



WELCOME TO THE

Future Homes Standard Technical Conference



Be sure to share your experience on LinkedIn using #FHSready



Future Homes Standard Essentials

Sponsored by **e-on next**



David Adams

Strategic Advisor

Future Homes Hub

FHS Technical Conference - Leeds

Get FHS Ready series

June 2026





We've come a long way...



Future Homes Standard: New Parts L and F published on 24 March 2026

Part L 2026

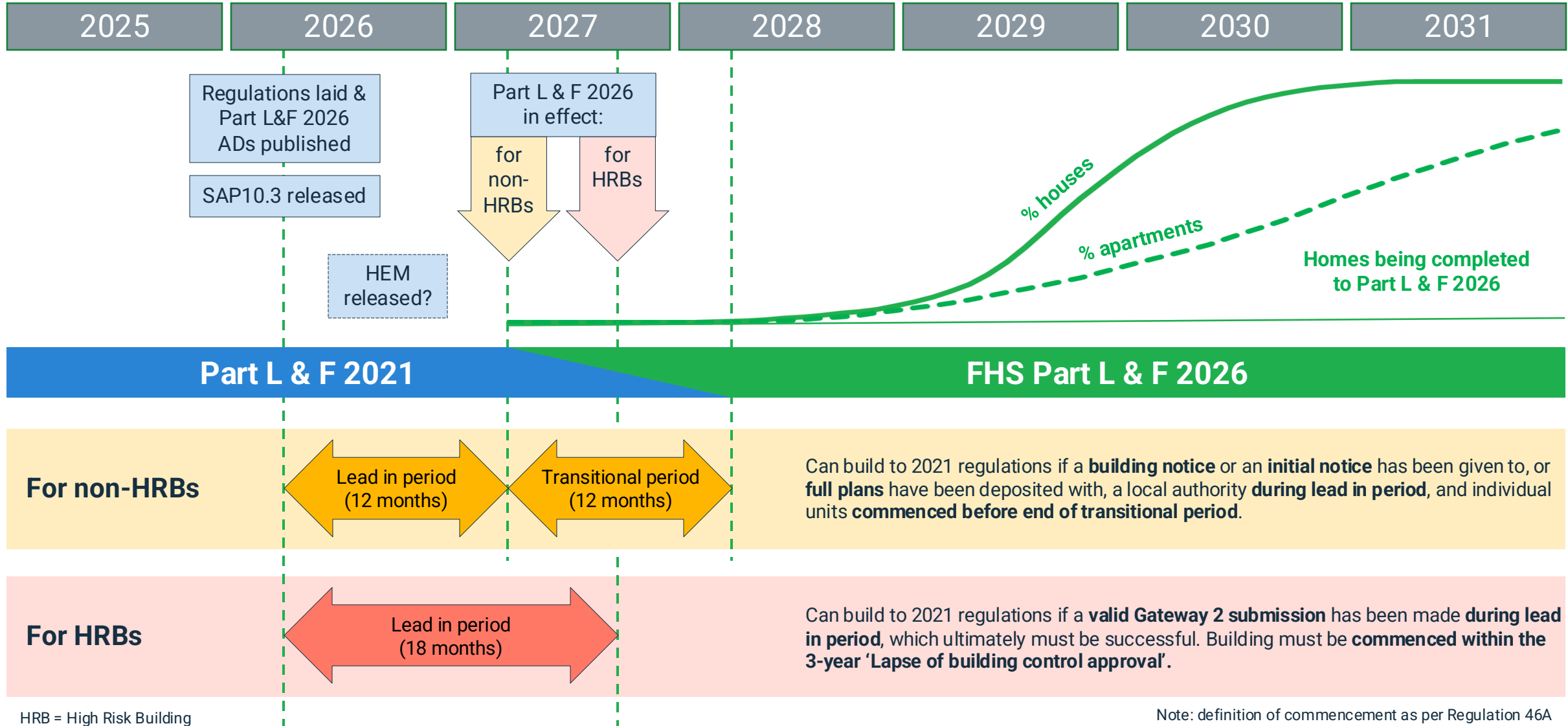


Part F 2026





FHS Timeline





The Future Homes Standard Essentials

Seven actions to de-risk delivery today



<https://futurehomes.org.uk/future-homes-standard-ready>

Google: get future homes standard ready



User specific guidance - published





Get FHS Ready Webinars and Podcasts

Fridays 1-2pm

Available in Hub members area

Future Homes Standard Reflections

Lead early, learn fast, share lessons

Delivering homes with heat pumps

Ventilation in New Homes

Build as designed

Prioritize grid availability

Getting heating design right (part 1)

19 June

Getting heating design right (part 2)

