CARBON HWB

WELSH ZERO CARBON HWB CONFERENCE

Delivering Better Homes for Wales

17/03/2026, 10:00-16:00, Cardiff

PROGRAMME / AGENDA

10:00	**Welcome from co-chairs / Croeso gan y cyd-gadeiryddion**
10:15	**Keynote speaker / Prif siaradwr**
10:30	**Session 1: Better Outcomes for Communities & Social Tenants**
	Sesiwn 1: Canlyniadau Gwell i Gymunedau a Thenantiaid Cymdeithasol
11:15	*Break / Egwyl*
11:40	**Session 2: How Data Can Help Achieve Net Zero**
	Sesiwn 2: Sut Gall Data Helpu i Sicrhau Sero Net
12:30	*Lunch / Cinio*

PROGRAMME / AGENDA

13:30	**Welcome to afternoon session / Croeso i sesiwn y prynhawn**
13:35	**Session 3: Heat Networks as Solutions for Low-Carbon Homes**
	Sesiwn 3: Rhwydweithiau Gwres fel Datrysiadau ar gyfer Cartrefi Carbon Isel
14:25	*Break / Egwyl*
14:45	**Session 4 – Workforce, Skills & Supply Chain**
	Sesiwn 4 – Y Gweithlu, Sgiliau a'r Gadwyn Gyflenwi
15:30	**Closing session: Next Steps for Better Homes**
	Sesiwn gloi: Y Camau Nesaf ar gyfer Cartrefi Gwell
16:00	*Close / Cloi*

ABOUT THE WELSH ZERO CARBON HWB

- The Welsh Zero Carbon Hwb was established by Welsh Government as an all-Wales agency to help developers, residential social landlords, housing associations and owners reduce the amount of energy and carbon in building and running homes.
- The Hwb is being funded via Welsh Government, supported by a steering group consisting of representatives from Welsh Government, ClwydAlyn, CHC Cymru, Pobl Housing, Welsh LGA and the Design Commission for Wales.
- The Hwb delivery partners are Energy Saving Trust and the Good Homes Alliance.

WELSH HOUSING CASE STUDIES

- **Developing ‘super case studies’ which dig deeper into the detail, key findings, lessons learned.**
- **Gwynfaen case study published with more to come.**
- **See summaries of the case studies on the screens in the lobby.**
- **Case study showcase webinar on 23rd April.**


Clean heat neighbourhoods
Welsh Zero Carbon Hwb Conference
nesta
a sustainable future

NESTA

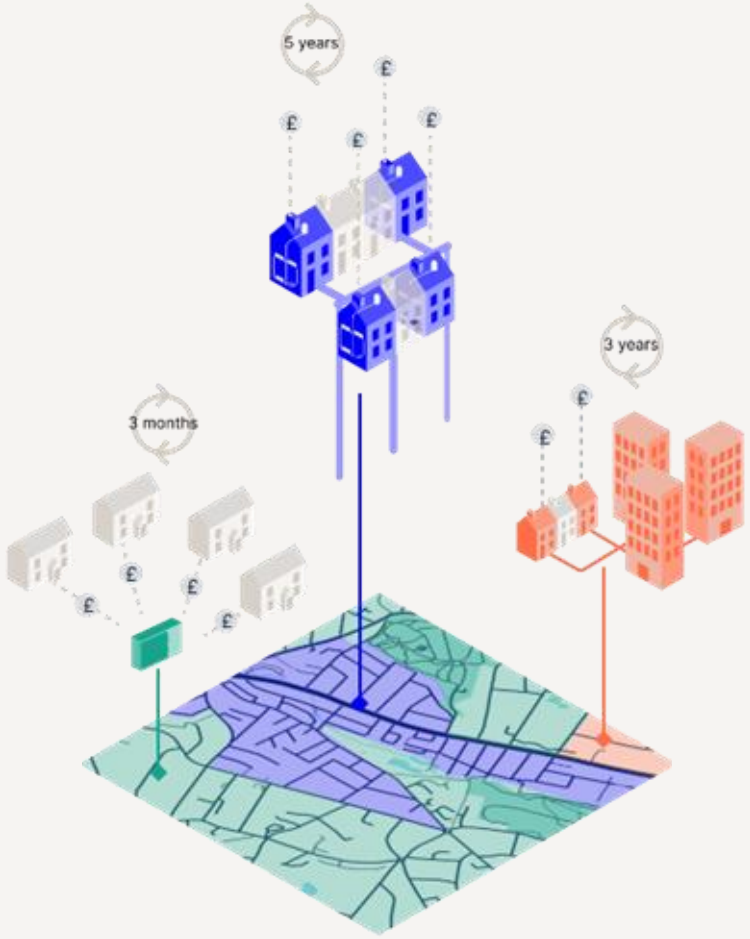
We are the UK's innovation agency for social good. We design, test and scale new solutions to society's biggest problems, changing millions of lives for the better.

For over 20 years, we have worked to support, encourage and inspire innovation that benefits society, a purpose that is more relevant now than ever.

At Nesta we are exploring clean heat neighbourhoods as an alternative option to the individual approach

It's an approach that involves multiple households within an area making the change to low-carbon heating through a local scheme.

We think this approach could vary in scale and technology to accommodate different communities and tenures.



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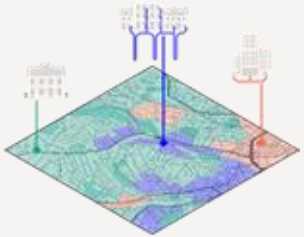
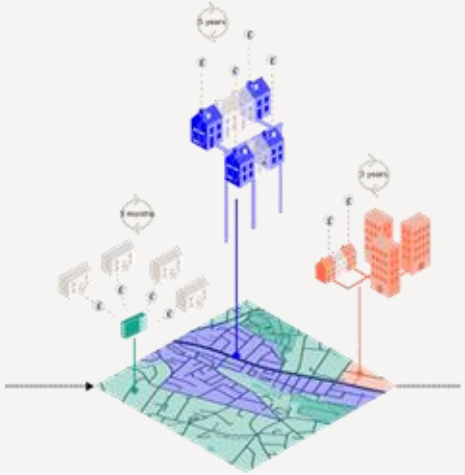
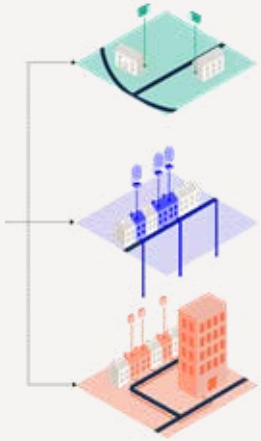
Clean heat neighborhoods







What needs to happen?	Planning by local government, enables the transition at scale.	Develop and facilitate schemes that reflect characteristics of communities and homes	Residents can access schemes that vary in technology and scale, across tenures.
Why	Everyone in the UK would have a clear direction of how their heating and home will change in the future	The market could be tailored to local areas, not one size fits all	Joining an area based programme should be the simplest and easiest way to decarbonise your home

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Our work on CHN

Developing an evidence base

Convening people around the idea of CHN

Understanding consumer preferences

Testing with households

Developing guides for others

Building a case study resource

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Shared infrastructure: challenges and opportunities

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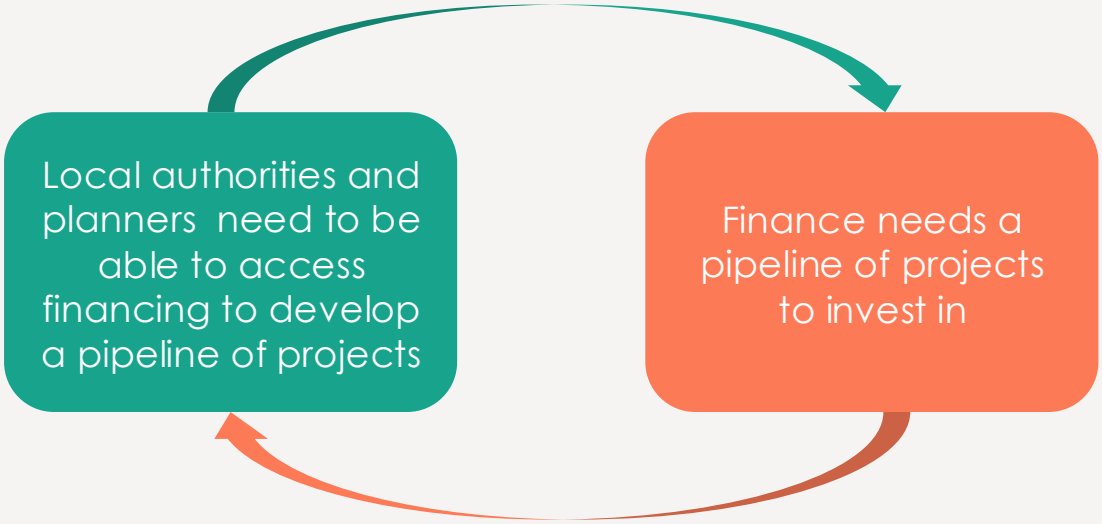
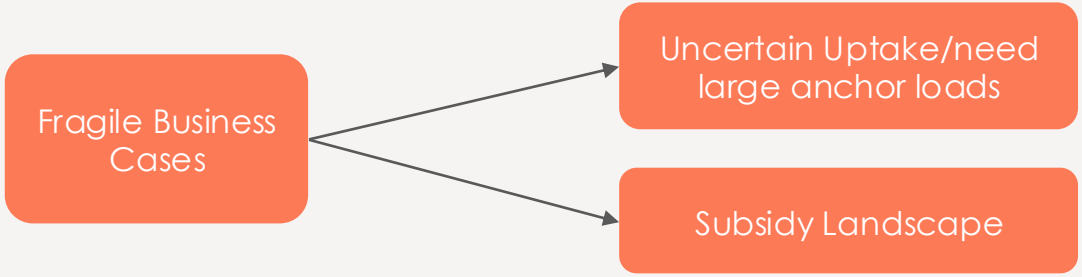
The pipeline problem



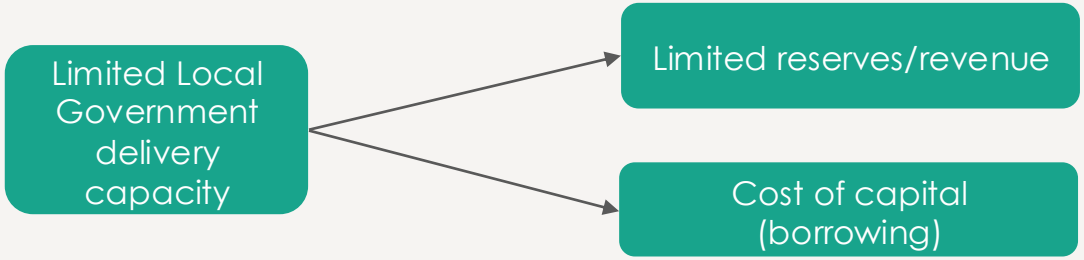
Without a pipeline of projects financing remains one-off, investment relationships and supply chains do not mature.

Why is it hard to build a pipeline?

Factors create **uncertainty** for private investors and delivery partners to invest:



Local authorities have added problems:



Potential solutions for area-based clean heat delivery

In our research, we identified solutions to increase the certainty of demand and solutions to make more/cheaper capital available to projects.

	UK Government	Welsh Government	LAs & Project developers
Building a pipeline locally and nationally		Support local authorities with granular heat planning to build a pipeline of projects	Use granular heat planning to send signals to suppliers and customers
Solutions to reduce uptake risk	Explore incentives for domestic connections	Expand mandates to connect (beyond new builds)	Use local assets and colocation with energy generation
		Create a favourable regulatory environment	
Solutions to make more & cheaper capital available	All tenure, all technology investment fund	Maximise the use of Warm Homes Plan consequentials	
	Use equity to support domestic retrofit	Support heat network delivery in Wales	

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Clean heat planning

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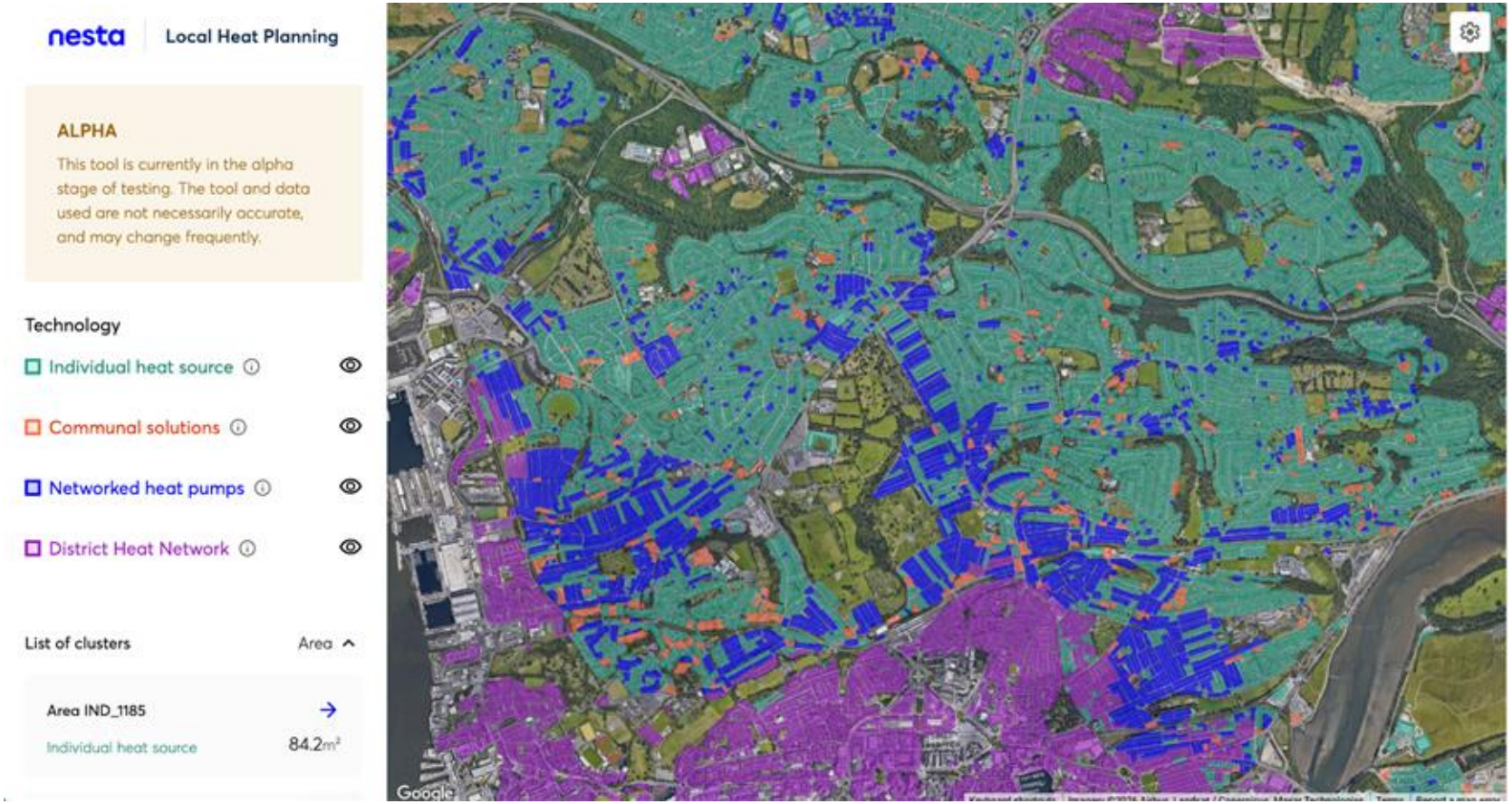
Local heat planning tool



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Local heat planning tool

nesta | Local Heat Planning

Area IND_144

Individual heat source

Note: the data shown for this area is preliminary and may change in future versions.

