

Building Communities: Reducing Energy Use in Tenanted Commercial Property

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Abstract

Reducing energy use in tenanted commercial property requires greater understanding of 'buildings as communities'. Tenanted commercial properties represent: (1) the divergent communities that share specific buildings and (2) the organisational communities represented by multi-site landlord and tenant companies. In any particular tenanted space the opportunity for environmental change is mediated (hindered or enabled) through the lease. This discussion draws on theoretical and practical understandings of (i) the socio-legal relationships of landlords, tenants and their advisors; (ii) the real performance of engineering building services strategies to improve energy efficiency; (iii) how organisational cultures affect the ability of the sector to engage with energy efficiency strategies; and (iv) the financial and economic basis of the relationship between owners and occupiers. The transformational complexity stems from: (i) the variety of commercial building stock; (ii) the number of stakeholders (solicitors, investors, developers, agents, owners, tenants and facilities managers); (iii) the fragmentation within the communities of practice; and (iv) leasehold structures and language. An agenda is proposed for truly interdisciplinary research that brings together both the physical and social sciences of energy use in buildings so that technological solutions are made effective by an understanding of the way that buildings are used and communities behave.

Keywords: asset management, commercial property, communities of practice, energy management, green leases, landlords, refurbishment, research agenda, socio-legal, tenants.

Introduction

The EU Energy Efficiency Plan acknowledges that there is a large untapped energy saving potential with existing buildings. Although techniques and technologies could cut existing buildings' consumption substantially, overall refurbishment rates remain low and a range of barriers to energy efficient buildings need to be overcome, including legal obstacles (European Commission, 2011). Given that approximately half of the total UK stock of 'core' commercial buildings (shops, offices and industrial premises) is occupied by tenants (IPF, 2007; Dixon, 2009) and that it is much more difficult in logistical terms to reduce the energy use in commercial buildings that are occupied by tenants than owner-occupied spaces, there is a clear need to identify effective and coherent ways to maximise energy reduction in tenanted commercial space (UNEP, 2009). To reduce energy use in commercial buildings it is necessary both to provide buildings in which energy efficiency is part of the design and refurbishment process, and to address energy demand (in both the use of primary fuels and electricity, as well as reducing waste heat). This requires an 'interdisciplinary' understanding not only of engineering science to know what is technically possible within the building, but also social science to understand the variety of factors that impact upon the way that landlords lease and tenants occupy and use that space.

Recent research has shown an emerging and increasing demand for sustainable offices by corporate occupiers (Dixon *et al.* 2009) with similar findings in both the US and Australia (Newell, 2008; Eichholtz *et al.* 2009). This is being driven not only by legislation but also by the perceived cost advantages that more energy-efficient commercial property can offer tenants and the potential for increased rentals for landlords (Kats, 2003; Dixon *et al.* 2009; Eichholtz *et al.* 2009; Pivo and Fisher, 2010, Fuerst and McAllister, 2011). It is underpinned by changes in corporate attitudes towards environmental issues and sustainability, with many companies now recognising the commercial benefits of sustainable business practices and processes. Leading companies are competing to be seen as 'the greenest' in response to legislation aimed at reducing carbon footprints; increased public pressure; the development of new business opportunities; and the shift towards greater corporate accountability. Furthermore, many companies have recognised the benefits of 'going green', driven by the desire to highlight corporate social responsibility credentials (Nelson, 2008; Pivo, 2008).

A key challenge to the transformation of energy efficiency and demand reduction in the tenanted commercial built environment is to understand and tackle the complexity that stems from the interrelationship of:

- the range and variety of commercial building stock (age, condition, use etc)
- the number of stakeholders – investors, developers, agents, owners, tenants, facilities managers, and users of the space (employees and customers)
- various social and organisational practices amongst stakeholder groups
- traditional leasehold structures and language.

Box 1. Illustrating the Need for Interdisciplinarity: A (Hypothetical) Established Shopping Mall.

The mall is mainly retail outlets, with a department store as the anchor tenant, and some office tenants. There is a regular turnover of many units: some tenants belong to (inter)national chains with clearly formulated environmental policies, others are small local businesses. The landlord has outsourced building operations and management to a company not party to the leasehold arrangements. The landlord maximises return on its investment by using 'net' leases with the tenant paying rent *plus* the variable costs (such as energy). Each occupier has a separate lease with the landlord, of different durations. The heads of terms for these leases were agreed between the landlords and tenants' agents, before lawyers became involved in the drafting. No environmental goals were discussed at this stage and therefore none are carried through to the leases. Although the mall presents opportunities for environmental 'upgrades' it is unclear whether the investment value of the property would be significantly increased by any such improvements, the landlord cannot pass capital costs onto the tenants, and leases do not allow the landlord access to the tenant's property in order to install energy efficiency equipment. Furthermore, although energy is supplied by the landlord, the costs are borne by the tenants (on a floor area basis as there is no sub-metering for individual units). A view of some of these relationships is depicted in Figure 1.