3 July

Commission with care

10 July

Own the customer journey

17 July

Evolve your design

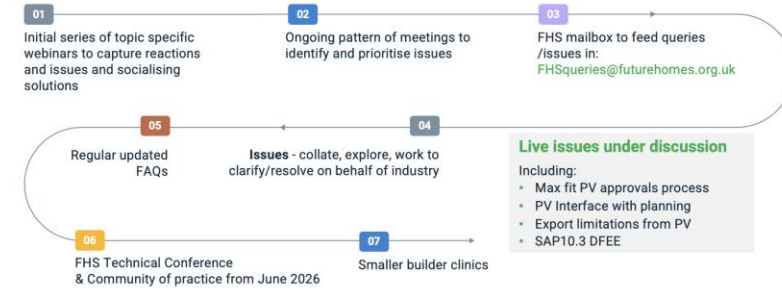
September





FHS Publication issues

nr	by	entered	priority	priority	Part L		PV	
1	Stuart Eimes	TH 26-Mar	2		Part L		PV	Need for further guidance on PV Max FIT
2	FHEH	TH 26-Mar	5		Part L	Appendix B, table B1, B2, B3	PV	Where are offset distances measured to? Edge of panel?
9	FHEH	TH 26-Mar	3		Part L & SAP10.3		PV	Equation for Functional PV requirement in Part L does not match SAP10.3 / BREL equation, leading to differing outcomes
4	FHEH	TH 27-Mar	12		Part L	Para 5.75	PV	Not clear why equation 5.1 is in kWp, but the requirement stated in para 5.73 and 5.74 is in kWh per annum. Is confusing.
5	FHEH	TH 27-Mar	13		Part L		PV	PV arrays on blocks of flats - how will this work in practice? Para 5.75 very loose as to what benefit to the dwelling could be. What is the definition of 'used for the benefit of residents'?
6	FHEH	TH 27-Mar	14		Part L		PV	No cap on PV required, so bungalows will have very large arrays...
8	FHEH	TH 27-Mar	7		Part L		PV	How is panel efficiency calculated - by dividing panel kWp by panel area or aperture area?
10	Energy Assessors meeting	TH 27-Mar	11		SAP10.3		PV	Is it right that small single story heated spaces are included in the area for 'ground floor' for the PV calc? With the offset distances required, they are very unlikely to be able to take any panels. Section 8.05 of SAP10 conventions is referenced in Part L2026 note (b) on p58
3	FHEH	DA 07-Apr	19		Part L	5.73 - 5.75	PV	what is a 'reasonably practicable roof area'
					G98 / G99		PV	An annual output (in kWh) for the building as calculated using the approved methodology at least equal to that of a photovoltaic array covering the reasonably practicable roof area with a panel efficiency of 0.22 kWp/m2
					Regulation L3 &		PV	An annual output (in kWh) for the building as calculated using the approved methodology at least equal to that of a photovoltaic array covering the reasonably practicable roof area with a panel efficiency of 0.22 kWp/m2
							PV	Need to understand more about the kWp PV vs kWp rating of inverter. What proportion of homes may need a G99 application?
							PV	Will OFGEM be raising the G98 kWp limit?
							PV	What is the definition of the "curtilage of the building" ?
							PV	Requirement L3: "... within the boundaries of the curtilage of



FHS mailbox to feed in queries /issues:

FHSqueries@futurehomes.org.uk

08:00 - 09:00

09:00 - 09:10

09:20 - 10:10

All things PV
Room 2

10:10 - 11:00

Feeling the heat: part 1
Room 2

11:00 - 11:30

11:30 - 12:20

Fabric first & reactions to SAP 10.3
Room 2

12:20 - 13:10

Powering up
Room 2

13:10 - 14:00

14:00 - 14:50

Fresh thinking on ventilation & IAQ
Room 2

14:50 - 15:40

Feeling the heat: part 2
Room 2

15:40 - 16:10

16:10 - 17:00

Learning by doing
Room 2



Future Homes Standard Essentials

Sponsored by **e-on next**



Dr Jim Parker

Reader

Leeds Beckett University



Future Homes Standard Technical Conference



All things PV



David Adams
Strategic Advisor
Future Homes Hub



Claire Enstone
Director of Technical
Eco2Solar



Neil Macdonald
Principal Technical
Specialist
NHBC



Jack Taylor
General Manager -
Europe
Allume Energy



Future Homes Standard Essentials

Sponsored by **e-on next**



All things PV

Claire Enstone
Director of Technical
Eco2Solar

eco₂solar

Powered by
e-on
next

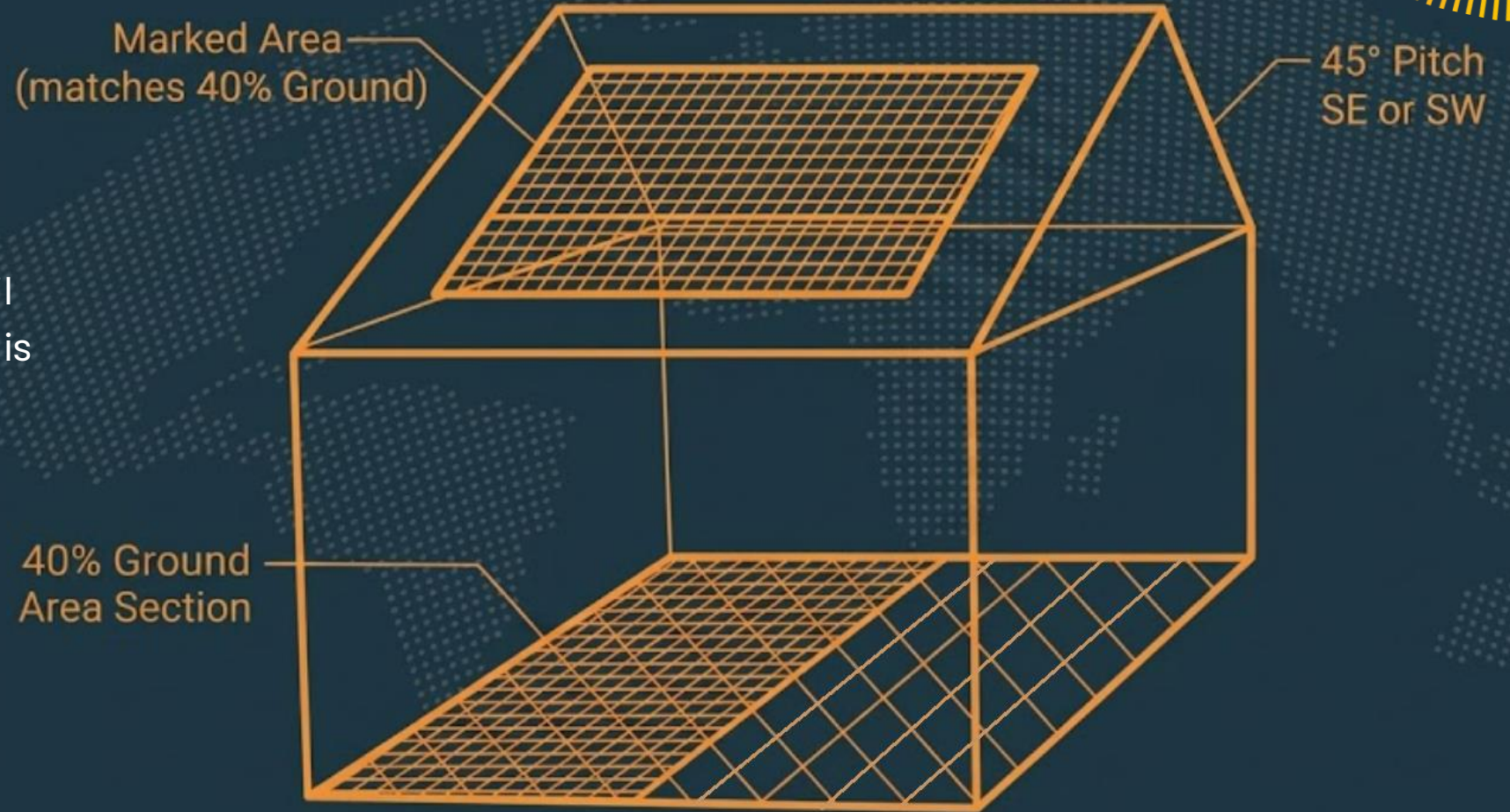


PV Design for the Future Homes Standard



Functional requirement calculation

- Calculate the target kWh per year using SAP 10.3 until Home Energy Model (HEM) is available
- This is based on 40% of the ground floor area in m^2
- PV panels with minimum output of $0.22kWp/m^2$



