

Summary Report: An Analysis of Emergent Retrofit Practices in the UK Commercial Property Sector



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Executive Summary

Commercial property produces about 10% of the UK's greenhouse gas emissions and consumes 7% of UK energy. It is estimated that UK business is overlooking a potential cost-saving of £1.6b through under-investment in energy efficiency, with the UK's commercial retrofit market potential estimated at £9.7b (or US\$16b). Using a multi-level perspective (MLP) this paper examines the nature and characteristics of the commercial property retrofit regime in the UK. Based on 37 face-to-face interviews conducted during 2012-2013 (as part of the EPSRC Retrofit 2050 programme) the paper examines the emergent trends in commercial property retrofitting at a 'regime' level to address the following key questions; (i) 'Who?': identifying the main stakeholders in the commercial property retrofit regime and its key features; (ii) 'What?': defining what is meant by 'retrofit' in the regime and examining the key retrofit technologies being used; (iii) 'Why?': examining the key drivers and barriers for commercial property retrofit;

and (iv) 'How?': examining the institutional frameworks, legislation and monitoring/standards behind commercial property retrofit (including financing, assessment methods, and monitoring and verification systems).

The research found that although there is evidence of emergent and niche experiments, the regime is hampered by complexity, fragmentation and conservatism. This is not helped by a lack of consensus over the meaning of the term 'retrofit'. Moreover the commercial property sector does not necessarily take a 'city-wide' view of retrofit projects: in this sense it is 'city-blind' with the focus more likely to be on individual building or property portfolio level. The summary report examines issues of scale, particularly at city level (and also summarises the key challenges to retrofitting at city scale in the regime), and finally sets out insights for the future, including policy and practice implications.

Introduction

In comparison with the domestic property sector the commercial property sector is perhaps relatively under-researched when it comes to examining energy efficiency and other wider ‘retrofit’ measures such as water and waste. Yet commercial property produces about 10% of the UK’s greenhouse gas emissions and consumes 7% of UK energy. It is estimated that UK business is overlooking a potential cost-saving of £1.6b through under-investment in energy efficiency, with the UK’s commercial retrofit market potential estimated at £9.7b (or US\$16b).

With an estimated 70% of existing commercial property still expected to be standing in 2050, understanding how the commercial property sector approaches retrofit activity also requires an understanding of its characteristics.

Firstly, there is a *higher level of tenanted property* in the commercial property sector than in the domestic sector. Over half of commercial property is rented (51%), compared to only a third of housing. This is because many businesses have become increasingly reluctant to commit the capital and management time required in owner occupation, and owner occupiers took advantage of high prices in the mid-2000s to participate in ‘sale and leaseback’ deals.

Secondly, *the sector is an important part of the UK economy*. In value terms the sector is worth about £717b, with retail, at £227b the largest commercial property sector. Offices are, however, catching up with retail, with greater capital value growth in 2011.

Thirdly, we also know that *average lease lengths in the sector are falling*. The average length of a new lease in 2011 fell to below 5 years, compared to 8.7 years in 1999. Over 75% of new leases now have durations of 5 years or less. Larger tenants, occupying bigger units, tend to have relatively long leases. Many tenants benefit from rent free periods at the beginning of a lease. Retail warehouses, where demand from tenants is relatively strong, have the longest leases and industrials the shortest.

Fourthly, we know that the sector is *complex*. The Carbon Trust report, *Building the Future* [1] talked about the complexity of the sector in terms of its diversity building types and its diversity of stakeholders. But the report also spoke about the *conservatism* of the sector and its risk-averse nature.

There is a need for research which examines the emergence of retrofit practices in the commercial property sector that: (i) places them in a socio-technical context; (ii) examines energy, water and waste retrofit; and (iii) analyses emergent practice across scales [2].

The overall aim of the research is to examine the emergent trends in commercial property retrofitting at a ‘regime’ level and to examine the following key questions:

- **Who?** – identifying the main stakeholders in the commercial property retrofit regime and the main characteristics of the regime;
- **What?** – defining what is meant by ‘retrofit’ in the regime and examining the key retrofit technologies being used;
- **Why?** – examining the key drivers and barriers for commercial property retrofit; and,
- **How?** – examining the institutional frameworks, legislation and monitoring/standards behind commercial property retrofit (including financing, assessment methods and monitoring and verification systems).

The research also examines issues of scale, particularly at city level (and also summarises the key challenges to retrofitting at city scale in the regime), and finally sets out insights for the future.

