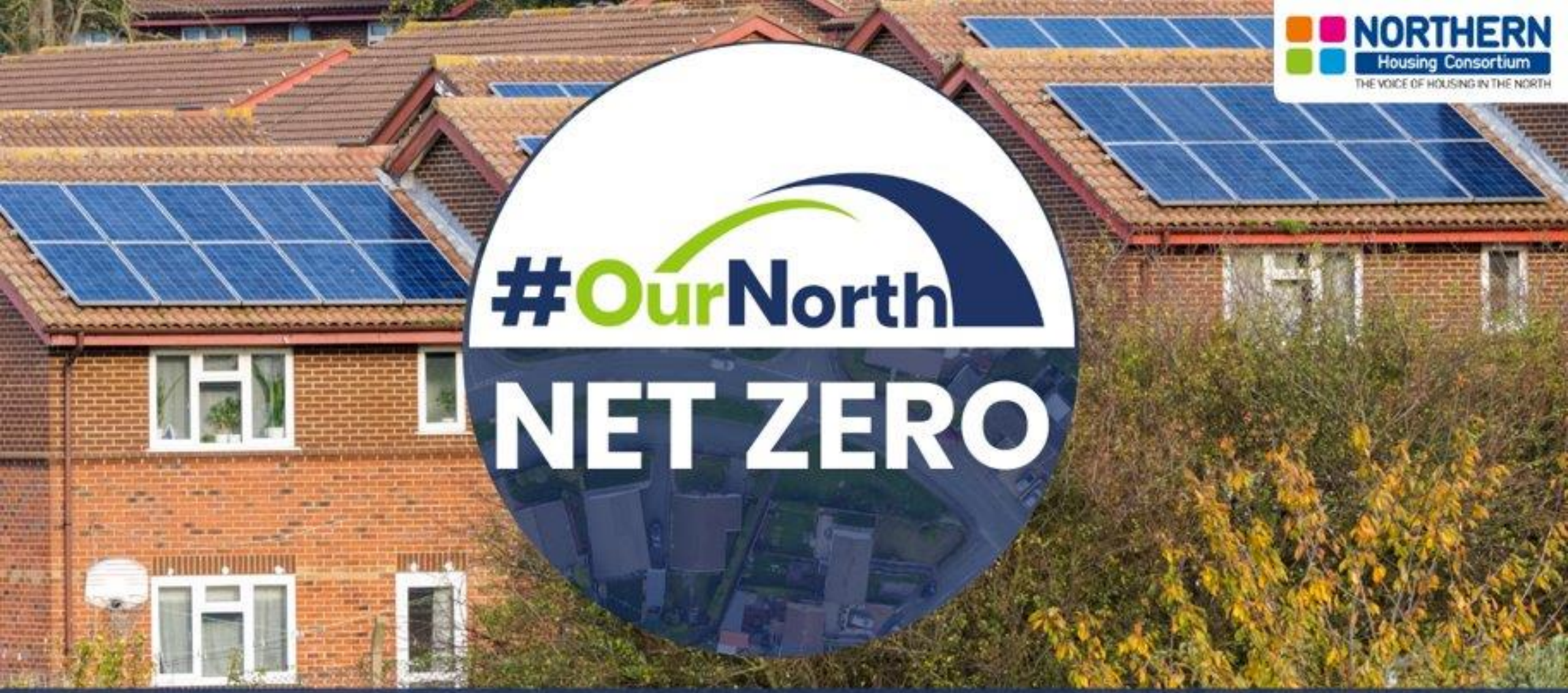


UNDERSTANDING YOUR STOCK – ASSET MANAGEMENT & ENERGY EFFICIENCY

WEBINAR, 16TH SEPTEMBER 2020

THANK YOU TO OUR PARTNERS

LIVERPOOL CITY REGION HOUSING ASSOCIATIONS

Halton Housing

thirteen
Managing and building homes

together HOUSING GROUP

Consortium Procurement
reduce risk, save time, save money, be compliant

#OurNorth NET ZERO

Welcome from the Chair

Tracy Harrison

Chief Executive

Northern Housing Consortium

Net-Zero:
A New Framework for Asset Management

Jon Slade,
Director,
Campbell Tickell

NORTHERN Housing Consortium
THE VOICE OF HOUSING IN THE NORTH

CAMPBELL TICKELL

The Asset Management Implications of Energy Efficiency

September 2020

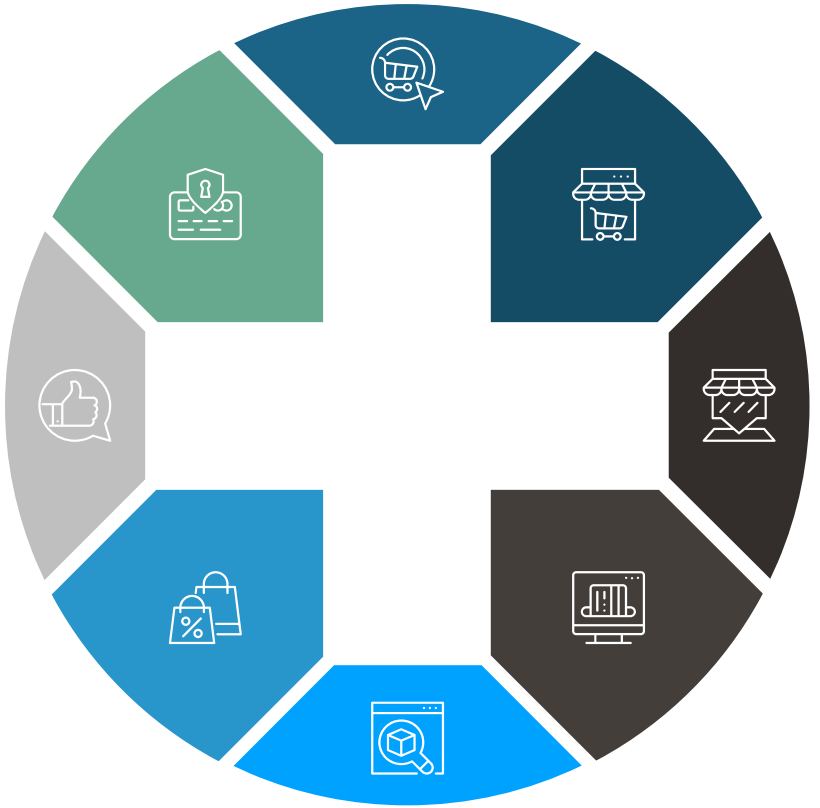
About CT

Approaching 25 years of consulting experience

Worked with all of the top 50 UK HAs by size

Strong track record in engaging Exec Teams and Boards on asset management

Worked with the commercial sector, contractors & charities



Associate model enables access to the best technical experts

Wide ranging experience of working with housing organisations

Strategy development
Options appraisals
Stock rationalisation
Troubleshooting

In depth understanding of regulatory landscape

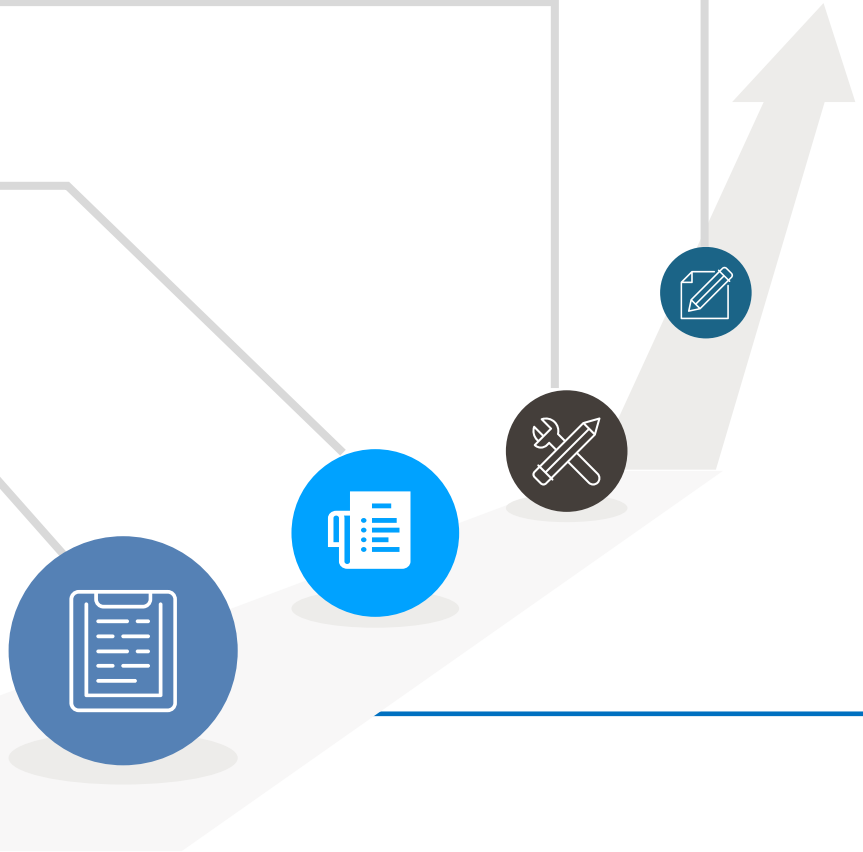
Historical context

Carbon Zero

Emerging Building Safety Agenda

Strategic Asset Management

Traditional asset management



Current context

Net Zero 2050
EPC C by 2035

Funding massively short

No clear technology pathway

A range of interventions are possible

Buildings

First port of call

Retrofit

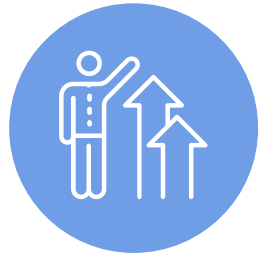
Super insulation

Etc.

Fuel Source

Goodbye to gas.

But range of sources available.



