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Improving heat pump outcomes in social housing: a practical action guide

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This guide reflects the best available knowledge at the time of publication. It is intended as general, educational guidance to help local authority social housing providers specify and assure heat pump installations. It may not apply to the facts of individual cases. Professional judgment should be exercised case by case, in line with applicable laws, standards (including MCS MIS 3005) and best practice.

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The structure, practical focus and many of the specification and quality assurance approaches in this guide are directly informed by Bristol City Council's ongoing experience of procuring, auditing and supporting heat pump installations across its social housing stock, with particular thanks to Matt Jones for sharing detailed materials, insights and lessons learned from live delivery programmes.

Academic input and review were provided by Dr Ruzanna Chitchyan (University of Bristol).

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Led by Glyn Hudson and Trystan Lea, HeatPumpMonitor is an open-source community initiative to share and compare real-world heat pump performance data. The site provides detailed evidence on how system design, commissioning and operation influence real-world heat pump performance. It is a key peer-to-peer learning resource used by customers, installers and anyone wishing to understand how to design, install and optimise heat pumps for high performance and low running costs.

This is intended to be the first iteration of a document that will continue to be refined through feedback from local authorities and delivery partners using the guide in practice.

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Innovate UK's £60 million Net Zero Living Programme is helping local authorities and businesses work together to deliver new solutions that improve local services and open markets for economic growth. Places across the UK are seizing the opportunities that come with decarbonisation to create warmer homes, cheaper local energy, new skills, and more secure work for their communities. But often, while the technology is available, places face barriers in areas such as resources, investment, planning and buy-in. The 52 local authorities taking part in the Programme have generated a wealth of experience on overcoming systemic barriers to net zero solutions.

For more information see: https://iuk-business-connect.org.uk/programme/net-zero-living/

Abbreviations and acronyms

ASHP – Air source heat pump

BS EN 128311 – European standard for room heat loss calculation

CIBSE – Chartered Institution of Building Services Engineers

COP – Coefficient of Performance (instantaneous efficiency)

DHW – Domestic hot water

DNO – Distribution Network Operator

eSCOP – Economic Seasonal Coefficient of Performance, the electricity price-weighted seasonal efficiency (modelled)

FGas – Fluorinated gas certification for refrigerants

HTC – Heat transfer coefficient (whole-house heat loss rate)

MID – Measuring Instruments Directive (meter accuracy class)

MCS – Microgeneration Certification Scheme (installer/product certification)

PAS 2030/2035 – BSI retrofit standards for installation/design/oversight

SCOP – Seasonal Coefficient of Performance (modelled 12-month efficiency)

SPF – Seasonal Performance Factor (measured 12-month efficiency)

TRV – Thermostatic radiator valve

UFH – Underfloor heating

WC – Weather compensation

Contents

1. Executive summary

1.1. Purpose of the guide

This action guide is designed to help local authority social housing providers to specify, procure and manage air-to-water heat pump installations that deliver reliable, high-performance outcomes, going beyond minimum compliance with standards.

It is intended for the social housing delivery workforce, including teams involved in programme design, procurement, technical assurance, asset management, resident engagement and contract management.

Heat pump outcomes vary widely depending on system design, installation quality, commissioning and ongoing operation. While installer accreditation and compliance with standards such as MCS are necessary, evidence from monitored installations shows they are not sufficient on their own to guarantee good outcomes.

Systems can meet minimum requirements yet still result in high running costs, comfort issues, increased maintenance burden and resident dissatisfaction. Poorly performing systems increase call-outs and component failure risk for landlords, raise energy bills for residents, undermine confidence in heat pumps, and reduce the carbon savings that public investment is intended to deliver.

Social housing teams need to be able to ask the right technical and operational questions of installers without needing to interpret multiple detailed standards and guidance documents. This guide addresses that need by walking through the key decision points across the heat pump delivery journey, from specification and design through to commissioning, handover and operation, that most strongly influence in-use performance. For each decision point, the guide sets out:

- what needs to be decided, and why it matters for performance, cost, comfort and deliverability
- what best-practice evidence suggests are the most important parameters to get right;
- specification-ready prompts (questions, evidence requirements, and checks) that can be built into tenders, designs reviews, commissioning sign-off and post-installation verification.

This is a UK-wide guide, with the core technical principles relevant to local authorities in England, Scotland, Wales and Northern Ireland.

This guide does not replace formal technical standards (such as MCS, CIBSE or PAS 2035), nor is it an installer training manual. Instead, it distils good practice evidence into a procurement-and delivery-focused format that helps social housing providers to specify, interrogate, assure and verify the factors most strongly linked to delivering high-performing heat pump systems in social housing.

1.2. How to use this guide alongside MCS minimum standards

This guide supplements the MCS MIS 3005 standards and related scheme rules. It does not replace them. Where this guide sets stricter requirements (for example flow temperature targets or evidence requests), treat those as additional client specifications to be met in addition to MCS minimums.

Background and context

1.3. Why are specification and audit so important?

Historically, when social landlords have procured heating systems, they have procured equipment. A gas boiler is specified, installed and, provided it meets building regulations, will typically operate within a relatively narrow and predictable range of efficiency, usually within around ±10% of average performance. As a result, there has been little need to specify or manage performance outcomes explicitly.

Heat pumps are fundamentally different in the extent to which system design, installation, commissioning and operation affect efficiency and running costs. In practice, this means that outcomes can vary widely between installations that are nominally compliant with the same standards.

Evidence from large-scale field trials highlights the scale of variation in real-world heat pump performance, measured primarily by the Seasonal Performance Factor. Seasonal Performance Factor (SPF) represents the ratio of useful heat delivered compared to the electricity consumed by the system. Higher SPF values indicate better real-world efficiency and lower running costs. The Electrification of Heat Demonstration Project, often regarded as indicative of average heat pump performance, recorded an average Seasonal Performance Factor (SPF) of 2.8 across its monitored sample. By contrast, data from the community-led HeatPumpMonitor initiative, which includes a higher proportion of systems designed by specialists in low-temperature heating, shows an average SPF of 3.9. This difference equates to around a 30% lower cost per unit of heat compared to an SPF of 2.8.

Based on April-June 2026 Ofgem energy price cap GB average unit rates (24.67p/kWh for electricity, 5.74p/kWh for gas) and assuming 85% boiler efficiency, a heat pump typically needs to achieve an SPF of at least 3.7 to match or undercut the running costs of a gas boiler being replaced. Systems that fall below this threshold will likely increase household energy bills (where not paired with solar PV and/or domestic battery) and risk deepening fuel poverty for the very households they are intended to help. This is particularly true for social housing, where residents usually have little control over system design or installation quality, yet are exposed to the consequences if systems underperform.

The factors that determine where a system falls on this spectrum are well understood. Accurate heat loss calculations, appropriate system sizing, correct emitter specification, low design flow temperatures, properly configured weather compensation controls, thorough commissioning supported by a clear, resident-focused handover from the installer to the resident, and post-installation monitoring and optimisation all contribute to high performance.

These are not marginal technical details: they directly affect resident comfort, energy bills, maintenance demand and carbon savings. When any of these factors are weak, performance suffers, sometimes dramatically. Resident education and engagement are also critical; even a well-designed and commissioned system can perform poorly if control settings are changed without an understanding of the implications for efficiency and comfort.

For social housing providers, poor outcomes carry particular risks. Underperforming installations can lead to higher bills, comfort complaints and reduced confidence in low-carbon heating. They also create a long-term liability for landlords, increasing reactive maintenance, call-outs and the risk of premature system and component failure. From a decarbonisation perspective, poor performing systems also deliver materially lower carbon savings than well-designed and well-operated installations.

Industry accreditation and compliance frameworks (for example, MCS certification, Level 3 installer qualifications and TrustMark registration) provide important baseline protections, but they are not, on their own, sufficient to guarantee high-performance outcomes. Installations can meet minimum requirements and still perform poorly if key decisions are weak or unchecked. Without clearly defined performance expectations and a mechanism to verify them, social landlords have limited visibility of whether systems are delivering what was intended.

Recent findings from the National Audit Office's statistical audit of solid wall insulation installed under ECO4 and GBIS schemes have reinforced these concerns across the retrofit sector more broadly.[5] While heat pumps were not included in that specific audit, the reputational and practical risks are directly transferable: poor-quality installations undermine public trust, waste public investment, and harm the households they are meant to protect.

Social landlords cannot afford to leave performance to chance. By specifying the outcomes they expect, and by understanding the technical decisions that determine whether those outcomes are achieved, procurement and delivery teams can ensure that heat pump installations deliver the efficiency, comfort and affordable running costs that residents need and that public funding rightly demands. **This guide is intended to support that shift from procuring equipment to procuring performance.**

Specification alone, however, is only half the picture. Without robust audit and monitoring, social landlords have no way of knowing whether the systems being installed in their homes are actually performing as specified. Too often, heat pump programmes proceed with limited visibility of real-world outcomes. Systems may be commissioned, signed off and handed over without anyone checking whether flow temperatures, efficiency levels or resident comfort are in line with what was agreed. Problems that could be identified and resolved early go undetected, sometimes for entire heating seasons.

Audit undertaken by skilled professionals provides social landlords with the evidence they need to hold installers to account, to identify systemic issues in the supply chain, and to build a progressively better understanding of what high-performance heat pump deployment looks like across their housing stock. Crucially, it provides the feedback loop that makes specification effective; there is little value in setting performance thresholds if there is no mechanism to verify whether they are being met. This guide therefore treats specification and audit as two sides of the same coin, with Section 4 covering what to specify and Section 5 covering how to assure and verify quality in practice.

1.4. The role of local authorities in UK heat decarbonisation

Local authorities are central to the delivery of heat decarbonisation in housing. As owners and managers of social housing stock, they are direct procurers of heating systems for some of the most vulnerable households in the country. The decisions they make about how heat pumps are specified, procured, installed, commissioned and maintained have a direct bearing on whether residents experience lower bills and improved comfort, or higher costs and reduced confidence in the technology.

Beyond their own housing stock, local authorities also play an increasingly important role in facilitating heat pump deployment for private residents, whether through administering grant schemes such as Warm Homes: Local Grant, providing advice and signposting, or shaping local retrofit delivery through planning and area-based energy strategies. In all of these roles, the ability to set clear expectations around installation quality, and to hold delivery partners to account, is essential. Delivery quality in social housing can be market-shaping: well-performing installations create confident residents and positive local narratives around heat pumps, while poor outcomes risk reinforcing scepticism and slowing wider adoption. Councils therefore have a clear opportunity to lead by example, demonstrating how outcome-focused specification and audit can deliver affordable, comfortable, low-carbon heat in practice.

The government's Warm Homes Plan represents a major investment in domestic retrofit, and local authorities will be expected to play a leading role in its delivery. Councils that develop strong procurement and quality assurance capabilities now will be better positioned to deliver at scale and deliver lower bills and healthier, more comfortable homes for residents.

[5] Energy efficiency installations under the Energy Company Obligation - NAO report

1.5. Key challenges for local authorities

Despite their central role in delivering heat decarbonisation, many local authorities face practical barriers to ensuring consistently high-performing heat pump installations. Officers responsible for procurement, contract management and asset management are rarely heat pump specialists, and the technical and operational complexity of heat pump systems can make it difficult to set robust specifications, scrutinise designs, or identify underperformance early.

Common challenges include:

- limited awareness of the challenges in delivering high-performing heat pump systems and common quality issues.
- lack of senior leadership understanding of skills gaps within in-house teams.
- limited in-house technical expertise to evaluate installer competence or scrutinise system designs.
- difficulty assessing the competence of external advisers and consultants and the quality of their technical advice.
- over-reliance on accreditation and certification as proxies for quality, even where these do not reliably predict real-world system performance.
- insufficient monitoring and quality assurance processes to identify underperformance or poor installation practices.
- difficulty attracting high-quality installers to publicly funded programmes, where margins are tighter and administrative requirements are greater.
- a lack of structured feedback loops from completed installations to inform future procurement rounds.
- lack of targeted training tailored to the needs of in-house delivery teams.