How the research was carried out

There have been a number of conceptual frameworks which have attempted to provide insights into how we should analyse decision-making contexts at an individual firm level or a wider, sector level. These range from organisational models such as PTEM (Physical Technical Economic Model) [3] and Market Transformation frameworks [4] through to the more complex multi-level perspective (MLP), linked with transition theory [1, 5]. However, if we are to understand sector change we also need to understand temporal change and how the landscape of policy and regulations may or may not influence change in the sector. In this research therefore whilst we test out sector models we utilise the MLP because it offers the opportunity to assess changes over time and across scales. In the MLP (Figure 1), ‘lock-in’ to existing systems is overcome and transitions occur as a result of experimentation and the emergence of new socio-technical configurations (innovations) within protected niches.

These factors, combined with landscape pressures, destabilise and transform or replace the existing ‘regime’. The socio-technical regime, as defined by Geels [6], includes a web of inter-linking actor networks

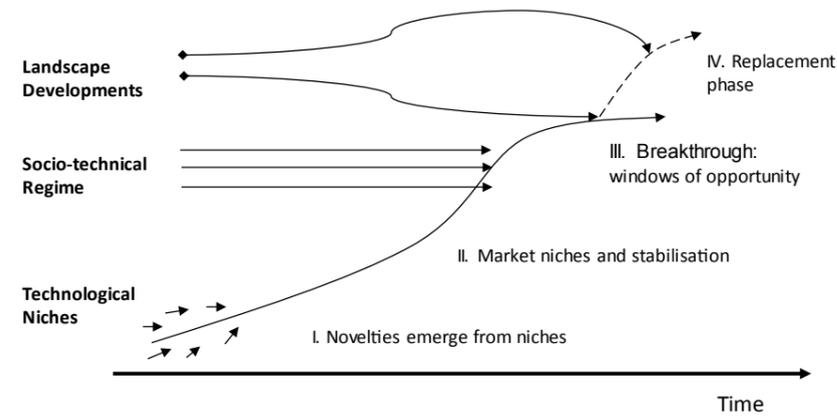


Figure 1 Multilevel perspectives on transitions (adapted from Geel [6])

across different social groups and communities following a set of rules. These rules comprise the established practices of a system and relate to technology; user practices and application; the symbolic meaning of technology; infrastructure; policy; and techno-scientific knowledge.

In our research, *commercial property* comprises retail, offices and industrial space (excluding public buildings and other ‘non-domestic’ property).

As well as using the lens of MLP to analyse the regime, we also examine the extent to which other conceptualisations of organisation-level technology deployment can offer a coherent view of the commercial property sector. These include technology diffusion models and technology push-pull models.

The research is based on 37 semi-structured interviews with key actors in the commercial property retrofit regime which were carried out between November 2012 and May 2013. All interviewees were senior decision-makers in their organisations. All interviews were transcribed and coded. **Table 1** summarises the groups.

Table 1 Summary of interviewee groups

Group	Number of interviews
Consultant (includes 3 architects and engineers)	10
Influencer	9
Investor/developer	5
Financier	4
Occupier (including retail)	3
Technology company	3
Corporate owner	2
Government	1
Total	37

Main Findings

‘Who?’ - the main stakeholders in the commercial property retrofit regime and the nature of the regime

The commercial property retrofit ‘regime’ is made up of a complex array of stakeholders who interact in a variety of ways when a retrofit project is undertaken. In the interviews that we conducted the commercial retrofit projects were generally carried out at building level, and organised from within the company undertaking the project, although this can also occur at a wider, portfolio level if the organisation holds a number of property assets. These projects therefore were primarily ‘driven’ and ‘led’ by owner occupiers, or in the case of tenanted property, by landlord investors or tenants (Figure 2).

The commercial property retrofit regime is characterised by complexity, fragmentation and conservatism despite emergent niche experiments.