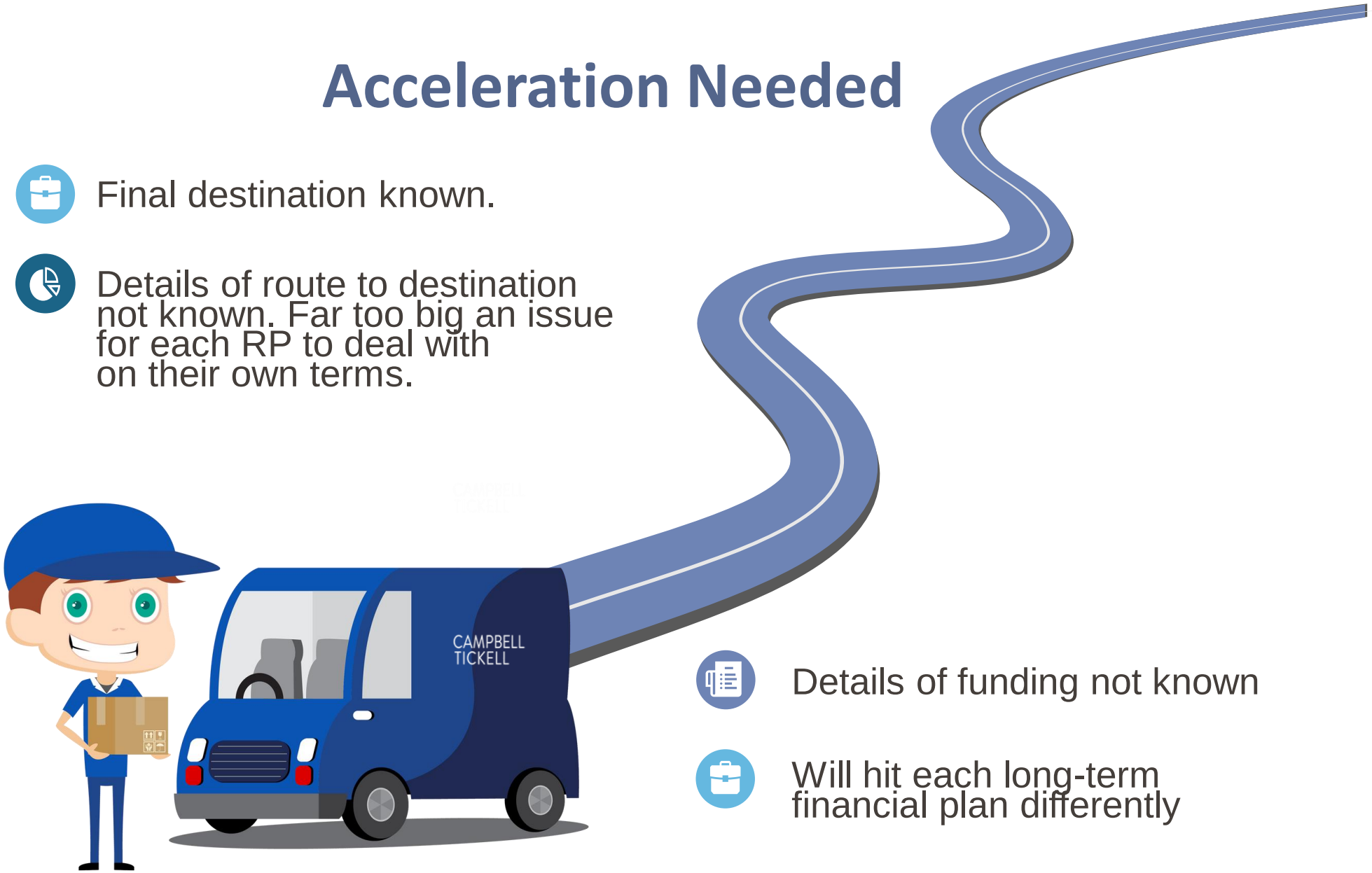
People

Supporting and enabling changes in behaviour.

Offers some of the best value.

Acceleration Needed

- Final destination known.
- Details of route to destination not known. Far too big an issue for each RP to deal with on their own terms.



- Details of funding not known
- Will hit each long-term financial plan differently

Escalating engagement and action

CAMPBELL
TICKELL

Retrofit Planning and Building Performance Evaluation

Marianne Heaslip,

Associate Principal,

URBED

Understanding Your Stock

targets and future-proofing

Marianne
Heaslip
Associate
Principal
URBED (Urbanism Environment and Design Ltd)

- ‘Zero Carbon’ is a great outcome but a tricky target:
  Focus on what you can measure and benchmark simply. Aim for performance and value, not just compliance.

- Having a ‘Whole House Plan’ is key:
  Do it once, do it right - take a holistic approach.

- It’s not just about counting carbon:
  Need to consider comfort, health and well-being, aesthetics and neighbourhood pride as integral to any plan!

urbed

Zero carbon

Net zero

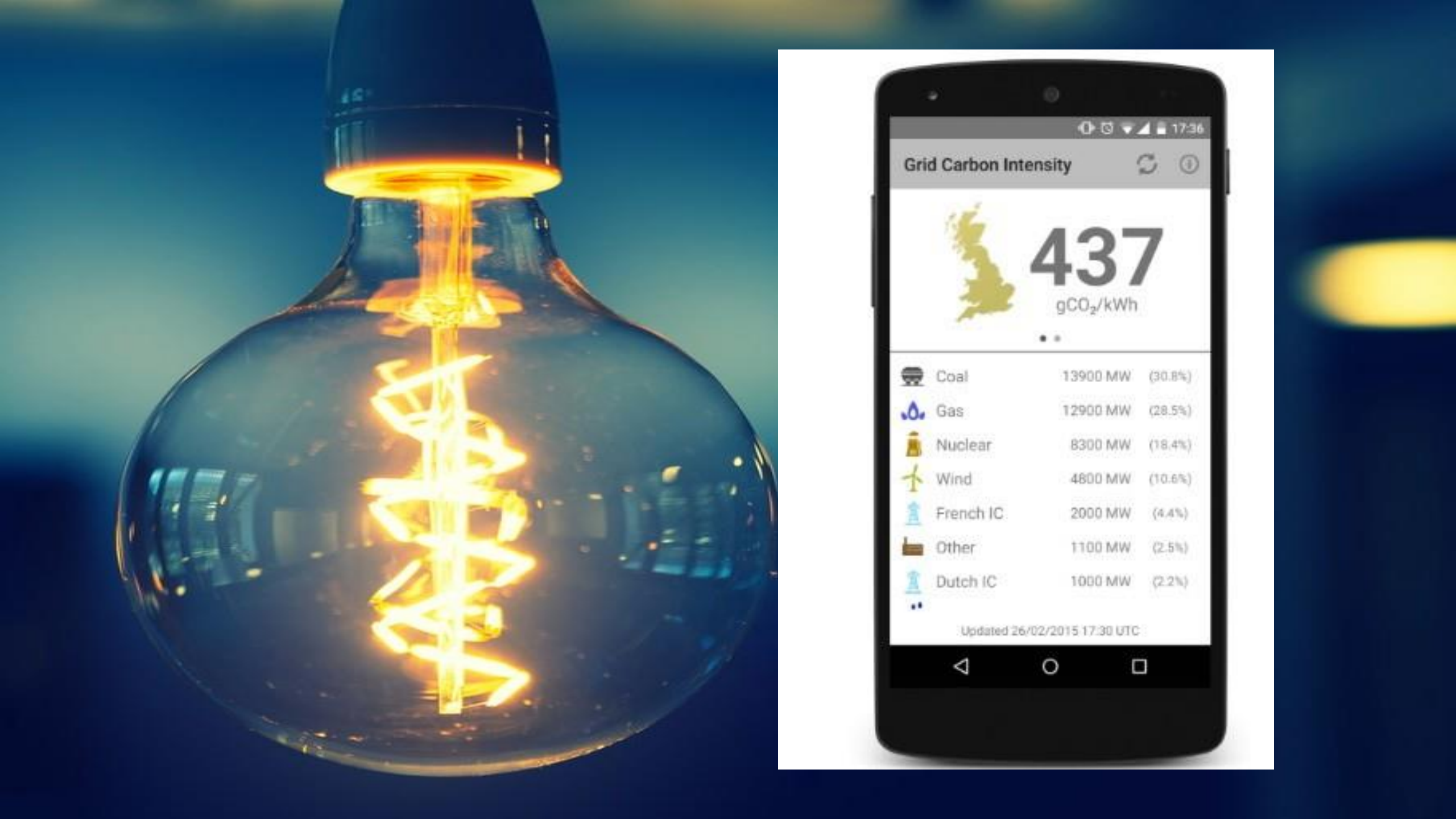
Carbon positive

Carbon neutral

ZERO CARBON READY?