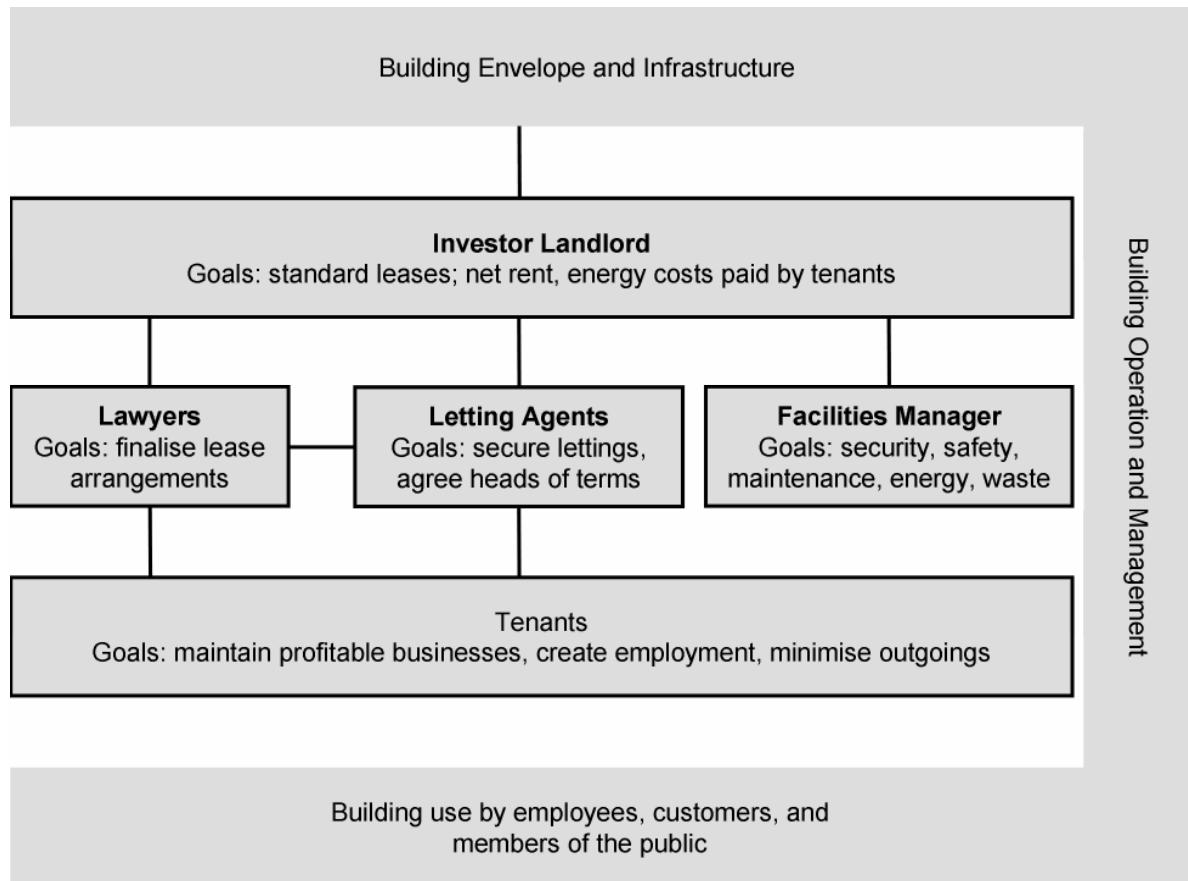


Figure 1. A simplified diagram of the legal relationships between the actors in a hypothetical shopping mall. The key points are that: legal and operational practices can weaken communication between tenants and landlords; and environmental goals must be introduced early in negotiations.

This understanding requires interdisciplinary work that draws on theoretical and practical understandings of (i) the socio-legal relationships of landlords, tenants and their advisors; (ii) the operational performance of engineering building services strategies to improve energy efficiency; (iii) how organisational cultures affect the ability of the sector to engage with energy efficiency strategies; and (iv) the financial and economic basis of the relationship between owners and occupiers. By bringing together these technical, legal, and social understandings of buildings and space, it is possible to examine how the communities sharing commercial space could be transformed to work together effectively to improve the energy performance of tenanted buildings in parallel with the requirement for organisational behavioural change to occur within emerging public policy and guidance.

To understand how to maximise the opportunities that exist to improve the energy performance of the commercial built environment, interdisciplinary research is needed that accommodates both the perspectives of all the actors and the physical context in which they interact. (Box 1 and Figure 1) This work adopts the definition of interdisciplinarity used by Catney and Lerner (2008, p. 293) as research which seeks to:

‘...form a uniform, discipline-transcending terminology or common methodology and to co-operate within a common disciplinary framework’.

(Catney and Lerner, 2008)

Greater focus is therefore given to addressing cross-cutting problems than in a ‘multidisciplinary’ approach, where disciplines retain autonomy with little attempt to synthesise theoretical and methodological

approaches, although the research still retains aspects of disciplinary concerns¹. Addressing the research agenda of energy reduction in the tenanted commercial built environment crosses the boundaries of social science and engineering science, and the public and commercial sectors. It therefore presents particular challenges. It requires researchers from very different backgrounds, in what is an under-funded research arena, to work together and develop an understanding of how their various disciplines interrelate (Lomas, 2009; Oreszczyn and Lowe, 2009). The understanding of how the communities using that space behave necessitates the involvement both of social scientists who understand how corporate bodies behave, but also legal expertise, often a blind spot in social policy research (Cowan *et al.* 2006). Moreover, an ‘action research’ approach, which focuses on change and process, working with end users as ‘partners’ in the research, also provides a more coherent opportunity for research to combine technical, legal and scientific elements (Oreszczyn and Lowe, 2009).