These challenges are compounded by the pace of change in the sector. Heat pump technology, understanding of best practice, installer training pathways, monitoring tools and funding requirements are all evolving rapidly, and it can be difficult for local authority teams to keep pace. This guide is designed to address these gaps by distilling the technical and operational knowledge that procurement and delivery teams need into a practical, decision-focused format.

1.6. Guide development process

This guide was developed by the Carbon Trust in partnership with Bristol City Council and the University of Bristol, drawing on Bristol City Council's practical experience of specifying, procuring and overseeing heat pump installations within its social housing stock. This has shaped the guide's emphasis on outcomes-based specification, evidence requirements and quality assurance, rather than reliance on compliance alone.

The guide compiles and synthesises insights from existing evidence and practitioner-led sources, including HeatPumpMonitor.org and Heat Pumps Unlocked (Lewis Litherland and James Law), alongside relevant industry guidance and standards. Bristol City Council's existing technical guidance, which informed this document, was itself shaped by contributions from Simon Poskett (Heat Geek). Technical review was provided by Glyn Hudson (Open Energy Monitor). While grounded in Bristol City Council's experience, the guide is intended as a practical, evolving resource applicable to local authorities and social landlords across the UK, distilling the key technical and operational considerations most relevant to delivering high-performing heat pump systems.

Credit: Sam Bush / Nesta / Climate Visuals

2. The heat pump delivery journey

Delivering a high-performing heat pump installation involves a chain of decisions and actions that spans procurement, design, installation, commissioning, handover and ongoing operation. Social housing teams can influence outcomes at every stage of this chain, and the guidance in this document is structured around those points of influence.

Figure 1 illustrates Bristol City Council's quality assurance process for heat pump installations and what should happen at each stage, what evidence should be required, and who should be involved. The important principle is that quality assurance should be embedded across the full journey, with clear evidence requirements at each stage, rather than relying on a single inspection or accreditation check at one point in the process.

While installer accreditation and compliance with standards such as MCS are necessary to access funding and meet regulatory requirements, they represent a minimum baseline. Social landlords, as clients and contract managers, are able to set higher performance, quality and assurance requirements through their specifications and contracts.

The rest of this guide is designed to support this approach. Section 3 sets out five overarching principles for improving heat pump deployment. Section 4 walks through the key technical decisions at each stage of the journey. Section 5 provides guidance on quality assurance, monitoring and verification. Section 6 covers resident engagement and support.

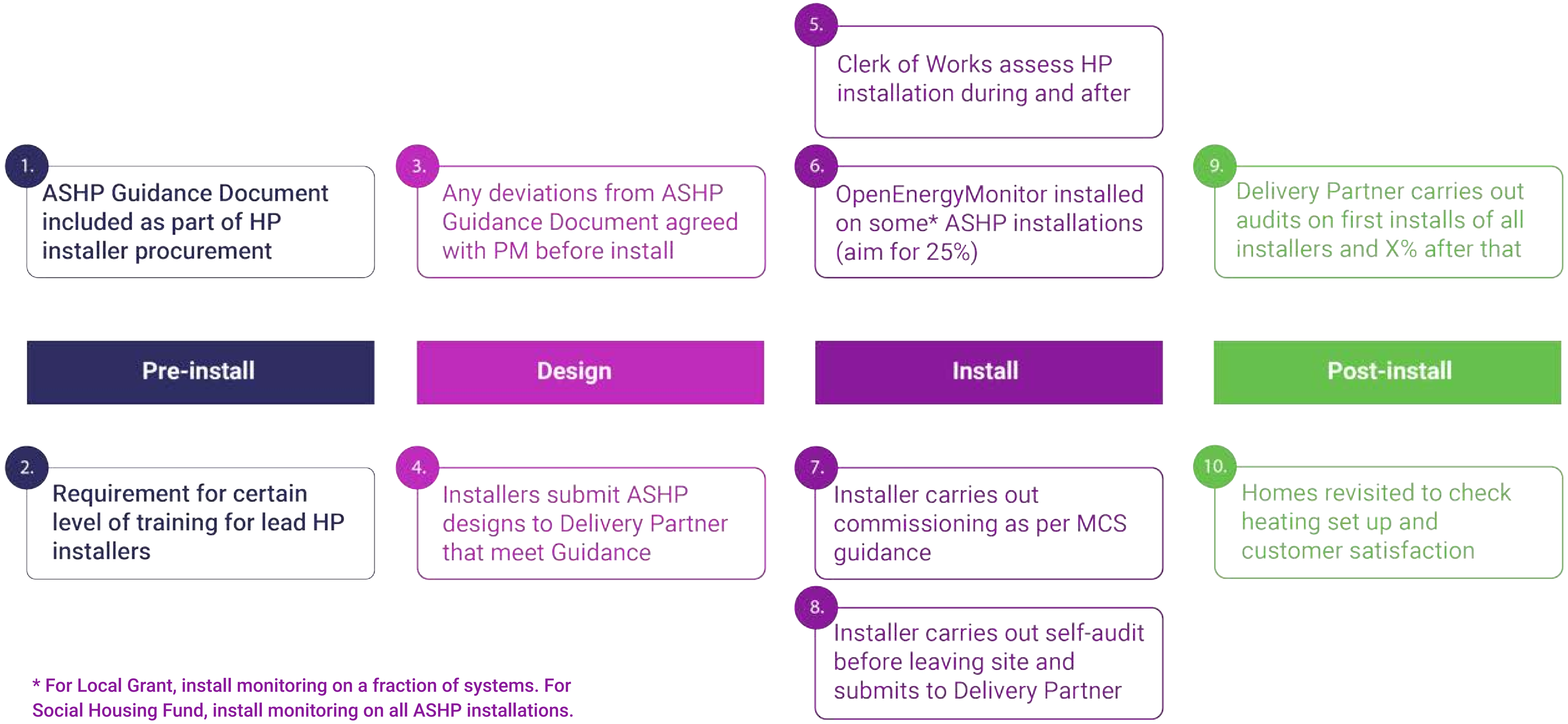


Figure 1: Bristol City Council's quality assurance process for heat pumps installations

2.1. Case study: Bristol City Council's heat pump delivery structure

Bristol City Council's approach to heat pump deployment illustrates the breadth of teams and roles involved in delivering retrofit and new-build heat pump programmes within a large unitary authority. The organogram below shows how Bristol's delivery model spans multiple service areas, from housing and landlord services through to the Bristol City Leap partnership, which manages social housing retrofit and Warm Homes: Local Grant delivery.

While every local authority's structure will be different, the Bristol example highlights a common challenge: heat pump delivery requires coordination across teams that may not have historically worked together on heating systems. Procurement officers, housing managers, maintenance teams, compliance leads and resident engagement staff all play a role in ensuring systems perform well over their lifetime.

Understanding who in your organisation holds responsibility for each part of the delivery chain is an important first step in embedding the practices set out in this guide. In Bristol City Council's experience, bringing officers together through a cross-departmental heat pump working group has been an important mechanism and an essential first steps for joining up delivery, raising awareness within the organisation and building critical mass for change.

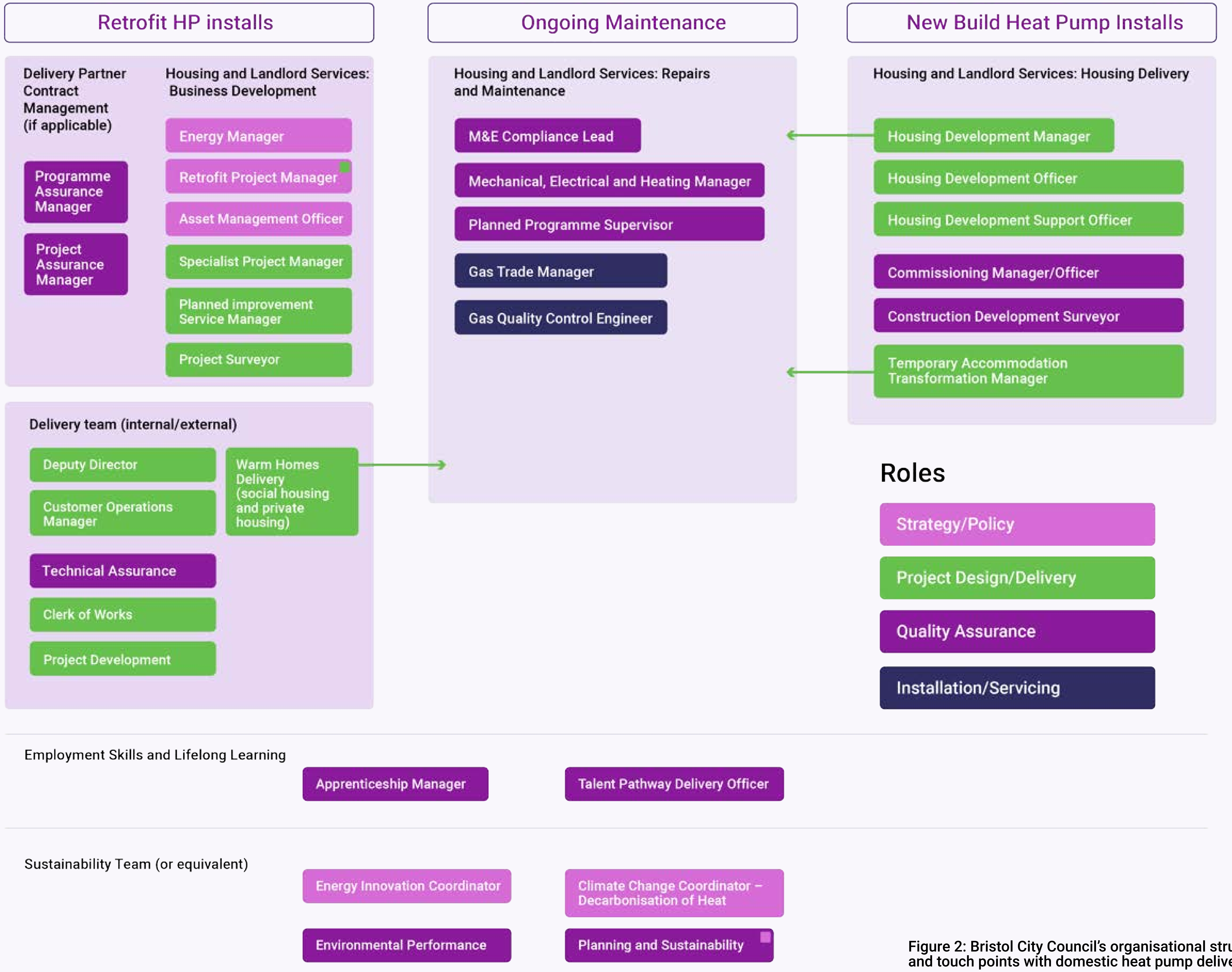


Figure 2: Bristol City Council's organisational structure and touch points with domestic heat pump delivery

3. Five practical actions to improve heat pump deployment

Improving heat pump outcomes within social housing programmes begins with recognising that performance is shaped by a chain of design, installation, commissioning and operational decisions. This section outlines five practical actions that help embed good practice across procurement, installation and long-term support.

These five steps focus on the specification, installation and operation of the heat pump system itself. They recognise that improving building fabric (for example insulation, draught-proofing, glazing upgrades) can play an important role in reducing heat demand, particularly where the performance of a heat pump installation is uncertain. Where feasible and affordable, delivering building fabric improvements ahead of heat pump installation is good practice.

Where fabric and heat pump works are delivered as part of the same programme, sequencing matters: insulation and airtightness improvements should be completed before the heat pump system is designed and sized, so that the heat loss calculation reflects the improved energy efficiency of the building rather than the pre-retrofit baseline.