urbed

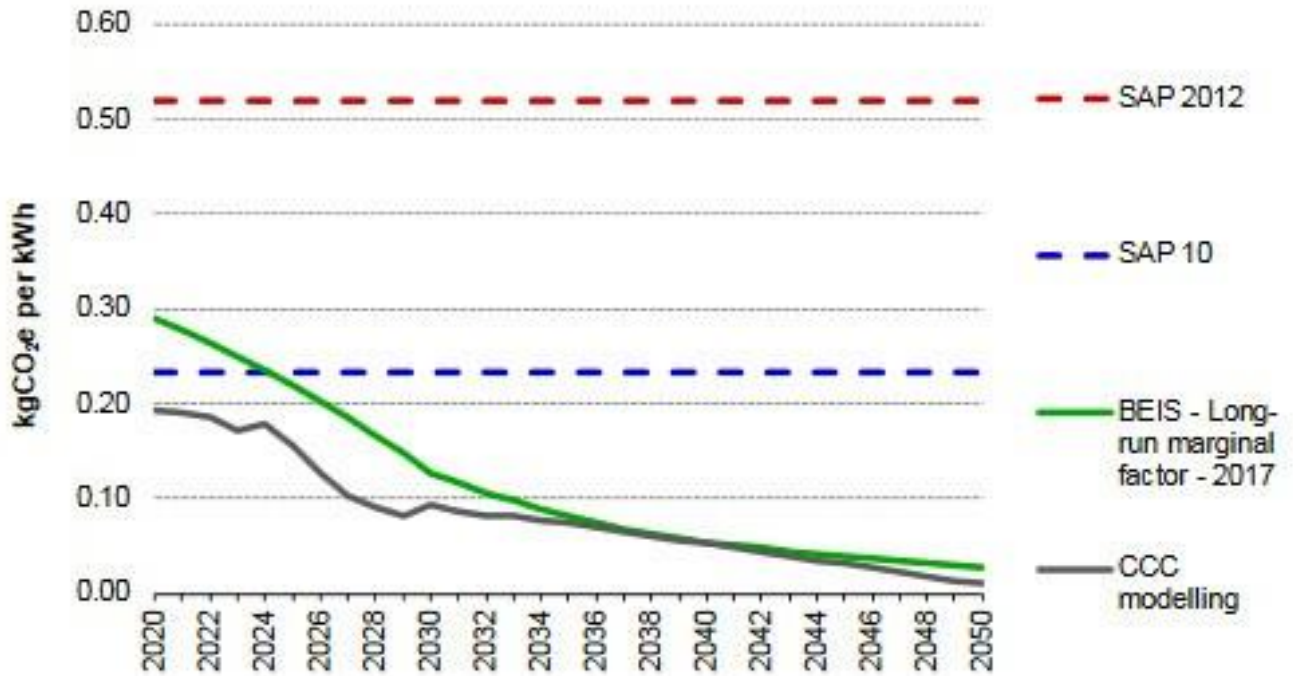

urbed


17:36
Grid Carbon Intensity
437
gCO2/kWh
Coal 13900 MW (30.8%)
Gas 12900 MW (28.5%)
Nuclear 8300 MW (18.4%)
Wind 4800 MW (10.6%)
French IC 2000 MW (4.4%)
Other 1100 MW (2.5%)
Dutch IC 1000 MW (2.2%)
Updated 26/02/2015 17:30 UTC


Carrier
12:15 PM
GB Grid Carbon Intensity
189
gCO2/kWh
Gas 12400 MW (38.1%)
Nuclear 7200 MW (22.1%)
Solar 4100 MW (12.5%)
Wind 3700 MW (11.4%)
Biomass 2100 MW (6.4%)
French IC 1700 MW (5.2%)
Dutch IC 770 MW (2.4%)
Storage 290 MW (0.9%)
Hydro 190 MW (0.6%)
Updated 13/05/2017 12:10 BST

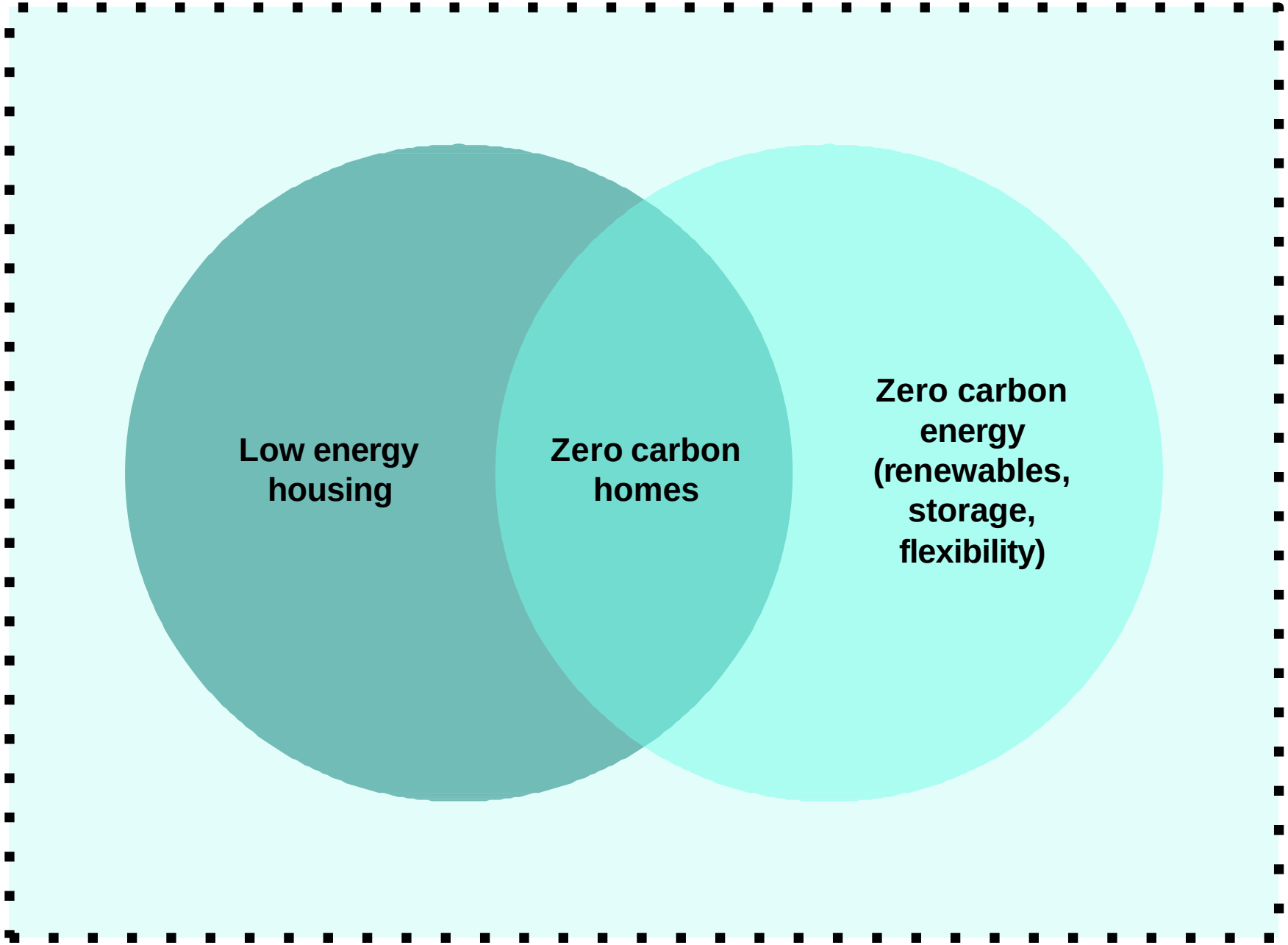
The changing nature of the grid has big implications for planning and benchmarking of stock:

Figure B2.3 Comparing assumptions on the trajectory of electricity carbon intensity



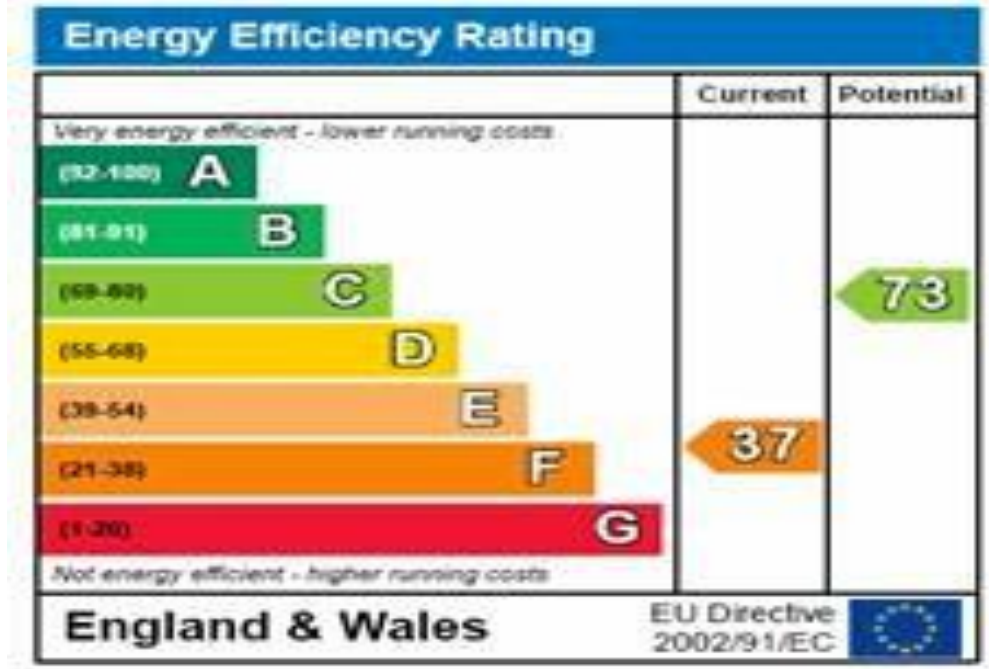
https://www.icax.co.uk/image_Electricity_Carbon_Intensity.html

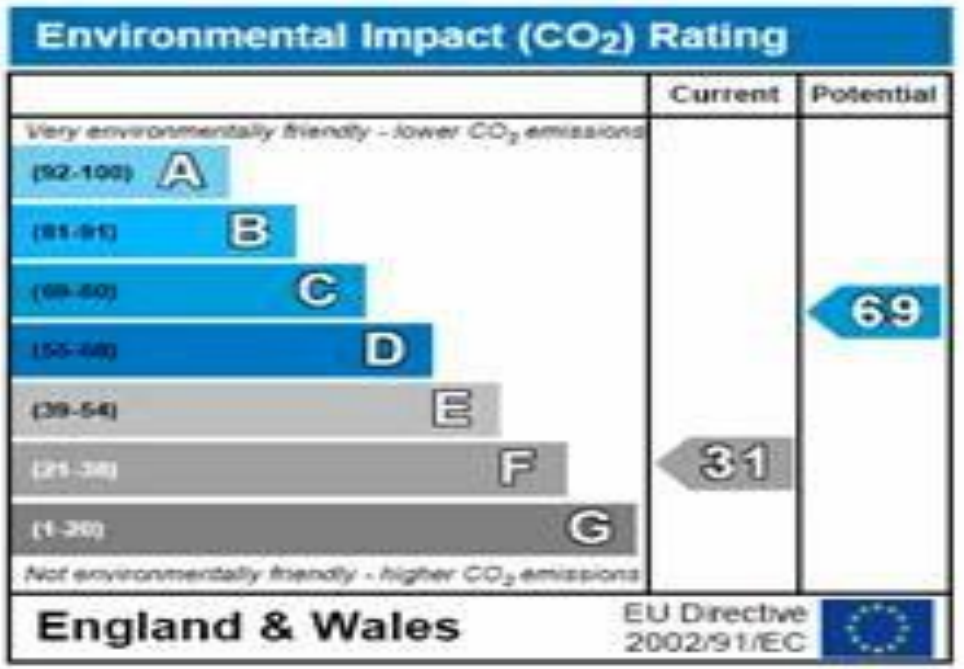
urbed


Low energy housing
Zero carbon homes
Zero carbon energy (renewables, storage, flexibility)

urbed

Just looking at the SAP rating won’t tell you enough!





