes possibilities for low-carbon transition more broadly. Importantly, the analytical focus of this paper on elements of 'non-energy' policymaking supports the broader aim of the IEP agenda to unsettle conventional understandings of 'energy policy' and extend the remit of energy research.

This novel textual approach can make several key contributions to the IEP agenda. First, the focus on all documentary evidence in a policy setting allows

researchers to identify which policies, priorities, or interactions have the potential to function as 'invisible energy policies'. Second, it permits researchers to examine the possible implications of intersections between energy and non-energy discourses for the governance of energy and its use. Lastly, the focus on how energy issues emerge in an organisation's documents can help researchers to identify opportunities for the further integration of energy policy objectives into non-energy decision-making. Therefore, by examining all documents and wider materials that are publicly available, this paper's approach engages with key contextual issues, such as the setting, background, and circumstances, for local energy and non-energy policymaking.

'Visible' versus 'invisible'

Authors have used the 'invisible' and 'visible' descriptors to highlight the extent to which the energy implications of policies and agendas are recognised in a non-energy policy area. Within this lens, the impacts of energy policies, objectives, or initiatives on practices and energy use are described as 'visible' to policy actors (such as policymakers or policy subjects). In contrast, the impacts of non-energy policies on energy demand have been described as largely 'invisible' to policy actors.

Non-energy policies with implications for demand have come to be described as 'invisible energy policies' in research to date. For example, recent research shows how wider neoliberal (non-energy) reforms in the UK higher education sub-sector can promote 'a results-orientated culture' in research that is linked to the incremental and largely 'invisible' uptake of more energy demanding working practices (Gormally et al., 2019: 129). Importantly, the conceptual distinction between 'invisible' and 'visible' is a heuristic device that helps scholars to emphasise the different links between policy, practices, and energy use in non-energy settings.

In practice, however, the in/visible distinction is relative, 'complicated and blurred', with certain policy actors more likely to recognise the energy impacts of non-energy policies (such as building managers) and others less so (Royston et al., 2018: 128). Likewise, a policy's energy implications may be less visible at a higher decision-making level (like a government department) and more visible at lower decision-making levels where it is implemented.

IEP scholars probe this issue of visibility to develop a clearer understanding of different policy actors' active or unintentional roles in shaping energy use in non-energy policy areas.

This work contributes to this discussion on in/visibility by examining the complex boundaries between different areas of school policymaking. Policy actors help to devise and implement (non-energy) school policies. This makes the documents' content of interest for exploring how conspicuous the relationships between policy, demand, and other energy matters are in school discourse. As such, the following analysis of the specifics of policy departs from previous empirical research in this space that has looked at the 'visibility' of policies' impact on energy consumption, by looking at how energy and its use feature in a non-energy policy area, and the implications of this for low-carbon transitions.

Areas of application

This final section discusses first how the core IEP concepts have been applied to different policy problems in recent empirical research. These areas include:

1. Varying impact of non-energy factors (such as policies, agendas, sectors, and phenomena) on energy demand
2. Intersections between non-energy policy factors
3. Translating non-energy objectives into practices with consequence for energy use
4. Negotiating conflicts between energy and non-energy policies

After discussing these areas, the section will outline how the research conducted for this work speaks to each application.

First, recent IEP research has started to showcase the wide range in ways that non-energy policy factors can influence energy demand (Cox et al., 2016, 2019; Royston et al., 2018; Wadud et al., 2019). Butler et al. (2018) illustrate this point by developing an analytical framework that distinguishes between the impact of 'direct' and 'broader' non-energy change. For example, non-energy policy factors can directly influence energy demand by necessitating new or additional forms of energy use. However, policy factors can also shape broader forms of societal transformation

(such as neoliberalisation or digitalisation) that may indirectly shape energy use by establishing 'what is conceived as possible in terms of energy policy and transitions' (2018: 71).

Second, the intersections between different non-energy policy factors can also pose important consequences for energy demand (Greene & Fahy, 2020; Morley et al., 2018; Royston et al., 2018). For example, Morley et al. (2018) show how the intersection between government policy and digitalisation can drive data demand, necessitating digital infrastructure development and, as a result, additional energy use. These intersections can take place over multiple decision-making levels and across different sectors. This can make it difficult to clearly understand how non-energy policy factors are influencing energy demand.

Third, policy actors play an important and complicated role in implementing policies in non-energy sectors. Green and Fahy argue that 'intermediary' policy actors, like educators or managers, interpret and translate various non-energy policies into particular outcomes (2020: 9). As a result, the 'intermediaries' help to shape everyday practices with consequences for energy use. Empirical research also finds that the ways policy subjects negotiate non-energy policies are often influenced by social characteristics, like gender or class (Greene & Fahy, 2020; Nicholls & Strengers, 2018).

