Market-based low carbon retrofit in social housing – Insights from Greater Manchester (UK)

Jenni Cauvain[1], Andrew Karvonen[2] and Saska Petrova[3]

Abstract

In recent years, social housing providers in the UK have become influential actors in realising the national government's decarbonisation agenda. However, when decarbonisation is considered in light of austerity measures and privatisation of public housing, a number of contradictions arise. From interviews and a workshop with policymakers and registered providers in the city-region of Greater Manchester, three tensions are highlighted. First, since the 1980s, the housing stock condition has been used as a political pawn in successive reforms to demunicipalize social housing. Second, local authorities continue to harness the collectivities that remain in the social housing sector to realise their decarbonisation goals. Third, the retrofit practices of social landlords are only superficially aiming for carbon control, instead they focus on the social aims that are seen as important to the ethos and business model of the landlord. The paper concludes that there are unavoidable conflicts between the interests of different actors whose low carbon economy is conceived at different spatial scales and with different underlying objectives. As social landlords are foregrounded in sub-regional low carbon policy, they are effectively co-opted into market-based retrofit, resulting in unintended consequences for the social housing sector.

[1] Corresponding author. School of Sociology and Social Policy, The University of Nottingham. University Park, Nottingham NG7 2RD, United Kingdom. jenni.cauvain@nottingham.ac.uk
[2]KTH Royal Institute of Technology, Stockholm.
[3] Centre for Urban Resilience and Energy, The University of Manchester.

Introduction

In recent years, social housing providers in the UK have become influential actors in realising the national government's decarbonisation agenda. Reducing the carbon footprint of existing housing is seen as beneficial to the environment, economy, and social welfare. However, when decarbonisation is considered in light of austerity measures and privatisation of public housing, a number of contradictions arise. This paper provides insights from empirical research on market-based low carbon retrofit in the city-region of Greater Manchester. This paper engages with three main arguments in the context of a policy push for low carbon retrofit in the English social housing sector. These are 1) the economic and political utility of the social housing stock and its condition, 2) the role of the carbon control agenda in elevating social landlords in the sub-regional space, and 3) the subsequent strategies for market-based retrofit in social housing.

As a consequence of Post-Fordist economic restructuring (Jessop, 1993), there is an increasing gap between the bricks and mortar of social housing estates and local authorities. Having all but lost their capacity to act directly in the housing sector, and as carbon control is elevated to a "first order policy concern" (While et al., 2010), local government actors are searching for effective multi-level governance mechanisms to transcend the urban and create networks of actors across different levels of social organisation (Bulkeley & Betsill, 2005; Betsill & Bulkeley, 2007). In the English context, this task is influenced by emerging "carbon geographies" (Bridge et al., 2013), as well as "eco-state restructuring" (While et al., 2010) whereby the pursuit of CO_2 emissions reduction, among other sustainability measures, is delegated to lower tiers of government. These forces have given rise to a supra-local metropolitan tier of low carbon polity in several UK city regions, and the social housing sector has emerged as a strategic low carbon instrument for city region actors.

This research focuses on retrofit practices in the social housing sector, and collaborative efforts between "low carbon stakeholders" among the city-region policymakers. The research is informed by semi-structured interviews, a collaborative workshop and participant observation conducted in Greater Manchester in 2013-2014. First, thirteen semi-structured interviews were conducted with representatives of registered social housing providers and the city-region's low carbon policymakers. These housing providers included independent social landlords, Arms Length Management Organisations (ALMOs), and stock transfer landlords that are active in Greater Manchester and have completed significant housing retrofit programmes. The interviews were transcribed and analysed thematically, focusing on retrofit actors and partnerships, and their main motivations. All direct quotations in the manuscript are from these interviews. In addition, participant observation took place at meetings of the Low Carbon Hub in Greater Manchester. The fieldwork concluded with a workshop in October 2014 where the preliminary results of the research were shared with 24 registered providers, retrofit contractors and local authorities.

The paper begins by summarising the connections between social housing stock conditions and demunicipalisation before describing the rise of the supra-local low carbon polity in Greater Manchester. The relationships and motivations of the city region's policy elite and social landlords are considered from the perspective of low carbon retrofit policy and practices. The authors conclude that social landlords use retrofit practices to respond to the risks and pressures arising from the ongoing austerity agenda in the UK. Given the emphasis given to the low carbon economy in city region policymaking, social landlords' status has been elevated among the city-region's political and business elites. However, the interests of the national and local state, as well as private actors in low carbon retrofit market do not

neatly align in the sub-regional space, and several paradoxes emerge from the prevalent market-based logic on low carbon retrofit. This suggests that low carbon retrofit may result in unintended consequences for the social housing sector while failing to realise the intended carbon reductions as promised by proponents of carbon market.

The demunicipalization of social housing and local sustainability capability

Since the general election of 2010, social housing has been targeted by the government for the purposes of expanding the market through "a radical resurrection of the Thatcherite agenda" (Hodkinson & Robbins, 2013, p. 59). Under these austerity-driven policies, punitive measures have been imposed on social tenants under the Welfare Reform Act 2012 and justified under the deficit reduction programme (Hall et al., 2013). The impact of these policy decisions are felt not only by tenants but also by social landlords at an institutional level. Austerity fallouts or knock-on effects create significant financial and operational risks to social landlords in terms of rent revenue and sustainability of tenancies. This research focuses on how social landlords have responded to these risks and pressures by mobilising low carbon retrofit as a strategic response to operational threats.