Max-Fit approach

- Where it is not possible to achieve the functional requirement on the actual dwelling, the 'maximum fit area' of the roofs is drawn using the offset distances in Appendix B
- The new target is the total achievable PV output (kWh) within this area



Additional Considerations

- If the calculated PV output is less than 720kWh per year then no PV is required
- PV systems should be appropriately sized for the available infrastructure and on-site energy demand
- The Appendix B offset distances do not need to be adhered to for the actual installation
- Full G98 & G99 applications to the DNO will still be required
- Adding battery storage will have the greatest impact in lowering bills
- Quality, safety and compliance





Making
solar
standard



Future Homes Standard Essentials

Sponsored by **e-on next**



All things PV

Jack Taylor

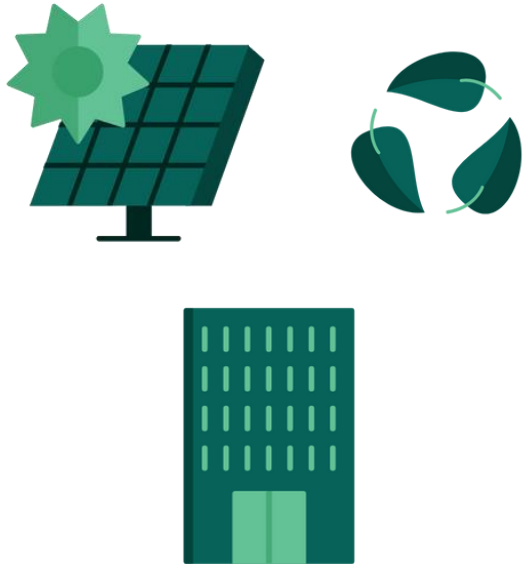


SolShare

Jack Taylor, General Manager of Europe
jack.taylor@allumeenergy.com
allumeenergy.com



HEM specifies **40% PV**



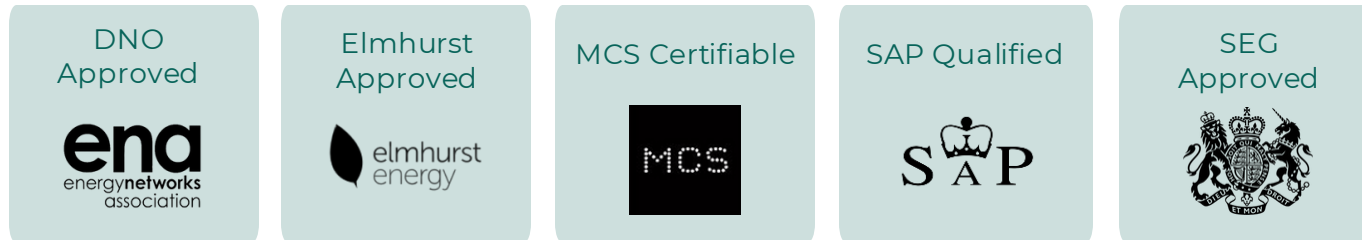
Solar brings benefits under SAP and HEM

However, PV for flats has always been **challenging**

Turn this **requirement into an opportunity** with Shared Solar

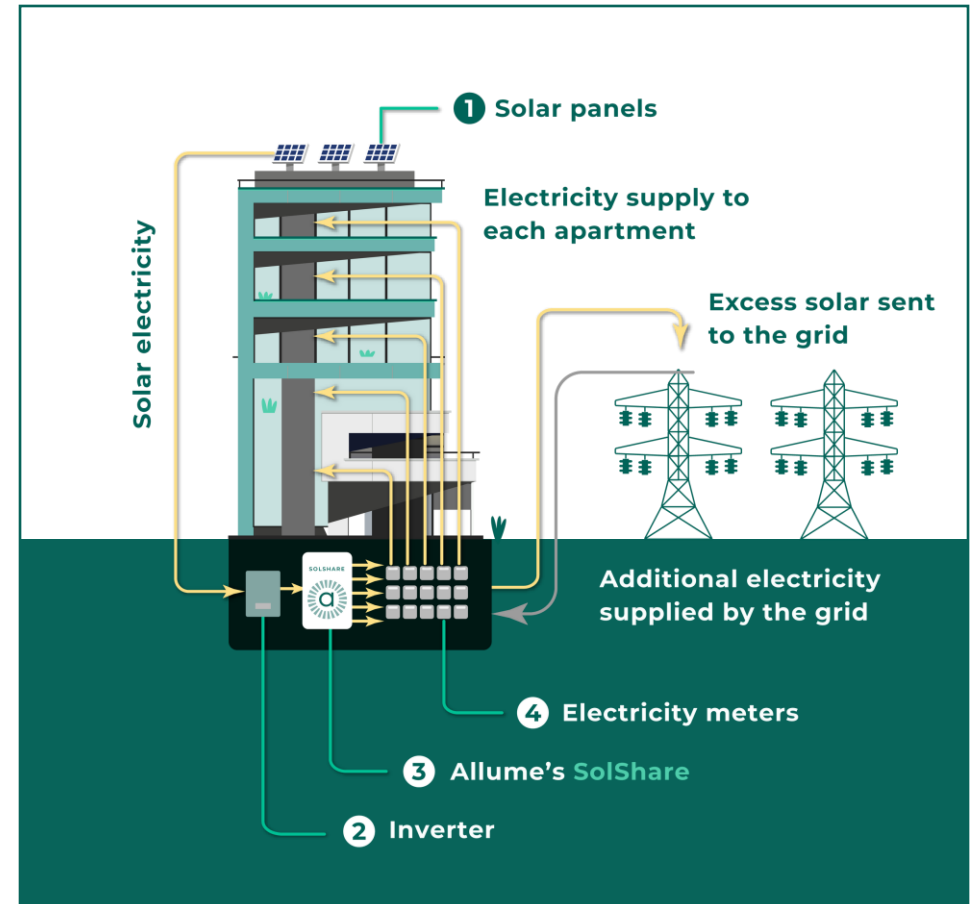
Allume has created **SolShare**

- **SolShare:** World's only solar system to directly connect multiple flats to a single rooftop PV and battery.
- A proven solution to over **10,000 flats.**



Benefits of SolShare (shared solar & battery system)

- ✓ Direct PV connection to individual flats
- ✓ Tailorable kWp: typically delivering 5–15 SAP points.
- ✓ 20–50% bill savings for residents (solar only).
- ✓ Solves fire safety concerns
- ✓ Easy, affordable & less intrusive energy efficiency measure.
 - All at a cost of approx. £1.5 – 4k per flat (turnkey).