Property makeup

Number of properties	82
Average outdoor space	361.0m²
Number of properties in listed buildings	Unknown
Number of properties off-gas	Unknown
Property types	Flats: 8 Detached: 0 Semi-Detached: 49 Mid-Terrace: 5 End-Terrace: 5

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Local heat planning tool

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2026 Ambition

- Test the planning process and tool in other areas across GB
- Develop models and methodology to be replicable and scalable.
- Publish a trusted and useable guide, with tools to reduce the lift for local areas.
- Work with local areas and the supply chain to ensure that plans are useful and enable delivery.

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Try it yourself

Enjoy exploring our Playbook and find out more about how you could set up a scheme in your local area

Want to find out more?

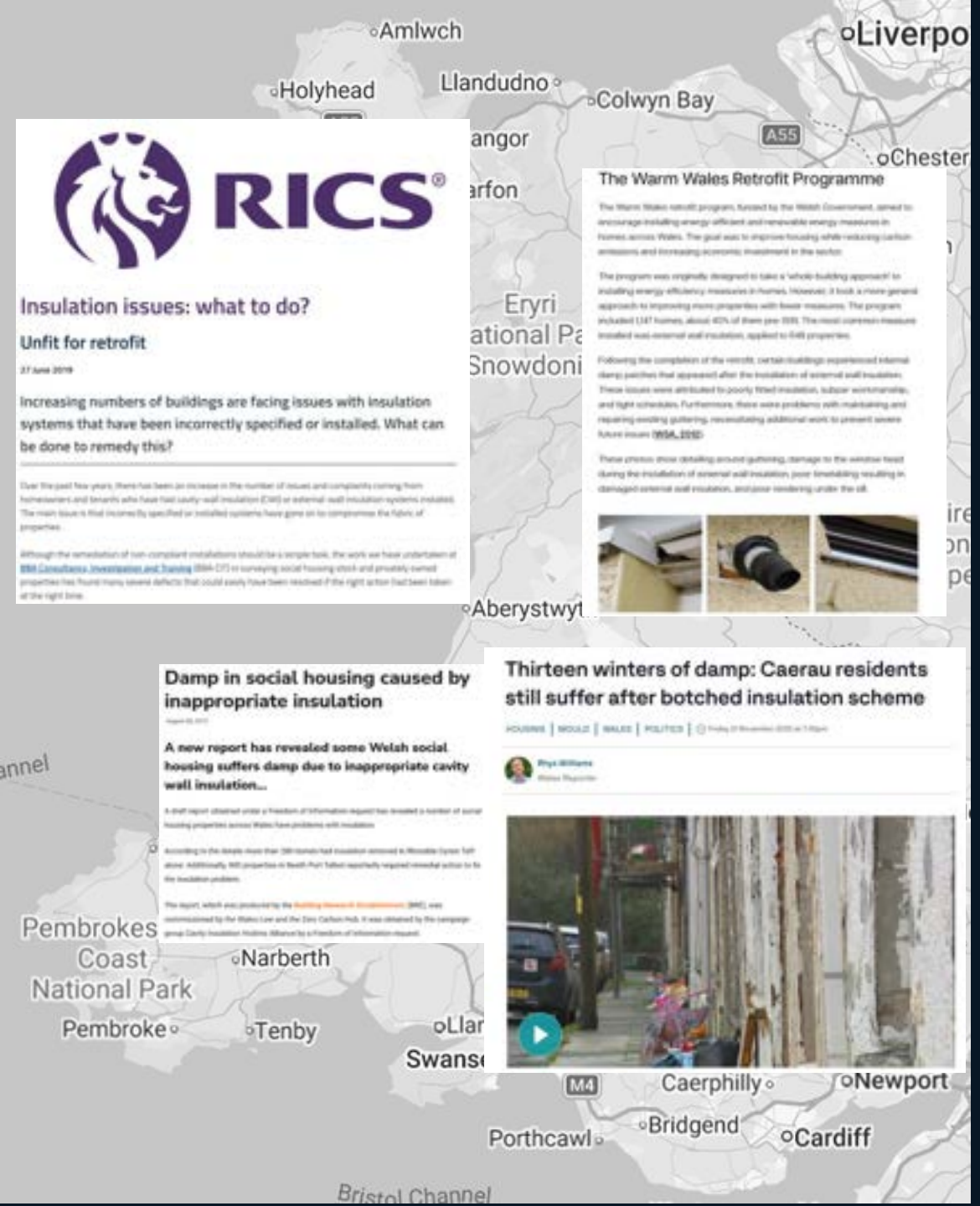
Join us on March 24th at 13:00 to hear about our partnership with Plymouth City Council and clean heat planning tool

nesta a sustainable future

SMARTER | FASTER | LOWER COST

Transformation of housing retrofit Using Existing Data + AI

Optimise AI

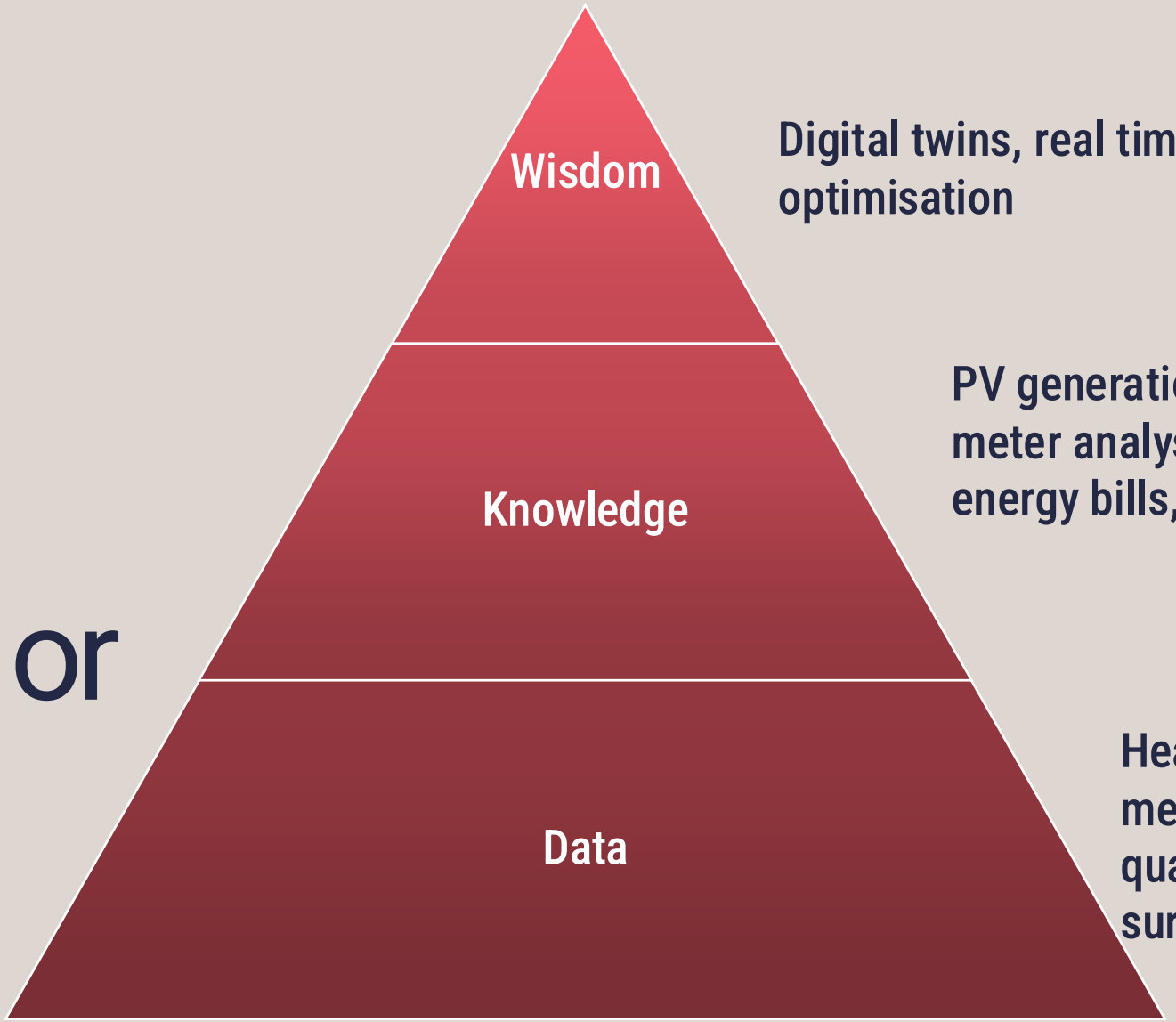


You're investing millions in retrofit.

Are you getting what you paid for?

Are you utilising your data to make the best decisions for your retrofit programme and for your clients?

Your data exists. It's just not connected or analysed.



Digital twins, real time validation and optimisation

PV generation dashboards, smart meter analysis, EPC records, online energy bills, individual experts.

Heat pump data, smart meter feeds, sensors, air quality sensors, asset survey data.

Poorly installed and commissioned retrofits Make Lives Worse.

TENANT BENEFIT	LANDLORD BENEFIT
Colder home, higher bills, worse health outcomes than before retrofit	Wasted capital. Carbon targets missed. Reputational damage.

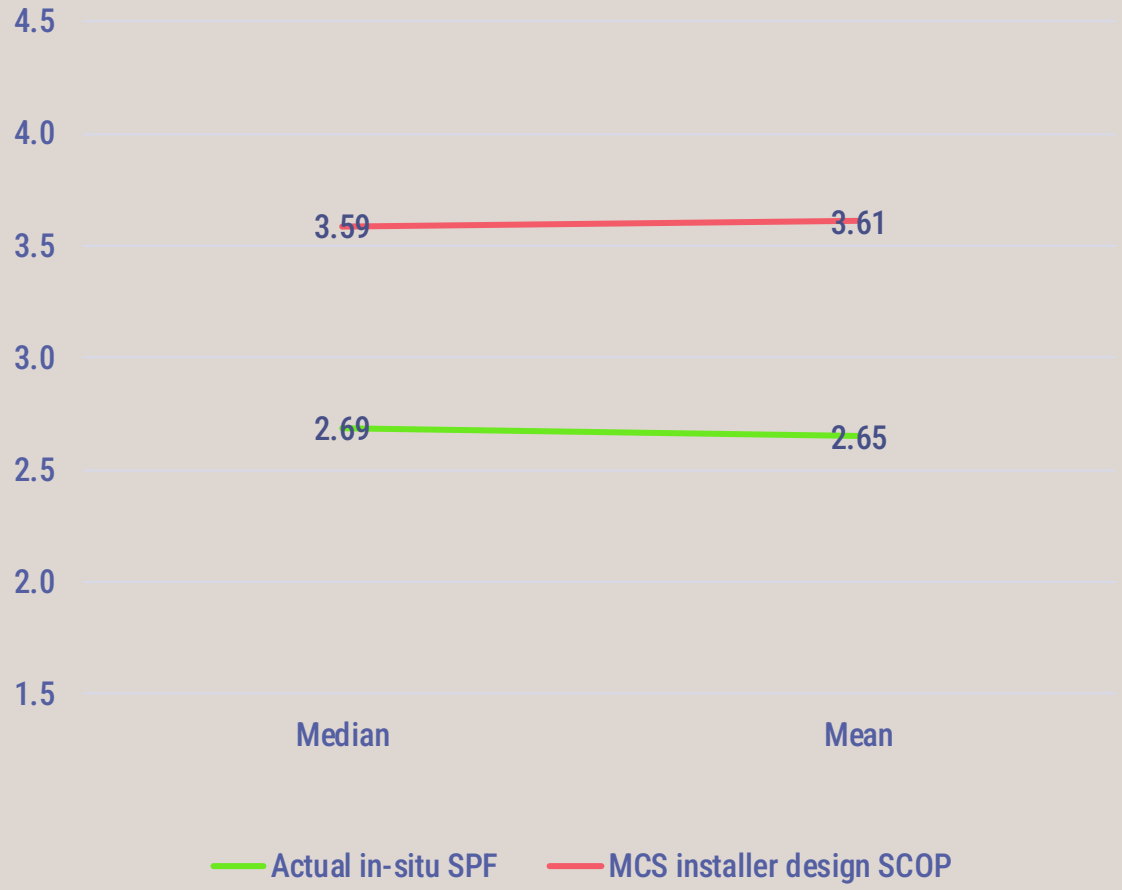
Are you using data in the analysis and commissioning phase of retrofit?

Are the tenants seeing the benefits?

Performance Gaps Are Real

For 92% of the properties the SPFH2 was lower than the SCOP.

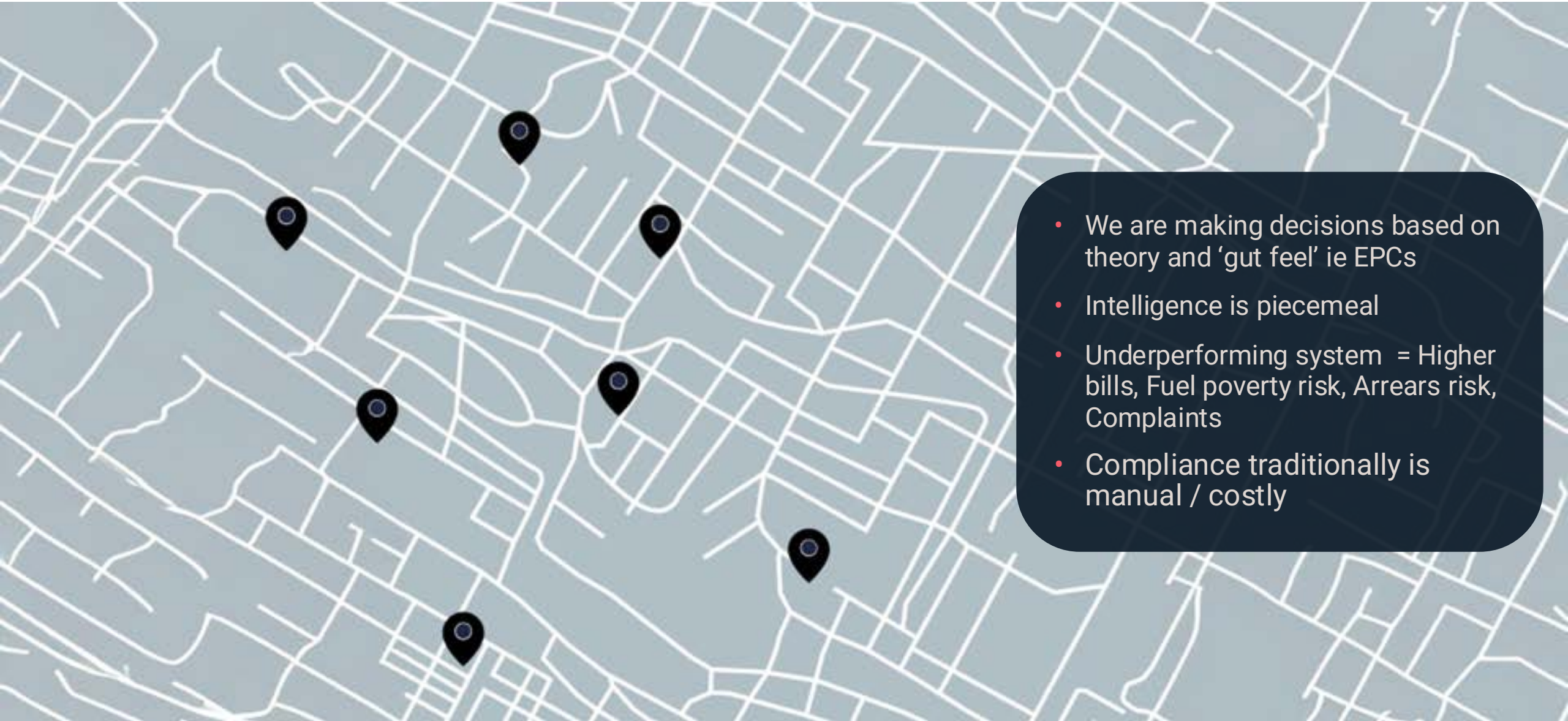
Source: EoH Report, Energy Systems Catapult / DESNZ, Dec 2024



Source: rb&m / Ofgem Data, Dec 2024

TENANT BENEFIT	LANDLORD BENEFIT
Tenant's heat pump may be costing £300–600 more per year than it should	20–30% of your retrofit investment may be underdelivering. You just don't know which 20–30%.

