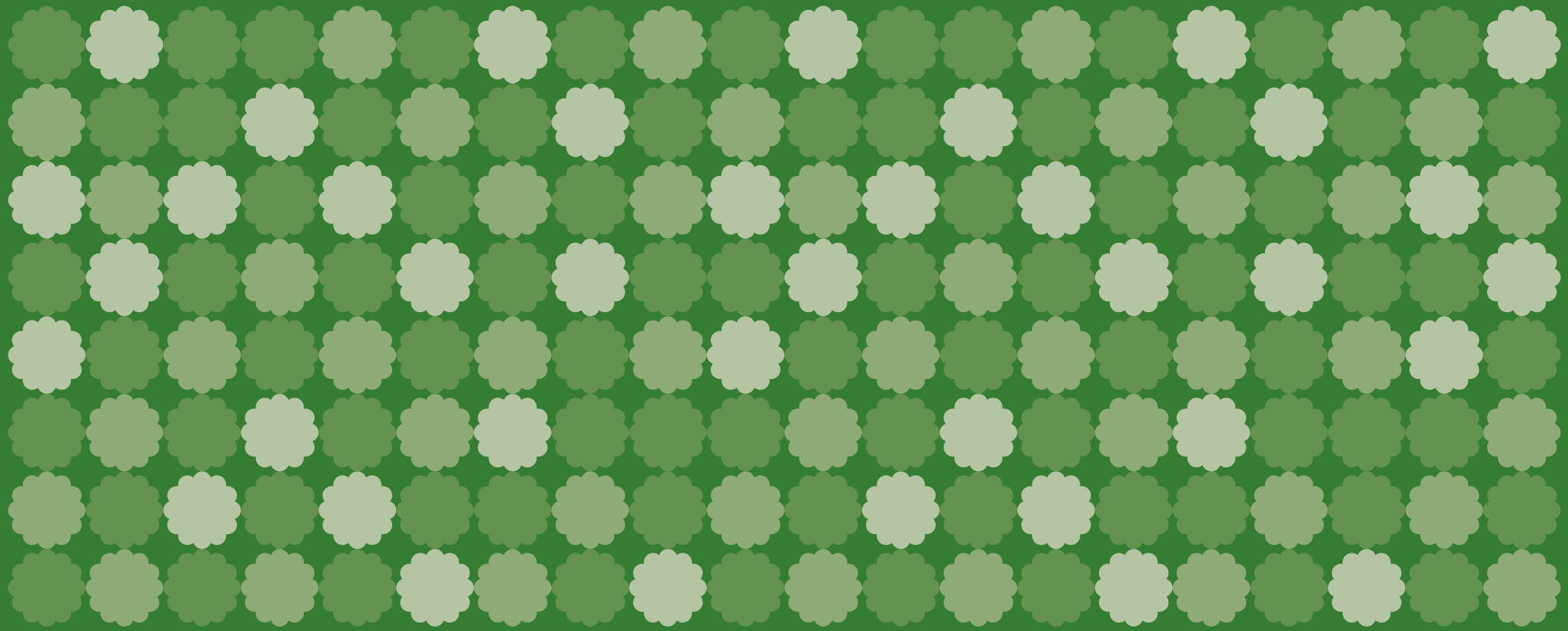
GREATER MANCHESTER
DOING THINGS DIFFERENTLY

retrofitGM

Accelerating the Renovation of Greater Manchester's Buildings

Enter

Foreword



Reducing the carbon emissions resulting from how we heat our buildings is a key priority for all of us and intrinsic to delivering our target of carbon neutrality by 2038. We established the Greater Manchester Retrofit Task Force in July 2021 to help tackle Greater Manchester's urgent retrofitting challenge. The Task Force brings together industry, academia, NGOs and the public sector to set out a detailed plan for Greater Manchester, as the UK's leading green city region, to take a global lead on retrofitting. This retrofitGM report is their first detailed Action Plan covering the next three years.

We are not starting with a blank page. This year alone we're investing £27m into our Green Homes Grant for residents to renovate fuel-poor homes bringing more people out of fuel poverty thanks to better insulated homes with modern, environmentally friendly heating systems that are lower carbon. We are also investing £78m in renovation and low carbon energy generation for over 150 public buildings this year including: leisure centres, schools and offices as well as investigating new financial products e.g. Carbon Bonds to make it easier and fairer for people to transition to net zero carbon. A new Retrofit Skills Hub has also been established, offering courses to 1,140 people to upskill into green jobs and training to get more people working on renovation projects. We are also introducing policies that will ensure all new homes will be net zero carbon by 2028.

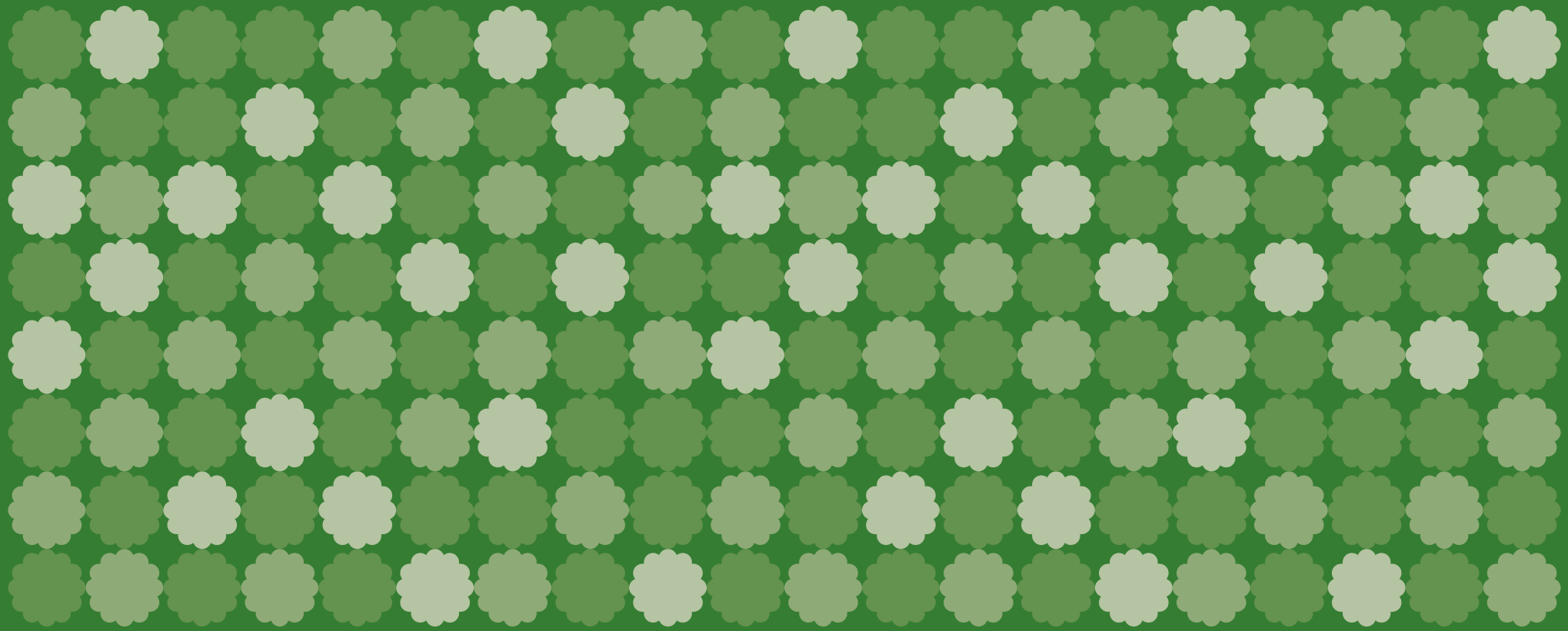
Whilst this is a great start, there are over 880,000 homes, 2700 public buildings and as yet unknown number of commercial buildings that will need some form of renovation by 2038. To reach these sorts of numbers, we will need to employ innovative finance solutions to significantly scale up our activities, building the skills and jobs needed to grow the supply chain in the process. If we receive the support we have requested from Government, over the next three years we will renovate 300 schools and other public buildings as well as over 12,000 homes, unlocking £350m in investment from social landlords.

By taking the right action to tackle the climate crisis, we can address the housing crisis and create good quality skilled jobs by training people in skills in jobs for life in green industries, and deliver better, more energy-efficient homes that are cheaper to run. A greener economy in GM will create and secure over 256,000 jobs across all sectors in GM by 2038 with 90,000 in retrofit alone. These are high skilled, sustainable, secure jobs in emerging sectors.

Residents can benefit through fuel bills reducing by as much as £600 a year. Not only does this save money but reduces the risk of people needing health and social care due to the health risks posed from cold, poorly insulated homes. If you run a business, investment today will mean you have more revenue tomorrow. You'll have greater fuel security, be able to better plan and manage your variable costs and invest more of the money you make back into your business. Our children and wider families will benefit from over 1,000 new apprenticeships on offer in Greater Manchester linked to net zero; we'll also be upskilling 85,000 people currently in existing construction jobs, so they have job security and relevant skills. Our local public services will save money on the expensive energy bills that currently come from heating our hospitals, council buildings, care services and offices; that's savings that can be invested into our local public services.

By working together and doing things differently we can help address climate change, improve living standards and `level up' by embracing the new green industrial revolution.

Executive Summary



Climate Change is the biggest challenge we have ever faced; it needs action at all levels of society from global to the very local. The science is clear, we need to reduce our greenhouse gas emissions drastically and rapidly if we are to keep global temperatures within safe limits. For Greater Manchester, to meet our carbon neutral target by 2038 and not exhaust our carbon budget, we need to take immediate action. As a city region we have already used next year's carbon budget and, at our current rate of emissions, our entire budget will be gone in 6 years. Action is required on every source of greenhouse gas emission, but we need to prioritise the decarbonisation of heat, our second biggest source of carbon emissions (after transport). The largest single source of heat emissions is from our buildings, domestic properties in particular, so decarbonising the heating of our homes is critical.

By 2030, our headline objective is to have reached an average of 61,000 domestic retrofits a year, and all non-domestic buildings reaching an average of Energy Performance Certificate rating C or Display Energy Certificate B. It will be seven years before all new homes in GM will be designed to be net zero carbon. In the meantime, over three quarters of our existing homes (some 887,000) will need to be improved. These improvements necessarily include both increasing thermal efficiency and air tightness and moving to renewable energy. This could involve loft or wall insulation, new windows or doors or solar panels, making them less draughty and easier and cheaper to heat. Combined, this requires the development of an annual domestic renovation market worth between £610m-£830m a year. Our ambition is to create this market in such a way that it benefits GM's residents and business, creating opportunities for all.

The Opportunity in Numbers

To achieve our environmental goals, we need to:

Renovate **887,000** homes, of which 138,000 are in the Social Rented Sector

Renovate **700** Local Authority controlled schools

Renovate **2,700** Public Sector Buildings

Renovate every commercially let property which has an EPC of less than B by 2030

Upskill **80,000** existing construction workers

Shortfall of approximately **7,000-8,000** construction workers over the next 5 years

Create a GM renovation market of **£600m - £800m pa**

Install **210,000** ASHP in those properties which require no renovation action

This is a big step-change for a market which is still in its infancy, and which suffers from multiple market failures including: a lack of market demand; supply chain capacity and capability; a suitably skilled workforce and the financial products needed to fund the measures.

Tackling the multiple market failures which exist will require a systemic approach. We need every organisation with a stake in renovation (inc. suppliers, training providers, banks and other lending providers, and potential customers themselves) to work together. Only then will we be able to ensure the necessary confidence to release the investments required to create a suitably skilled workforce.

What is the opportunity?

While the renovation challenge we face is large, complex and multifaceted, so are the benefits we will realise by meeting it. These benefits are not limited to environmental gains; the retrofitting of GM buildings will result in a step change in the way we live and work, bringing with it a suite of benefits ranging from direct economic gain, through to health and wellbeing improvements and a more skilled and resilient workforce. Done correctly, it will ensure that no one is left behind, that those people and businesses who are most vulnerable benefit the most and our resilience to future climate change shocks is strengthened.

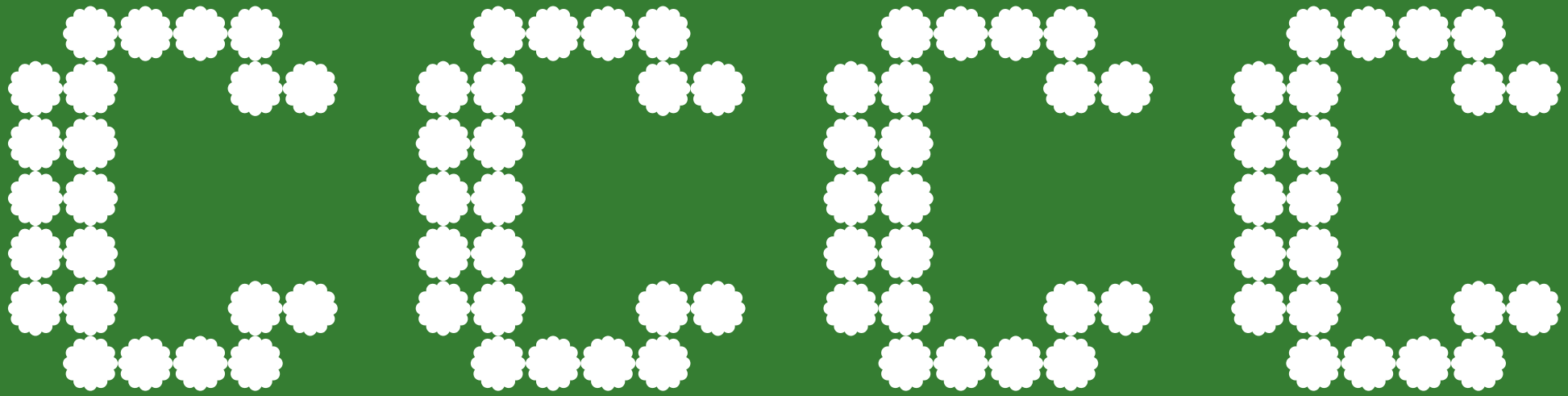
This is not about paying today for gains at some unspecified point in the future, there are opportunities today which can be realised immediately, such as:

- installing 210,000 Air Source Heat Pumps into those properties which are suitable and don't need to be retrofitted, a £1.2bn market for local companies.

- responding to the 31% of GM owner occupiers who want to renovate their homes in the next 5 years, a £3-5bn opportunity.

The scale of the renovation task means that not only will retrofitting our buildings help address some of the biggest socio-economic challenges we face as a city region, but also ensure a fair and just transition to a net zero carbon society.

Renovation is about the four C's



Comfort

a more constant, controllable temperature throughout the home with no draughts

Carbon

significantly lower carbon emissions

Coughs

better health and wellbeing through improved internal air quality and eliminating damp and mould costs

Costs

reduce long term energy costs and price volatility

Decarbonising the heating of buildings is critical to achieving not only our environmental targets, but it can also realise many wider benefits whether it's improved health, equality, economic inclusion, or alleviation of fuel poverty. 157,000 Greater Manchester households (15% of homes) are currently in fuel poverty. In addition, reducing carbon emissions reduces the risks from future energy price shocks and energy supply constraints. We therefore need to cease basing our assessment of investment potential purely on the energy savings of retrofit, which can act as a deterrent for investment, instead recognising and capturing the wider policy benefits.

Priority area 1: Boosting skills

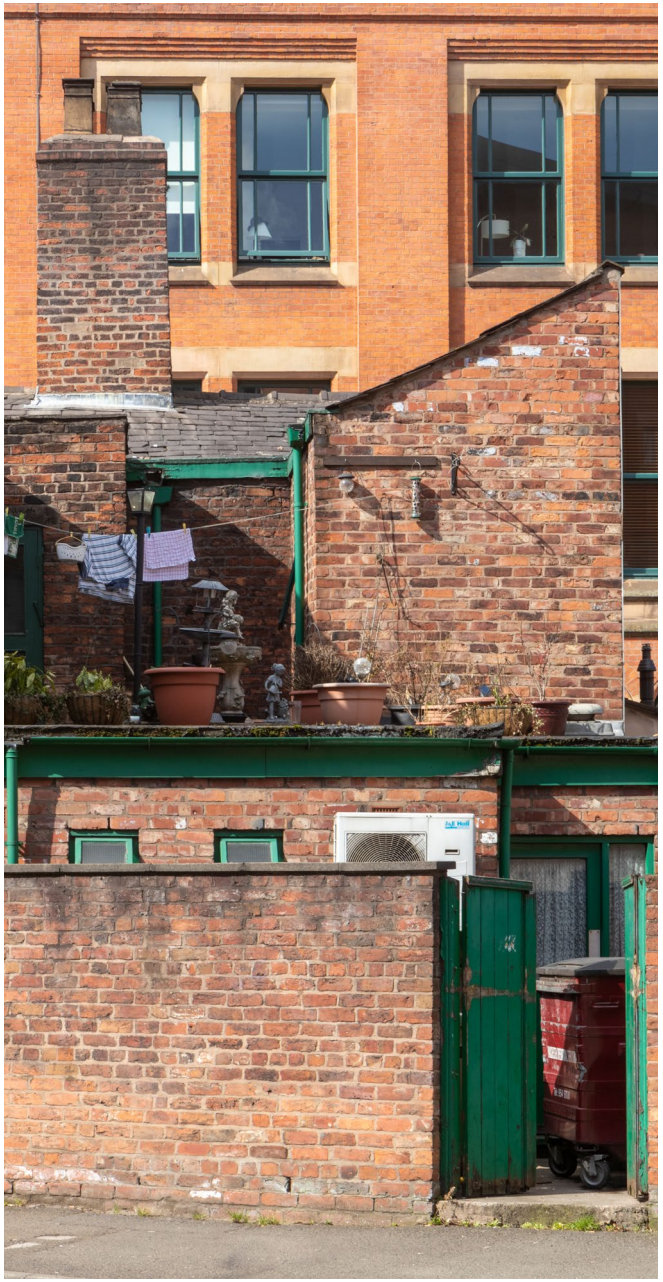
While retrofit generally does not require new trades, it creates a clear opportunity to upskill and retrain existing tradespeople within the construction sector to meet the expected future demand. Our current training programme indicates that 60% of trainees are existing tradespeople and 40% new to the sector across GM. The sector sees around 1,000 apprentices and 3,000 Further Education learners completing Construction programmes every year. This needs to increase, with young people learning about the sector on systems like GM Apprentices and Careers Service. This will require employers to provide entry-level opportunities to young people across the wider sector, as there is an existing shortfall of approximately 5,000 workers, largely due to an ageing workforce and Brexit.

Curriculum changes are needed in existing apprenticeships. Work is ongoing to explore how the region can best make use of the "Shared Apprenticeship Scheme" – a popular programme in project-based sectors like Construction. Increasing the number of enrolments onto entry level (L2 and L3) apprenticeships is critical to the success of retrofitting in GM. In addition to craft trades, there is a need for higher level skills such as Retrofit assessors and coordinators, as well as degree level apprenticeships. High level skills delivered by universities need greater emphasis too, with retrofit requiring a system change in architecture, civil engineering and design. There is a broad spectrum of apprenticeships and higher/degree level qualifications which will need to address the changes happening around building retrofit and the role their profession needs to take. The Plan sets out how we will support these transitions in our education system.

Priority area 2: Improving access to funding and finance

To enable this suitably skilled and scaled market to emerge, we need those who can 'move early' to lead by example, whether in the public, private or third sector. They need to use the powers they have to enable and support building renovation within all tenures.

