

HOUSING 2050

How UK social housing
can meet the challenge
of climate change



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Foreword

The Paris Agreement signalled a significant change in the way climate change should be addressed, putting the onus on businesses of all kinds to take responsibility for their emissions alongside countries. In the UK we have seen the publication of the Clean Growth Strategy and 25 Year Environment Plan, both signalling a change in tone from the Government as it tries to realign the economy amid discussions on Brexit. There is also growing public concern on environmental matters such as the level of plastic pollution in our oceans and water supply and air quality in our cities.

The science states that we must make significant reductions in CO2 emissions by 2050 in order to avoid the worst impacts of climate change. Typical financial planning cycles of 30 years for social landlords means that it is imperative to start planning now, before getting locked into financially-crippling strategies.

The UK social housing sector accounts for around 17% of all homes and as such bears a significant responsibility for reducing our CO2 emissions. Importantly, social landlords also have a responsibility to ensure that new and existing homes are adapted to forthcoming impacts of climate change. This research gives a snapshot into the current state of UK social housing and how landlords have progressed so far towards science-based climate change targets.

Financial constraints are forever present, so how can social landlords invest in their properties to meet their climate change responsibilities? This document provides many examples where landlords are using cost-effective techniques as well as novel financial mechanisms to ensure that housing is fit for the 21st century. In some cases the methods generate new money for landlords, whilst at the same time making homes more energy efficient.

It is hoped that the detail in this report will inspire others to assess where they are on climate change and to make the necessary changes. The examples should assist landlords in making more of a business case and help them generate new cash.

Executive summary

A major reduction in CO2 emissions is needed by 2050 in order to prepare for the worst effects of climate change. This research set out to discover how the current state of social housing aligns with this environmental need. The current energy efficiency of stock was compared against the science-based climate change target. In addition, the research sought to examine how well UK social housing has adapted homes in readiness for the adverse effects of climate change which are expected to get worse over the next 32 years. Social landlords and other key stakeholders were engaged through a combination of interviews, surveys and roundtables. Detailed energy modelling and forecasting was also carried out.

POSITIVE FINDINGS

- New finance and funding are providing forward-thinking landlords with extra income whilst at the same time making homes and operations less CO2 intensive.
- Energy-efficiency measures in homes are reducing costs for landlords.
- Products for insulation, low-carbon heating and clean energy generation are widely available.
- There are pockets of excellent examples where landlords have made progress on retrofitting existing homes so they emit low CO2 levels and building very energy-efficient new homes.
- Recent developments in electric vehicles now make them a very attractive proposition for urban fleets.
- Residents are increasingly interested in charging points for electric vehicles.
- Concerns over clean air are driving legislation and action on electric vehicles.

NEGATIVE FINDINGS

- "Business as usual" - homes continue to be built to standard building regulations and there is insufficient upgrading to reduce the risks of fuel poverty or CO2 emissions to safe levels by 2050.
- Low confidence amongst social landlords that they would meet 2050 science based targets.
- Interest and resources for developing the right strategies are lacking within many landlord organisations.
- UK social homes are not adapted to the adverse effects of climate change and there is very little interest in doing so.
- Levels of installing solar PV have dramatically declined in last few years.
- Long-term strategies that pave the way to making homes prepared for 2050 do not exist, despite being within the reach of most landlords' financial planning cycle.

KEY FINDINGS:

- Current social housing is not fit for 2050, nor will it be in "business as usual" scenario.
- 2050 is just over 30 years away, which aligns with landlords financial planning.
- Action is needed now to ensure 30-year plans are still financially viable given the "gap" in environmental performance.
- New finance models and cost savings are available to reduce CO2 emissions to safe levels, whilst at the same time being financially beneficial.



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Introduction Why Housing 2050?

Based on international science, the UK introduced an 80% reduction in CO2 emissions by 2050 in the shape of the Climate Change Act 2008. The successful Paris Agreement, which for the first time included the financial community, reinforced the world commitment to reducing CO2 emissions to safe levels. Also, the publication of the UK’s Clean Growth Strategy and 25 Year Environment Plan, both signal a change in tone from the Government.

2050 is a little over 30 years away which means it is in the planning cycle of social landlords. But is the UK’s social housing sector prepared for the business changes necessary to protect their futures and the futures of their staff and residents? That is the first part of what this research aims to assess.

Along with the projected dangers of climate change (flooding, heatwaves, water stress, food insecurity) come a huge range of opportunities. As well as creating a housing stock that protects the physical wellbeing of millions of people, there are financial opportunities. For example, \$13.5 trillion of investment will be needed to achieve the Paris Agreement aims that the UK has signed up to. New financial models can make this a viable reality for landlords.

This report presents a “gap” analysis between where we are now and where we need to be. The “business as usual” scenario is explored along with the opportunities and barriers that present themselves to landlords.

Key Questions

- The 3 key questions are:
- 1 Where do we need to be by 2050?
 - 2 What trajectory are we on at the moment?
 - 3 How do we get to 2050 targets?