This paper focuses on the letting (rental) and refurbishment of existing buildings. As new build represents only 1-2% of total stock (per annum), transforming the energy efficiency of existing property remains crucial and presents greater challenges (Dixon *et al.* 2009). The paper concentrates on energy use, but the arguments are similar for other environmental impacts. This research agenda is relevant internationally, although UK practices are highlighted. There are differences in detail in the property and letting practices of the major developed nations, but the issues they face are similar, and both those owning and renting commercial spaces are often international players.

In the second section, this paper identifies the barriers that hinder constructive discussion between landlord and tenants about energy use and efficiency. The third section then sets out the new interdisciplinary approach. The key is the adoption of a holistic approach that sees buildings and stakeholders as ‘communities’. The various communities are examined through three lenses: legal and property aspects, policy and organisational perspectives, and ‘real-world’ energy performance. In turn, the interaction of these themes is explored by three levels of analysis, looking at the general context, an organisational or company level, and a building level. The communities are not only those who share physical space but other stakeholders and actors involved in letting space, as well as ‘fleets’ who are linked by corporate structures across countries and internationally.

Problematic Practices

It is widely recognised that there are serious barriers and disincentives to the implementation of energy efficient measures in tenanted commercial space (Miller and Buys, 2009; Dixon *et al.* 2009; Sayce, 2009). The Carbon Trust’s report on the UK Climate Change Programme identified the “landlord-tenant divide” as one of the key barriers to energy efficiency take-up in buildings (Carbon Trust, 2005, p. 32), and such barriers are also highlighted in other countries, including the US and Australia / New Zealand (Kempener, 2007; Kilgour and Pigneri, 2009; Cortese *et al.* 2010). This divide, commonly known as the ‘split-incentive’, refers to the division of ownership, management and costs responsibility within the landlord and tenant relationship, with the landlord responsible for structure, plant and equipment whilst the tenant pays for energy use (Carbon Trust, 2009). Energy costs generally form a relatively low proportion of the tenant’s overall costs of 1 - 2%, meaning that there is little incentive for the tenant to reduce energy use. But this is not the only problem with leases. They are rigidly drafted, and take little, if any, account of environmental performance, (Bright, 2008). Commercial tenants frequently complain of poor communication (both between landlord and tenant, and between tenants in multi-tenanted buildings), adversarial stances, lack of trust in the landlord, and slow response times to problems (Langley and Stevenson 2007a and 2007b; IPF, 2009b; HM Treasury, 2005; Carbon Trust, 2009). Tenants are resistant to paying for anything non-essential, and so are unlikely to agree to pay for energy efficiency upgrades (unless, unusually, compelled to do so under the terms of the lease), especially as the investment costs of new technology are usually high compared to annual energy savings. Figure 2 shows that (equally weighted) average UK lease lengths are relatively short and have dropped by 42% between 1999 and 2010, to 5.0 years taking account of break clauses (BPF and IPD,

¹ Interdisciplinarity should also be distinguished from ‘transdisciplinarity’, an approach which is based on common theoretical understandings and accompanied by a fusion of methodologies and epistemologies / ontologies. Transdisciplinarity, for example, was highlighted (although not defined explicitly) as being characteristic of the UK CaRB project.

2010), although retail tenancies tend to be longer. The driving forces behind this reduction are likely to reflect wider economic conditions and are beyond the scope of this discussion, but it means that pay-back periods will usually exceed the tenant's temporal interest in the property. Given that commercial lease lengths in many other parts of the world are relatively short (Titman and Twite, 2011) similar issues arise internationally, although much depends on the nature of individual legal systems, economic environment and the structure of commercial property markets.