urbed

Modelling a 3-bed mid-century semi detached home:

	SHD	total gas kW total elec	kWh	Fuel Closts	CO2 (SAP 9.92)	CO2 (SAP 10)	SAP (9.92)	Band
Baseline	116	13740	2700	£1,174	53	40	69	C
Bregs	97	12784	2700	£1,137	36	29	80	C
Bregs+ PV	97	12784	1581	£940	36	23	89	B
Bregs+ASHP	97	0	5678	£1,069	33	26	87	B
B regs+ ASHP+PV	97	0	4559	£872	33	26	87	B
Fabric First	42	6854	2955	£948	36	9	80	C
Fabric First + ASHP	42	0	5185	£1,070	36	23	89	B
Fabric First + ASHP + PV	42	0	4066	£874	33	9	87	B

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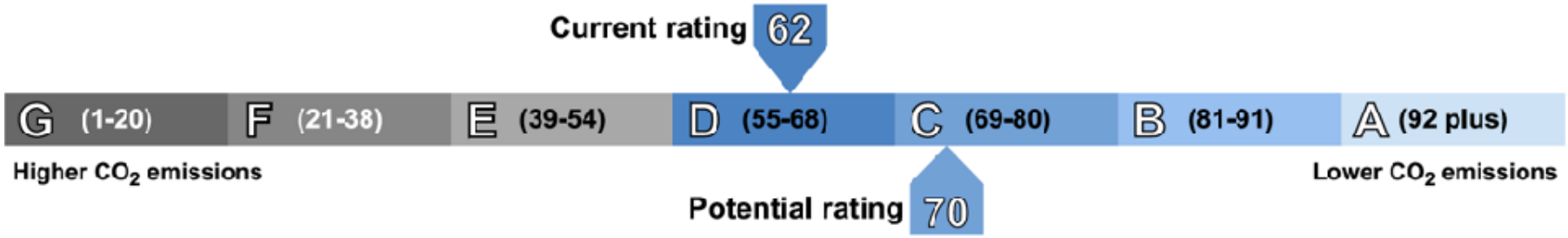
Fabric First	42	6854	2955	£ 948				
Fabric First + ASHP	42	0	5185	£ 1,070				
Fabric First + ASHP + PV	42	0	4066	£ 874				

….but there is useful information in an EPC



Your home's heat demand

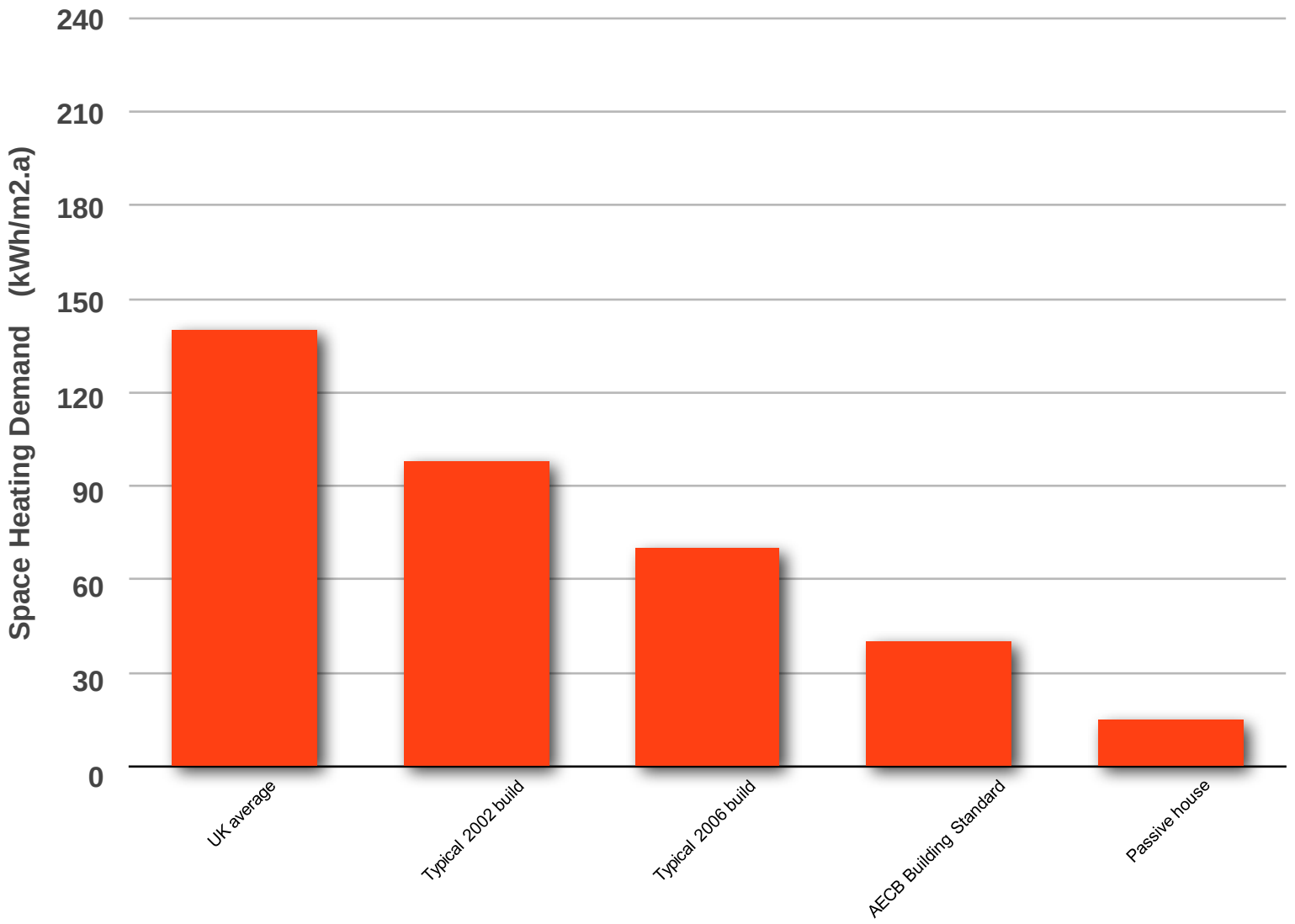
For most homes, the vast majority of energy costs derive from heating the home. Where applicable, this table shows the energy that could be saved in this property by insulating the loft and walls, based on typical energy use (shown within brackets as it is a reduction in energy use).

Heat demand	Existing dwelling	Impact of loft insulation	Impact of cavity wall insulation	Impact of solid wall insulation
Space heating (kWh per year)	12,545	N/A	N/A	N/A
Water heating (kWh per year)	2,881			

which can be normalised and benchmarked against area

urbed

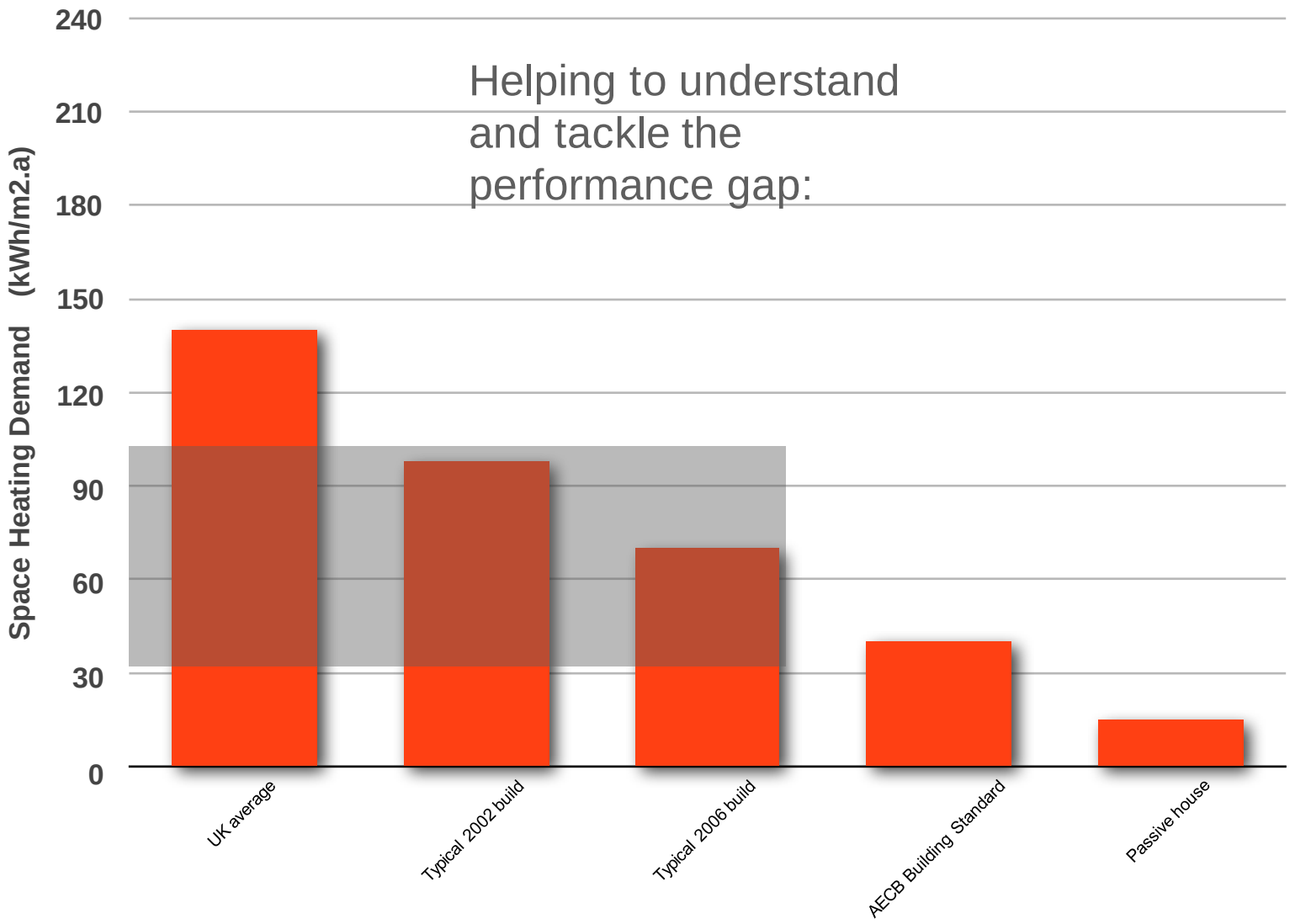
Space heating demand is a particularly useful metric:



Good for: fuel poverty, comfort, health, lower bills, reduced carbon emissions, simple management, durability, long life.

urbed

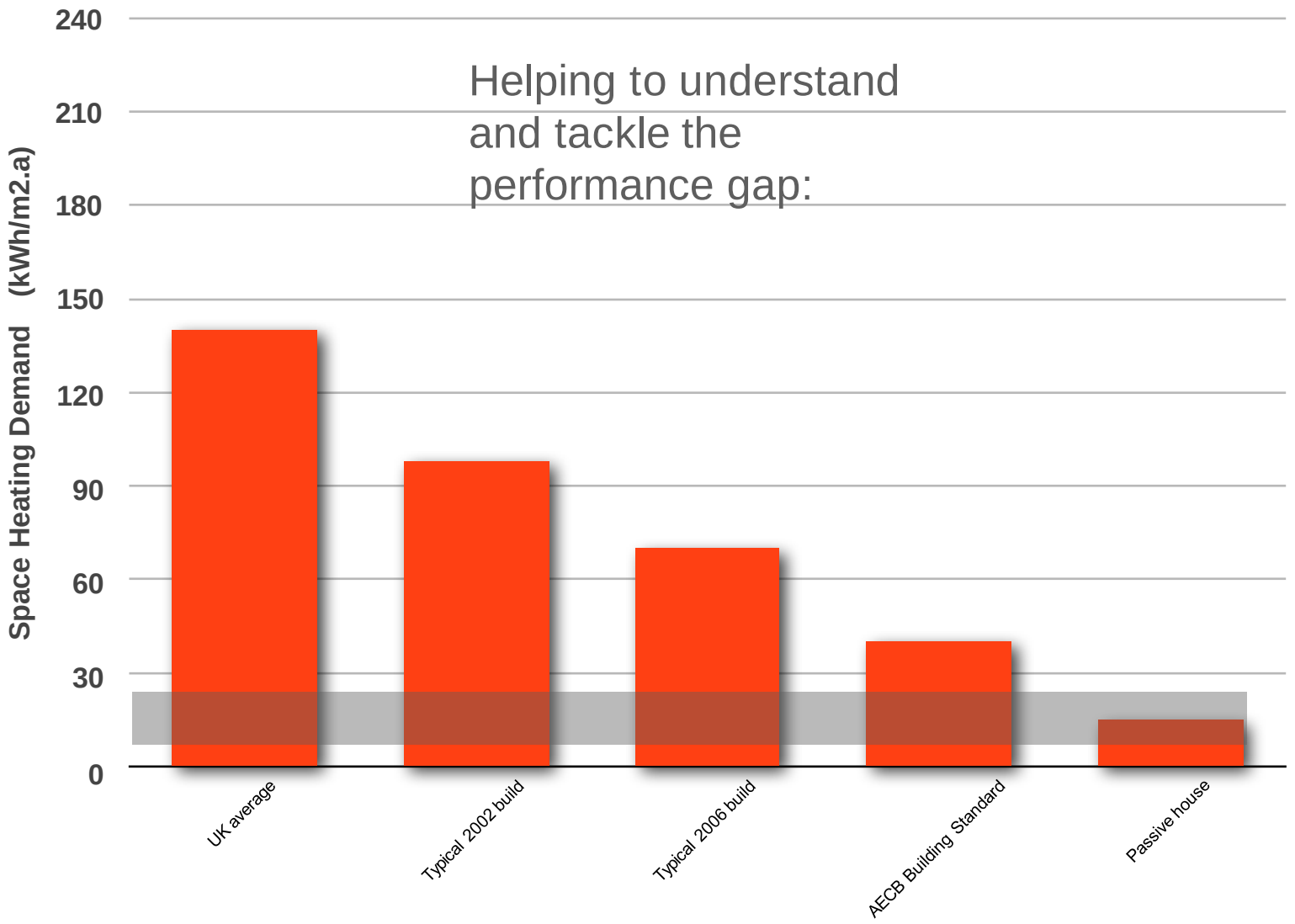
Space heating demand is a particularly useful metric:



Good for: fuel poverty, comfort, health, lower bills, reduced carbon emissions, simple management, durability, long life.

urbed

Space heating demand is a particularly useful metric:



Good for: fuel poverty, comfort, health, lower bills, reduced carbon emissions, simple management, durability, long life.

urbed

Suggested alternative metrics, to maximise performance and value:

- **Space Heating Demand** (and/or Heat Loss Parameter)
(doesn't change over time, informs design)

- **Peak Heat Load**
(informs design + system wide effects)

- **Energy Use Intensity**
(measure-able at the meter, includes all energy use)

- **Running Costs**
(tracked against fuel poverty risk)

- **Carbon emissions**
(over time / whole life - but be clear about assumptions!)

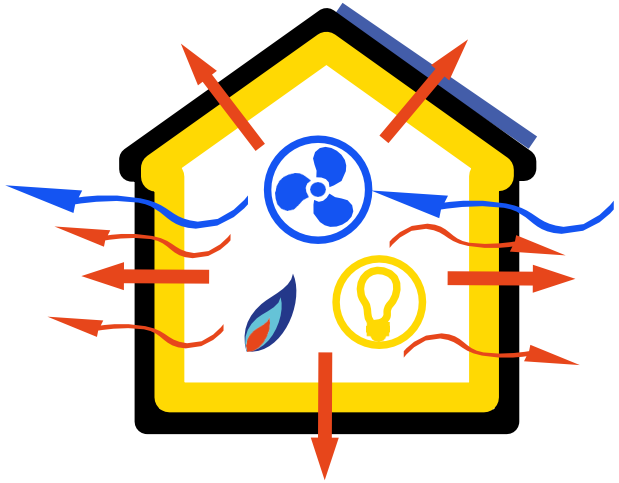
urbed

Have a whole house plan!

- Homes are the site of a number of interacting systems - a holistic approach is necessary to avoid unintended consequences.

- This includes consideration of repair and maintenance needs, ventilation and moisture management - its not just about energy systems!

- It also needs to consider people, their needs and habits. e.g - is there somewhere they can safely dry clothes?



urbed

Have a whole house plan!

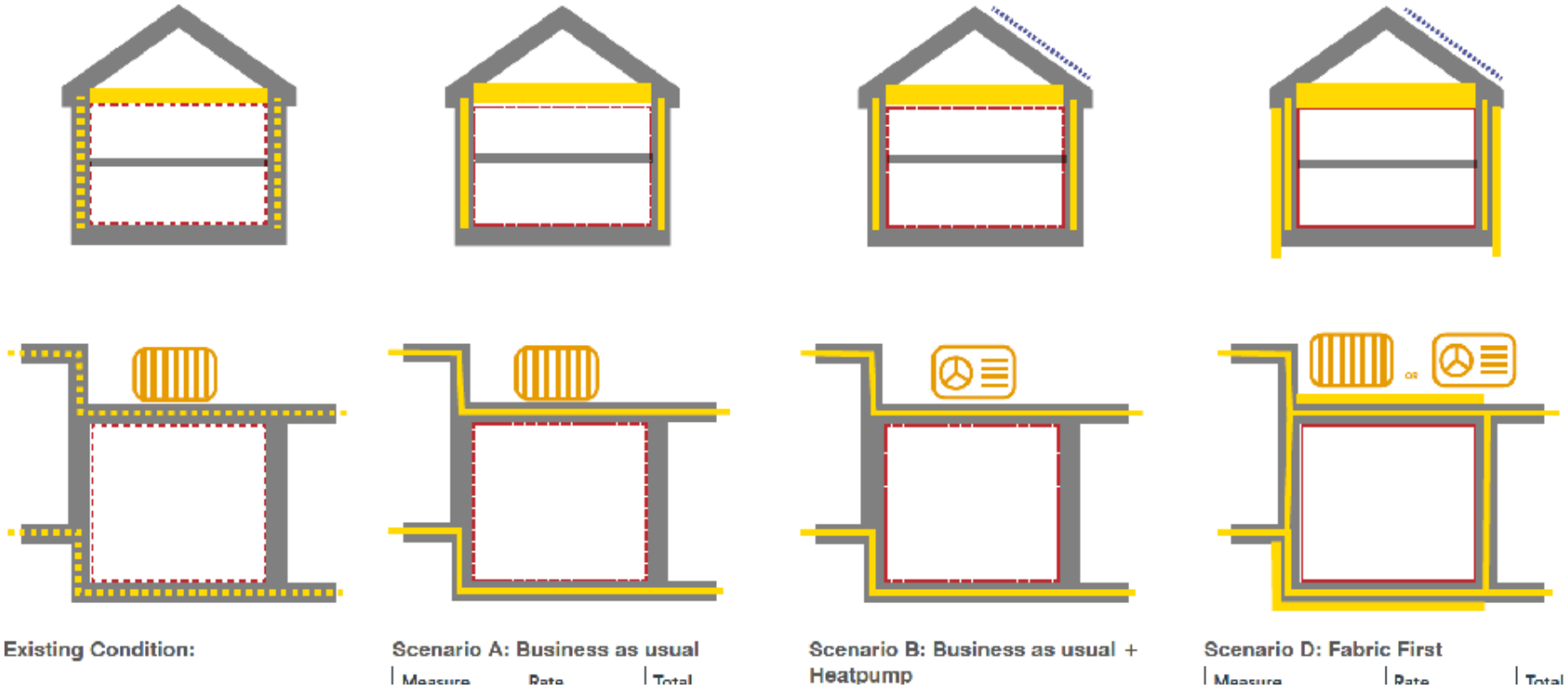
Need to avoid past mistakes…

http://www.katedeselincourt.co.uk/tag/fuel-poverty/

urbed

Have a whole house plan!