However, deep fabric retrofit is not a prerequisite for high real-world heat pump efficiency. Evidence from monitored installations shows that well-designed, installed, commissioned and operated systems can achieve strong performance, even in homes with relatively modest fabric standards.

While system efficiency (SPF) can be high without extensive fabric measures, total heat demand, and therefore total energy consumption and running costs, will generally be higher than they would be in a better-insulated home. Fabric improvements reduce the amount of heat required, whereas good heat pump system design and operation determine how efficiently that heat is delivered. Both therefore play distinct and complementary roles.

Action 1: Specify the outcome, not just the equipment

What to do

Define performance outcomes in the specification (for example resident comfort standards, maximum design flow temperatures, and evidenced SPF/eSCOP or running cost expectations for the first year of operation)

Signal that bids must include evidence demonstrating that the proposed design can meet those outcomes (for example heat-loss method, emitter schedules sized at the target flow temperature, controls strategy, commissioning plan)

Build verification and accountability into the contract (for example proportionate retention pending commissioning evidence, targeted post-install checks on a sample, extended warranties, and a clear route to remediation if outcomes are not met)

Where appropriate, consider outcome-based contractual approaches (such as retention linked to verified performance, or other incentive mechanisms), recognising the need to balance administrative complexity, risk allocation and value for money.

Why it matters

Baseline accreditation, minimum compliance and product lists do not guarantee predictable comfort, running costs or resident satisfaction. Specifications that focus on outcomes rather than components give contract managers clearer levers to interrogate bids, verify delivery and intervene where systems fall short. By clearly articulating expectations, using proportionate monitoring to assess performance, and sharing delivery risk appropriately, social landlords can attract more capable installers and create a collaborative environment where issues are identified early and resolved constructively.

Action 2: Ask for evidence, not just qualifications

What to do

Weight evaluation towards demonstrable capability, not just accreditation. Ask for recent, comparable design packs (assumptions, heat-loss method, emitter schedules at the target flow temperature, controls strategy).

Seek evidence of past performance data where available. Request clear evidence of past success, including examples of high-performance systems, ideally supported by MID-class metering[1] (preferred) or controller-derived data (greater uncertainty: treat as indicative/triage, not verification).

Probe low-temperature design competence explicitly (ability to meet your programme maximum design flow temperature with the proposed emitters/pipework and controls)

Why it matters

Baseline accreditations and qualifications are necessary but not predictive of real-world outcomes. Asking for evidenced designs and commissioning deliverables allows you to test credibility before award, and to link payment and remediation to things that materially affect comfort, running costs and resident satisfaction.

Action 3: Don't fit and forget – operation is key

What to do

Commission controls optimally: set up weather compensation to function optimally; avoid fixed/high flow with on/off room thermostat control; configure domestic hot water (DHW) schedules and appropriate hysteresis.

Plan an early optimisation check (2–4 weeks after installation) via visit or remote assistance to calibrate the weather compensation curve, confirm DHW behaviour and resolve teething issues. Clarify who is responsible for first-winter optimisation and any fault response.

Use remote assistance prudently: where feasible, enable remote diagnostics/support to spot underperformance early; be upfront about data, consent and support routes. Annual performance reviews, drawing on monitoring data and resident feedback, can help prioritise systems for remedial attention or additional resident support. Note connectivity constraints in some social housing settings.

Consider bundling proactive maintenance and extended warranties into the main installation contract to incentivise installers to invest in long-term performance, rather than treating installation as a one-off transaction. Care must be taken to ensure that measures are in place to ensure installers are competent to deliver the installation and maintenance and that minimum performance standards are achieved.

Consider smart controllers/optimisers, where suitable and budgeted (for example Homely, Havenwise, Passiv), and plan for any install/subscription costs and ongoing support. Ensure fail-safe resident operation if services change

Why it matters

The installation creates the foundations for good performance; day-to-day operation and optimisation determine whether residents actually

[6] MID-class sensors are independently certified meters that meet legal accuracy standards and are suitable for performance verification and contractual use.

experience comfort and affordable running costs. Correctly configured weather compensation and an optimisation check early in the heating season prevent inefficient cycling, unnecessarily high flow temperatures and avoidable call-outs. Remote assistance (otherwise known as the more intrusive-sounding ‘remote monitoring’, which may sound intimidating to tenants) and targeted follow-ups surface issues sooner and reduce disruption for residents.

Common pitfall: poorly commissioned controls

Weather compensation is central to efficient heat pump operation. A correctly configured weather compensation curve adjusts the system’s flow temperature in response to outdoor conditions, maintaining comfortable indoor temperatures while keeping the system running at the lowest effective temperature.

However, the curve needs to be calibrated to the specific property after installation, and this is often missed or done poorly. Installers may set the curve too high and rely on thermostatic on/off controls to limit indoor temperatures, which undermines the efficiency benefits of low-temperature operation.

A follow-up visit two to four weeks after installation to check and adjust the weather compensation settings is an important step that should be built into the specification. Some heat pump systems, where commissioned with appropriate controls and an active data connection, offer remote connectivity that enables weather compensation settings to be reviewed and adjusted without a site visit.

Smart controllers and optimisers (for example Havenwise, Homely, Passiv) can go further, dynamically adjusting flow temperatures in response to indoor temperature setpoints, hot water demand, external conditions, time-of-use tariffs and solar PV generation. This can reduce the dependence on manual calibration and simplify the resident experience. Where budgets allow, specifying smart optimisation as part of the installation can reduce the risk of underperformance and improve long-term outcomes (although it should be noted that optimisation systems typically come with an installation and/or subscription cost).

Action 4: Engage tenants early and support their journey

What to do

Embed engagement as a standard part of delivery, not a one-off event: provide clear pre-install information, a structured handover at installation, and early follow-up support during the first heating weeks.

Focus engagement on what will feel different with a heat pump (longer run times, lower radiator temperatures, steady background heat), how to adjust settings safely, and how to get help if something doesn’t feel right.

Deliver a structured, unhurried handover that prioritises practical demonstration of controls, hot water schedules and expected system behaviour, supported by simple written or video materials specific to the resident’s installed system (for example a video recording of the in-person handover on heat pump controls).

Plan ongoing support: a check-in 2–4 weeks after installation, clear routes for advice or fault reporting, a review of the first energy bill and additional support for residents who may need it, including through peer support networks.

Why it matters

In social housing, residents typically have limited control over system choice and installation quality, and households may change over time. Without clear, repeatable engagement and support, even well-installed systems can be misunderstood, adjusted incorrectly or reported as faulty. Early, structured support improves comfort, reduces avoidable call-outs, and helps residents build confidence in using low-temperature heating systems effectively.

Common pitfall: behavioural change

Efficient heat pump operation requires residents to use their heating differently. Heat pumps perform best when running for longer periods at lower temperatures, maintaining a comfortable and steady indoor environment rather than providing short bursts of high-temperature heat.

For residents accustomed to gas boilers, this means moving away from switching the heating on and off twice a day, closing off unused rooms, or boosting the system when it feels cold. Instead, the aim is to maintain a comfortable temperature across the whole home, with the system running at low intensity for extended periods.

This is a significant change, and it will not suit every household. Residents who already tend to heat most of their home and maintain fairly steady temperatures are well placed to make the transition. Those who currently heat only one or two rooms, have highly intermittent occupancy, or have very low overall energy use may find that a heat pump does not deliver the expected savings, or may need more intensive support to adapt.

In some cases, alternative heating solutions may be more appropriate, and it is worth considering this at the planning stage rather than discovering it after installation. For example, air-to-air heat pumps may be better suited where households have intermittent heating patterns or where cooling is also required.

Action 5: Build knowledge, share learning and collaborate on solutions

Heat pump deployment in the UK is a rapidly evolving field, and everyone involved is still learning, including installers, manufacturers, social landlords and residents. Progress depends on open dialogue, shared experience and a willingness to learn from both successes and failures. Social landlords that actively seek out industry knowledge, engage with peer networks and share their own experiences will strengthen their internal capability and improve outcomes over time.

The following is a non-exhaustive list of resources that provide accessible, practical insights for social housing deliver teams looking to deepen their understanding of heat pump performance, installation quality and sector developments:

Ambient – data-driven not-for-profit offering a monthly heat pump industry tracker.

BetaTalk – Nathan Gambling's podcast for honest, expert-led conversations that demystify the heat pump industry

BetaTeach – champions peer-to-peer learning, offering a monthly newsletter to connect with quality engineers and understand best practices.

Heat Geek – informative website articles and YouTube videos.

HeatPumpMonitor – open-source community initiative sharing heat pump performance data and key technical insights.

InstallD – Dominic Eves' home heating podcast.

LinkedIn

Nesta – UK innovation agency for social good, who design, test and scale new solutions, including 'Visit a heat pump' service, 'Get a Heat Pump' website, 'Start at Home' initiative.

Net Zero Go (Energy Systems Catapult) – Peer network for local authority energy managers.

RISE (Retrofit Information, Support and Expertise) – Free service for Warmer Homes: Social Housing Fund projects.

Credit: Liz Seabrook / Nesta / Climate Visuals

4. Procurement specification guidance

How to use the 'Your choices' panels

Throughout this guide, shaded 'Your choices' panels are used to help social landlords translate the guidance into their own policies, specifications and procurement documents.

These panels are intentionally interactive. They highlight the key decisions that organisations need to make and prompt readers to define their own requirements, thresholds and rules based on their housing stock, delivery model, risk appetite and internal capability. The blank fields are provided for readers to complete with their own values or statements.

Within these panels, the box-shaped bullet points are used to present discrete options or decisions for consideration. They are intended to be read like checkboxes: each line represents a potential requirement, choice or position that an organisation may choose to adopt, adapt or exclude when developing its own specification.

The options listed are not defaults or mandatory recommendations. Not all choices will be appropriate in all contexts. Where values are not specified, organisations may choose to adopt a phased approach, starting with baseline requirements and tightening them over time as internal capacity, delivery experience and performance evidence grow.

4.1. Overview of heat pump procurement principles

The procurement specification guidance in this chapter is built around outcomes-based procurement principles. Rather than specifying equipment alone, the aim is to define the performance outcomes expected and to structure the procurement process so that these outcomes are achieved and verified. This means setting clear performance thresholds, requiring evidence of competence, building in quality assurance at every stage and, where appropriate, linking payment to demonstrated results.

At the same time, effective procurement requires striking a balance between setting robust quality requirements and maintaining a competitive and responsive market. Specifications that are overly prescriptive or disproportionate to the scale of the programme risk limiting bidder interest or discouraging participation altogether. The guidance therefore encourages social landlords to identify a clear 'sweet spot': high enough to protect performance, residents and public value, but realistic enough to attract capable suppliers and secure viable tender responses.

The guidance is designed to work within existing procurement frameworks, whether through open tenders, framework agreements, or direct award routes. Consider sharing this guide, or the relevant specification sections, with prospective installers as part of the tender process. Early transparency about quality expectations helps attract installers who are confident in their ability to deliver to a high standard and allows all bidders to prepare accordingly.

Where heat pump installation is being delivered alongside remedial works or fabric improvements, such as insulation, draught-proofing or glazing upgrades, the sequencing of works is important. Fabric measures should be completed before the heat pump system is designed and sized, so that the heat loss calculation reflects the improved building. Sizing a heat pump to a pre-retrofit heat loss figure, then insulating the property afterwards, risks significant oversizing, which can reduce efficiency and increase capital costs. Where fabric and heating works must be procured together, the specification should require the installer to base their system design on the post-retrofit fabric condition and to confirm this in their design submission.