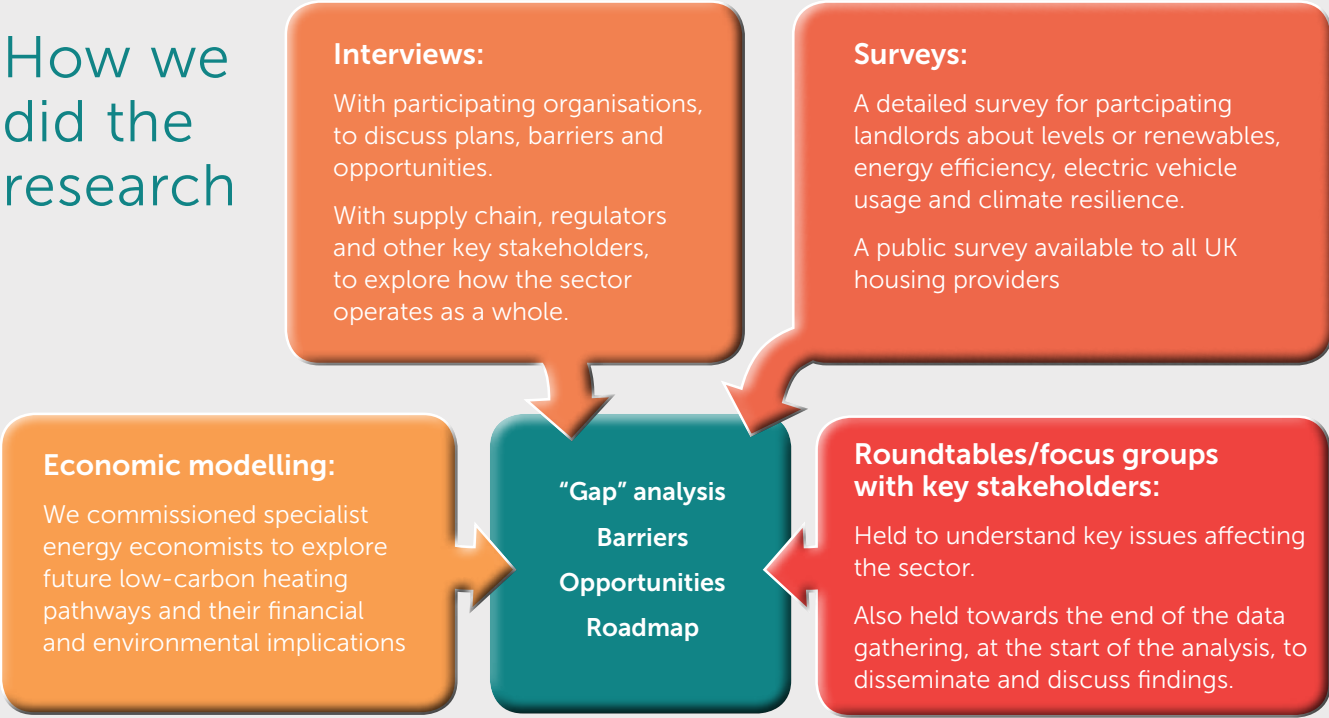
Key Themes

- The research was broken down into 6 main, intersecting key themes:
- | | | | |
|-------------|----------------------------|-------------|------------------------|
| KEY THEME 1 | Energy efficiency of homes | KEY THEME 4 | Electric vehicles |
| KEY THEME 2 | Low carbon heat | KEY THEME 5 | Climate resilience |
| KEY THEME 3 | Renewable and clean energy | KEY THEME 6 | Resources and capacity |

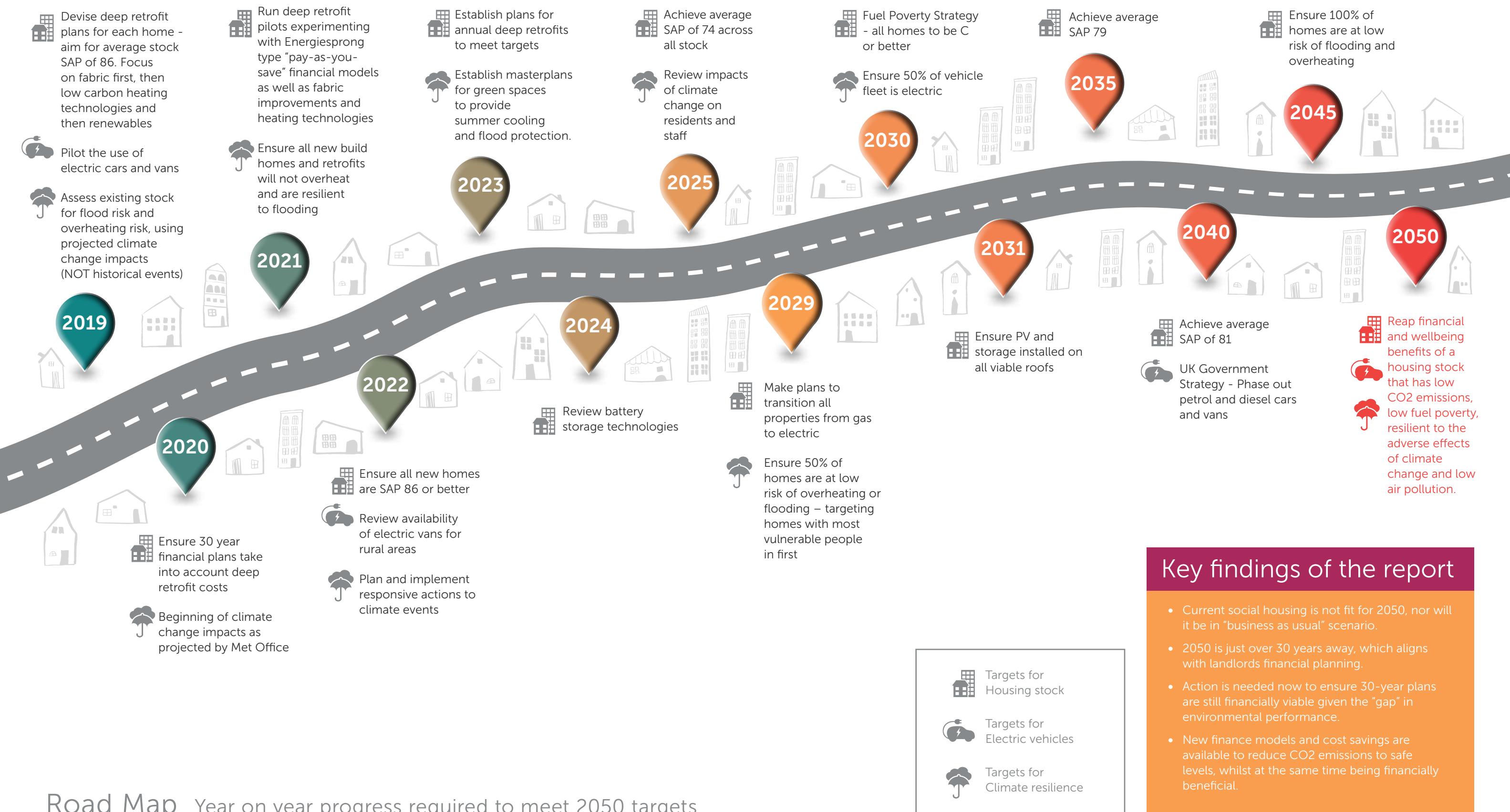
Landlords representing over 240,000 UK homes are represented in this research, along with key stakeholders