Without Estate Data and AI We Can’t Get Ahead of this



- We are making decisions based on theory and ‘gut feel’ ie EPCs
- Intelligence is piecemeal
- Underperforming system = Higher bills, Fuel poverty risk, Arrears risk, Complaints
- Compliance traditionally is manual / costly

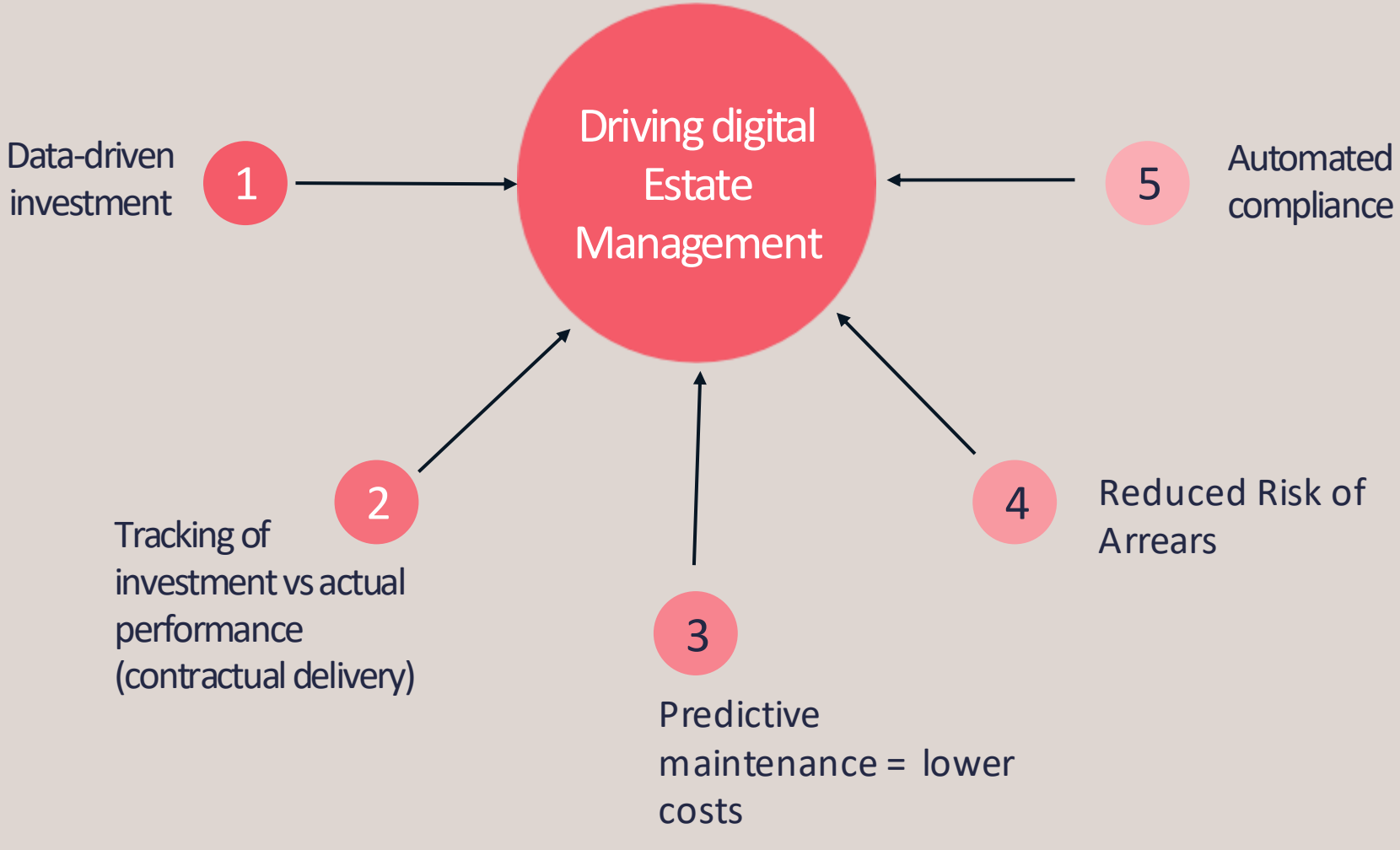
See Your Whole Estate. Predict What's Failing.

Semantic AI = full estate visibility

- One platform pulling live data from across your estate
- Manage all data sources - energy, water, damp, compliance, comfort…
- Investment / deployment plan driven by data
- Predictions for early interventions
- Continuous compliance and optimisation
- Systems performing as planned
- You and the tenant saving money

TENANT BENEFIT	LANDLORD BENEFIT
The worst-affected homes get found first – before the tenant has to chase anyone	Prioritised action list. No guesswork. Resource goes where it's needed most.

What's the upside to using your data and AI to install PVs, batteries and heat pumps?



You have the data to plan investment, deliver the retrofity and to ensure it performs as planned.

Raise your hand if...

Using data and AI for investment planning and delivery is interesting to you?

Using data and AI for proactive commissioning and intervention is interesting to you?

Using data and AI for compliance is interesting to you?

Thank you

Optimise AI

How Data Can Help Achieve Net Zero

Evidence from Social Housing Performance Monitoring across Wales

What We Do

- We collect and unify data collected across 1,000s of homes from multiple landlords and data monitoring system suppliers
- Standardise data to support consistent analysis across all homes funded under ORP
- Analyse this data to provide performance insights
- Manage this unified dataset to support Welsh Government and their research partners
- Collate data from landlords on interventions — bringing these datasets together to form the largest dataset of its kind in the world, across new build and retrofit homes in Wales

12,000+

Unique Homes

70,000+

Sensors & Meters

10M+

Data Points Per Day

Low carbon technologies include: ASHPs, GSHPs, PV arrays, battery storage systems, thermal energy storage systems, smart EV chargers, and intelligent energy management systems

Why Monitor Homes?

The Performance Gap

- Heat pump real-world efficiency averages 30% below design ratings (Ofgem/DESNZ data, 2024)
- A poorly performing heat pump can cost tenants more than a gas boiler — the opposite of policy intent
- PV energy being exported back to the grid with no financial payback.
- Insulation measures adversely impacting internal environments.

What Monitoring Delivers

Accountability

Prove impact for funders and investors — verified, not assumed

Insight

Understand what works, what doesn't, and why. Data-driven design improvement

Troubleshooting

Catch commissioning errors, faulty settings, and wiring issues across hundreds of homes

Empowerment

Give residents visibility of savings and control. 3-15% savings from energy feedback alone

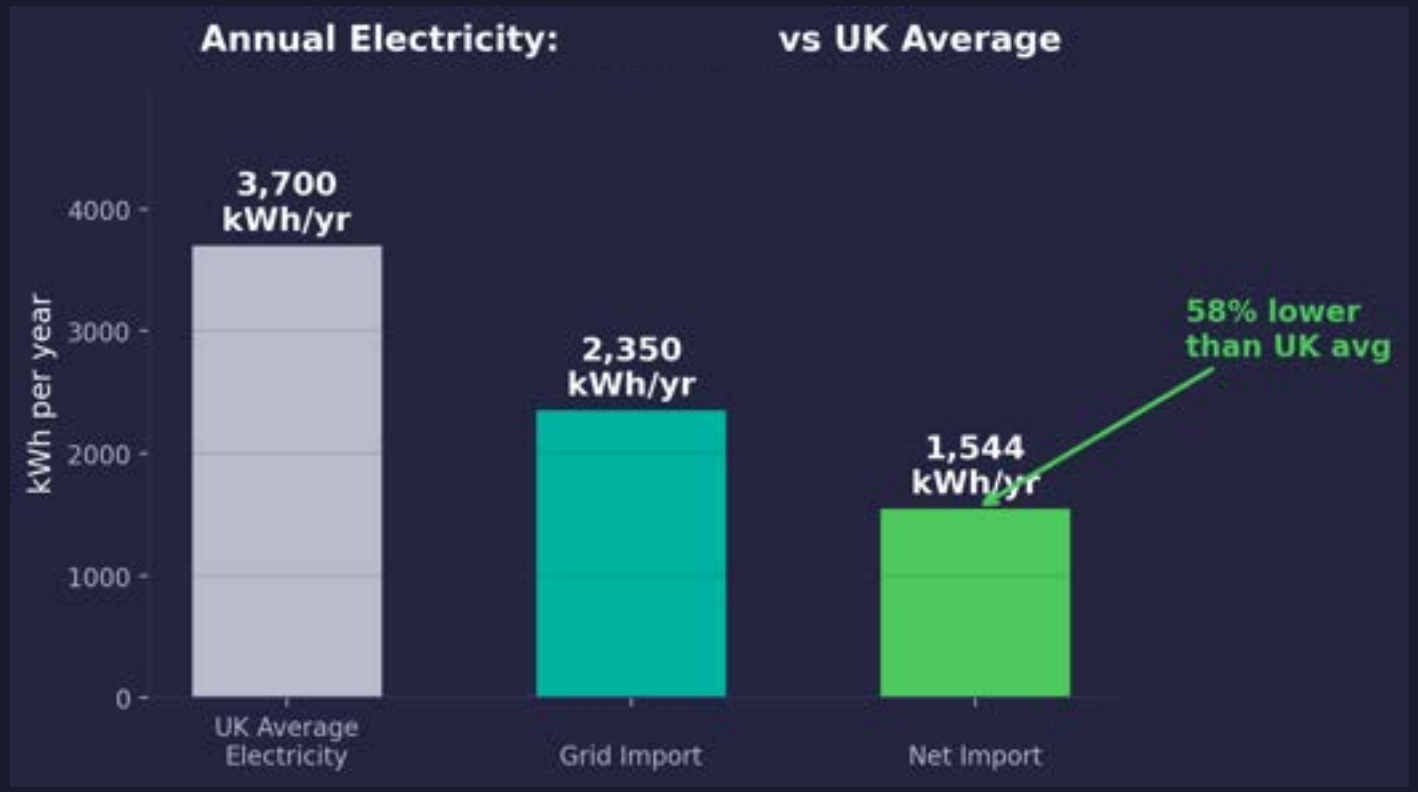
"Without monitoring, you simply don't know whether a heat pump is performing at SPF 3.5 or SPF 1.8."

Case Study: Pobl Group

Over 70 low carbon new build homes, featuring:

- Low energy envelop design
- Air Source and Gound Source Heat Pumps
- Hybrid PV and battery systems
- Thermal storage
- EV chargers
- Intelligent energy control

Energy Performance



£583

Est. Annual Electricity Bill

£1,167

Saving vs UK Average (£1,750)