The political story of austerity and welfare cuts has been popularised by mainstream media outlets and mobilised by the political opponents of the government in the UK general election of 2017. In addition, there are significant structural changes to the social housing sector that are less visible to the public. The logic of these stealthy reforms has been to continue the demunicipalization of social housing set in motion by the Thatcher administration and propelled forward by the "Third Way politics" of the New Labour government in 1997-2010 (Hodgkinson and Robbins, 2013, p. 63). In this most recent tranche of reforms, legislated in the Localism Act of 2011, new fiscal regulations were introduced to the Housing Revenue

Account. The so-called self-financing regime applicable to the housing stock that remains in local authority ownership includes a borrowing cap – an arbitrary limit to the amount that the local authority can borrow to invest in its housing stock. This has resulted in several local authorities relinquishing their remaining social housing assets, often citing investment pressures for future energy efficiency requirements as a primary driver. Examples of this in the case study area of Greater Manchester include Bolton, Oldham, Rochdale and Salford, jointly representing a stock of over 50,000 council-owned houses that has been transferred away from local government ownership after the new borrowing cap was introduced. Table 1 provides details of housing stock size and institutional arrangements by the ten local authorities in Greater Manchester.

The retreat of local authorities as owners of social housing is a long term trend that began with post-Fordist reforms in 1980s. Housing statistics reveal that local authorities in England owned 1.64 million dwellings on 1 April 2015, a decrease of 1.5 per cent from 2014 (DCLG, 2016). Since 1994, local authority ownership has dropped by more than half (from 3.67 million as at April 1994) as a direct consequence of government policy such as Right to Buy and large scale voluntary transfers. In the same time period, local authorities have gradually emerged as the main actors of climate protection and sustainability (Betsill & Bulkeley, 2007). This reveals two contradictory trends involving the privatisation of social housing and the increasing reliance on local authorities to reduce carbon emissions. In other words, there is increasing pressure to reduce carbon emissions through local and sub-regional governance, but a weakened capacity for local authorities to achieve this.

The institutions and instruments of market-based retrofit

National political contexts have an important influence on the mobilisation and operationalisation of sustainability agendas by local and regional governments (Voisey et al., 1996). In the UK, local government has historically lacked powers (Bulkeley & Kearns, 2006) and the demunicipalization of social housing has accelerated this. Traditionally, housing retrofit has been the domain of national policymakers and the privatised utility industries. However, the latter sector has been deemed ineffective in delivering sustainability (Eyre, 1998; Hannon et al., 2013). From the perspective of a political project, the involvement of the utility industry in energy efficiency retrofit is an example of neo-liberal "roll-out" strategy, following the fall-outs from the post-Fordist deregulation and "rolling back" of the state (Peck & Tickell, 2002). In pre-war Britain, nearly two thirds of the electricity supply industry and one third of gas supply was owned by large municipalities with the remainder in private ownership (Robson, 1950). Immediately after the war, electricity supply and other important industries were nationalized, similar to other developed countries (ibid). The subsequent wave of privatization and deregulation of nationalized industries during the 1980s and 1990s, is said to have been the most significant in the Organisation for Economic Co-operation and Development (OECD) (Pollit, 1999). The reforms were intended to create "ideal" market conditions for competition, increased efficiency and lower consumer prices by minimising state involvement. These reforms had mixed results; UK consumers enjoyed low energy prices for many decades while energy efficiency goals were not realised because deregulated energy markets had no incentive to reduce energy consumption (Eyre, 1998; Meyer, 2003). Therefore, to "stimulate the industry's involvement in energy efficiency", especially through "demand side management", the government intervened to re-regulate the market (Eyre, 1998, p. 965).

Peck and Tickell (2002, p. 385) argue that whereas the national state used to be "the principal anchoring point for institutions" under the Fordist-Keynesian model, inter-urban competition became necessary "*cutting social and environmental regulatory standards and eroding the political and institutional collectivities upon which more progressive settlements had been constructed in the past"*. Utility privatization, as well as the demunicipalization of social housing, form a central pillar of the 1980's roll-back neoliberal strategies (Graham and Marvin, 2001). As the market failings become apparent, active re-regulation and state intervention was required to repair the failings of earlier policies while "extending and bolstering market logic" (Peck & Tickell, 2002, p. 389). This chain of events is clearly evidenced in the field of energy efficiency.