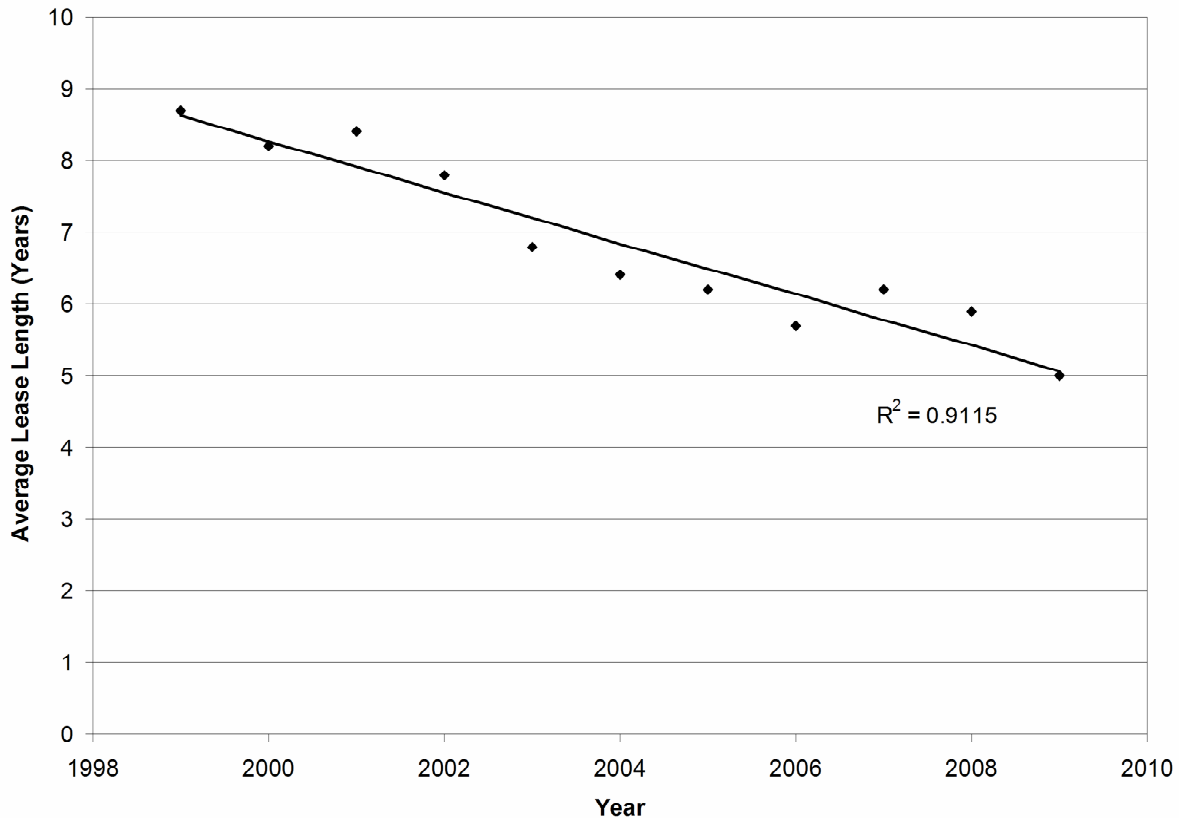


Figure 2. Average lease lengths (equally weighted) have been steadily dropping in the UK over the last decade (BFP and IPD, 2010).

It is not only the legal structure that is problematic. It is people that use energy, not buildings (Janda, 2011), but there will seldom be established mechanisms for ensuring that the community of persons using the space do so efficiently. Moreover, there are hidden costs of adopting more efficient energy equipment, such as learning how to use equipment properly. Different tenant organisations will place different emphasis on the importance of environmental performance.

Closing the gap between an existing commercial building's technical potential and its resource use in practice is therefore a complex and multi-layered problem that requires both technical and social solutions and an understanding of whole-systems thinking (Lorenz *et al.*, 2008). The legal framework for the occupation of tenanted buildings is set at the time of entering the lease, yet there will seldom be visibility or comprehension of the technical possibilities for energy improvement among the professionals finalising the lease arrangements. A truly low-carbon retrofit may require changes both to a building's physical facilities and letting arrangements. Research worldwide has often followed mono-disciplinary physical, technical, and economic approaches to increasing the level of energy performance in the building sector (Lutzenhiser, 1993). However, there are notable exceptions, including the 'CaRB' and 'Building Market Transformation'

projects². Social and institutional factors have been understudied relative to technologies, yet they hold the key to significant market transformation in practice (Biggart and Lutzenhiser, 2007). This is also heightened by the diverse and complex nature of the different stakeholders involved (Carbon Trust, 2009). These issues affect not only individual buildings, but entire property portfolios. A recent global survey of 700 listed property companies and fund managers revealed that the majority of the companies surveyed are not yet actively managing environmental issues in their property portfolio (Kok *et al.* 2010). Landlords, agents, facilities managers, tenants, building services companies, and users all have different levels of interest, investment, and control over such changes. This means that the whole community of users must be engaged in the performance upgrade process, and in particular it requires the landlord and tenant relationship to work in a way that promotes clearly defined environmental objectives.

This type of interdisciplinary approach has not, with some notable exceptions (Lomas, 2010) received any substantial public funding in the UK or indeed elsewhere. For example, no significant UK Research Council funding has been focused on research in commercial property *per se*, and certainly not on researching energy efficiency from the standpoint proposed in this paper (which is perhaps part of a wider weakness in the energy and buildings research base identified by Oreszczyn and Lowe (2010)). Although some industry-funded ‘research’ has been conducted, it has not explored the idea of ‘buildings as communities’ and has often suffered from a perceived lack of independence and often a resistance to release results into the public domain. This lack of robust research and evidence has potentially compromised policy debate. The proposed research agenda is designed not only to benefit key stakeholders, but also to provide useful inputs into the framing of current and future public policy. The adoption of a more academically rigorous and interdisciplinary approach should therefore enable generalisable principles to be drawn out with an understanding of the limitations of the effect of current practices. However, in this new research area the commercial sector will only gradually build up sets of ‘case-studies’; this will be too slow and too fragmented to have significant impact on energy demand. This is because there are too many permutations: type of business of the tenant (influencing their energy-use and performance), size of organisations involved in the negotiations (SMEs through to multi-nationals), relative size of the landlord and (potential) tenant, number of sites and geographical spread, type and age of building, types of agreement, and methods of evaluation (both of property and technology).

Little or no truly interdisciplinary academic research in this field has identified how to make commercially acceptable and effective changes which can lead to better outcomes. The dynamics created by catalytic partnerships between the private sector and government and/or academia are highly influential. Participatory research on the environmental performance of commercial buildings has shown that involvement in the academic research project itself generated improved practices by establishing dialogue between user groups that normally do not communicate (Langley and Stevenson, 2007a and 2007b). These findings acknowledge that, if nurtured by other entities, effective solutions can grow from within the landlord and tenant communities.

Towards A New Interdisciplinary Approach

The previous section shows that lease structures alone do not explain why so much energy saving potential remains untapped with existing tenanted buildings. New interdisciplinary research that brings together the technical and legal solutions and sets these in a socio-cultural context (Guy, 1998) could release this potential by breaking down the issues into three interlocking themes and levels of analysis (Figure 3). These themes are:

- legal and property aspects of improving energy performance
- policy context and organisational response
- technology and environmental performance

The following sections discuss each theme, then describe the levels of analysis.

