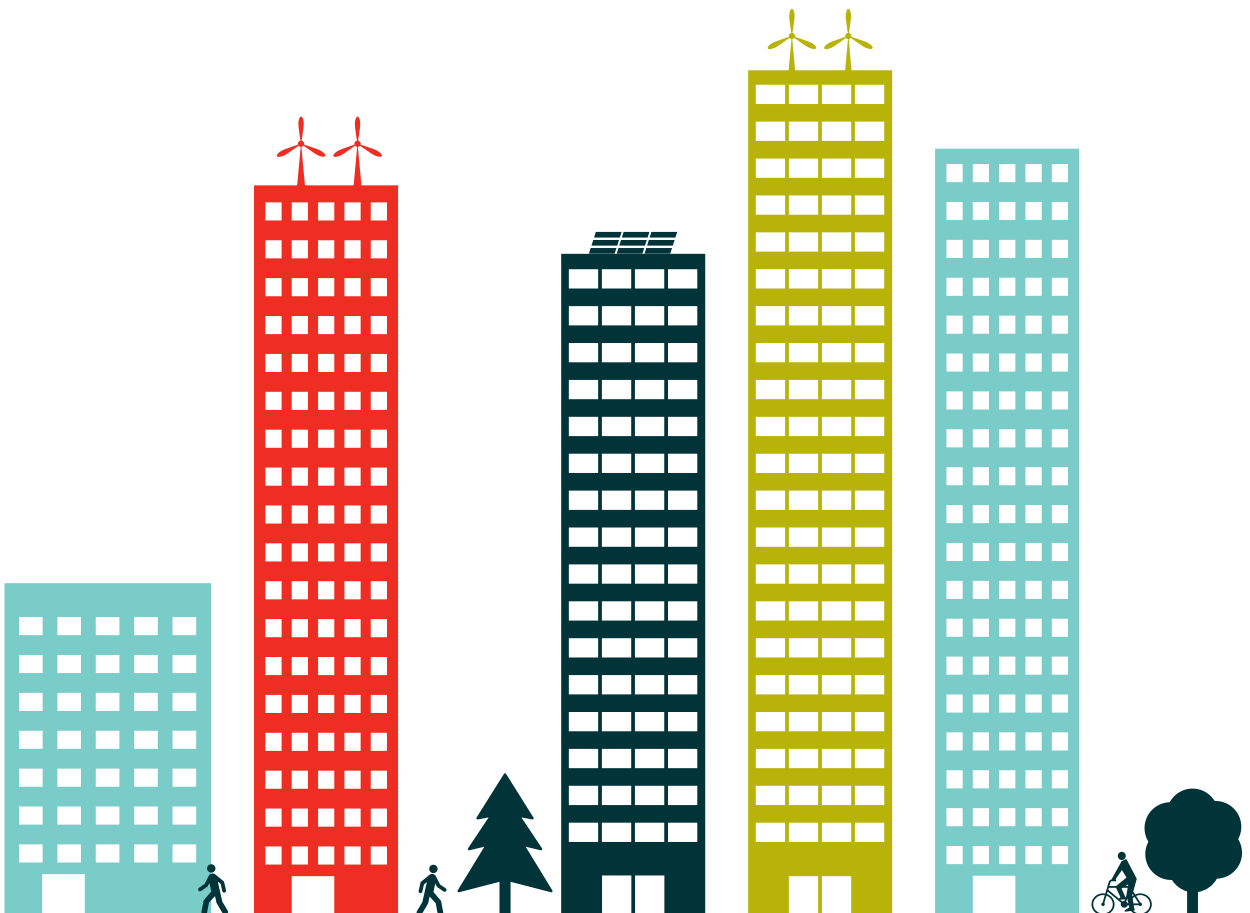


# Greening the skyline

The challenges and opportunities of tower block retrofit



**green  
alliance...**



## Greening the skyline

### The challenges and opportunities of tower block retrofit

by Faye Scott

#### Green Alliance

Green Alliance is a charity and independent think tank focused on ambitious leadership for the environment. We have a 35 year track record, working with the most influential leaders from the NGO, business and political communities. Our work generates new thinking and dialogue, and has increased political action and support for environmental solutions in the UK.

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## Executive summary

The UK's cities have been growing politically and economically for some time. Following the Scottish referendum, the debate about how to accelerate and broaden that progress is now centre stage. Alongside the economic and social potential of enhanced city development, there is a vigorous environmental agenda as cities take the lead in driving low carbon progress. Many cities have emissions reduction targets that exceed national ones, exciting plans for green job creation and policies to support low carbon industries

But this focus on sustainable futures brings with it the risk that cities forget their existing homes and infrastructure. Cities and towns are strewn with estates that reflect what the architects of the day saw as the ideal approach to modern urban living. Tower blocks, predominantly built in the 1960s and 70s, offer one of the most stark contrasts between the ideas and enthusiasm with which they were built and the crumbling, undesirable reality that many have become. There is a marked difference between these and the sustainable communities that cities now aspire to.

The past cannot be left behind as cities move towards a low carbon future. Retrofit of existing buildings has been identified as one of the four key opportunities that cities have to act on climate change.<sup>1</sup> Tower blocks are undeniably complex environments to retrofit, and the temptation to put them at the back of the queue is understandable.

Many tower blocks suffer from decay, maintenance challenges, fractured communities and poor quality communal and green spaces. They are often incredibly energy inefficient structures that result in residents paying disproportionately high energy bills. Given that tower block residents often live on lower incomes and that energy prices keep rising, this is an issue that local authorities and housing associations are finding harder to ignore.

Although tower blocks are challenging from technical, resident engagement and funding points of view, a well designed tower block retrofit programme can address all of these difficulties. In this report we identify the conditions for planning successful tower block retrofits, based on interviews and workshops with a range of experienced stakeholders (listed on page 30). The principles acknowledge that, despite the current funding context, local authorities and housing associations can achieve significant improvements.

## Five principles for planning a successful tower block retrofit

### 1. Start with stock and outcomes

Rather than designing projects around funding streams and what they will support, successful tower block retrofits often take the nature of the existing stock and the intended outcomes as their starting point. This is a stronger foundation when designing a scheme, developing its business case and seeking funding.

### 2. Value wider benefits

Tower block retrofit can deliver a range of benefits that go well beyond fuel poverty reduction, energy efficiency gains and decreased emissions. Identifying and valuing these benefits, such as improved health and security, can strengthen business plans, bolster a project's rationale and help to access other pots of funding.

### 3. Join up the work

An effective retrofit requires joint working across an organisation. A variety of teams will, in aggregate, look after a block. Exploring and capitalising on the overlaps in their responsibilities is essential when putting a comprehensive retrofit together.

### 4. Set realistic timescales

Planning and budgeting a tower block retrofit can take more than six months, often with a political sign off process required at the end. Stakeholders we spoke to highlighted the need to be aware of this, but also the value in opportunism. Having retrofit projects 'on the shelf', with some planning already completed, allows organisations to respond rapidly to new opportunities.

### 5. Value resident engagement

Residents' support for a project is essential to keeping delivery on track, and effective engagement is vital to maximise the benefits of a retrofit scheme. Budgets should include generous financing for engagement and demonstrate the opportunity costs of failing to get it right.

## Two further opportunities to make the most of tower block retrofit

### Smart meters

The majority of homes will receive smart meters between 2016 and 2020. Government research has highlighted that smart meter communications equipment will not work in up to 30 per cent of homes.<sup>2</sup> Tower blocks are frequently cited as an example of housing that will fall into this category.<sup>3</sup> In practice, this means that smart meters in tower blocks will be unable to 'talk' to the in-home displays that are critical to helping consumers make more informed choices about their energy use. As a result, tower block residents risk missing out on the benefits of smart meters altogether or, at best, waiting at the back of the installation queue.