Whilst some renovation activity is already happening, it is mainly in the worst performing properties, as this is where the government funding is currently targeted to realise wider social objectives. While socially desirable, and equitable, this approach excludes 75% of the homes that need to be improved in GM. Grant funded programmes are essential to stimulate the market but will not deliver the speed or scale of activity required. We need to create the conditions which allow more market-based delivery and finance mechanisms to be developed: things like local climate bonds, property-linked financial products, green rental agreements, and green mortgages. Such mechanisms will need to support 'middle income' households who may not be eligible for larger grants but are unable to fund the difference themselves. Positioned correctly this is an opportunity to attract patient institutional investors which could reduce the cost of finance significantly. The Plan sets out how we will investigate the feasibility of deploying such funds.



Priority area 3: Speeding up delivery

Through the Greater Manchester Spatial Framework, standards for new buildings and developments will be set, but we still need to increase renewable energy generation and low carbon heating in existing homes and buildings. To achieve this, residents, businesses and stakeholders will need support to help make the right decisions, making sure everyone can benefit from these changes to ensure a fair and just transition.

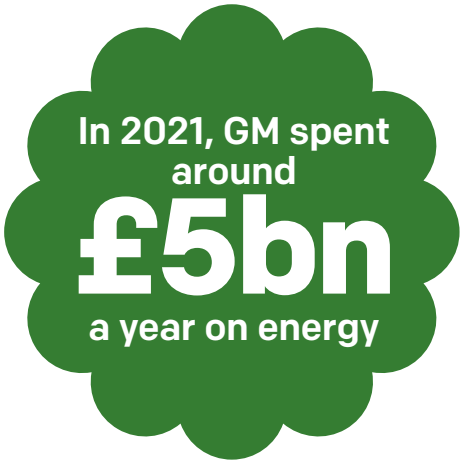
GMCA is taking an active 'market-making' role to help drive up renovation activity. We are developing a traded service which will assess homes and provide customers with a customised 'retrofit plan' – giving them confidence about what needs to be done, in what order, and how it could be paid for. This will particularly focus on the 31% of GM homeowners who we know are willing to undertake some form of retrofit in the next 5 years with the right assurances and support. This is in addition to existing plans to invest in retrofitting 7,200 socially rented properties and other commercial, public, and academic building renovation schemes.

The retrofitting of buildings and the associated transition to the electrification of heat, will increase the demand for electricity, which is already increasing due to our move to electric vehicles

The GMCA has been working closely with our local Distribution Network Operator, Electricity North West (ENWL) to ensure they are fully aware of this plan, and have incorporated the actions they need to undertake to support its realisation into their Business Plan, which they have submitted to the regulator Ofgem for approval.

Currently, GM spends around £5bn a year on energy, with most of the money leaving the city region. This financial outflow will increase unless we seize the opportunity to meet this energy demand through local onsite generation, which has multiple benefits, including:

- reducing the ongoing cost of heating the building;
- reducing exposure to future energy price shocks;
- reducing the need to reinforce the electricity grid (which has embedded carbon); and
- reducing unemployment by generating local high skilled jobs.



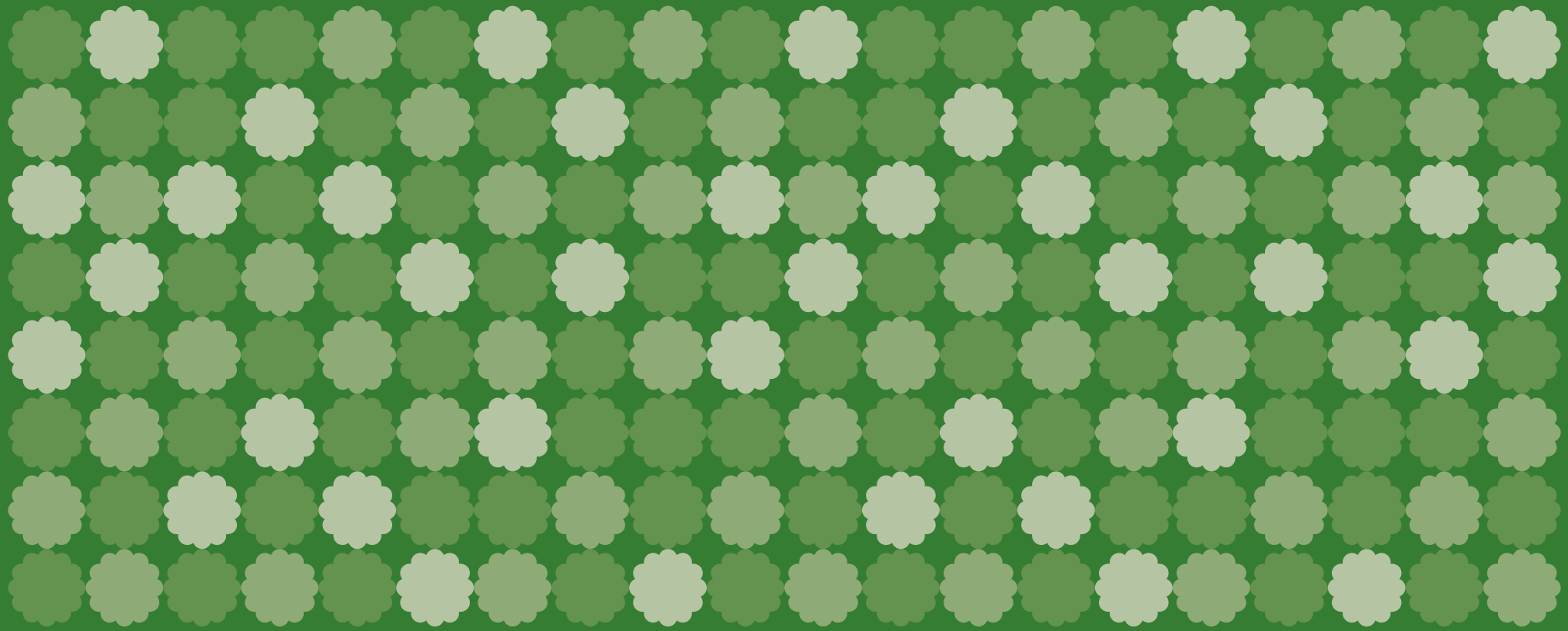
The Plan sets out our proposals for accelerating retrofit and local energy generation, utilising public grants, where available, enhanced by private finance products and upscaling the market offer for those who are `able to pay'.

An Implementation Plan is provided in Annex1.

Ensuring we have the electricity we need.

ENWL has included investment within its RIIO-ED2 regulatory business plan covering 2023 – 2028, to fund the provision of enhanced electricity network capacity to enable the regions decarbonisation plans. This business plan has been developed through extensive engagement and consultation with the region's local authority planning teams. For GMCA this joint planning has included all aspects of potential heat networks, renewable energy generation, electric transport and electric heat to ensure alignment of the electrical infrastructure plans and the GMCA development plans. ENWL carries out annual updates to its plans basing the outputs on local authority engagement, known developments, incentive funding and technology developments. The culmination of this is publish in ENWLs Distribution Future Energy Scenarios document every December. To ensure specific areas of the network are upgraded in step with GMCA plans, ENWL and the GMCA will continue to hold regular joint planning meetings including the ten Local Authorities. Upgrade works will be commissioned based on this joint planning process funded by ENWL.

Our Opportunity



This Plan sets out how Greater Manchester will move quickly to increase the speed and scale of retrofitting across the city region. This is as much an environmental imperative, as it is a social and economic opportunity. A sustained plan to renovate our buildings will create thousands of new, high-quality jobs and opportunities for existing tradespeople to diversify into sustainable careers, as well as making Greater Manchester a leading city-region for implementing low carbon technologies. It will also cut energy bills for some of our most vulnerable residents and improve health and wellbeing by improving the physical fabric of our homes.

This is our Greater Manchester approach to decarbonisation – delivering on our climate commitments through actions that also level up and improve people's lives. That's why our refreshed Greater Manchester Strategy puts the climate and equalities agendas at its heart. We are committing to viewing all our activities, priorities and plans through these lenses. Our goal of a carbon neutral GM by 2038 is a once-in-a-generation opportunity to deliver substantial carbon reductions, environmental and health benefits for our people, whilst also delivering our Local Industrial Strategy by creating new green industries and jobs that capitalise on our outstanding research assets and large low carbon goods and services sector.

For example, we want to deliver a London-style public transport system. This would improve the day-to-day experience of the network (with more frequent, reliable and cheaper transport connections) and decarbonise it (through electrifying the bus fleet). The result is a better public transport system that gets people out of their cars and cuts congestion and carbon. But it also connects people to the better opportunities our city region has to offer – widening the jobs market and helping young people go to the college of their choice not the college they can reach.

Our business, universities and other partners are also coming together to form the 'Innovation Greater Manchester' partnership. This is a plan to leverage and accelerate the success of Greater Manchester's existing research and development (R&D) hubs in global frontier sectors, including advanced materials and manufacturing and clean growth, and drive more commercialisation and application of innovation. This partnership will deliver the aims of our Local Industrial Strategy by translating GM's scientific excellence into productivity gains, economic growth and everyday innovations that will drive down the cost of decarbonising. We're also providing support through 'Bee Net Zero' to help businesses who want to decarbonise, have created a new Energy Innovation Agency and have launched the UK's first City Region Mission for carbon neutral living in GM by 2038.

With the right action, we can decarbonise our economy and improve people's lives with better homes, better jobs and better public transport.

At around 3,560kt CO_2e per annum, the carbon emissions associated with heating our buildings are the second largest source of the region's greenhouse gas emissions (after transport). We need to urgently address this if we are to meet our 2038 carbon neutral target, and more importantly stay within our carbon budget. The actions needed to achieve this target will also help to address wider GM socioeconomic objectives related to equality, inclusion, fuel poverty, health and wellbeing, and economic resilience. To reduce these carbon emissions, we need to heat our buildings with renewable energy, and to do this economically means we need to renovate them, so they are thermally more efficient.

What do we mean by retrofitting?

In this report, when we talk about 'retrofitting' we are talking about two main types of activity:

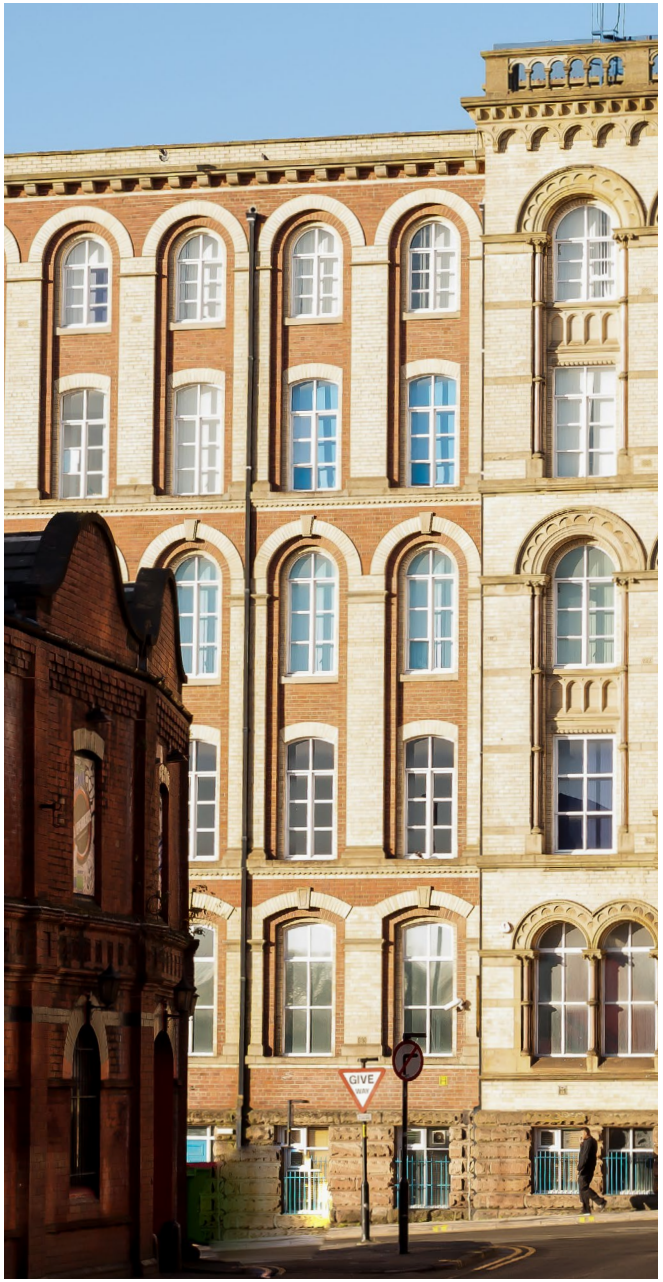
1

Improving thermal efficiency and air tightness. Most buildings in the UK have poor thermal efficiency. They 'leak' heat through poorly insulted roofs, walls and floors. This is inefficient and costly; it is also a barrier to moving to renewable sources of heat. Renewable heating systems (like heat pumps) operate most efficiently when generating heat at lower temperatures. If higher temperatures are required to heat a thermally inefficient home, this can increase running costs. This means action to improve the thermal efficiency of many existing buildings (through new doors, windows, draught exclusion and insulation) needs to happen before households can switch on mass to lower carbon heating systems that operate most efficiently and economically.

2

Shifting to renewable heating. This means replacing (mainly) gas boilers with low carbon alternatives, heat pumps and other systems which use renewable energy to generate heat as well as energy storage and smart controls. The retrofitting delivery covered by this plan includes 3 submarkets with distinct opportunities, challenges and policy.

The delivery of retrofit covered by this plan includes 3 submarkets with distinct opportunities, challenges and policy levers: domestic retrofit, public building retrofit, and commercial / industrial retrofit.



Challenges to scaling up retrofit

To hit our environmental targets, and wider policy objectives, retrofitting of buildings needs to happen rapidly and at scale. To do this we need to overcome several key challenges:

An underdeveloped market

The scale and speed at which we need to renovate of our buildings means the private sector and the market will need to play a central role, but the market is not currently fit for purpose. The market currently lacks capacity, capability, financial products and services, a skilled present and future workforce, and quality assurance. Once unlocked, it will be a powerful driver for place-based change. There are four key challenges preventing this being realised, namely:

- Poor economic incentives. Our national energy taxation policy disincentivises the switch to renewable heating, by taxing carbon intensive gas less than electricity. Whilst Government has stated it will address this, it is yet to give a quantified timeline for what is envisioned to be an incremental shift;
- Poor awareness. Most people do not know that we need to heat our homes, offices and schools differently. Those that do face a plethora of inaccurate information on the efficacy and cost of renewable heating;
- Poor availability of finance. Unlike most other building and domestic home improvements projects, retrofit measures are often viewed solely through the lens of payback. Unfortunately, this can be drawn out. The cost of retrofitting a property, including the installation a heat pump, can be between £10,000-£15,000, so most people will need to borrow money over a number of years and the interest charged can have a significant impact on the overall cost the retrofit. Long term patient (low interest) capital is needed, which recognises that the duration of the loan may well be longer than resident lives in the property; and
- A vicious cycle. Because such buyers are not well-informed, the consumer demand needed to fix the market is not present. This creates a vicious circle of poor demand driving poor supply, which needs to be broken.

The scale of the environmental challenge means action is needed across all building tenures, whether domestic, commercial and industrial, or public. But the barriers and drivers to decarbonising these different types of buildings are different and will require specific interventions. We need to sequence these interventions and start by targeting those sectors/individuals who already recognise the urgency we face. Doing this will create the necessary demand to stimulate the provision of skills and the enabling financial products and services. It is critical that this demand stimulation is mirrored by a commensurate increase in the capacity of the supply chain to meet this demand, otherwise there is a risk of inflated costs and poor quality.

An under-skilled workforce

As well as stimulating demand, we also need to develop a suitably skilled and scaled supply chain. Whilst this will create some new jobs, much of the work will be done by our existing workforce of tradespeople who will need to be upskilled. It is not clear at this stage where that balance will be and it is likely to change over time as the wider construction market follows its highly cyclic demand profile.

The Opportunity in Numbers

To achieve our environmental goals, we need to:

- Renovate 887,000 homes, of which 138,000 are in the Social Rented Sector
- Renovate 700 Local Authority controlled schools
- Renovate 2,700 Public Sector Buildings
- Renovate every commercially let property which has an EPC of less than B by 2030
- Upskill 80,000 existing construction workers
- Shortfall of approximately 7,000 – 8,000 construction workers over the next 5 years
- Create a GM renovation market of £600m - £800m pa
- Where needed, install 210,000 ASHP in those properties which are heat pump ready

It will be difficult to make this happen, because the construction sector has a strong pipeline of non-retrofit work. As long as this is the case, employers are unlikely to invest the time and resources needed to release staff to train in 'retrofit skills' on their own. As retrofit competes with more traditional projects for labour, we need to demonstrate a long-term pipeline to give employers, employees and colleges the confidence they need to enter the market. The market will also require employers to acquire new third-party accreditations such as Trustmark and Microgeneration Certification Scheme (MCS); which will cost time and money.

78%

reduction to carbon emissions by 2035

Under-developed infrastructure

The UK's legally binding commitment to a 78% reduction in carbon emissions by 2035 and to have less dependency on imported gas is driving the transition to the electrification of heat. This is happening in parallel with the move to electric vehicles, so significantly increasing the demand for electricity over the next 5 years. This will require a whole system approach to the energy challenge. By installing local renewable energy generation and storage it will be possible to generate long term revenue streams, reducing our risk to future energy price shocks and security of supply.

Where are we?

Greater Manchester is not currently on track to be carbon neutral by 2038. We have already 'used' next year's emissions budget and, at our current rate of emissions, our entire budget to 2100 will be 'spent' in 6 years. Whilst action is required on every source of greenhouse gas emission, we need to prioritise the decarbonisation of heat because it is our second biggest source of carbon emissions (after transport).

Although around a quarter of GM's homes could install renewable heating today, to make renewable heating affordable in the remining homes we need to reduce ongoing energy demand and cost by retrofitting them to increase the thermal efficiency so that less energy is needed to keep them warm. Where feasible, we also aim to generate more renewable energy on site as both actions reduce ongoing energy cost, offsetting the upfront capital investment needed.