This is a requirement of PAS2035 standard - enabling intelligent phasing of works and helps avoid rework and unintended consequences.



Existing Condition:

Scenario A: Business as usual

Measure | Rate | Total

Scenario B: Business as usual + Heatpump

Scenario D: Fabric First

Measure | Rate | Total

It’s not just about carbon!

This work is an opportunity to change and improve homes and lives - it’s not just a numbers game!

urbed

Case Study:

Smart Meter Enabled Thermal Efficiency at Halton Housing

Lee Reevell,

Lead Innovator,

Halton Housing

UNDERSTANDING YOUR STOCK:
ASSET MANAGEMENT & ENERGY EFFICIENCY

Halton Housing

Lee Reevell

Lead Innovator, Halton Housing

@Lee_Reevell

https://www.linkedin.com/in/leereevell

INNOVATION
Improving people's lives

ABOUT HALTON HOUSING

Who are we?

Halton Housing is no ordinary Housing Association. Established in 2005, we've experienced tremendous success. We own and manage over **7,000** homes across Runcorn and Widnes, and across the Northwest.

We have ambitious growth plans and aim to build and acquire over 1,000 homes in the next 5 years. Our customers are at the heart of our business and our vision is Improving People's Lives.

INNOVATION AT HALTON HOUSING

"We aim to embed creativity and fresh thinking into everything we do, providing real solutions to real problems – from how we could enhance the way we deliver services to our customers, to how we develop our neighborhoods, improve our properties and support our people."

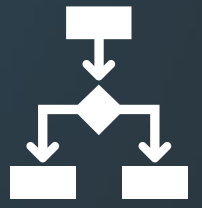
Business Problem

Customer Need

Technology

Academia

Process



Services

INNOVATION
Improving people's lives

PRE-EMPTIVE MAINTENANCE

- Technology developed to become more pre-emptive around stock condition management
- Data sets from temperature and humidity sensors in 100 homes
- Ability to alert when certain conditions exceed pre-defined limits
- Highlighted properties where either building fabric was failing or a behavioral causation
- Interventions in several properties leading to positive outcomes, backed by data
- Leading to a better understanding through data analysis of prone architypes
- Leading to targeted engagement with customers

INNOVATION
Improving people's lives

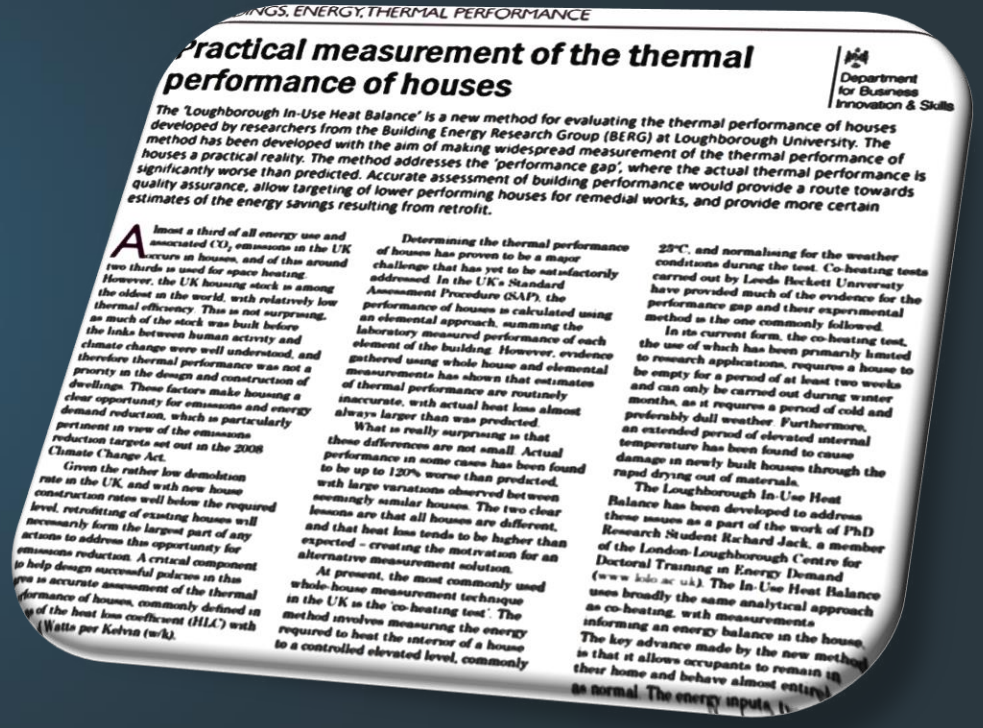
PRACTICAL MEASUREMENT OF THE THERMAL PERFORMANCE OF HOUSES

- Requirement for social landlords to reach EPC C by 2030
  - Reduce Carbon output
  - Our journey to NetZero
- Wealth of data from existing sensor network
- Augment the sensor data with Smart Meter Data
  - Energy input and energy output
- Reach out to academic institutions to understand the data
- Compare results with current methods

INNOVATION
Improving people's lives

PRACTICAL MEASUREMENT OF THE THERMAL PERFORMANCE OF HOUSES

- Addressing the performance gap, where the actual thermal performance is significantly worse than predicted
- Accurate assessment of building performance provides a better route to quality assurance.
- Allows targeting of lower performing houses for remedial work
- Provide more certain estimates of the energy saving resulting from retrofit



...INGS, ENERGY, THERMAL PERFORMANCE

Practical measurement of the thermal performance of houses

Department for Business Innovation & Skills

The 'Loughborough In-Use Heat Balance' is a new method for evaluating the thermal performance of houses developed by researchers from the Building Energy Research Group (BERG) at Loughborough University. The method has been developed with the aim of making widespread measurement of the thermal performance of houses a practical reality. The method addresses the 'performance gap', where the actual thermal performance is significantly worse than predicted. Accurate assessment of building performance would provide a route towards quality assurance, allow targeting of lower performing houses for remedial works, and provide more certain estimates of the energy savings resulting from retrofit.

Almost a third of all energy use and associated CO_2 emissions in the UK occurs in houses, and of this around two thirds is used for space heating. However, the UK housing stock is among the oldest in the world, with relatively low thermal efficiency. This is not surprising, as much of the stock was built before the links between human activity and climate change were well understood, and therefore thermal performance was not a priority in the design and construction of dwellings. These factors make housing a clear opportunity for emissions and energy demand reduction, which is particularly pertinent in view of the emissions reduction targets set out in the 2008 Climate Change Act.

Given the rather low demolition rate in the UK, and with new house construction rates well below the required level, retrofitting of existing houses will necessarily form the largest part of any actions to address this opportunity for emissions reduction. A critical component to help design successful policies in this area is accurate assessment of the thermal performance of houses, commonly defined in terms of the heat loss coefficient (HLC) with units of (Watts per Kelvin (w/k).

Determining the thermal performance of houses has proven to be a major challenge that has yet to be satisfactorily addressed. In the UK's Standard Assessment Procedure (SAP), the performance of houses is calculated using an elemental approach, summing the laboratory measured performance of each element of the building. However, evidence gathered using whole house and elemental measurements has shown that estimates of thermal performance are routinely inaccurate, with actual heat loss almost always larger than was predicted.

What is really surprising is that these differences are not small. Actual performance in some cases has been found to be up to 120% worse than predicted, with large variations observed between seemingly similar houses. The two clear lessons are that all houses are different, and that heat loss tends to be higher than expected – creating the motivation for an alternative measurement solution.

At present, the most commonly used whole-house measurement technique in the UK is the 'co-heating test'. The method involves measuring the energy required to heat the interior of a house to a controlled elevated level, commonly 25°C, and normalising for the weather conditions during the test. Co-heating tests carried out by Leeds Beckett University have provided much of the evidence for the performance gap and their experimental method is the one commonly followed.

In its current form, the co-heating test, the use of which has been primarily limited to research applications, requires a house to be empty for a period of at least two weeks and can only be carried out during winter months, as it requires a period of cold and preferably dull weather. Furthermore, an extended period of elevated internal temperature has been found to cause damage in newly built houses through the rapid drying out of materials.

The Loughborough In-Use Heat Balance has been developed to address these issues as a part of the work of PhD Research Student Richard Jack, a member of the London-Loughborough Centre for Doctoral Training in Energy Demand (www.lcdc.ac.uk). The In-Use Heat Balance uses broadly the same analytical approach as co-heating, with measurements informing an energy balance in the house. The key advance made by the new method is that it allows occupants to remain in their home and behave almost entirely as normal. The energy inputs to...