Although the smart meter roll-out is supplier led, a communal approach that upgrades all flats at the same time would be more effective in tower blocks. The government has acknowledged this, a working group is exploring communal approaches and trials of different options are underway.

Housing associations and local authorities are well placed to ensure that their blocks are 'smart ready' by allowing access for trials. Once a communal approach is agreed, tower block managers can enable community engagement about smart meters and facilitate the upgrade by providing information about which energy companies supply a block.

We encourage local authorities and housing associations to recognise the potential for smart meters to help reduce energy bills and emissions and to ensure that the tower blocks they manage do not miss out.

### District heating

District heating is growing in popularity and has the potential to address rising heating bills. Fourteen per cent of the UK's heat demand could be met by district heating networks by 2030 and 40 per cent by 2050.<sup>4</sup> The government is supporting local authorities in exploring its potential. A number are interested, as district heating could help to meet their low carbon energy, fuel poverty, energy security and job creation ambitions.

Tower blocks can act as central components of a district heating network, as they have a high density and diversity of heat demand. Moving to district heating also offers significant efficiency and carbon savings, as most tower blocks are using very inefficient electric heating.

As local authorities explore the potential for district heating we encourage them to capitalise on the specific advantages that tower blocks provide. In doing so, heat networks should be strengthened and the benefits of lower energy bills can be secured for residents and emissions can be reduced.

## Summary of recommendations

### Planning tower block retrofit

Local authorities and housing associations responsible for managing tower blocks should apply the five principles for planning tower block retrofit we have outlined to:

- strengthen their business case and efforts to secure funding;
- capture and maximise all the benefits retrofit can offer;
- build in success by investing in effective resident engagement during and after a project.

### Funding and incentivising tower block retrofit

To drive retrofit in high rise housing effectively, funding streams such as ECO should:

- remain consistent in their approach, providing a reliable foundation and clear direction for those undertaking complex retrofit schemes;
- consider an outcomes based approach to funding to enable comprehensive retrofit that delivers the best energy and fuel poverty outcomes for a block.

### Getting tower blocks smart ready

Local authorities and housing associations should ensure that tower blocks do not miss out on the environmental and energy bill benefits of smart meters. They can help to secure smart upgrades by:

- allowing access to their tower blocks for trials;
- liaising with organisations delivering smart upgrades, for example by providing information about which energy companies are supplying a block;
- leading community engagement about smart meters;
- initiating a smart upgrade by communicating with the organisations delivering them.

### Integrating tower blocks into district heating networks

All local authorities should undertake energy opportunity mapping and develop planning policies that encourage approaches such as district heating. As heat networks develop:

- local authorities should capitalise on the advantages that tower blocks offer to strengthen heat networks, reduce emissions and enable residents to benefit from significantly reduced energy bills;
- those managing tower blocks should proactively identify district heating plans in development, highlighting a block's potential and ensuring that opportunities do not get missed.

# 1 Introduction





The past few years have seen cities grow in stature in the political debate. Talk of their vibrancy and potential to drive growth and job creation now dominates political narratives about economic recovery and decentralisation. On the low carbon front, many cities have ambitious aspirations, and the enviable ability to give shape and life to the low carbon economy. Many cities also have climate change emission reductions targets that exceed national ones. Manchester aims to reduce emissions by 48 per cent by 2020 and Leeds aims for a 40 per cent reduction by 2022, compared to the UK's overall target of 34 per cent by 2022.<sup>5</sup>

Cities are being encouraged to think beyond narrow local authority boundaries and to consider how they can better address local priorities by working collectively, eg across a 'travel to work' area. This will see more local authorities working as combined authorities, in which Manchester has led the way.

**Comprehensive retrofit programmes should be central to any city's plans for the future**

With a wider geography and the prospect of more responsibilities, spending control and revenue raising rights, thoughts inevitably turn to a city's future. What new transport connections and infrastructure will enable job creation and employment and better meet resident's needs? Will empowered cities move from administration to municipalism, becoming market actors in areas such as energy provision? And how can cities create liveable environments and consider their green infrastructure on a larger scale?

Underlying all of these questions is the preoccupying and often fraught one of housing. Where will current and future city residents and employees live? Here too, the focus is on the new, with garden cities and urban extensions vying for first place on the list of options. It is tempting to focus on where the homes of tomorrow should be built, but cities are ever changing patchworks. Housing developments cover the urban landscape, each of them serving as reminders of how successive decades envisaged modern living. In the pressurised debate over where to build new housing, much of this existing housing is being forgotten and is falling to a standard far below the liveable, smart, connected and sustainable vision that cities hope to realise.

This report focuses on tower blocks, which are good examples of the reality of housing decline in many areas. Often iconic when they were originally built, many are now far from ideal places to live. High density living continues to make sense in cities and is alluring for architects and landowners, many of whom are reimagining it for the future with sustainable, new high rises. But cities also need to look at what they already have and ensure that all residents benefit from these aspirations for high quality, sustainable homes, whether the building's foundations are just being laid or whether they have been dominating a skyline since the 1960s.

Comprehensive retrofit programmes should be central to any city's plans for the future, as recent research by Michael Bloomberg, the UN's special envoy for cities and climate change, and the C40 Cities Climate Leadership

**Tower blocks are challenging to retrofit and the temptation is to put them at the end of the queue. But they could act as exemplars of what is possible**



Group has concluded.<sup>6</sup> Tower blocks are uniquely challenging to retrofit and the temptation is to put them at the end of the queue for upgrades. But they could act as exemplars of what is possible in cities. It is for this positive reason that we have chosen to focus on them, exploring how existing tower blocks can be a viable, sustainable part of a city's future, as well as its past.

### **Why tower blocks matter**

Since 1949, around 6,500 tower blocks have been built in the UK, comprising 400,000 dwellings.<sup>7</sup> Many of them went up rapidly in the 1960s when local authorities faced demanding house building targets. High density, high rise buildings were seen as a modern approach that offered a lot of housing on a small footprint. In Glasgow, 75 per cent of new build in the 1960s was high rise and in London it was 50 per cent.<sup>8</sup> Despite some collapses due to poor quality, many of those tower blocks are still standing.

**With the high number of social tenants in tower blocks, there are also pressing incentives to upgrade tower blocks to address fuel poverty**

When thinking about tower blocks, the iconic, brutalist blocks may be the main reference point. But ‘high rise’ tends to refer to any block that is six stories and above. So a significant number of blocks, smaller in stature but suffering the same complexities and challenges of high rise living, dot the landscape of UK cities and towns. Many suffer from ongoing decay and maintenance challenges, with poor quality communal and green spaces. And most are very energy inefficient, resulting in high energy bills for residents. This is especially problematic given that many tower block residents live on lower incomes and are disproportionately affected by high energy costs. In 2001, 71 per cent of those living on or above the fifth floor of a building were social rented sector tenants.<sup>9</sup>

With creative approaches to retrofit, high rise homes do not have to be cold, damp, isolated places. The smart growth agenda advocates accessible, connected urban communities that make the most of existing infrastructure and preserve open spaces. This approach has influenced planning in a number of European and US cities. As UK cities look to improve their liveability, many are focusing on better public transport and reducing emissions. As part of this effort, they should also be looking at how to improve poor housing.