The involvement of the utility sector in reducing domestic carbon emissions via market mechanisms has had a direct influence on the way in which social landlords have carried out low carbon retrofit, with social housing stock caught up in these waves of "roll back" and "roll-out" neoliberalism. Smyth (2013, p. 39) posits that since the 1980s, social housing was starved of funds which led to an "*unsustainable backlog of repairs and maintenance"*. To address this policy failure, the so-called Decent Homes policy options were developed to improve council housing during the Labour administration (1997-2010) (Pawson, 2006; Smyth, 2013).). The obligation to bring social rented homes into a "decent standard" was tied to a performance and grant regime, that was available only on the condition that local authority housing stock was delegated to an ALMO where the local authority would still retain ownership of the housing stock; 'stock transfer' whereby the ownership of the stock was transferred to a new independent landlord; or a "Private Finance Initiative" (Pawson, 2007; Ginsburg, 2005) – the latter a market-based instrument that the Labour government became infamous for (Raco, 2014; Wilks-Heeg, 2009). However, evidence has shown that

improving socially rented homes was a "Trojan Horse" for the privatisation agenda, where local authorities and notably council tenants were cajoled into voting in favour of new management models, in exchange for home improvements (Ginsburg, 2005; Smyth, 2013). The policy was thus designed to further uncouple the historically strong ties between local government and social housing that emerged in the Fordist-Keynesian era. While the historic link between the social programmes and 'pro-poor' housing policies was pronounced in the UK and Europe more widely, this was absent in the US where socialist values were marginalised in the post-war political settlement (Valverde, 2011). Although English local government no longer owns much housing stock, the institutional collectivities associated with the sector remain. These collectivities have led the social housing sector to be foregrounded in low carbon polity in GM, their perceived market influence being the reason. The chief executive of Registered Provider 1 argues that, "*Potentially we can put pressure on the private sector, one way or the other, because when they have a GM target to increase SAP ratings, cross the whole of GM, I think if social housing partners can lead on it, it's like then we can set the market for the private sector, we can effect funding […]*".

The social housing sector is perceived to be more responsive to state influence when compared with the private rented and owner occupied sectors. The deep-seated problems with meaningfully regulating or even engaging with the private rented sector about stock condition are well documented (Crook & Hughes, 2001; Kemp, 2011). Thus, social housing serves as a vehicle to develop an attractive retrofit market that can then draw in the private rental and owner sectors. In effect, the social housing stock serves as a test bed for products and services, and the sector provides leverage for the domestic retrofit market.

The logic and geographies of carbon control

The “eco-state’s” relationship with territorial carbon governance and targets (While et al., 2010) is central to the main argument put forward in this paper about Greater Manchester’s low carbon policy. At the time of writing, the UK government forwards a narrative of localism that is underpinned by an entrepreneurial economic agenda. This is represented by so called city deals such as the “Northern Powerhouse” (Osborne, 2014, 2015; Haughton et al., 2016; Nurse et al., 2017), relating to Greater Manchester’s “devolution agenda” (HM Treasury and GMCA, 2014). The dominant low carbon polity follows the contours of this fashionable sub-regional economic geography. The Low Carbon Hub created as part of the City Deal (AGMA, 2012) between Whitehall and the newly constituted Greater Manchester Combined Authority (GMCA), reflects an underlying economic decentralisation agenda, which for the political right is primarily about increasing competition (Rodriquez-Pose & Sandall, 2008). The aim of Greater Manchester’s Low Carbon Hub is central to the city region’s economic growth strategy (AGMA, 2012). It is through a low-carbon, pro-growth agenda that Greater Manchester aims to create a regional economy that can rebalance the UK economy that is over reliant on the South East.

Local governments are interested in carbon control not simply due to the negative effects of anthropogenic climate change but also due to the spatial implications of low carbon economic development (Bridge et al., 2013). Low carbon has emerged as an economic trump card in the same cities that not long ago considered climate discussions at best marginal to the mainstream issue of jobs, economic growth and inward investment. Hodson and Marvin (2010) describe this as an “eco-competitive race” where ecological issues are tied to market performance. In this case study, the “spatiality of carbon governance” (While et al., 2010, p. 77) is increasingly expressed through the supra-local mechanisms of Greater Manchester. Here, the political and economic leadership is increasingly funnelled through the city-region

machinations that have only loose ties with local democracy as conceived through elected local government. The GM Low Carbon Hub Board, a metropolitan low carbon polity executive, includes members from the private sector (such as Siemens, Arup, Manchester Airport Group, and the Cooperative Group) as well as public sector actors from education and housing. As such, the Hub represents a new low carbon orientation for the pre-existing 'grant coalitions' in Manchester (Cochrane et al., 1996; Jones & Ward, 1998). Social housing sector is one of many sectors that are implicated in this new low carbon configuration of city-region governance.

Community-based retrofit and the market's "carbon gaze"

The low carbon agenda in Greater Manchester includes many of the deficiencies of preceding notions of sustainable development. Sustainability originally encompassed a social dimension as per the Bruntland report but has largely been interpreted through economic and environmental issues (Vallance et al., 2011) while neglecting questions of social justice and democratic governance relating to the governance of urban areas, key infrastructures and assets (Raco, 2014). Moreover, While and colleagues (2010, p. 88-9) argue that there has been a shift from "*discursively strong but materially weak trade-off between economic and environmental goals, to a harder-edged instrumental concern with reducing carbon emissions as a first order policy concern.*" This conceptual narrowing of sustainability to carbon control has resulted in the downscaling of climate responsibilities to lower tiers of government in order to "mobilize strategic interests and actors to undertake specific projects and activities" (ibid, p. 80). As such, these activities are increasingly concerned with controlling carbon emissions on a territorial basis.

While the territorial logic of carbon geographies has given rise to international perspectives on carbon trading, carbon budgets, and renewable energy policies (Bridge et al., 2013), local and community perspectives are also relevant, particularly in the housing sector (Karvonen, 2013; Heiskanen et al., 2010; Walker, 2011). We argue that the carbon gaze of market-based housing retrofit is focused on this local scale, opening up different ways of understanding community-based retrofit. Low carbon retrofit in social housing estates involves a combination of interventions in the built environment as well as social programmes (e.g., education, health and information campaigns) to reduce the carbon footprint of social housing.