Air-to-water heat pumps are suitable for many homes, but may be less appropriate where physical or practical constraints significantly increase cost, disruption or performance risk. These constraints may include:

- limited external space for outdoor units
- flats or high-density buildings where individual systems are difficult to accommodate
- insufficient internal space for cylinders and pipework
- homes where achieving low-temperature heat distribution would require extensive internal rework

Certain non-traditional construction types, or buildings containing widespread asbestos, can further constrain internal alterations and increase health, safety and programme risks. Electrical capacity constraints, challenging hot-water requirements, and situations where residents require simple, low-intervention systems may also reduce suitability. These factors do not automatically rule out air-to-water heat pumps, but where several coincide, alternative technologies or shared solutions may offer a more deliverable and lower-risk route to decarbonisation.

What are your aims and outcomes?

Before developing your specification, it is helpful to define the overarching outcomes the programme aims to achieve. These may include:

- resident satisfaction with the installation process
- residents understand how to use their heat pump to minimise the cost of heating
- residents are satisfied that running costs are affordable
- installations are good value for money, good quality and are designed to last

Clear programme aims make it easier to decide which specification requirements are essential and which are optional.

4.2. Installer competence requirements

What to decide

Your organisation must determine the minimum competence and accreditation criteria that heat pump installers must meet. This includes deciding on:

- required certifications (such as MCS accreditation under the MIS 3005 standard)
- relevant technical qualifications (such as certified training in heat pump installation and system design)
- evidence of past performance (such as references or measured efficiency data)

Setting clear competence requirements upfront is crucial: it ensures that only qualified, experienced contractors are considered, which in turn drives high-quality installations and long-term performance.

What you need to know

Basic industry accreditation is necessary but not sufficient. MCS certification is the baseline for heat pump installers. It is required for a number of government schemes and indicates compliance with key standards (such as the MCS MIS 3005-D Heat Pump Design Standard). It can be achieved either by direct accreditation or via an umbrella scheme.

Where an installer holds MCS certification through an umbrella scheme rather than direct accreditation, the system design responsibility typically sits at company level rather than with the individual installer on site. Social landlords should understand this distinction and satisfy themselves that the individuals carrying out design and installation have the necessary competence, regardless of the accreditation route.

However, qualifications and certifications alone do not guarantee high performance outcomes. Even MCS-accredited, Level 3 qualified installers can deliver variable results if they lack deeper system design skills. Many traditional heating engineers with gas boiler backgrounds may lack experience in low-temperature heating system design and commissioning, which are critical for heat pump efficiency.

Bristol City Council's heat pump audit programme has found that MCS certification alone is not a reliable guarantee of installation quality. This suggests that MCS Certification should be treated as a baseline requirement, not as a guarantee of good installation quality.

Additional advanced level training can be a useful indicator of capability. Look for installers who have pursued low-temperature system design training beyond the basics, such as courses like Heat Geek Mastery (online course equivalent to multiple days, Warmur Academy (1-day masterclass, unexamined) or equivalent. Installers who have completed these courses are strongly represented within the HeatPumpMonitor.org dataset.

Require proof of real-world success. An installer should be able to demonstrate a track record of delivering efficient heat pump systems (not just possess certificates) to ensure that the installer's claims of competence are backed by data and experience. To complement formal credentials, ask for evidence of the performance of recently completed installations, including:

- performance data (such as Seasonal Coefficient of Performance, ideally MID-monitored),
- client references attesting to system performance and user satisfaction.

Installers should also demonstrate their commitment to the long-term performance of the system by giving examples of:

- robust handover support (such as providing homeowner training, ensuring weather compensation is set up optimally)
- monitoring (such as installation of monitoring systems, system optimisation services, check-ins with the resident 1-2 months after installation)
- maintenance plans

It is important to note that introducing too many requirements may limit the size of workforce eligible to complete the work. Ensure that requirements are justifiable/valuable. A phased approach, where some requirements are introduced as desirable criteria initially and become essential over time, can help manage this balance.

Core technical qualifications are still mandatory. In addition to MCS, ensure installers have all relevant trade qualifications and memberships:

- Installation teams must include personnel with a Level 3 heat pump installation and maintenance qualification (such as BPEC/LCL Awards/EAL/NOCN in Heat Pump Installation), which covers the practical skills for ASHP systems.
- Pressurised hot water cylinder work by someone with a G3 Unvented Hot Water qualification (as required by building regulations).
- Installer must have a valid Water Regulations Advisory Scheme-approved Water Regulations qualification. Hot and cold water services pipework should be installed in accordance with WRAS).
- Electrical work must be carried out by a certified electrician (such as NICEIC/NAPIT or equivalent accreditation)

- The installer requires F-Gas certification (City & Guilds 2079 or equivalent) where refrigerant handling is involved, for example:
  - → installation, maintenance or repair of split-system heat pumps
  - → any work that involves opening or working on the refrigerant circuit.
- F-Gas certification is not required for the installation, routine maintenance or decommissioning of monobloc heat pumps, as the refrigerant circuit is factory sealed.
- Where an existing gas boiler is being decommissioned, works must be carried out by a Gas Safe registered engineer.

Compliance with retrofit standards: For publicly funded retrofit projects, installers may also need to be TrustMark registered and compliant with PAS 2030/2035 retrofit standards. These frameworks ensure a robust quality management process, so aligning your competence requirements with them can help uphold quality in grant-funded installations.

Regional certifications: for example SNIPEF, Scottish and Northern Ireland Plumbing Employers' Federation, the principal trade association for plumbing and heating businesses based in Scotland and Northern Ireland.

Notes for procurement teams

Embed your chosen requirements in your tender document as mandatory conditions or evaluation criteria.

Make key items like MCS accreditation and required qualifications pass/fail criteria to filter out unqualified firms at an early stage.

Request detailed competence proposals. In the quality evaluation, ask bidders to explain their team's expertise and approach to ensuring performance. For instance, require CVs for the proposed installation team (to verify individual qualifications and experience) and ask how they will meet your technical specifications. A strong bidder should describe processes like conducting full MCS-compliant heat loss calculations, sizing emitters for <45°C flow temperatures, and following industry best practices for commissioning and handover.

Encourage a collaborative approach to building competence, not just within the installer workforce, but also across your own procurement and delivery teams. Everyone is learning, and progress depends on open dialogue and shared experience. Look for installers who actively support knowledge-sharing: working with installers who are willing to collaborate and share learning will strengthen your team's capability and improve long-term outcomes.

Your choices

Required installer accreditations:

- ☐ MCS Certified for heat pump installation (either own accreditation or under an Umbrella Scheme)
- ☐ TrustMark registered for PAS 2035 compliance, if applicable

Mandatory qualifications for personnel:

- ☐ At least one team member with Level 3 Award in Heat Pump Installation
- ☐ All electrical works to be carried out by a NICEIC/NAPIT-certified electrician
- ☐ Any refrigerant work by an F-Gas certified engineer
- ☐ Any hot water cylinder work by a G3-qualified installer

Advanced training requirements (if any):

- ☐ Lead installer/system designer must have completed an advanced low temperature heating system design course (such as Heat Geek Mastery, Warmur Academy or equivalent)

Evidence of past performance to submit:

- ☐ Where available, installers are invited to provide actual, rather than modelled, performance figures (SPF) for recent installations completed within the past ____ years. Examples that reflect typical delivery experience may be viewed more favourably than exceptional cases alone.
- ☐ Installer must provide at least ____ heat pump project references from the last ____ year(s). Customer references must include customer name, phone number, email address.
- ☐ These project references must include details of each system's design and measured performance (such as SCOP or efficiency data).
- ☐ Bidders should highlight any projects where they achieved exceptional performance (for example SPF greater than ____)

Additional verification measures (optional):

- ☐ Shortlisted installers will be required to arrange a site visit to one of their recent installations.

Requesting qualifications:

- ☐ Request qualifications held by the company's staff as a whole (less onerous for installer)
- ☐ Request individual CVs of installers working on the commission (more onerous for installer)

4.3. Heat loss calculation methodologies

What to decide

What heat loss calculation method(s) your organisation will require installers to use when designing heat pump systems.

This is an important choice because it directly affects:

- Correct heat pump sizing (ensures minimum comfort level, minimises heat pump capital cost, enables lowest possible flow temperatures for maximum efficiency, avoids short-cycling and shorter heat pump lifespan where heat pump capacity is 2-3+ times greater than actual maximum heat loss)
- Emitter sizing and pipework design (to meet the heat requirements of the building whilst optimise efficiency)
- DNO implications (oversizing may trigger unnecessary 3-phase grid upgrades)

What you need to know

A heat loss calculation estimates the heat needed to maintain indoor temperature during cold weather and is essential for sizing the heat pump and emitters.

Heat loss calculations should account for proposed fabric thermal improvements.

Measured heat loss methods can be used to estimate whole-building heat transfer coefficient (HTC), a measure of the rate of heat loss per degree temperature difference between inside and outside. It can be used to derive design heat loss at design outdoor temperatures.

The HTC can be calculated by energy modelling methods (such as SAP, RdSAP, Passivhaus, BS12831) or measured (such as SmartHTC by Build Test Solutions)

A **full room-by-room heat loss calculation** should be completed to MCS standards. The updated 2026 CIBSE Domestic Heating Design Guide presents a method that aligns more closely with the UK standard methodology BS EN 12831-1, removing many of the conservative margins previously included.

The CIBSE Domestic Heating Design Guide describes BS EN 12831-1 as 'a complex standard that requires software tools to fully implement'. Heat loss calculation software to support consistent and accurate calculations include Carno, Elmhurst Design SAP, Heat Engineer, Heat Geek, HeatPunk, h2x, Installio, Spruce and h2x.

Heat loss assumptions have, historically, often been conservative, aggregating to sometimes become a significant source of error. The main factors that have contributed to differences between heat loss calculations and measured demand are as follows:

- **Air change rates** – historically, actual air change rates tended to be lower than in CIBSE guidance (particularly for pre-2000 properties) and can be tested by methods including blower door testing.
- **U-values** – actual U-values can often be lower than CIBSE defaults
- **Design outside temperatures** – actual 99.6% design temperature can often be higher than CIBSE default tables. Local micro-climates can also affect design temperatures by several degrees.
- **Semi-detached/terraced assumptions about neighbouring property temperatures** – whilst it is wise to have contingency to cover periods where the neighbouring property is unoccupied, this can be an additional element of conservatism.

For detailed discussion of these factors and their impact on heat loss accuracy, see the CIBSE Domestic Heating Design Guide (2026), Chapter 2, and the Open Energy Monitor heat loss documentation.

An overestimated heat loss calculation can contribute to heat pump oversizing when paired with oversizing the heat pump. Conversely, adding some margin on top of an accurate heat loss calculation may be preferable. See HeatPumpMonitor for more information.

HeatPumpMonitor design recommendations provide detailed guidance on how more accurate heat loss calculations can enable lower design flow temperatures and help prevent excessive oversizing.

Your choices

Our required **minimum heat loss method** is:

- ☐ (for example, full MCS room-by-room heat loss calculation)
- ☐ Heat loss calculation software:
  Options include: Heat Punk, Heat Engineer, h2x, Elmhurst
- ☐ Software platform with integrated heat loss calculation:
  Options include: Carno, Installio, Spruce

Will measured heat loss be required?

- ☐ Yes, for **all** properties
- ☐ Yes, for specified archetypes (list below)
- ☐ Optional, at installer discretion with justification
- ☐ No – modelling sufficient

If applicable, building archetypes requiring measured heat loss calculation:

Additional requirements (optional):

- ☐ Require photos evidencing fabric condition (loft, wall type, glazing)
- ☐ Require installer to justify conservatism included in the heat loss calculation and heat loss sizing
- ☐ Require comparison of modelled vs measured (where both used)
- ☐ Require separate DHW heat loss/demand calculation method description
- ☐ Require defrost capacity adjustments

Further information

For more information, see CIBSE Domestic Heating Design Guide (2026) – Chapter 2 'Heat Loss Assessment'

4.4. System design temperature limits

What to decide

What maximum design flow temperature your organisation will require installers to use for heat pump system design. Design flow temperature is the flow temperature of the system at design conditions, that is the coldest external temperature in which the system is designed to operate.