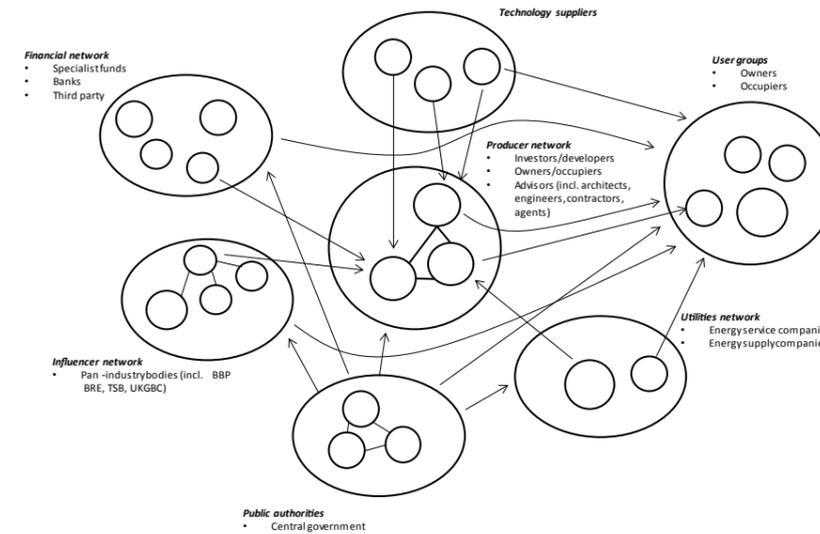


Figure 2 Conceptualisation of the commercial property retrofit regime

‘What?’ – retrofit defined and the key technologies being used

Retrofitting takes on an important significance in the context of commercial property. In the academic literature there has been much debate over the meaning of ‘retrofit’ and its distinction, if any, from ‘refurbishment’ or ‘renovation’. In a literal sense retrofit can be defined as (Oxford English Dictionary): ‘to provide (something) with a component or feature not fitted during manufacture; to add (a component or feature) to something that did not have it when first constructed’. In other words, the term, which originated in the USA in the late 1940s and early 1950s, is essentially a blend of the words, ‘retroactive’ (applying or referring to the past) and ‘fit’ (to equip).

Based on 37 in-depth interviews with key players, the EPSRC research found that many instances a distinction was indeed made between retrofit,

where a building(s) could be refitted with relatively ‘light touch’ energy efficiency measures, for example, whilst a tenant was still in occupation, as opposed to the case of ‘refurbishment’ which entails a much ‘deeper’ level of refit with changes to the internal and external fabric of the building, with the latter frequently occurring at lease renewal. However, in other cases refurbishment was used rather than retrofit.

There needs to be a much clearer consensus over what the term retrofit means therefore (Table 1) as this is hampering progress because of a lack of common language and understanding. For example, although the RICS provides guidance on sustainability and valuation the current edition of the guide does not define ‘retrofit’ and ‘refurbishment’ explicitly.

Table 1 Suggested definitions for retrofit and refurbishment

Retrofit	Refurbishment (or renovation)
Literally: 'add (a component or accessory) to something that did not have it when manufactured' (OED).	Literally: 'renovate and redecorate (something, especially a building) (Renovate - restore (something old, especially a building) to a good state of repair' (OED).
Commercial property retrofit	Commercial property refurbishment (or renovation)
The process of making planned interventions in a building to install or replace elements or systems which are designed to improve energy and/or water and waste performance.	The cyclical process of improving a building above and beyond its initial condition in order to increase asset value. The focus is on systemic upgrading and renewal of building elements, finishes and mechanical services, with a potential impact on energy and/or water and waste efficiencies.
Characteristics	Characteristics
Typically non-intrusive whole system upgrades, or new elements added to existing systems.	Major alterations to fabric and/or services at a systemic, whole building level.
Carried out during lease or during ownership.	Carried out on lease renewal (or lease end) or on a cyclical basis in owner occupied property.
	May also include 'retrofit' measures.
'Light retrofit' will include making changes to existing energy, and/or water and waste systems.	
'Deep retrofit' will include a whole building approach to upgrades of energy and/or water and waste systems (and may equate to 'refurbishment').	

Key retrofit technologies include energy efficient lighting and controls, building services, and management systems and controls (Figure 3). These types of measure are frequently referred to as the 'easy wins' or 'low hanging fruit', and include 'commercially proven' technology measures that are lower risk, create less disruption, and have a shorter payback time (usually 2-3 years or less). The 'other' category included measures such as interior fabric, water efficiency and behavioural change measures. Typically these measures can achieve energy savings of 20-40% per annum. Where retrofit projects

were carried out, the primary focus was on energy, with a relatively lower degree of emphasis on water and waste, and with the latter tackled mainly through recycling measures.

There are examples of emergent niche experiments in commercial property retrofit at company and pan-industry influencer level (through BBP, UKGBC for example). These relate to company practices, property portfolio approaches, and policy and practice guidance, as well as the use of 'test bed' technologies.