Fourth, non-energy policy arenas, like schools, include a range of policy priorities, which can result in experiences of conflict that policy actors and subjects must negotiate (Butler, 2022; Gormally et al., 2019). For example, Gormally et al. show how the tension between neoliberal reforms and a laboratory energy policy in the UK can lead to a conflict between conserving energy and '"doing good science" and/ or being a "productive employee"' (Gormally et al., 2019: 129). Potential conflicts and the different ways they are negotiated in spaces, like schools, pose a challenge for understanding the relationship between non-energy policies, practices, and energy use.

The research here offers contributions across these different areas of application within IEP research and thought. It aims to contribute to the first area of application by probing both the 'direct' energy implications of school policies and the 'broader' ways in which energy themes are constituted in school discourse. It speaks to the second application by aiming to disentangle the ways in which energy concerns intersect with specific education policies and broader forms of change at the school (such as wider agendas relating to environmental sustainability).

The analysis speaks to the third and fourth areas of contribution by foregrounding the challenges of interpreting, translating, and negotiating a range of non-energy policies in a single context, like a school. To this end, it identifies key tensions and synergies between energy and non-energy objectives within the content of school documents. The following section will justify the case study selection. It also outlines the paper's discourse analysis method, which represents a novel methodological approach in the emerging IEP field.

Methodology and method

Case study non-energy policy area—UK schooling

UK schools spend approximately £630 million each year on energy, which includes costs relating to gas, electricity, and fuel (DfE, 2022). The education sector (including universities) accounts for 36% of the total building emissions in the UK's public sector (DfE, 2022). The total annual energy consumed by state secondary schools in the UK was approximately 8 TWh in 2021 (BEIS, 2022). This makes the subsector the second largest consumer of energy (~30% of total) in the education sector.

The secondary education sub-sector has been transformed over the past 20 years by substantial (non-energy) governance reforms, termed 'academisation' (Gorard, 2009; West & Bailey, 2013; West & Wolfe, 2019). This broader process of change involved transferring governance, management, and certain decision-making responsibilities from local government to autonomous Trusts, which are 'private companies with charitable status' (West & Wolfe, 2019: 72; DfE, 2020a). The impact of these reforms has been most profound in secondary education, where 'academies' account for almost 80% of all schools (DfE, 2021).

An 'academy school' is an important empirical context for IEP research because local actors have come to play a greater role in policymaking. The research adopted a case study approach and examined documentary evidence from a single secondary academy school. This narrow focus supported the

research's aim to examine textually how 'energy' features across a range of policies in a non-energy policy area. As such, the single school case study approach supports the in-depth analysis of non-energy policies themselves.

The academy case study was chosen for two reasons. First, it is managed by a Trust that operates numerous secondary schools in the UK. Second, it converted to an academy during the main expansion of the broader 'academisation' reforms after the Academies Act 2010 (West & Wolfe, 2019). Contextually, this makes the school a fairly typical example of a secondary academy school.

Over 1500 pupils aged 11–19 attend the academy, which includes both a secondary school and sixth form college. The spend on energy was 2% of the school's total expenditure in the year 2020/2021 (DfE, 2020b). This spend on energy is in the highest 20% of similar secondary schools. The academy's energy costs did not factor into the case study selection. However, the relatively high spend on energy marks it out as a more salient context for energy research.

Data

The discourse analysis included all publicly available documents published by the academy on its website and social media page since its conversion. Additional documents from other publicly available sources were included on the basis of their direct relevance to the academy. These materials were gathered from the websites of the Trust, and other relevant actors, including the national school regulator Ofsted, the external catering company, and the prior building contractor. Since the study focuses on local decision-making, it excluded documents published for the sectoral level by national stakeholders, like the DfE.

A total of 99 documents were examined. This sample included a mix of document types, including legal, inspections, governance, estates, operations, teaching, equality, safeguarding, social media, and wider promotional output. The sample's date range is 2005–2020. Most materials in the sample were published between 2017 and 2020. The one document to predate the school's conversion to academy status is a Master Funding agreement between the Trust and DfE. This document provides an overarching framework for the Trust to govern and operate new academies.

The research uses publicly available resources and permission was not sought for their use. However, the author has taken the decision to mask the name of the academy and the Trust because their identification is not relevant to the analysis presented here. A labelling process for the documents is used instead. The sample summary and labelling process according to the category of the document has been presented in Table 1.

The academy and/or the Trust as institutions are the authors of most of the documents in the sample. Few documents possess named authors. Moreover, certain documents that the academy authors are described as using policy 'templates' produced by an administrative department at the Trust. This makes it hard to establish the relative contribution of the academy and the Trust to the development of certain policies.

However, the newsletter published by the academy included written extracts on school life written by a range of actors at the school (such as school leaders, teachers, caterers, and pupils). These newsletters offered useful (if regulated) insights into the life of different actors at the academy. Overall, there are three primary purposes of all the documents sampled: (1) demonstrating legal and regulatory compliance; (2) communicating with caregivers; (3) marketing the academy, the Trust, and external providers to the wider community.