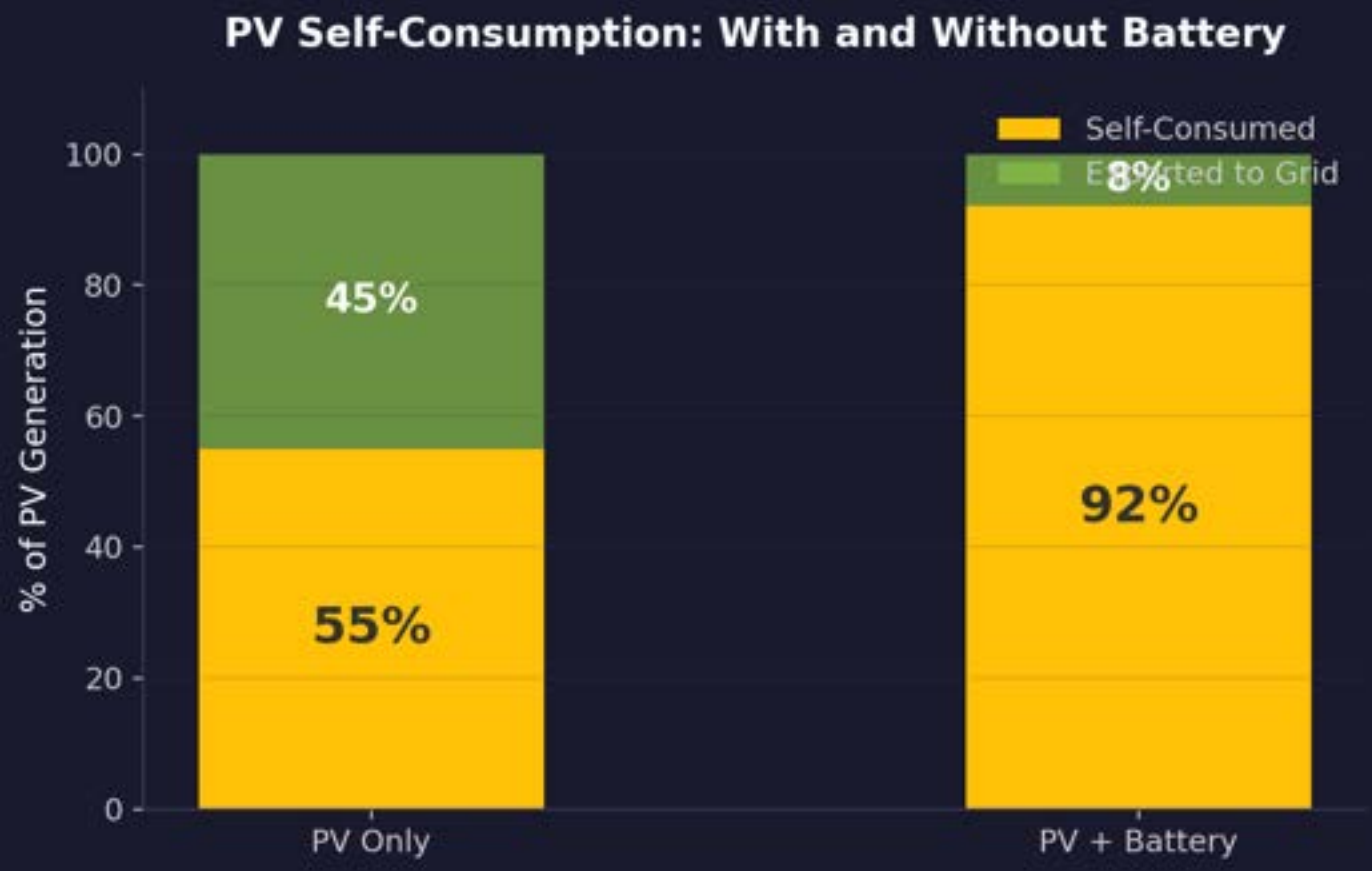
58%

Lower Net Import than UK Average

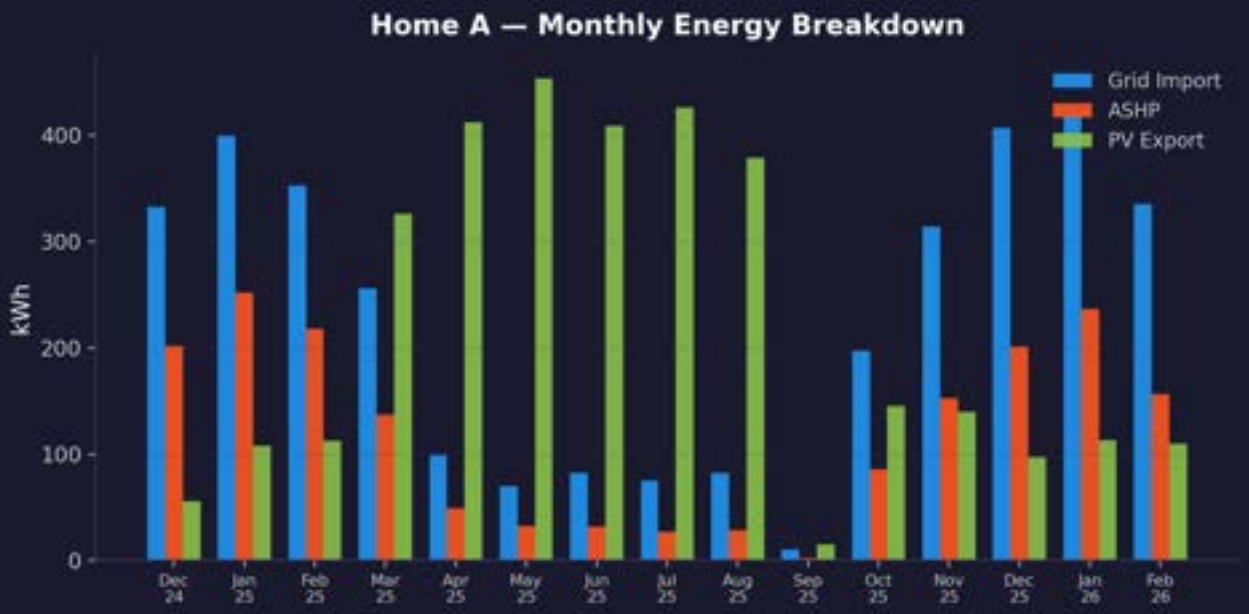
1,496

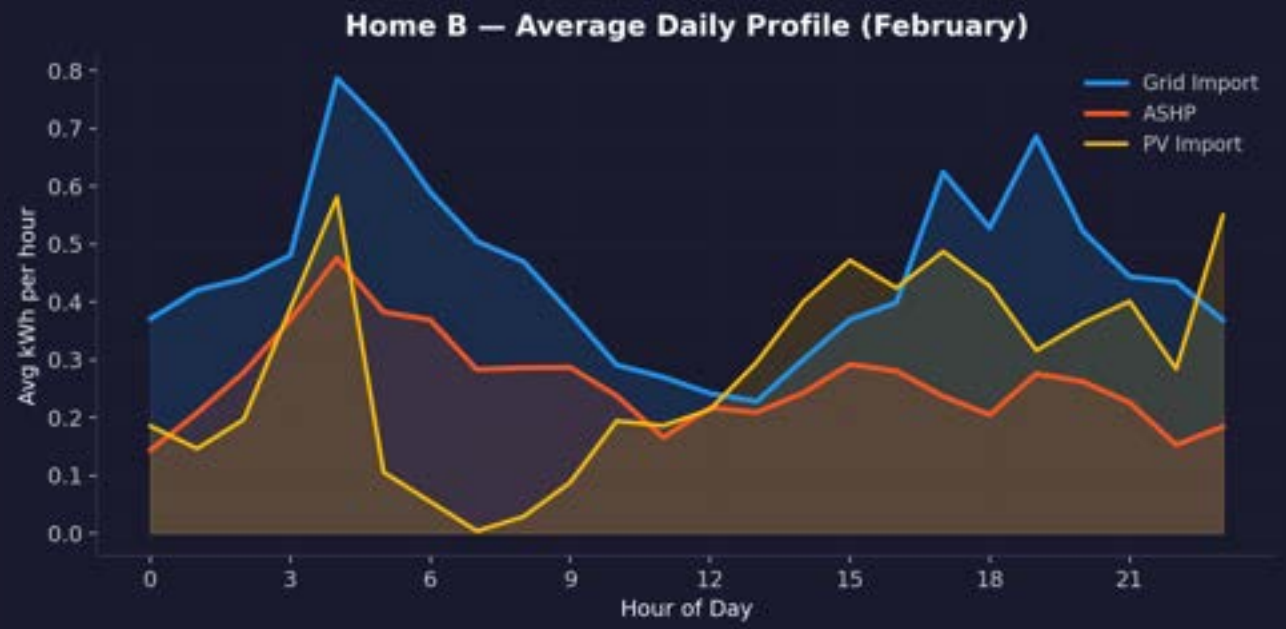
kWh/yr Avg Heat Pump (35 homes)

PV & Battery Systems

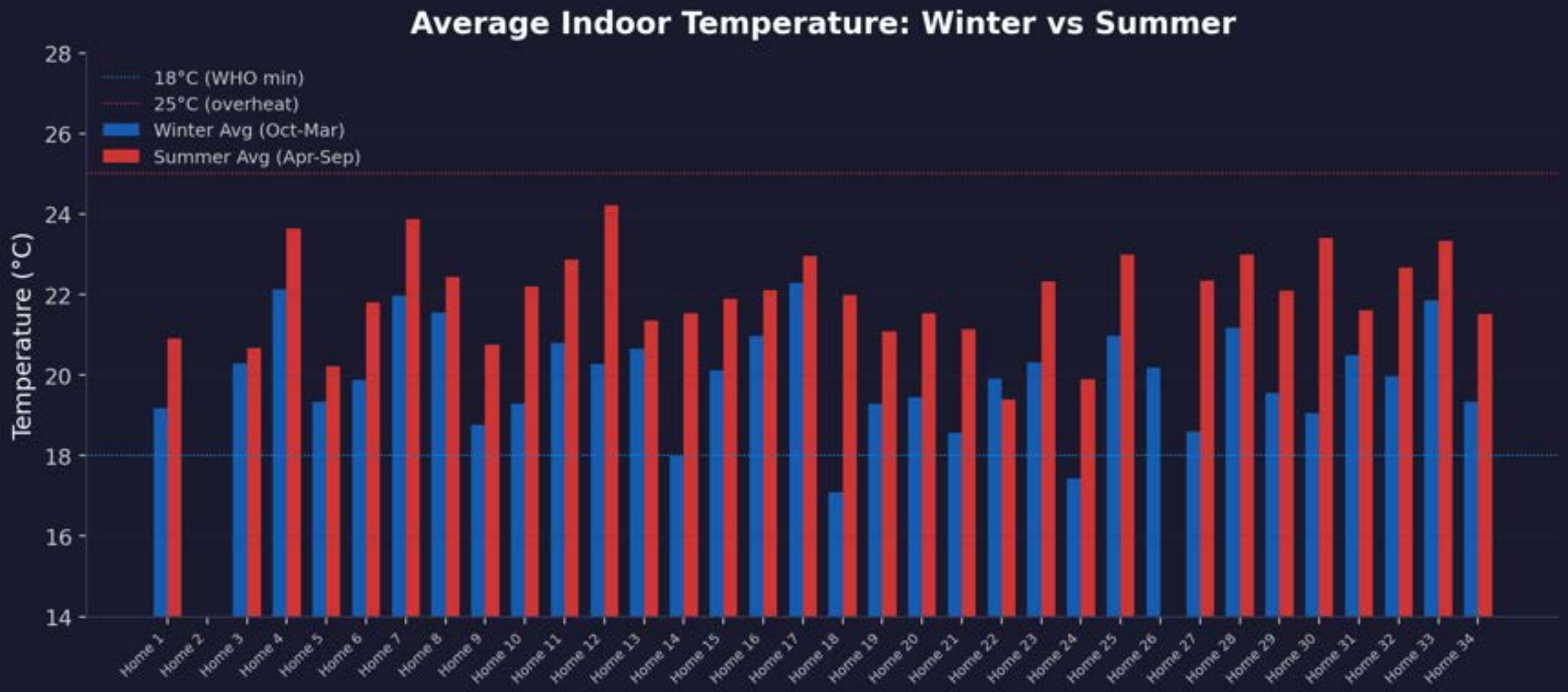


Understanding Performance



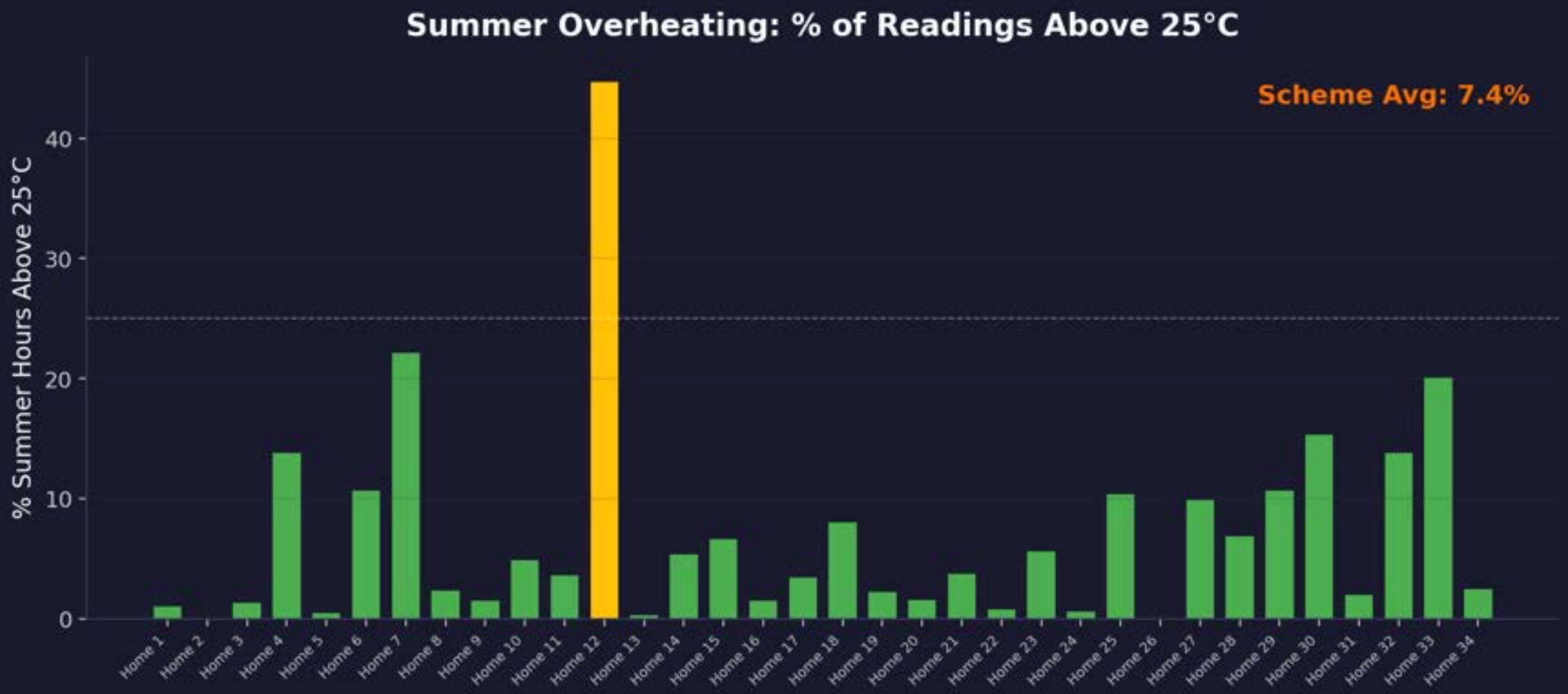


Quality Environments: Indoor Temperature



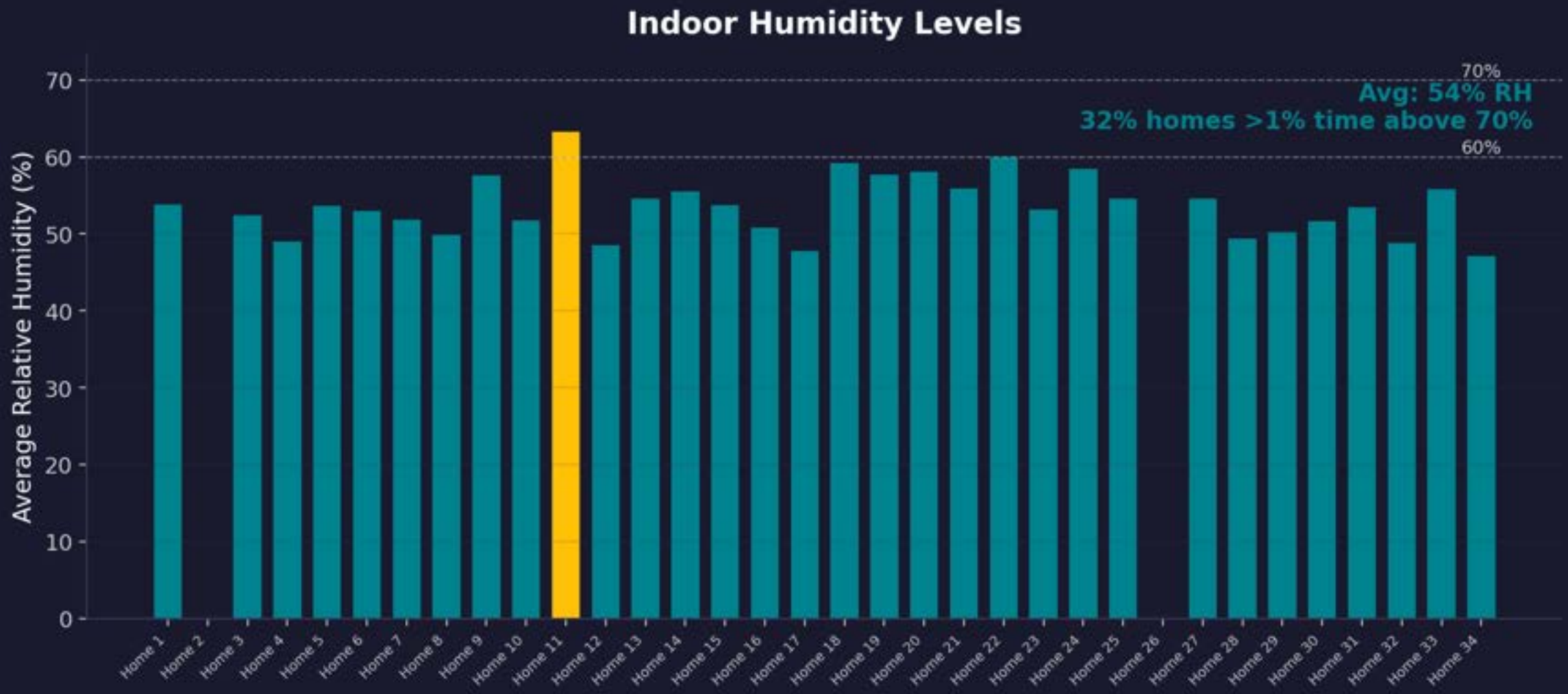
Across 33 homes: avg winter temp 20.0°C, avg summer temp 22.0°C. 3 home(s) have average winter temperatures below the WHO recommended minimum of 18°C.

Quality Environments: Overheating Risk



Percentage of summer temperature readings exceeding 25°C for each home. The scheme average is 7.4%. The worst-performing home has 44.7% of readings above 25°C, suggesting significant overheating risk. Summertime overheating is the primary environmental concern.

Quality Environments: Indoor Humidity



Humidity well controlled: avg 54% RH across 32 homes. Minimal time above 70% threshold. 11 home(s) spend >1% of time above 70% RH.

What Data Monitoring Has Uncovered

Across all homes being monitored — issues invisible without continuous data

Underperforming PV Arrays

Monitoring identified homes where PV generation was significantly below expected output, enabling rapid investigation and rectification before years of lost generation.

Battery Systems in Incorrect Modes

Battery storage systems found operating in non-optimal modes, reducing self-consumption of PV and failing to deliver expected savings to tenants.

Insufficient Ventilation

Humidity and CO_2 monitoring flagged homes with inadequate ventilation, enabling proactive intervention before damp or mould issues develop.

Isolated Systems

Systems found with isolators left in off position following installation. Without monitoring, these homes receive zero benefit from installed technologies.

Over-Active Immersion Heaters

Immersion heaters running excessively, consuming significant electricity unnecessarily and undermining the efficiency benefits of heat pump systems.

Wiring Errors

Energy sensors connected to wrong circuits, meaning consumption data was being misattributed. Corrected through data analysis of seasonal patterns.

Understanding High Energy Usage

Homes with consumption significantly above scheme average identified for targeted resident engagement and system investigation.