for climate change resilience and the supply chain. This range of participants reinforces the validity of the findings.

How we did the research



Research was conducted between July and December 2018



Road Map Year on year progress required to meet 2050 targets

KEY THEME 1

Energy efficiency of homes



FINDINGS

Although the majority of homes are in the EPC C category (Fig 1), social homes are not on track to reach an average SAP of 86 by 2050 and very few landlords have plans for deep retrofit beyond 2030. The EPC "C" by 2030 target is on the radar of some landlords, but the economic modelling (Fig 2) shows that relying on this alone will not bring CO2 emissions down to the safe 80% CO2 reduction level.

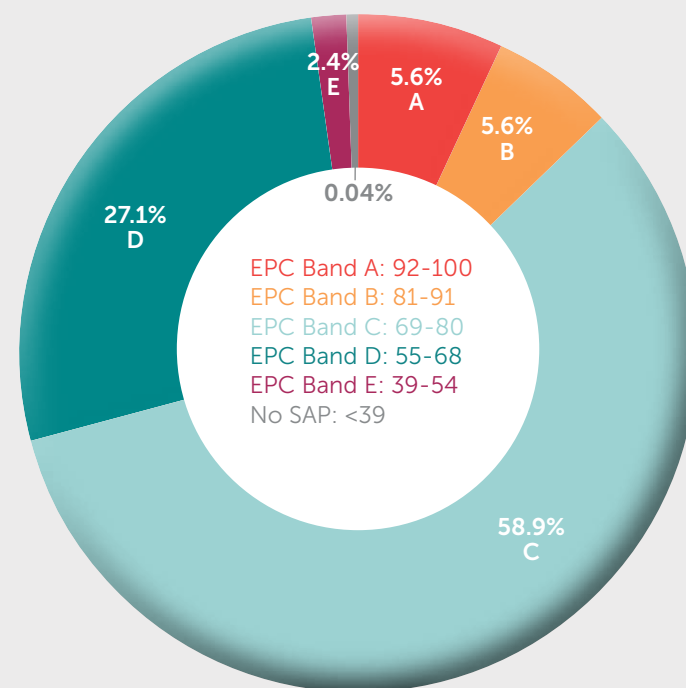
Adding new-build homes to the stock does go some way to reduce housing stock CO2 emissions, assuming there is an increased rate of build and higher than building regulations energy efficiency standards. However, our findings show the number of new homes being built to **EPC band A is minimal**.

Despite this shortfall, overall this is an area in which **the social housing sector can lead the way**, initially using fuel poverty reduction as a driver. Concurrently, landlords can take advantage of the wide range of commercial and financial opportunities that exist for improving value for money whilst reducing CO2 emissions.