Table 1 Number of documents per category of document

Document type	Document label	Total
Legal, regulation, and governance	Legal and governance 1–6	6
Estates, financial, operations, and work policies	Administrative 1–17	17
Equality, SEND, and safeguarding policies	Inclusion and safeguarding 1–15	15
Teaching policies	Teaching 1–10	10
Social media and wider promotional output	Promotional 1–51	51

Analytic approach

The analysis method used was based on a post-structural approach that involves observing and examining the inductive themes and intertextual links that emerge in the discourse sample (Fairclough, 1992; Foucault, 1972; Waitt, 2005). Intertextual links are the explicit, implicit, and discursive interrelations between different groups of statements, which, in effect, shape the meaning of the discourse.

For the findings presented here, the analysis entailed applying inductive and discursive techniques to explore the descriptions and framings of energy issues in the sample. An 'energy issue' was understood as a topic that directly or indirectly speaks to a feature of the overall energy system. For example, the issue of 'energy consumption' is directly linked to the energy system, whereas a climate change 'protest' establishes a more indirect reference to the effects of unabated fossil fuel use and the overall sustainability of the energy system.

An inductive approach to coding the content of the documents was initially adopted, allowing the words used within the documents to inform the development of themes (Sacks, 1985; Saldaña, 2013; Waitt, 2005). This included a list of energy-related topics that were used in a subsequent deductive analysis that coded for descriptions of energy topics and aspects of non-energy policy that could be expected to have energy implications.

There are two key limitations to this document-analysis based methodology. First, only published materials were sampled, and energy policy priorities may emerge more clearly in confidential documents, such as building management policies or procurement records. Second, one cannot gauge how significant a non-energy policy is to academy life without talking to stakeholders. As a result, the methodology cannot examine how the sampled policies impact energy-demanding practices.

Therefore, the following analysis adopts a textual approach to the IEP thesis and explores how energy does or does not feature in different school policy areas and wider discourse. The next section outlines key findings from the analysis. First, I focus on discussing the key areas where energy featured in the school discourse. After this, I move to discuss the key findings of relevance to thinking about the nature of policy and discourse in this non-energy area of education. The analysis is focused on two areas of discourse in the sample that are revealing for thinking about the ways that energy surfaces or is absent in school documents: (1) sustainability; (2) energy-related education.

Revealing how energy issues feature in the life of a UK secondary school

Academy policy and energy

As a first overarching observation, the sample of 99 documents did not include a single policy that exclusively addressed energy demand. This finding supports the thesis on 'invisible energy policies' that 'energy demand' is a low visibility priority in non-energy policy settings, despite the clear relevance of policy in this area for energy demand and wider energy governance challenges (Butler et al., 2018; Cox et al., 2019; Royston et al., 2018). The analysis found two policies published by the Trust that included an objective that directly targeted energy consumption: (1) environmental policy; (2) Master Funding agreement. It identified many policies that have the potential to impact energy use directly and more broadly. The subsequent discussion sections will focus on school policies with implications for patterns of travel and building use.

Notably, the discourse analysis found that an 'energy issue' tended to emerge as a concern through its intersections with particular school 'policy themes' (such as sustainability, educational achievement, and economic accountability), which were not designed to primarily target 'energy' (see Table 2). These three 'policy themes' are thematic framings that grouped together all meaningful statements about a school topic that features 'energy' in some from as a concern. The role of energy in each policy theme foregrounds the IEP argument that boundaries between energy and non-energy policymaking are complicated and tend to overlap (Royston et al., 2018). In particular, the analysis will focus on the intersection between energy and other environmental issues, and energy and education. It shows how these intersections help to surface energy as a concern in quite a constrained way in the school discourse.

The intersection between energy and other issues in the sample can result in potential tensions and

Table 2 Energy objectives and issues in different policy themes

Theme	Energy framing
Sustainability	Energy demand reduction is included alongside a range of environmental objectives designed to reduce the environmental impact of academy operations
Educational achievement	Energy topics and the development of energy-related skills are included in the formal and extracurricular provision of education
Economic accountability	Both Trust and academy are responsible for ensuring that energy consumption remains within normal running costs

conflicts which can allow local policy intermediaries to prioritise certain objectives. For example, the school's sustainability policy theme addresses a range of different environmental objectives, including recycling waste, managing water, community service, food provision, and in a few cases 'energy use'. Likewise, there is a tension between energy-related learning in the science, technology, engineering, and mathematics (STEM) curriculum and energy consumption to support learning. Lastly, responsible financial management at the school included a range of costs, of which fuel, lighting, and electronic equipment costs were only a small part. The remainder of the analysis will focus in on two policy themes 'sustainability' and 'educational achievement', as areas of school discourse that included the richest statements on energy.

Using these two exemplar areas, I argue that 'energy' surfaces and remains absent within the school and Trust discourse with implications for understanding how energy might be brought more firmly into the agendas of non-energy policy areas, and where some of the challenges for shifting focus might lay. I conclude by reflecting on the need to develop clearer, more contextual understandings of local policy, strategy, and discourse to shift decision-making in a way that supports low-carbon transitions in non-energy settings. In particular, I discuss these two policy themes in relation to the four areas of application in IEP research and thought identified earlier (see 'Areas of application' section). I identify examples of school policy and strategy that pose direct implications for energy consumption. The related discussion also illustrates the broader ways energy subjects are constituted in these areas of the school discourse. To this end, it disentangles the intersections between energy, other policy priorities, and elements of broader change at the school. The analysis of these intersections draws attention to key tensions and synergies between energy and non-energy policy priorities.