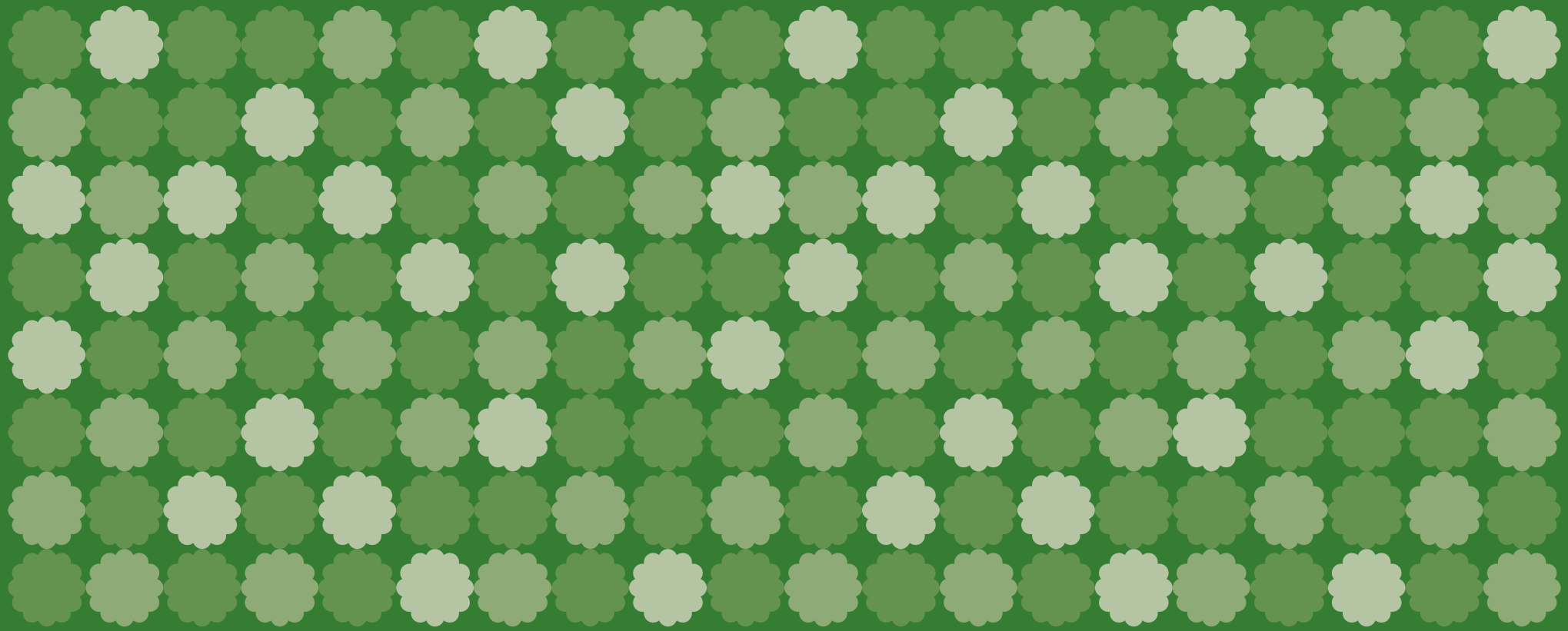
The current retrofit market is in its infancy and still suffers from multiple market failures which need to be simultaneously addressed if we are to stand any chance of achieving a fair transition to a zero-carbon society.

The current market will not deliver the number of retrofits which are needed, because:

- Most people do not know they need to heat their homes differently
- Changing heating systems is not a priority for most people and is often an emergency purchase. As such, little thought is given to the options available.
- Most people are unaware of what they can do to make renewable heating an affordable reality
- The current supply chain is too small, with many potential suppliers having a limited or an incorrect understanding of what can be achieved.
- Due to a lack of demand (volume and coordination), the unit costs are too high, and we are lacking a suitably sized and skilled workforce
- The current financial products are not well suited for long duration loans where benefits are split between present and future property owners or tenant landlord
- Due to the failings of past initiatives, the supply chain has limited confidence that the market will take off, so they are not prepared to invest in the new skills needed
- As there is very limited demand for 'retrofit skills' training providers are reluctant to invest or run course they are not confident they can fill Current policy, regulation and taxation does not send a strong enough message to create the changes needed.

As these challenges are all intrinsically linked, with overall progress constrained by any one of them, systemic intervention into the marketplace is required. The systemic nature of this intervention will also have wider implications, supporting the adoption of zero carbon technologies and renewable energy generation outside of building retrofit.

Why Act Now?



The UK housing market is on the cusp of a renovation revolution.

As we look to heat our homes and buildings with renewable energy, many of us will need to implement the upgrades needed to make our properties fit for the future. Left to market forces alone, only those with the necessary knowledge and resources will be able to benefit from this revolution. This will result in many people being left behind, especially those who find themselves in vulnerable circumstances, and so further entrench inequality. As more people move to renewable energy sources, or to generating their own energy, those left behind will face higher costs per household to maintain the electricity network.

Early public intervention is needed to catalyse the market, making it cheaper and easier to adopt these changes, and supporting a fair and just transition to zero carbon heating. This structured intervention will deliver multiple benefits to Greater Manchester residents and businesses including, for:

People: For residents' health, education, jobs, income, and prosperity.

Economy: Improving productivity via more effective use of resources (energy), and the potential to create of new jobs, industries and skills, as well as reduced pressures on public finances.

Environment: making a significant contribution to reducing CO_2 emissions.

Or as Red, one of GM's retrofit specialist companies puts it, it's all about the four C's

Comfort, Carbon, Coughs, and Cost

These benefits are outlined in more detail below.

Benefits for Greater Manchester's residents

Reducing energy demand by improving a home's fabric offers substantial economic benefits to the people living there. This is particularly important in Greater Manchester, where the number of people living in fuel poverty has risen every year for the last three years and currently stands at around 157,000 households (c.15% of all GM households). Reducing the proportion of income spent on energy positively impacts food poverty (tackling the infamous 'heat or eat' challenge). It can also improve household relationships (due to reduced financial stress) and health inequalities, (resulting in fewer GP visits). This in turn has implications for school attendance and attainment.

Retrofitting homes also delivers big health benefits. Cold or poorly ventilated homes are prone to damp and mould which can exacerbate existing respiratory conditions such as asthma or Chronic Obstructive Pulmonary Disease (COPD) and have a significant impact on mental health (increasing the risk of depression and anxiety by 50%). They can also double the risk of children getting asthma or bronchitis. Cold homes cost the NHS an estimated £600m-£2.5bn (depending on the method used), which is around 1.7% of total NHS spending (as of 2016/17 figures). Investing £1 in retrofit is estimated to save £0.42 in direct health costs alone. There is therefore the potential to make significant savings in public health costs by retrofitting homes.

Example: The Warm Homes Oldham Projects

The 2016 Warm Homes Oldham project was aimed at households with poor health due to fuel poverty. It found:[1]

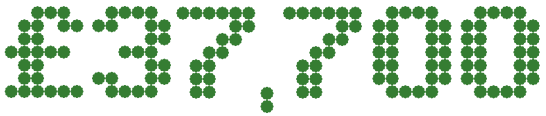
- 60 per cent of respondents with a physical health problem felt that the initiative had a positive impact on their health
- 80% reported that the project had a positive impact on their general health and wellbeing
- 96% of those who self-reported as being at 'high risk' of mental illness on completion of the General Health Questionnaire moved to 'low risk' following the initiative
- 96% of respondents agreed that their home was easier to heat because of their involvement in the project; and 84% agreed that they now spend less on their heating
- It was predicted that 75% of participants would move out of fuel poverty because of the initiative

Alongside these self-reported improvements in health and wellbeing, the project evaluation also tried to quantify the financial savings to the health system. For example, around 128 adults (of the 885 in the project) were estimated to have a Common Mental Disorder. Taking a conservative estimate of the benefits of the project (that the observed benefits had an immediate effect, but only lasted for one year) it found savings of around £45,000 in health costs (through a mix of reduced medication, counselling, GP and inpatient and outpatient costs).

The evaluation also calculated the employment, output and fiscal savings from impact on numbers of individuals with a CMD was also calculated. It found:

of extra GDP due to higher employment rates of extra

GDP due to reductions in sickness absence

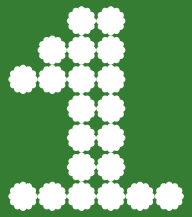


of fiscal savings to the public purse through reductions in benefit claims.

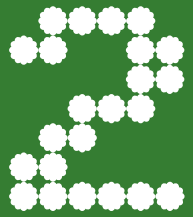
[1] 427 respondents from 176 householders took part, around one third of the participants, the report by Sheffield Hallam University states "From analysis of this dataset, the general picture is one of statistically significant change in almost all key change variables"

Benefits for Greater Manchester's economy

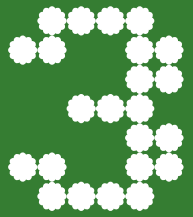
The benefits to GM's economy from retrofitting our buildings arise in four ways:



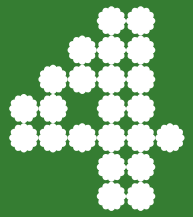
Reducing our collective £5bn energy bill, enabling GM residents and businesses to spend or invest some of this money in more productive ways (from individuals buying more food, to firms investing more in R&D and innovation) and keeping more of it in GM;



Supporting our foundational economy through the creation or securing the estimated 90,000 retrofit jobs required, and safeguarding thousands more roles, by growing the local renovation market;



Increasing our energy security both from future energy prices shocks and by providing more security of supply;

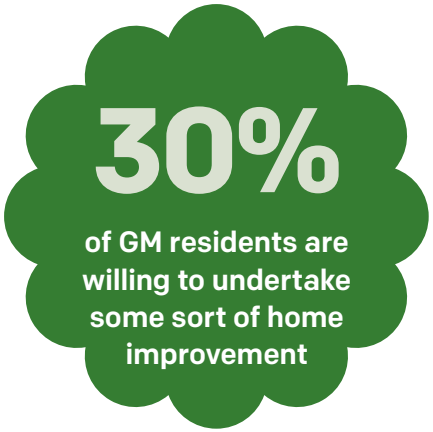


Delivering the ambitions in our Local Industrial Strategy to deliver the 2038 Mission for carbon neutral living in GM, and in doing so, create new green industries and jobs capitalising on Greater Manchester's research assets and large low carbon goods and services sector, which already includes 2,500 companies and employs over 45,000 people.

Foundational Economy

Our work with the Energy Systems Catapult identified that around 30% of GM residents are willing to undertake some level of home improvement retrofit in the next 5 years. This would translate into an opportunity worth between £3bn and £5.4bn. Investment of this scale, and the forward buying messages it would send to the market, would be a game-changer. Coordination of this pipeline would not only act to reduce costs, but it would also be an attractive proposition for inward investors looking to use GM as a springboard into the wider UK market.

Current capacity constraints in the retrofit supply chain also provides a driver for more companies to diversify into the sector and for product manufacturers and distributors to relocate to the region due to local demand and the ability to reduce distribution costs. By engaging these employers through existing initiatives, such as The Good Employment Charter and the campaign for Greater Manchester to become a real Living Wage City-Region, there is an opportunity to create high quality jobs for GM residents.



The foundational economy is the part of the economy that supplies everyday but essential goods and services that keep us safe and provide social and economic functioning and wellbeing' – (Foundational Economy Collective). The 'foundational' and 'everyday economy' account for 62.5% of GM's workforce, including social care, early years, retail and construction. GMCA's Foundational Economy Programme is working to create higher pay and better jobs and investment, to reduce economic inequality and increase productive investment. The creation of high-quality retrofitting jobs works to support this aim and increases the long-term resilience of the construction sector and its supply chains.

The Greater Manchester Good Employment Charter

The Charter is a voluntary membership and assessment scheme that aims to raise employment standards across the city-region, for all organisations of any size, sector, or geography. It describes seven key characteristics of good employment: secure work, flexible work, pay (including the real Living Wage), engagement and voice, recruitment, people management, and health and wellbeing. It is closely linked with the campaign to make Greater Manchester a real Living Wage City Region. The development of a Good Employment Charter for Greater Manchester was first proposed in Andy Burnham's manifesto for the 2017 Greater Manchester Mayoral election. Following extensive consultation, the Charter was introduced in July 2019. It has now engaged over 400 employers across the city region, covering over 200,000 employees. This includes 16 property and construction employers signed up as supporters and 6 full members.

The charter is open to any organisation that employs people and has two levels:

- Supporters have made a commitment to improving practice in all characteristics of good employment.

- Members have made the Supporter Commitment and meet the membership criteria in all characteristics of the Charter.

The Charter is committed to creating a community of like-minded businesses and organisations who can work with one another to share good practice and influence peers within their sector. The Charter Unit (based at the Growth Company) deliver networking events and webinars throughout the year to highlight and disseminate best practice, in addition to recording a popular podcast series with high profile guests from across Greater Manchester.

Parts of the construction sector are also facing multiple challenges including an ageing workforce with fewer young people attracted to the industry, pre-existing skills shortages and difficulties incentivising and managing training and lifelong career development due to employment structures, and difficulties planning for long-term investment given the sector's vulnerability to recessions and other crises affecting demand. This creates an opportunity for GM to use the training and adoption of new technologies needed for carbon reduction, and the creation of a stable pipeline of demand, to attract more young people into the sector and increase the management capacity, innovation and productivity of construction companies.

Developing a leading market for retrofit also provides opportunities to increase innovation in the city-region's economy. For example, one of the key challenges is that the business case for renovation is not always strong enough to enable commercial investment in retrofitting. Whilst changes in energy taxation policy (moving taxes from electricity to gas) will help, the timing of these changes in uncertain so they can't be factored in to cost-benefit analysis. The business case is further challenged if commercial tenants need to move out for retrofitting to take place (or the space is vacant). For these reasons, there is a clear opportunity to develop innovative products and services, including those that enable commercial renovation to work within the current tax and property valuation landscape.

The Energy Innovation Agency - a partnership between GMCA, The Growth Company, SSE Enterprise, Hitachi EU, Bruntwood, The University of Manchester, Manchester Metropolitan University, and The University of Salford has identified non-domestic retrofit as one of its key challenge areas. The Agency will help secure the rapid adoption of innovative solutions which will enable the acceleration of commercial retrofit, using the estates of local anchor organisations as testbeds. By leading on these innovations, GM can benefit from 'first mover advantage' where innovations developed here go on to be bought by others outside the city-region.

Benefits for Greater Manchester's Environment

Greater Manchester can't solve climate change on its own, it can though make its fair share of the carbon reductions. As both the home of the industrial revolution, and of the industrialisation of carbon emissions we have both an obligation and an opportunity to show the world how to transition to a post-industrial zero carbon city region. In doing so we can not only show national and global leadership we can reap the wider benefits this transition can bring when it's done in a fair, just and equitable way. In the same way we reaped the benefits of industrialisation 200 years ago.

By upgrading our buildings to improve energy efficiency and introducing renewable heating systems (like heat pumps) across the Region will reduce the amount of greenhouse gas emissions we currently generate. By decarbonising our buildings, we can reduce our annual domestic emissions by 3,793 $ktCO_2e$, or commercial emissions by 1,190 $ktCO_2e$, and our public estate emissions by 505 CO_2e this is the equivalent of 43% of GMs direct carbon footprint.

Burning fewer fossil fuels to heat our homes will also reduce NOx emissions, improving both indoor and outdoor air quality. Reducing overall growth in demand for electricity will also reduce the need to reinforce the electricity distribution network, further reducing the emission of greenhouse gases and the 'embedded carbon' involved in these projects, reducing the demand on finite resources.

Building upgrades also provide opportunities for wider environmental gains such as water efficiency or green roofs which not only help to control a buildings temperature but increase biodiversity. Green roofs also increase the time it takes water to enter the drainage systems reducing the risk of flooding. Homes in areas at risk from surface water can also have adaptation measures fitted to their properties as part of the renovation works which reduce the risk and impact of future flooding which will only become more frequent as the consequences of our warming climate.

What are we going to do?

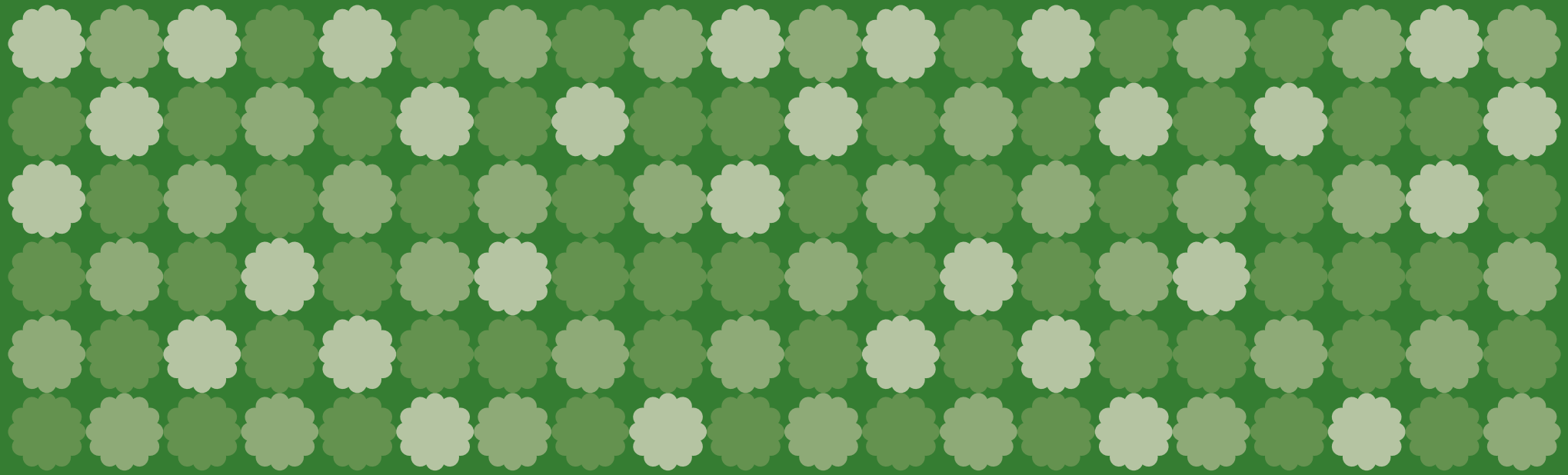
By 2030, our headline objective is to have reached an average of 61,000 domestic retrofits a year, and all non-domestic buildings reaching an average Energy Performance Certificate (EPC) rating of C and DEC rating of B respectively. This plan sets out three priority areas where we need to take urgent action if we are to achieve this objective, meet the environmental challenge we face as a region, and to realise the identified economic, health and other benefits of scaling up retrofit across the region. These are:

Boosting Skills

Improving access to Funding and Finance

Speeding up Delivery

Boosting skills & talent pipeline



Where are we now?

The market in Greater Manchester, as it stands, is primarily catering for small-to-medium scale retrofit across the social housing sector, with some current projects in the pipeline. There is a small but growing demand for retrofitting private homes. Building retrofit requires commissioners (be that public, commercial or domestic) to become informed clients and requires retrofit assessors and coordinators; individuals who can develop whole house solutions connecting thermal efficiency, heating and ventilation. These are relatively new career pathways, and there are few organisations and individuals qualified to conduct this work.

Retrofit generally does not require new onsite trades. Instead, there is a need to upskill and retrain many existing tradespeople within the construction sector to meet the expected future demand.

There are some big challenges we will need to tackle to make this happen, including:

Existing shortages - Work needs to be done addressing the pre-existing shortage of skilled trades across GM. This is estimated to be between 5,000-6,000 before any growth in retrofit activity.

An ageing workforce - Work is needed to address the age profile of the sector by attracting younger workers who currently do not view it as an occupation of choice.

The talent pipeline - In construction and retrofit is not encouraging, as there are existing shortages and high levels of self-employment, there are too few employers offering entry level work-based apprenticeship and traineeship opportunities.

Weak incentives to train:

Hesitancy - There has been some hesitance among employers to reskill staff on new retrofit technologies and techniques. This is partly down to historic initiatives which were introduced then withdrawn and to low visibility of the pipeline. Tradespeople are already busy, with increasing investment in both new building and the domestic market while many in the sector are cautious to invest time and energy into reskilling while this is the case. Faced with immediate and certain existing demand for 'traditional' construction work, many in the sector are cautious about investing time and energy into retrofit as it can seem like a riskier bet.

'Feast and famine'. The use of multi-level subcontracting reduces the profits available to those who actually deliver the works; making it easier to let staff go when markets turn downwards (not all return). As such, skills are often bought in though subcontractors / self-employed and not developed within the labour force.