### **Green Alliance’s work on tower blocks**

This report builds on Green Alliance’s existing work on tower blocks. In 2012 we published *Towering ambitions: transforming high rise housing into sustainable homes*, which was accompanied by *A toolkit for high rise green living*, a practical handbook for tower block residents and managers. Both publications covered energy, water, waste management, transport and green space. In this report, we focus only on energy, where the most substantial improvements are needed and the biggest opportunities lie.

Through research with stakeholders involved in managing tower blocks and their retrofit we have identified some principles for successful retrofit and we feature case studies of projects that demonstrate the principles in action. We also explore two issues on the horizon: the smart meter roll-out and district heating, which present specific obstacles and opportunities for tower blocks.

Tower blocks can be made up of privately owned flats, or a mixture of private and social rented housing. But many are predominantly social housing, managed by local authorities or housing associations. These organisations are the main audience for this work. Retrofits are generally most effective when a ‘whole block’ approach is taken, and local authority and housing association managers are in the best position to initiate such projects with their tower blocks. With the high number of social tenants in tower blocks, there are also pressing incentives to upgrade tower blocks to address fuel poverty.

# 2

## Retrofit challenges



For local authorities and housing associations with tower blocks in their stock, embarking upon a retrofit programme is not something to be taken lightly due to the technical, resident liaison and funding challenges involved.

### Technical challenges

Many tower blocks are classed as 'hard to treat' from an energy efficiency point of view. They have very poor thermal efficiency, and many have solid walls, which rules out cavity insulation. Instead, expensive external wall insulation, also known as cladding, is needed for the whole block. Prior to cladding a block it is vital that any structural problems are identified and repairs made. Small inconsistencies in design throughout a block can become apparent and require tailored approaches to avoid heat leakage or damp once the cladding is in place.

### Resident liaison challenges

Cladding a tower block has a high impact on residents. They live inside a building site, often for almost a year, with their windows and light obscured by scaffolding. Ensuring that they understand and value the benefits of the work underway is critical to securing their buy-in and patience. It is also essential that residents understand how to use any new technologies installed, to maximise the benefits. This requires a sophisticated and comprehensive commitment to resident and community engagement that many local authorities and housing associations acknowledge is a challenge.

### Funding challenges

Retrofit projects are never cheap, and tower blocks are more expensive than average because of the products and complexity involved. The government sought to incentivise the retrofit of hard to treat properties with the creation of the Energy Company Obligation (ECO), introduced in January 2013. This set targets for energy companies to provide subsidised energy efficiency services to low income customers and hard to treat properties. It galvanised local authority and housing association plans to retrofit their hard to treat stock, with tower blocks among their priorities.

Changes to ECO, announced in the government's 2013 Autumn Statement, undermined these incentives. Under pressure to reduce consumer energy bills, the government relaxed ECO's targets. Energy companies were given longer to meet them and were allowed to include the installation of easier and cheaper measures. As a result, any fillip for hard to treat retrofit projects was removed before it had time to have much effect.

In the short term the changes should have reduced the average household energy bill by approximately £50 per year.<sup>10</sup> In the long term, the changes significantly reduced the likelihood that hard to treat properties will benefit from retrofit.

**“There are a lot of projects with holes in their budget because of changes to ECO.”  
Central government**

**“Policies and funding pots as set up can’t really deal with complex housing needs.”**

**Environmental charity**

### **The impact of changes to the ECO scheme**

- A London housing association was looking at a range of tower block energy saving projects, but following changes to ECO none of them went ahead as ECO providers failed to provide the 100 per cent funding that had been under discussion.<sup>11</sup>
- Birmingham City Council reduced the number of blocks it planned to retrofit from 20 to 16 following changes to ECO and had to make up large sections of the budget that would no longer be covered by ECO.<sup>12</sup>
- Islington’s £2.3 million scheme (see page 19) was expecting £750,000 from ECO but is now likely to receive a maximum of £300,000.<sup>13</sup>

The examples outlined above are a powerful illustration of the need for consistency in energy policy and funding design. However, even before the changes, ECO and the schemes that preceded it were seen as less than ideal by those responsible for tower blocks. Schemes are thought to be too directive about the measures they will support, rather than focusing on energy efficiency outcomes. As a result, retrofit projects often end up being piecemeal and opportunistic, which can have a significant impact on the efficiency improvements delivered. For example, ventilation is essential to good retrofit, particularly when cladding and new windows are involved. But funding for it often falls between the gaps, putting the work carried out at risk of underperforming or, at worst, causing unintended negative side effects.

Because of these challenges, local authorities and housing associations will often disregard high rise properties in favour of more straightforward projects. But tower blocks are an integral part of the urban environment and should exemplify a city’s sustainability ambitions, rather than being out of step with them. In the next chapter we discuss how some local authorities and housing associations are taking a different starting point and developing tailored retrofit programmes with strong business cases.

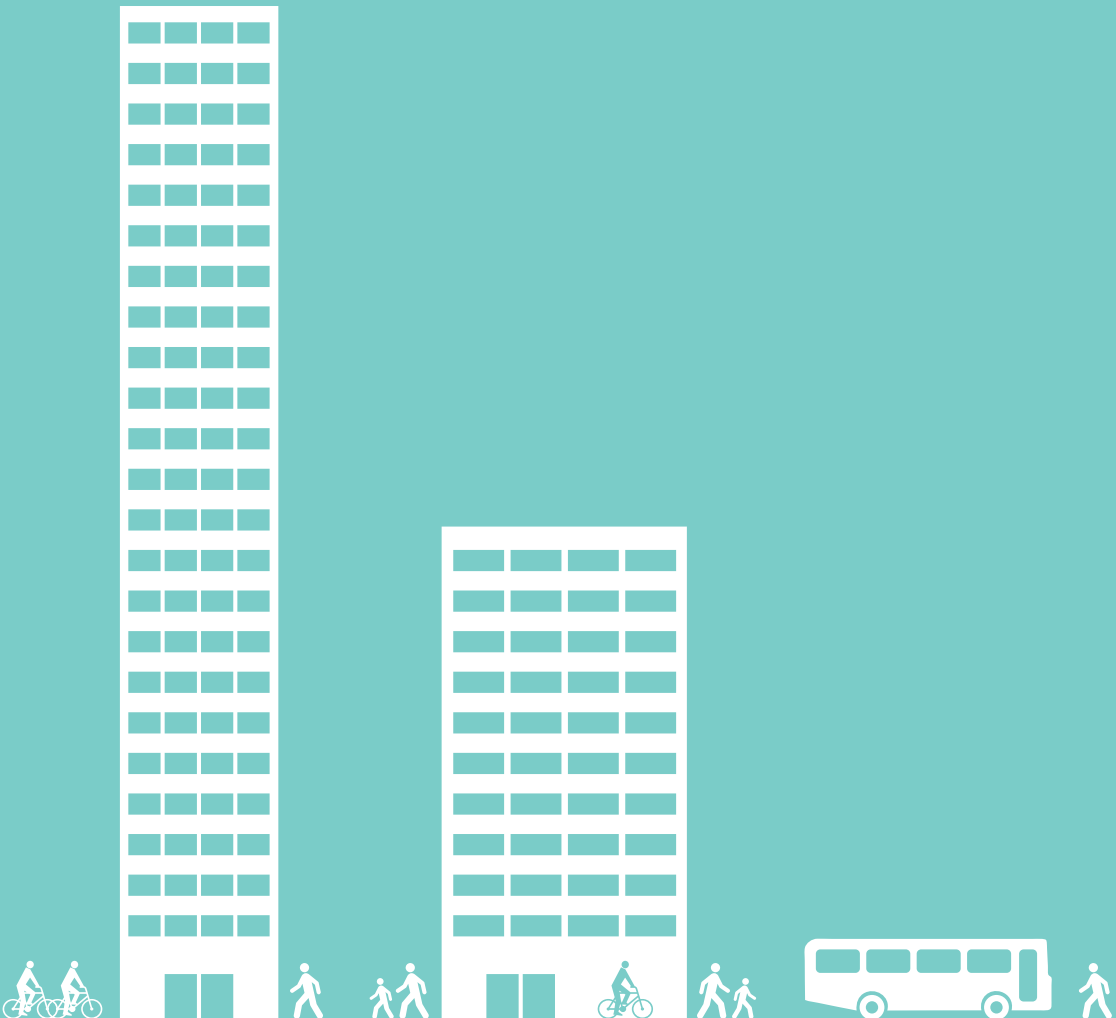
### **Recommendations**

To effectively drive retrofit in complex housing like tower blocks, funding streams such as ECO should:

- remain consistent in their approach, providing a reliable foundation and clear direction for those undertaking complex retrofit schemes;
- consider an outcomes based approach to funding to enable comprehensive retrofit that delivers the best energy and fuel poverty outcomes for a block.

3

## Five principles for tower block retrofit



**“Energy efficiency projects are best pursued on the merits of their business case, not just because a funding stream like ECO has opened up.”**  
**Local authority**

**“Some social landlords have chased the money, business plans have become distorted and they have had to manage resident expectations when things changed.”**  
**National policy organisation**

Despite the challenges, some local authorities and housing associations have robust, securely funded tower block retrofit programmes with political buy-in. They have recognised that tower blocks cannot get left behind and have developed approaches to overcome the funding and resident engagement challenges. The technical challenges remain, but designing a tailored programme goes a long way towards keeping costs down and delivering the best outcomes.

The case studies featured in chapter four (page 18) look at projects underway in Islington and Portsmouth. More broadly, our conversations with local authorities and housing associations have helped to identify a set of five principles to apply when planning for tower block retrofit:

### **1. Start with stock and outcomes**

Successful tower block retrofit schemes are often initiated by local authority or housing associations, rather than being responses to ECO or other funding streams. This makes them less vulnerable to policy changes and allows them to be tailored to the blocks in question. The Portsmouth case study on page 20 demonstrates the value of this approach. Patched together funding for individual measures would have been unable to support such a comprehensive retrofit and the level of efficiency improvements and benefits for residents that it intends to deliver.

A stock and outcomes based approach is a much stronger starting point for developing a business case that can demonstrate wider benefit and secure political support. A comprehensive picture of the improvements offered by a retrofit programme can be presented to decision makers, creating more of a narrative and vision than simply saying that funding has been secured for specific energy efficiency measures.

### **2. Value wider benefits**

Successful retrofit programmes often take a lateral approach to demonstrating and quantifying the benefits that they will deliver. Energy savings and the associated reductions in bills, fuel poverty and emissions will remain core justifications for any scheme. But thinking about wider benefits can strengthen a business case and assist in securing funding from different budgets, as in our Islington case study (page 19). Developing a robust business plan that demonstrates the ability to deliver a return on investment across a range of indicators can also position retrofit programmes for borrowing on the open market.

The wider benefits described below are based on a range of stakeholder experiences. Some projects have incorporated them as added value in their business cases from the start. Others were discovered after completion. All of them are opportunities that future retrofit projects should explore.

#### **Reducing fuel poverty**

Tackling fuel poverty is often a key driver for social landlords. Demonstrating how a tower block retrofit will help meet affordable



**“If you can demonstrate other opportunities like employment opportunities and health benefits, then other pots of money can be blended in.”**

**National policy organisation**

**“Being able to talk about regeneration and employment benefits makes it much more exciting and more than just a housing upgrade.”**  
**Retrofit business**

warmth or fuel poverty targets is a powerful way of making the case for the project and can enable access to different funding streams.

### **Improved security and appearance**

Retrofit projects often deliver substantial improvements to the appearance of tower blocks and may include the installation of a concierge service, both of which have the potential to reduce anti-social behaviour. The latter is often a priority concern for estates, so identifying and valuing this as part of a scheme can strengthen business cases and allow for cross-subsidy between budgets.



### **Maintenance savings**

Good quality retrofit schemes deliver long lasting improvements and save on routine maintenance year to year. External wall insulation, for example, will include repairs to all existing damage, clad a vulnerable tower block and protect it from ongoing problems. Tower block maintenance costs are often very high, so the costs saved should be valued in the business case.

### **Job creation**

Some retrofit programmes offer local job creation and most schemes will explore how to maximise those opportunities. The value of any employment opportunities should be reflected when making the case. Many local authorities will be focused on tackling local unemployment so, once again, the convergence of aims may allow for cross-subsidy between funding streams.

### **Better health**

Poorly insulated tower blocks often have serious condensation or damp problems. In addition, people frequently live in colder conditions than are ideal, to avoid exorbitant energy bills. Both of these affect people's health and can be addressed by improved energy efficiency. Health benefits often come to light after a scheme is complete, with a number of studies identifying improved physical and mental health among residents following a retrofit. Improvements to blocks in east London have also been associated with falls in self-reported illness days and demands on the local health service.<sup>14</sup>

**“Health improvements are harder to incorporate into a business case, but retrofit can be a preventative measure.”**  
**National policy organisation**

**“Changes to the heating system in a tower block delivered significant noise reductions. It was a benefit that we hadn’t foreseen and it was a huge improvement for residents’ quality of life.”**  
**Retrofit adviser**

There is a growing interest in identifying potential health benefits ahead of time, to reflect their value when making the case for retrofit. As local authorities integrate further with the health system via the health and wellbeing boards established in 2012, the overlap in benefits between health and retrofit is one that should be explored at the planning stage.

### **Better quality of life**

As with health benefits, these are hard to quantify and some are unexpected, such as noise reduction resulting from changes to a heating system. A number of studies also point to the reduced sense of isolation and the maintenance of social capital that refurbishment can maintain and strengthen.<sup>15</sup> Whilst these cannot be as easily pinpointed and valued ahead of time it is important to evaluate tower block retrofits for such benefits to contribute to the growing body of evidence and to enable future schemes to identify the potential for them.

### **3. Join up the work**

As well as thinking laterally when making the case for a retrofit programme, the practicalities of getting one off the ground require joint working across a local authority or housing association. A variety of teams look after a tower block. It is good practice to explore overlaps in their responsibilities and to identify opportunities to maximise sustainability in day to day operations. This becomes essential when planning retrofit. Features such as a block’s heating system or boilers will often be the responsibility of maintenance teams, while ‘green’ teams focus on energy efficiency. But a block’s boilers are central to efficiency, and maintenance teams are important in identifying opportunities for improvement and conveying benefits directly to residents. It can be hard for organisations with long established ways of working to forge new connections between teams, but it is vital for an effective retrofit.

### **4. Set realistic timescales**

When developing a scheme it is important to be realistic about how long it will take to get it off the ground. In local authorities it can take more than six months, often longer, to pull a plan and budget together. The potentially lengthy process of securing political buy-in and sign off by councillors also needs to be accounted for. Officers point out that such processes don’t allow for fast responses to new pots of funding, such as ECO. And it is essential to have certainty around the funding to include in their budgets. For many local authorities, the changes to ECO, therefore, illustrate the risks associated with relying on funding subject to changes in government policy.