ACTIONS TO BE TAKING NOW

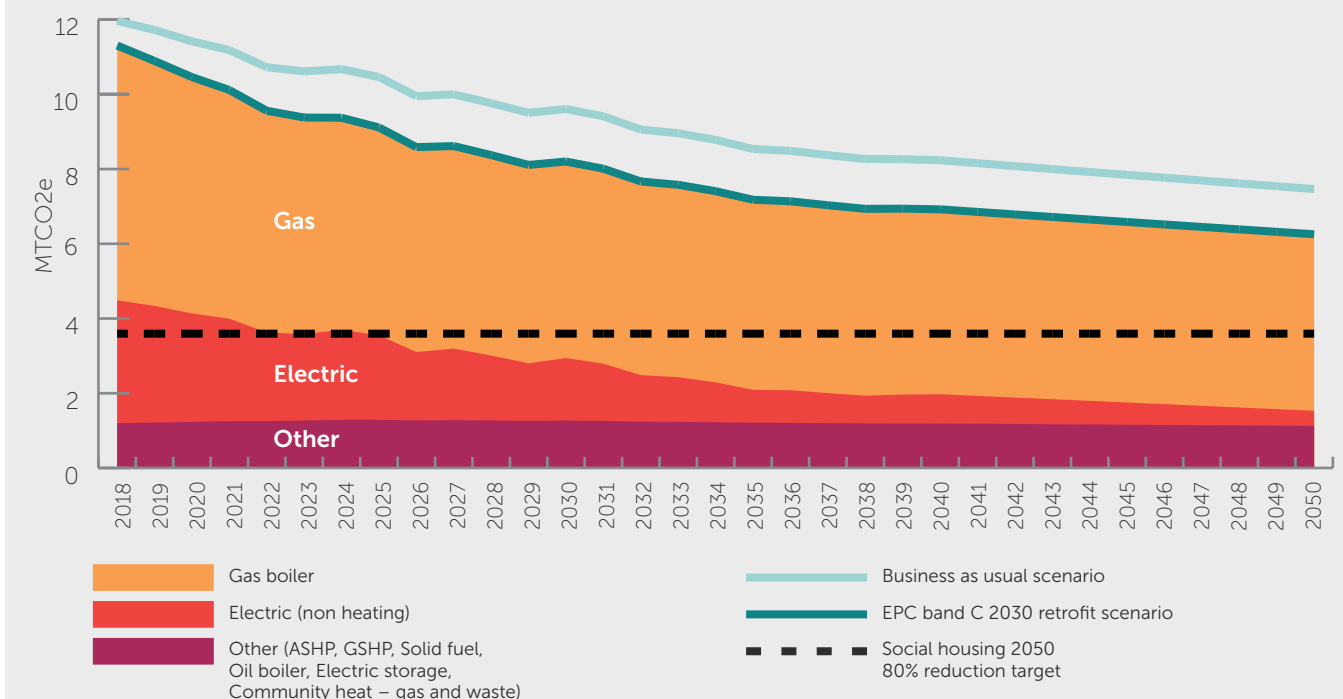
- Ensure an **up-to-date record of the sustainability performance** of existing stock is a priority.
- Develop a clear strategy for achieving 2050 targets (ie SAP 86) which will also reduce residents' bills and maintenance costs.
- Take every opportunity to integrate deep retrofit work with major cyclical works - especially have a long term "whole house plan" which should be referred to for all fabric works.
- Focus on fabric first, then look at efficient forms of heat generation. Do not focus on funding and then trying to make it work.
- Set **SMART targets for CO2 reductions**. This is important because it is a way of engaging all levels of the organisation, as it is often cited as a top priority.
- Establish new-build standards **beyond building regulations** and work with contractors to ensure **high standards are met in practice**.
- Consider the opportunities being offered by Modern Methods of Construction (MMC).

Figure 1: Current distribution of energy efficiency



Current distribution of energy efficiency. A 2050 target is that the "average" SAP should be 86 or in the middle of the EPC "B" band.

Figure 2: Social housing emission projection – EPC Band C 2030 Retrofit scenario



The business as usual scenario will not deliver the necessary CO2 reductions.

AREAS TO MONITOR

- Increasing viability of **emerging technologies, standards and financial models** e.g. modular housing, Home Quality Mark (HQM), Energiesprong (deep retrofit paid for from money identified for cyclical repairs and from an Energy Plan that residents pay in to).
- Future improved funding opportunities for expensive measures, particularly solid wall insulation.
- Changes in the SAP methodology may mean that existing SAP ratings may need to be revised.
- Projects showing the financial viability of **zero-carbon new builds and retrofits**.
- In Wales recent rent policy has allowed social landlords to increase the amount of rent they can charge. This has driven some SAP improvements.
- **Social rent** funding for **new build** may be an option as there is growing recognition that grant funding based on affordable rent in high value areas is not truly affordable for residents.

Example

One major London housing association participating in this research reported significant investigation into an off-site manufacture for new build. The drivers were both cost savings and improved new build standards.