This is a critical choice because it directly affects:

- system efficiency (SCOP/SPF/eSCOP)[2]
- resident running costs
- emitter (radiators/UFH) sizing requirements for space heating, and
- whether existing pipework is adequate.

What you need to know

Lower design flow temperature = higher efficiency = lower heating bills.

HeatPumpMonitor.org found that to achieve moderate-high performance (SPF~3.5), a design flow temperature of no more than 45°C and ideally closer to 40°C should be targeted.[8] To achieve high-end performance (SPF ≥ 4.0), a design flow temperature of no more than 42°C and ideally closer to 37°C should be targeted[8].

Setting a higher design flow temperature may make installation cheaper (fewer radiator and pipework changes) but results in higher bills for residents and potentially risks poor long-term performance.

Setting a very low design flow temperature could face resistance from installers with limited low-temperature experience, and could cause more resident concerns about cold radiators.

Note that low design flow temperatures are only achievable where the heat loss calculation is accurate and emitters are correctly sized for the lower temperature. Setting an ambitiously low flow temperature target on the basis of an inaccurate or overly optimistic heat loss calculation risks a system that cannot maintain comfortable indoor temperatures during cold weather. This can lead to resident dissatisfaction, complaints, and pressure to override controls or raise flow temperatures manually, all of which undermine performance. Accurate heat loss assessment (see Section 4.3) is a prerequisite for low-temperature design, and the two should always be considered together.

Appropriately-sized radiators and pipework are needed to maintain comfort at lower temperatures. Radiator output can be increased either by increasing width/height dimension, by increasing the number of panels (such as K1/K2/K3) or by using fan-assisted radiators. Underfloor heating can be used either as an alternative to, or in combination with, radiators and is well suited to low-temperature heat pump systems. Where underfloor heating is to be installed, the spacings between the loops in the floor should be carefully considered. Conventional heating systems use 100-250mm spacings, Heat Pumps Unlocked (L. Litherland, J. Law) recommends 100-150mm spacing to minimise flow temperature.

Accurate heat loss calculations make it easier to design for lower flow temperatures and help to prevent excessive heat pump oversizing (such as heat pump capacities two to three times greater than required).[3]

In designs where more accurate heat loss calculations result in lower heat loss figures, lower the default design flow temperatures instead of reducing emitter capacities. In practice, designs that previously required 45°C to 50°C design flow temperatures (with over-estimated heat loss) for a given emitter design can now often only require 35°C to 40°C with more accurate heat loss input assumptions, without changing radiator sizing. This is especially relevant for older pre-2000 properties.

Notes for procurement teams

Insert your chosen flow temperature rules into procurement documents as a mandatory technical requirement.

State explicitly whether installer-requested deviations must be approved before installation.

Link this section to your quality assurance and commissioning process, ensuring weather compensation is set to your chosen maximum design flow temperature.

Require installers to show calculated SCOP at your chosen flow temperature in their submitted design packs. These should inform contractual terms relating to promised performance.

[7] SCOP is the design efficiency of the heating system for a 12-month period. SPF is the actual efficiency of the heating system. eSCOP measures heating system efficiency and adjusts by weighting electricity use against the price paid per kWh, to give a picture of the price paid for the year.
[8] https://docs.openenergymonitor.org/heatpumpmonitor/recommendations.html

Your choices

- Design flow temperatures for space heating should be no more than: °C at °C external air temperature.
- Are exceptions permitted?
  - ☐ No exceptions – maximum design flow temperature is mandatory
  - ☐ Exceptions allowed only with written justification
    Please specify approval process (for example technical officer sign-off)
- Internal design temperature: °C (standard) and °C (setback)
- Hot water setpoint temperature: °C
  (Note this is distinct from the temperature controlled by the system controller for anti-legionella cycles)

Further information

For more information, see CIBSE Domestic Heating Design Guide (2026) – Section 5.5.1 'Heating System Water Temperatures'

4.5. SCOP performance requirements

What to decide

Set minimum and aspirational SCOP (Seasonal Coefficient of Performance) and SPF (Seasonal Performance Factor) thresholds for installed systems. See also ‘4.4 System design temperature limits’.

Determine how performance will be verified and incentivised. This includes deciding whether to link payment or preferred supplier status to in-situ performance outcomes.

What you need to know

SCOP (Seasonal Coefficient of Performance) is a standardised, modelled performance metric, representing the average system efficiency over a 12-month period. COP (Coefficient of Performance) is a snapshot measure of efficiency within a defined time period under specific conditions.

SPF (Seasonal Performance Factor) is defined as a real-world, measured efficiency metric across 12 months.

SCOP and SPF are key indicators of system performance and, therefore, running cost. SCOP is calculated as the ratio of total heat output (kWh) to total electrical energy input (kWh). A higher SCOP/SPF indicates better performance and, therefore, lower running costs. Note that SCOP and SPF are often used interchangeably.

Based on Ofgem’s April-June 2026 energy price cap unit rates, a minimum SCOP/SPF of around 3.65 is required simply to match the running costs of the gas boiler being replaced (assuming 85% boiler efficiency).

Real-world monitoring data from the Electrification of Heat Demonstration Project (average SPF = 2.8) and HeatPumpMonitor (average SPF = 3.9) show that SPFs vary significantly depending on installer competence, system design and commissioning quality. High SCOPs can be achieved across all housing types and building ages.

HeatPumpMonitor demonstrates that installations by highly trained engineers with expertise in low-temperature design consistently achieve SPFs above 3.5, with top-performing systems exceeding 4.5. In contrast, large-scale field trials, such as the Electrification of Heat Demonstration Project, show average SCOPs are around 2.8. Bristol City Council’s heat pump audits observed that underperforming systems are often linked to insufficient installer training and lack of performance monitoring.

Homes with very low space-heating demand often exhibit lower overall SPF as a greater proportion of annual energy use is associated with DHW production, which is typically less efficient than space heating. SPF figures should be interpreted in the context of heat demand, system design and operating strategy, rather than considered in isolation.

Note also that suboptimal usage patterns (i.e. resulting in lower SPF) may be desirable in conjunction with a variable tariff where the loss of efficiency is more than offset by the cost savings.

Notes for procurement teams

SCOP requirements should be clearly stated in tender documents and contracts, including:

- Minimum and aspirational SCOP thresholds.
- Monitoring and verification expectations (such as 12-month data, acceptable metering methods).
- Payment retention and bonus mechanisms tied to verified performance.

Consider requiring or prioritising installers with advanced low-temperature system design training (such as Heat Geek Mastery, Warmur Academy)

Ensure that monitoring equipment is specified and budgeted for in the installation scope. Where robust performance verification is required, independent MID-approved heat metering should be considered in preference to controller-integrated monitoring.

Include a process for reviewing SCOP data post-installation and addressing underperformance (for example remedial works, re-commissioning).

Align SCOP requirements with other performance metrics (such as flow temperature limits, heat loss calculations) to ensure consistency across the specification.

Your choices

- ☐ Minimum design SCOP requirement for all installations: across 12 months
- ☐ Minimum actual SPF requirement for all installations: across 12 months
- ☐ Provisional COP requirement for all installations: across 3 months of the heating season (e.g. Oct-Dec) as an early indication of performance.
  Aspirational SCOP threshold: across 12 months
  To qualify for performance bonuses or preferred contractor status.
- ☐ SPF to be assessed and verified via:
  - ☐ MID-class metering
  - ☐ Controller-integrated energy monitoring
    Note: this has greater uncertainty than MID-class metering and can vary between heat pump brands, but is integrated into the controller as standard for most brands.
- ☐ Performance-linked terms:
  - ☐ Retain a percentage of payment until SCOP is verified: %
  - ☐ Offer performance-linked bonuses: % uplift for SPF above
- ☐ Contractors must also provide actual on-board monitoring performance data (SPF) for those installs, where available.

Note: actual performance data (SPF) is ideally MID-metered data. Where onboard system controller data of historical performance are provided, take note of the heat pump system controller manufacturer as this will have an impact upon the accuracy of the readings.

Further information

For more information, see CIBSE Domestic Heating Design Guide (2026) - Section A.6.5.2 'Heat pump efficiency'

4.6. Emitter sizing

What to decide

Determine how emitter sizing (such as radiators, underfloor heating) will be specified and assessed in your heat pump installations. This includes deciding whether to require full room-by-room emitter schedules, minimum sizing standards, and how to handle retrofit constraints.

What you need to know

Heat pumps operate most efficiently at lower flow temperatures (typically ≤45°C). To deliver sufficient heat at these temperatures, emitters must be appropriately sized; often larger than those used with gas boilers.

Undersized emitters are a common cause of poor performance, leading to higher running costs, reduced comfort, and resident dissatisfaction.

Emitters should be sized to deliver the required room heat output at the agreed design flow temperature, based on accurate room-by-room heat loss calculations.

In retrofit settings, space constraints may limit emitter upgrades. In such cases, careful design and resident engagement are essential to manage running cost expectations and explore alternatives, such as adding additional radiators, using fan-assisted radiators, or installing underfloor heating, where appropriate.

Concern has been raised about radiator manufacturers overstating radiator heat outputs. For more information, see this BetaTeach newsletter article.

Your choices

- ☐ Require installers to provide full emitter schedules based on room-by-room heat loss calculations and the agreed system flow temperature (see ‘4.4 System design temperature limits’).
- ☐ Decide whether to allow reuse of existing emitters, and under what conditions (for example only if they meet sizing requirements at the design temperature).
- ☐ Radiator positions should be agreed with the householder.

Further information

For more information, see CIBSE Domestic Heating Design Guide (2026) – Section 5.6 ‘Heat Emitters’

4.7. Pipework requirements

What to decide

Decide how pipework should be specified, sized, and installed to ensure efficient, quiet, and reliable operation of heat pump systems. This includes whether to allow reuse of existing pipework, what insulation standards to apply, and how to handle system balancing and flow rate requirements.

What you need to know

Heat pumps require higher flow rates than gas boilers to deliver the same amount of heat at lower temperatures. This means pipework must be appropriately sized to avoid excessive pressure drops, noise, or pump strain.

Undersized or poorly routed pipework can lead to poor system performance, increased energy use, and resident complaints (such as noise, uneven heating).

Microbore pipework (such as 8mm or 10mm) may be unsuitable for heat pump systems due to flow rate limitations, particularly where plastic microbore is used. Installers should carefully assess and justify its suitability, taking account of the property heat loss and the requirements of the wider heating system.

Proper system balancing is essential to ensure even heat distribution and efficient operation. This can be supported by Flow Regulating Valves (FRVs).

Heating circuits should not be installed in the roof spaces of any property, if this is not possible the location of pipe work should be kept to a minimum and suitably insulated.

Heating pipes should not be installed in solid floors. If this is unavoidable preformed ducts should be used and the location agreed with the resident.

Generally, internal pipework within the thermal envelope may be left uninsulated where it contributes useful heat to the living space.

To minimise heat loss, good care should be taken to ensure joints are neat, mitred (as appropriate), and sealed where pipework is external, in lofts, or in unheated voids.

External and loft pipe lagging should use 19mm minimum thickness. Exposed lagging should be weatherproof and UV-protected. Ideally external trunking should be used to protect pipework from the elements.

All pipework routed through the fabric of the building must be sleeved, sealed and fully lagged throughout its length, as per Part L of Building Regulations.

Existing pipework and emitters should be thoroughly flushed prior to connection to the new heat pump.

Notes for procurement teams

Pipework specification is often overlooked in heat pump procurement but has a direct impact on system performance, noise, and resident satisfaction. Undersized or poorly insulated pipework is a common cause of post-installation complaints.

Require pipework details as part of the design submission and review for adequacy before installation begins.