Sustainability

IEP scholars use the 'energy'/ 'non-energy' heuristic distinction to both distinguish between different types of policies for analysis in academic research and foreground the 'blurred' boundaries in real world policymaking. This section primarily aims to develop this argument by discussing where the boundaries lay in the school sustainability discourse relating to energy use and its reduction. However, by looking at how energy surfaces as an issue in the sustainability discourse, it is also possible to see that there are openings for bringing the implications of energy demanding practices further into view. The section reflects on the importance of these discursive boundaries for energy research on policymaking in non-energy policy arenas to better understand the challenges that bringing energy into wider policy areas might pose. It argues that the thinking on energy at the school is quite limited compared to some of the aims within the IEP work to shift the patterns and ways of living that underlay energy demand more radically.

The Trust's environmental policy includes a range of objectives, one of which explicitly references 'energy consumption'. It states the Trust's aim to 'measure, monitor and reduce our consumption of all energy supplies and associated carbon emissions against an annually reviewed baseline' (Administrative 14: 1). This is a clear example of an 'energy policy' objective that directly targets energy demand. The objective predates more recent mandatory publishing of annual energy data and energy efficiency measures as part of the Streamlined Energy and Carbon Reporting regulations that applied to larger Trusts from 2018 (ESFA, 2022). The policy also contains other objectives that either relate to other environmental challenges or 'environmental' governance in a more general sense. These other environmental challenges include water consumption, waste

disposal, materials, and the sustainability of products derived from wildlife. The discursive grouping of these statements together in a single policy exemplifies how energy surfaces as part of a broader sustainability agenda at the school.

The Trust and the academy also produce generalised 'environmental' policy objectives to target the broader issue of sustainability at the school. For example, the Trust sets out the objective to 'demonstrate that, where relevant, environmental issues are considered when making decisions and planning and developing policy' (Administrative 14: 2). It is unclear from the sample which 'environmental issues' the Trust are exactly referring to in this statement. Such discursive ambiguity is important because it allows a policy actor to interpret the objective as addressing one, or any number, of the subjects expressed in the document.

Consequently, looking at how 'environmental issues' are represented and prioritised in the wider sample becomes essential. The term 'environment' is predominately used to describe non-energy issues, such as the 'physical environment' for SEND pupils (Inclusion and Safeguarding 1: 2), the 'working environment' for staff (Promotional 51: 4) and 'a well-ordered environment, conducive for learning' (Legal and Governance 2: 2). A 'respect' for a range of policy concerns, including the 'environment' does feature in the school's Outdoor Education and Off-Site Visits Management plan. However, the term is used to describe learning about the environment, 'environmental studies', or safeguarding against 'variable hazards including environmental' and having 'a pre-visit or thorough knowledge or experience of the environment' (Teaching 4: 2–4). Notably, this focus on learning about the environment and staying safe in the off-site environment excludes other 'environmental issues', like forms of energy use related to school trips (such as travel and accommodation). This illustrates how the non-specificity of a term, like 'environment', can allow local actors to interpret environmental issues and prioritise those in planning that are considered the most important, such as environmental studies or outside safety.

Beyond this, the school organises 'The Green Team' for students interested in supporting Article 24, 'the right to a clean environment' (Promotional 11: 25). The group undertake awareness raising activities relating to the environmental issues of reducing waste and promoting recycling. For example, pupils perform as 'a junk band…at assemblies in schools to encourage their fellow students to double the amount they recycle' (Promotional 11: 25). They also try to reduce school food waste by feeding 'food scraps' to the school's rabbits based on 'Article 24 every child (and rabbit) deserves healthy food and a clean environment' (Promotional 14: 14). While the Green Team address school-based environmental issues, an explicit concern for energy use remains absent in their documented activities. This again signals how the non-specificity of the 'environmental' term can allow for interpretations that prioritise specific issues, like waste, over others, like energy use. Given the absence of energy use as an explicit concern in these examples, it becomes vital to interrogate further how 'energy' is constituted as part of a broader 'environmental' or 'sustainability' theme in the document sample. In particular, the discourse analysis found that 'energy' featured as an indirect challenge in two ways: (1) traffic congestion and pollution; (2) climate protest.

First, the localised effects of fossil fuel consumption featured implicitly in statements on 'traffic congestion' and 'air pollution'. For example, the travel notice for parents in the academy's newsletter informs parents on the benefits of pupils 'walking' as 'a great way to get to school' in part because it helps to reduce 'traffic congestion' and 'pollution' (Promotional 4: 2). The promotion of active home-to-school transport behaviours implicitly encourages localised energy demand reduction. Pupils also learn about air pollution and traffic congestion on the Year 10 Geography Field Trip. In both cases, fossil fuel consumption for travel is framed in relation to its negative local health impacts, 'pollution', and discussed in a way to inform parents and children about the need for change, such as walking rather than driving to school.