Weak demand. Commissioners buy to a budget not the specification of what is needed to achieve our carbon neutral targets, often omitting more sustainable options, even when they are specified there are often "value engineered" out to hit a budget.

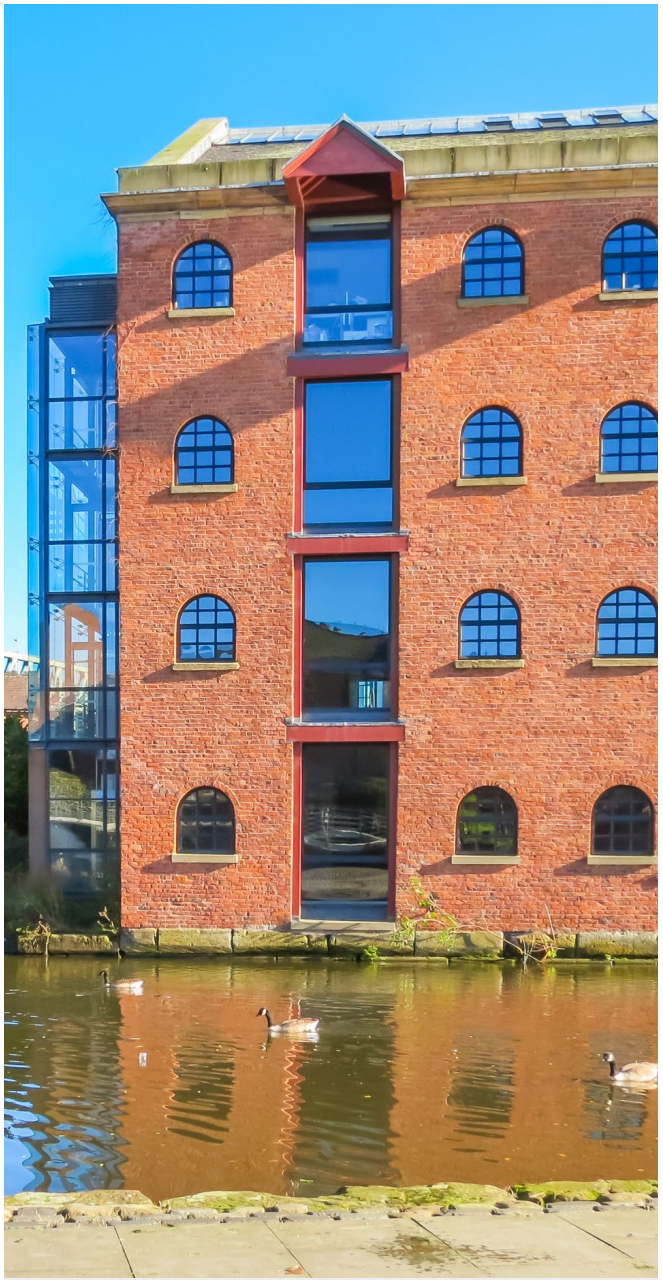
Scale and breadth of training required:

- A large and diverse market. Many employers in GM are SMEs, which adds complexity for at-scale upskilling and training.
- Existing skills infrastructure does not support quick upscaling of relevant training. Directly relevant apprenticeships in Retrofit Advisor and Assessor are still to be developed. There needs to be more relevant material in the existing pathways at FE/HE level.
- Training requirements are not limited to tradespeople and needs to include higher skilled training e.g. Retrofit advisors, assessors and coordinators for whole house retrofits.

There is a general need across the sector for Continuous Professional Development, so that the sector becomes aware of both the challenges of retrofit and suitability of the low carbon solutions, so they can support property owners to retrofit their homes and buildings. This is critical as currently there is a widespread lack of knowledge in the workforce, which is filled with misinformation and urban myths as to the efficacy, reliability and cost of the technology. This is a significant barrier to progress. Retrofit projects of all sizes require trades and construction professionals to operate differently. This will require new skills and competencies, which see greater interaction across different trades. It also needs better planning and understanding of a whole building approach and, in the future, the wider system. But market demand for these skills is currently limited, and confidence that the skills will be needed in the short term remains low. This means there are few training providers offering the necessary courses. Even when courses do exist, there are also challenges around current qualifications containing the required content to meet the retrofit quality standards required.

GM already has a good spread of skills provision for occupations related to construction and therefore for retrofit-dependent trades. However, there is a lack of understanding amongst providers and other stakeholders of the ability and process for current curriculums to deliver a cohesive retrofit training package; the extent of the change required in delivery is still unclear. It is envisaged that there will also be a training need for current tutors and assessors of Skills in GM.

The understandably cautious approach of employers to invest in upskilling and reskilling for low-carbon homes means that this will be a niche market until it is driven by regulation.



Retrofit Skills Need - Considerations

Retrofit Scale

- 1.2m homes in Greater Manchester
- Approx. 250,000 Social Hosuing Units
- Approx. 60,000 homes per year need retrofitting to hit 2038 carbon neutrility target
- Heating is the largest single source of carbon emissions in the region

New Construction

- All new constuction pipeline in GM approx. £14.1bn over next 5 years (£6.9bn of which Housing)
- Pipeline 16% higher than last (2017) forecast - big investment in new projects
- Existing shortage of workers to meet this need - particularly electrical, surveyors, bricklayers, roofers.

Exisiting Workforce

- Approx. 85,000 existing Construction workers in Greater Manchester
- Roles of both Tradespeople and to support staff will change with requirement
- Few specialist retrofit workers

Existing Provision

- Approx. 3,000 annual Construction FE learners
- Approx. 1,000 annual Construction apprentices
- Niche provisoin on specific technologies
- Updates to curriculum ongoing - future-proofing of delivery to account for retrofit skills needs

Figure 1: Retrofit Skills Considerations

This reskilling process is not restricted to the craft trades such as joiners, plumbers, plasterers or electricians. It also needs quantity surveyors, architects' planners and project commissioners. Building retrofit also requires retrofit assessors and coordinators; people who can develop whole house solutions connecting thermal efficiency, heating and ventilation. Retrofit advice, assessment and coordination are new skills and do not always require a higher level of educational attainment.

Whilst this may appear complex, this does not mean all retrofit projects need to be invasive or 'Deep', this will be dependent on the existing thermal efficiency of the property and the end level of efficiency the owner wants to achieve. While some owners may desire Passivhaus or BREEAM outstanding, these are not necessary to economically run renewable heating. Those currently working in the sector, or who have recently left, could be re-trained or upskilled.

Retrofit training should be largely on-site and the skills acquired will largely depend on the types of retrofit needed. Skills provision must involve some entry-level provision, but also higher-level skills for more complex retrofit works.

Where do we need to be?

As this is an emerging market, there is a need to develop and agree suitable standards and protocols to ensure the work undertaken and the technology installed is fit for purpose. This accreditation landscape is becoming increasingly clear nationally, coalescing around the PAS 2035 requirements and registration with Trustmark alongside the Microgeneration Certification Scheme. This outlines the approach to retrofit, and the roles needed such as Retrofit Assessor and Retrofit Coordinators. These accreditation bodies will also enable tracking of the shape and size of the GM supply chain.

Data shared by Trustmark indicates that around 440 individuals and businesses are registered in Greater Manchester to work on Retrofit projects. Given the full construction workforce in GM numbers around 85,000, the number of Trustmark accredited installers will need to increase substantially in the coming years. Additionally, the data reveals some particular vulnerabilities in the existing Retrofit workforce – for example, low numbers of external wall insulation installers. This workforce will need to be both expanded and upskilled to ensure that the Skills supply meets the demands of the region. In addition, businesses and workers in the sector need to engage with the accreditation process to ensure they are best positioned to take advantage of the opportunities of retrofit.

440

individuals and businesses are registered in GM to work on retrofit projects

Trades	Supervisor and specialist roles
Existing trades affected: • Heating engineers (especially higher-level upskilling) • Electrical trade and installations • Plumbers • Joiners • Roofers • Plasterers	**Existing trades affected:** • Architects • Project managers • Site supervisors • Planners • Designers
New roles: • Multi-skilled trade (Retrofit designers and advisors)	**New roles:** • Retrofit Assessor, Retrofit Coordinator, Reterofit Designer
Skills Opportunity: • Upskill for new competencies required as part of PAS2035 • Embed skills and competencies set out in PAS2035 into curriculums for existing trades or add on as extra modules. • Create opportunities for existing trades to become multi-skilled • Encourage upskilling where there are new "competent person" schemes for example heat pump installation	**Skills Opportunity** • Upskill existing professions to develop new competencies required as deliver to PAS2035 standards up to L5 retrofit coordinator • Ensure new entrant routes have curriculums which meet this standard or offer competencies as part of extra modules.

Figure 2: Skills development opportunities by trades & professional roles.

How will we achieve this?

It is challenging to develop a clear timeline for skills development for retrofit because employers will not invest in retrofit reskilling themselves unless there is a clear and visible market. This challenge is mirrored for training providers provision and curriculum will not be fully developed until the pipeline of occupations is clear. In the short term, there are opportunities to upskill the existing workforce in large numbers, and to turn more of the workforce into multi-trade professionals who can work on retrofit projects.

In the medium term, more work will need to be done on attracting new entrants to the market by promoting the green credentials of retrofitting jobs. Increasing funding options for these entry level roles will be critical. Additionally, there is work to be done both in reviewing the curriculum of existing construction provision (in Colleges and Universities) and stimulating the provider market to deliver more relevant training and qualifications, through targeted funding for relevant provision, flexible delivery requirements, and demonstration of the opportunity. In the long term, the construction workforce will need to be larger and more flexible to meet the retrofit delivery demand. Explaining the scale of the opportunity for young people on careers systems, like Greater Manchester Apprenticeship and Careers service, will be a crucial part of building the talent pipeline. There is a desire among young people in the region to work in a "Green" career – if positioned in the right way, the retrofit workforce will see new entrants as young people gravitate towards "Green" careers. Retention of the existing workforce will need to increase as well as see growth in entry level workers to offset the ageing construction workforce employers should work towards improvements in pay, conditions, and professional development.

The response from the skills system needs to be wide ranging, both to upskill the existing workforce and to increase the number of new entrants into the sector. A key part of making this happen will be to provide an accurate aggregation of the upcoming demand in Retrofit activity. This will help to stimulate interest and confidence, encouraging workers of all ages to train, retrain, or switch career. In addition to this, there are various separate solutions for each group within the workforce.

Stakeholders across the GM Skills system needs to:

Start small and grow rapidly: Reskilling and retraining alongside pipelines of small-to-medium sized projects with housing providers, whilst building an employer base for future projects.

Develop new competencies: Provide opportunities for new design and advisory competencies resulting in a new workforce of retrofit designers and advisors. This may lead to the creation of new training pathways for retrofit coordinators.

Target professions for CPD so that they can cascade retrofit approaches down through a project. Ensure training includes the development of toolkits to support in cascading retrofit advice.

Develop clearer reskilling and retraining pathways and packages for employers which meet a GM standard of "effective training for retrofit".

Develop new types of agile and flexible learning including mobile, site-based training and digital solutions.

Raise the profile of construction as a green skills sector through inspiration activity with young people and families inside and outside of school which gives consistent messages about the career pathways for retrofit.

7

Promote a career in the sector as one which is **both high paid and has long term security**

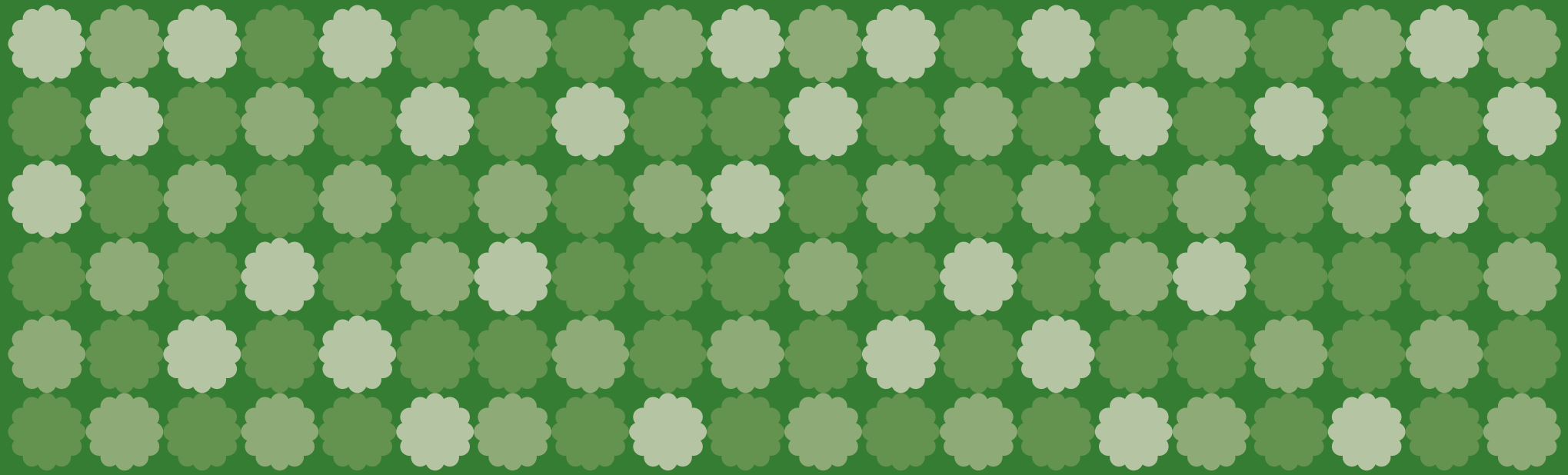
8

Increase skills for new types of heating and plumbing and encourage employers and workers to get accredited against national standards.

9

Linked to the above, **promote employer engagement** through increasing technical routes, including apprenticeships

Improving Access to Funding and Finance



Where are we now?

Retrofitting a home will result in multiple benefits for the people who live in the property, to the wider economy and society at large. While it is possible to monetarise some of these benefits, they are not always realised by the person making the investment, making the business case harder to justify for those who need to do so, e.g., commercial or residential landlords.

This can be further complicated when the cost of a retrofit is compared with replacing a gas boiler, ignoring the wider home improvements which a retrofit can involve and the comfort and wellbeing gains. This can result in long payback periods as the investment is not always fully reflected in an increased value for the property, in the same way some other home improvements are. This is likely to be less material over time, for all tenures, as house prices are starting to reflect energy performance.

The Economics to Retrofitting a Home

It is difficult to generalise on the costs and benefits associated with retrofitting a typical home. Although the Energy Systems Catapult estimate that retrofitting a home will save between £200-£1,000 a year in fuel bills, it will depend on:

- how inefficient the property was in the first place
- how far the building has been upgraded
- how will future costs for gas and electricity prices change
- how many people live in the property and how warm do they have their home

Each building upgrade will need a different budget to spend on a relatively short list of possible improvements, namely:

Types of Measures	Price Range
Draught proofing existing windows and doors	£
Insulation – loft, wall (cavity, external or internal) or floor	£ - £££
Energy efficient lighting	£
Smart heating controls	£
An induction cooker	£ - ££
New bathroom and kitchen fans and wider ventilation improvements	£ - ££
Low carbon heating system (e.g., ASHP)	£££ - £££££
New efficient double or triple glazing	££ - £££££
Whole house ventilation	££ - £££
Solar photovoltaic panels	££ - £££

£	££	£££	£££££	£££££
< £500	£1,000 - £5,000	£5,000 - £7,000	£7,000 - £10,000	> £10,000

GMs Pathways to Healthy Net Zero Housing report determined that the average investment needed per home to make the use of a heat pump cost effective was £10,100, and a further £3,000 if Photovoltaic Solar Panel are installed. This economic case is further strengthened because a "do nothing" scenario will at some point in the next 10 years likely to require maintenance which would have been covered in the new boiler costing £2,000, so the marginal cost of a retrofit is circa £8,000.

Types of Retrofit Measures	Typical Cost	Carbon Saving
Cost Effective (CE) Fabric	£4,000	29%
Heat Pumps	£6,000	94%
Heat Pumps + CE Fabric	£10,000	95%
Photovoltaic (PV)	£3,000	2.4%
Heat Pumps + CE Fabric + PV	£13,000	97%

Property Architype	Average house price in GM	Forecast Uplift from EPC D to C
Detached houses	£360,858	£18,000
Semi-detached houses	£231,356	£11,500
Terraced houses	£165,645	£ 8,300
Flats and maisonettes	£160,584	£ 8,000
All property types	**£207,246**	**£10,300**

In addition to all the benefits of living in a newly renovated home, the costs of an average retrofit will largely be recovered by a comparable increase in a property's value, even before any energy savings are realised.

Funding renovation is a complex challenge which requires a range of different finance solutions that reflect the issues facing different sectors:

Individuals

Individuals need to be able to easily access finance solutions which are patient and provide an incentive to undertake the necessary work. Successful grant programmes, such as the care and repair grants remain small scale and while they are not sufficient in themselves to address the issue, could form part of the funding package. The recently announced Boiler Upgrade Scheme will give £5,000 up-front to individual households for ASHP installs.

Commercial/residential landlords

Commercial/residential landlords are often able to access finance through traditional lenders. However, the spend and benefits are misaligned – the landlord pays for the work, but the tenant often sees the direct financial benefit of lower bills (and the payback will not be short term).

The Public sector

The Public sector can access finance through the Public Works Loans Board which generally offers cheaper finance and is easy to obtain. But justifying such loans for building upgrade can be difficult because the wider benefits of retrofit are not captured as income streams take time to cover the loan. There have been some relatively small-scale grant programmes which capture the income stream, to help the business case, but they require a pipeline of proposals to be ready and deliverable. Developing this pipeline of projects requires time, money, and technical specialists – all of which are in short supply.

Whilst the issues around funding are now better understood, and there are now examples of companies accessing 'green' funding, the innovative solutions to address these issues are not currently widely available or publicised. Many of the solutions that address this area of the market require further development and, in some cases, legislative change.

As well as access to finance, there are also financial issues created by competing priorities across organisations. Retrofit measures often deliver marginal financial returns and do so over longer timeframes than traditional development projects. When money is tight, it can therefore be difficult to convince decision-makers to choose to retrofit over alternative options. This is especially true when wider climate change commitments and policies are not factored into the decision making.

Where do we need to be?

There is a need for a suite of widely available financial products, which meet the needs of organisations and individuals who want to renovate their properties, and which are 'technology-blind'. Outside of a few relatively small-scale government grant programmes, there are currently few financing options for retrofit which seek to address the challenges noted above.

There is an opportunity for a GM partnership to act as a trailblazer, bringing new finance initiatives to the market that support the widespread delivery of retrofit in the public, commercial, domestic, and social rented sectors. Key to making this happen will be to review and value the wider benefits of renovation – including the cost of carbon and security against future market price changes and security of supply of gas.

Creating financial products which are predicated on carbon savings and onsite generation should also reduce the prevalence of "value engineering" out the low carbon measure, as to do so would make them ineligible for the financial product.

How will we achieve this?