Include pipework insulation standards in your specification and check compliance during on-site quality assurance visits. Poor insulation of external and loft pipework is a frequent issue that is easy to identify visually.

Credit: Liz Seabrook / Nesta / Climate Visuals

Your choices

Pipework sizing and suitability

- ☐ The installer must size all primary and secondary heating pipework to accommodate the flow rates required for low temperature heat pump operation, based on the design heat load and selected system flow temperature.
- ☐ The installer must submit a pipework specification as part of their design submission, including pipe diameters, routing, and insulation approach.
- ☐ Existing pipework may only be reused where the installer demonstrates, in writing, that pipe diameters are adequate for the required heat pump flow rates and pressure drops. The system must also be flushed and treated.
- ☐ Microbore pipework (8mm or 10mm) must not be used unless explicitly approved by the client, following the installer's written justification demonstrating adequate flow and system volume at peak load for the property.

Pipework layout and routing

- ☐ Pipework must be designed and installed to minimise bends, restrictions and unnecessary complexity, in order to reduce pressure losses, noise and pumping energy.
- ☐ Heating circuits must not be routed through roof spaces. Where unavoidable, routing must be minimised and pipework fully insulated.
- ☐ Heating pipes must not be installed within solid floors. Where unavoidable, pipework must be installed in pre-formed ducts, and routing must be agreed with the resident in advance.
- ☐ All pipework passing through the building fabric must be sleeved, sealed and insulated in accordance with Part L of the Building Regulations.

Insulation standards

- ☐ All external and loft pipework must be fully insulated to minimise heat loss and frost risk.
- ☐ All pipework routed under suspended ground floors must be insulated throughout its length.
- ☐ Internal pipework must be insulated in areas where excessive heat gains may be undesirable (for example airing cupboards).
- ☐ Minimum insulation thicknesses must be:
  - ☐ Internal pipework: 13mm minimum thickness (to BS5422:2009) or left uninsulated where it contributes useful heat to the living space.
  - ☐ External and loft pipework: 19mm minimum. External pipework must be weatherproofed and UV-resistant.
- ☐ External pipework must be protected using external trunking, where exposed to weather or impact risk.
- ☐ External pipework must be held securely in position using clipping and external trunking (as applicable).
- ☐ Insulation joints must be neatly mitred and sealed, particularly externally and in unheated voids.

System cleanliness and preparation

- ☐ All existing pipework and emitters must be thoroughly flushed prior to connection to the heat pump.
- ☐ Evidence of flushing and water treatment must be provided as part of commissioning documentation.

Reuse and deviations

- ☐ Require system balancing to be completed and documented as part of commissioning.
- ☐ Installers should confirm that flushing has been completed as part of commissioning.

Further information

For more information, see CIBSE Domestic Heating Design Guide (2026) – Section 5.5 'Pipework'

4.8. Hot water cylinder requirements

What to decide

Determine the specification, sizing, and performance requirements for hot water cylinders in heat pump installations. This includes deciding on minimum insulation standards, acceptable reheat times, and whether to allow reuse of existing cylinders.

What you need to know

Heat pumps heat water more slowly than gas boilers, so domestic hot water (DHW) cylinder sizing and insulation are critical to ensure adequate hot water availability and efficiency.

Undersizing of hot water cylinders is one of the most common issues identified in heat pump audits. Traditional sizing rules based on gas boiler reheat rates may not be appropriate for heat pump systems, and installers should size cylinders based on the expected daily hot water demand, the heat pump's DHW output capacity, and realistic reheat times.

Energy Stats UK offers a free 'Hot Water Calculator' and suggests that a rule of thumb of 60 litres per occupant may be more sufficient than the MCS guidance of 45 litres per occupant (when greater than the number of bedrooms + 1).

Cylinders should be sized to meet daily hot water demand, with sufficient storage volume and reheat capacity to achieve an acceptable reheat time. Heat pump installations should use cylinders specifically designed for heat pump operation, with coil performance suitable for low-temperature heat sources.

Smart hot water cylinders, such as the Mixergy X, offer greater levels of hot water controls for tenants, including more granular scheduling, remote adjustment and tariff-aware operation. Where suitable, these systems may offer benefits for tenants by improving usability, transparency and control over domestic hot water use.

High levels of cylinder insulation are essential to minimise standing heat losses and maintain system efficiency.

Reuse of existing cylinders may be appropriate but requires strong justification and evidence of measured performance.

Unvented cylinders must comply with Building Regulations (Part G3) and be installed by a qualified operative with G3 certification.

Hot water cylinders should always be powered by the heat pump for maximum efficiency, rather than the immersion controller.

Many modern R290 heat pumps do not require an immersion heater for legionella water temperature control cycles. Retaining an immersion heater as an emergency backup is good practice, but it should not be used for routine hot water production, as this is significantly less efficient than heat pump operation.

DHW heating should be only during scheduled periods, with minimum hysteresis enabled is set so that the water is not reheated as soon as the DHW temperature drops by 1°C.

A DHW setpoint of 45°C with a hysteresis of 7°C is a reasonable starting point for many heat pump systems, balancing efficiency, comfort and reheat frequency.

Hysteresis explainer: hysteresis is the temperature gap between when the system switches on to reheat the cylinder and when it switches off. A wider hysteresis reduces short-cycling but allows a larger swing in hot water temperature; a narrower hysteresis maintains tighter temperature control but can increase cycling.

Your choices

- ☐ Minimum cylinder insulation standards:
  For example, 50mm+ factory-applied foam
- ☐ Installer must demonstrate that the coil surface area is appropriate to the heat pump output
- ☐ Cylinder sizing rule: litres per occupant/number of bedrooms + 1 (whichever is greater)
  For example, 45 (MCS) or 60 (EnergyStatsUK)
- ☐ Maximum reheat time: hours from 10°C to °C (chosen DHW temperature here). Use Energy Stats UK 'Hot Water Calculator' for more information
- ☐ Reuse of existing cylinders is only permitted where insulation and coil performance meet current standards, requiring justification and evidence of measured performance.
- ☐ The heat pump is to be the primary source for DHW, with the immersion heater reserved as backup.
- ☐ Hot water heating to be scheduled times per day. Constant reheat is not permitted.
- ☐ Minimum DHW hysteresis of °C

Notes for procurement teams

Require installers to submit cylinder specifications, including insulation thickness, coil size, and reheat time.

Ensure installers hold G3 certification for unvented hot water systems.

Further information

For more information, see:

- CIBSE Domestic Heating Design Guide (2026) – Section 4.5 'Domestic Hot Water Storage Cylinders'
- Energy Stats UK 'Hot Water Cylinder Sizing and Mixing' guide
- MCS Domestic Hot Water Calculator

4.9. Controls and weather compensation

What to decide

Decide how heating system controls will be specified to ensure efficient, user-friendly operation of heat pumps. This should include mandatory use of weather compensation, alongside decisions on whether to specify smart controls and how resident interfaces and usability will be managed.

What you need to know

Heat pumps operate most efficiently when running continuously at low temperatures. Traditional on/off room thermostats often 'pulse' the heat source near the setpoint, causing short-cycling and reduced efficiency on heat pumps. Where an on/off thermostat is unavoidable, disable TPI and configure a sensible hysteresis and minimum off-time; primary temperature control should be via weather compensation.

Weather compensation adjusts the flow temperature of the heating system based on outdoor temperature, helping maintain comfort while maximising efficiency. The weather compensation curve needs to be calibrated correctly to ensure that indoor temperatures are maintained without overheating or underheating. If not, it could lead to poor comfort and resident interference that can aggravate system performance issues.

Even well-calibrated weather compensation controls require minor adjustment/optimisation after the system has been in operation for a few heating weeks. This can be completed through a return visit from the installer, adjustment via remote smart controls (where applicable), or completed automatically where a system optimiser has been commissioned (such as Havenwise, Homely, Passiv)

Smart controls/optimisers can be commissioned by the installer in discussion with the resident. Some optimisers can also be used in conjunction with time-of-use tariffs to shift electricity consumption to lower-cost periods. This may involve a slight compromise on system efficiency in exchange for lower running costs overall.

Smart controls can support better engagement and remote support, but may not suit all residents.

Low flow temperatures are more efficient for system operation, but may lead residents to believe that the system is off or broken. Controls that show system flow temperature and operational status can help to show residents that the system is operating, preventing unnecessary interference.

Open-loop systems (that is systems without hydraulic separation, either without TRVs or where the TRVs are kept open) are often preferred for heat pumps, using a central controller to modulate flow temperature and maintain steady-state operation.

Open-loop systems explainer: In systems without hydraulic separation, the heat pump serves the heating circuit directly, without a buffer tank or low-loss header. This configuration can improve efficiency by avoiding unnecessary temperature uplift, provided the system is designed to maintain adequate flow and volume under all operating conditions.

Adjusting heat output primarily via TRVs should be discouraged. Closing multiple TRVs can restrict system flow and reduce the water volume available during defrost. Many installers recommend fitting TRVs only in bedrooms, while keeping emitters in main living spaces open to maintain stable operation and avoid the need for additional system volume from a volumiser or buffer tank.

Resident controls must be simple, intuitive, and clearly explained. Poor usability can lead to tampering, inefficiency, or dissatisfaction.

A common installation shortcut is to set a fixed flow temperature or a high-offset weather compensation curve and to control room temperature using TRVs or a room thermostat to switch the system on and off. This reduces efficiency as the system runs at higher temperatures than necessary and cycles on and off, rather than modulating smoothly. Specifications should require properly calibrated weather compensation with flow temperatures that vary in response to outdoor conditions, without reliance on on/off thermostatic control to manage comfort.

Buffer tanks with hydraulic separation should not be specified by default. They should only be included as a necessary, deliberate design choice. While there are legitimate uses in some systems, their inclusion often increases the effective design flow temperature and can reduce overall heat pump performance.

In practice, buffer tanks are sometimes used to mask underlying design issues, such as inadequate emitter sizing or sub-optimal control strategies. They may also be added as an 'insurance policy' where installers expect intermittent heating patterns or frequent radiator closure by residents, resulting in limited system volume. Buffer tanks introduce additional components, increasing system complexity and therefore the risk of failure.

More knowledgeable installers may be able to design systems with sufficient volume, appropriate controls and fewer components, achieving reliable operation with lower complexity.

Where additional system volume is required to improve system performance during low load or during defrost cycles, a volumiser can be added in series on the space heating circuit, usually on the return.

Hot water production should normally be provided by the heat pump rather than the immersion heater. Many modern R290 heat pumps can meet legionella control requirements without using an immersion heater. Where an immersion heater is installed, it should be reserved for emergency backup only, not for routine hot water production.

The domestic hot water (DHW) schedule should be set to reheat the cylinder at specific times rather than maintaining a constant temperature throughout the day, as continuous temperature maintenance increases heat losses. A single daily reheat (or two at most) is usually sufficient for most households. Where a time-of-use tariff is in place, reheating can be scheduled to coincide with low-cost periods or solar PV generation. The hysteresis setting should be configured to avoid unnecessary cycling while ensuring adequate hot water availability.

Notes for procurement teams

Controls configuration is one of the most common areas where installation quality falls short. Even well-designed systems can underperform significantly if the controls are poorly set up. Require a controls strategy as part of the design submission and review it before and after installation.

Pay particular attention to weather compensation settings during commissioning witness checks. If the system appears to be running at a fixed flow temperature or cycling on and off frequently, this may indicate that weather compensation has not been configured correctly.

Resident usability should be a scored criterion in tender evaluation. Ask bidders to describe how they will ensure residents can operate the system confidently, including what information will be displayed to the resident (such as system status, flow temperature) and how settings will be protected from inadvertent changes.

Where smart controllers or optimisers are specified, ensure that ongoing subscription or maintenance costs are understood and budgeted for, and that the resident is not left dependent on a service that may be discontinued. Many smart controllers require a working WiFi connection, and functionality can be lost if a resident changes their router or internet service provider without re-connecting the controller.