These statements on congestion and pollution also enable the effects of energy use to surface indirectly as a concern in school life. Congestion increases the number of acceleration and deceleration events compared to free-flowing traffic, which can result in higher CO_2 emissions (Grote et al., 2016). However, the recognition of the more nuanced relationship between policy, congestion, and CO_2 emissions is absent in the sample. Although the school promotes active transport, it is not necessarily possible for all pupils and staff to walk to school. The decision to take a particular mode of transportation is shaped

by a range of factors, such as distance, duration of commute, access to cars or public transport, and perceptions of safety (Li & Zhao, 2015; Marique et al., 2013). Urban form and local policy planning decisions, which are beyond the school's remit, can influence these factors (Li & Zhao, 2015; Marique et al., 2013; Susilo & Maat, 2007; Zhang et al., 2021).

Education-related decisions may also contribute to this complex local challenge. For example, the school's fixed opening hours may exacerbate congestion by necessitating the 1500 pupils to arrive and leave at similar times. Conversely, the school's admission policy, which prioritises the enrolment of pupils living within the local catchment area, may ease congestion by admitting pupils that can potentially walk over shorter distances to school. The potential and more complicated interrelationships between school and wider policy, congestion, and energy use are absent in the sample. Instead, low-carbon home-to-school transport is promoted as a form of individual behaviour change, leaving out the more fundamental role of policy in contributing to the congestion problem.

Second, the global impact of fossil fuel consumption featured implicitly in the description in the newsletter of a pupil-led climate protest in 2019. The academy described the pupils as holding a 'protest to raise awareness of climate change issues' and remarked that 'the spectacle prompted questions and support from the school community' (Promotional 28: 29). This indicates a broader awareness among certain pupils and other groups at the school of the need to reduce the use of fossil fuels. Importantly, the broader awareness does not result in the questioning of the ways that schools operate to produce demand for energy more fundamentally. 'Air pollution' and 'climate change' are energy-related challenges that enable energy use to surface as a concern in the school discourse. Yet, these problems allow energy to emerge as a concern in a way that is open to interpretation by school policy actors. This allowance for different interpretations can prevent a deeper questioning of the role of school policy and strategy in shaping energy demanding practices. As such, statements about these topics help energy use to surface as a contextual concern in school life, but not necessarily in a way that readily promotes explicit energy demand reduction outcomes at the academy.

There is a danger that the more precise topic of school energy demand reduction becomes a lower priority than

other environmental concerns at the school. The way energy is constituted as one out of a range of 'environmental' objectives at the school is an important point. It makes it possible for academy managers to translate and prioritise 'environmental issues' and decide 'relevant' decision-making situations for their consideration (Gormally et al., 2019; Greene & Fahy, 2020). This suggests that the interrogation of how (non-energy) school policy intermediaries understand different environmental topics (such as 'environment', 'travel', 'pollution', and 'climate change') is likely a significant area of analytical scrutiny for future IEP research.

Overall, this section shows how energy demand reduction is one out of a range of environmental concerns that may or may not relate to 'energy' at the school. While the Trust's environmental policy targets energy demand management, it also includes (non-energy) discursive elements that complicate the extent to which energy demand reduction can be understood as an important feature of the document. This is reminiscent of the wider sample where a concern for energy use tends to implicitly surface as part of another concern, such as 'travel', 'pollution', or 'climate change'. By looking at the specifics of policy, strategy, and discourse in a non-energy decision-making context, IEP research can identify where key boundaries reside in the thinking about energy and its use in spaces, like schools.

The identification and scrutiny of representations of energy use is likely to be a key activity for research that seeks to shift (non-energy) decision-making in ways that help to reduce energy demand. By better understanding how energy concerns surface in policy, strategy, and discourse, researchers can identify opportunities (such as active transport) and challenges (such as changing school opening hours) for bringing energy into wider policy areas. These textual understandings of how 'energy' does or does not feature in non-energy settings enable energy researchers interested in demand reduction to work with existing priorities, such as addressing local pollution. A focus on policies themselves is likely to be a key approach for empirical research that seeks to advance this aim.

Education

The educational achievement of pupils is of course core within the academy school's discourse and represents a primary goal. The STEM curriculum and

STEM-related extracurricular activities are integral features of this theme. STEM enrichment activities at the school include a weekly STEM club, an annual school-wide STEM Festival, and involvement in a national competition to develop and race an electric car. This section largely focuses on extracurricular activities because they are described in greater detail to promote the school to the wider community.