KEY THEME 2

Low carbon heat

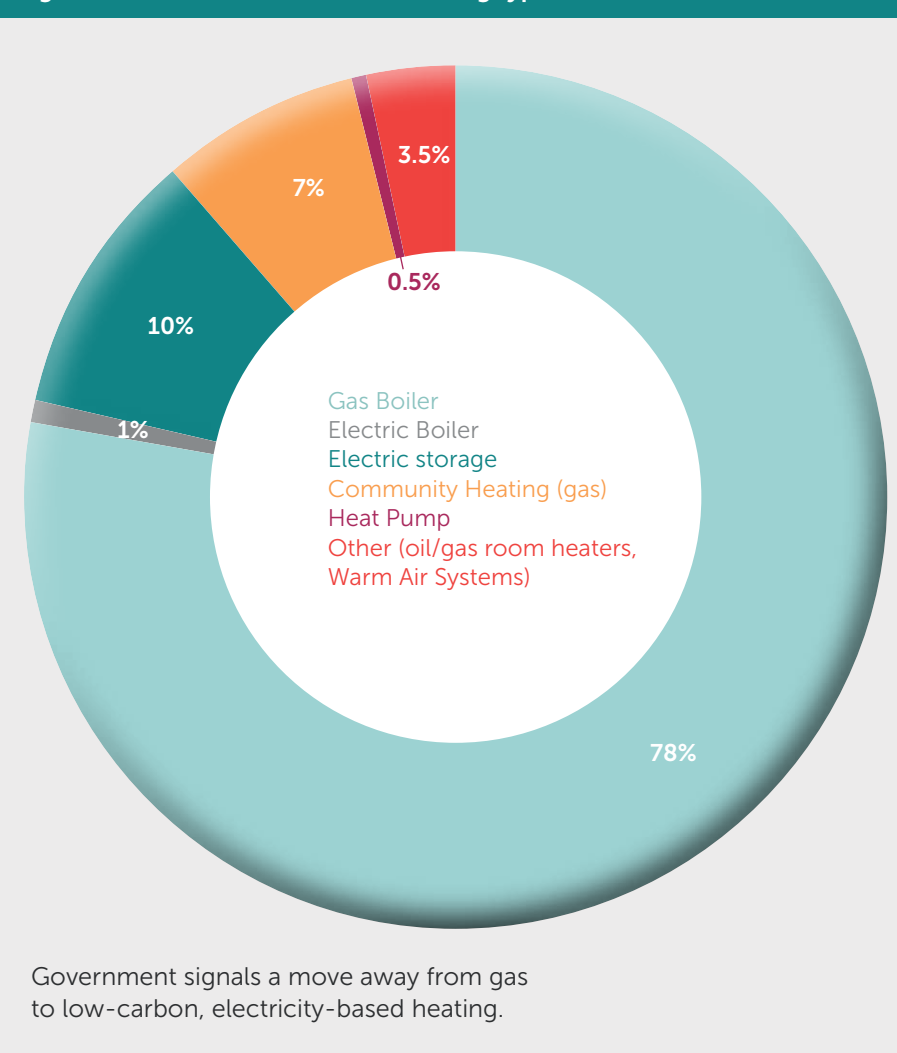
FINDINGS

There is no concerted drive to transition from electric storage, oil and solid-fuel heating to low-carbon heat. Where interest exists it is primarily aimed at heat pumps installation. The chart below (Fig 3) shows the main types of heating currently installed at participants' stock.

There is minimal interest in a transition away from gas and it dominates as a heating source. This is despite Government signals to switch to all-electric domestic energy supply. However, the research found uncertainty over the future of low-carbon heat (in terms of both technology and policy). Alongside the convenience of gas, the clear lack of policy direction has limited substantial action.

There was some success with Mechanical Ventilation with Heat Recovery (MVHR) systems in new-build homes. The key message was that these systems need to be designed, installed and commissioned by contractors who know what they are doing. Another important element for success is to engage residents in plenty of time so that they understand that MVHR works in a different way to heating systems they may be more used to. Although not officially classified as low-carbon heat for Renewable Heat Incentive purposes, MVHR certainly is very low carbon as it relies on high levels of insulation in the home as well as heat generated from the sun and human activity in the home.

Figure 3: Current distribution of heating types



ACTIONS TO BE TAKING NOW

- Replacement of off-gas grid heating systems with heat pumps is proving popular because of funding opportunities. However, a fabric first approach should always be borne in mind.
- Set rigorous, clear **specifications** for design, installation and commissioning of new types of systems such as heat pumps.
- Raise internal levels of expertise about new technologies to ensure housing providers make the most of opportunities and don't suffer unduly from new technologies and requirements.
- Seek out **public-private partnerships** for low-carbon communal heating systems. For instance one participant had Ground Source Heat Pump (GSHP) installed for free. The installer received the Renewable Heat Incentive (RHI), the resident gets cheaper heat and the participant gains the GSHP when the lease term is complete.
- Install MVHR systems in new builds. This also leads to low levels of fuel poverty and damp and condensation.



AREAS TO MONITOR

- Hydrogen and fuel cells were mentioned as a complementary technology to heat pumps.
- Funding opportunities from BEIS to explore new forms of low carbon heat.

KEY THEME 3

Renewable and clean energy



FINDINGS

Perhaps unsurprisingly this research found that investment in renewable electricity has generally plateaued or declined. The main reason given was lack of funding.

However, we found that **opportunities for public-private partnerships are under-utilised**. For example, one participant used a private company to install PV panels for free and then charged residents a lower rate for the electricity generated from them. Fig 5 shows survey results that indicate that many landlords are pursuing renewable energy installations for organisational cost savings.

Landlords reported a growing interest in **emerging technologies** such as battery storage, smart homes and distributed energy, but markets are still immature.

The energy modelling (Fig 6) shows that only a combination of higher new-build standards, renewable installation, deep retrofit and low-carbon heat will achieve 80% CO₂ reduction and landlords should start planning for this now.

Figure 4: Number of homes installed with solar PV, thermal, ASHP or GSHP since 2010