We need to create a blueprint for what suitably structured financial products would look like, demonstrate there are organisations willing to provide them and show there are customers who would be willing to use them. GMCA is working in collaboration with the Green Finance Institute to move forward several workstreams to bring such products to market, as illustrated below:

Targeted Design

Strategic advisory role on designing the finance workstream, drawing on the GFI's sector experience to maximise impact

Industry Engagement

Eploit the GFI's extensive network to amplify, promote and build momentum behind the GM retrofit strategy

Shovel Ready Projects

Leverage the CEEB's project pipeline and pre-commercial work[1] to maximise the sucess of pilot schemes

Innovative Pilot Schemes

Establish a portfolio of pilot schemes to prove viability and create scalable markets:

- Property Linked Finance
- Demand Aggregation Financing
- Green Mortgages
- Local Climate Bonds
- Green Rent Agreement
- Share Best Practices

Demondstrate and advocate the benefits of a coordinated place-based retrofit strategy, using the GMCA and GFI's work as a template for UK-wide adoption

[1]Generating financial product ideas from a standing start is proven to be challenging, therefore the CEEB's pre-commercial work can increase the probability of successful delivery

Examples of pilots that are being developed with GFI include:

Local climate bond

Local Climate Bonds, a type of 'community municipal investment', allow local authorities to raise capital to fund specific initiatives in their neighbourhoods. Detailed work is underway to determine if a viable pilot can be established in GM, potentially as a method of funding the Public Sector retrofit pipeline which has been developed through the Go Neutral programme.

Property linked finance

This is a concept where financing for retrofit stays with the property and not the individual/ developer when ownership changes, and it has been successfully piloted in the U.S. Work is already under development by the Green Finance Institute to establish a financial product for older people which would allow them to fund retrofit through an equity release type mechanism. To make this kind of product accessible to the wider population it would likely require legislative change to link the loan to the property so that it does not need to be repaid when the property is sold. The full legal requirements are being worked through, taking into account that the Green Deal repayment mechanism still exists.

Demand aggregation and coordination

This means bringing together many individuals or businesses who want a particular product. This creates a combined volume of demand that then proves attractive to suppliers/financiers, provides economies of scale and reduces costs. For example, the GM Solar Together campaign saw over 300 households sign up together to get Solar PV arrays installed (but due to timing it was not possible to incorporate a suitable financial product with this). A pilot to trial this approach in GM is being developed.

Green rental agreement

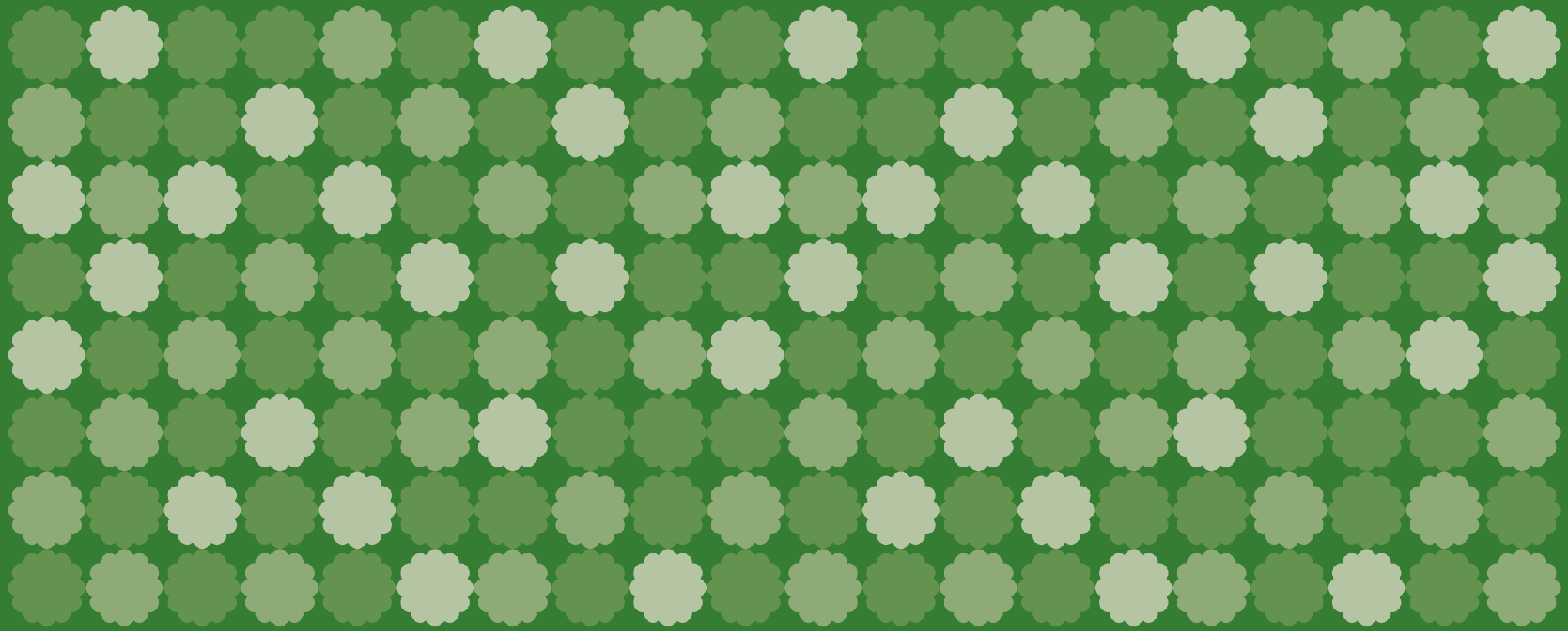
This initiative sees retrofit funded through rental agreements for both commercial and residential landlords which include the cost of heating, this result in the financial savings from the energy efficiency go to the landlord, thus providing an incentive for landlords to act. This addresses one of the key challenges of retrofitting in that the benefits and financing are not always realised by the person who pays for the retrofit. Work is underway to establish how this type of agreement could be linked with design of GM's Good Landlord Charter.

Green mortgages

This is where lenders (like banks and building societies) offer preferential rates to homeowners that retrofit their property. 'Green mortgages' do already exist, but the offer is not extensive or well recognised.

Discussions are ongoing with GFI as to how the messaging in this area could be supported and improved. In addition to the above, GMCA are exploring the establishment of a retrofit fund, which would attract institutional investment and would allow patient capital to be deployed into the market.

Speeding up Delivery



There are many, often related, reasons why the retrofit market in GM is not delivering at the scale needed to address the challenge. Layered on top of this core market failure, there are currently a range of other competing demands on the retrofit sector, including:

- A backlog of works which were stopped/delayed due to covid restrictions
- A demand for home upgrades being driven by an increase in home working
- A stamp duty relief designed to increase the number of people moving home (moving home often triggers building works)
- Post-Grenfell safety works on External Wall Cladding/Insulation and
- Short term Government initiatives e.g., Green Home Grants

This means that the sector has more work than it can deliver. Companies can therefore pick and choose what they do and, understandably, are mainly choosing routine work they are familiar with rather than doing retrofit work or releasing staff for retrofit training. This cost increase is exacerbated by the rapid increase in the demand for materials on the back of COVID induced supply chain pinches.

We therefore need to balance the urgent need for large numbers of properties to be retrofitted with the physical limits of the existing supply chain. If we grow demand too quickly then we increase the risk of poor quality or inappropriate installation, which would jeopardise future delivery. One way to help overcome this bottleneck, in the medium term, is to look to develop and implement innovation solutions which make renovation quicker, simpler, cheaper, less invasive with increased customer protection. The mass deployment of such innovative solutions would increase the uptake by reducing upfront costs and non-financial barriers. Other potential solutions to meeting the anticipated demand would be to encourage more retrofit start-ups in GM, or to encourage retrofitting companies from outside the city-region to create new facilities here

Speeding up Delivery in each sub-market: domestic, commercial and public buildings

Retrofit delivery is best viewed as three submarkets with distinct opportunities and challenges and distinct public policy levers. These are: Domestic retrofit, Commercial/industrial retrofit and Public building retrofit.

The following sections look in more detail at these markets and the opportunities they afford.

Domestic Delivery – The Race to C

For a household to be able to affordably heat their home from renewable sources, the energy rating needs to have an Energy Performance Certificate of C or above, otherwise running costs become prohibitive in the current market. The work we have undertaken with Parity in 2020/21 "Pathways to Healthy Net Zero Housing for Greater Manchester" tells us that we need to increase the thermal efficiency of three quarters of our homes, some 887,000 households.

If we are going to be successful in driving delivery, we need to know what progress we are making, and understand efficiency levels across GM's housing stock, without the need for expensive data collection systems. To do this, we intend to use existing nationally available data provided through Energy Performance Certificates (EPCs). These are certificates which measure a home's energy efficiency and which homeowners are required to get every time a house is sold or let.

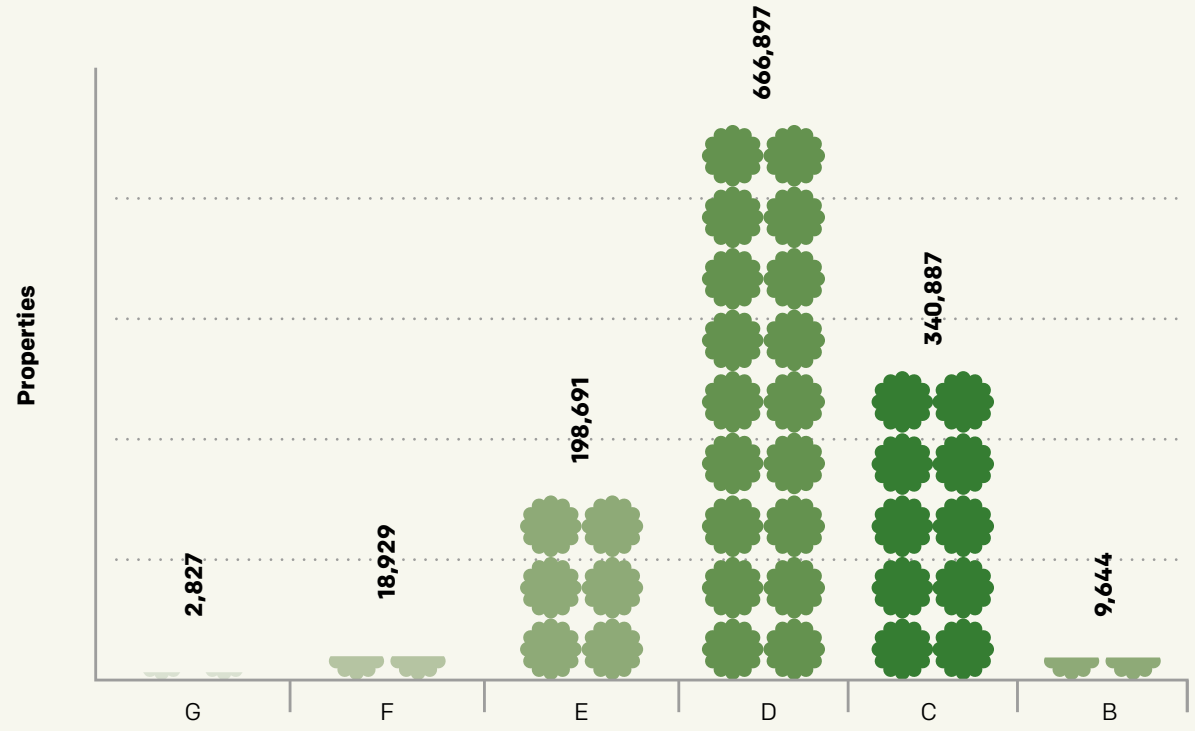


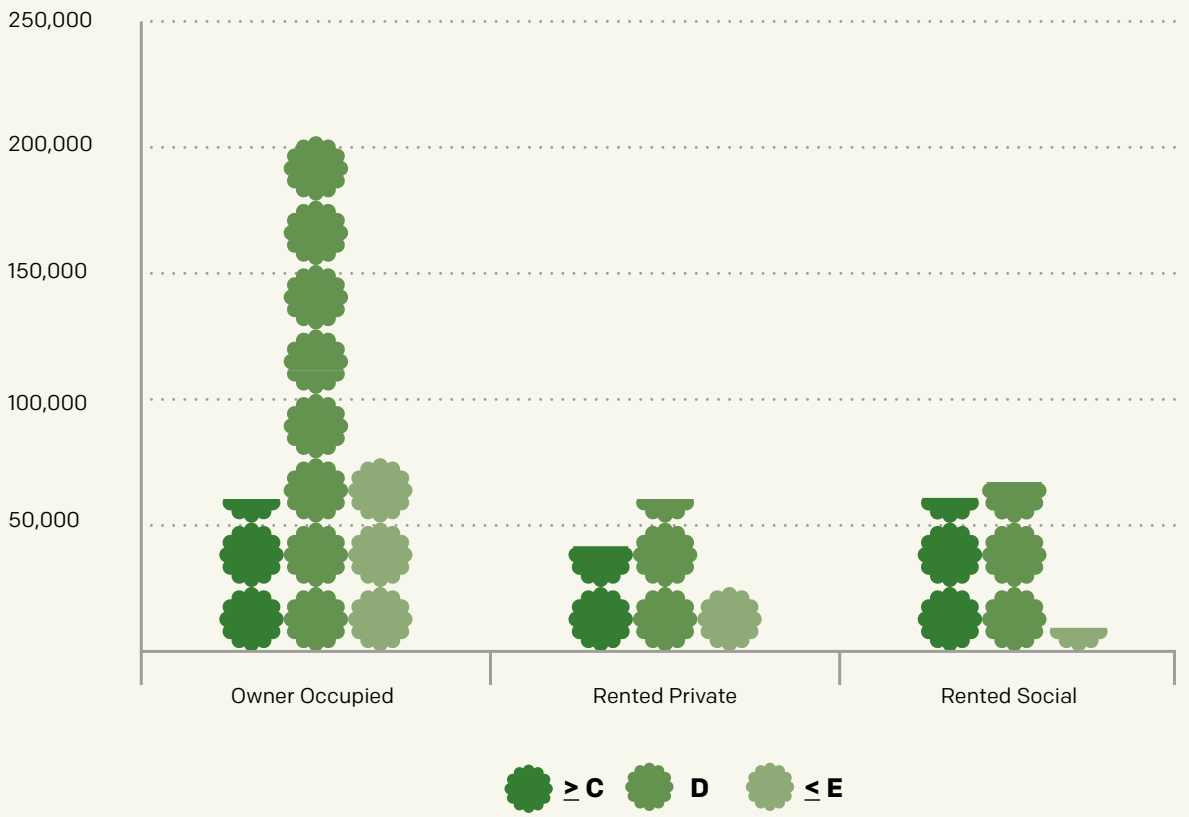
Figure 2-1: Distribution of SAP rating homes in Greater Mancester

We will also analyse how Standard Assessment Procedure (SAP scores) change over time, to help determine incremental changes which, while not large enough to result in an EPC score change, are nonetheless a meaningful change when assessed across the entire housing stock.

Our work with Parity identified that 57% of GM households are owner occupied, 20% private rented, and 23% social rented. While renovation activity is needed across all three tenures, the owner occupier sector has the most inefficient housing (both in absolute and percentage terms).

Our work with the Energy Systems Catapult found that around 30% of GM homeowners say they are willing to retrofit their home in some way but are not doing so because of the barriers previously identified. In recent years there have been several Government interventions to try and encourage households to undertake retrofit (and to subsidise the cost) but they have often been small-scale, short-term, and have had mixed success.

Number of properties (with EPC), by tenure, across GM

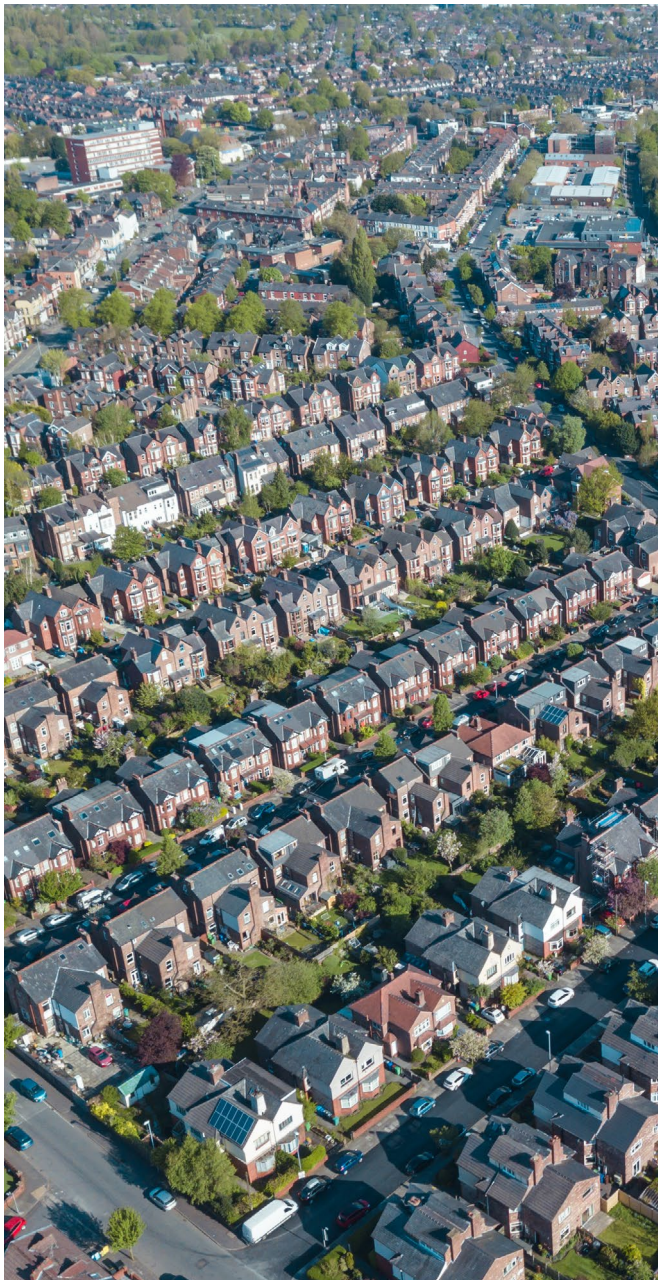


Note: only around half of properties have an Energy Performance Certificate

To support the market, Government introduced the Green Homes Grant voucher scheme. This was launched in 2020 and targeted the private rented and owner occupier sectors. It was widely deemed to be unsuccessful, has since been scrapped, and received highly critical feedback from the National Audit Office. The similarly named Local Authority Green Homes Grant has been more successful, investing £27m this year in GM to renovate the most fuel poor homes. The challenge with this fund has been that there is not enough capacity in the supply chain to meet customer demand. This means it is likely to underspend in GM, with funds returned to Government. This lack of supply chain capacity is particularly acute for External Wall Insulation contractors due to post-Grenfell remedial works on tall buildings (GM has the highest number of tall buildings in the UK outside London). Whilst both funds have been of some value, their scale and duration have not been commensurate with the challenge GM faces. This is compounded by the schemes' focus on the most inefficient homes (EPC – E, F & G) which make up only a quarter of the 887,000 homes that need retrofitting.

It should be noted that not all homes need to be retrofitted for renewable heating to be a financially viable option, e.g., there are around 210,000 homes in GM which could install an Air Source Heat Pump today without any fabric improvements, a potential £1.2bn market. The Government's £5,000 Boiler Upgrade Scheme grants will, from April 2022, support this market to develop and will be particularly attractive to those who are both willing to pay and live in such a property.