Data Monitoring is the Accountability Mechanism for Net Zero Housing

✓ **Proving Impact**	Verified savings for funders, not assumptions — monitored homes use 33% less net electricity than UK average
✓ **Catching Problems Early**	Commissioning errors, faulty settings, and underperforming systems identified and corrected
✓ **Supporting Residents**	Targeted engagement based on actual consumption data — empowering behaviour change and reducing fuel poverty
✓ **Scaling with Confidence**	As Wales decarbonises 1.4M homes, monitoring supports delivering its promise

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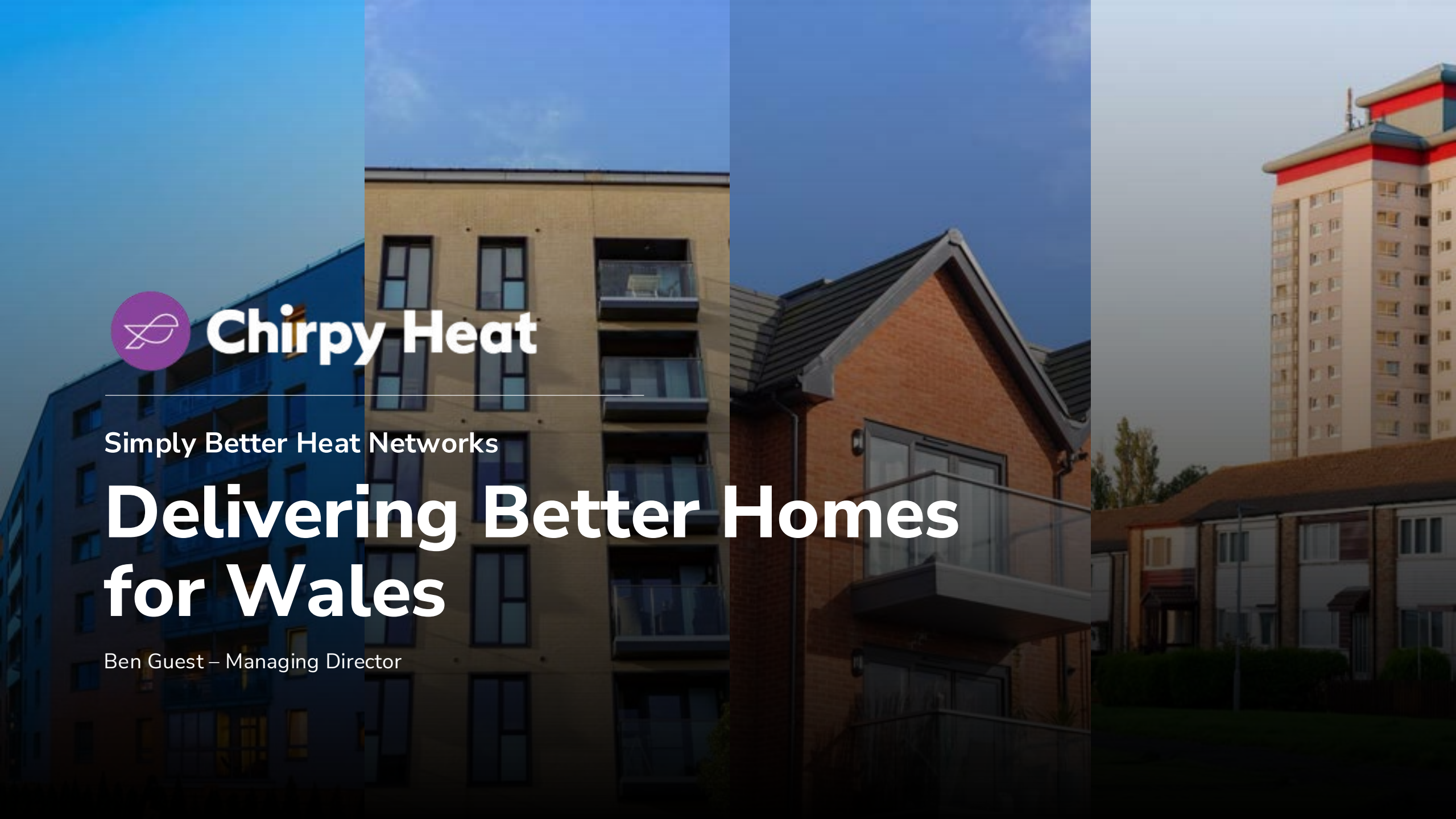

Chirpy Heat

Simply Better Heat Networks

Delivering Better Homes for Wales

Ben Guest – Managing Director

01 About us...

Introductions

Delivering Better Homes for Wales – March 17 2026

Ben joined Chirpy Heat in 2025, bringing over 20 years of leadership experience within the energy services sector.

He leads a growing and dynamic team, fostering collaboration to maximise the potential of both people and systems, to deliver meaningful impact..

Ben Guest
Managing Director

www.chirpyheat.com
www.linkedin.com/company/chirpy-heat

Chirpy Heat

Certified B Corporation

Established 2019 – the UK's leading provider of independent HEAT NETWORK SUPPORT for SOCIAL HOUSING Providers:

- **Vision**: A world where heat is affordable, reliable and low-carbon for all..
- **Mission**: To deliver independent expertise and leading solutions that help the housing sector create simply better heat networks
- **From the sector**: established and developed by people from housing – over 100 years of experience of heat networks in housing
- **Services**: from Plant Room to Board Room

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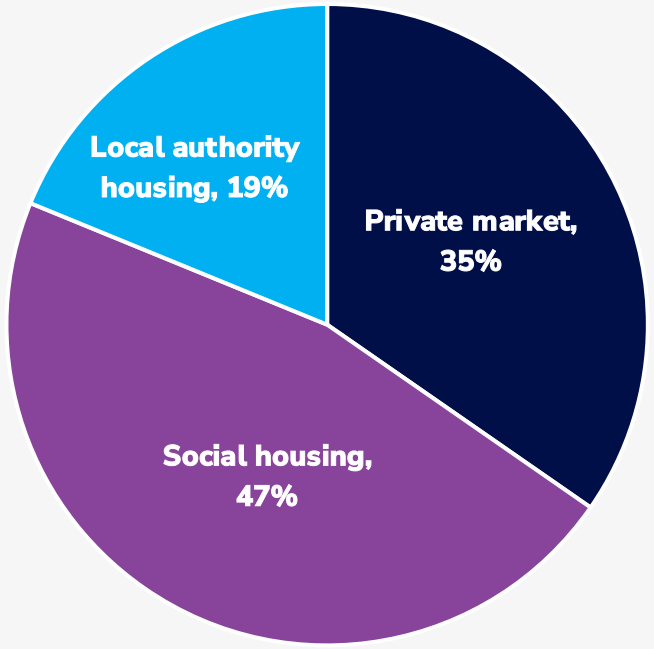
Heat networks in the UK



Where are we now?

- 14,000 heat networks in the UK
- 3% of UK buildings currently on a heat network
- 500,000 customers live on a heat network
- Only ~2,000 schemes are metered
- Around 2/3 are in social housing management

Where are we going?

- Low carbon heat networks listed in Government's Net Zero Strategy
- 20% of UK heat demand by 2050 to meet UK carbon reduction targets
- 5 million customers on a heat network
- Government funding (GHNF, HNES), regulation and zoning

Full Heat Network Regulation

Heat Network Regulation

Consumer Protection

- Transparency
- Quality
- Pricing
- Vulnerability

Heat Network Regulation

Technical Standards

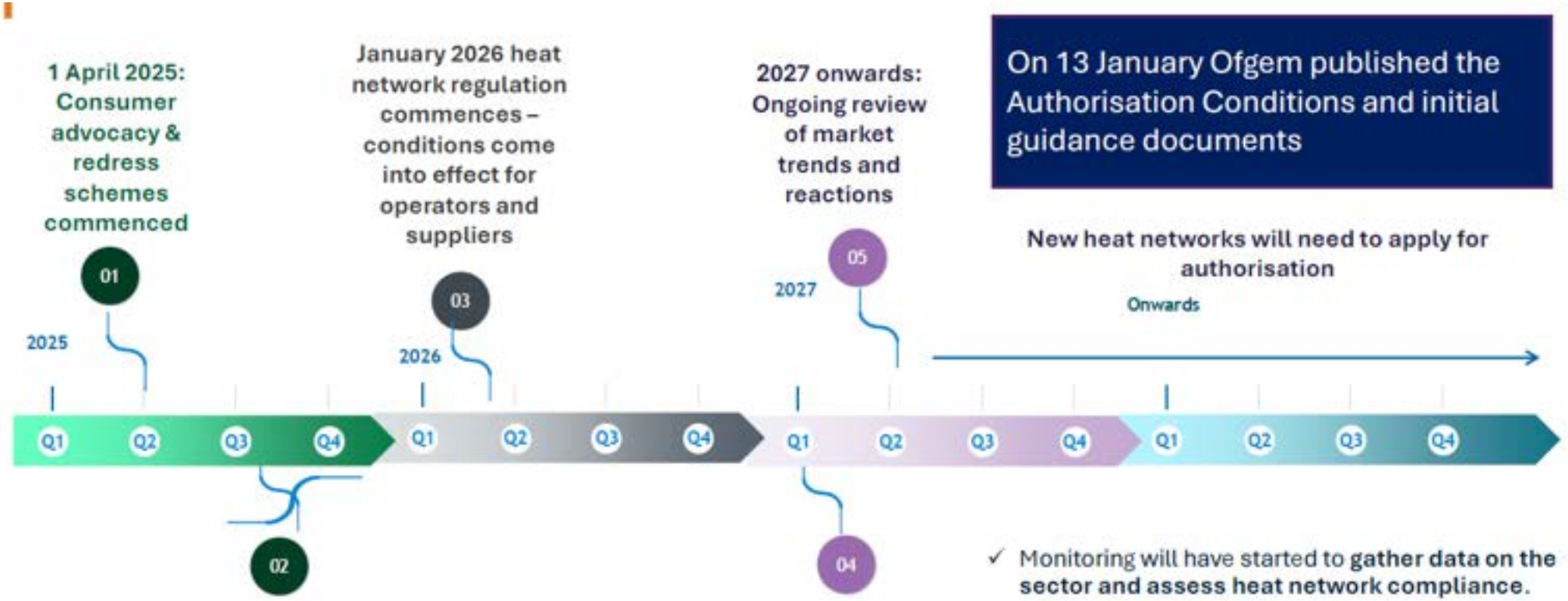
- Performance standards and thresholds
- New networks - certification before authorisation
- ‘Legacy’ networks: 10-year Heat Network Improvement Plan
- 3rd party assessment and verification

Heat Network Regulation

Zoning

- Support roll out of heat networks
- Lowest cost, lowest carbon solution
- National methodology, local coordination
- Mandated connections: new buildings, communal heating, commercial

Key Regulatory Milestones



- ✓ Monitoring will have started to **gather data on the sector and assess heat network compliance.**
- ✓ The **data collected by consumer bodies** on the experience of heat network customers will also form part of our intelligence gathering.
- ✓ Throughout there will be **engagement opportunities** to support transition and **supportive materials.**

ofgem

Risks of Non-Compliance

Legal

- Potential for prosecution
- “After the commencement of regulation, carrying out the regulated activities of operation and supply on a relevant heat network without authorisation will become a criminal offence.”

Financial

- Non-compliance could impact governance and credit ratings (G1/V1)
- Inability to let properties: immediate for new build
- Unlimited Fines (e.g. fixed penalty notices for non-reporting)

Reputational

- Standards of performance and higher customer expectations
- Customers have access to Citizens Advice & Energy Ombudsman

Operational

- Regulator monitoring, audits
- Compliance plans

Consumer Protection -Standards of Conduct

Transparency of information

- Heat Supply Agreements
- Requirements pre, during and post occupation
- Signpost to Energy Ombudsman and Citizens Advice

Fair pricing

- Ensure costs are Fair, Reflective, Justifiable
- 31 days notice
- No pass through of compensation charges

Metering, billing and payments

- Customers empowered to manage own heat consumption
- Enhanced metering via HNTAS
- Smart metering protocol

Vulnerable customers

- Policy: define, identify and support
- Signpost to support agencies
- Priority Services Register
- No Disconnections

Complaints

- Complaints handing process
- Independent support
- Escalated to Energy Ombudsman
- Record & report