While and colleagues (2010) note that whilst carbon control and eco-state restructuring are not inherently anti-progressive, they have mainly centred on neoliberal market environmentalism and have effectively excluded those issues that lack economic value. Social housing therefore seems like an unlikely investment target in a traditional sense of market valorization. Historically, the post-Fordist regime de-incentivised public investment while funnelling the most vulnerable members of society into this tenure (Hodgkinson & Robbins, 2012). This has resulted in a stigmatisation of social housing in a society that is increasingly focused on values of commodification (Flint & Rowlands, 2003). And yet, the findings from this research reveal that social landlords are at the vanguard of low carbon retrofit and green investment. This shift of social housing from the periphery to centre stage is fuelled by eco-state restructuring that emphasises local and regional retrofit markets. For example, the global consultancy firm Arup (2013) states that social landlords can stimulate wider change because they can develop and influence the supply chain and capacity in the retrofit market. This creates a perverse situation where a longstanding public sector service is being reframed as a vanguard of private sector market environmentalism.

The emergence of a low carbon agenda in the Manchester city region

Since the Industrial Revolution, Manchester's "boosterist" political and business communities have seen the management of natural resources as part of the economic development agenda. For example, public health interventions to maintain the city's air and water quality were undertaken to ensure economic prosperity for the city (MacKillop, 2012). However, sub-regional governance to address residential carbon emissions has only recently emerged, despite the longstanding evidence suggesting that a city region approach could be beneficial (McEvoy, 2001). Manchester city region has a history of over 25 years (Deas, 2014) but prior to 2007, interviewees argued that there was "*a total absence at city region level*" of coordinated carbon reduction policy, and at local authority level such policies used to be "*completely vague or disconnected*" (Senior Manager, GM Low Carbon Hub). This could be explained by the negative experiences of the Agenda 21 implementation that caused Manchester's economic and political elite to distance themselves from the "environmentalists" (While et al., 2004). A change occurred around the time of the Climate Change Act 2008 when a Mini Stern review was commissioned to assess the economic impact of climate change legislation for the Manchester City Region (Deloitte, 2008). Consequently, the GM Climate Change Strategy (2011) set out the target for carbon emissions reduction of 48% by 2020. A bespoke GM housing retrofit strategy interpreted this low-carbon ambition by setting a target of 90% of the city-region's housing stock to reach Energy Performance Certificate (EPC) level B by 2035. Thus, the social housing stock emerged as a golden opportunity to realise the low carbon ambitions of the city region.

Social landlords in Greater Manchester

The community of GM social landlords is heterogeneous and geographically unbounded from the city region. It is made up of historically independent social landlords and landlords with accommodation that is owned or previously owned by the local GM authorities. The latter dominate the sector with a ratio of 3 to 1 homes being associated with the ten GM local authorities; the social rented sector overall accounts for almost 1 in 4 homes in GM (AGMA, 2008). Recent mergers in the sector have grown the size of independent social landlords. They range from large national and regional outfits with stock size of up to 150,000, to smaller landlords with a stock of about 4,000 or less, spread across the region or concentrated in one local authority area, sometimes in just one ward. In the early- to mid-2000s, most of the GM local authorities transferred their stock to one or more independent landlords or created one or more Arms Length Management Organisations (ALMOs). This change was required under the Decent Homes funding conditions at the time. See Table 1 for a brief summary of the institutional arrangements for local authority housing in GM. Four of the original GM ALMOs (Bolton, Oldham, Rochdale, and Salford) recently became stock transfer landlords. In a few cases nationally, including one in GM (Wigan), local authorities have scrapped their ALMOs and brought the social housing stock back under direct management. This institutional landscape is still in flux and further changes are expected across the sector in England.

(TABLE 1 ABOUT HERE)

Organisationally, those landlords with links to council-owned stock, either transferred or still under council ownership via ALMOs, tend to have closer ties with the city-region polity. Geographically their stock is in GM, and historically, staff used to work for the parent local authority: "*the AGMA [Association of Greater Manchester Authorities] link is really strong*

and because the whole stock is within Greater Manchester they absolutely see the strategic alignment with AGMA" (Director, GM Low Carbon Hub).

In terms of the sub-regional implications of the recent restructuring relating to carbon management, While and colleagues (2010) predict that it could lead to two opposing "experiments in reterritorialisation of governance" that either increased collaboration in or resist city-regional governance. The case of GM illustrates how the former strategy has been mobilized by the pre-existing metropolitan political and economic regime. The GM stakeholders maintain that the city region model is beneficial for communities, from a strategic resource and policy coordination perspective. One GM policy stakeholder suggested that the centralized city-regional coordination made it easier to develop "*consistent neighbourhood characterisation, identify strategic opportunities and housing stock profiling.*" A research effort was undertaken at the GM level to provide comprehensive stock condition data from social housing providers to create a holistic perspective on the city-region's socially rented stock that could be used for low carbon strategizing. In addition, city region advocates argue that large energy companies find it more "manageable" to work with a centralised point of contact for the ten local authorities rather than individual landlords or local authorities. However, this view is contradicted by evidence from social landlords regarding large utility-funded retrofit schemes. Each individual landlord collaborated with large energy companies directly, either independently or with contractors who specialise in social housing partnerships with the "big six" utility companies. The chief executive of Registered Provider 1 notes: *"a lot of people use their contractor partners as a mechanism to get their grant funding [from utilities], because more and more of the big contractors have people specialised in working with the utilities."*