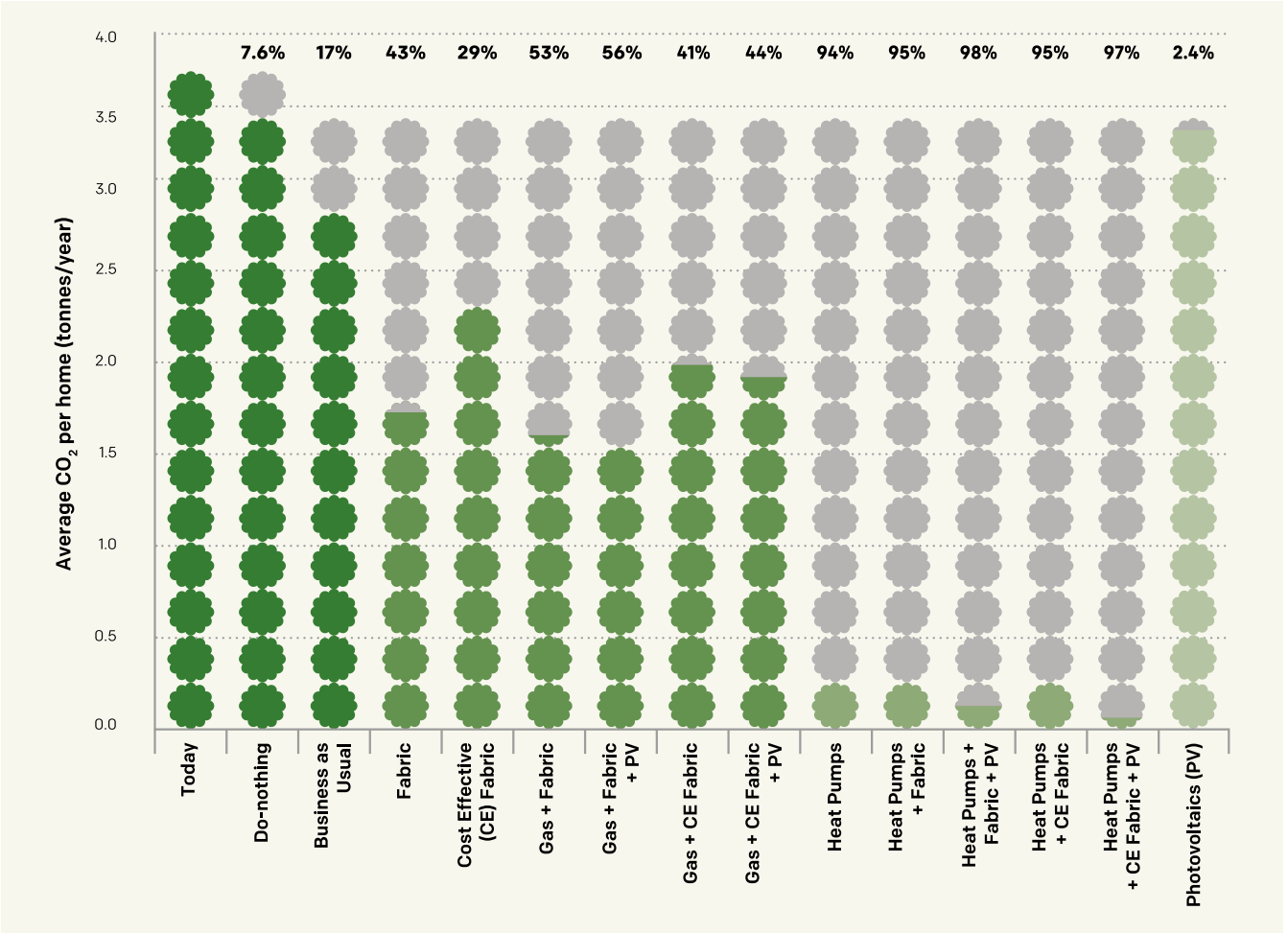
To prevent the retrofit challenge from getting worse, all new GM homes will be designed to be net zero carbon by 2028. Also, in GM we also plan to build 30,000 net zero affordable homes by 2037. This will require new ways of thinking, new supply chains to be engaged and skills to be adopted by both the existing and new workforce. This provides an opportunity to share and transfer the learning secured on new build into the wider retrofit and home improvement market.



Where do we need to be?

The Parity Project's report Pathways to Healthy Net Zero Housing in Greater Manchester[2] provided a range of scenarios for GM to achieve net zero carbon housing by 2038. Historically, renovation schemes in the UK focus on improving insulation and the efficiency of a boiler, but largely remain reliant on fossil fuel heating. This must change, as there is no place for mineral gas in net-zero housing. The main option to decarbonise domestic heating in GM is the electrification of heat through air source heat pumps (ASHPs) and, where opportunities exist, the development of heat networks where an energy centre provides and distributes heat to multiple dwellings.

Our modelling suggests that "Heat pump + cost effective fabric + solar PV" is the most cost-effective means of reaching carbon neutrality, reducing emissions by 97% (see graph below © Parity Projects).



[2] Pathways to Healthy Net Zero Housing in Greater Manchester – by Parity Projects, Bays, The Association of Decentralised Energy and Energy Systems Catapult

To enable an ASHP to cost-effectively heat a home, the home needs to be insulted to an EPC C level and heating systems may need to be altered (e.g., bigger radiators). This means fabric measures like insulation are often necessary to make ASHPs economically viable, although fabric measures alone are not sufficient to cut emissions. Such insulation measures also support immediate reductions in fuel poverty and, even if they aren't being installed at the same time, make it easy to deploy heat pumps or other zero carbon solutions at a later date. As such:

- We need to stop using gas fired heating
- We need a large-scale rollout of heat pumps this decade
- We need widespread insulation improvements to make homes suitable for low carbon heating technologies (including heat pumps), including retrofitting over 887,000 homes to move from EPC grade D or lower, to a C or above and
- We need to give people the confidence to move from their current heating system to one which can be perceived as novel and complex

Whilst significant behaviour change is not needed to live in a retrofitted building, residents will need some education on how to best use the technology as heating response times are slower than a gas boiler, providing more constant, controllable stable temperatures.

Further work is also needed to demonstrate to `place-based regeneration' organisations, departments and future Mayoral Development Corporations, the role and benefits domestic retrofit can deliver against wider policy objectives such has health, poverty, and equality. The inclusion of retrofit measures into such place-based schemes would help develop the market and increase understanding and acceptance in the wider community.

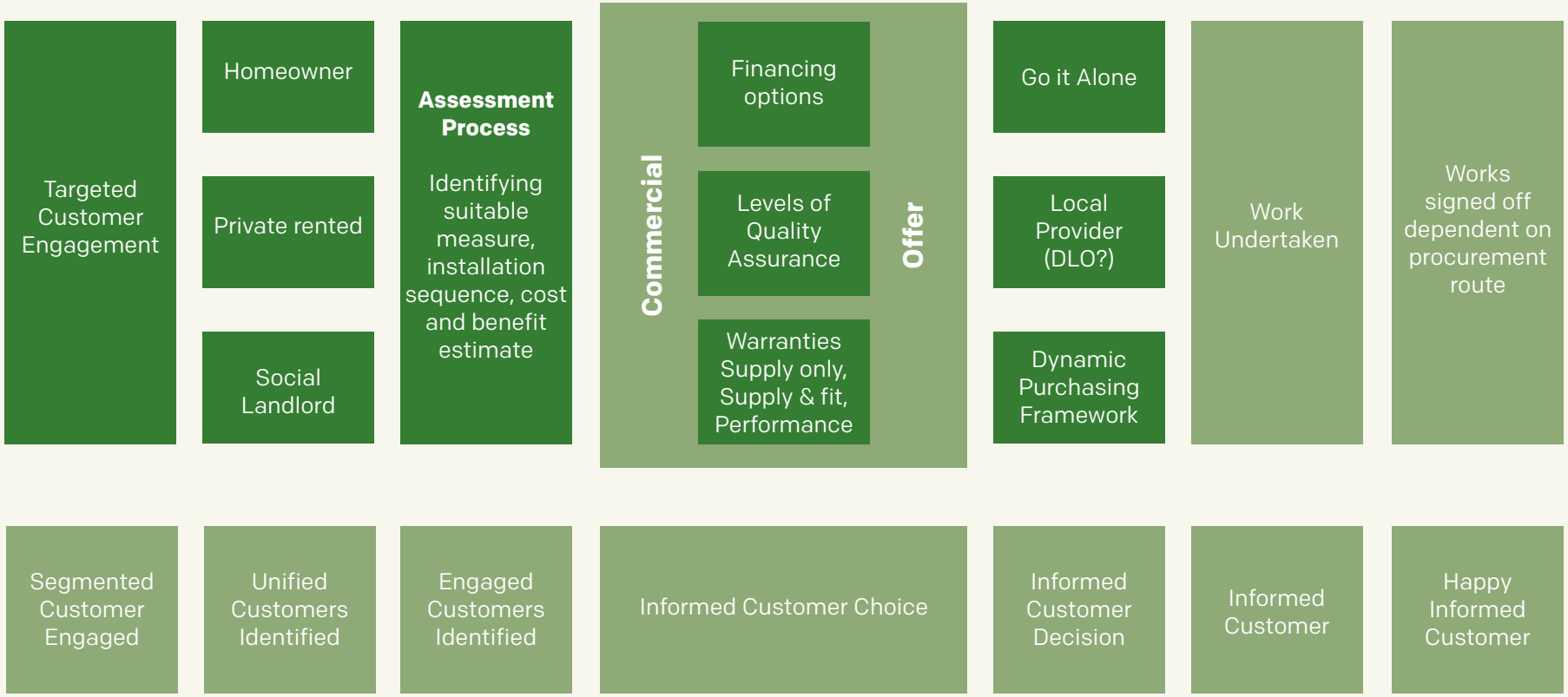
How will we achieve this?

Owner occupiers and the private rented sector

To enable an `at scale' retrofit market to develop, action is needed in both the social sector and the willing to pay market (private landlords and owner occupiers). To help catalyse this willing to pay market, GMCA is looking to procure a vehicle, (retrofitGM) which will create a flexible customer-focused end to end service. The service will assess a home, clearly outline which retrofit actions are needed, the order the work needs to occur in, the expected costs and sources for finance. Customers can then choose how to progress the works, including contracting RetrofitGM to deliver the improvements. The RetrofitGM scheme is looking to enable a market which can renovation an average of 61,000 homes each year, although this will take time to achieve.

To support the uptake for renewable heating in the Private Rented sector, GM is looking to develop a Good Landlord Charter which will recognise those rental properties with good energy performance and low carbon heating systems. In addition, GM is looking to strengthen regulators enforcement of the private rented sectors through the Good Landlord Scheme.

Willing to Pay Customer Journey



The social rented Sector

Around 20% of GM's 1.2m households live in social housing. On average, these tend to have better energy ratings than a Private rented or Owner Occupier homes, but 138,000 will still need and benefit from building upgrade improvements to make them suitable for renewable heating and to meet the current Minimum Energy Efficiency Standard by 2030.

Social housing providers could send the retrofit market a clear signal as to the scale, nature, and timing of the uptake of renewable heating and any associated retrofit measures. By using Social Value clauses in the procurement of such work, they can stimulate both the provision and uptake of a range of retrofit skills. If this approach is orchestrated with wider public sector procurement, GM could create a de facto GM standard. This collaborative approach is needed to create a fully functioning retrofit market, which can specify minimum standards for key technologies and which, in turn, will reduce the unit costs.

The current picture in the sector is mixed with some Providers already committed to installing no new gas boilers, others looking to make similar commitments, while some have no stated plans to stop `like for like' replacements for gas boilers. Further work is needed to galvanise those in the sector who are committed to GM's 2038 goal. We need to create a clear pathway with timelines for both the phasing out of gas boilers and the number of properties which will need to be improved. Such an approach will also make it possible to better phase the necessary works over time. This is important as it will help social housing providers to avoid a 'hump' of work as we approach the 2030 deadline, a 'hump' which would put excess demand on retrofit suppliers and drive-up costs. The shape and size of this programme can then be communicated to the market and skills providers to inform and stimulate interest. The sector currently has plans to renovate around 7,200 of the 138,000 homes which need it, with an investment of £118m investment.

In addition, GMCA through the Buildings Challenge Group will look to engage with major housebuilders, the Green Building Council and other relevant parties to determine how the learning on net zero new build can be disseminated to catalyse the uptake of new ways of working.

Commercial Sector

Unlike the residential sector, in building used for commerce electricity makes up 56% of the 1,190 ktCO2e emitted in 2019, with the remaining arising from gas heating systems.

Increasing the number of commercial buildings which can be heated with renewable energy will not only reduce GM's carbon emissions, but will support the ambitions of their tenants, especially SMEs. For many tenants their inability to reduce their carbon emissions from the buildings they occupy is a major barrier to their zero-carbon transition.

Whilst the problems faced by building owners are very similar in nature to those faced in the residential sector for Owner Occupiers and Landlords, the creation of a viable business case is critical. As such, the previously stated challenges of expenditure on building fabric improvements are not wholly reflected in the asset's value and the spilt incentive, where a landlord invests but a tenant realises the benefits, are critical barriers.

Many commercial building owners are not aware of what they can do to their buildings to upgrade them for a zero-carbon future, due in part to the market failures outlined above. This challenge is compounded for such building owners as there are a broader suite of technology solutions and more properties that require bespoke interventions, making it harder for the owner to determine the right course of action.

Where do we need to be?

Under the Minimum Energy Efficiency Standards (MEES) Regulations by 2030, all commercial buildings need to have and EPC of B or above, so they are suitable for renewable heating systems. At face value, these MEES which apply to all privately rented property from April 2023 should drive this change as this is the standard set, but this is caveated with ''where cost effective (payback over 7 years)''. In addition, the lack of rigorous enforcement of MEES means that this Standard alone will not drive the change at the pace needed. To do this requires a suite of solutions which are similar to those needed in the domestic sector, such as:

- Access to independent advice which outlines what retrofit actions can and need to be undertaken and an estimation of the cost involved – a Commercial Retrofit Action Plan
- Access to patient capital, which could be linked to a property or portfolio of properties
- Access to rental agreements which share the ongoing benefits of retrofit with the landlord
- Access to proven Energy Service Company (ESCO) providers who turn heat into a service and undertake whole building upgrades
- Clearly outlined changes, on when, and at what magnitude taxation will shift from electricity to gas, creating a stronger business case for 'pay to save' investments.
- Consistent strong enforcement of MEES

How will we achieve this?

Greater Manchester has diverse commercial letting portfolio, this ranges from domestic scale dwellings e.g., local shops and care homes, to destination retail outlets, large multi-floor offices and mixed tenure buildings. As such many of the mechanisms being put in place to support the domestic sector will, if structured appropriately, support and enable landlords to renovate their properties. These include new financial products, an increased awareness and use of green leases and the use of Energy Service Companies (ESCOs). For smaller properties, the end-to-end renovation vehicle being developed for the domestic sector, RetrofitGM, will also be able to support landlords to increase their EPC to a B, the minimum energy efficiency standard by 2030 (EPC C by 2027).

To help the sector better understand the need for retrofit and what measures need to be taken, GMCA will agree with The Growth Company, and its Business Growth Hub, what role they can take to support the sector. This could build on the support they give via their existing funded programmes and through MIDAS, Business Finance Solutions and Marketing Manchester.

To address the key challenge of the difficulties in making a commercial business case for retrofitting, we will develop new innovative products and services to enable commercial retrofit to work within the current tax and property valuation landscape. As such, The Energy Innovation Agency – a partnership between GMCA, The Growth Company, SSE Enterprise, Hitachi EU, Bruntwood, The University of Manchester, Manchester Metropolitan University, and The University of Salford – will prioritise non-domestic retrofit innovation as a key challenge area to secure rapid adoption of innovative solutions using the estates of anchor organisations as testbeds.

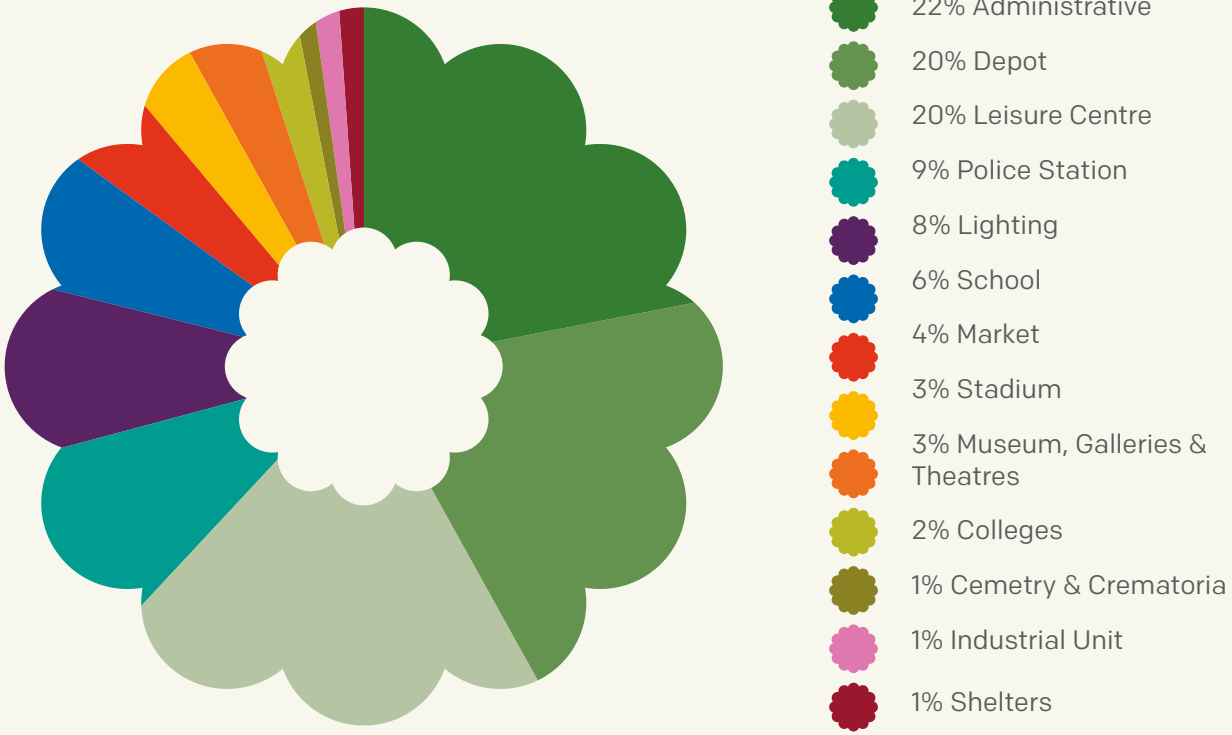
Another challenge the sector faces is that the business model case for renovation is not always strong enough to enable investment and while changes in energy taxation policy (moving taxes from electricity to gas) will help, these are not yet timetabled so cannot currently be factored into future cost/benefit. This challenge is further exacerbated by the fact that, in some cases, tenants need to move out (or the space is vacant) before the necessary works can be undertaken which further challenges the business case. For this reason, there is a clear opportunity to bring in new innovative products are services which both reduce cost and disruption. This is an area of focus for Energy Innovation Agency, a partnership between Bruntwood, Greater Manchester Combined Authority, Hitachi Europe, Manchester Metropolitan University, SSE, The Growth Company and the Universities of Manchester and Salford which look to bridge the innovation gap enable the rapid deployment of low carbon products and services.

To encourage the adoption of retrofit Measures, GM is looking to introduce a Good Landlord Charter, similar to the Good Employment Charter with recognises those who are supporting Greater Manchester shared objectives to decarbonise our buildings by 2038. Underpinning this drive to improved energy efficiency are the Minimum Energy Efficiency Standards which state that all commercial building will need an ECP B or greater by 2030. MEES will also require increased enforcement, supported by the Good Landlord Scheme alongside the encouragement provided by the Good Landlord Charter. This backstop date should encourage and motivate the laggards who fill find it increasingly difficult to rent their properties.