Ongoing monitoring is important to ensure controls are set correctly desired performance and comfort is achieved.

Your choices

- ☐ Require weather compensation as standard, with a defined heating curve and adjustable settings.
- ☐ Require a weather compensation calibration check after 2-4 weeks of system operation. Where installation is completed outside of the heating season, the calibration check must be carried out at the start of the next heating season.
- ☐ Specify that fixed flow temperatures paired with on/off thermostatic controls are not acceptable. Weather compensation must modulate flow temperature in response to outdoor conditions.
- ☐ TRVs must be limited to bedrooms only (except where acceptable justification is provided by the installer) or excluded entirely in favour of open-loop systems with centralised flow temperature modulation.
- ☐ Resident controls must have:
  - ☐ a simple interface
  - ☐ lockable settings
  - ☐ smart control compatibility
- ☐ Third-party thermostats and controls must not be used except for optimisers.
- ☐ A smart controller/optimiser is [required]/[preferred]/[optional]. *Note: Provision must be made for any ongoing subscription costs.*
- ☐ Require installers to provide a controls strategy as part of the design submission, including flow temperature control and user interface.
- ☐ Installers must provide resident training and easy-to-read handover materials to support resident understanding and use of controls.
- ☐ DHW is controlled via scheduled reheat and appropriate hysteresis settings *(see Section 4.8)*
- ☐ Buffer tanks with hydraulic separation must not be specified by default. Where a buffer tank is proposed, the installer must provide written justification and obtain client approval.

Further information

For more information, see CIBSE Domestic Heating Design Guide (2026) – Section 3 'Controls'

4.10. Commissioning requirements

What to decide

Determine the commissioning standards and documentation you will require from installers to ensure systems are safe, efficient, and performing as designed. This includes decisions on performance verification, handover procedures, and post-installation monitoring.

What you need to know

Commissioning is a critical stage that ensures the system has been installed correctly, operates as intended, and meets the design specification.

Poor commissioning is a common cause of underperformance in heat pump systems, including incorrect flow rates, unbalanced circuits, or misconfigured controls.

Commissioning should include checks on system pressures, flow rates, temperatures, electrical connections, control settings, safety devices and water quality.

Installers should complete a commissioning checklist and provide evidence of key parameters (such as flow temperature, return temperature, flow rate, SCOP estimate).

MCS standards (such as MIS 3005) set out minimum commissioning requirements for certified installations.

Resident handover is part of commissioning and should include clear, accessible guidance on system use and maintenance.

Notes for procurement teams

Include commissioning requirements in your specification and request completed checklists and evidence as part of handover.

Consider building in time and budget for independent verification or quality assurance checks.

Ensure resident handover is prioritised; poor understanding of system operation can lead to misuse, complaints, and reduced efficiency.

Commissioning quality can be included as a scored criterion in tenders, or linked to retention payments or performance incentives.

Your choices

- ☐ Commissioning must confirm that the system has been installed in accordance with the approved design.
- ☐ Minimum commissioning evidence must be submitted, including flow and return temperatures, system flow rates, system pressure, and control settings (including weather compensation configuration), confirmation of system balancing, domestic hot water settings (including setpoint temperature, hysteresis and reheat schedule), water quality confirmation and photographic evidence of key elements (including heat pump level measure, hard standing and soakaway, pipework insulation, cylinder installation and control interfaces).
- ☐ The client reserves the right to witness commissioning on a sample of installations.
- ☐ Independent verification or spot checks of commissioning may be required, either by a third party or internal technical staff.
- ☐ A resident handover pack must be provided at commissioning, including system overview, user instructions, maintenance guidance, and contact details for support.
- ☐ Resident handover must include a practical explanation of system operation and controls, sufficient for the resident to operate the system confidently.
- ☐ Post-installation performance monitoring is required (for example SPF, energy use) to verify in-use performance.
- ☐ Post-installation optimisation checks are required, including adjustment of weather compensation and DHW settings.
- ☐ Installers should confirm whether optimisation can be undertaken remotely and what data connectivity is required.

Further information

For more information, see CIBSE Domestic Heating Design Guide (2026) – Section 1.5.1 'Commissioning'.

See also Bristol City Council's '5-point non-technical checklist for ASHP installations', 'Technical ASHP audit form' and 'Post-installation self-audit form for installers', which your organisation may find useful when developing their own handover materials. For more information, contact jack.adkins@carbontrust.com.

4.11. Handover requirements

What to decide

Decide what information, documentation, and support must be provided to residents and internal teams at the point of handover. This includes expectations for user guidance, training, and system documentation to ensure safe, confident, and efficient operation of the heat pump system.

What you need to know

A well-managed handover is essential to ensure residents understand how to use their new heating and hot water system effectively.

Heat pumps operate differently from traditional gas boilers. Without clear guidance, residents may misuse the system, leading to discomfort, higher bills, or unnecessary call-outs.

Handover should include both verbal explanation and written materials tailored to the audience; ideally co-designed with residents or tested for clarity.

Internal teams (for example housing officers, maintenance staff) also need appropriate training and documentation to support residents and manage the system over its lifetime.

Handover is a requirement under MCS standards and should be documented as part of the commissioning process.

Notes for procurement teams

A poor handover can undermine an otherwise well-installed system; it is a critical part of the resident experience and long-term performance.

Require installers to submit sample handover materials as part of the tender process and assess them for clarity, accessibility, and relevance.

Consider co-producing handover materials with residents or testing them with target user groups to ensure they are effective.

Ensure handover includes both residents and internal teams; both need to understand how the system works and how to respond to issues.

Build in time and budget for follow-up support, especially in the first few weeks after installation when questions and adjustments are most likely.

Your choices

- ☐ The installer must provide resident handover materials, including:
  - ☐ a clear overview of the installed heating and hot water system
  - ☐ user instructions for heating and hot water controls
  - ☐ a video showing how to us the heating and hot water controls
  - ☐ clear contact details for advice, faults and follow-up support
- ☐ Handover must be delivered in-person, with sufficient time for questions and demonstration of key controls.
- ☐ Handover must include a practical demonstration of:
  - ☐ heating controls and temperature adjustment
  - ☐ hot water schedules
  - ☐ expected system behaviour (for example, steady operation and lower radiator temperatures)
- ☐ Handover materials must be provided in accessible formats, appropriate to the resident's needs (for example written guides, video tutorials)
- ☐ Handover materials must be clear, jargon-free and suitable for non-technical audiences
- ☐ Training sessions or materials must be provided for the client's internal teams, covering system overview and operation, basic fault diagnosis, maintenance procedures, and resident support routes.
- ☐ Handover quality is included as a scored criterion in tender evaluation.
- ☐ Handover delivery is to be linked to retention payments, where appropriate.

Further information

For more information, see CIBSE Domestic Heating Design Guide (2026) – Section 1.5.2 'Handover'

See also Bristol City Council's 'Handover documentation examples', which your organisation may find useful when developing their own handover materials.

4.12. Resident support provisions

What to decide

Decide what ongoing support will be provided to residents following installation, including how queries, issues, and system use will be supported over time. This includes determining the level of post-installation engagement, troubleshooting assistance, and how feedback will be gathered and acted upon.

What you need to know

Heat pumps represent a significant change in how residents experience heating and hot water. Without adequate support, residents may struggle to use systems effectively, leading to dissatisfaction, higher energy bills, or unnecessary service calls

Early weeks post-installation are critical; this is when residents are adjusting to new controls, heating patterns, and expectations. Putting time and budget into a structured handover, clear guides and an early system optimisation check reduces the long-term cost of avoidable call-outs. It also helps your delivery team to focus on genuine faults rather than usage issues

Support can take many forms: follow-up visits, telephone helplines, digital resources, or community-based advice

Resident feedback is essential for identifying issues early and improving future installations.

Vulnerable residents or those with specific needs may require tailored support or additional reassurance

Consider partnerships with local community organisations or energy advice services to provide trusted, ongoing support.

Notes for procurement teams

Resident support is essential to the long-term success of heat pump programmes; it protects your investment and builds trust.

Include resident support requirements in your specification and assess delivery partners on their approach to engagement and aftercare.

Consider how support will be resourced and funded. This may include dedicated staff time, training, or partnerships.

Build in feedback loops to ensure resident experiences inform future procurement, design, and delivery decisions.

Tailor support to your resident base: consider digital inclusion, language needs, and the role of trusted intermediaries.

Your choices

- ☐ Post-installation resident support must include:
  - ☐ a 2–4 week check-in
  - ☐ a 3-month follow-up
  - ☐ an annual review
- ☐ The installer or delivery partner must provide a dedicated contact route (for example a helpline or named contact) for resident queries following installation
- ☐ Resident queries will be triaged by the social housing provider before referral. The installer/delivery partner must maintain a dedicated contact route for escalations and respond within ____ working days
- ☐ In-home follow-up visits are required to check system use, comfort, and performance
- ☐ Early follow-up support should include a review of system use and resident experience, in addition to any fault diagnosis
- ☐ Support materials must be accessible and appropriate to resident needs (such as easy-read guides, translated documents, video tutorials)
- ☐ Additional or tailored support must be provided for vulnerable residents, where identified
- ☐ The installer must inform residents of the client’s mechanisms for gathering resident feedback and complaints.
- ☐ The installer commits to reviewing resident feedback with the client and using it to inform future design, specification and delivery decisions.

5. Quality assurance, monitoring and verification

This chapter outlines how social landlords can embed quality assurance, monitoring, and verification throughout the project lifecycle, from installer selection to post-installation performance tracking.

5.1. Installer monitoring and assessment

Robust oversight of installer performance is critical to maintaining standards and identifying issues early.

Pre-install requirements

Ensure installers are certified (for example MCS-accredited), ideally with advanced training (such as Heat Geek Mastery, Warmur Academy) and have demonstrable experience in delivering high performing, low temperature heat pump systems for similar property types and resident groups. Request sample documentation, case studies, and references as part of the procurement process. See **4.2 Installer competence requirements** for more details.

Documentation and evidence checks

Require installers to submit key documents before work begins, including system designs, heat loss calculations, emitter schedules, and product specifications. These should be reviewed for compliance with your technical requirements.

Site-based verification

Conduct spot checks or audits during installation to verify that work aligns with submitted designs and specifications. This may include checking pipework insulation, emitter sizing, or control setup. Consider using internal staff, clerk of works, or third-party quality assurance providers. Bristol City Council uses a 5-point checklist for ASHP installations, which your organisation may find useful to refer to when developing their own handover materials.

5.2. Installation quality assurance and oversight

Installation quality has a direct impact on system performance, efficiency, and resident experience.

System design checks

Review submitted designs for consistency with your requirements, including flow temperatures, emitter sizing, cylinder specification, and control strategy. Flag any deviations for clarification or redesign. Bristol City Council is exploring options for a design-checking tool to support this process.

Plan for verification and accountability. Integrate your installer requirements with a robust Quality Assurance process. For instance, require the contractor to maintain a **project-specific quality assurance log** capturing key design and installation data, such as calculated heat loads, selected heat pump size, design flow temperature, and commissioning test results, for each property. This log can mirror best-practice templates (such as Bristol's heat pump quality assurance log which tracks design vs actual performance and follow-up dates) and should be submitted to you for review.

By contractually mandating this documentation, you create a feedback loop to verify competence: installers know their work will be scrutinized and must stand up to performance checks. In addition, consider linking a portion of payment or retention to successful performance verification (for example, releasing final retention only after the system achieves the promised efficiency in real use), as this further motivates installers to apply their highest competence.

Commissioning witness tests

Attend a sample of commissioning visits to observe key checks, such as flow and return temperatures, flow rates, system pressures, and control settings. Ensure commissioning checklists are completed and submitted.

SCOP verification approach

Require installers to estimate SCOP (Seasonal Coefficient of Performance) based on design assumptions and verify these post-installation using monitored data where available. This helps ensure systems are delivering expected efficiency.