Future Homes Standard Technical Conference



Feeling the heat: part 1



Dan Neasham
Head of Sustainability
and Performance
Future Homes Hub



Nick Houghton-Best
National Head of New
Build
Daikin



Nathan Lord
Technical Sales Manager
East Goscote Plumbers
Ltd



Neil Stone
Managing Director
REDD



Danielle Michalska-Morris
Director of Research and
Technical Innovation
Taylor Wimpey



The Future Homes Standard Essentials

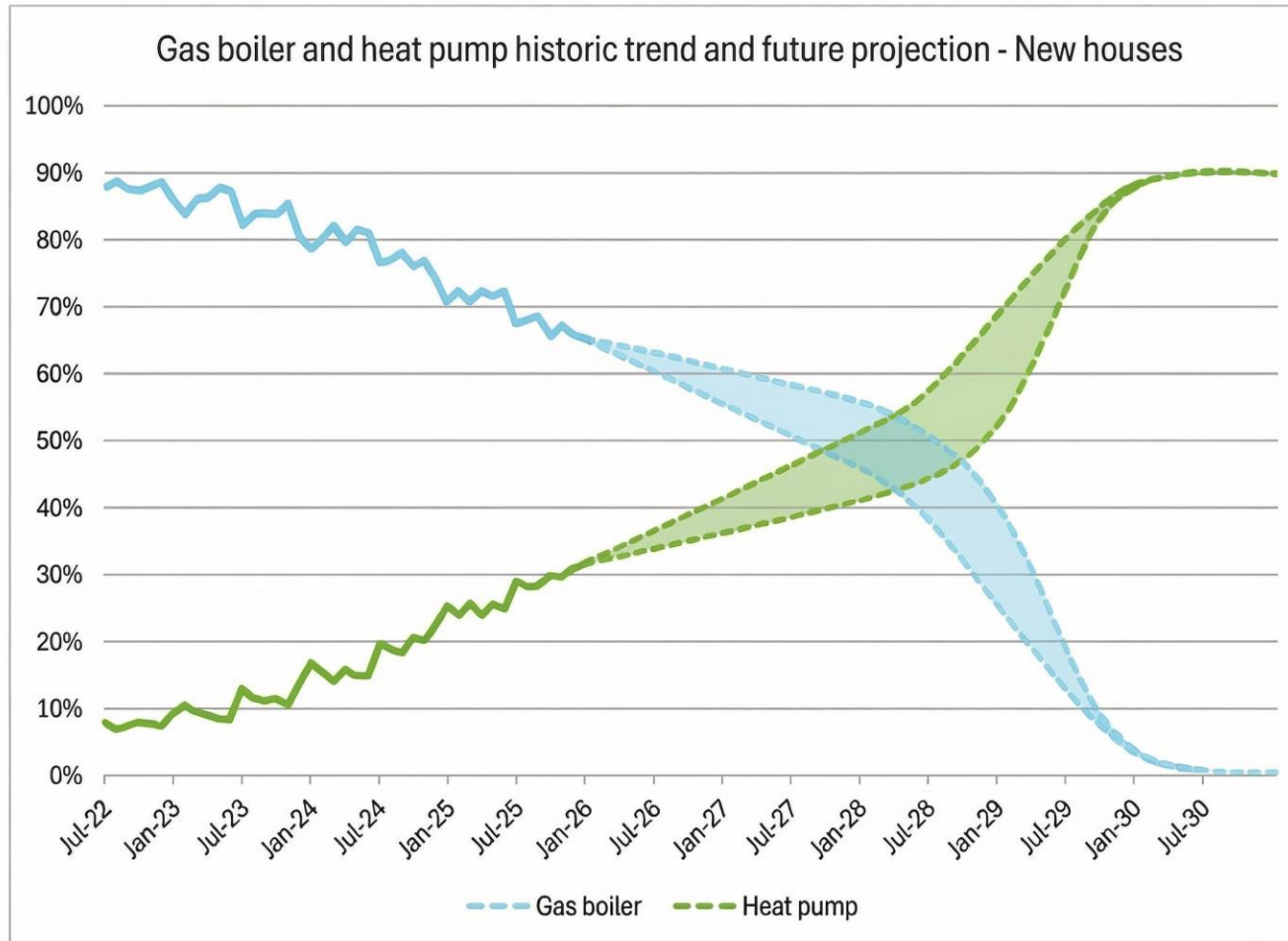
Seven actions to de-risk delivery today



<https://futurehomes.org.uk/future-homes-standard-ready>

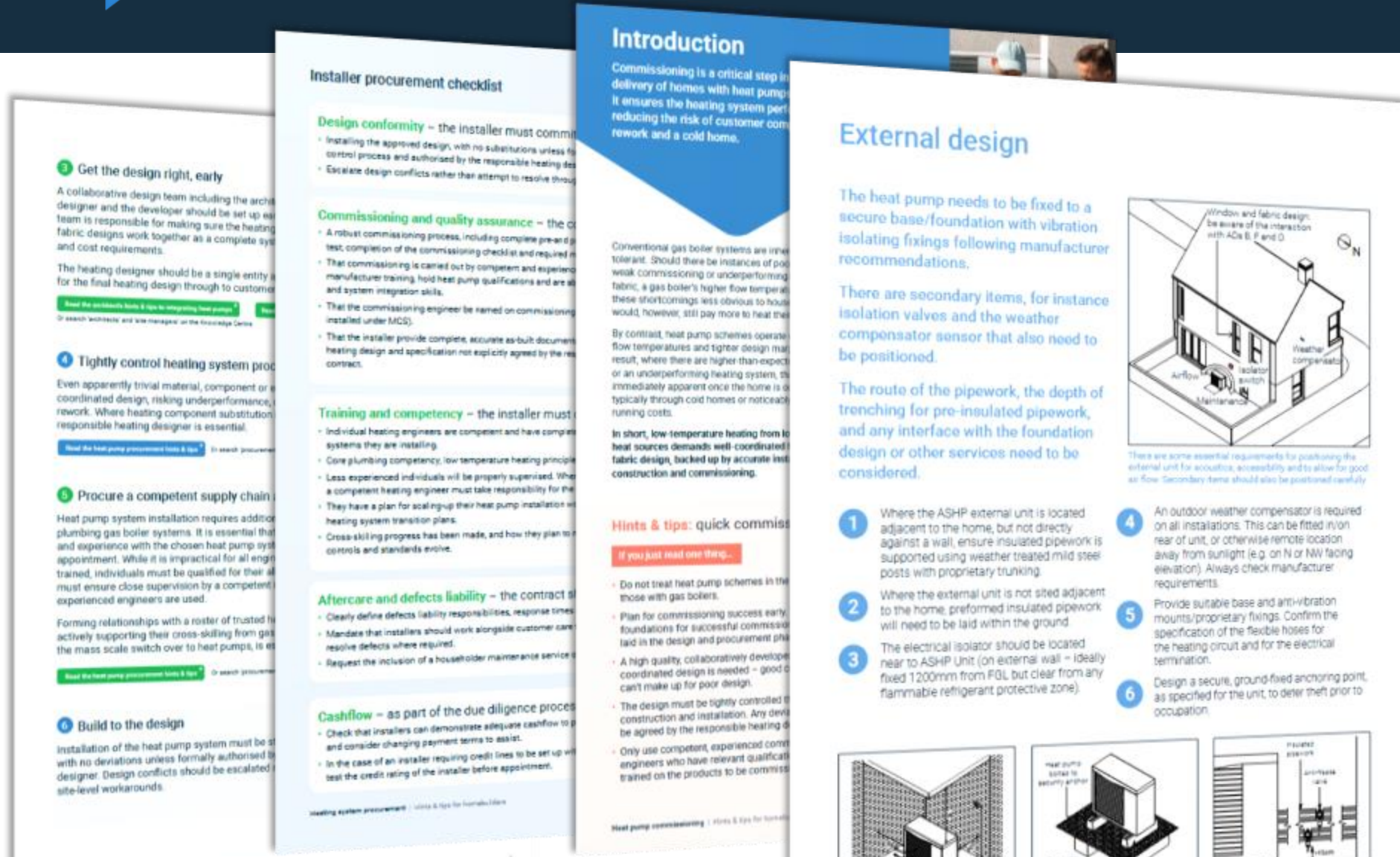
Google: [get future homes standard ready](#)