Public Buildings

Greater Manchester's Public Sector is also a significant contributor to heat-based emissions, emitting 4.3% of GM's total carbon footprint. To put this into context, it is equivalent to Wigan's entire transport emissions, or 80% of the combined emissions of all home heating across both Oldham and Rochdale. Through the Public Sector Decarbonisation fund, 150 buildings are currently being retrofitted, with an investment of £78m saving an estimated 9,000 tCO_2e per annum, removing 144,000t CO_2e contribution to our carbon budget. While this is significant, it is also nowhere near the scale needed as it represents less than 2% of the Public Sector's emissions.

Total Energy by Building Category



Where do we need to be?

For GM to remain within its carbon budget and for the renovation ambition to be credible, the public sector needs to lead by example, to show not tell. Sending a clear message to the supply chain, landlords and society at large that such rapid change is both needed and should be welcomed due to the positive outcomes it will deliver. The goal therefore is to have every public building meet the same minimum energy efficiency standards as commercial landlords by the same 2030 deadline.

How will we achieve this?

There is a need to develop a public sector building decarbonisation programme covering the entire estate. Work contributing to this has already begun. Assessments have been carried out to understand what individual public sector buildings emit and what function they provide, including local authority-controlled schools. This creates an emissions hierarchy which helps prioritise where early action will have the most impact. This has the potential to reduce implementation costs by developing solutions based on common building architypes e.g., two thirds of the emissions of public sector buildings come from administrative buildings, depots and leisure centres.

Decarbonisation of the Public sector

Recognising the need for urgent action to reduce our current rate of emissions significantly, public sector organisations have come together to develop a collective systematic approach to the decarbonisation of their estate to ensure we do not exhaust our entire carbon budget in the next 6 years. The initial focus of this work has been to understand what the opportunities for retrofit and local energy generation exist across the 2,700 properties which make up the estate. By creating a project pipeline, GM has been able to secure £78m from the Public Sector Decarbonisation Scheme. Funding measures such as low-carbon and renewable heating systems, and solar panels in leisure centres, council offices and town halls creating or safeguarding of around 2,000 local jobs. Another early win is Go Neutral a highly innovative smart energy programme. This programme will develop low carbon renewable energy generation and smart energy assets using public sector land, car parks and buildings, by combining opportunities it has the potential to bring forward schemes which on their own would not current be viewed as economically viable.

In October 2021, Government announced a series of measures which will support the public sector to decarbonise its' estate, making £1.45bn available over the next 3 years through competitive bidding. Whilst this is welcome and, if successful, will help decarbonise some of GM's public estate, it is not at the scale needed to meet our carbon budgets. Also, by only retrofitting buildings when grants are available does not show leadership and risks sending the message that retrofit can only happen when secured through grant funding. The public sector therefore needs to develop business cases which capture the wider benefits that renovation brings to the realisation of the Greater Manchester Strategy. These business cases should be used to unlock finance which could be PWLB, Local Green Bonds or the use of Energy Service Companies. The public sector will need to do this at an unprecedented scale and speed and will need to dedicate resources, both people and capital to make this a reality. This is a step change and will require doing things differently, including more streamlined decision making and governance structures which can support rapid deployment while ensuing the necessary level of scrutiny.

By adopting this approach, the public sector will not only support the emergence of a functional retrofit market and the wider suite of benefits this will bring it will show leadership to others and so catalyse wider more rapid adoption.

£1.45bn
available over the next 3 years

Renewable heating and generation supply chain

Suppliers who want to install renewable energy technologies need to be registered with the Microgeneration Certification Scheme (MCS). This means we can use MCS registration data to better understand the capacity of the renewable energy technology installation market. There are currently 39 MCS-accredited installers in Greater Manchester (though this does not include any of the associated ancillary building work and its supply chain).

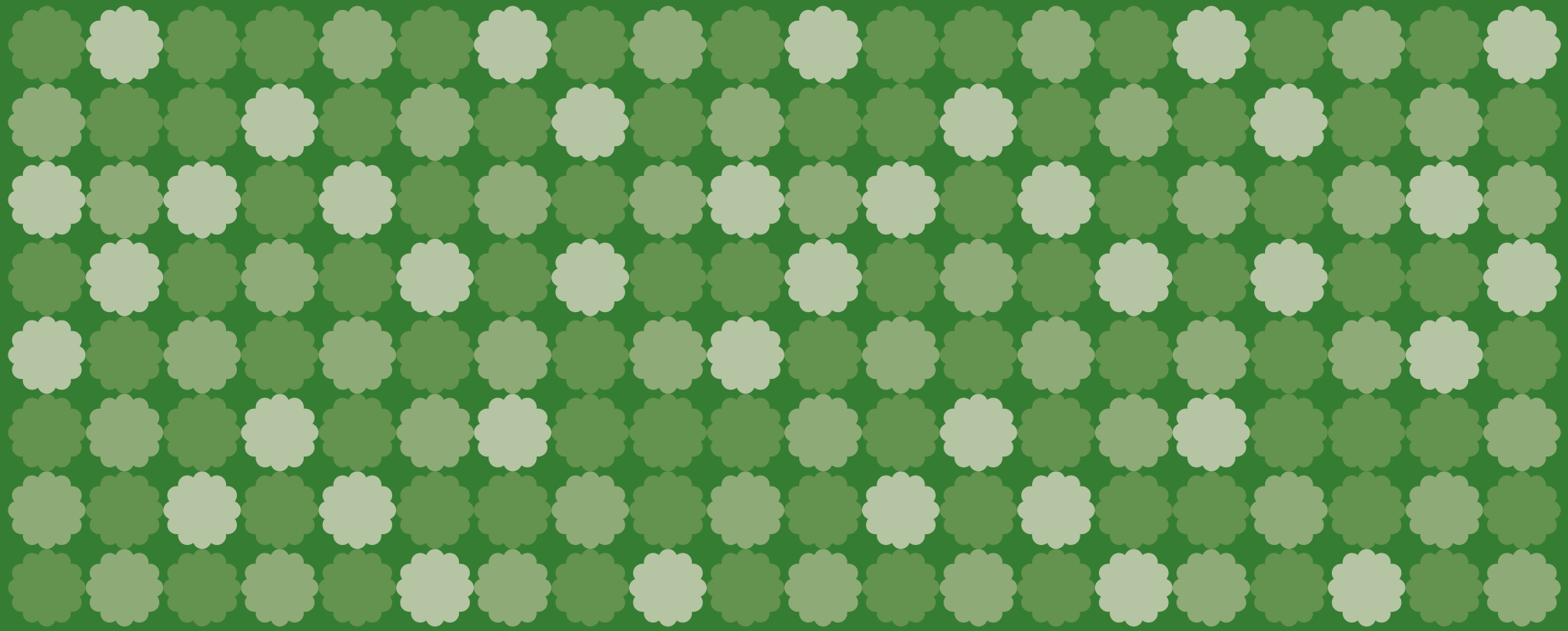
The MCS data can also tell us what technology has been deployed, its location, and the tenure of the properties in question. This means that monitoring the number of MCS accredited installations in GM (and how many were done by local companies) can help us to monitor and understand the capacity of the local supply chain to deliver the demand. By combining this with the number of MCS installs that were delivered by GM companies elsewhere in the UK, we can estimate the current capacity of GM's market.

There are currently

39

MCS-accredited installers in Greater Manchester

Conclusion



Heating our homes and buildings with renewable heating technologies will not only support our Climate Change objectives it will make significant inroads in addressing some of the wider challenges Greater Manchester faces as we move out of the pandemic.

The scale and longevity of the opportunity will, if addressed in a systemic way, accelerate the realisation of GM's wider strategic objectives including those in the Greater Manchester Strategy, which puts climate change and inequality at its heart (and the supporting strategies including the Local Industrial Strategy). We recognise this opportunity as one which will only arise once-in-a-generation: the potential to deliver substantial carbon reductions, environmental and health benefits for our people, whilst also creating new green industries, innovations and jobs.

There are currently a series of market failures that need to be addressed to realise a fair and just transition to a net zero carbon society. Without intervention the market will be limited to those who have the knowledge, desire, and ability to pay, limiting the benefits to those people and businesses most able in society. Not intervening therefore risks further entrenching inequality, as failing to achieve the transformational scale needed to address Climate Change will limit the impact on wider social and economic policy objectives. This will ultimately cost the economy and society, particularly those least able to afford it, and with the lowest carbon footprint more.

This report sets out how the Retrofit Taskforce will drive systemic action to overcome these failures by:

- The identification, stimulation, coordination and realisation of building renovation across all sectors and tenures, to provide confidence to the market and to secure the necessary investment in the provision of a skilled workforce and in the adoption of innovative solutions

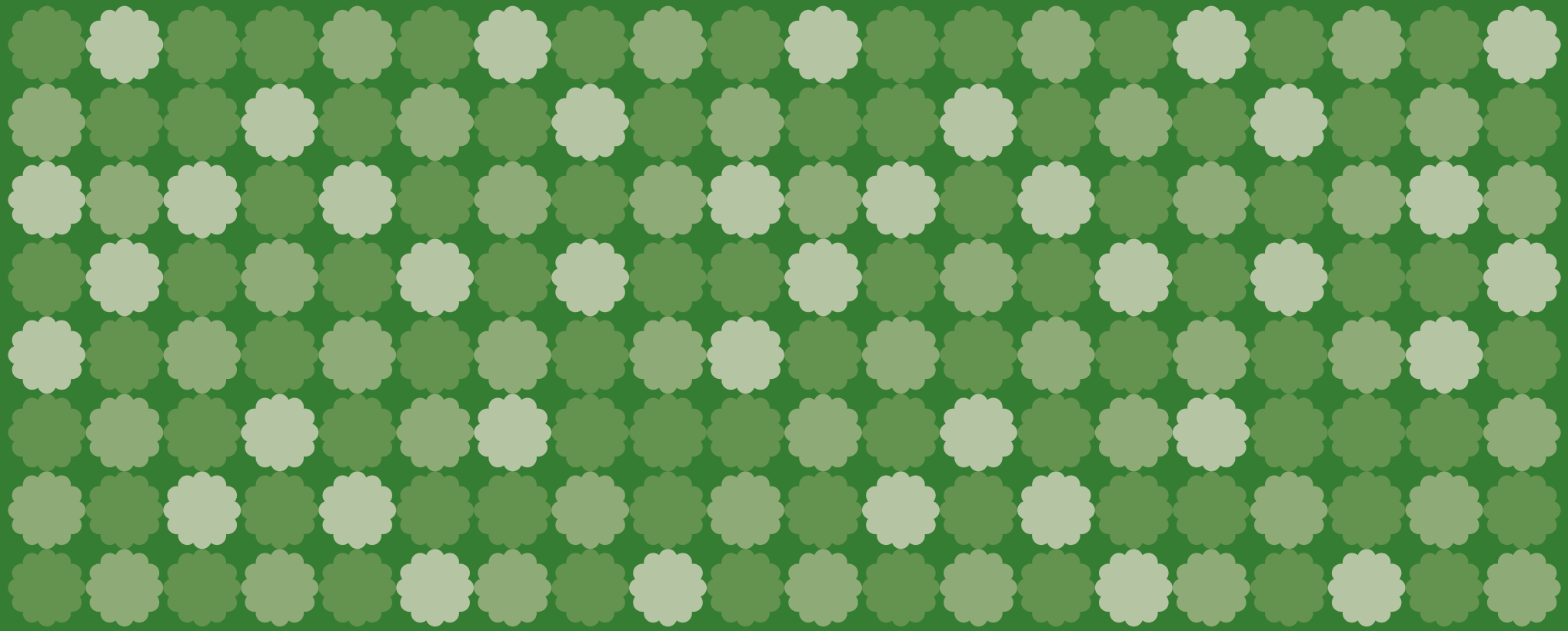
- The development and deployment of new financial products and services which gives building owners access to affordable funding which enables them to undertake the retrofit. This may also look at local green municipal bonds which enable GM's residents to accelerate the transition

- The provision of local 'retrofit' training course places which provide individuals with the knowledge and skills the sector needs, at the time when they are needed. This will cover further and higher education providers, including craft and more specialist roles such as heating engineers and retrofit coordinators

- The collection, verification and analysis of data and other key performance indicators to monitor progress towards the goal of all residential properties having an EPC of at least a C by 2038, and Commercial properties having an EPC of B or above by 2030.

This will be done in such a way as to maximise local social, economic and environmental impact, ensuring that the opportunity retrofit provides is realised in a way which is fair and just and acts as a driver for the wider societal and economic changes needed post pandemic.

Implementation plan



Start date: January 2022	Short term (0-9 Months)	Medium term (9 – 18 Months)	Long term (18 – 36 Months)
Skills			
Increase the number of skilled workers able to work on retrofit projects	• Deliver a programme to upskill 875 individuals in related qualifications (Retrofit Skills Hub) – **Low Carbon Academy** • Deliver a programme to attract individuals to the sector (Retrofit Bootcamp) – **Low Carbon Academy** • Explore embedding of Retrofit skills in existing curriculum – **Colleges/ GMLPN/MCS/ESC** • Encourage and enable apprenticeships among Retrofit and Construction workforce – **Employers** • Investigate using public procurement mechanisms to stimulate apprenticeships- **GMCA**	• Continue commissioned delivery of Retrofit Skills Hub to additional 265 individuals – **Low Carbon Academy** • Evaluate success of programmes – **GMCA** • Assess future funding options and programmes – **GMCA** • Deploy funding from AEB for existing provider network – **GMCA & Existing Providers** • Investigate the potential of an integrated retrofit skills offer – **Salford University, Colleges & existing providers**	• Audit, Evaluate and renew funding options for successful programmes – **GMCA/ESC** • •Exploration of long-term provision options (adaptation of existing curriculum, development of new pathways) – **GMCA & Existing Providers**
Better understand the supply and demand sides of skills for retrofit in GM	• Aggregation of market - localised small to medium sized social housing retrofit projects – **Sector Bodies** • Engage with employers to understand their needs and concerns – **B4Box, Rothwell Grp** • Monitor the supply of skills (number of starts and completions on relevant programmes and qualifications) – **GMCA** • Release the Green Economy Skills Intelligence Report – **GMCA**		

Start date: January 2022	Short term (0-9 Months)	Medium term (9 – 18 Months)	Long term (18 – 36 Months)
Improve the quality of construction and STEM provision across GM	• Encourage onsite training on live projects as part of provision – **Employers & Training Providers** • Develop additional elements for existing curriculum – **Colleges & Training Providers** • Qualification and accreditation bodies to ensure skills infrastructure supports quality provision – **TrustMark/MCS**	• Improve understanding of real-time skills demands among provider market – **GMCA & Employers** • Feed into central government and other regions to share best practice and challenges – **GMCA**	• Continue GMCA research into curriculums for trade and specialist roles – **GMCA** • Evaluate existing qualification pathways and review funding routes and delivery models – **Colleges & Training Providers**
Promote careers in Retrofit as high-skilled and "Green" careers to attract more workers to the sector	• Employers to engage with colleges and provider network to share skills needs and demand – **Employers** • Coordinate messaging on Green career pathways through GMACS – **GMCA**	• Employers and stakeholders to provide case studies of careers - Employers • •Work with Enterprise Advisor network to improve understanding of Retrofit – **GMCA & Employers**	• Continue messaging to change perceptions around career options – **GMCA**

Start date: January 2022	Short term (0-9 Months)	Medium term (9 – 18 Months)	Long term (18 – 36 Months)
Funding and Finance			
Programme	• Establish a collaboration agreement with GFI, and develop a programme strategy – **GFI/GMCA** • Hire a programme manager to provide dedicated resource to design and deliver pilots - **GFI**		
Local Climate Bond	• Determine if the GMCA can sign up to the GFI's Local Climate Bond pledge - **GMCA** • Develop a pipeline of potential projects to be funded by a Local Climate Bond – **GMCA/Local Authorities**	• Launch the first Local Climate Bond, subject to satisfactory due diligence – **GMCA/Abundance**	• Issue a rolling programme of Local Climate Bonds - **GMCA/Abundance**
Property Linked Finance	• Establish legislation changes required in order to effect property linked finance options – **GFI** • Commercial property group to be established to work through specific challenges for the sector – **CBRE/ Bruntwood**	• Design a pilot scheme to trial property linked finance in GM - **GFI** • Advocate for legislation changes identified as being required – **GMCA/ GFI/GM LEP**	• Launch a GM property linked finance pilot - **GFI**
Demand aggregation	• Develop a demand aggregation GM Pilot - **GFI**	• Launch a demand aggregation GM Pilot – **GFI/Manchester Growth Company**	• Issue a rolling demand aggregation programme - **GFI/Manchester Growth Company**
Green Mortgages	• Host a Lender Roundtable to discuss the current green mortgage market, potential developments and communications strategy – **GMCA/ GFI/NatWest**	• Develop and launch a GM Green Mortgage product - **GMCA/GFI/ NatWest**	

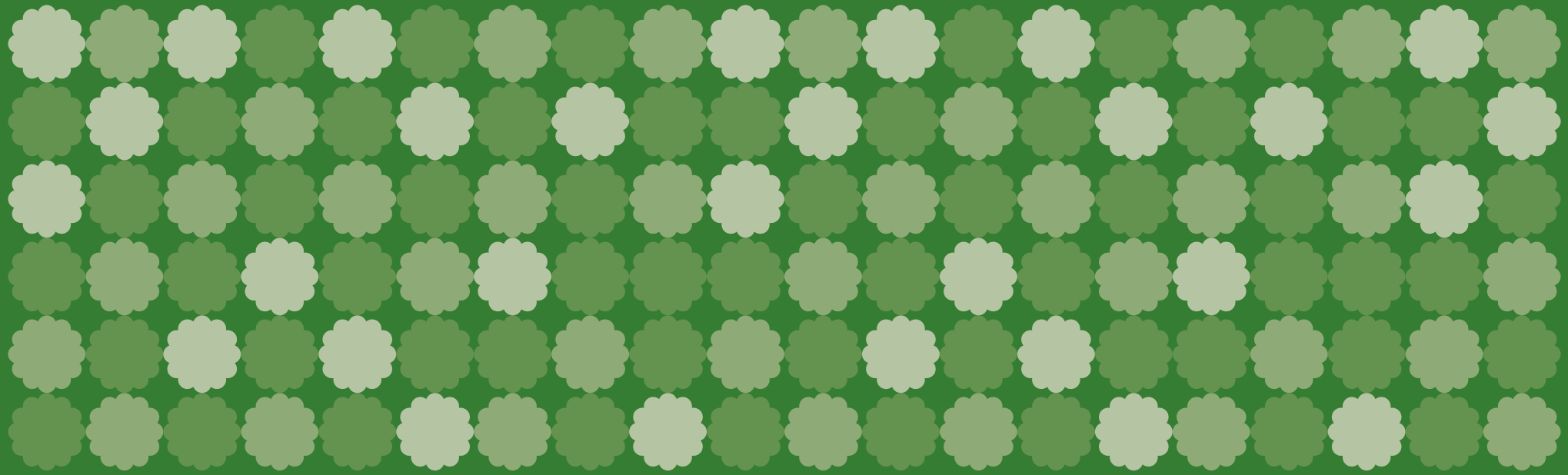
Start date: January 2022	Short term (0-9 Months)	Medium term (9 – 18 Months)	Long term (18 – 36 Months)
Green Rental Agreements	• Integrate Green Rental Agreements into the Good Landlord Charter - **GMCA** • Identify Landlords to develop a GM green rental agreement pilot - **GFI**	• Launch a GM green rental agreement pilot – **GFI**	
Retrofit Fund	• Host a Lender Roundtable to discuss the opportunity to establish a retrofit fund – **GMCA/GFI/Lloyds Bank**	• If appropriate, establish a retrofit fund - **GMCA/GFI/Lloyds Bank**	