Remote monitoring utilisation

Where feasible, specify the use of smart meters, MID-approved heat meters, or system-integrated monitoring to track performance. This can support early fault detection, performance optimisation, and evidence for funding compliance (such as the Boiler Upgrade Scheme).

Credit: Sam Bush / Nesta / Climate Visuals

5.3. Post-installation monitoring

Ongoing monitoring and support are essential to ensure systems continue to perform and residents remain satisfied.

Remote diagnostics

Encourage or require systems with remote monitoring capabilities that allow installers or asset managers to identify faults, underperformance, or unusual usage patterns without needing a site visit.

One-month follow-up

Schedule a check-in (by phone or in person) around 4 weeks after installation to review resident experience, system performance, and any emerging issues. This is a key opportunity to catch and resolve problems early.

First winter optimisation

Plan for a performance review after the first full heating season. This may include reviewing energy use, comfort levels and resident feedback, and making adjustments to controls or settings as needed.

Common failure modes to look for

Be alert to recurring issues such as:

- incorrect flow temperature settings
- undersized emitters or pipework
- poorly configured controls
- inadequate cylinder performance (for example, insufficient usable hot water, excessive reliance on immersion heaters, slow reheat times, constant reheating, low COP.)
- resident confusion or misuse
- poor water quality

How to detect and track

- Capture at commissioning using a standard checklist with photo evidence
- Collect operational data, where available, either using controller data or independent monitoring
- Early optimisation check: review following 2-4 weeks of system usage and record adjustments
- Log consistently, maintaining a simple quality assurance log of faults and call-outs (for example, property, installer, issue, root cause, fix, outcome)
- Sample and review: audit a defined sample of systems per work package, share a one-page monthly trend dashboard with the contractor
- Close the loop, feeding the top recurring causes back into specification wording, design prompts and pre-installation programme/work package briefings.

Tracking these issues across multiple installations can help refine specifications, improve installer training, and inform future procurement.

Credit: Liz Seabrook / Nesta / Climate Visuals

6. Resident engagement and support

6.1. Why resident onboarding is crucial

The success of any heat pump programme depends not only on technical performance but also on how well residents understand, accept, and use their new systems. Heat pumps operate differently from traditional gas boilers, and without clear guidance and support, residents may struggle to adapt. This can lead to discomfort, increased energy bills, and dissatisfaction, even when the system has been installed and commissioned correctly.

Effective resident onboarding builds trust, reduces the risk of complaints and call-outs, and ensures that residents can use their systems efficiently and confidently. It also supports wider goals around decarbonisation, fuel poverty reduction, and tenant wellbeing.

6.2. Pre-install engagement

Engaging residents early in the process is essential. Pre-installation engagement should focus on:

- explaining what a heat pump is, how it works, and how it differs from a boiler.
- setting expectations around installation timelines, potential disruption, and what to expect on the day.
- gathering information about household needs, routines, and any specific accessibility or language requirements.
- building trust by introducing the installation team and providing clear points of contact.

Best practice includes offering multiple formats for communication (such as letters, phone calls, home visits, translated materials, videos) and involving trusted intermediaries such as housing officers or community groups where appropriate.

6.3. Handover best practice

The handover is a critical moment in the resident journey. It should go beyond technical sign-off and focus on ensuring the resident understands how to use their new system. Key elements include:

- a clear, jargon-free explanation of how to operate the heating and hot water system
- demonstration of key controls and settings, including how to adjust temperatures and schedules
- provision of user-friendly written materials (such as quick-start guides, FAQs) and, where possible, video tutorials, ideally of the resident's own system
- a simple explanation of how to get help if something goes wrong

Installers should allow time for questions and check that the resident feels confident before leaving. Where possible, handover should be delivered in person and tailored to the resident's needs.

6.4. Post-install support

Support should not end at handover. Residents often need time to adjust to their new system, and questions or issues may arise in the first few weeks. Post-install support should include:

- a follow-up call or visit within 2–4 weeks to check how the system is performing and whether the resident has any concerns
- access to a dedicated helpline or contact point for ongoing queries
- optional in-home support for residents who need additional help
- mechanisms for gathering feedback and using it to improve future installations

Providing this support helps ensure systems are used correctly, reduces the risk of underperformance, and builds long-term trust.

6.5. Supporting fuel-poor / vulnerable households

Residents in fuel poverty or with additional vulnerabilities may face greater challenges in adapting to new heating systems. These households may also stand to benefit the most from improved efficiency and lower running costs; but only if systems are designed and supported appropriately.

Key considerations include:

- identifying vulnerable residents early and tailoring engagement accordingly
- ensuring materials are accessible (for example large print, easy-read, translated)
- providing additional reassurance and support, including in-person visits and follow-up
- ensuring systems are designed with simplicity and usability in mind; avoiding overly complex controls or configurations, whilst ensuring the controls support optimal operation (for example supporting weather compensation rather than on/off thermostatic controls)
- working with local support services, community organisations, and energy advice providers to offer wraparound support

By embedding resident support throughout the project lifecycle, from planning to post-installation, social landlords can maximise the impact of their heat pump programmes, reduce risks, and deliver better outcomes for residents.

7. Innovative tools and technologies summary

A number of relevant tools and resources are referenced throughout the procurement specification guidance in Section 4 and the industry insights in Section 3.

7.1.Categories of tools

Advanced heat loss measurement

Tools such as pulse or blower door testing, in-situ U-value measurement and heating tests that provide more accurate input data than standard assumptions. More accurate heat loss calculations enable lower design flow temperatures and reduce the risk of oversizing.

Digital design tools

Software platforms that support room-by-room heat loss calculation, system sizing, emitter selection and design documentation. These can improve consistency and reduce errors in the design process, particularly where multiple installers are working across a programme.

Remote monitoring and diagnostics

Hardware and software that enables remote tracking of system performance, including heat output, electrical input, flow temperatures and SCOP. Early identification of underperformance allows issues to be resolved before residents are adversely affected. Examples include HeatPumpMonitor and manufacturer-integrated monitoring platforms.

Smart controls and optimisers

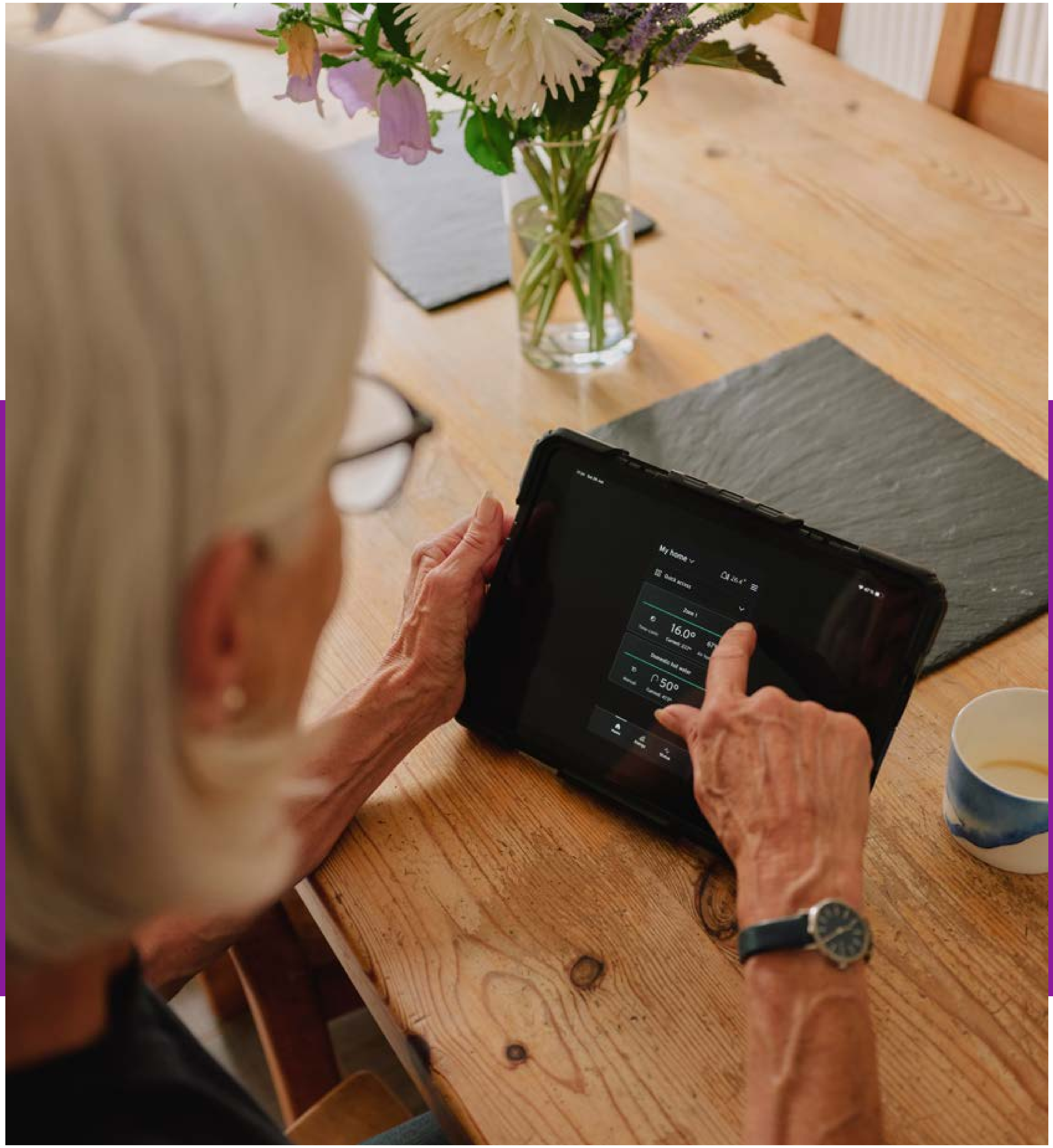
Devices and software that dynamically adjust flow temperatures, heating schedules and hot water production in response to weather, occupancy and tariff signals. Products such as Havenwise, Homely and Passiv can improve system efficiency beyond what static weather compensation curves achieve, and can simplify the resident experience.

Quality assurance automation tools

Platforms that support installer self-audit, photographic evidence capture, design review workflows and compliance tracking. These can reduce the administrative burden of quality assurance while increasing consistency and traceability across large programmes.

Resident-facing digital tools

Apps and platforms that help residents understand and interact with their heating system, track energy use, access support, and communicate with their landlord or installer. These can improve resident engagement and reduce unnecessary call-outs.



Credit: Liz Seabrook / Nesta / Climate Visuals

Final thought: make performance the default

This guide is intended to help social landlords move from procuring heat pump equipment to procuring good outcomes. Good outcomes do not happen by chance. They depend on clear specification, competent design, robust commissioning, proportionate quality assurance and effective resident support.

No local authority needs to do everything at once. A practical place to start is to identify the most important changes you can make now: strengthen installer evidence requirements, set clearer design expectations, improve handover and resident support, and put in place a feedback loop so each programme informs the next.

Use this guide as a working document. Adapt it to your stock, delivery model and procurement route, and build on it over time as your organisation's confidence, evidence base and supply chain maturity grow.

Credit: Liz Seabrook / Nesta / Climate Visuals

Innovate UK

About the Net Zero Living Programme

Innovate UK's £60 million Net Zero Living Programme is helping local authorities and businesses work together to deliver new solutions that improve local services and open markets for economic growth. Places across the UK are seizing the opportunities that come with decarbonisation to create warmer homes, cheaper local energy, new skills, and more secure work for their communities. But often, while the technology is available, places face barriers in areas such as resources, investment, planning and buy-in. The 52 local authorities taking part in the Programme have generated a wealth of experience on overcoming systemic barriers to net zero solutions.

For more information see: https://iuk-business-connect.org.uk/programme/net-zero-living/

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