A range of political tensions exist among the local authorities that comprise the city-region. There is a commonly held perception that GM activities disproportionately serve Manchester City Council's strategic aims. As a senior manager of Registered Provider 2 notes: "*AGMA, again, if it's not Manchester-led then it tends to go nowhere."* These internal rivalries among local authorities in GM are a long-standing feature of its metropolitan governance (Deas, 2014). These ongoing frictions make the city region model highly politicized and this, some interviewees argued, creates barriers to the low carbon agenda. The chief executive of Registered Provider 1 states: "*There was an AGMA approach to having a Manchester-wide solar PV scheme, probably about four years ago, just before the feed-in tariff went down, and at one point I was sat in the room with probably all ten authorities being represented by different solicitors and in the end, just didn't happen in time for the feed-in tariff.*" This suggests that the ideal of collaboration is not being realised despite frequent deliberation amongst local authorities.

A second issue that emerged involves the viability of market environmentalism. Operating at the city-region scale means "big business making big profits", and some argued that this is not a good model for social landlords that are better placed to engage with local supply networks, SMEs and so on. A senior manager of Registered Provider 2 notes that, *"There's too many people in the AGMA circuit that are external that want to make big money and that's where it all falls down."* This suggests a mismatch between the scale and ambitions of city region low-carbon governance and social housing retrofit, with the latter operating at a much more intimate scale. This mismatch was clearly manifested in the GM Green Deal/ ECO framework agreement that required substantial institutional demands from all partners. Senior Manager of Registered Provider 2 highlighted that the rules set by Government left only "a few massive players" in a position to operate, the chosen partners were Wates with

British Gas, Keepmoat with EDF and Wilmott Dixon (MAFC, 2014). When the much-vaunted Green Deal was disbanded by Government in July 2015 (only a year after the Greater Manchester partnership was launched) the viability of this type of market environmentalism was brought into question. Meanwhile, the Government's decision to drastically reduce Feed-In-Tariffs at the end of 2015 raised further questions about the viability of a market-based approach to retrofit.

One of the success stories of the city region's low carbon agenda involved an investment decision by Japan's New Energy Development Organisation (NEDO) to fund a heat pump trial in Greater Manchester. GMCA received a £15-20 million pilot demonstration project that is primarily funded by the Japanese government to "*break into the European market in heat pump technology*" (GM Officer). The grant was a "government to government" investment, therefore only local authority-owned stock qualified for the scheme. The chief executive of Registered Provider 1 notes that, "*I think what they liked about AGMA was the fact that AGMA had a captive audience [10 local authorities] and it had to be ALMOs because it's what's classed as a government to government scheme.*" GM barely met the investment criterion, having only four ALMOs left in the entire city-region; one each in Manchester, Wigan and Leigh, Stockport and Bury, and three took part in the NEDO heat pump trials. The trials demonstrated how public ownership can be an attractive proposition to an international investor. However, the question of scale can be misleading. Greater Manchester implies "big" but the number of properties retrofitted remain modest (600) when compared to the size of the GM social housing stock (about 250,000). The scale of the NEDO trial is similar to what individual landlords have achieved. For example, in 2011, one GM landlord installed a biomass system to 487 homes and solar panels to 1,900 homes as part of a scheme funded by British Gas.

Social housing retrofit - "cash for carbon"

A Parliamentary Select Committee report (ODPM 2004) notes a lack of policy coordination around the Decent Homes standard, energy efficiency and fuel poverty. The Committee detailed evidence of how the definition of thermal comfort in the DH programme became to mean effective heating and insulation, as opposed to taking account of fuel poverty (which was included in the original definition and then later omitted). The bar was set low in an energy efficiency sense, as efficient heating could be classed as "*any gas or oil programmable central heating or electric storage heaters or programmable LPG/solid fuel central heating or similarly efficient heating systems which are developed in the future*". Despite the low threshold for thermal comfort in Decent Homes, the Committee noted that in social rented sector "*more homes fail on the thermal comfort criterion than any of the other three criteria*" (ibid, paragraph 42).

Certainly, some landlords interviewed had completed substantial insulation measures under Decent Homes: *"Even in Decent Homes, we've done 12 million pound of insulation measures, we did three and a half million pound of cavity wall and loft insulation which was all 100% funded." (Head of Investment, Registered Provider 3).* However, the shift towards low carbon retrofit in social housing occurred towards the end of Decent Homes, after specific financial instruments were rolled out via the utility sector's carbon obligations. Considering Decent Homes as a retrofit activity to address energy efficiency and fuel poverty, many stakeholders in the GM housing sector characterise it as a "missed opportunity" (CHARISMA project workshop 2014). The utility sector recognised the potential of social housing landlords as institutional actors with capacity and social housing estates as "carbon banks". The main waves of utility industry-led low carbon retrofit in social

housing were undertaken under the Carbon Emissions Reduction Target (CERT) (2008-2012) and the Community Energy Saving Programme (CESP) (2009-2012), with many social landlords forming partnerships with the "big six" utility companies. This created a carbon market in the social housing sector. The sustainability manager for Registered Provider 2 noted, *"Carbon's a big figure, there's millions and millions of pounds being made every day from carbon"*.