Housing associations won’t necessarily have the political dynamic, but it will still be important to convince board members of the value of any significant expenditure. And, as with any organisation, they are averse to exposing themselves to fluctuating and uncertain funding environments.

There can be value in opportunism though, and some local authorities and housing associations advocated having retrofit projects ‘on the shelf’. With a certain amount of planning already complete and some permissions in place this has enabled them to respond rapidly to new opportunities.

**“Good engagement can help to overcome significant barriers. Even where things were going badly wrong on a project, people accepted it as they felt that they were engaged and informed about what was going on.”**  
**Environmental charity**

**“Community engagement is often derided but it saves vast amounts of money if you do it right. On one scheme I would estimate that it saved us 30-40 per cent of the amount that we normally budget for dealing with delays.”**  
**Retrofit adviser**

## 5. Value resident engagement

The importance of engaging residents in retrofit programmes came through very strongly in our research. Due to the number of households in tower blocks and the duration of retrofit programmes, it is usually not feasible to move residents elsewhere while work is underway. Their understanding of the benefits of the retrofit and acceptance of the disruption involved is therefore essential to success.

Good practice approaches to engaging residents while planning and undertaking retrofit include show homes, digital outreach and social media, more creative communications and encouraging residents to discuss the retrofit work.

More fundamentally, residents’ understanding of the improvements can be essential to realising the benefits of retrofit fully. If, for example, they do not understand how to get the best out of their new heating controls, or how to manage ventilation once extensive insulation has been installed, the efficiency improvements from retrofit may be undermined. Residents may also fail to realise the full extent of reductions to their energy bills, or they may experience unintended side effects, such as condensation.

Post-completion engagement remains patchier and is an important area for improvement. Many stakeholders acknowledge the need to support residents better in understanding the improvements being made to their homes and how to use them efficiently. Some noted that there is information available if people have problems, but that more could be done to head off problems in the first place. Others noted that although residents get detailed information and support once a retrofit is complete, this is not repeated for new tenants that move in subsequently, even though the technologies in use may also be unfamiliar to them.

Despite the clear advantages many projects continue to see engagement as a ‘nice to have’ and don’t plan or budget for it sufficiently. But those with experience of the benefits argue that engagement should be presented as an ‘invest to save’ activity. It should be well resourced and business plans should be clear about the opportunity costs of not engaging with residents effectively.

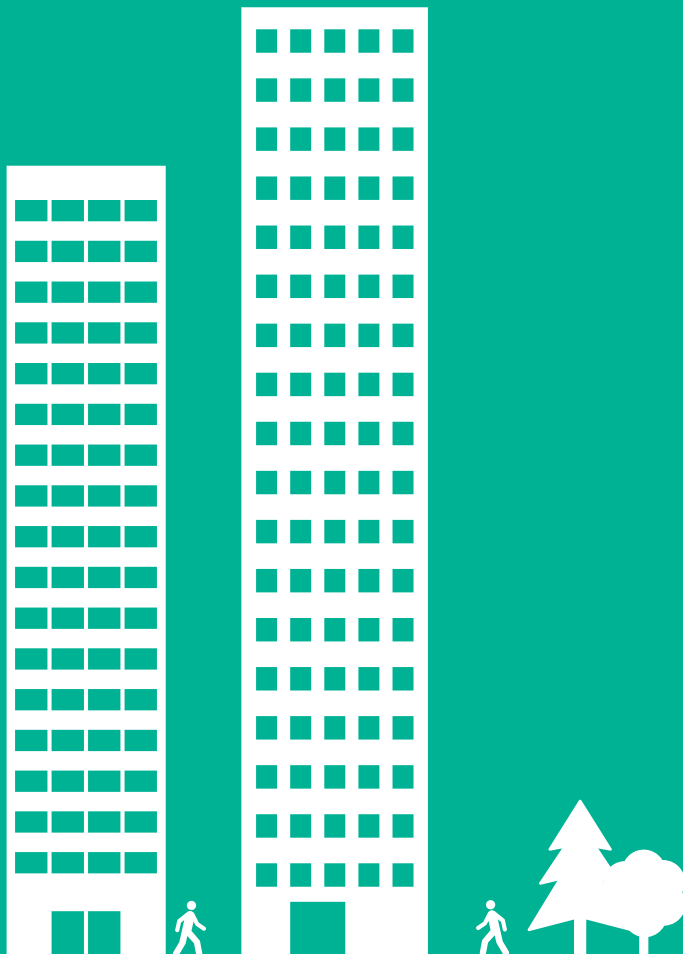
## Recommendations

Local authorities and housing associations responsible for tower blocks should apply the five principles outlined above to:

- strengthen their business cases and efforts to secure funding;
- capture and maximise all the benefits that a retrofit can offer;
- build in success by investing in effective resident engagement during and after a project.

4

# Demonstrating the principles: two case studies



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## Case study 1

### Building the case for retrofit in Islington

**The London Borough of Islington has created a comprehensive retrofit plan for the houses and tower blocks it manages. The business case is based on what will work best for the individual blocks and is justified by the range of benefits that it will deliver.**



Over a fifth of Islington residents live in fuel poverty, with homes that have very poor energy efficiency and unacceptably high energy bills.<sup>16</sup> In some council managed homes, residents are paying over £200 a month for heating and electricity. In response, the council has made energy advice available to all residents and is retrofitting the homes it manages.



This has not been simple or cheap. Many of Islington Council's homes are in complex estates, with a combination of low rise, medium rise and high rise blocks. The majority have solid walls and insulating them requires expensive external cladding, which is disruptive to install.

**Islington invested in engagement, ensuring that residents understood the benefits of the work**

Securing political buy-in and funding for Islington's £2.3 million scheme to retrofit three hundred homes, including three high rise blocks, was very challenging. It required a strong rationale, with benefits extending beyond the environmental case.

Demonstrating how tower block retrofit would help the council meet its affordable warmth obligations led to councillors allocating resources that would not otherwise have been available. Cladding the blocks also delivered improvements to the estate's appearance, and the business case made a prominent feature of the job creation opportunities it could deliver for the borough.

The scheme's budget includes some ECO funding, but is not dependent on it, nor is the project designed around what it will fund. This proved to be a strength when 2014 changes to ECO reduced its contribution to the project from £750,000 to a maximum of £300,000.

In 2013-14 the Holly Park estate, with over four hundred units, had external wall insulation installed. Although disruptive to residents, Islington invested in engagement, ensuring that residents understood the benefits of the work. It's now paying dividends, with tenant's energy bills falling by one third since the insulation was installed.

The project will continue into 2015, when three tower blocks will be retrofitted, as well a number of lower rise homes. Any remaining 'F' and 'G' rated boilers will be replaced, and two combined heat and power schemes are also being retrofitted to provide heating for the estate.<sup>17</sup>

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## Case study 2

### A long term vision for retrofit in Portsmouth

**Tower block retrofit in Portsmouth demonstrates the value of having a long term vision when undertaking retrofit, and the range of benefits that it can deliver.**



**For Portsmouth City Council, the maintenance costs were becoming prohibitive, so doing nothing was not an option**

Wilmcote House in Portsmouth is made up of three connected blocks, each 11 storeys high. Its retrofit will meet high environmental standards, deliver significant reductions in energy bills and offer benefits across a wide range of local authority priorities.

Built in 1968, Wilmcote House has many of the problems common to blocks from that period. It requires extensive repairs to its concrete fabric, a new roof and new windows. Residents' energy bills are very high due to the use of an electric heating system. To reduce heating costs, a third of residents routinely don't heat their bedrooms, and 80 per cent of living rooms fail to reach the indoor temperatures recommended by the World Health Organisation. Additionally, a third of the flats suffer from condensation.