Start date: January 2022	Short term (0-9 Months)	Medium term (9 – 18 Months)	Long term (18 – 36 Months)
Delivery			
Create a retrofit market in GM aimed at domestic properties with a local trusted supply chain	• Procure a project management agent to deliver retrofit plans to the willing to pay market (RetrofitGM) - **GMCA** • Develop a comprehensive programme of Social Housing retrofit including business case development, project pipeline, procurement, evaluation – **Registered providers** • Roll out the emerging findings and actions from the Heat Pump Accelerator Programme –**Pump Accelerator / Local Authorities** • Develop a Collective Purchasing initiative aimed at domestic properties for Heat Pump Installation - **GMCA/ suppliers/RetrofitGM provider** • Subject to opportunity bid for Retrofit funding with suitable partners – **GMCA/ Register Providers /Local Authorities** • Investigate the development of a unified GM approach to publicly coordinated "warm home" upgrades for residents in vulnerable circumstances, building on existing good practice - **GMCA/CCG/ Care&Repair** • Deliver the current Green Homes Grant offer to 1800 homes - **GMCA**	• Engage with suppliers and manufactures on collective procurement opportunities arising from Social Housing retrofit - **Registered providers** • Implement Heat Pump Collective Purchasing scheme and evaluate impact – **GMCA/Procured Supplier** • Review the impact and trajectory of the Willing to Pay Market – **GMCA** • Promote Retrofit GM to public sector employees – **Local Authorities / RetrofitGM** • Building on the lessons learnt from GM Solar Together, undertake a collective purchasing scheme for Solar PV/ battery with a finance offer – **GMCA / Suppliers** • Based on the investigation, consider implementing a unified approach to "warm home" upgrades for residents in vulnerable circumstances - **GMCA/ CCG/Care&Repair**	• Based on the shape and size of the emerging market review the attractiveness to inward investors – **MIDAS** • Based on impact and need, undertake additional rounds of collective procurement – **GMCA / Suppliers**

Start date: January 2022	Short term (0-9 Months)	Medium term (9 – 18 Months)	Long term (18 – 36 Months)
Increase the number and resilience of GM suppliers who can provided high quality retrofit service	• Develop, resource and implement a targeted business support offer to the retrofit supply chain – **The Growth Company / GMCC/ GMCA** • Identify and bid for any additional resources needed to support market develop actions - **The Growth Company / GMCC/ GMCA** • Engage the local supply chain with the emerging willing to pay market – **RetrofitGM agent**	• Create a simple access gateway for installers to find suitable training provision – **Colleges/The growth Company** • Identify emerging limitations on the local supply chain, and target support to address this – **GMCA/Colleges/ Installers** • Identify the specific needs of the early adopter social housing retrofit programme and engage suppliers / training providers / manufacturers – **Registered Providers / GMCA**	• Evaluate impact of Retrofit - **GMCA** • Review the shape, size and growth of the sector to determine what future support its needed - **GMCA / The Growth Company**
Create and maintain an open and transparent dialogue to ensure the lessons learnt are timely, understood and acted on	• Open dialog with domestic new build stakeholders to create a space for lessons and challenges to be learnt and resolved – **Budlings and Energy Innovation Challenge Groups**	• Ensure space for ongoing dialogue, collaboration and dialogue – **GMCA** • Review Lessons learnt considering the upcoming Future Homes Standard – **Buildings Challenge Group**	• Ensure space for ongoing dialogue, collaboration and dialogue – **GMCA**
Increase the level of innovative products, services and tools deployed to accelerate decarbonisation of commercial buildings	• Launch a Commercial Retrofit Innovation Challenge using live opportunities – **Energy Innovation Agency** • Promotion of the need and opportunity for retrofit in commercial buildings – **business support organisations** • Develop a Collective Purchasing initiative aimed at SMEs for Solar Photovoltaic panels - **GMCA**	• Implement the deployment of innovative retrofit solutions into commercial buildings –**Commercial landlords** • Create a rolling programme of challenge based innovation sprints – **Energy Innovation Agency** • Implement PV Collective Purchasing scheme and evaluate impact – **GMCA** • Engage Commercial Landlords to review post Covid challenges to building retrofit – **Buildings Challenge Group**	• Evaluate the impact of the Energy Innovation Agency – **EIA Board**

Start date: January 2022	Short term (0-9 Months)	Medium term (9 – 18 Months)	Long term (18 – 36 Months)
Increase the decarbonisation of the public estate	• Develop local public buildings retrofit procurement framework including feasibility studies - **GMCA** • Continue to deliver the existing Public Sector Decarbonisation Scheme and increase readiness to deliver future programmes - **Public Bodies / GMCA** • Develop a comprehensive programme of GM school retrofit and increased readiness including business case development, project pipeline, procurement, evaluation and dissemination - **Local Authorities / GMCA** • Develop the Go-Neutral programme of energy generation across publicly owned land assets up to 85MW - **Local Authorities / GMCA**	• Review progress to date across all retrofit programmes in line with agreed carbon budgets and emerging local and national policy - **GMCA** • Realise a rolling programme of retrofit delivery aligned to our agreed carbon pathway – **Public Bodies / GMCA** • Initiate and accelerate the implementation of GM Schools retrofit programme, identifying early lessons learnt - **Local Authorities / GMCA** • Based on lessons learn Develop a toolbox for none maintained schools and Governors to instigate retrofit programmes – **GMCA / Local Authorities / Academy's/ Dioecies** • Use the Go Neutral smart energy procurement framework to deliver 20MW of renewable and smart energy assists - **Public Bodies / GMCA**	• Review progress to date across all retrofit programmes in line with agreed carbon budgets and emerging local and national policy - **GMCA** • Complete the rolling programmes of public and maintained school retrofit works in line with agreed carbon budgets – **Public bodies/ GMCA** • Widen schools' programme to none maintained schools – **GMCA / Local Authorities**

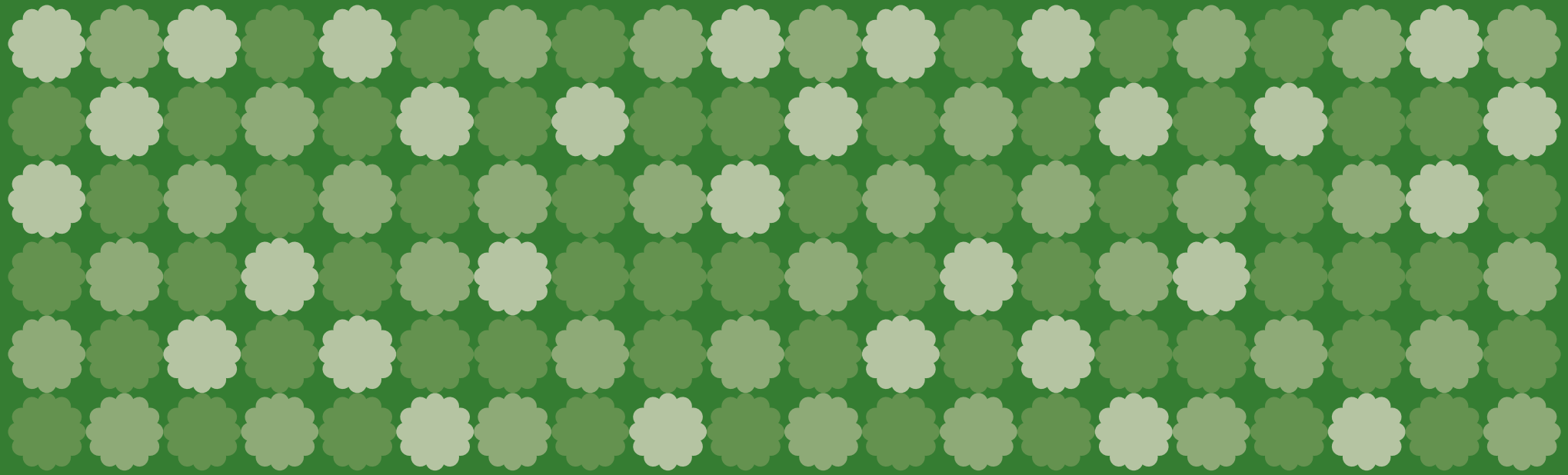
Annex 1: Performance Metrics



Deliverables	3 Year Total*
Number of public buildings retrofitted	300
Number of LA controlled schools retrofitted per annum	210
Number of socially rented homes retrofitted	7,200 (TBD)
Number of Willing to Pay owners engaged	20,000
Number of Willing to Pay homes improved	12,000
Number of households moving from EPC D or less to C and above	Monitor
Number of MCS renewable heating systems deployed in Greater Manchester	Monitor
Number of Retrofit Equivalents**	Monitor
Number of new TrustMark accredited installers in GM	1,000
Number of construction workers upskilled	1,100
Number of new apprentices in Construction Sector	3,600
Number of related qualifications completed through AEB	2,400
Number of related Green Careers engagements through GMACs	1,200
Number of GM Funding Pilots launched	4

* These figured will be reviewed every 12 months and revised accordingly dependent on how the market develops
** Similar to FTE, this is a measure of other overall improvement in the housing stock and is equivalent to the SAP rating increasing by 7 points e.g., if the total SAP score increases by 42, then this is 6 retrofit Equivalents

Annex 2: Infographic



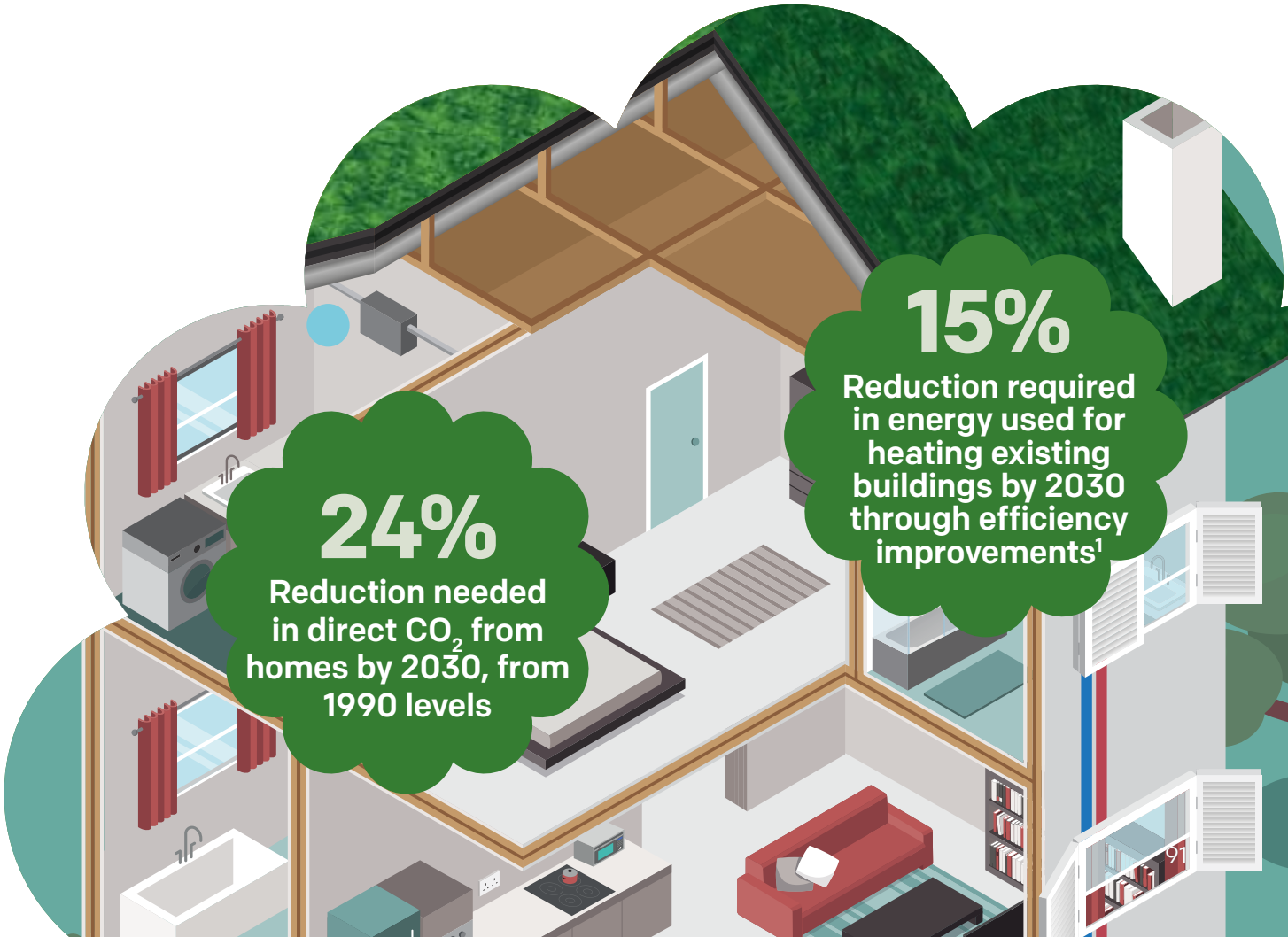
Homes of the future are needed today

Committee on Climate Change

Decarbonising and adapting the UK's housing stock is critical for meeting legally-binding emissions targets by 2050 and preparing for the impacts of climate change. The UK Government, householders and developers need to implement policies and measures now that ensure new and existing homes are fit for the future.

What does a low-carbon, sustainable home look like?

Current technology, and measures aimed at preparing for the impacts of climate change, can help new and existing homes to become low-carbon and ultra-efficient as well as adapted to flooding, heat and water scarcity.



Notes: [1]A 15% reduction relative to 2015.

Existing homes

Improving existing homes can help existing house-holders meet the challenges of climate change

1. **Insulation**
   in lofts and walls (cavity and solid)
2. **Double or triple glazing with shading**
   (e.g. tinted window film, blinds, curtains and trees outside)
3. **Low-carbon heating**
   with heat pumps or connections to district heat networks
4. **Draught Proofing**
   of floors, windows and doors
5. **Highly energy-efficient appliances**
   (e.g. A++ and A+++ rating)
6. **Highly water-efficient devices**
   with low-flow showers and taps, insulated tanks and hot water thermostats
7. **Green space (e.g. gardens and trees)**
   to help reduce the risks and impacts of flooding and overheating
8. **Flood resilience and resistance**
   with removable air brick covers, relocated appliances (e.g. installing washing machines upstairs), treated wooden floors

New build homes

New build homes can and should meet even more ambitious standards in some areas

- **High levels of airtightness** — A
- **More fresh air** — B
  with mechanical ventilation and heat recovery, and passive cooling measures such as openable windows
- **Triple glazed windows and external shading** — C
  especially on south and west faces
- **Low-carbon heating** — D
  new homes on the gas grid by 2025 latest
- **Water management and cooling** — E
  more ambitious water efficiency standards, green roofs and reflective walls
- **Flood resilience and resistance** — F
  e.g. raised electricals, concrete floors and greening your garden
- **Construction and site planning** — G
  timber frames, sustainable transport options (such as cycling)

What householders can do today

There are number of practical, easy and cheap steps that householders can take now to adapt their homes, and reduce their bills and carbon emissions:

1

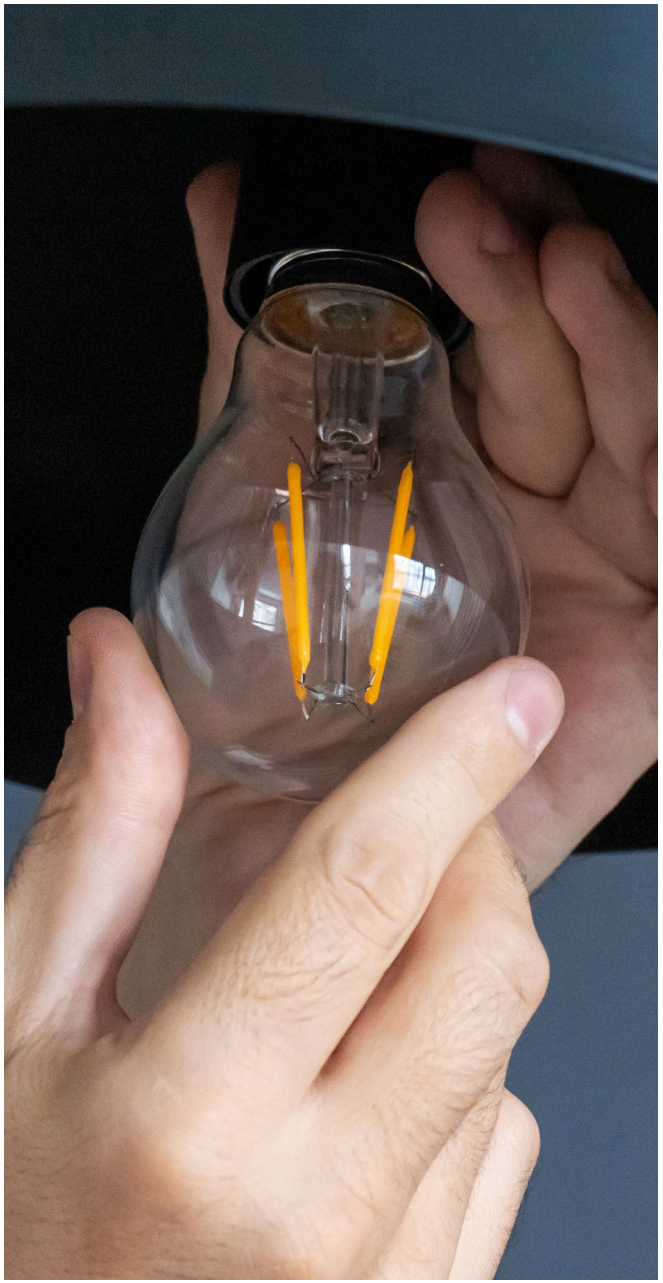
Improve home energy, heating and water usage and efficiency

- Install low-energy lighting, hot water tank insulation,
- low-flow shower heads and draught-proofing
- Turn off the lights/other electricals when not being used
- Turn taps off when brushing teeth, have shorter showers, check pipes for leaks and water gardens only as needed
- Install water and smart energy meters to manage water and energy use and help identify water leaks

2

Is the heating system working correctly?

- Install heating controls like timers and room thermostats
- Turn your thermostat temperature down to 19˚C



3

Reduce the risk of overheating in summer

- Opt for thick curtains or blinds (close them during the day), plant trees to provide shade and open windows at night

4

Flooding

- If you're in a flood risk area sign up to flood warnings and devise your own household plan to prepare for possible floods

Our recommendations to Government

The Government needs to take action in five areas NOW to improve the UK's housing stock and help achieve long-term emissions reduction targets. This includes:

- Enforcing standards, ensuring compliance with those standards and closing the 'performance gap'
- Delivering a step-change in construction skills
- Retrofitting existing homes so they are low-carbon, energy efficient and resillient to a changing climate
- Ensuring new homes are low-carbon, ultra energy efficient and climate resilient, with sustainable transport options
- Addressing urgent flooding needs

Read our new report! Find it online here:
www.theccc.org.uk/publications

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Version 1
January 2022