While the Decent Homes standard was largely undertaken by social landlords, managed by in-house capital investment teams, low carbon retrofits instigated by the utility industry were markedly different. In GM, retrofit programmes were often initiated by the utility companies and delivered by their contractors, the social landlord's role sometimes confined to brokering access to the neighbourhoods identified by industry analysts as providing the most carbon savings and having the correct socio-economic profile for the funding conditions. A programme officer of Registered Provider 4 notes, "*It was determined by the geographical areas in which they [energy companies] were working … essentially the whole city was carved up into particular areas based on the housing stock and also the profile of the residents and how poor they were, basically.*" And the head of investment for Registered Provider 3 added, *"From our point of view we are governed by the way things are funded and CESP was targeted at the lower super output areas of the lowest 10 per cent."*

More entrepreneurial and risk-taking landlords had sought funding to carry out their own retrofit schemes, combining different opportunities especially in renewable energy tariffs to create an income while collaborating with local private landlords. The sustainability manager of Registered Provider 2 notes: *"There's lots of funding pots, RHI (Renewable Heat Incentive), you know, let's try and put, if you're orientations right let's bring in for that private landlord, let's bring in solar thermal then we claim RHI five, £600 a year on, you*

know, and then you've got yourself an income there." Meanwhile, several interviewees stressed that the regulatory framework around retrofit funding constrains creativity in the sector. The sustainability manager of Registered Provider 2 notes: *"I've partnered with Npower and EDF so I can get some fully funded packages, depending on the carbon, because that's what it's about and that's the side I'm working with […] kill two birds with one stone, trying to do things for the landlords and at the same time trying to give as much carbon to the big six."* Thus, there is an internal calculus to align the goals of the social housing providers with those of the energy providers and the government schemes. The chief executive of Registered Provider 1 notes: *"The other long term option would be to actually earn an income […] so you could over an asset management plan put in air source heat pumps and then feed back into the grid […] that's very, very optimistic and aspirational, but that's what sits behind it all."*

However, to be creative in market-based low carbon retrofit required skills that some felt were in short supply in social housing, and the risks involved were off-putting for many. Addressing the risks and complexity, a programme officer of Registered Provider 4 noted:

"It's not about the funding either, if it's available, it's actually complying with all the Ofgem rules, those do need to be simplified because at the end of the day, you know, we're simply housing folk, it scares us off when we've got so many hoops to jump through that potentially could mean that the funding's not available at the end of a job. And I think there's a number of associations which have really had their fingers burnt on this, that we're promised a lot and unfortunately you get these development managers from the big [utility] companies and they promise a lot, but once you get into the nitty-gritty of it, there's actually a lot of problems with it."

Improving the social housing stock helped the Labour administration to expand the demunicipalization project via voluntary stock transfers. In the later phase of market-led low carbon retrofit, social housing estates have become a pawn in the carbon market created by the demand for carbon by the utility industry to meet government policy objectives. British Gas provides an extreme example of a closed loop circuit for "cash for carbon' in social housing, where the cash ultimately returns to them, as explained by head of investment of Registered Provider 3:

"*People like Npower or Eon* […] *They will fund you, they will literally give you cash for carbon […] British Gas approach is different, if they've got hundreds of millions of pounds to get rid of to buy carbon, what British Gas have been doing over a number of years is buying those companies that deliver those things […] so what they now do is approach housing providers and they say we will give you x amount of funding but we'll also deliver the measures for you. So on one hand they're getting rid of money and on another hand they've got money coming in".*

The market-based retrofit logic is conducive to carbon-focussed valorisation of community benefit. This accounts for the target households' relative poverty and the characteristics of the built environment as measured by the Standard Assessment Procedure (SAP) rating. The next section considers the agency and values that social landlords bring to bear in low carbon retrofit practices, and the motivations that landlords have in participating in the carbon market.

Landlord motivations for low carbon retrofit

When discussing the motivations for low carbon retrofit schemes, carbon control was low on the list of priorities of social housing providers. Landlords often used carbon as a necessary 'hook' to secure funding but their subsequent strategies often had a very different focus. The

organising principles of community-based retrofit had more to do with sustainability in a broader sense, to ensure the landlord's ability to provide housing to low income and vulnerable people in a climate of austerity and rising energy prices. Landlords described their retrofit 'business case' to be about securing rental income and stock viability, as well as tenants' welfare and alleviating fuel poverty, as explained by project officer of Registered Provider 4: "*The priority really was on that, trying to reduce fuel poverty for our tenants and I suppose in the long run make them [properties] more sustainable and lettable because people in the future will be looking at the performance ... how energy efficient the property is when they're deciding whether to rent it or not*". Sustainability officer of Registered Provider 5 made the same point: *"If we can help them save money, ultimately they're likely to come out of fuel poverty, or not get into fuel poverty and they may be able to afford their rent".*

It was clear that retrofit strategies were influenced by the impact of austerity policies and the welfare reform on people's income, and the operational risks this created for the landlord, as the sustainability manager of Registered Provider 2 explains:

"*It was all about bills, it was all about getting the fabric of the building correct […] we knew the current climate with the universal credit coming in, we didn't know how bad it was going to be but it's the way it is, we're going to lose probably the best side of a million pound this year on that, so therefore with utility bills going up as well, you know, people are less likely to pay the rent. So we're trying to attack is if we've got a property that's warm, cosy and affordable to live in, that's free from damp, free from mould, well, and it's cheap to pay your bills, there's more chance of them then paying their rent on time, and preferably staying in that house longer*".

