

RISE

Retrofit information,
support & expertise

Harnessing Heat: The Language of Air Source Heat Pump for Retrofit

Rise Discoveries

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Introduction

This guide is based on a RISE podcast episode featuring **Wes McGeeney, the Net Zero Technical Manager at Thirteen Group**. With over three decades of experience in social housing and more than a decade working with renewable technologies, Wes shares practical insights into the deployment and optimisation of Air Source Heat Pumps (ASHPs) across Thirteen Group's housing stock. The RISE podcast, hosted by Jonathan Newton from Turner and Townsend, aims to provide expert-led support for retrofit initiatives.

Readers that would like this document in a more accessible format should contact rise@turntown.co.uk.

Background

Thirteen Group

Thirteen Group is a housing association supporting around 100,000 people across the North East, Yorkshire and Humber. Each year investing to keep homes safe and well maintained. Helping people to get onto the housing ladder, manage rent and keep homes in good repair. Thirteen Group's involvement in Warm Homes-aligned activity is long-standing. Their programmes focus on improving EPC ratings, reducing fuel poverty, and delivering low-carbon heating at scale directly contributing to the aims of Warm Homes initiatives. Their evidence-led approach, shaped by early ASHP monitoring, has enabled them to debunk myths, refine installation practices, and build a robust, scalable retrofit model that continues to accelerate through new funding

Thirteen group began its journey with ASHPs in 2013 during the Renewable Heat Premium Payment (RHPP) scheme. Initially met with scepticism, Wes McGeeney implemented performance monitoring to validate the efficiency claims of ASHPs.

Key milestones include:

- Installation of over 500 ASHPs.
- Deployment of more than 1,000 solar PV systems.
- Use of funding from schemes like the Central Heating Fund and Social Housing Decarbonisation Fund.
- This data-driven approach enabled Thirteen Group to build a robust evidence base, debunk myths, and refine their retrofit strategy

The importance of language

Effective communication with residents is crucial for the success of ASHP installations. Wes emphasises using relatable analogies to explain complex systems:

- **Fridge analogy:** Explains how heat pumps work by comparing them to a fridge in reverse.
- **Kettle analogy:** Demonstrates how hot water cylinders heat and refill like a kettle.
- **Environmental system:** Replacing the term 'heating system' with 'environmental control system' helps shift perceptions.

These analogies make the technology easier to grasp and help residents feel confident using it correctly.

Technical Foundations

Successful ASHP deployment depends on robust technical planning and design. Key considerations include:

- **Fabric-first approach:** Ensure properties meet a minimum EPC rating of 65 before installation and ensure properties are as insulated and draughtproofed as is practically achievable.
- **Heat Loss Calculations:** Essential for determining appropriate system sizing.
- **Radiator sizing:** Radiators from gas, oil and LPG systems may be reused by adjusting flow temperatures.
- **Flow temperatures:** Typical ASHP systems operate between 35- 55°C, can be adjusted to reduce radiator replacement.
- **System components:** Includes external unit, wet system with radiators, pipework, hot water cylinder, weather compensation and thermostats.

Resident behaviour and system performance

Wes highlights that 50% of ASHP performance depends on resident behaviour. Key behavioural insights include:

- Thermostat use: **Simplified thermostats with up/down controls improve usability.**
- Setback temperatures: **Maintain 16-17°C at night and 20-21°C during the day for optimal efficiency.**
- TRVs: **Should not be turned off; instead, set to lower levels and keep doors closed to maintain zone control.**
- Education: **Residents must understand that ASHPs operate continuously and should not be turned off like traditional systems. Guidance around weather**

compensation for residents is also important, so they understand the indoor temperature response to the temperature outside.

System performance, cost efficiency, and integrated energy solutions

Long-term monitoring across Thirteen Group's housing stock **provides a clear picture of how ASHPs perform in real-world social housing environments. When combined with effective procurement practices and complementary technologies such as solar PV, ASHPs can deliver substantial carbon reductions, improved comfort, and meaningful financial savings for residents.**

Performance outcomes from long-term monitoring

Thirteen Group's data, collected over several years, demonstrates consistent and reliable performance across hundreds of installations:

- Heating Efficiency (COP): **This means that for every 1 kWh of electricity consumed, the system delivers 3.64 kWh of heat around four times more efficient than a gas boiler (generally gas boilers provide 1 unit of heat for 0.9 units of electricity)**
- Hot Water Efficiency (COP): **Heat pumps are significantly more efficient at producing hot water than gas systems.**
- Carbon savings: **Properties have seen reductions from 5 tonnes CO₂ per year to as low as 0.3 tonnes, depending on fabric improvements and system optimisation.**
- Bill reductions: **In monitored cases, annual energy bills dropped from £1,300 to around £600, particularly where ASHPs were paired with solar PV and supported by resident education.**

These outcomes highlight the importance of correct system design, fabric readiness, and resident engagement in achieving optimal performance

Procurement strategy for cost-effective, high-quality installations

Wes McGeeney emphasises that procurement decisions can make or break the success of an ASHP programme. To avoid **inflated costs and ensure high-quality installations, Thirteen Group follows a structured procurement approach:**

- Use MCS-Accredited installers: **Ensures compliance with industry standards and guarantees that installers can complete full heat loss calculations and system designs.**
- Conduct pre-work EPCs: **EPC assessments help determine whether the property fabric is suitable for a heat pump or requires insulation upgrades first.**

- Separate procurement of heat pump and cylinder: Purchasing these components directly prevents mark-ups and ensures consistency across installations.

This approach helps social landlords maintain value for money, avoid unnecessary radiator replacements, and ensure systems are designed to the correct specification.

Integrating solar PV for enhanced efficiency and resident savings

Solar PV significantly enhances the performance and affordability of ASHP systems. When combined, the technologies create a complementary energy ecosystem:

- Winter benefits: **Even in colder months, PV generation can offset the low power continuous operation of heat pumps, which often run at only 300 - 500W.**
- Summer benefits: **Hot water can be heated almost entirely using solar energy, dramatically reducing electricity consumption.**
- Automation and controls: Simple timers or automated schedules are preferred over diverters, which can introduce maintenance issues. Straightforward controls ensure reliability and maximise resident benefit. In cases where there is a large hot water demand, a diverter can save residents money from an export tariff.
- Battery storage: Use of a battery can maximise self-consumption, and store energy for later use when an ASHP would be in use e.g., evenings and non-sunny days. See latest guidance for installation.

The combination of ASHPs and solar PV has proven to be one of the most effective strategies for reducing both carbon emissions and household energy bills

Summary

The experience of Thirteen Group demonstrates that ASHPs can deliver significant carbon and cost savings when implemented correctly. Success depends on a combination of technical design, fabric readiness, resident education, and strategic procurement. By adopting a data-driven, customer-focused approach, housing associations can confidently integrate ASHPs into their retrofit programmes and contribute meaningfully to net zero goals.

Please see additional resources on the next page.

Links resources referenced:

[Home | Thirteen](#)

[Harnessing Heat: Podcast](#)

Links to other relevant RISE resources:

[A Beginner's Guide to Air Source Heat Pump's - RISE App](#)

[Air Source Heat Pumps toolkit](#)

[Solar PV – A Social Housing Perspective Masterclass](#)

[Battery Storage and Solar Photovoltaics toolkit](#)



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