Pupils explicitly learn about the energy system through these activities. They also develop the foundational knowledge and skills needed to enter STEM-related further education courses and careers (such as engineering and computer science). Previous research has looked at the relationship between energy-related learning and energy behaviours (DeWaters & Powers, 2011; Gill & Lang, 2018; Lee et al., 2015; New et al., 2019), but there has been less consideration of the links between (non-energy) education, skills, and the supply of workers to the energy system (Cox et al., 2019). Therefore, this section speaks to the links identified by Cox et al. (2019). The ongoing skills shortage in the UK energy sector makes this relationship of interest to IEP scholars (BEIS, 2020; Green Jobs Taskforce, 2021).

Figure 1 is an excerpt on the Year 7 STEM club (for pupils aged 11 to 12 years) taken from the newsletter. It illustrates how the implementation of a STEM activity is constituted by different priorities (such as learning and preparation for work). The pupils are described as having learnt about energy supply, and in the activity, they apply their understandings to imagine 'new ways to produce power' for the school. In part, the education document surfaces the importance of 'energy', in language like 'extensive knowledge', 'creative ideas', 'imaginative suggestions', and 'thought', as a subject to demonstrate learning and critical thinking. However, the pupils also learn about energy supply as a form of introduction to developing energy-related skills ('pathways they could take') and working in the energy sector ('varied types of engineering jobs'). Therefore, 'energy' also surfaces as a subject to start preparing pupils for their working life after the school. Overall, it is through the non-energy priority intersection of learning and work that energy supply and energy-related jobs surface as topics in the (non-energy) education document.

Pupils encounter energy-related learning and skills developments in a range of (non-energy) extracurricular activities at the school. The school's extracurricular offering occurs after hours between three and four PM. It comprises a range of activities, including some that involve energy-related education. For example, there is the 'STEM club' for pupils aged 11–12, 'Science Revision' for pupils aged 15–16, and 'Computer Science catch-up and extension (learn some new skills)' for pupils aged 11–18 (Promotional 3: 4–6). Energy-related education takes place alongside other activities, like homework, physical education, and cultural societies in the school's extracurricular programme. This foregrounds the overlapping boundaries between 'energy' and 'non-energy' concerns in the academy's extracurricular education provisioning.

The extracurricular programme promotes the after-hours use of the premises. These additional activities can necessitate energy use for additional lighting and heating by delaying the shutting down routines and heating schedules across the whole school. This potential link between an education policy, learning, and energy use is absent in the documents sampled. There is some recognition in Fig. 1 that certain teachers and pupils understand that the school requires sustainable sources of 'power'. Yet, this apparent appreciation of energy and schooling does not appear to translate into the deeper forms of response to the relationship between education policy and demand. The extracurricular offering highlights an important tension in the

Fig. 1 Excerpt of school newsletter on the STEM club (Promotional 33: 13)

Year 7 STEM club girls took part in an energy workshop run by [an external provider] in school on 12th February. The 28 girls learnt all about the many and varied types of Engineering jobs there are, and explored the pathways they could take to find employment in those areas. The girls were keen to show off their extensive knowledge of renewable and non-renewable sources of energy and had some incredibly creative ideas for new ways to produce power in the future. Some of the more imaginative suggestions included a special PE suit that would store the energy created by running around and could be used to power equipment in school. Another group came up with a system that used tiny turbines in the plug holes of sinks that would collect the energy from waste water, and several groups thought of setting up a system of pedals or treadmills beneath the desks that students could use whilst studying to power the whiteboards.

school discourse, whereby 'energy' surfaces as an educational concern, but its use to support after-hours learning is not recognised in the materials sampled.

Equally, however, the school, as part of its Master Funding arrangement between the Trust and central government, must ensure that it is 'at the heart of its community' (Legal and Governance 4: 5). This means that it has a duty to share its facilities with 'the wider community' (Legal and Governance 4: 5). As a result, community groups can hire different school spaces out-of-hours to run various low-carbon activities (such as sport, drama, and arts and crafts) (Promotional 6). Significantly, the early closure of schools may prevent those spaces from playing a broader role in reducing energy demand beyond the school gates by reducing pupil and wider community access to low-carbon pursuits. Therefore, the early closure of schools could undermine their role in supporting urban sustainability. This complicates the potential relationship between extracurricular policy and energy demand.

Overall, this section foregrounds how 'energy issues', like energy supply, skills, and demand, do or do not feature in the (non-energy) educational achievement policy theme. It shows that energy surfaces through learning and developing the necessary skills for energy-related further education and work (Cox et al., 2019). However, it also shows how 'energy' is only one out of a range of different learning activities available at the school. This testifies to the complex and porous policy boundaries between 'energy' and 'non-energy' concerns at the school. Lastly, it emphasises the tension in the school discourse between learning about the energy sector and acknowledging the impacts of education policies, like its extracurricular offering, on energy demand. In doing so, it also draws attention to how the extracurricular offering can play a wider role in demand reduction by facilitating the provision of onsite low-carbon activities for pupils and the wider community. In short, the education policies make 'energy' an identifiable concern in the sample, but not in a way that surfaces the more nuanced relationships between policy, practice, and energy demand.