² These are two of the projects funded by the UK Engineering and Physical Sciences Research Council and Carbon Trust’s Carbon Vision initiative.

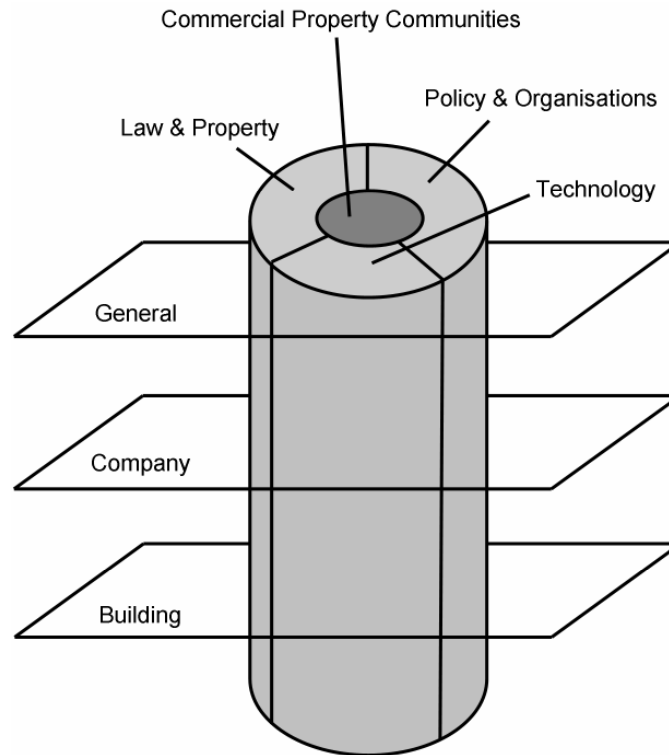


Figure 3. A conceptual framework of analysis depicting how our themes and levels of analysis intersect to describe commercial property communities. Each of the three aspects – policy and organisations, property and law, and technology – needs to be examined within all three levels.

Legal and Property Aspects

This theme considers how new and existing commercial lease arrangements can enable and promote the improvement of energy performance, with a particular emphasis on: (a) the legal relationships which underpin landlord and tenant communities; (b) the roles played by these communities, and their advisors, in developing such relationships from the moment of matching a tenant to an available space throughout the relationship; and (c) the implications of such lease arrangements for commercial property asset management and property value.

As a response to some of the more widely recognised shortcomings of traditional leases, the idea of ‘green leases’ has been developed in several nations including Australia, Canada, the UK, and the US. Recent research (Hinnells *et al.* 2008; IPF, 2009a; 2009b; Bright, 2008; BBP, 2009) shows how leasing arrangements can be developed to improve environmental performance standards in commercial property. Anecdotal evidence suggests that the idea of using environmentally sensitive leases needs to be introduced very early in the letting process as it is very difficult to get a green lease agreed unless it forms parts of the ‘heads of terms’. At a practical level, a number of mono-disciplinary initiatives have been devised to provide standardised wording and approaches to help landlords and tenants: for example, good practice guides and toolkits (Langley and Stevenson, 2007a; 2007b; Langley and Hopkinson, 2009; BBP, 2009). Inherent to these developments is an awareness that it is essential for owners and occupiers to collaborate to reduce the environmental footprint of commercial buildings, i.e., buildings need to work as communities. For example, the green lease toolkit promoted by the Better Buildings Partnership (BBP) discusses ‘co-operation’ and ‘sharing’, and makes provision for a building management committee that includes owners, occupiers, facilities managers to meet periodically (BBP, 2009). There are suggestions as to how leases can be realigned to encourage landlord expenditure on energy efficiency measures by sharing the tenant’s savings with the landlord to enable the recoupment of costs (OLTPS, 2011). Where leasing patterns are altered, there may be an impact on property rental value or yield, through, for example, an impact on cash flow in the case of internal repairing leases, or on the refurbishment cycle and/or depreciation in the case of net leases on full

repairing and insuring terms. Guidance given by the Royal Institution of Chartered Surveyors (RICS) recommends that the presence of a green lease should be evaluated. Such a lease could mark a risk reduction factor within the appraisal of value or, conversely, it could result in a lower rental bid if it contains onerous terms (RICS, 2009). Given that leased premises provide the space for much of the economic activity in retail and service-based industries, the impact that property value changes (and their underpinning methodologies and practices) may have on investment in commercial property is important to an economy (Baum and Crosby, 2007).

Where it is not possible to negotiate new lease styles or wording, or to vary a continuing lease, it is suggested that parties agree a 'memorandum of understanding' that encourages a collaborative, yet flexible, approach between landlord and tenant in working towards improved environmental performance (BBP, 2011). Notwithstanding these initiatives and the commitment of some industry leaders to improving environmental performance through innovative commercial leasing (Roussac and Bright), anecdotal evidence shows that there is market resistance to green leases, even when promoted by leading property companies. Use of green leases is recognised as rare (BNA, 2010; DECC, 2009, para 2.39; Jackman, 2010). The headlining of a lease as 'green' reveals nothing about the extent of the obligations to improve environmental performance contained therein: it may reflect only 'light green' commitments (e.g. recycling or energy efficient lighting) or much more significant 'dark green' provisions that require extensive monitoring of energy use and performance to achieve benchmarking standards. Little information exists in the public domain on the extent of the 'green-ness' where green leases are (reportedly) used, and no academic research has been carried out investigating this. Further, the focus has been on prime property and an effective way is needed of cascading green lease principles into the secondary and tertiary letting markets. Given the inflexibility and longevity of leases, market transformation needs to happen soon. This means that future research needs to take account of:

- the factors that shape the content of leases; the roles of professional advisors in concluding heads of terms (particularly letting agents) and the drafting of lease terms (particularly lawyers)
- the impact that green lease structures may have on the valuation of property interests
- the causes of resistance from landlords and tenants
- the way that property is managed and its performance monitored – particularly where buildings management is outsourced
- the practical experience of implementing green leases where these have been used.