For Portsmouth City Council, the maintenance costs were becoming prohibitive, so doing nothing was not an option. Demolition was considered, but most of the blocks are made up of three bedroom homes. These are in very short supply locally, and the council does not have the capacity to rehouse residents elsewhere during a demolition and rebuild.

The council has embarked upon an ambitious retrofit programme at a cost of £12 million. It includes repair to the building fabric, external wall insulation, triple glazed windows and the enclosure of external walkways. The latter feature will provide each home with some additional living



space. A new entrance will also be provided and outside areas will be re-landscaped. The plans have been subject to extensive resident consultation, with almost all residents in favour of them.

The retrofit has secured political support by demonstrating the benefits it will deliver against the following priorities:

- . reduce crime and the fear of crime;
- . increase availability, affordability and quality of housing;
- . protect and support the most vulnerable residents;
- . improve efficiency and encourage involvement;
- . regenerate the city;
- . a cleaner and greener city.

**Energy bills are expected to fall by £750 per year, a massive 67 per cent reduction in costs**

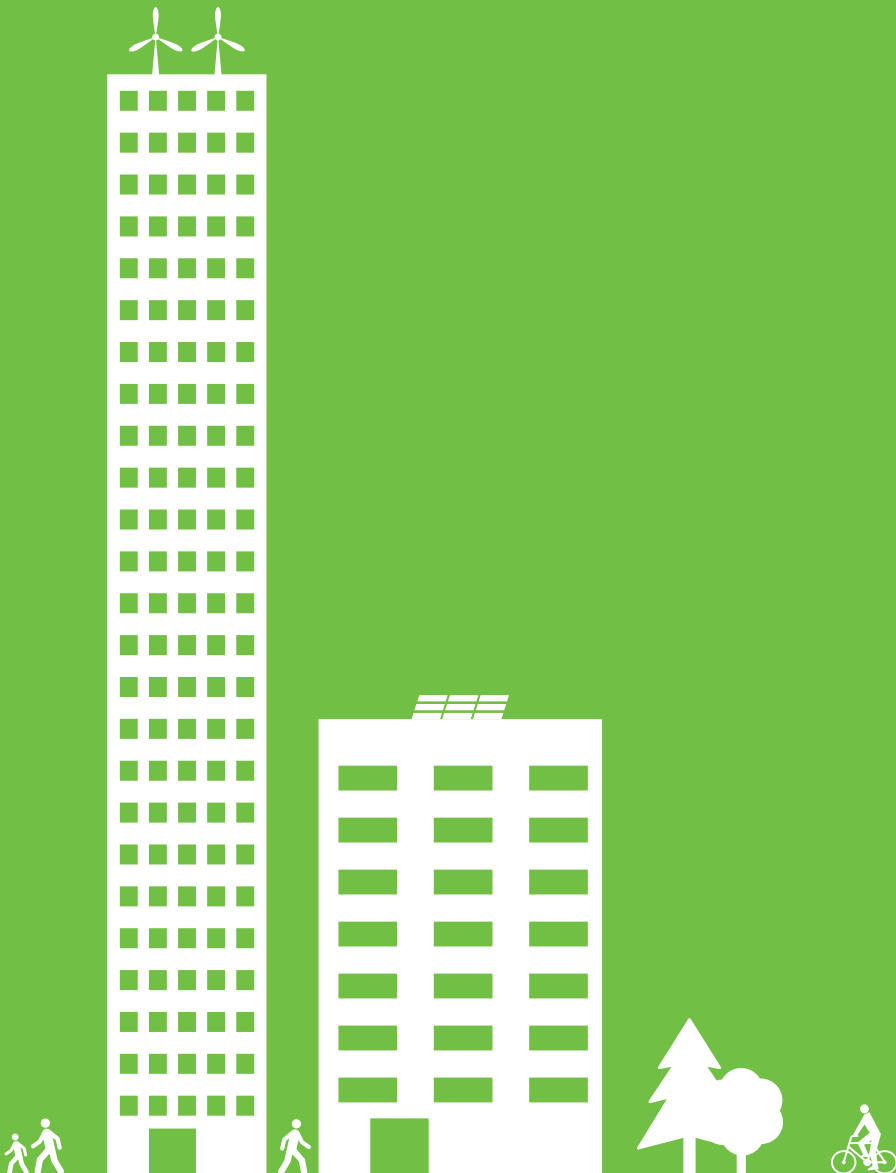
For residents, the overall improvements to the quality of their housing will be substantial and will hopefully deliver better health and quality of life. More critically, average energy bills are expected to fall by £750 per year, a massive 67 per cent reduction in costs.

Portsmouth City Council's long term vision is worth noting. It made the decision to go for a scheme that will reach a stretching environmental standard called EnerPhit, rather than simply meeting current building regulations. This has added £1 million to the cost, but it will save £87,000 per year in running costs, compared to a refurbishment to the current building regulation standards.<sup>18</sup>



# 5

## Two opportunities for maximising potential





Any tower block retrofit should be designed with its unique characteristics in mind. But smart meters and district heating are two developments on the horizon with relevance to tower blocks and they are worth considering in detail.

### Smart meter ready tower blocks

The smart meter roll-out has begun and the majority of customers will receive them between 2016 and 2020. In-home display units and other tools will provide householders with a more sophisticated overview of their energy usage, helping them to identify where savings can be made and enabling reductions in both energy bills and emissions.

The government has a lot riding on the roll-out. Consumers are paying for it via their energy bills, so the programme is under pressure to deliver the expected energy use and bill reductions. Tower blocks offer a unique canvas on which to demonstrate the value of smart meters to customers struggling with energy bills, and to increase public acceptability, as communities see and talk about the benefits. But they are currently at risk of missing out altogether or, at best, having to wait at the back of the installation queue.

**“There is a tipping point with large buildings like tower blocks where a shared solution will be more effective.”**  
**Central government**

Government research has highlighted that smart meter communications equipment will not work in up to 30 per cent of homes.<sup>19</sup> An additional communications approach, currently in development, will extend coverage to 95 per cent. But tower blocks are frequently cited as an example of housing where coverage will be problematic.<sup>20</sup> In practice, this means that smart meters in tower blocks will be unable to ‘talk’ to the in-home displays critical to helping consumers make more informed choices about energy use. It will also leave customers using pay as you go meters at risk of being cut off, if payment updates are not communicated to meters quickly enough. As high rise residents are more likely to be social tenants with high energy bills, it is essential to overcome these obstacles to smart meter installation in tower blocks.

The government has recognised the challenges that tower blocks and other multi-dwelling units present to smart meters. Although the roll-out is supplier led, communal options that upgrade all residences at once will be more effective in tower blocks. A government working group is exploring options that could enable this. Among them, technology providers could take a lead in communicating with energy companies that supply a block, to get buy-in to a shared solution. A single energy company could take the lead and work with other suppliers to the block, or they could work collectively on a solution. Energy companies want to see a cost effective solution developed, but tower blocks are likely to be neglected by the roll-out until an approach is agreed upon.

Some stakeholders worry that installing smart meters in complex environments like tower blocks will ultimately be deemed unviable and residents will miss out altogether. But tower block specific options have been developed and trialled, as we show in the example below. Additional trials are necessary to test different approaches and many are in the planning phase.