Discussion and implications for IEP research

Previous IEP research has used the conceptual distinction 'energy'/ 'non-energy' and 'visible'/ 'invisible'

to identify and examine the overlooked ways in which different policy areas shape energy demand (Butler, 2022; Butler et al., 2018; Gormally et al., 2019; Greene & Fahy, 2020; Nicholls & Strengers, 2018). Royston et al. (2018) argue that the boundaries between these conceptual binaries are complex and overlap in non-energy policymaking settings. Inspired by this argument, the analysis shows how 'energy' surfaces as a policy concern through different policy themes (such as sustainability and education). Focusing on the specifics of policies illustrates how energy issues both surface and remain absent in different policy areas at the academy. This final discussion will speak to the four areas of empirical application identified in recent IEP research ('Areas of application' section): (1) varying impacts; (2) policy intersections; (3) translating objectives; (4) negotiating conflicts.

The documentary analysis identifies school policies and objectives that 'directly' target or impact energy use (such as the Trust's environmental policy, the school's travel notice, and the extracurricular timetable) (Butler et al., 2018). While the environmental policy directly targets energy demand reduction, other policies have the potential to impact energy use directly. For example, the analysis highlights how the travel notice promotes low-carbon, active transport based on the health concern to reduce air pollution. Likewise, the extracurricular education policy encourages after-hours occupancy, potentially necessitating additional energy use in the school while reducing consumption beyond the school gates. The analysis also shows how 'broader' school policy themes (such as sustainability or educational achievement) indirectly shape how energy issues feature or remain absent in the sample (Butler et al., 2018).

Specific 'energy issues' (such as energy use, pollution, and energy skills) surface in the school discourse in quite constrained ways. For example, there is a recognition of the links between (non-energy) education policies, learning about energy topics, and working in the energy sector. However, the more nuanced relationships between school policies, practices, and energy demand are largely absent in the sample. For example, there is no recognition of the links between school opening hours, home-to-school travel patterns, and energy use related to congestion. This is important because it indicates that the existence of 'energy' as a policy concern in certain situations does not necessarily translate into more profound forms of policy

response to how the school's operations produce demand for energy more fundamentally.

Second, a concern for energy intersects with other school priorities such as addressing environmental issues and promoting high-quality learning (Greene & Fahy, 2020; Morley et al., 2018; Royston et al., 2018). These intersections with other policy priorities create important openings for bringing the implications of the practice of energy demand into view. For example, the environment/energy intersection results in statements on the local and global effects of consuming fossil fuels (such as 'pollution' and 'climate change'). Likewise, the education/energy intersection sees certain energy topics surface as part of the school's learning provision. Although these intersections create openings for energy matters to feature as policy concerns, this recognition does not necessarily help to surface energy and its use in other ways at the school. For example, energy demand management surfaces as an 'environmental issue' and, as a result, it is included as a single objective alongside a range of other environmental goals in the Trust's environmental policy. This non-specificity, to an extent, allows local policy actors to interpret generalised environmental objectives in ways that prioritise specific concerns (such as recycling waste or environmental literacy) and exclude energy use. Likewise, learning about energy and developing energy-related skills does not necessarily provoke explicit questioning of the relations between education policies and energy demanding practices.

Lastly, the intersections between policy factors also speak to the third and fourth areas of empirical application (Butler, 2022; Gormally et al., 2019; Greene & Fahy, 2020; Nicholls & Strengers, 2018). This is because energy and its use are part of a range of other concerns that must be negotiated, prioritised, and ultimately implemented. The outcome of this could have the effect of relegating more profound energy demand reduction interventions behind other priorities, such as addressing educational targets or promoting more low-hanging environmentally responsible behaviour initiatives on recycling and walking to school. The identification and interrogation of representations relating to these intersections are key activities for research that aims to support energy demand reduction in non-energy contexts. For instance, the description of 'air pollution' speaks to the synergistic intersection between environmental, health, and energy use concerns at the school. By exploring this opening, IEP research can help schools to develop low-carbon travel policies. However, other representations are more conflictual and relate to discursive tensions, such as the prioritisation of 'environmental' concerns, or potential conflicts, such as between learning about energy and using energy to teach. These more conflictual representations are important because they necessitate interpretation and negotiation by academy managers and other intermediaries. The interrogation of how policy intermediaries understand different discursive tensions and conflicts is likely to be a key area of analytical scrutiny for future IEP research.

Overall, the analysis shows how openings in non-energy contexts for energy concerns to surface are currently heavily bounded. This suggests that the ways that energy is considered in school discourse can allow select energy issues to feature, while other concerns, like energy demand reduction, continue to remain absent. Nevertheless, it is through developing deeper understandings of such openings in non-energy contexts for energy concerns that IEP scholars can explore solutions that work with the goals of local policy actors. Taken together, this demonstrates the need to consider how energy features in language and discourse as an essential line of enquiry for thinking about and progressing low-carbon energy transitions in line with IEP agendas.