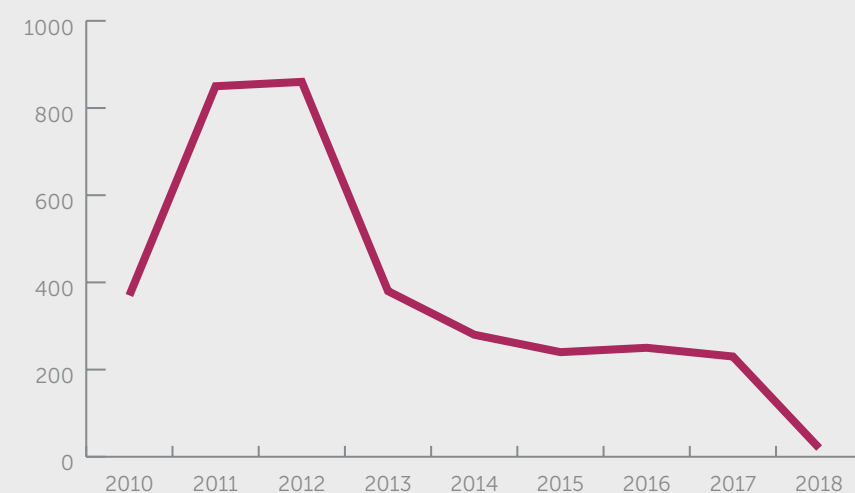
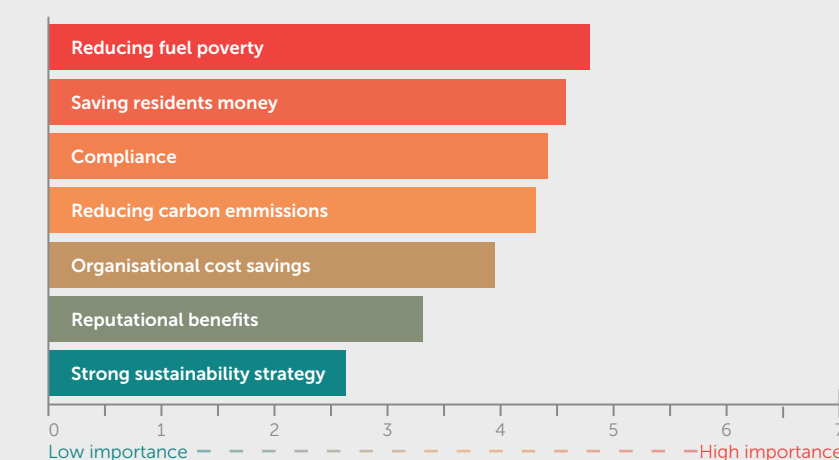


Figure 5: The importance of various drivers for installing renewable energy systems, as reported by landlords



"Fuel Poverty" was the highest importance, but "organisational cost savings" also came out as quite high in importance

ACTIONS TO BE TAKING NOW

Housing providers should **consider innovative joint ventures** and business partnership solutions (while recognising the potential risks).

Plans are needed for a transition to a low-carbon, distributed, flexible-energy future, in which housing providers will play an important role. Landlords should consider a role as an ESCo.

AREAS TO MONITOR

Falling capital costs and **increasing financial viability** of PV and battery storage.

Pioneer battery storage trials, particularly within private sector. Technology is currently pricey so it's worth waiting until they have been field tested and cost-effective options are available before investing.

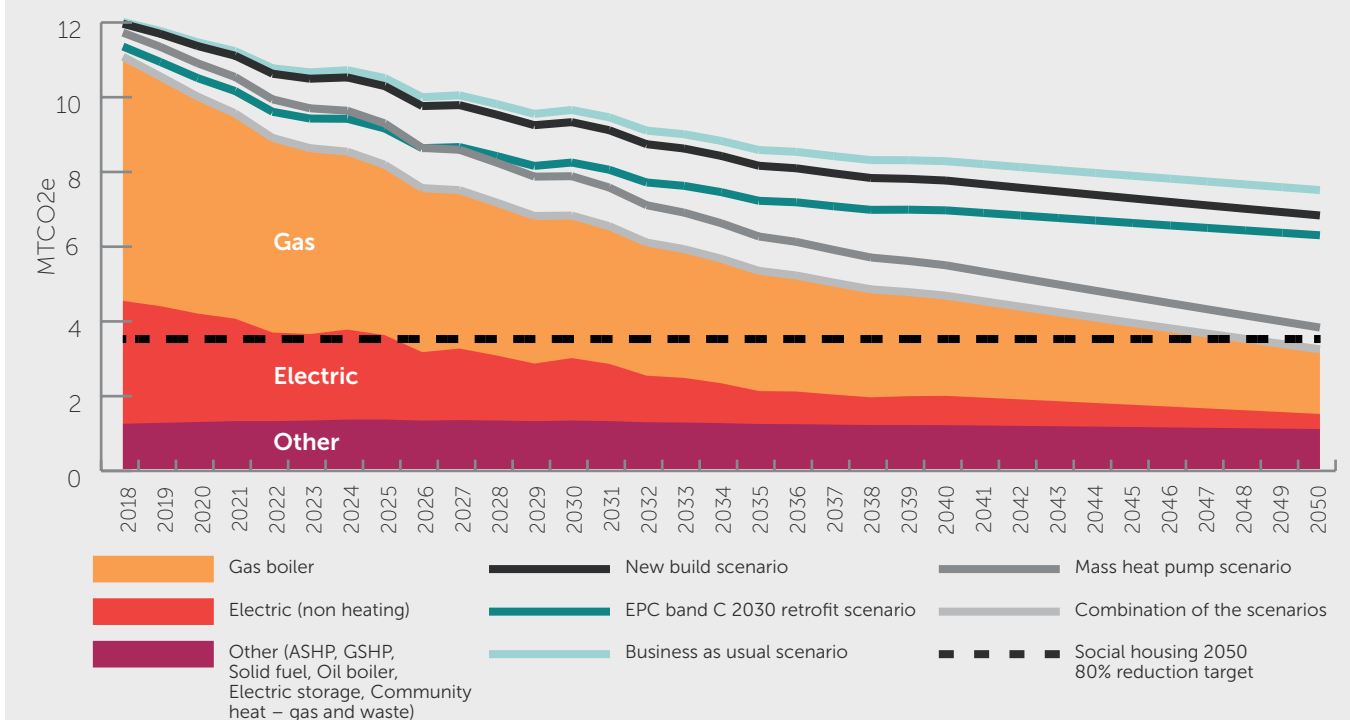
Case study

By focussing on good energy strategy, utilising partnerships with external companies and making convincing business cases to stakeholders, Colchester Borough Homes (~6,000 homes) have:

- Secured £1.2 million external funding
- Secured £22 million in equipment and organisational cost savings
- Reduced maintenance costs
- Gained an excellent reputation for the organisation
- Installed PV on over 48% of all roofs

George Phillips, Energy Manager, Colchester Borough Homes

Figure 6: Social housing emission projection – Combination of scenarios



Only a combination of measures will result in a reduction of CO₂ emissions to safe levels.