Loughborough University

INNOVATION
Improving people's lives

SMART METER ENABLED THERMAL EFFICIENCY RATINGS (SMETER) INNOVATION PROGRAMME

Department for Business, Energy & Industrial Strategy

"This funding scheme aims to develop, test and demonstrate technologies that measure the thermal performance of homes, using smart meter and other data"

Technical assessment contractor awarded to a consortium made up of:

Loughborough University

LEEDS BECKETT UNIVERSITY

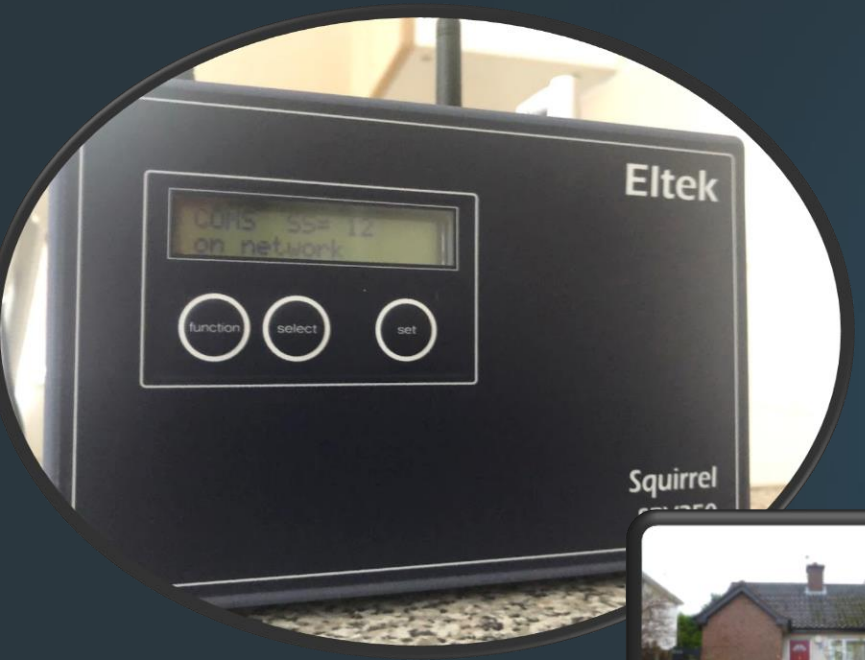
Halton Housing

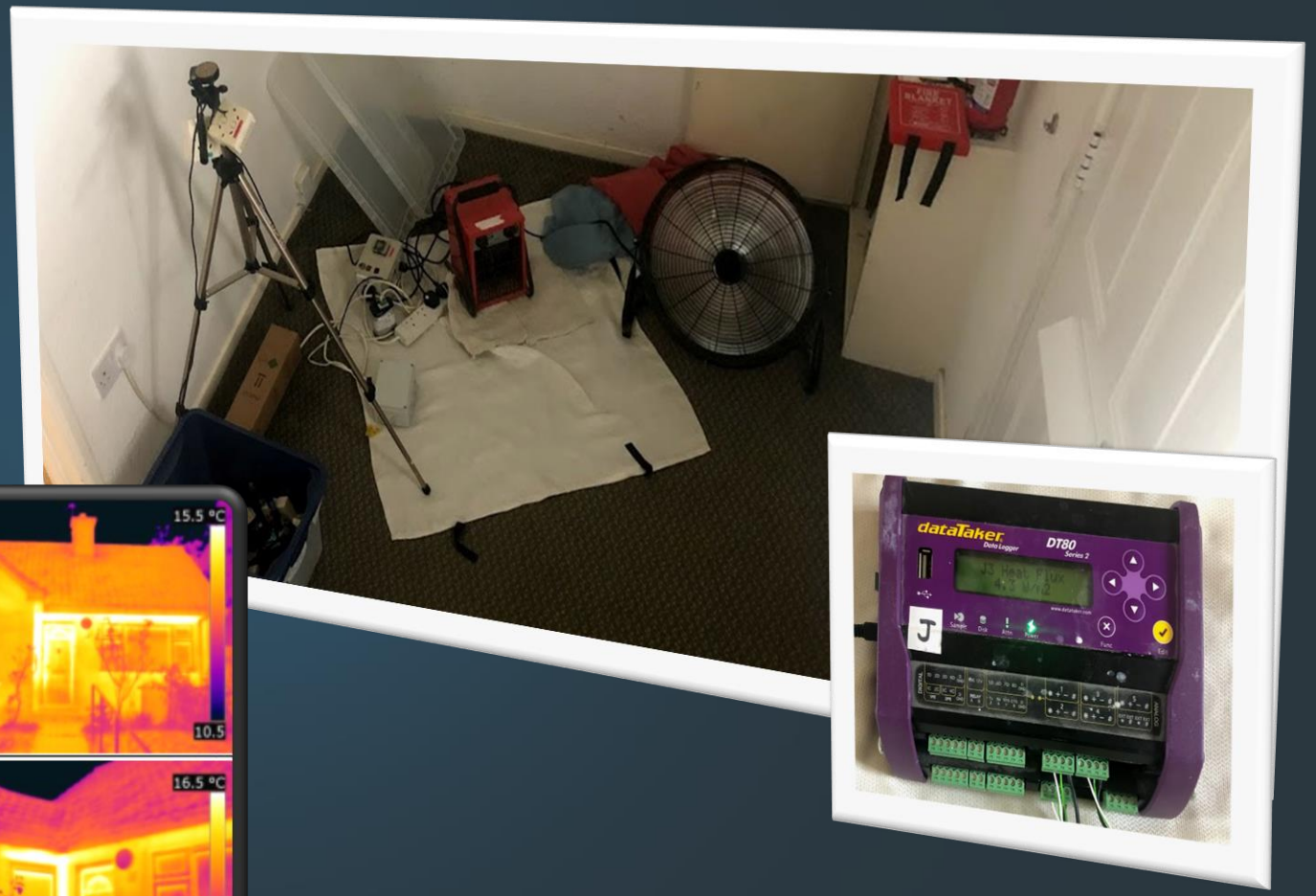
UCL

- 30 homes over 12 months
- 3 weeks of testing prior to customer arriving
  - Actual EPC derived as a baseline
  - Full 2D/3D floor plans of each home

INNOVATION
Improving people's lives

SMART METER ENABLED THERMAL EFFICIENCY RATINGS (SMETER) INNOVATION PROGRAMME





25 Degrees

3 weeks

INNOVATION
Improving people's lives

SMART METER ENABLED THERMAL EFFICIENCY RATINGS (SMETER) INNOVATION PROGRAMME

Airtightness Spreadsheets:

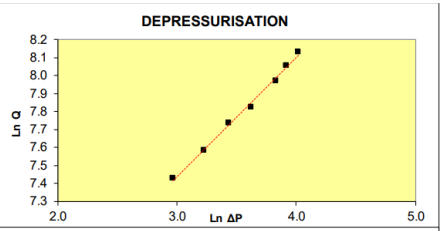
LEEDS BECKETT UNIVERSITY — Leeds Sustainability Institute

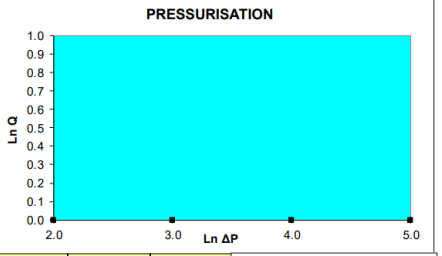
MINNEAPOLIS BLOWER DOOR DATA INPUT AND CALCULATION

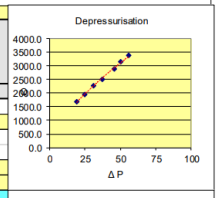
date:	26/09/2019	Version 16e	23 October 2018	
test house address:	SMETER House 5			
company:				
house type:	Semi detached			
tester:	DMS, FT			
test reference number:		Blower Door & Gauge Used	Model 3 with DG700	
outdoor temp (°C)	17.1 °C	Note: ENSURE THAT FLOW SETTINGS ARE IN m3/h - When using the DG700 gauge run baseline pressure adjustment for minimum 60s with fan switched on but not rotating		
indoor temp (°C)	20.8 °C			
outdoor humidity (%rh)	64.9 %RH			
indoor humidity (%rh)	65.3 %RH			
outdoor barometric pressure	995.2 mbar or hPa	Calculated Outdoor Air Density	1.19 kg/m³	
indoor barometric pressure	995.3 mbar or hPa	Calculated Indoor Air Density	1.17 kg/m³	
temperature corr. fact. depress.	0.987	description of main construction details:		
temperature corr. fact. press.	1.013	Concrete frame, Vents Open		
wind speed (m/s):	2			
baseline pressure diff (Pa) (+/-)	Pa			
house width:	m			
house depth:	m			
house height:	m			
floor area:	m²			
volume:	220.6 m³			
envelope area including floor:	222.7 m²			
Pressure Difference for ELA	10 Pa			
RESULTS:				
Q50 Mean Flow at 50Pa =	m³/h			
Mean Air Leakage at 50Pa =	h⁻¹			
Mean Air Permeability at 50 Pa =	m/h or m³/h/m²			
Equivalent Leakage Area =	m² at	10	Pa	

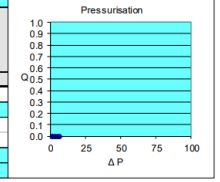
DEPRESSURISATION	RING - O,A,B,C,D,E for BD3 0,1,2,3 for DuctBB	MEASURED FAN PRESSURE (Pa) Max. 90 Pa	MEASURED FLOW (m³/h)	ADJUSTED FLOW (m³/h)	FLOW RANGE OK FOR SELECTED RING?	Adjusted Pressure (Pa)	Ln delta P	Ln Q	Q50 Calculated Flow at 50Pa (m³/h)	Permeability Depressurisation Only (m³/(h.m²))	Air Leakage Depressurisation Only (h⁻¹)
Approx 65 Pa	a	19.4	1704	1680.5	OK	19.4	2.965	7.427	3097.15	13.91	14.04
Approx 57 Pa	a	25.2	1991	1963.6	OK	25.2	3.227	7.583	r²	0.996	
Approx 49 Pa	a	31	2323	2291.0	OK	31	3.434	7.737	C_{env}	234.719	m³/h.Pa*n*
Approx 41 Pa	a	37.5	2537	2502.1	OK	37.5	3.624	7.825	n	0.660	
Approx 33 Pa	a	46	2935	2894.6	OK	46	3.829	7.971			
Approx 25 Pa	a	50.3	3199	3155.0	OK	50.3	3.918	8.057	C_L (corrected)	233.967	m³/h.Pa*n*
Approx 20 Pa	a	55.7	3438	3390.7	OK	55.7	4.020	8.129			

