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specific[®]

The Future of Home Heating



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💧💧 Iteration is slow in construction.
The development cycle of building something, operating it and monitoring can take 3 years. ””

💧💧 Providing decent homes for people is such a big responsibility. When you've got tenants on low income experiencing cold, you can't afford to wait that long. ””

The Future of Home Heating

In December 2020, SPECIFIC Innovation and Knowledge Centre hosted a meeting of South Wales housing associations. The aim was to share experiences of low carbon heating in social housing, as a positive step towards tackling this significant challenge together. The meeting was attended by eleven people representing eight South Wales housing associations.

What about existing homes? The Welsh housing stock is among the oldest and least efficient in Europe and is responsible for 21% of Welsh carbon emissions.¹

If Wales is to meet its climate targets, buildings will need to operate at close to zero emissions by 2050. This will require a substantial change in how they are heated.

The Welsh Government has declared that all new homes in Wales are to be heated and powered from clean energy sources from 2025²: just five years away. Are we ready?

This summary shares our collective experience. It does not make recommendations and it is not a review of all knowledge in this area.

If you would like to learn from someone who had direct experience of the issues mentioned then please contact us at info-specific@swansea.ac.uk

Themes

The discussion focussed on three core themes:



Technology

- What technology did you use?
- What are you glad you used?
- What do you wish you hadn't used?



Data

- What do you know about the energy performance of your housing stock?
- What do you wish you knew?



Challenges

- Overall, what are the most challenging things in decarbonising your housing stock?

¹ <https://gov.wales/all-new-homes-wales-be-heated-and-powered-clean-energy-sources-2025>

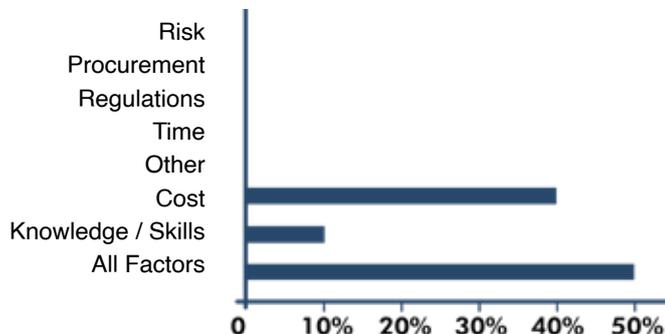
² Green et al. 2020. Cited at: <https://journal-buildingscities.org/articles/10.5334/bc.19/>

Summary of Main Points:

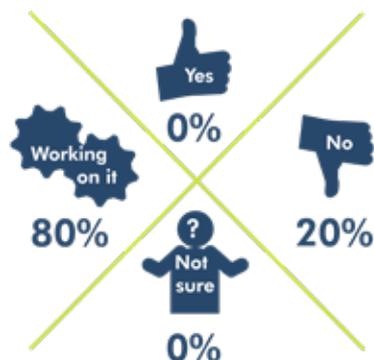
- None of the housing associations had a clear low carbon solution yet. Retrofit, dealing with existing stock, is one of the biggest challenges they face.
- We need to do more to share experience and learn from each other about what works. This includes funders, who strongly influence choices. “How do we still not know what to do?”
- Getting installation and commissioning right is critical to the building’s performance. Often it wasn’t the technology itself that created problems, but the way it was installed and used.
- Data is vital. “We cannot afford paralysis by analysis, but a lack of data is preventing us from learning from past experience”. Data is vital for commissioning, fault-finding, quality control and it enables us to improve rather than abandon systems that don’t work in the first instance.

Polls

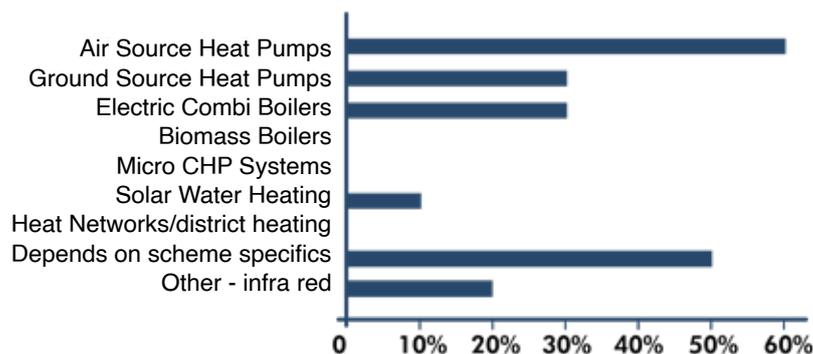
What do you think is the main challenge in shifting to use low carbon technologies for you as a housing association?