Policy Context and Organisational Response

This theme addresses how recent environmental policy demands are being interpreted and applied by building industry stakeholders, as well as the role that organisational responses can play in setting and delivering environmental agendas. New policies, particularly the European Union's Performance of Buildings Directive (EPBD) and the UK Carbon Reduction Commitment Energy Efficiency Scheme, and new opportunities (such as the UK Green Deal) are beginning to have an impact on the buying, selling, and leasing of property (Hinnells *et al*, 2008). Existing standards, which include building regulations, also shape the physical infrastructure of the building stock. Regulations can make bad performance illegal, but may not promote innovative solutions. Schiellerup and Gwilliam (2009) assert that building energy standards in the UK act as

'...a ceiling rather than an instrument which is pulling forward the energy performance of buildings dynamically over time.'

(Schiellerup and Gwilliam, 2009)

Moreover, building energy standards rarely address the performance of the existing stock, unless significant renovations are undertaken.

Many commercial property owners are now asking for clear minimum energy standards for new buildings (BBP, 2010). Energy labelling (for example, energy performance certificates in the UK or EnergyStar labels in the US) may be expected to help drive improved energy efficiency in existing buildings. However, efficiency gains from physical improvements often do not match their theoretical potential for a

variety of technical, social and organisational reasons. Therefore, existing policy initiatives require the support of positive organisational behaviour to create adaptation and change in existing commercial property. Toolkits such as the ‘*Landlord’s Energy Statement and Tenant’s Energy Review*’ (BPF, 2011) recognise that landlord and tenant organisations have important and different roles to play in fostering optimal building energy performance. Such toolkits provide some important basic recipes for building a positive culture around building energy performance, but transforming the entire sector will require better understanding and support for variations between and within stakeholder groups. The importance of stakeholder groups in producing (or inhibiting) environmental changes in the building industry has been recognised by Nishida and Hua (2011). They call attention to the importance of engaging stakeholders in programme design and its introduction. Lützkendorf *et al.* (2011, p. 496) show how diversity within financial stakeholders leads to a need for ‘*new forms of cooperation and information exchange*’. The ‘building communities’ approach proposed in this paper agrees that engaging stakeholders and understanding their diversity are essential elements of further research.

Organisational cultures affect the ability of different companies (both as landlords and as tenants) to engage with energy efficiency strategies. This effect is clear for energy visibility (discussed below). Understanding is needed of how organisations develop and implement company-wide environmental policies so that energy management is practiced not only within specific physical spaces but across a geographically diverse portfolio of properties. This also provides opportunities for shared learning. Tenanted commercial properties represent the intersection of two different types of communities: (1) the divergent communities that share specific buildings and (2) the organisational communities represented by multi-site landlord and tenant companies (the idea of ‘fleet’ landlords and tenants). Both groups are communities of practice in which knowledge can be spread and expertise nurtured. In any particular tenanted space the opportunity for environmental change within these communities is mediated (hindered or enabled) through the lease. It may be helpful to see tenanted commercial property as characterised by a range of Communities of Practice (CoP) (Cushman *et al.* 2002; Ruikar *et al.* 2009). A CoP is a system of relationships between people, activities and their outside world developing over time and interconnected with other CoPs, which themselves can be found within businesses, across businesses and other organisational and professional structures (Zboralski and Gemunden, 2006; Lave and Wenger, 1991). The concept of CoP also has implications for knowledge management and its codification (Brown and Duguid, 1991). As yet such theoretical frameworks have been relatively undeveloped and untested in the current field of study and so there is potential for new research which focuses on the sharing of knowledge across boundaries within and between CoPs and how these relationships shape (and are shaped) through and across the stakeholder groups in UK tenanted commercial property.

Capturing the Real-World Energy Performance of a Building

At the core of the split-incentive problem is valuing the savings from any interventions. There are two components: awareness of energy, and the pay-back times of technological solutions compared to the lease duration. Energy performance relies not only on specific energy-efficient equipment, but also operational strategy. Figure 4 illustrates why, typically, it is difficult to deploy energy efficiency measures. The energy inputs to different units within a building may have different suppliers and sources, each with contracts of differing durations and terms.

Energy visibility, as both a technical and organisational issue, is a key factor. It is often assumed that there is an energy manager who sees, monitors and manages energy use. However, depending on the size, composition, and interests of the organisation, this management function may be non-existent or served by one person or an entire team (Lutzenhiser *et al.* 2002; Janda *et al.* 2002). Understanding the technical and organisational capabilities to use comparative data to benchmark buildings and upgrade properties includes the ability to share information between tenants and landlords, across an organisation’s property portfolio. The extent to which energy is “seen” as a problem by senior management is unclear. Although energy efficiency investments and practices are cost-effective, they are often not pursued; energy is often seen as peripheral to the strategic goals of companies (Figure 1), and other investments are seen as having higher priority or profitability (Cooremans, 2007). Studies are emerging on operational performance of buildings through analysis of Display Energy Certificates (Bruhns *et al.* 2011) and on building management to achieve

energy efficiency and occupant satisfaction (BSRIA, 2011). In the context of occupant expectations and changing occupant attitudes to thermal comfort (Nicol and Humphreys, 2009) especially in urban buildings, and incorporating the impact of climate change (Demanele *et al.* 2011), further work is required.