Standards of performance

- Interruptions & Outages notices and resolutions
- GSoP Payments

Data and Reporting: initial Registration upload and quarterly reporting


Chirpy Heat
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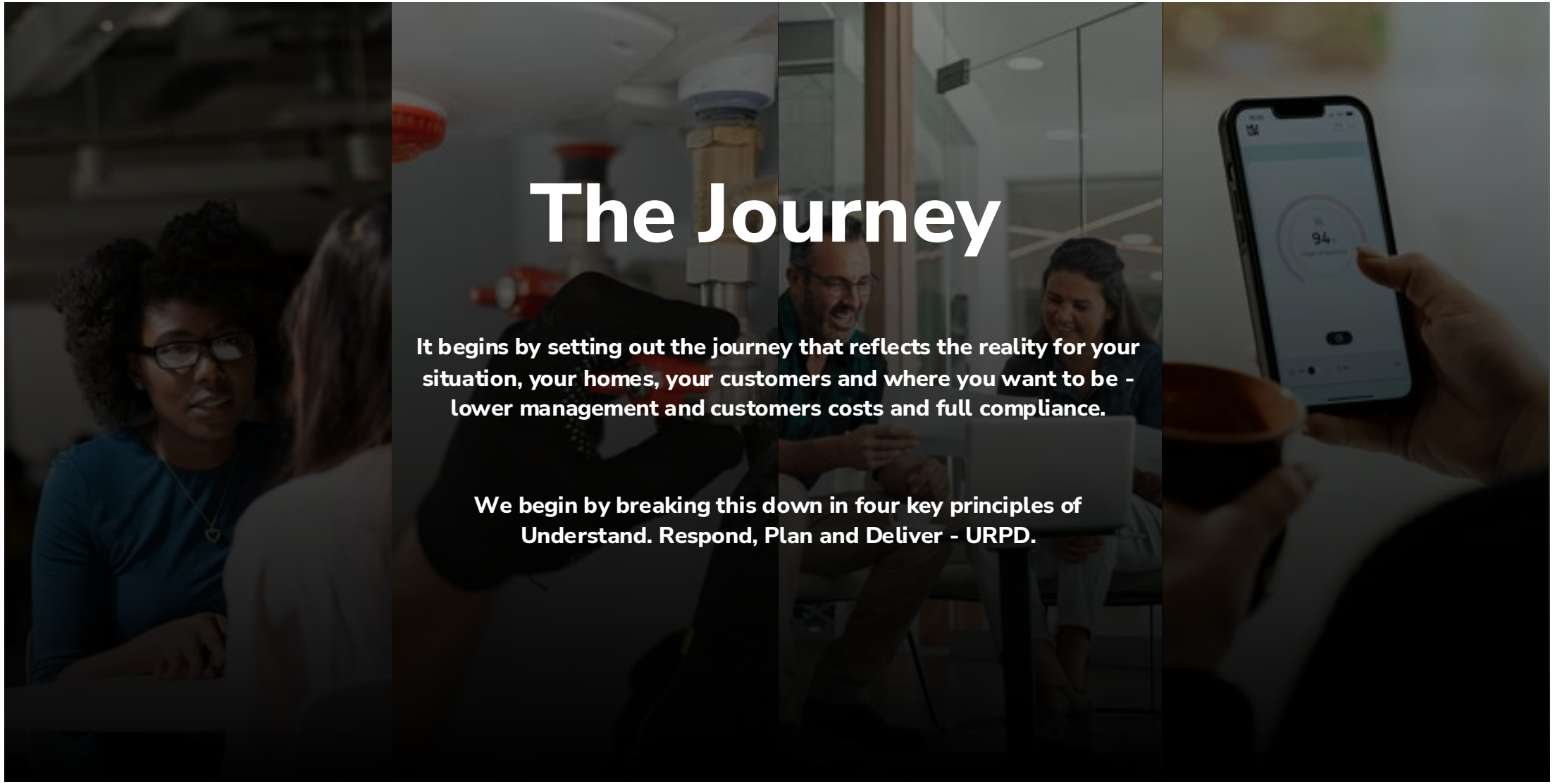
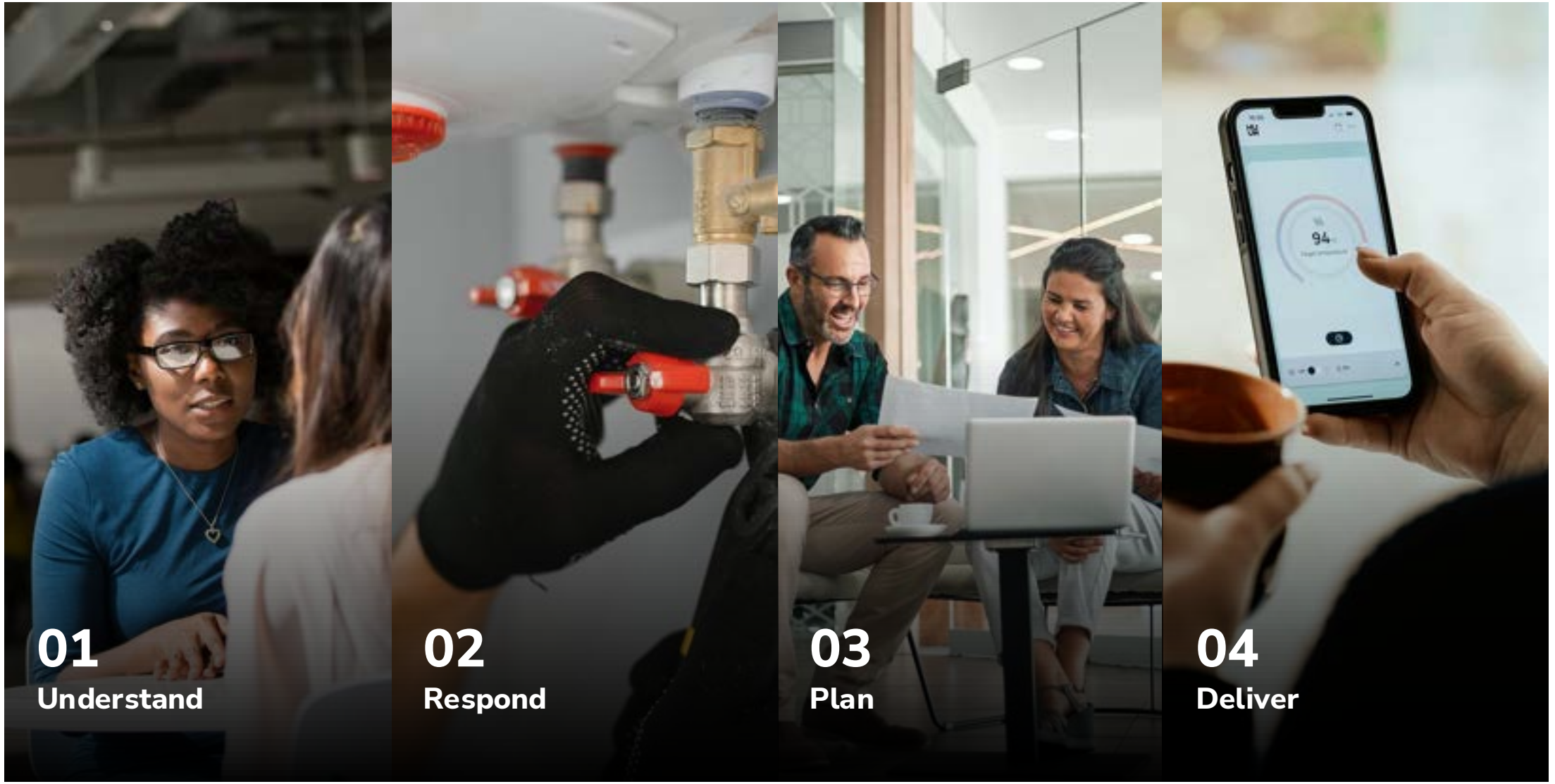
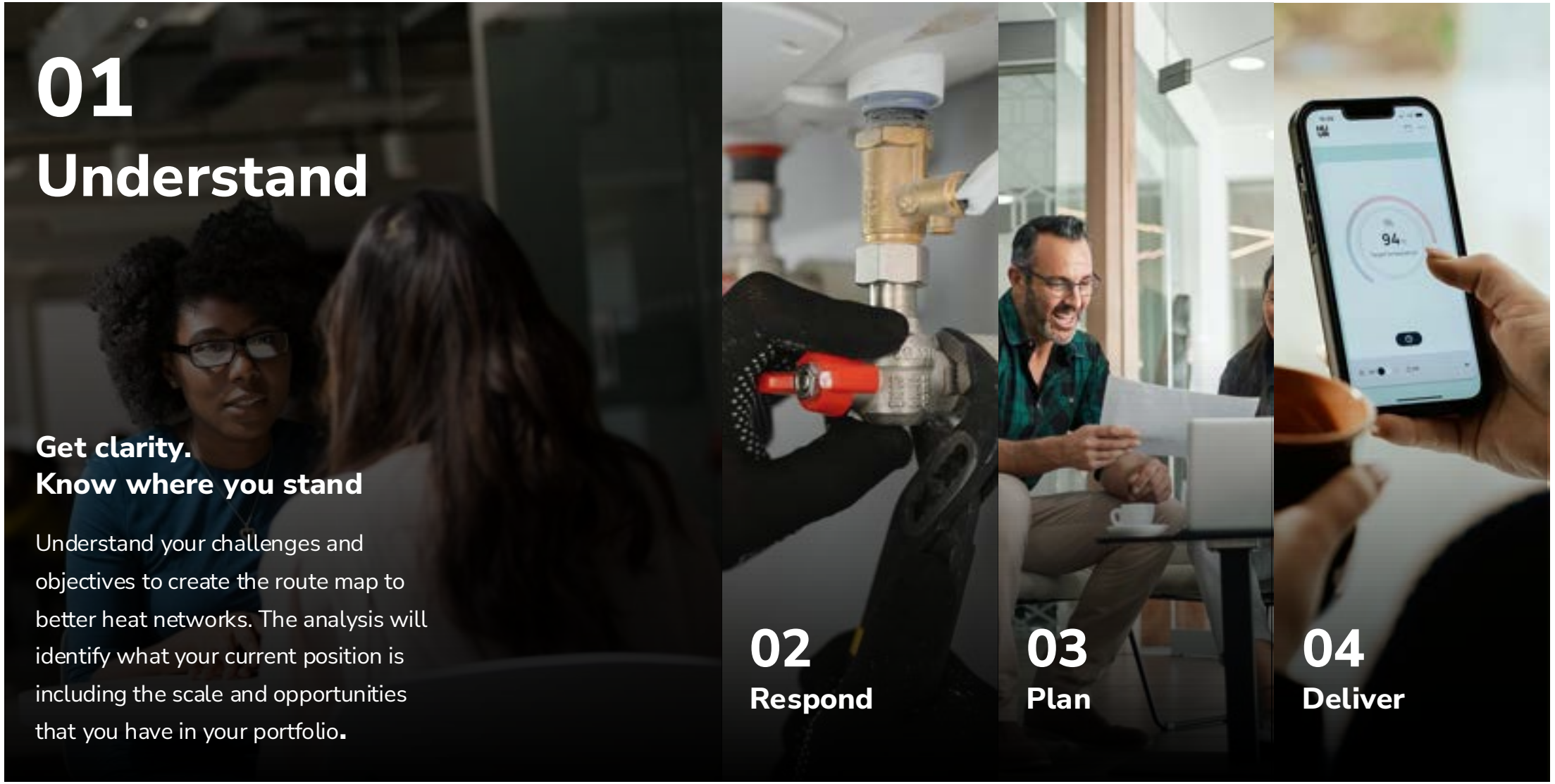


The Journey

It begins by setting out the journey that reflects the reality for your situation, your homes, your customers and where you want to be - lower management and customers costs and full compliance.

We begin by breaking this down in four key principles of Understand. Respond, Plan and Deliver - URPD.


01
Understand
02
Respond
03
Plan
04
Deliver



01 Understand

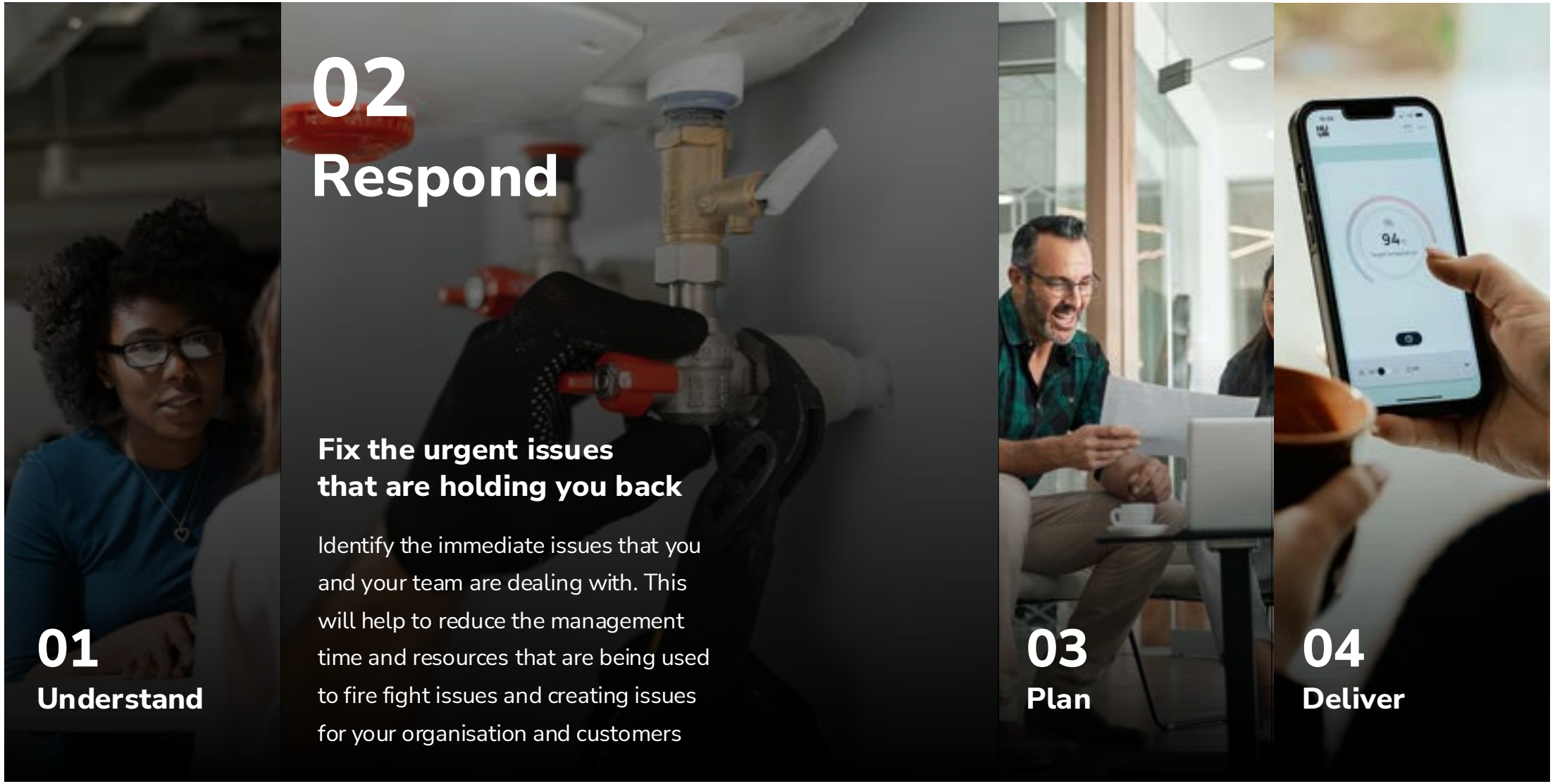
Get clarity. Know where you stand

Understand your challenges and objectives to create the route map to better heat networks. The analysis will identify what your current position is including the scale and opportunities that you have in your portfolio.