The chief executive of Registered Provider 1 also highlights a similar concern:

"The key reasons over the past year there's been increasing pressure on people's income, as I say our key goal is to try and help tenants reduce their fuel bills […] in theory the driver for that is the lower the fuel bills are the more likely they are the pay the rent".

The more entrepreneurial landlords saw the emerging low carbon market as a business opportunity, recognising how ultimately any income generated in this way would be beneficial in the longer term, as noted by the chief executive of Registered Provider 1:*"Everything we do really is aimed at trying to make our tenants more comfortable […] so there is a community priority there as well, although, it's difficult to say that we're doing this just for the community because in reality we're not, it's a pilot which goes beyond just the community, but having just said that, if we were to earn an income all that income will go back into investment".*

The reality of market-based retrofit reveals numerous conflicts and potential risks for the landlord, even when retrofit schemes are proposed as requiring no investment and no or low risk. The rules of the carbon market give little margin for error, and potentially offer a perverse incentive for ill-conceived retrofit schemes, as argued by Sustainability manager of Registered Provider 2: *"There's too many people out there that don't know how it all works but are selling it and they're selling the wrong thing, because they know, once you bank your carbon that's it you can't go back again, that's gone, you'll never be able to do that again even if it's all done wrong you can't bank it again, you only get one shot at this, that's what I'm trying to tell people don't rush into anything"* .

The interviewee referred to another unnamed landlord in the city region who replaced gas boilers with air source heat pumps. However, the retrofit was badly designed with respect to insulation and ventilation and the landlord had to pay for the old system to be restored after six months. Learning from mistakes is essential for the sector, and indeed it was suggested

that a climate of carbon control has revitalised the "*historic lack of asset management approach*" (Chief Executive, Registered Provider 1) in the housing sector. This involves moving away from retrofit projects towards integrating retrofit activities into asset management plans that typically span 30 years. The risks associated with managing assets over a 30-year period reveals the risks of short-term opportunities such as feed-in tariffs that are influenced by short term political cycles in the UK context.

While learning from mistakes is important, evaluation of actual long term carbon savings from retrofit was far from an established practice. The lack of evaluation is influenced by how Ofgem regulates grant funding and its over-reliance on the before and after EPC. Most social housing providers directed a great deal of resources towards securing funds, and delivering the retrofit schemes, while devoting little or no funding to evaluate the long term impacts. There were a few exceptions to this, with some landlords installing energy monitors in retrofitted homes, trying out different solutions in demonstration or pilot projects, and engaging with residents in dialogue at planned community meetings. But for the most part, evaluation of low carbon retrofit was not prioritised.

The research community have recognised the lack of retrofit evaluation for some time. Stevenson and Leaman (2010, p. 439) note that there is a "*lack of discussion concerning evaluation methods in the domestic sector*" and this was echoed by the interviewed landlords. Systemic evaluations of social housing retrofit are rare, perhaps the most substantial evaluation in England is by Gentoo in the North East (Gentoo, 2013). A smaller scheme in Cambridge City Council as part of a TSB funded project was evaluated by Sunikka-Blank and colleagues (2011), noting that the predicted and actual efficiency savings were misaligned, largely due to resident behaviour (see also Elsharkawy & Rutherford, 2015).

Notably, energy consumption in social housing can be substantially different from 'standard' assumptions in the RdSAP, which is used for planning low carbon retrofit. Gentoo concluded that social tenants on low incomes often under heat their homes and thus, EPC results can be misleading (Gentoo, 2013).

Conclusions

The low carbon agenda is increasingly mobilised through local governance mechanisms. The social housing stock, its condition and maintenance, have been used as a political pawn under successive administrations for the purpose of demunicipalization that strips material assets away from local government ownership. The most recent example of this the "borrowing cap" for local authorities that comes at a time when there is an increased pressure to invest in housing to meet low carbon targets. It is typical of the policy reforms that improved stock condition is used as a prize for voluntary privatisation of council housing. There is then an underlying neoliberal ideology being pursued through the means of the seemingly benign objective of housing improvement or more recently, low carbon performance. The national, international or local carbon markets however do not adhere to a specific ideological project about council-owned homes. Evidence was found to suggest that public ownership may be an asset in the low carbon economy. In the case of government-to-government Japanese investment on heat pump trials, local government ownership of the participating housing stock was a prerequisite condition.

The GM experience highlights the "repositioning" of social housing whereby it is brought to the fore in sub-regional economic and carbon governance. At the sub-regional level, the social housing stock is touted as a test bed for new low carbon products and services in order to stimulate the wider retrofit market. Meanwhile, a public sector service is repositioned into

serving the forces of market environmentalism. The Greater Manchester carbon geography is a construct based on an argument by the policy elite that favours big business. It is dependent on Whitehall deals on the one hand, and willing local partners such as social landlords, on the other. However, the GM social housing landscape is institutionally and geographically more diverse than the jurisdiction of the ten local authorities forming GM, and organisationally the social housing sector continues to be in flux as a consequence of UK government policy.