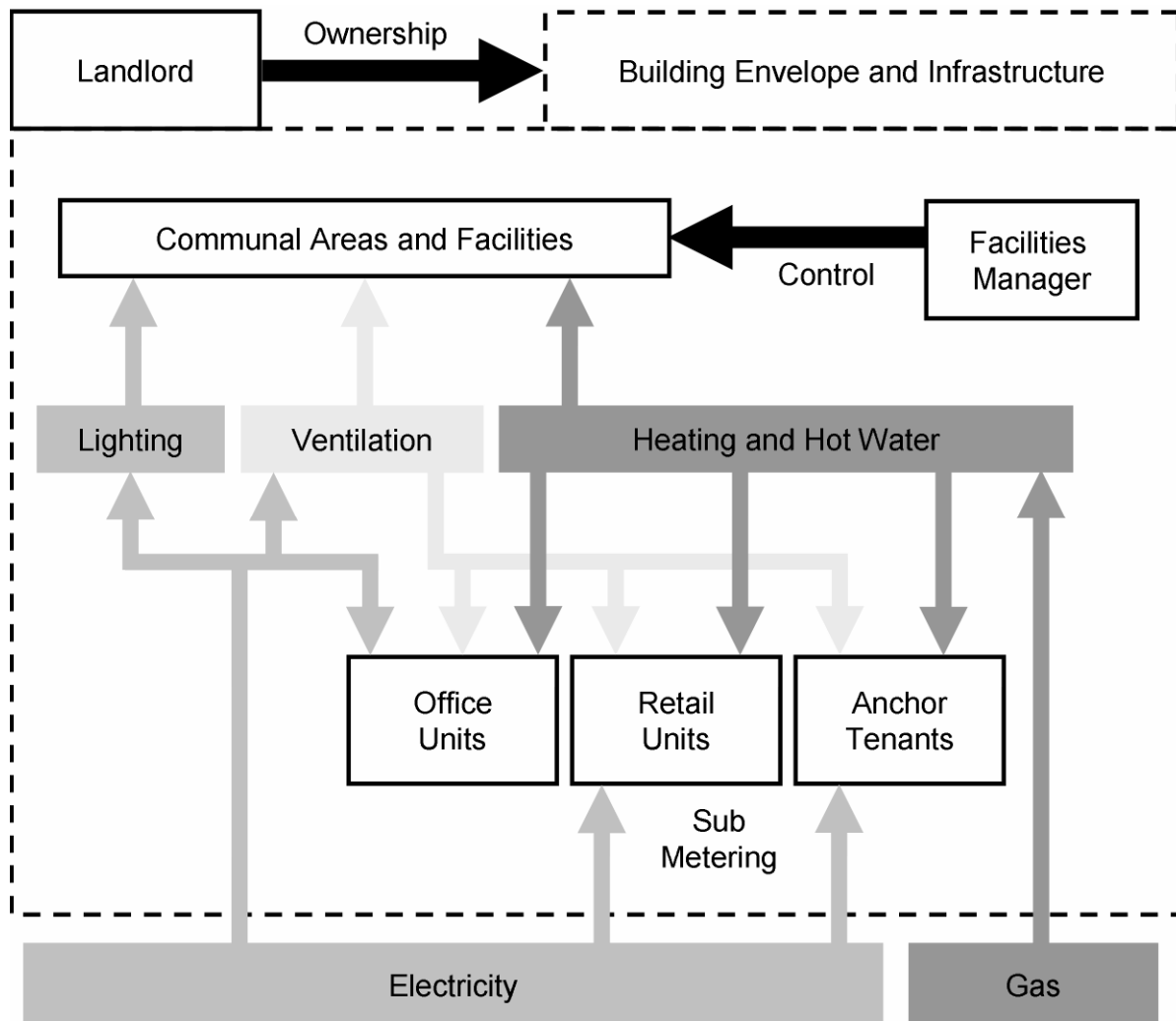


Figure 4. A schematic diagram representing the complicated energy flows and uses in the hypothetical shopping mall described in Box 1. The split pathways illustrate the difficulty in apportioning costs relating to implementing energy efficiency measures or distributed / renewable generation in a tenanted commercial building. The electricity potentially is supplied by three different retailers.

The rate of take-up of building-energy technologies, their improvements in efficiency and efficacy over time, and use by occupants are key indicators for valuing potential energy saving measures (BBP, 2010). Studies of small-scale electricity generation (Maribu *et al.* 2007) and work of active and passive components (Andrews and Krogmann, 2009) are two examples of how it is possible to understand the way buildings services technologies have diffused through the market. The need is to bring this together with occupant behaviour to assess how the energy performance and occupant satisfaction could be improved if different technology or operational practices are used with different leasing practices.