KEY THEME 4

Electric Vehicles

FINDINGS

Electric vehicle infrastructure is beginning to be installed but at a very low level. Participants had installed a total of 84 items. Items included home charge points, office charge points and fleet vehicles. The current situation compares very poorly with future ambitions. Government has a strategy to ban sale of petrol and diesel vehicles by 2040.

EVs are on participants' radars. Charging points will be on some new-build specifications. In addition, resident requests and an attractive financial case are driving increased interest.

ACTIONS TO BE TAKING NOW

- Check **whole-life costs** when choosing between EVs and combustion engine vehicles.
- Establish an **EV strategy**, with specifications for EV where economically feasible.
- Investigate opportunities to **couple business/maintenance fleets with resident pool car schemes**, to optimise EV and charging point usage and ensure that price point is not a limiting factor on residents' uptake of EVs.
- Provide charge points in office car parks to encourage employee EV uptake. It is cost effective to install more than is needed at the moment, rather than expand when demand increases.
- Install the infrastructure for future charging point expansion when putting in new charging points.
- Couple any EV roll-out with **sufficient training and support** for users to ensure a smooth transition.
- Make the most of the current interest in EVs to channel employee engagement and enthusiasm.

AREAS TO MONITOR

- Reduce EV costs and increased range which improve the viability of EV fleets in rural areas.
- Increased congestion charges and low-emission zones in urban areas across the UK.
- Emergence of vehicle-to-grid (V2G) capability – car batteries can be used to store renewable energy for the home.
- On a whole life-cost basis there is usually a **strong financial case for electric maintenance fleets** in urban areas.
- **New business models of car sharing and usage** are emerging, which housing providers are ideally situated to take advantage of. For example, EV business car/maintenance fleets shared with residents out of hours.
- **Air quality and congestion charges** are key drivers of EV uptake, which may mean EVs will have to be adopted for compliance reasons rather than financial reasons.



Example

Electric bikes, purchased for housing officers on short trips, have saved money and travel.

Bernie McCullagh,
Sustainability Manager, WM Housing

[Electric Vehicles 4p per mile]

[Petrol/diesel 6.5 - 11.5p per mile]

[Electric Vehicles 66% less CO2 (even better if renewables are used to charge batteries)]

KEY THEME 5

Climate resilience

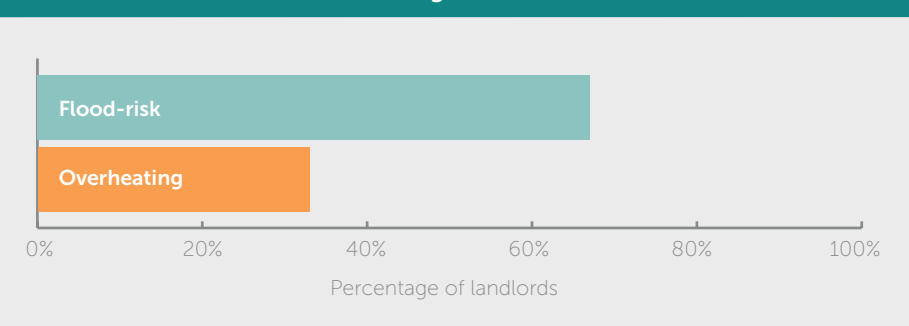
FINDINGS

There is a tendency for climate resilience measures to be **perceived as low-priority**. Even after an exceptionally hot summer in 2018, which has generated discussion around overheating risk, little substantive action has been triggered. While some organisations have had flood risk assessments, few have undertaken comprehensive overheating assessments.

Even where risks are assessed, **very little action has been taken to improve housing resilience**. Landlords have chiefly taken a reactive approach, responding to issues as they arise rather than a strategic approach to prevent future problems.



Figure 7: Percentage of landlords to have undertaken flood-risk assessment or overheating assessments



ACTIONS TO BE TAKING NOW

- Actions should be framed around futureproofing and stranded assets rather than climate resilience (there is a strong practical and financial case for action that goes beyond the seemingly abstract concept of climate adaptation).
- Prioritise flooding and overheating risk assessments.
- Identify opportunities for projects with multiple benefits, e.g. regeneration and placemaking with vegetation that reduces flood and overheating risk, improves air quality and health/wellbeing and reduces carbon dioxide emissions.
- Identify **low-regret measures** for at-risk properties with vulnerable residents first (including behaviour change). These should be low cost.

- **Work collaboratively with insurance companies** to work out mutually beneficial and innovative solutions (e.g. reduced insurance premiums on the proviso that all stock will have flood/overheating measures).

AREAS TO MONITOR

- The **UKCP18 climate projections** (released in November 2018) should help to build a stronger case for climate change resilience.
- Increased incidence of climate related events, e.g. heat waves and flooding.