The sector is already scaling up



We must de-risk delivery in advance of adoption of heat pumps at scale under FHS

Some of our heat pump guidance

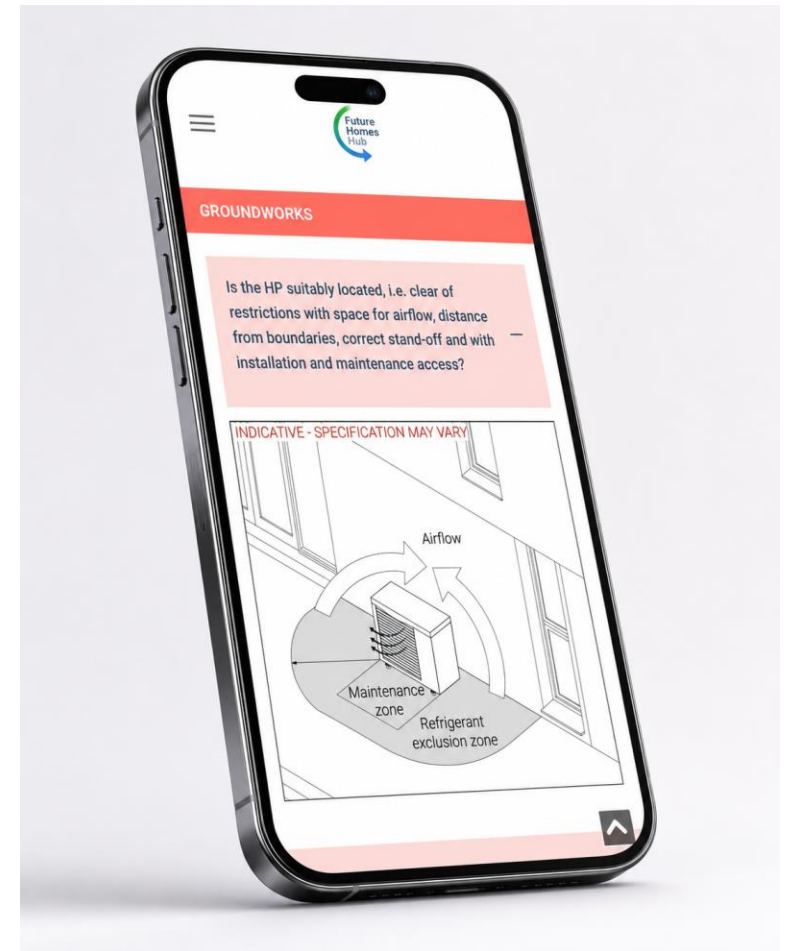
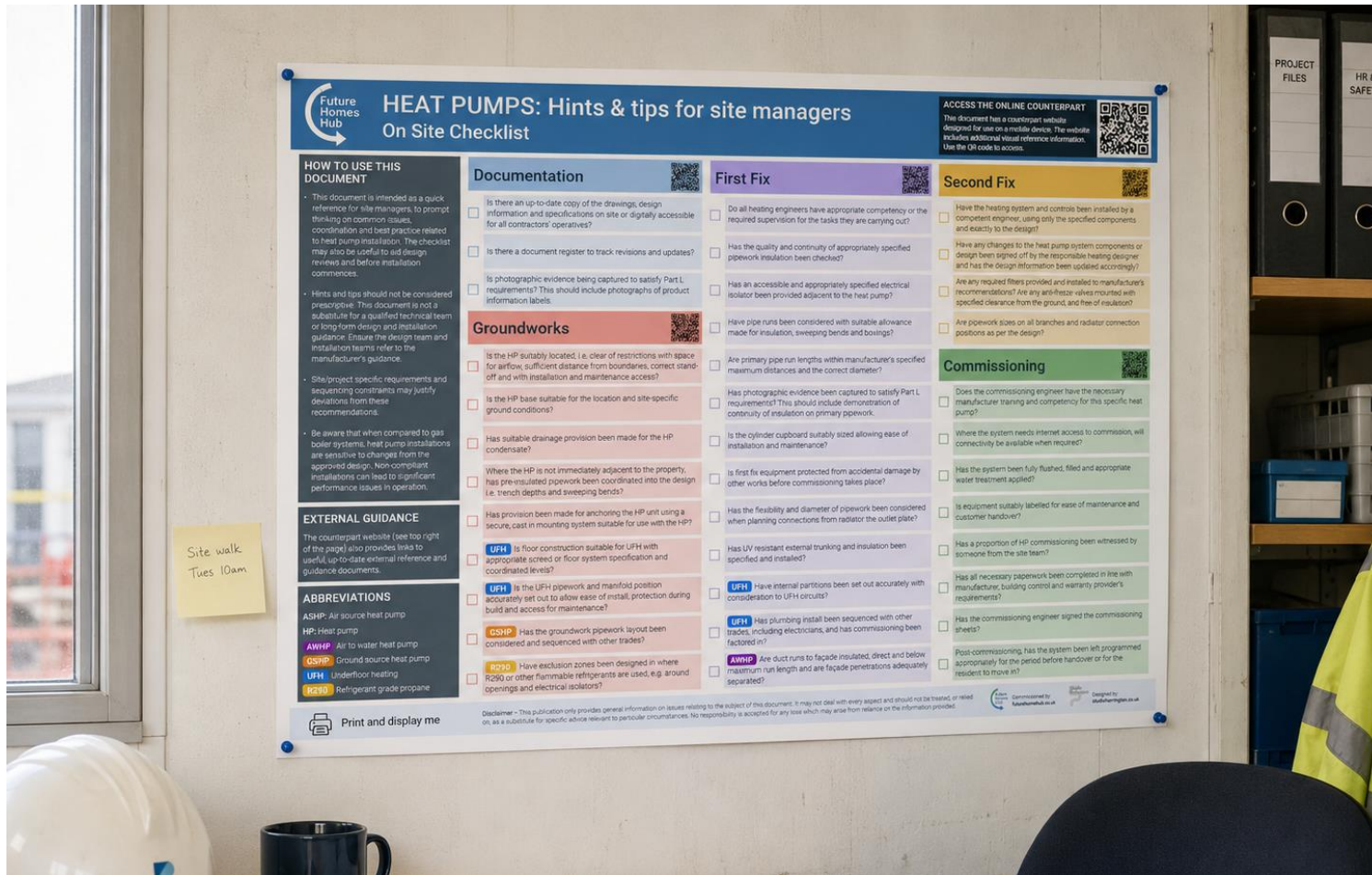