Technologies

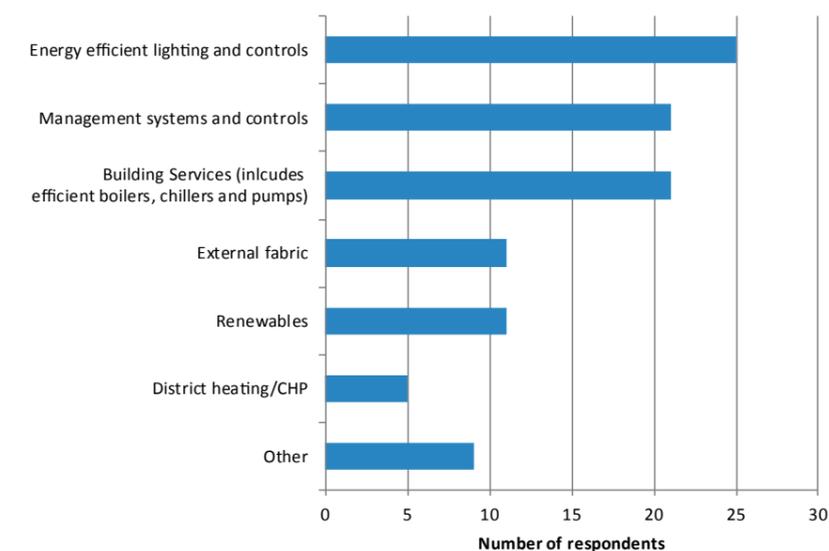


Figure 3 Key commercial property retrofit technologies

Why? – the key drivers and barriers

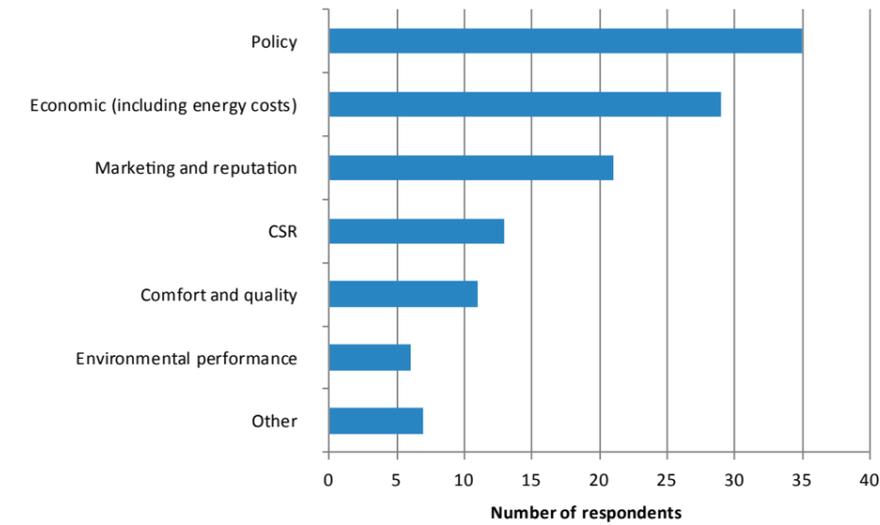
The most important drivers in commercial property retrofit relate to policy, economic factors (for example rising energy costs) and marketing/reputation (Figure 4). Despite the criticism levelled against the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme, for example, it was seen as being important in driving change in organisations¹. Other important legislation mentioned included the Energy Act 2011, which from April 2018 will, under current proposals, make it unlawful to let residential or commercial properties with an Energy Performance Certificate (EPC) Rating of F or G²; Building Regulations under Part L; and renewable grants, including the Renewable Heat Incentive (RHI).

The most important barriers relate to economic factors (overall cost and value impact), organisational issues and lease structures (Figure 4). The significance of organisational barriers should not be underestimated. For some commentators the term ‘barriers’ carries the sense that in some way if these were removed then energy efficiency would automatically act as a precursor to ‘rational’ behaviour in the marketplace, but this ignores the organisational context for decisions, and also ignores the interrelationship between the barriers themselves, and the fact that they should best be seen in the context of the socio-technical landscape and regime.

¹ Other relevant emerging policies include the Energy Savings Opportunity Scheme (ESOS), which under Article 8 of the EU Energy Efficiency Directive states that non-SMEs are subject to an energy audit.

² The Energy Act also introduced the legislation underpinning the Green Deal.