Do you have a plan for low-carbon heating after gas boilers are banned in new homes in 2025?



What is your preferred low carbon heating solution? (select up to two)



💧💧 We talk about our successes,
but nobody wants to admit when
there's been a problem. We need a
climate of honesty where people can
say: we tried this, it didn't work, if
we were to do it again this is what
we'd do differently. 📌📌



Our Hits – Eight Things We'd Do Again

Technology



1. PV and storage

Enjoyed by residents – little effort needed to understand or operate it; reduced fuel bills; green feel-good factor; created some changes in behaviour but they were not long-lived.

We've seen big differences in very similar properties due to: quality of installations and workmanship and handover had a big impact on end usability and how well it was understood; differences in residents' behaviour.

Correct battery sizing and control systems are critical, we're getting much better at that.

2. ASHP

Effective in the right homes; familiar operation; it was received differently by residents depending on manufacturer.

Success dependent on installing in the right circumstances and quality of workmanship / installation.

3. Fabric first

Good insulation is critical.

Data



4. Making informed decisions using past performance

If a system fails once, it's difficult to justify using it again. By collecting performance data we have been able to improve and build on experience rather than discarding it.

5. Having data for fault finding

Monitoring helped us identify a MVHR fault and provide evidence to help the contractor to fix it.

6. Having enough decent data to enable commissioning

Allowing time and having enough data for commissioning saves time and trouble in the long run.

Challenges



7. The less interaction between tenants and tech the better

Simplicity is key. Not everybody wants to know how it works, it just needs to work.

8. There's no substitute for practical experience...

to make informed decisions and build confidence, but we can learn from others' experience.

Our Misses – Seven Things We Got Wrong

Technology



1. MVHR

Poor installation; too much user input required; high energy use; issues with ducting, lagging, flow rates; lack of M&E design experience.

MVHR systems are often installed in larger buildings, with straight ductwork, **but it's more convoluted in houses.**

“Various issues with M&E design experience for MVHR in houses. We installed wall panel heaters instead.”

2. Biomass

Poor installation, pellet issues and blockages (tied to a single pellet manufacturer)

Teams didn't have a full understanding.

“Great on paper, a nightmare in practice.”

3. Exhaust air heat pumps

Using warm moist air from kitchen and bathroom and assisted by solar thermal collectors. **The main issue with these systems relates to the size of property it's required to serve.**

“It worked ok in flats but was a disaster in houses. We swapped it for an ASHP, which was considered by occupants to be a big success.”

Challenges



4. Being led by funding

E.g. cavity wall insulation – will it be the same with tech like external wall insulation?

We carry out work at the wrong time of year to suit funding – *“we have been forced to put external wall insulation on when it's damp, just to meet funding requirements”*

“We make choices based on decisions by someone else in a room somewhere. We assume they've done the research but that's not always the case and different tech works in different situations.”

5. Are we creating a legacy of poorly implemented projects?

Poor installation and commissioning can affect lifetime performance.

Technology is advancing very quickly.

We don't always see projects through; limited budgets prevent full commitment.

Are we learning from past experience? If something doesn't work it's hard to justify using it again.

Trying to do too much with too little is potentially doing more damage than good – it'd be better to focus on one thing and do it well than try lots of systems and have them fail, because that makes it difficult to justify doing it again.

6. Trusting the knowledge, experience and understanding of contractors

Poor installation in general – contractors don't understand (or even consider) the long-term implications.

How do we make sure they deliver what they're supposed to? Would performance specifications help?

Lack of testing and quality control on site – “nobody's checking U values; manufacturers claims aren't always true in reality, we need to check them”

“Gas engineers sent to service the solar thermal system were technically qualified to do it but didn't understand the system.”

7. Not investing enough in the residents

The way heating systems are used has a big impact on performance – *“We need to invest time and effort into home user guides and support.”*

“We've seen properties on the same site with the same technology and the same aspect perform very differently.”



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