KEY THEME 6

Resources and capacity

There were a range of approaches to how environmental work was resourced. The average was 2.1 full-time employees per 10,000 homes with specific job titles relating to environmental objectives. Other participants had as many as 5.5 employees per 10,000 homes. Some participants had environmental skills and tasks distributed amongst other staff who also had different main roles.



[40%] average confidence of the organisation achieving 80% CO2 reduction target

[70%] average confidence of their organisation achieving internal environmental targets



Key recommendations and conclusions for social landlords

On a positive note, this research found that there were lots of examples where landlords had carried out works that will help get the UK's social housing stock closer to high levels of energy efficiency. In a lot of cases the interventions are actually generating cash and cost savings for landlords. This will go some way to mitigating CO2 emissions and reducing the adverse effects of climate change.

However, there was no evidence of a large-scale drive to achieve 2050 targets, even though this is within reach of the 30-year planning cycle for most landlords. It also means that landlords are missing out on new cash and costs savings. Furthermore, it was clear that the business-as-usual scenario will not be enough to reduce CO2 emissions to safe levels; neither will achieving 2030 Fuel Poverty Strategy aims nor new-build homes. A combination of many interventions is needed.

EXISTING HOMES

- Develop a whole house retrofit plan for each home to be retrofitted to a high level of energy efficiency - and average housing stock SAP of 86 aligns with 80% reduction of CO2 emissions. Interventions may not be affordable right now, but it is essential to have a plan to prevent "dead end" technologies being installed. Focus on fabric first.
- Explore deep retrofit solutions that use money you would spend anyway over the next 30 years. There are mechanisms around that will also allow landlords to recoup some of the cost from the residents' energy bill savings. Where deep retrofit is not possible or is not viable now, explore

funding for other interventions that suit the long-term plan; ECO3, FIT and RHI are still around. Partnership deals with external suppliers can also prove lucrative and reduce CO2 emissions and mean that no upfront costs are required.

- Investigate the links between energy-efficient homes and reduced maintenance costs for your stock. This will help make the business case for increased energy efficiency.
- Educate and upskill relevant staff in energy efficiency and new technologies and your long-term plan. This will mean that only effective correct interventions are deployed.

As well as reducing CO2 emissions now, homes need to be adapted to the projected adverse effects of climate change. These are increased flood risk, reduced water security and overheating. Sadly, the evidence gathered in this research found that the UK social housing stock is a long way from being adapted to climate change.

So what should landlords do? One option is to wait until regulations or other policy drivers force landlords into compliance. The science of climate change is well understood and it is highly likely that if voluntary approaches don't work, then legislation will come. Compliance with new rules is most often costly and disruptive and may come too late.

The ideal approach is to start work now. This will be a less disruptive approach. It will also mean that landlords can start generating new money and cost savings.

- Carry out detailed assessment for flood and overheating. Ensure that future climate is used and not historic climate. For example, flooding is now more likely to come from surface water runoff rather than river flooding. Heatwaves are projected to become more prevalent than they have in the past. Once risks have been identified, either install "low regret" measures or design reactive responses. The costs of dealing with flooded or overheated properties can become very high. Preventing flooding and overheating will save costs in the long run.

NEW HOMES

- Ensure that a SAP 86 is the minimum build standard.
- Explore and experiment with low cost build that will result in energy efficient homes. New methods are becoming available and one example is off-site manufacture.
- Explore and experiment with MVHR systems. They have been successfully and cost-effectively installed in homes from participating organisations. These are extremely low CO2 heating systems. The key is to pay attention to correct design, installation and commissioning. It is also crucial that residents are trained to use the new systems.
- Ensure new homes are flood resilient. Ensure projected climate is incorporated into the risk assessment and do not rely on past flood events as an indicator of flood risk.
- Ensure new homes are at low risk of overheating, again using projected climate scenarios.
- Use robust methods of overheating risk assessment. The methodology in building regulations is clearly not robust enough as residents in new homes have experienced overheating.

OPERATIONS

- Explore and experiment with electric vehicle fleets. Electric cars are viable on a whole-life costing basis and they reduce CO2 emissions and localised air pollution. Maintenance vans are reported to be viable in urban areas.
- Keep an eye out for new developments for electric vans in rural areas. Battery technology is moving very rapidly.

FINAL THOUGHT

It is clear that social landlords must start planning now for climate change. As well as helping to prevent extreme adverse effects of climate change, the opportunities for increased financial income and costs savings are immense.

It is hoped that landlords are inspired by this research and will take on board the recommendations. Ultimately, following a low-carbon agenda can help housing providers deliver on their social purpose by ensuring that residents have resilient, high-quality homes, low-energy bills and access to new technologies that facilitate a low-carbon lifestyle.



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PARTICIPATING ORGANISATIONS

Sustainable Homes would like to thank all the participating organisations in this research.

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OTHER CONTRIBUTORS:

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Our mission is for every
home to encourage more
sustainable lives.

We work with housing providers across all tenures, local authorities, central government and the supply chain to reduce fuel poverty and improve sustainability in the housing sector.

With over 10 years' experience in the sector we have carried out baseline environmental assessments, gap analyses, climate change risk assessments and strategy development for a huge range of clients.

We take a practical approach and understand the realities of working in the sector. If you would like us to work for you to derive workable solutions to climate change or other environmental matters, please contact us.

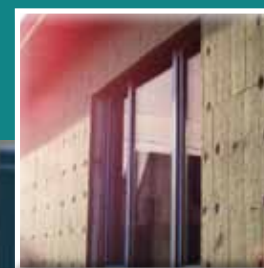
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