Including:

- Heat pump delivery guide
- Architect's heat pump hints and tips
- Heat pump procurement guide
- Heat pump commissioning guide



Site manager's hints and tips





Facilitating resolution of FHS issues - Hub process

Updated: 01-Jun

WORKING DOCUMENT

In Blue - Items added/updated since last issue

Appendix A - FHS ISSUES LOG

Issue ID	Issue Title, Description & Comments	Subject	Grouping	Importance	Urgency	Rating (xU)	Status	Current Action by	Team to action	Suggested Actions	Relevant Doc	Section
4	<p>Guidance for consistency of interpretation of PV 'Max-fit' requirements</p> <p>Related items: #10, #11, #12, #13, #15, #16</p> <p>"5.73(b) An annual output (in kWh) for the building as calculated using the approved methodology at least equal to that of a photovoltaic array covering the reasonably practicable roof area with a panel efficiency of 0.22 kWp/m²"</p>	PV	PV2 - 'Max-fit'	0.9	1	1	1	FHH	PV D&CPG	Future Homes Hub to set up 'PV design and compliance process' group	Part L	Para 5.73(b) & Appendix B
2	<p>Guidance on roof vent acceptable and unacceptable locations</p> <ul style="list-style-type: none"> - length of ductwork may increase if relocate to make way for PV panels. What implications does this have for ventilation system design? - potentially could be quite a few vents, especially if using purge vents for Part O compliance and/or internal downpipes - what 'rules' should be applied around location of vents, especially in 'Max-fit' scenario? 	PV	PV2 - 'Max-fit'	1.0	1	1	1	FHH	PV D&CPG	Future Homes Hub to set up 'PV design and compliance process' group	Part L	
1	<p>Definition of 'electricity is available to residents' in the context of PV on flats</p> <p>What configuration of PV system on a block of flats would meet the requirements? What is the intended definition of 'used for the benefit of the residents' within Para 5.75?</p> <p>"5.75 The system for renewable electricity generation should be designed so that generated electricity is available to residents of the dwellings. In buildings containing dwellings, this could be to individual dwellings and communal spaces where the electricity can be used for the benefit of the residents of the dwellings"</p>	PV	PV5 - For apartments	1.0	1	1	1	FHH	PV D&CPG	<ul style="list-style-type: none"> - FHH to develop/collate list of contender examples - Homebuilders to provide supporting evidence - Future Homes Hub to set up FHS Apartments' Group at which this can be discussed 	Part L	Para 5.75
1	<p>Definition of the "curtilage of the building" in the context of Requirement L3</p> <p>What is the definition of "curtilage of the building"? This is not a defined term in Part L. Requirement L3: "... within the boundaries of the curtilage of the building".</p>	PV	PV6 - General	1.0	1	1	1	MHCLG	MHCLG	Clarification sought from MHCLG	Part L	Requirement L3 & Para 5.70 & 5.71
1	<p>Required PV calculation in the context of a detached garage roof</p> <ul style="list-style-type: none"> - confirmation detached garage is excluded in area for 40% requirement (as current SAP10 conventions)? - would detached garage be part of the area required to have PV as part of 'Max-fit'? 	PV	PV6 - General	1.0	1	1	1	MHCLG	MHCLG	Clarification sought from MHCLG	Part L	