Drivers



Barriers

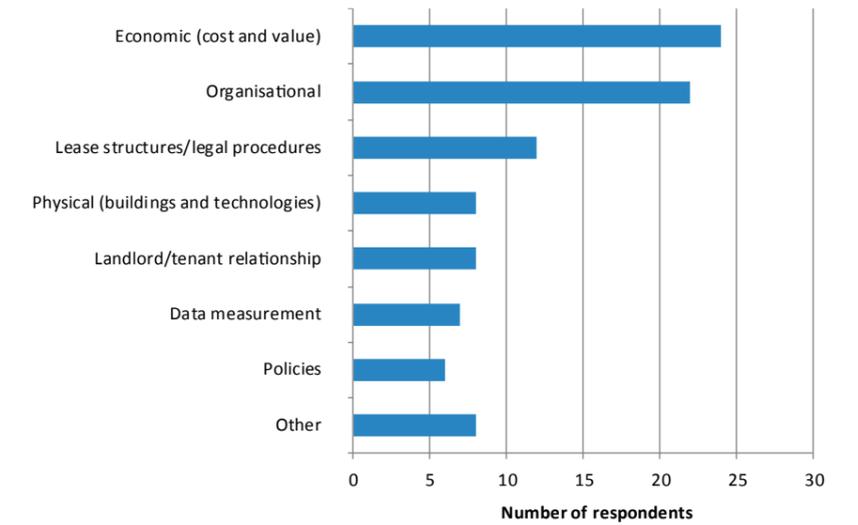


Figure 4 Drivers and barriers for commercial property retrofit

'How'? – institutional frameworks, legislation and monitoring/standards

Many in the 'producer', 'user' and 'technology supplier' groups saw the big picture as one of technology push, with some degree of market pull. Other interviewees saw that the big picture was one of emerging niches within a landscape of wider policy and practices. There is a need to recognise the importance of the complex relationships that exist in the socio-technical configuration of the commercial property retrofit regime.

Key challenges for emerging niches in commercial property retrofit were related to the types of technology being used, and revolved around collaboration; alignment of the technology and development lifecycle; improving the evidence base; and issues around technology innovation.

There is a range of financing models used in commercial property retrofit. The majority of projects are self-financed or paid through a service charge. There are a number of emergent and niche financing models in the sector, including Energy Performance Contracting (EnPC), alongside the emergence of specialist investment funds (Figure 5). There was a high degree of scepticism surrounding the Green Deal and its potential impact in the sector.

Note: Dotted lines indicate more recent initiatives.