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### **A smart ‘backbone’**



Siemens has developed a solution to putting smart meters in tower blocks, by creating a communications ‘backbone’. It uses the landlord supply wires in a block as its skeleton, which run features such as the communal lighting and work even in a power cut. This is complemented by a central building control centre and ‘zigbee bridges’

throughout a block. These work alongside newly installed smart meters and in-home devices, such as display units or smart pay as you go meters. Zigbee is a radio technology that all smart meters are mandated to work with. The zigbee bridges detect information that smart meters are trying to send and transfer it to a central building control centre. It can then identify which in-home device the information is intended for and the zigbee bridges pass it on using existing power lines.

The approach overcomes the problem of smart meters being in a tower block basement or too far from the in-home displays that they need to communicate with. The backbone approach also avoids some of the challenges that tower block construction presents, such as steel reinforced concrete floors and metal meter rooms, which block radio signals. As well as technical benefits, a single upgrade for all residents at once also allows for more effective consumer and resident engagement.

At present, Siemens has worked with Poplar HARCA to trial their approach in a six storey tower block and other housing associations are also exploring it.<sup>21</sup>

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### Tower blocks as lynchpins for district heating

District heating is growing in profile. By harnessing heat that is otherwise wasted or by generating and distributing it more efficiently, it has the potential to address rising heating bills, reduce fuel poverty and bring down carbon emissions. There are 2,000 heat networks in the UK supplying heat to 210,000 homes and 1,700 commercial and public buildings.<sup>22</sup> The government hopes this will grow. Fourteen per cent of the UK's heat demand could be met by district heating networks by 2030 and 40 per cent by 2050.<sup>23</sup> London alone has committed to generating 25 per cent of the city's energy requirement through local decentralised energy by 2025.<sup>24</sup>

Tower blocks have potentially prominent roles in district heating. A cost effective network requires high building and heat density and diversity of heat demand. Tower blocks offer all of these. Diversity and constant heat demand tends to be built-in across a network by including offices, housing and leisure facilities, all of which have peaks in demand at different times. But tower blocks offer diversity and a reliable density of heat demand within a single building due to the mix of residents and their heating use across the day. For this reason, tower blocks are appropriate for communal heating systems that supply a whole building, as well as being good lynchpins for district heating networks.

**“The primary driver for local authorities on district heating is a mix. For each project focused on fuel poverty and security of supply there is someone looking at jobs and growth and creating a low carbon economy.”**  
**Central government**

They are also structurally well suited for inclusion in a district heating network. They generally have vents rising through a block which can be used by the heating system. And flats will have the same layouts, which makes it straightforward to connect them to a system, compared to connecting individual homes with varied layouts. In terms of improving energy efficiency and tackling fuel poverty, the efficiency and carbon saving gains of switching tower blocks to district heating are also significant and should be maximised. Tower blocks tend to be using inefficient electric heating, so a switch to district heating offers a 40 per cent efficiency saving. In comparison, a switch from individual gas boilers to district heating only offers an efficiency saving of around ten per cent.<sup>25</sup>

To encourage further development, the government is supporting local authorities to explore the potential for district heating. A number are interested, as it could help their efforts to pursue low carbon energy, tackle fuel poverty, create jobs and increase energy security. Local authorities are key actors, as many of them manage large premises, such as schools or leisure centres, that have high heat demand and are needed to anchor networks, as well as housing such as tower blocks. Local authorities are also responsible for the planning issues that a new or extended network will need to navigate and are well placed to energy master plan for an area and establish the feasibility of a network.

Despite the potential, local authorities face considerable challenges in developing heat networks. Many lack the expertise needed to undertake feasibility studies and to identify how a network can reach commercial viability. Procuring this expertise is expensive and funding has not been readily available. In response, the government has set up a Heat Networks Delivery Unit (HNDU). It has provided funding to support authorities in undertaking feasibility studies and developing business plans to attract commercial investment. So far 91 local authorities have benefited from grants of £10,000 to £250,000.<sup>26</sup> A similar body was already in place in London, supporting the majority of boroughs in developing projects.

## Recommendations

### Smart meters

Local authorities and housing associations should ensure that tower blocks do not miss out on the environmental and energy bill benefits of smart meters. They can help to secure smart upgrades by:

- allowing access to their tower blocks for trials;
- liaising with organisations delivering smart upgrades, for example by providing information about which energy companies supply a block;
- leading community engagement about smart meters;
- initiating a smart upgrade by communicating with the organisations delivering them.

### District heating

All local authorities should undertake energy opportunity mapping and develop planning policies that incentivise approaches such as district heating. As heat networks develop:

- local authorities should capitalise on the specific advantages that tower blocks offer to strengthen heat networks, reduce emissions and enable residents to benefit from significantly reduced energy bills;
- those managing tower blocks should proactively identify district heating plans in development, highlighting a block's potential fit and ensuring that opportunities do not get missed.

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## Heating Aberdeen

Aberdeen City Council's development of a district heating network was driven by its affordable warmth strategy. The strategy required a focus on the most inefficient homes, aiming to alleviate unmanageably high heating bills for residents. The city's 59 tower blocks proved to be the worst offenders.



The first step focused on a cluster of four tower blocks, each with 19 storeys and a total of 288 flats. The council explored different heating system options, as well as considering whether to install external wall insulation.

Analysis concluded that a gas fired combined heat and power (CHP) network and insulating the blocks would deliver the lowest heating cost for residents. But the insulation cost considerably more to install and only delivered an additional benefit to resident's bills of 47p per week, compared to installing a CHP

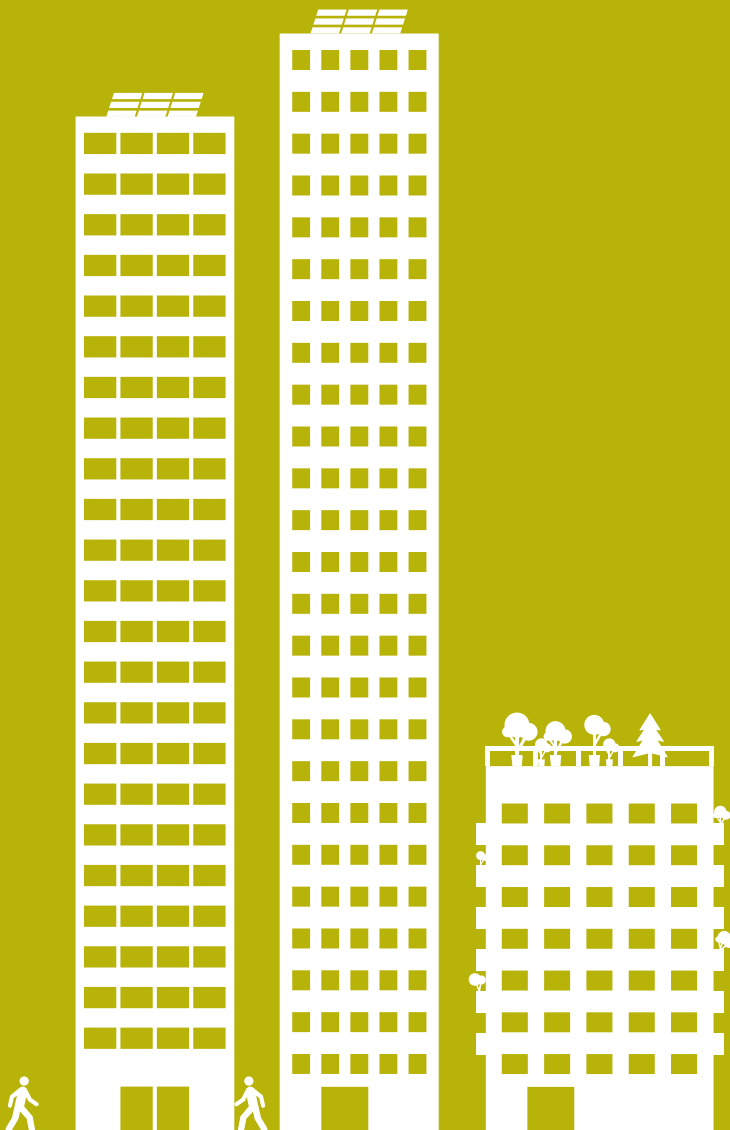
network alone. Insulation was therefore not seen as cost effective by the council and the decision was made to develop district heating on its own.