The results of market-based retrofit in GM are patchy. Typical schemes ranged from a few streets to e.g. individual or groups of tower blocks, rarely involving more than a few hundred households at a time, almost exclusively associated with just one landlord. The GM policy construct has strengths too, carbon control has given rise to increased collaboration in sub-regional governance, but the rhetoric surrounding economies of scale in the city region runs well ahead of the reality. Low carbon retrofit schemes in Greater Manchester look more promising as a test bed for learning from smaller projects, such as pilots and demonstrators, with the GM policy platform providing a space for sharing lessons learned. In terms of future research priorities in this field, there is an obvious gap in longer term evaluation of market-based retrofit in social housing. Also, the long term implications of the latest wave of privatisation and other rapid institutional changes in the social housing sector should be better understood in light of the ongoing crisis in affordable housing in the UK.

Finally, the interests of different actors in the low carbon retrofit market do not align neatly in the sub-regional space, nor do they align from the perspective of underlying aims and objectives. Social landlords are foregrounded in the carbon control activities of the city region polity because of the historic collectivities associated with the sector, especially with former council stock. Their potential in stimulating the sub-regional retrofit market and

hitting territorial carbon targets is an asset in carbon governance. However, retrofitting low income housing delivers only modest carbon savings, often below estimated levels based on SAP ratings. What is more, social tenants have been targeted through the austerity programme of welfare cuts, and these reforms have institutional impacts on social landlords, creating operational risks in terms of rental income and sustainability of tenancies. The carbon agenda is then mobilised by social landlords to pursue a multitude of aims via retrofit, including future proofing the stock and ensuring business viability by alleviating fuel poverty. The end result for retrofit is that carbon objectives are diluted, but this may be a more progressive outcome than the alternative, focused strictly on curbing emissions. It does, however, question the fit between market-based financial instruments for low carbon retrofit, and social housing.

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Table 1: Local authority housing stock in Greater Manchester

Local authority	Housing organisation	Institutional arrangement	Approx. stock size
Bolton	Bolton At Home www.boltonathome.org.uk	ALMO since 2002, stock transfer in 2011	18,000
Bury	Six Town Housing www.sixtownhousing.org	ALMO since 2005	8,000
Manchester	Northwards Housing www.northwardshousing.co.uk	ALMO since 2005	13,000
	Southway Housing Trust (Manchester) Ltd http://www.southwayhousing.co.uk	Stock transfer in 2007	6,000
	City South Manchester Housing Trust Ltd (now called One Manchester after merger with Eastlands Homes in 2015) www.onemanchester.co.uk	Stock transfer in 2008, merger in 2015	4,500
	Parkway Green Housing Trust and Willow Park Housing Trust, now part of Wythenshawe Community Housing Group (WCHG) www.wchg.org.uk	Stock transfers in 2006 and 1999 respectively, merger in 2013 to create WCHG	14,000
	Mossbank Homes www.msvhousing.co.uk	Stock transfer in 2007-8, creating a subsidiary of Manchester-based Mosscare Housing. Mosscare merged with St Vincents in July 2017.	1,100
	Eastlands Homes (now called One Manchester after merger with City South in 2015) www.onemanchester.co.uk	Stock transfers in 2003 and 2009, merger in 2015	8,000
	Brunswick and Miles Platting PFIs - regeneration involving refurbishment, demolitions and new build https://www.adactushousing.co.uk/Information/140 (Miles Platting) http://s4bmanchester.co.uk/about-us/ (Brunswick)	The City Council retains ownership of stock; housing management and services provided by an external PFI partner over 25-30 years	650 and 1,500
Oldham	First Choice Oldham www.fcho.co.uk/	ALMO since 2002, stock transfer in 2011	12,000
Rochdale	Rochdale Boroughwide Housing www.rbh.org.uk/	ALMO since 2002, stock transfer in 2012	13,750
Salford	Salix Homes www.salixhomes.org	ALMO since 2007, stock transfer in 2015	8,500
	City West Housing Trust www.citywesthousingtrust.org.uk	Stock transfer in 2008, later merged with ForViva Group	14,800
Stockport	Stockport Homes	ALMO since 2005	12,000

Tameside	New Charter Housing (North) Ltd and New Charter Housing (South) www.newcharterhomes.co.uk/	Large scale voluntary stock transfer in 2000, North and South merged in 2008, creating New Charter Homes Ltd. Later merger with Aksa Homes (Oldham) and Gedling Homes, (Nottingham), created New Charter Housing Trust Group. In 2017, a merger has been announced with Adactus.	20,000 (combined stock 33,000 after merger with Adactus)
	Ashton Pioneer Homes www.ashtonpioneerhomes.co.uk	Stock transfer completed in 1999, stock concentrated in one ward in Ashton Under Lyne	1,000
Trafford	Trafford Housing Trust www.traffordhousingtrust.co.uk/	Large scale voluntary stock transfer in 2005	9,000
Wigan	Wigan and Leigh Housing www.wigan.gov.uk/Resident/Housing/	ALMO created in 2002, Wigan Council published plans in 2017 to regain direct control of the stock	22,000