Future Homes Standard Essentials

Sponsored by **e-on next**



Feeling the heat: part 1

Nick Houghton-Best
National Head of New Build

Daikin

Heat Pumps Leason's Learned

















- Design
- Technical
- Training
- Supply Chain
- Summary

Nick Houghton-Best

UK Head Of New Build

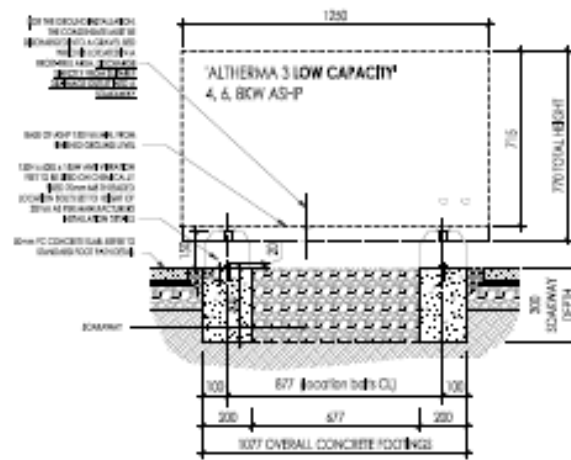


Leason's Learned - Design

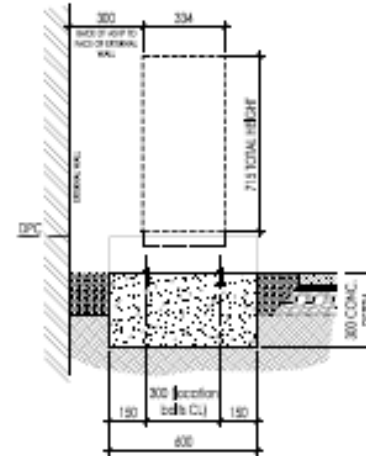
1	1	1	2	3	4	5	6	7	8																																																																																													
Drawing Number: ST-171 (1 of 3)	Drawing Number: ST-171 (2 of 3)	Drawing Number: ST-171 (3 of 3)	Scale: NTS @ A3	Revision: P4	<ul style="list-style-type: none"> • SEE PAGE 1 FOR MECHANICAL SET UP • SEE PAGE 2 FOR DETAILED WIRING • SEE PAGE 3 FOR RELEVANT CONTROLLER SYSTEMS CONFIGURATION SETTINGS 	<ul style="list-style-type: none"> • DPOT RELAY (NOT SUPPLIED BY DAIKIN SEE PAGE 2 FOR DETAILED WIRING) • OPTIONAL FOR HEAT METERS • ROTARY ISOLATOR TO BE SITUATED OUTSIDE PROTECTIVE ZONE 																																																																																																
FIRST FIX		INSTALLATION PHASE			PRE-COMMISSIONING																																																																																																	
 <p style="text-align: center;">X1M</p> <p>NOTE: THE SOLUTIONS TO NOT WIRE UP HEATER AS STANDING. TO OPTIONAL KIT</p> <p>■ - HIGH VOLTAGE OPTIONS □ - LOW VOLTAGE OPTIONS ○ - WIRING FOR BLH KIT ○ - UNIT POWER SUPPLY</p>		<table border="1" style="width:100%; border-collapse: collapse;"> <caption>TABLE 1 - DATA - MONOBLOC HEATING ONLY 1 PHASE</caption> <thead> <tr> <th>EQUIPMENT</th> <th>RELAYS/VS</th> <th>RELAYS/VS</th> <th>RELAYS/VS</th> </tr> </thead> <tbody> <tr> <td>PRIMARY PIPING (mm)</td> <td colspan="3" style="text-align: center;">MINIMUM 28</td> </tr> <tr> <td>FLOW RATE (l/min) CENTRAL HEATING</td> <td>13.2</td> <td>17.2</td> <td>22.4</td> </tr> <tr> <td>MINIMUM WATER VOLUME (L/min)</td> <td colspan="3" style="text-align: center;">SEE TABLE 3</td> </tr> <tr> <td>MAX CURRENT (A)</td> <td>19.9</td> <td>24</td> <td></td> </tr> <tr> <td>FUSE (A)</td> <td>20</td> <td>25</td> <td></td> </tr> <tr> <td>WIRING FOR DHW/SH (V/3W)</td> <td colspan="3" style="text-align: center;">230V</td> </tr> <tr> <td>MAX CURRENT (A) DHW/SH</td> <td colspan="3" style="text-align: center;">13.0A</td> </tr> <tr> <td>FUSE (A)</td> <td colspan="3" style="text-align: center;">16</td> </tr> <tr> <td>MINIMUM CABLE (mm²) FOR MIP</td> <td colspan="3" style="text-align: center;">1.5</td> </tr> <tr> <td>MAXIMUM DISTANCE TO TANK (m)</td> <td colspan="3" style="text-align: center;">10</td> </tr> <tr> <td>MAXIMUM LEVEL DIFFERENCE (m)</td> <td colspan="3" style="text-align: center;">5</td> </tr> <tr> <td>HEIGHT (mm)</td> <td colspan="3" style="text-align: center;">370</td> </tr> <tr> <td>WIDTH (mm)</td> <td colspan="3" style="text-align: center;">1250</td> </tr> <tr> <td>DEPTH (mm)</td> <td colspan="3" style="text-align: center;">360</td> </tr> <tr> <td>WEIGHT EMPTY (kg)</td> <td colspan="3" style="text-align: center;">88</td> </tr> <tr> <td>WEIGHT FULL (kg)</td> <td colspan="3" style="text-align: center;">98</td> </tr> </tbody> </table>	EQUIPMENT	RELAYS/VS	RELAYS/VS	RELAYS/VS	PRIMARY PIPING (mm)	MINIMUM 28			FLOW RATE (l/min) CENTRAL HEATING	13.2	17.2	22.4	MINIMUM WATER VOLUME (L/min)	SEE TABLE 3			MAX CURRENT (A)	19.9	24		FUSE (A)	20	25		WIRING FOR DHW/SH (V/3W)	230V			MAX CURRENT (A) DHW/SH	13.0A			FUSE (A)	16			MINIMUM CABLE (mm ²) FOR MIP	1.5			MAXIMUM DISTANCE TO TANK (m)	10			MAXIMUM LEVEL DIFFERENCE (m)	5			HEIGHT (mm)	370			WIDTH (mm)	1250			DEPTH (mm)	360			WEIGHT EMPTY (kg)	88			WEIGHT FULL (kg)	98			<table border="1" style="width:100%; border-collapse: collapse;"> <caption>TABLE 2 - INSULATION THICKNESS</caption> <thead> <tr> <th>PPRG LENGTH (m)</th> <th>MINIMUM INSULATION THICKNESS (mm)</th> </tr> </thead> <tbody> <tr> <td><20</td> <td>19</td> </tr> <tr> <td>20-30</td> <td>32</td> </tr> <tr> <td>30-40</td> <td>40</td> </tr> <tr> <td>40-50</td> <td>50</td> </tr> </tbody> </table>	PPRG LENGTH (m)	MINIMUM INSULATION THICKNESS (mm)	<20	19	20-30	32	30-40	40	40-50	50	<p>CHECKLIST BEFORE COMMISSIONING</p> <p>AFter the installation of the unit, first check the items listed below. Once all checks are fulfilled, the unit must be closed. Power-up the unit after it is closed.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>YOU READ THE COMPLETE INSTALLATION INSTRUCTIONS AS DESCRIBED IN THE INSTALLER REFERENCE GUIDE.</td></tr> <tr><td>THE OUTDOOR UNIT IS PROPERLY MOUNTED.</td></tr> <tr><td>FIELD WIRING - BE SURE THAT THE FIELD WIRING HAS BEEN CARRIED OUT ACCORDING TO THE INSTRUCTIONS DESCRIBED IN THE CHAPTER'S ELECTRICAL INSTALLATION, ACCORDING TO THE WIRING DIAGRAMS AND ACCORDING TO THE APPLICABLE LEGISLATION.</td></tr> <tr><td>THE SYSTEM IS PROPERLY EARTHED AND EARTH TERMINALS ARE TIGHTENED.</td></tr> <tr><td>THE FUSES OR LOCALLY INSTALLED PROTECTION DEVICES ARE INSTALLED ACCORDING TO THIS DOCUMENT, AND HAVE NOT BEEN BYPASSED.</td></tr> <tr><td>THE POWER SUPPLY VOLTAGE MATCHES THE VOLTAGE ON THE IDENTIFICATION LABEL OF THE UNIT.</td></tr> <tr><td>THERE ARE NO DAMAGED COMPONENTS OR SCRIPPED PIPES ON THE INSIDE OF THE DOOR UNIT.</td></tr> <tr><td>ONLY FOR MODELS WITH INTEGRATED BACK UP HEATER (FIELD SUPPLY) OR IF THE EXTERNAL BACK UP HEATER KIT (F-B: FACTORY MOUNTED IN THE BACK UP HEATER KIT) IS INSTALLED BACK UP HEATER CIRCUIT BREAKER F18 IS TURNED ON.</td></tr> <tr><td>ONLY FOR TANKS WITH BUILT-IN BOOSTER HEATER: BOOSTER HEATER CIRCUIT BREAKER F08 (FIELD SUPPLY) IS TURNED ON.