Levels of Analysis

Cutting across the themes described above, the authors propose a need for three levels of analysis in the tenanted commercial property sector: the general context; company-level and building-level. The general context provides a top-down approach to studying the commercial property market, recognising that the

market(s) for commercial properties operate in a complex ‘social-economic-political-geographic’ set of systems (Ball *et al.* 1998). For example, many commercial property tenants and landlords are national or multinational companies, and local and regional companies are influenced by the need for, and requirements of, space that the larger companies exert. All are subject to government regulations for health, safety, and (more recently) environmental concerns.

There is evidence to suggest that buildings with a superior environmental performance can benefit both occupiers and investors / landlords (Fuerst *et al.*, 2011). For example, if occupiers benefit from reduced operating costs (energy and related utility costs savings), improved productivity for occupants, or other related benefits relating to image or brand, these may lead to increased rental bids, which, in turn benefit investors. Investors can potentially benefit from reduced holding costs (through lower vacancy rates), reduced depreciation and reduced regulatory risk. There is a close relationship with the ‘energy labelling’ of commercial property. For example, Energy Performance Certificates (EPCs) and Display Energy Certificates (DECs) (in the UK) assess environmental performance, and these metrics should be reflected in the pricing of property assets, and hence values, in the market. However, if there is no market differentiation in terms of either occupier or investor demand, between a building that displays strong sustainability credentials and one that does not, there will be no impact on value. As the RICS guidance on sustainability in relation to valuation points out:

‘In common with certain other building characteristics, it may often be the case that, when a market is very strong and supply is constrained, there will be little, if any, discernible difference between rents and yields achieved for low sustainability buildings and those which score highly. However, within the UK, the US and other mature and transparent markets, there are signs that, increasingly, sustainability criteria matter to property owners (be they owner occupiers or investors) and to tenants. Where this can be demonstrated as affecting pricing through analysis of comparable transactions, the valuation should be adjusted accordingly’.

(RICS, 2009)

Within the general context of this research agenda it is vital to consider the way in which the relationship between landlords and tenants in the commercial property market is linked with value and valuation practice (through rental value, property yields and ensuing capital values), set in the context of energy labelling and green leases³.

Analysis at the company-level considers organisations as determinants of environmental performance in tenanted commercial properties. This will mean investigating the internal processes of tenant and landlord companies, incorporating an analysis of the role of size, core business goals, physical requirements, and the geographic distribution of a company’s portfolio of buildings. This should also examine how organisations develop and disseminate environmental policies throughout the organisation, and, in particular, the extent to which account is taken of how these policies can be implemented throughout the property portfolio. It is also important to assess how individuals at a number of different levels within the organisation (including board level management; specialists in property, legal affairs, environmental issues, and technical management) interpret and assess such information (Cooke *et al.* 2007).

Building-level analysis focuses on the role of individual buildings and the actors within them in shaping energy performance. Although the other levels of analysis may influence the decisions made, actions to improve performance are shaped by technical constraints and opportunities in specific places. There is also an important physical dimension to asset management and property valuation which can be captured at this level. Individuals within the building community (owners, occupiers, and professionals involved with the processes of letting, valuing and managing the building) are the people who are able to give insight into community issues related to the practices involved in letting, managing, and using each location. However, in the context of research methodology, there are potential limitations relating to relevant data at company level and building level analysis. For example, issues of confidentiality and data access may arise, although there are ways to maintain degrees of anonymity and still source data in a rich and meaningful way.

³ There is an interesting urban-economic perspective relating to business models which requires analysis, but is beyond the scope of this paper.

The intersection of these themes and levels of analysis intersect is shown in Figure 3. Although the levels of analysis are conceptualised as separate hierarchical planes, in reality these levels are nested and intersecting. However, by analytically separating these levels (and researching them with various methods), there is an opportunity to look across and between them; and to develop a strong interdisciplinary focus at each level.

Conclusions

Improving energy efficiency in tenanted commercial buildings requires an interdisciplinary ‘whole systems’ understanding of ‘community-based’ practices. A fleet of commercial properties represents a significant target for saving energy. Ownership of energy resources and changing community dynamics can affect the success or failure of this common goal. However, the ownership, management, and occupation of the fleet are usually divided between different entities which need to work together for the full savings to be achieved. The ability to create environmental synergies across property fleets and within individual buildings is the key; the factors at the organisational level that promote or inhibit the greater uptake of energy saving technologies and practises, as well as the division of responsibilities surrounding decisions to enact change are area on which new research needs to concentrate. This is true not only at a domestic level. Many organisations are now global players, and although there may be specific localised environmental challenges and policies, the ‘problem of leases’ is not a local one. The research agenda is set against the backdrop of the international emergence of ‘green leases’ and related arrangements. This may produce new business models and responses in tenanted commercial properties such as setting up green building management groups, measuring performance and sharing data for benchmarking, new and innovative financing arrangements for retrofitting buildings, and aggregating the provision and procurement of a range of building services, including energy supply. These arrangements seek to promote standards of sustainable asset management on either, or both, the landlord and the tenant, as well as the particular challenges presented in trying to map energy and carbon reduction policies onto standard leases. The opportunity for learning through shared experiences and communities of practice is an international one. Moreover, the proposed research agenda has the potential to help key stakeholders engage more closely in helping formulate current public policy and future policy in this domain.

Previous research in the field of commercial property has not been able to address how new technologies can be and are deployed in practice to improve energy performance. Nor has it been able to analyse the socio-technical frameworks that underpin these measures in sufficient detail. Therefore, there is an urgent need for new research which brings together law, property, social science, and engineering to examine the nature of the existing relationships between landlord and tenant communities.

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