PRESSURISATION	RING - O,A,B,C,D,E for BD3 0,1,2,3 for DuctBB	MEASURED FAN PRESSURE (Pa) Max. 90 Pa	MEASURED FLOW (m³/h)	ADJUSTED FLOW (m³/h)	FLOW RANGE OK FOR SELECTED RING?	Adjusted Pressure (Pa)	Ln delta P	Ln Q	Q50 Calculated Flow at 50Pa (m³/h)	Permeability Pressurisation Only (m³/(h.m²))	Air Leakage Pressurisation Only (h⁻¹)
Approx 65 Pa											
Approx 57 Pa									r²		
Approx 49 Pa									C_{env}		m³/h.Pa*n*
Approx 41 Pa									n		
Approx 33 Pa											
Approx 25 Pa									C_L (corrected)		m³/h.Pa*n*
Approx 20 Pa											









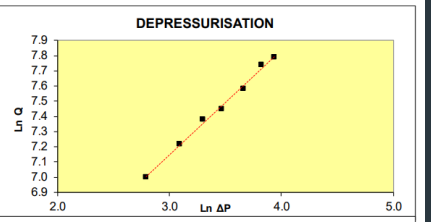
LEEDS BECKETT UNIVERSITY — Leeds Sustainability Institute

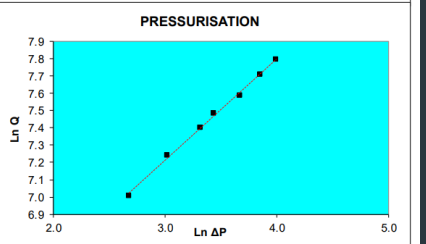
MINNEAPOLIS BLOWER DOOR DATA INPUT AND CALCULATION

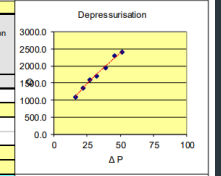
date:	26/09/2019	Version 16e	23 October 2018	
test house address:	SMETER House 5			
company:				
house type:	Semi detached			
tester:	DMS, FT			
test reference number:		Blower Door & Gauge Used	Model 3 with DG700	
outdoor temp (°C)	17.1 °C	Note: ENSURE THAT FLOW SETTINGS ARE IN m3/h - When using the DG700 gauge run baseline pressure adjustment for minimum 60s with fan switched on but not rotating		
indoor temp (°C)	20.8 °C			
outdoor humidity (%rh)	64.9 %RH			
indoor humidity (%rh)	65.3 %RH			
outdoor barometric pressure	995.2 mbar or hPa	Calculated Outdoor Air Density	1.19 kg/m³	
indoor barometric pressure	995.3 mbar or hPa	Calculated Indoor Air Density	1.17 kg/m³	
temperature corr. fact. depress.	0.987	description of main construction details:		
temperature corr. fact. press.	1.013	Concrete frame, Vents closed		
wind speed (m/s):	2			
baseline pressure diff (Pa) (+/-)	Pa			
house width:	m			
house depth:	m			
house height:	m			
floor area:	m²			
volume:	220.6 m³			
envelope area including floor:	222.7 m²			
Pressure Difference for ELA	10 Pa			
RESULTS:				
Q50 Mean Flow at 50Pa =	2330.70 m³/h			
Mean Air Leakage at 50Pa =	10.57 h⁻¹			
Mean Air Permeability at 50 Pa =	10.47 m/h or m³/h/m²			
Equivalent Leakage Area =	0.094 m² at	10	Pa	

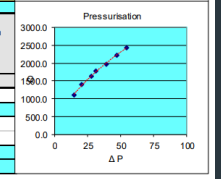
DEPRESSURISATION	RING - O,A,B,C,D,E for BD3 0,1,2,3 for DuctBB	MEASURED FAN PRESSURE (Pa) Max. 90 Pa	MEASURED FLOW (m³/h)	ADJUSTED FLOW (m³/h)	FLOW RANGE OK FOR SELECTED RING?	Adjusted Pressure (Pa)	Ln delta P	Ln Q	Q50 Calculated Flow at 50Pa (m³/h)	Permeability Depressurisation Only (m³/(h.m²))	Air Leakage Depressurisation Only (h⁻¹)
Approx 65 Pa	b	16.3	1111	1095.7	OK	16.3	2.791	6.999	2371.09	10.65	10.75
Approx 57 Pa	b	22.1	1376	1357.1	OK	22.1	3.096	7.213	r²	0.995	
Approx 49 Pa	b	27.2	1626	1603.6	OK	27.2	3.303	7.380	C_{env}	161.149	m³/h.Pa*n*
Approx 41 Pa	a	32	1740	1716.1	OK	32	3.466	7.448	n	0.688	
Approx 33 Pa	a	38.9	1984	1956.7	OK	38.9	3.661	7.579			
Approx 25 Pa	a	45.7	2326	2294.0	OK	45.7	3.822	7.738	C_L (corrected)	160.675	m³/h.Pa*n*
Approx 20 Pa	a	51.4	2442	2408.4	OK	51.4	3.940	7.787			

PRESSURISATION	RING - O,A,B,C,D,E for BD3 0,1,2,3 for DuctBB	MEASURED FAN PRESSURE (Pa) Max. 90 Pa	MEASURED FLOW (m³/h)	ADJUSTED FLOW (m³/h)	FLOW RANGE OK FOR SELECTED RING?	Adjusted Pressure (Pa)	Ln delta P	Ln Q	Q50 Calculated Flow at 50Pa (m³/h)	Permeability Pressurisation Only (m³/(h.m²))	Air Leakage Pressurisation Only (h⁻¹)
Approx 65 Pa	b	14.6	1091	1106.2	OK	14.6	2.681	7.009	2290.30	10.28	10.38
Approx 57 Pa	b	20.5	1376	1395.2	OK	20.5	3.020	7.241	r²	0.998	
Approx 49 Pa	b	27.6	1616	1638.6	OK	27.6	3.318	7.402	C_{env}	234.031	m³/h.Pa*n*
Approx 41 Pa	a	31.1	1754	1778.5	OK	31.1	3.437	7.484	n	0.586	
Approx 33 Pa	a	39.3	1951	1978.2	OK	39.3	3.671	7.590			
Approx 25 Pa	a	47.3	2199	2229.7	OK	47.3	3.857	7.710	C_L (corrected)	231.781	m³/h.Pa*n*
Approx 20 Pa	a	54.5	2399	2432.5	OK	54.5	3.998	7.797			









INNOVATION
Improving people's lives

SMART METER ENABLED THERMAL EFFICIENCY RATINGS (SMETER) INNOVATION PROGRAMME

4 x Temperature & Humidity Sensors

Secondary Smart Gas Meter

Secondary Smart Electricity Meter

INNOVATION
Improving people's lives

SMART METER ENABLED THERMAL EFFICIENCY RATINGS (SMETER) INNOVATION PROGRAMME

Outcomes & Learning

- World leading data set monitoring 'lived in' conditions
- Greater insight into the performance of our homes
- How customer behaviours can effect assets
- Target poorly performing homes requiring varying levels of retro-fit
- Prove benefits of investment with data
- Continued monitoring of asset over lifecycle

INNOVATION
Improving people's lives

SMART METER ENABLED THERMAL EFFICIENCY RATINGS (SMETER) INNOVATION PROGRAMME

Future

- Present data to the International Annex 71 conference in March 2021
- BEIS to release data and algorithm to developers / partners
- Development of a set of sensors that can be deployed in a 'lived in' environment for 3 weeks to ascertain a true EPC
- Extension of BEIS monitoring for additional 12 months
- Continue gathering data, new ways to present and gain value
  - Collaborate and share learning within sector
- **Lobby for access to smart meter data**

INNOVATION
Improving people's lives

BUILT FORM DATA

Future of data driven asset management

- Review quality and cleanse existing data
- Define clear data strategy
- Review application platforms

- Develop a distributed BIM to include fixed and IoT controlled assets
  - Rich data layers mapped over 2D / 3D floorplans
  - Include GIS level data.
  - Include compliance (Smart or fixed assets)

- Further uses of data – build digital first in the future?
  - Underpin with blockchain for ultimate transparency & accountability

INNOVATION
Improving people's lives

BUILT FORM DATA

INNOVATION
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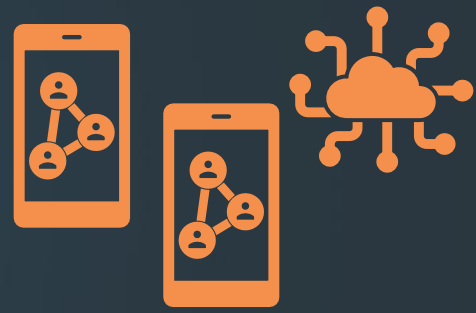
GIS Informs BIM. BIM Fuels GIS

By providing a real-world context of an asset's existing environment within which designers and engineers can explore and evaluate design and construction – GIS informs BIM. Then, rich, more accurate models can be utilized to improve the overall operations and maintenance of assets within a larger area – in this way, BIM fuels GIS.

Real world Understanding

The fusion of BIM and GIS provides the power to build a robust context model where geographic information and infrastructure design data are brought together, helping to better understand how assets interact within the context of a real place and geography



More, Better with Less

To build more sustainable and resilient infrastructure, we need more seamless sharing of data and information between BIM design processes and GIS technologies. Breaking down barriers will improve urban planning and management and help us make investments in infrastructure with less negative social, economic and environmental impacts.

FIND OUT MORE:

www.haltonhousing.org/innovation

Lee Reevell

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FIND OUT MORE:

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Roundtable Discussion with Audience

- Raise your hand to be brought into the webinar & join our speakers
- Continue to send questions in via the QnA function if you wish

Close

23rd September, 13.00 – 14.30 – Financing Energy Efficiency

29th September, 10.00 – 11.30 - Retrofit Part 1 – Scaling up Supply & Demand, and Fabric First

7th October, 10.00 – 11.30 - Retrofit Part 2 – Home Energy Systems

13th October 13.00 – 14.30 – Retrofitting Neighbourhoods

21st October 13.00 – 14.30 - Decarbonising Rural Areas

28th October 10.00 – 11.30 - Getting Communities on Board


THANK YOU
FOR ATTENDING THIS EVENT
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