The project cost £1.6 million in total. A not for profit called Aberdeen Heat and Power Ltd was set up to deliver and run the network, with the core objective of relieving fuel poverty. £730,000 of the capital costs were secured from the community energy programme.<sup>27</sup> Additional funds of up to £1 million were secured by borrowing, based on the income that the network would produce.

Aberdeen has continued to develop the network. Once completed it will have 2,500 flats and 14 public buildings connected to it. The network delivers a 45 per cent reduction in CO<sub>2</sub> emissions and a 40 per cent reduction in heating costs for residents. Residents report that they are happier with their accommodation and there has been a noticeable reduction in void flats, as the blocks are once more seen as desirable places to live.<sup>28</sup>

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# 6 Conclusion



Unless tower blocks are improved, they will continue to be more and more out of step with the cities that surround them, as they strive for sustainable, low carbon futures. After weathering the uncertainty caused by changes to the ECO scheme, local authorities and housing associations are now well placed to share ideas and to think about how they can take tower block retrofits forward.

Retrofitting tower blocks is undeniably complex. But with maintenance costs and energy bills increasing, quality of life declining and the need to reduce emissions, it is clear that action is needed. The examples shared in this report demonstrate what is possible, and the ways that business cases for tower block retrofit can be strengthened by reflecting the wider benefits that they can deliver.

Those responsible for tower blocks should explore the opportunities of smart meters and district heating. And the five principles we have outlined for planning tower block retrofit incorporate good practice from the growing experience of those local authorities and housing associations already transforming their estates.

As cities and towns consider the promise of devolution, they should be ambitious in their pursuit of a low carbon future. But the environmental and social challenges presented by existing housing will not go away. With tower blocks dominating many urban skylines, it is essential that they have a role in a city's future, as well as its past.

## Appendix: stakeholder input

### **We are grateful to the following organisations for contributing their time and expertise to this work:**

Aberdeen Heat and Power  
AgilityEco  
Amber Infrastructure  
Birmingham City Council  
Bromley by Bow Centre  
Carillion  
CityWest Homes  
Combined Heat and Power Association (CHPA)  
Department of Energy and Climate Change  
ECD Architects Limited  
ENER-G  
Haringey Council  
Institute for Sustainability  
Islington Council  
Knowledge Transfer Network (London)  
Tower Hamlets Council  
London Climate Change Partnership  
The London School of Economics and Political Science  
National Housing Federation  
Pellings  
Poplar HARCA  
REHAU Ltd  
Rockwool  
SE<sup>2</sup>  
Siemens  
Sustainable Homes  
SW Energy  
Tower Hamlets Homes  
Urban Life  
wpd Scotland



# Endnotes

- <sup>1</sup> M Bloomberg and C40 Cities, 2014, *Advancing climate ambition: cities as partners in global climate action*, a report to the UN secretary-general from the UN secretary general's special envoy for cities and climate change, in partnership with the C40 Cities Climate Leadership Group
- <sup>2</sup> Department of Energy and Climate Change, 2013, 'Government response to the consultation on the second version of the smart metering equipment technical specifications, part 1', Smart metering implementation programme
- <sup>3</sup> National Audit Office, 2013, 'Update on preparations for smart metering', report by the comptroller and auditor general
- <sup>4</sup> Department of Energy and Climate Change, press release, 3 October 2014, '£9.4 million to boost low carbon heating'
- <sup>5</sup> Manchester target: from AGMA, 2011, *The Greater Manchester climate strategy 2011-2020: transformation, adaptation and competitive advantage*; Leeds target: from Leeds City Region, 2010, *Proposal: a Leeds city region deal*; UK target: from HM Government, 2009, *The Climate Change Act 2008 (2020 Target, Credit Limit and Definitions) Order 2009*
- <sup>6</sup> M Bloomberg and C40 Cities, 2014, *Advancing climate ambition: cities as partners in global climate action*, a report to the UN secretary general from the UN secretary general's special envoy for cities and climate change, in partnership with the C40 Cities Climate Leadership Group
- <sup>7</sup> Presentation by Richard Ferarro, ECD architects, to the Green Sky Thinking event in London 28 April 2014, 'High rise retrofit 1989-2014, mapping a sustainable approach'
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- <sup>10</sup> HM Treasury, 5 December 2013, Chancellor George Osborne's Autumn Statement 2013 speech
- <sup>11</sup> Stakeholder interview
- <sup>12</sup> Stakeholder interview
- <sup>13</sup> Stakeholder interview
- <sup>14</sup> K Crawford et al, 2014, *Demolition or refurbishment of social housing? A review of the evidence*, UCL Urban Lab and Engineering Exchange for Just Space and the London Tenants Federation
- <sup>15</sup> Ibid
- <sup>16</sup> Source: [www.islington.gov.uk/services/parks-environment/sustainability/sus\\_athome/energy\\_at\\_home/Pages/affordable\\_warmth.aspx](http://www.islington.gov.uk/services/parks-environment/sustainability/sus_athome/energy_at_home/Pages/affordable_warmth.aspx)
- <sup>17</sup> Facts are from a stakeholder interview with Bryony Willet, housing business plan manager, Islington Council, on 25 September 2014
- <sup>18</sup> Case study facts are drawn from conversation with ECD architects, who designed the retrofit, and a presentation by Nick Newman from ECD architects at a Green Sky Thinking event in London, 28 April 2014, 'What can be achieved by refurbishing high rise housing to Passivhaus standards'
- <sup>19</sup> Department of Energy and Climate Change, 2013, 'Government response to the consultation on the second version of the smart metering equipment technical specifications, part 1', Smart metering implementation programme
- <sup>20</sup> National Audit Office, 2013, 'Update on preparations for smart metering', report by the comptroller and auditor general
- <sup>21</sup> Details are from stakeholder interview with Steve Rafferty, Siemens, on 7 July 2014
- <sup>22</sup> Department of Energy and Climate Change, press release, 3 October 2014, '£9.4 million to boost low carbon heating'
- <sup>23</sup> Ibid
- <sup>24</sup> [www.londonheatmap.org.uk/Content/home.aspx](http://www.londonheatmap.org.uk/Content/home.aspx)
- <sup>25</sup> Stakeholder interview
- <sup>26</sup> [www.gov.uk/government/publications/heat-networks-funding-stream-application-and-guidance-pack](http://www.gov.uk/government/publications/heat-networks-funding-stream-application-and-guidance-pack)
- <sup>27</sup> A government programme supporting community heating that ran from 2001-04
- <sup>28</sup> Details from stakeholder input from Michael King, Aberdeen Heat and Power, via email

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#### Image credits

p8 Institute for Sustainability

p15 ECD Architects

p19 Lawtech Ltd

p20 ECD Architects

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p24 Siemens

p27 Aberdeen Heat and Power Company Ltd



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