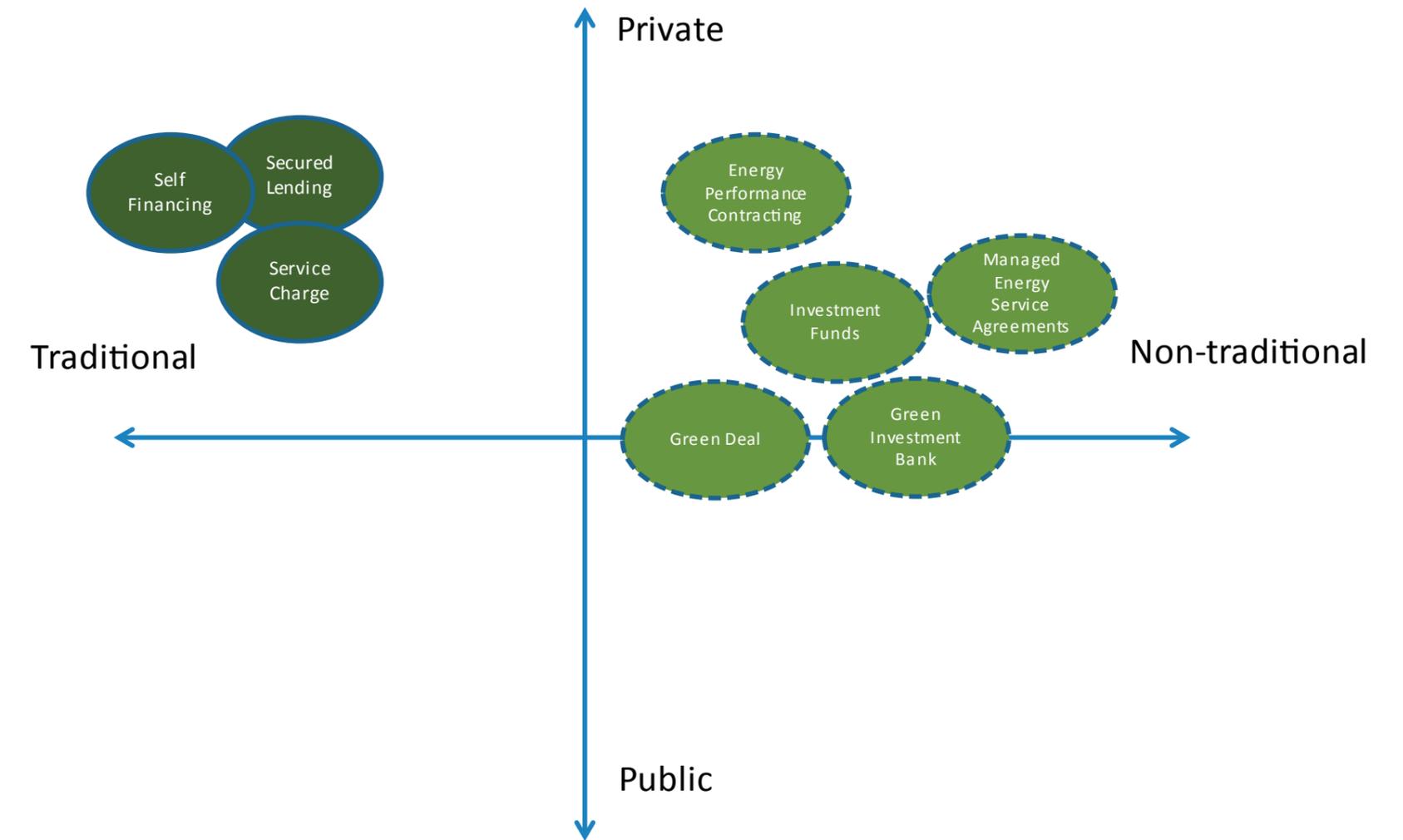


Figure 5 Commercial property retrofit financing: current and emerging niche models

Further issues: A question of scale? The key challenges to retrofitting at city level

The diversity and heterogeneity of commercial property presents challenges in large-scale retrofit. Investors and landlords did not necessarily take a city scale view of the world. As one investor/developer suggested:

'We are kind of city blind. We do look at our portfolio, from a retrofit point of view we'll look at our portfolio and say, OK, where can we get best bang for buck, if you like? We're trying to reduce our carbon emissions; there's no point in us concentrating on the lowest carbon emitting building in our portfolio. We'll go and concentrate on the biggest one, and ... can we actually do to it? The only time that cities come into it is through either the legal requirements of that particular city, if we're doing developments in that city or something like that.'

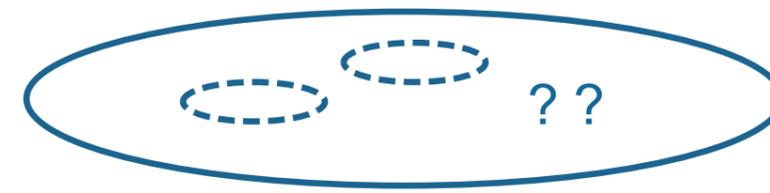
As a result, the commercial property sector does not necessarily take a city scale view of retrofit projects. The focus is more likely to be on individual building or property portfolio level. 'Sticky' infrastructure projects such as district heating schemes could, if accompanied by mandatory measures and incentives, provide opportunities for the sector to take a different view.

We can therefore see niche experiments operating at a range of scales but with the greatest levels of activity in the regime occurring at building scale and portfolio scale (Figure 6). Further research (see for example [7, 8]) suggests that city level experiments have, in some instances, started to engage more directly with the commercial property sector and vice versa, but these niche experiments remain patchy at best.

'Multi-scale' commercial property retrofit niche experiments

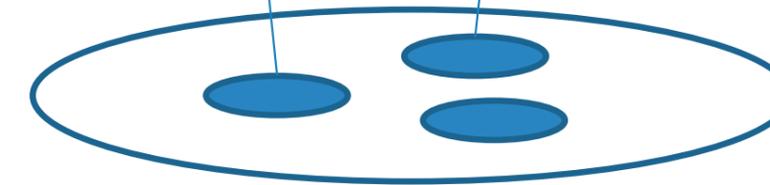
'Physical scale'

City scale



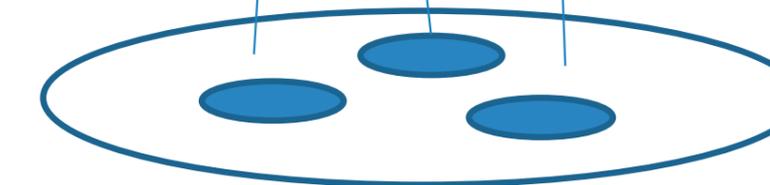
Examples: district heating schemes, city-wide retrofit programmes and finance models (e.g. City Deals)

Portfolio scale



Examples: company-led projects; some influencer-led experiments and emergent finance models

Building scale



Examples: retrofit projects, influencer-led experiments and emergent finance models

Figure 6 'Multi-scale' commercial property retrofit niche experiments

Conclusions

The MLP offers a helpful perspective through which to view emergent practices in the commercial property retrofit regime. It is clear that a number of niche experiments have been emerging at company level (for example, through the producer network and the user network) and these relate to company-level practices through, for example, the development of sustainable development briefs; company-wide sustainability plans; and asset management strategies (see Figure 7).

We are also seeing further development of emergent practices at pan-industry influencer level with best practice guides, toolkits and other guidance (for example, ‘low carbon retrofit’, ‘green leases’ and ‘green building management groups’). Finally, a further set of niche experiments relate to the development of specialist funds and financing models for commercial property retrofit.

We need to understand these experiments within the context of a complex set of relationships between key actors/stakeholders in the regime, founded on a cultural values, market and user practices and regulations and policies.