Conclusion

The main contribution of this paper is to show the heavily bounded ways that energy and its use surface as an issue in school policy, strategy, and discourse. Its findings support previous research in this space, which highlights how energy demand is generally a low-priority concern in non-energy policy areas (Butler et al., 2018; Cox et al., 2019; Royston et al., 2018). The novel document-based analysis takes inspiration from the invisible energy thesis and makes a distinctive contribution by examining the specifics of policies rather than making concrete claims about the relationships between policy and demand. It argues that the way energy surfaces in policy themes (such as sustainability and education) does not necessarily mean that the role of the school's operations in shaping energy demand more fundamentally also surfaces.

The textual analysis demonstrates how school policy and wider strategy have the potential to shape energy demand directly and indirectly (Butler et al., 2018). For example, it foregrounds objectives and policies that may directly impact energy use, such as the Trust's energy demand reduction policy objective, the school's travel notice promoting active travel, and the school's extracurricular policy supporting energy-related education, while also necessitating after-hours use of the premises. Although the Trust's energy policy objective demonstrates recognition of the issue of energy demand reduction, there is no recognition in the materials sampled of the direct and more fundamental ways school policies can shape energy use.

The analysis also reflects on the complexities of the potential broader links between policy, practice, and energy demand. For example, the research shows how the non-specificity of the school's environmental discourse may allow policy actors to prioritise other environmental concerns, like waste, environmental education, and safety in the environment, over demand reduction. Equally, it draws attention to the complex, broader relationships between school policies, wider urban strategy, and localised school congestion. Lastly, it reveals how the after-hours use of school premises can also allow pupils and the wider community to participate in low-carbon activities, which supports wider urban sustainability. These potential broader links testify to school policy actors' influence and the limits of this influence on daily energy use patterns.

Energy surfaces as a concern at the school through its intersection with other policy priorities and agendas, especially sustainability and educational achievement (Greene & Fahy, 2020; Morley et al., 2018; Royston et al., 2018). The analysis shows how energy demand features as an environmental policy objective and how other energy topics surface in relation to sustainability (such as travel, pollution, and climate change) and education (such as energy supply, energy skills, and jobs). These findings on policy intersections build on the argument of the complex boundaries between energy/non-energy and visible/invisible by proposing that, in this case, the boundaries of the school's thinking on energy are at present quite constrained and behaviourally focused (Butler et al., 2018; Gormally et al., 2019; Royston et al., 2018). Identifying and interrogating these openings for discussions on energy use to surface as a concern in

school life are likely to be key activities for reflecting on how to shift decision-making in ways that support low-carbon transitions in non-energy policy areas.

Focusing on documentary evidence and discourse can reveal the discursive synergies, tensions, and conflicts that need to be harnessed or overcome to help support low-carbon transitions in these areas. This argument builds on previous research in this space looking at the translation and negotiation of policy priorities by suggesting that the language in which energy issues are represented plays an important role in how they feature or remain absent (Butler, 2022; Gormally et al., 2019; Greene & Fahy, 2020; Nicholls & Strengers, 2018). The interrogation of how local policy actors understand these representations is likely a key area for future enquiry in this field. By focusing on the specifics of policies, documents, and materials, IEP research can help to develop more contextual understandings of non-energy policy areas and how actors might further embed energy concerns into these decision-making areas. This means that the ways energy is considered in the policy area can foreground points of tension or negotiation to begin conversations about the largely absent yet more fundamental ways policy can shape energy demand.

Recommendations

The paper's findings have been used to develop three central recommendations for those seeking to advance net-zero transitions in non-energy policy sectors, like the education sector.

First, policymakers can systematically examine their policies and wider strategy to identify documents that may pose unintended consequences for the sustainable governance and use of energy. The textual analysis identified policies or interactions between policies that could be expected to pose implications for energy demand. By developing a systematic inventory of institutional policies that may function as 'invisible energy policies', policymakers can start to address the more fundamental ways policies can shape and necessitate additional forms of energy consumption.

Second, an inventory of 'invisible energy policies' can help to reveal which policies, with implications for energy, local actors can influence (such as travel, attendance, and admissions policies) and which are

beyond their remit (such as urban planning decisions or the national curriculum). This activity also draws attention to the interconnectedness between policies from different sectors and levels of decision-making. As a result, institutions and local policymakers can distinguish challenges that directly relate to their operations from those that require cooperation between actors.

Third, it is essential to locate and work with existing discourses that help energy issues to feature as a policy concern. For example, this analysis shows that actors could propose a low-carbon transport intervention because it reduces pollution and promotes healthy, active lifestyles that benefit pupil learning. Equally, learning about energy and developing energy skills could start more fundamental conversations about how school operations impact building use and the institution's role in creating space for low-carbon community activities that advance broader urban sustainability agendas. Such engagement can reveal significant barriers to and opportunities for shifting governance objectives and processes in ways that support low-carbon transitions. In practice, this could entail engaging with educational discourses and problems of pedagogy to find those arguments that promote low-carbon teaching methods. In this way, IEP research can help to prize existing crevices (such as those relating to pollution and climate change) even further open, rather than imposing external ideas and arguments that are potentially alien to education policymakers.

Declarations

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