02 Respond

03 Plan

04 Deliver



01
Understand

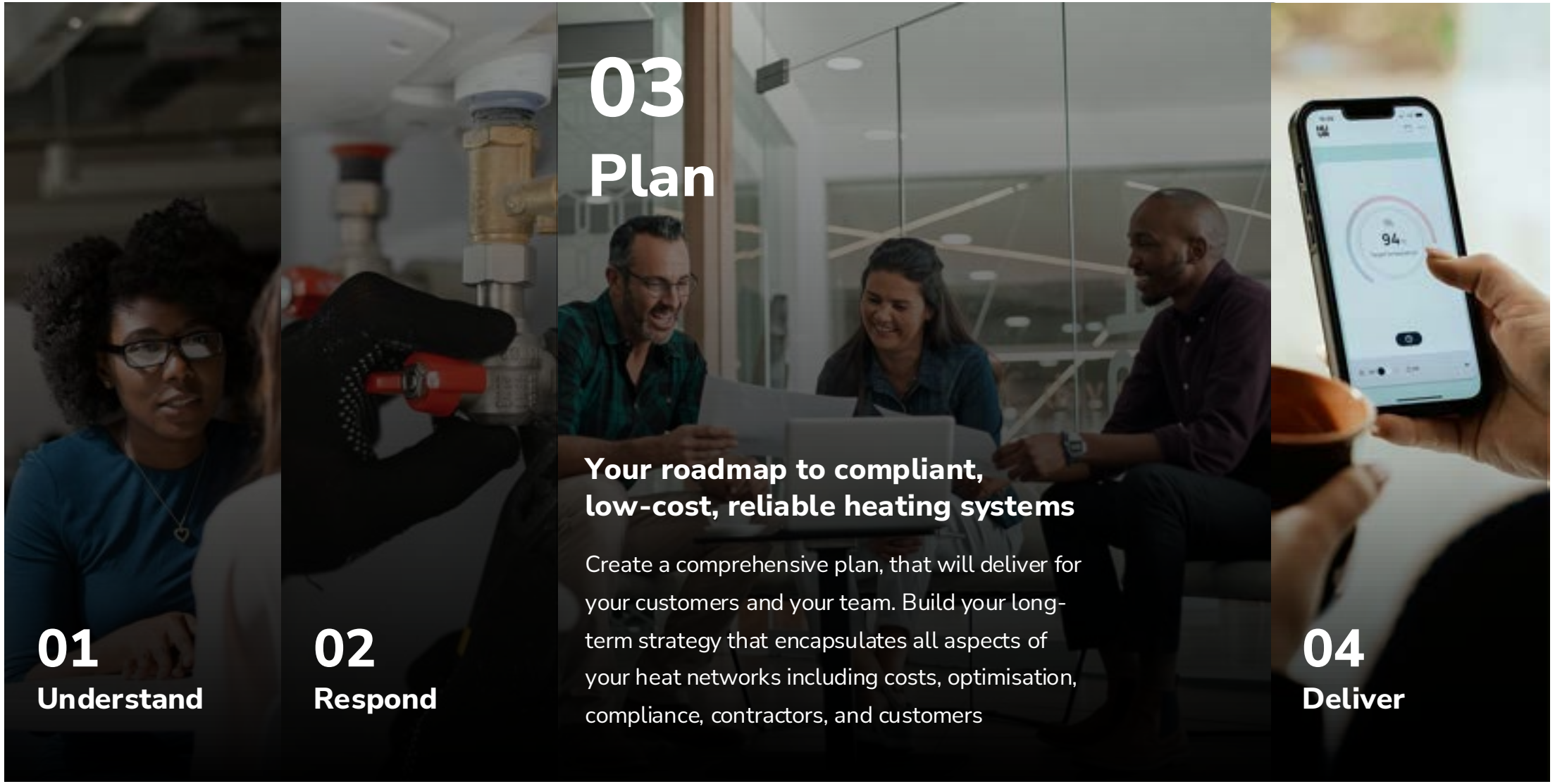
02
Respond

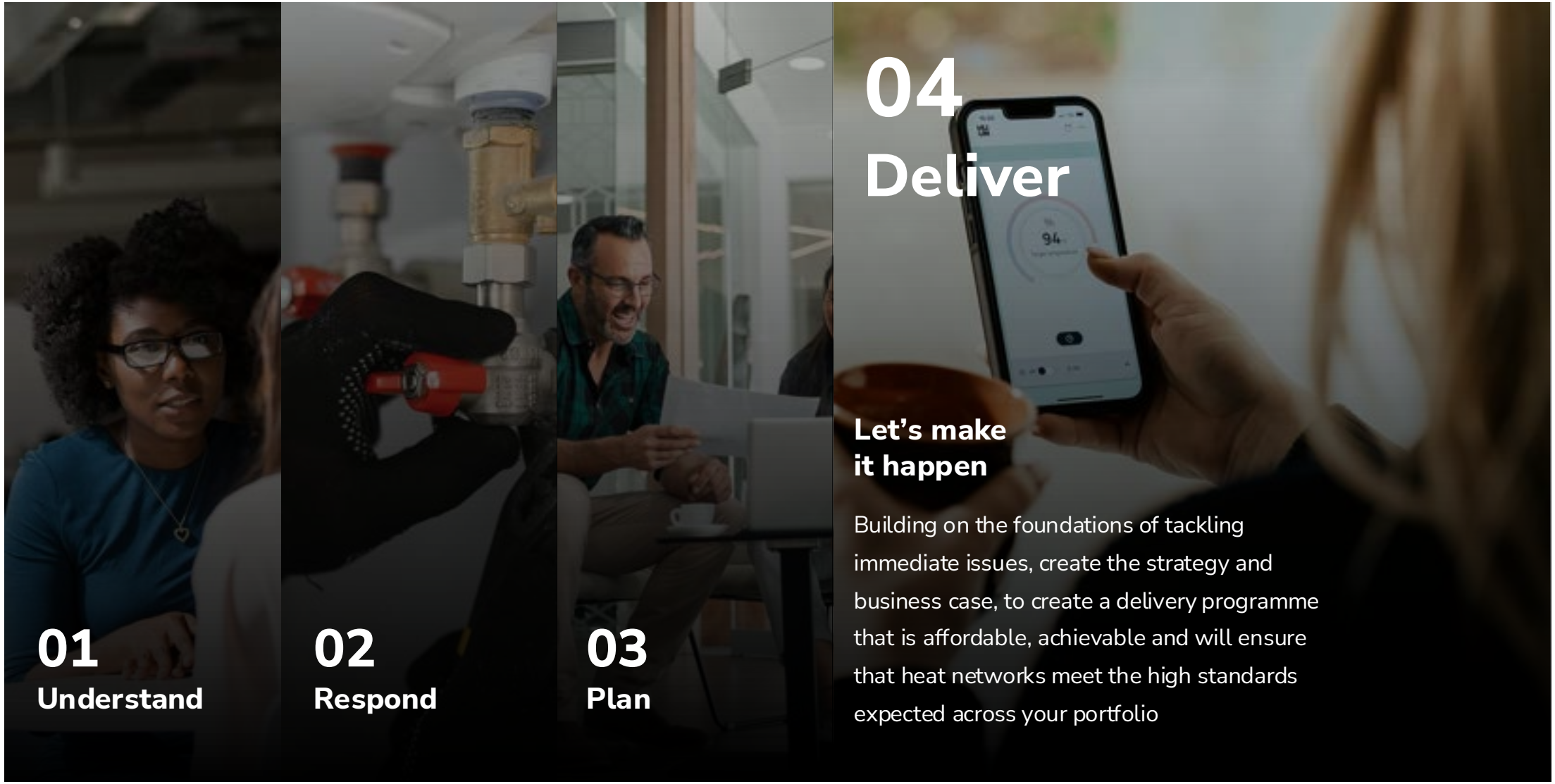
Fix the urgent issues that are holding you back

Identify the immediate issues that you and your team are dealing with. This will help to reduce the management time and resources that are being used to fire fight issues and creating issues for your organisation and customers

03
Plan

04
Deliver


01
Understand
02
Respond
03
Plan
Your roadmap to compliant, low-cost, reliable heating systems
Create a comprehensive plan, that will deliver for your customers and your team. Build your long-term strategy that encapsulates all aspects of your heat networks including costs, optimisation, compliance, contractors, and customers
04
Deliver



01
Understand

02
Respond

03
Plan

04
Deliver

Let’s make it happen

Building on the foundations of tackling immediate issues, create the strategy and business case, to create a delivery programme that is affordable, achievable and will ensure that heat networks meet the high standards expected across your portfolio

So, what to do next?

01 **Define your role** - Heat network operator / Heat Network Supplier

02 **Review** third party management / ESCo / lease contracts & arrangements

03 **Engage with contractors** - O&M, R&M, metering & billing,

04 **Register** with the Energy Ombudsman

So, what to do next?

05 **Register with OFGEM**

06 **Create a compliance plan** & ensure resources are in place

07 **Prepare for reporting requirements**

08 **Creating and implementing policies & processes**

Chirpy Heat Insight Group

Now is the perfect time to join the Chirpy Heat Insight Group, a free, email-based newsletter for housing associations and local authorities navigating heat network regulation.

You'll receive:

- Clear updates on heat network regulations
- Practical tools, data dashboards, and sector intelligence
- Exclusive content and early access to events and webinars
- Insights to help deliver better, more reliable heat networks

It's free, easy to join, and won't clog your inbox!

Scan the QR code to sign up

Our next webinar

Heat Network Priorities 26/27:

Compliance, Debt Management, Excellent Service and Beyond

Thursday 16th April 2026

10am – 11am

- Courses count towards CPD
- Open courses available
- In house courses available

Government Funded Training

Course 1: Heat network operation and maintenance for the housing sector

Housing providers and their supply chain will understand:

- The key components of a heat network
- Good heat network design
- What can go wrong, how to spot it and what to do about it
- Elements of performance and optimisation (energy centre, distribution, in-dwelling)
- How to deliver efficient heat networks (data, effective repairs and maintenance, KPIs, metering)
- Overview of the Heat Network Technical Assurance Scheme (HNTAS), it's impact on the housing sector and what providers can do to prepare
- Becoming an intelligent heat network client, and exceeding client expectations

Course 2: Strategic approaches to heat networks

Housing providers will understand:

- The role and value of heat networks in the current and future energy system
- The key components of a heat network
- The shape of the forthcoming Regulations (consumer protection, HNTAS, zoning)
- What the consumer protection framework means for housing providers and their customers
- How housing providers can respond to the consumer protection regulations, get ahead of the regulatory curve and improve their management approach


Chirpy Heat
Thank you

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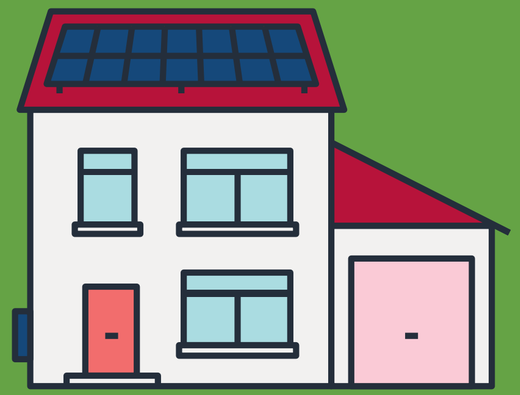
Data for WZCH dashboard and targeted interventions



Ieuan Davies
Data Analyst - Energy Saving Trust
email: ieuan.davies@est.org.uk

WZCH dashboard and data

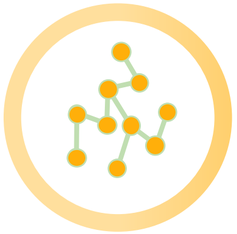
Insight into Welsh homes

Deliver environmental goals

Dashboard built by Energy Saving Trust

Access to Home Analytics data

WZCH dashboard and data



Covers 100+ property features

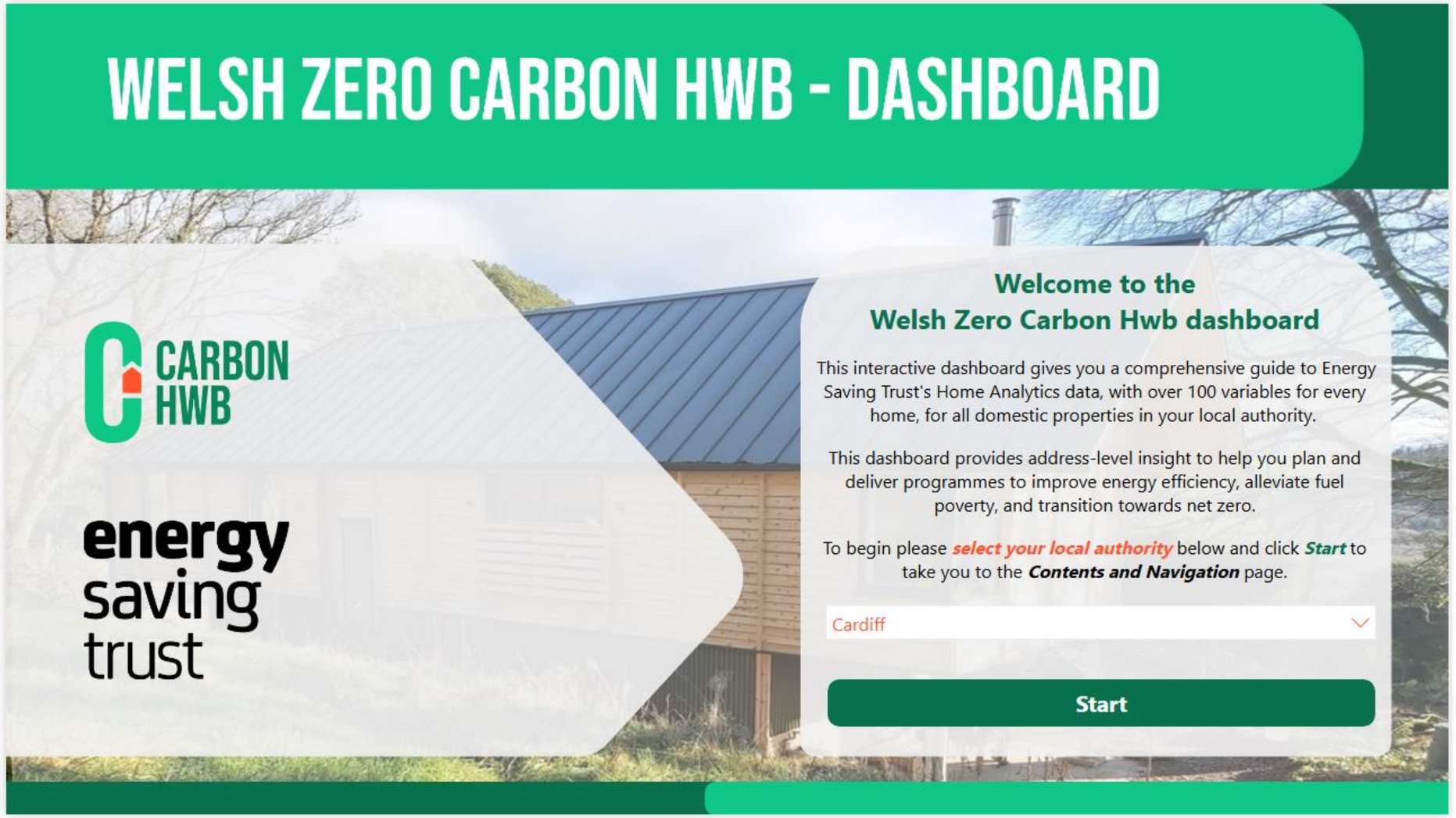
Wide variety of data sources

Advanced modelling techniques

Help energy efficiency, fuel poverty & net zero

NOTE: Access to the dashboard requires Home Analytics licence from Energy Saving Trust and currently is restricted to local authorities

Hwb dashboard



Hwb dashboard – Address data

Address data
Cardiff

CARBON HWB

energy saving trust

Interact with the full full Home Analytics data for your local authority. If you would like a download of the data then please contact either *Dai.Grady@est.org.uk* or *Ieuan.Davies@est.org.uk* with your request.

Use the filter panel on the left to filter data and the green button above to reset the data.

171.3K
Number of homes selected

100%
Percentage of homes selected

Current filters applied

FILTER PANEL

UPRN	UDPRN	TOID	Country	Region	Local Authority	Local Authority Code	Ward Co...	Ward Name	LSOA Co...	LSOA Na...	COA Code	Postcode Area	Postcode District
		osgb5000005330124767	Wales	Wales	Cardiff	W06000015	W05001290	Pontprennau and Old St Mellons	W01002016	Cardiff 003E	W00010552	CF	CF3
		osgb5000005328100196	Wales	Wales	Cardiff	W06000015	W05001282	Llandaff	W01001780	Cardiff 026B	W00009213	CF	CF5
		osgb1000000277698714	Wales	Wales	Cardiff	W06000015	W05001281	Lisvane and Thornhill	W01001777	Cardiff 001A	W00009181	CF	CF14
		osgb1000000276485709	Wales	Wales	Cardiff	W06000015	W05001276	Ely	W01001746	Cardiff 041D	W00008998	CF	CF5
		osgb1000000276485709	Wales	Wales	Cardiff	W06000015	W05001276	Ely	W01001746	Cardiff 041D	W00008998	CF	CF5
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		osgb1000000276485709	Wales	Wales	Cardiff	W06000015	W05001276	Ely	W01001746	Cardiff 041D	W00008994	CF	CF5
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		osgb5000005342301191	Wales	Wales	Cardiff	W06000015	W05001279	Grangetown	W01001947	Cardiff 048E	W00010173	CF	CF11

Page left

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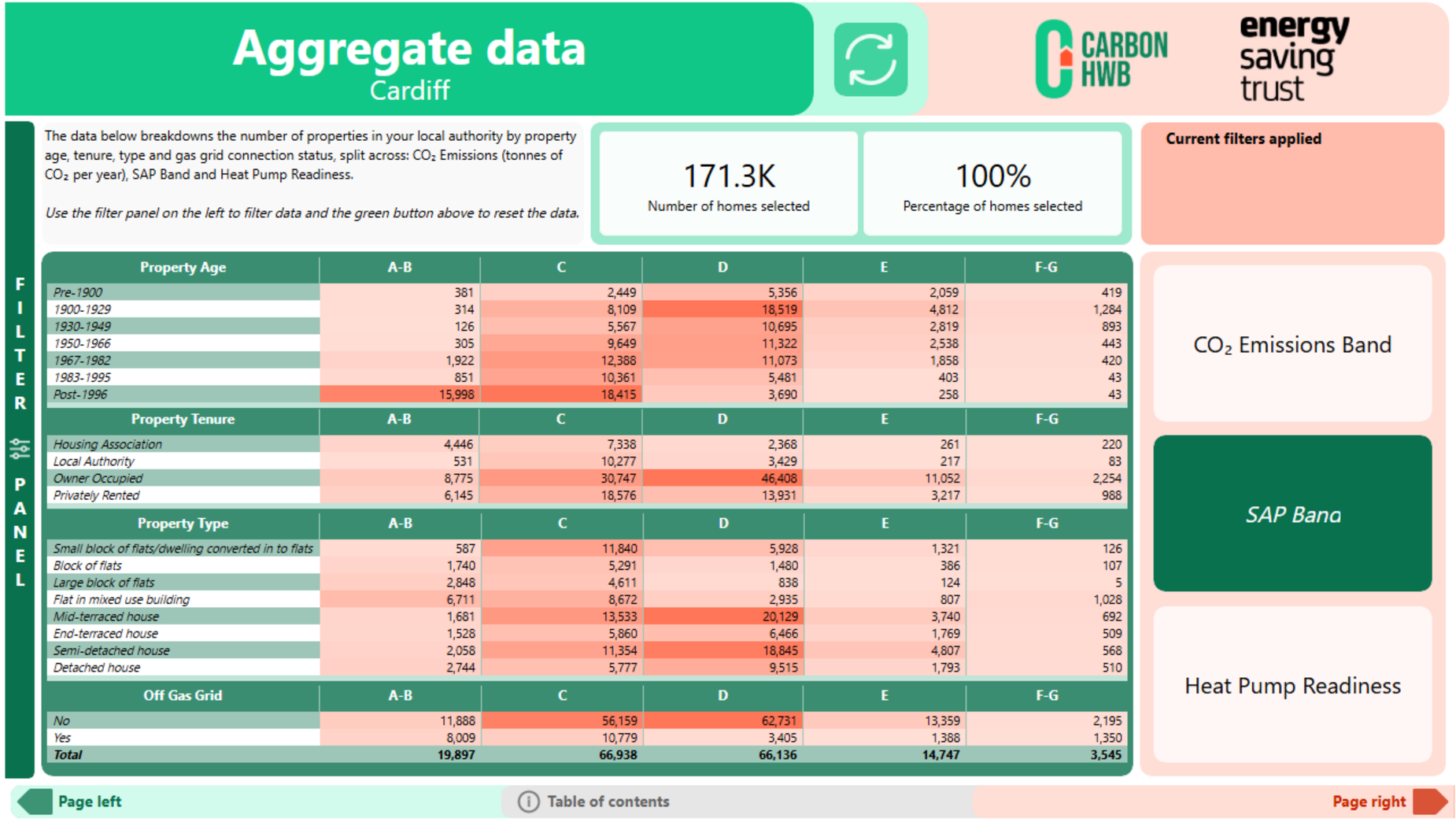
Hwb dashboard – Aggregate data