Despite the emergence of these experiments and the importance of policy as a key driver (for example, the Climate Change Act, Energy Act and CRC), the sector remains one which is conservative and risk-averse in

nature. This is hampering whole-scale transformation of the sector and the roll-out of retrofit in the sector at city level. Stronger legislation is needed to drive change and better integration of the public and private sectors around the retrofit agenda at city scale.

Achieving a consensus on what we mean by retrofit is essential, but for large scale commercial property retrofit to succeed at all scales there also needs to be urgent action in both policy and practice. This is founded on four key principles.

- Financing is crucial to success. The Green Deal needs substantial restructuring for it to be successful in the commercial property sector. There should be further financial strengthening of the UK Green Investment Bank, which could then offer financial support at city level to retrofit projects and also to SMEs.
- Actual energy performance should be transparent. Display Energy Certificates (DECs) should be mandatory in the sector, perhaps incentivised through business rates and stamp duty reductions for more energy efficient properties. Other suggestions include increasing financial penalties for those failing to fulfil both EPC and DEC requirements.

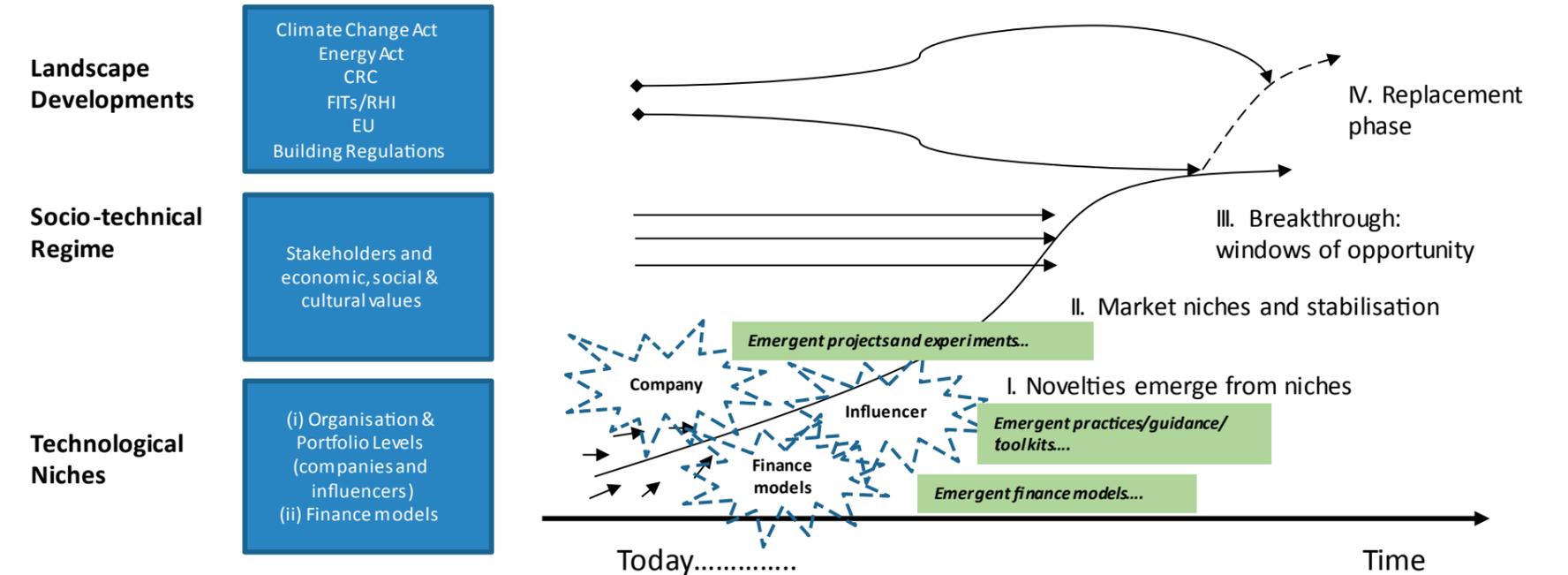


Figure 7 Emergent practices in the commercial property retrofit regime: a multi-level perspective

Conclusions continue...

- Better integrated leadership at city level is needed. Local authorities have a role to play in helping drive the retrofit agenda, but they face funding constraints. Local Economic Partnerships and the wider business community also both have a key role to play through partnerships and innovative financing models. ‘Sticky’ infrastructure projects, such as district heating schemes supported by improved incentives, could also provide further opportunities for city-wide retrofit to attract commercial property stakeholders.
- Consistency in standards is needed at a number of levels. There needs to be a clearer consistency in commercial retrofit assessment standards around BREEAM, Ska Rating and other related standards. An approved products and suppliers list is also needed for commercial property retrofit, with more transparent performance in use data, and better support for

emerging technologies, so that companies have more certainty over technology choice. There should also be better consistency in monitoring and verification standards, perhaps based around the International Performance Measurement and Verification Protocol (IPMVP®). This could also be underpinned by a comprehensive database of UK commercial buildings which could create a performance benchmark and help foster competition.

As one interviewee in the EPSRC research put it:

‘I don’t think that we need to wait and hang around for the next big thing. I think it’s there... it’s about people collaborating together, whether that’s developer, tenants or whether that’s whole neighbourhoods or ... retailers joining hands. We need to get together to put some scale into it but I don’t think we can do that without some mandatory action, primarily by the government’

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The work was led by Professor Tim Dixon (Principal Investigator and

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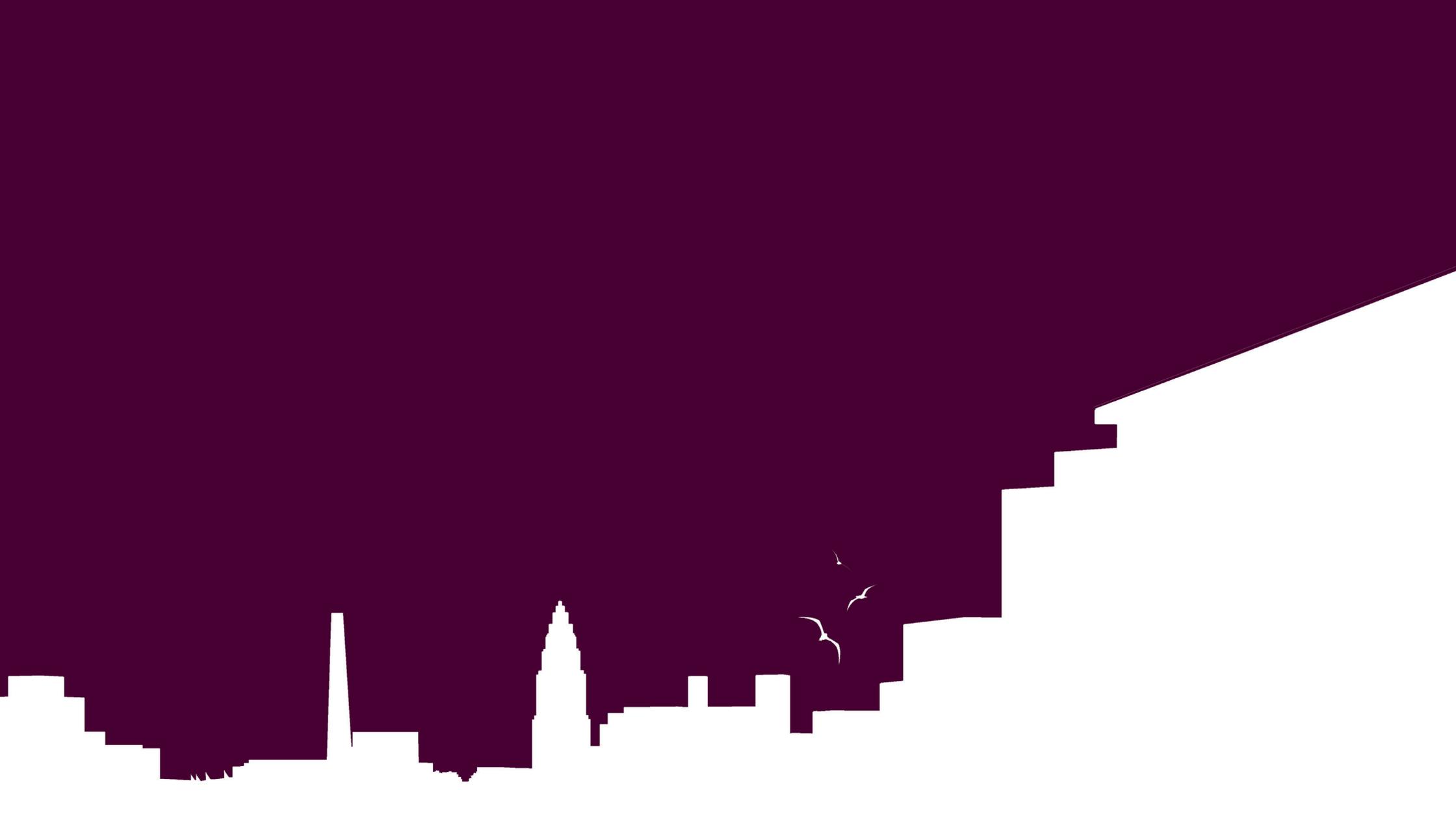
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