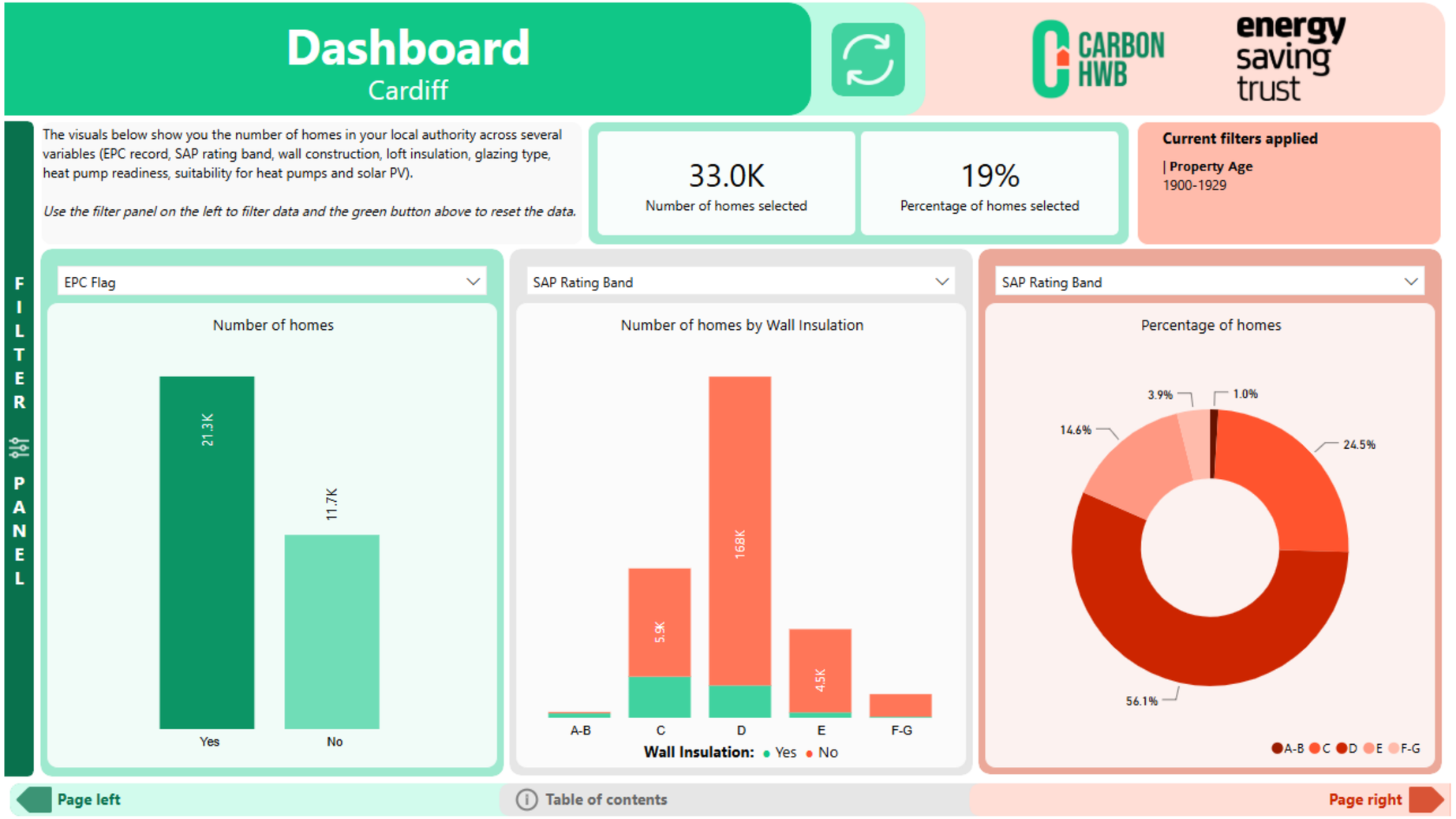
Property Age	A-B	C	D	E	F-G
Pre-1900	381	2,449	5,356	2,059	419
1900-1929	314	8,109	18,519	4,812	1,284
1930-1949	126	5,567	10,695	2,819	893
1950-1966	305	9,649	11,322	2,538	443
1967-1982	1,922	12,388	11,073	1,858	420
1983-1995	851	10,361	5,481	403	43
Post-1996	15,998	18,415	3,690	258	43

Property Tenure	A-B	C	D	E	F-G
Housing Association	4,446	7,338	2,368	261	220
Local Authority	531	10,277	3,429	217	83
Owner Occupied	8,775	30,747	46,408	11,052	2,254
Privately Rented	6,145	18,576	13,931	3,217	988

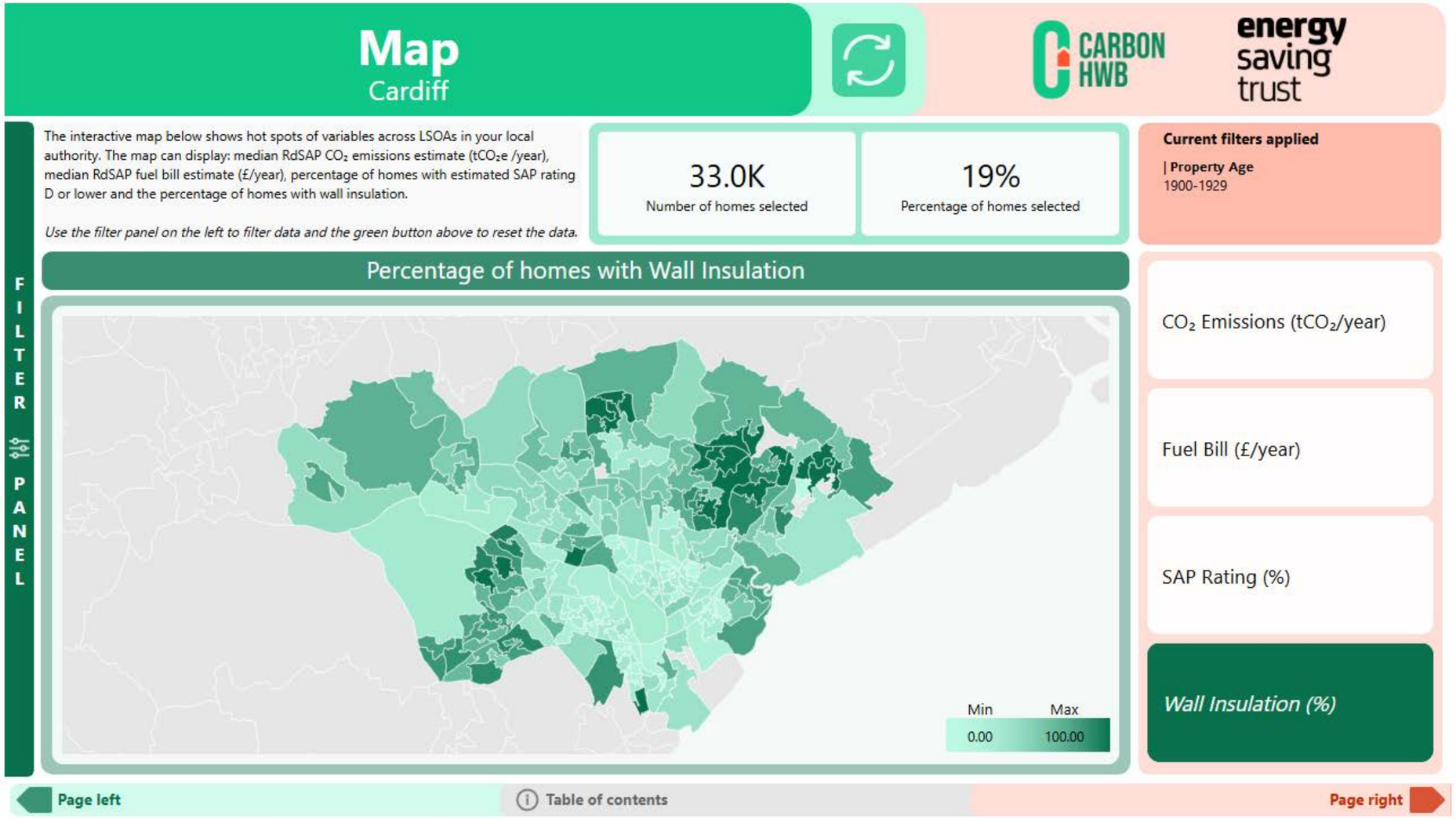
Property Type	A-B	C	D	E	F-G
Small block of flats/dwelling converted in to flats	587	11,840	5,928	1,321	126
Block of flats	1,740	5,291	1,480	386	107
Large block of flats	2,848	4,611	838	124	5
Flat in mixed use building	6,711	8,672	2,935	807	1,028
Mid-terraced house	1,681	13,533	20,129	3,740	692
End-terraced house	1,528	5,860	6,466	1,769	509
Semi-detached house	2,058	11,354	18,845	4,807	568
Detached house	2,744	5,777	9,515	1,793	510

Off Gas Grid	A-B	C	D	E	F-G
No	11,888	56,159	62,731	13,359	2,195
Yes	8,009	10,779	3,405	1,388	1,350
Total	**19,897**	**66,938**	**66,136**	**14,747**	**3,545**

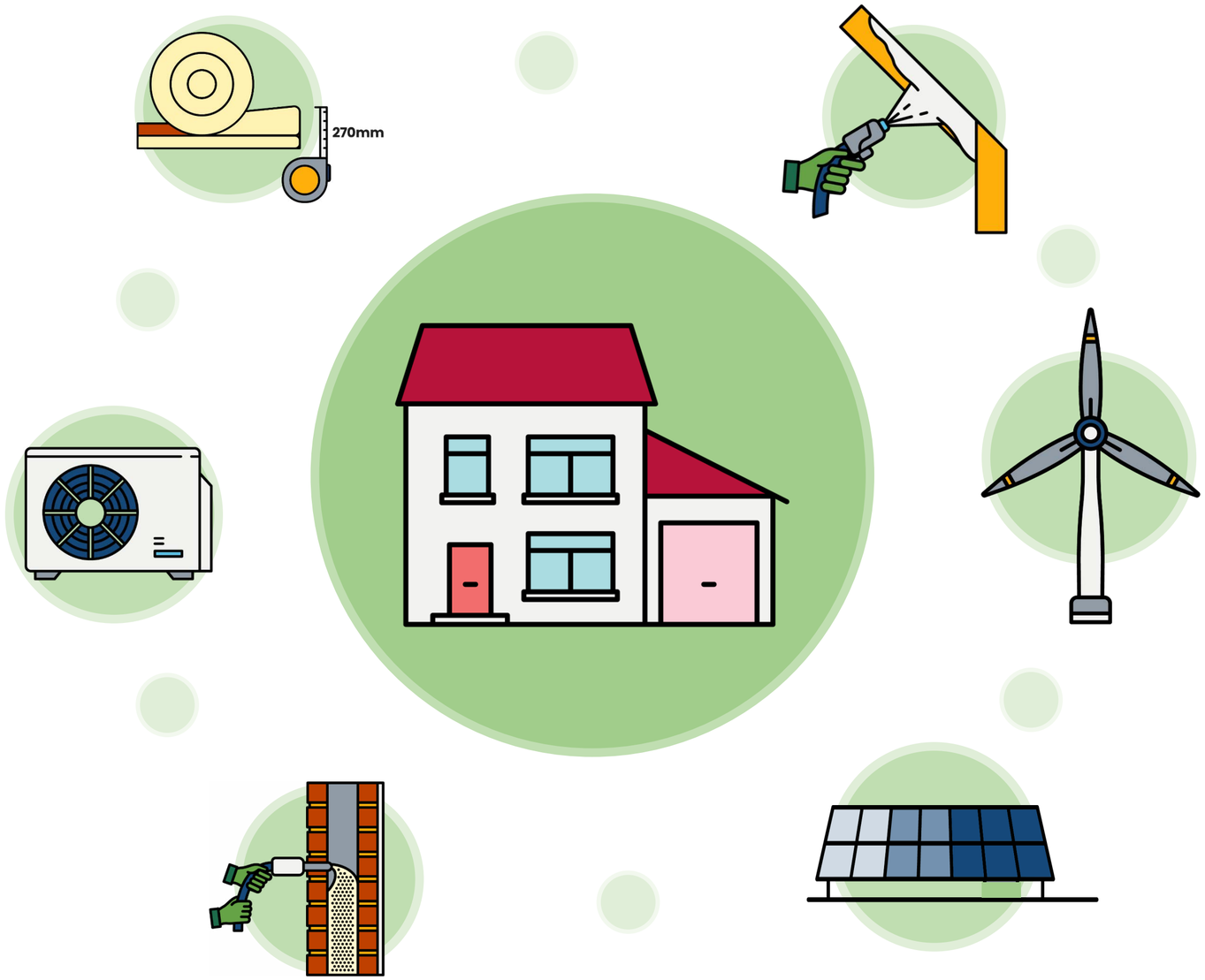
Hwb dashboard - Dashboard



Hwb dashboard - Map



Targeted interventions



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Thank you

Please contact me via email
ieuan.davies@est.org.uk

Heat Networks
Opportunities and Challenges

Welsh Zero Carbon Hwb Conference – Delivering Better Homes for Wales

Nick Abbott
Sustainability Lead

codi

Us and Our Heat Networks

70+
heat networks

Existing portfolio
high temperature

New networks
mostly SGLs

Utilities reseller

codi

Fuel Source Flexibility

Centralised / semi-centralised heat ‘production’ with dispersed consumption.

- Limited **customer change and or impact** from changes to fuel source:
    - easier transition to net zero,
    - rapid implementation of change,
    - greater diversity of fuel sources.
- Customer experience is relatively **consistent** with other ‘traditional’ heating systems.
- Natural gas **maintains reliability** of many heat networks.

Photo by Arno Senoner on Unsplash

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Maintenance

Only surface similarity to other heating technology.

- Robust monitoring and active management requirement required to deliver **long term efficiency**.
- **Limited compliance** visits into customers homes.
- **Interconnected** system with risk of **large-scale** or unintended disruption.
- Expertise, experience and skills in the supply chain is **limited**.

Photo by Marian Florinel Condruz on Unsplash

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Customer Protection

Heat networks are often owned and operated by the landlord.

- Customer protection **more easily achieved** via:
  - tariff setting,
  - debt management,
  - vulnerability identification.
- Fuel procurement **risks** and associated consumer impacts.
- **Reduced** requirement to **enter properties** for compliance and safety purposes.

Photo by Arthur Lambillotte on Unsplash

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Customer Understanding

Consistent in-home experience when compared to traditional heating technology.

- **Surface simplicity** familiarity of immediate in-home operation and component interaction.
- Limited understanding beyond immediate operation and components creates **‘fiddling hazard’**.
- Comparison with alternatives around tariffs and personal costs is **challenging**.

Photo by BOOM Photography via pexels

Where collective strength
creates lasting local impact.