</td></tr> <tr><td>THE CORRECT PIPE SIZE IS INSTALLED AND THE PIPES ARE PROPERLY INSULATED.</td></tr> <tr><td>THERE ARE NO WATER LEAKS INSIDE THE OUTDOOR UNIT.</td></tr> <tr><td>THE SHUT OFF VALVES ARE PROPERLY INSTALLED AND FULLY OPEN.</td></tr> <tr><td>FOR MODELS WITH INTEGRATED BACK UP HEATER: THE AUTOMATIC AIR PURGE VALVE (ON THE BACK UP HEATER) IS OPEN. FOR OTHER MODELS: THE MANUAL AIR PURGE VALVE IS CLOSED.</td></tr> <tr><td>THE PRESSURE RELIEF VALVE PURGES WATER WHEN OPENED: CLEAN WATER MUST COME OUT.</td></tr> <tr><td>THE MINIMUM WATER VOLUME IS GUARANTEED FULL CONDITIONS. SEE TO CHECK THE WATER VOLUME AND FLOW RATE IN 'S.I. PREPARING WATER PIPING'.</td></tr> <tr><td>(IF APPLICABLE) THE DOMESTIC HOT WATER TANK IS FILLED COMPLETELY.</td></tr> </table>					YOU READ THE COMPLETE INSTALLATION INSTRUCTIONS AS DESCRIBED IN THE INSTALLER REFERENCE GUIDE.	THE OUTDOOR UNIT IS PROPERLY MOUNTED.	FIELD WIRING - BE SURE THAT THE FIELD WIRING HAS BEEN CARRIED OUT ACCORDING TO THE INSTRUCTIONS DESCRIBED IN THE CHAPTER'S ELECTRICAL INSTALLATION, ACCORDING TO THE WIRING DIAGRAMS AND ACCORDING TO THE APPLICABLE LEGISLATION.	THE SYSTEM IS PROPERLY EARTHED AND EARTH TERMINALS ARE TIGHTENED.	THE FUSES OR LOCALLY INSTALLED PROTECTION DEVICES ARE INSTALLED ACCORDING TO THIS DOCUMENT, AND HAVE NOT BEEN BYPASSED.	THE POWER SUPPLY VOLTAGE MATCHES THE VOLTAGE ON THE IDENTIFICATION LABEL OF THE UNIT.	THERE ARE NO DAMAGED COMPONENTS OR SCRIPPED PIPES ON THE INSIDE OF THE DOOR UNIT.	ONLY FOR MODELS WITH INTEGRATED BACK UP HEATER (FIELD SUPPLY) OR IF THE EXTERNAL BACK UP HEATER KIT (F-B: FACTORY MOUNTED IN THE BACK UP HEATER KIT) IS INSTALLED BACK UP HEATER CIRCUIT BREAKER F18 IS TURNED ON.	ONLY FOR TANKS WITH BUILT-IN BOOSTER HEATER: BOOSTER HEATER CIRCUIT BREAKER F08 (FIELD SUPPLY) IS TURNED ON.	THE CORRECT PIPE SIZE IS INSTALLED AND THE PIPES ARE PROPERLY INSULATED.	THERE ARE NO WATER LEAKS INSIDE THE OUTDOOR UNIT.	THE SHUT OFF VALVES ARE PROPERLY INSTALLED AND FULLY OPEN.	FOR MODELS WITH INTEGRATED BACK UP HEATER: THE AUTOMATIC AIR PURGE VALVE (ON THE BACK UP HEATER) IS OPEN. FOR OTHER MODELS: THE MANUAL AIR PURGE VALVE IS CLOSED.	THE PRESSURE RELIEF VALVE PURGES WATER WHEN OPENED: CLEAN WATER MUST COME OUT.	THE MINIMUM WATER VOLUME IS GUARANTEED FULL CONDITIONS. SEE TO CHECK THE WATER VOLUME AND FLOW RATE IN 'S.I. PREPARING WATER PIPING'.	(IF APPLICABLE) THE DOMESTIC HOT WATER TANK IS FILLED COMPLETELY.
		EQUIPMENT	RELAYS/VS	RELAYS/VS	RELAYS/VS																																																																																																	
PRIMARY PIPING (mm)	MINIMUM 28																																																																																																					
FLOW RATE (l/min) CENTRAL HEATING	13.2	17.2	22.4																																																																																																			
MINIMUM WATER VOLUME (L/min)	SEE TABLE 3																																																																																																					
MAX CURRENT (A)	19.9	24																																																																																																				
FUSE (A)	20	25																																																																																																				
WIRING FOR DHW/SH (V/3W)	230V																																																																																																					
MAX CURRENT (A) DHW/SH	13.0A																																																																																																					
FUSE (A)	16																																																																																																					
MINIMUM CABLE (mm ²) FOR MIP	1.5																																																																																																					
MAXIMUM DISTANCE TO TANK (m)	10																																																																																																					
MAXIMUM LEVEL DIFFERENCE (m)	5																																																																																																					
HEIGHT (mm)	370																																																																																																					
WIDTH (mm)	1250																																																																																																					
DEPTH (mm)	360																																																																																																					
WEIGHT EMPTY (kg)	88																																																																																																					
WEIGHT FULL (kg)	98																																																																																																					
PPRG LENGTH (m)	MINIMUM INSULATION THICKNESS (mm)																																																																																																					
<20	19																																																																																																					
20-30	32																																																																																																					
30-40	40																																																																																																					
40-50	50																																																																																																					
YOU READ THE COMPLETE INSTALLATION INSTRUCTIONS AS DESCRIBED IN THE INSTALLER REFERENCE GUIDE.																																																																																																						
THE OUTDOOR UNIT IS PROPERLY MOUNTED.																																																																																																						
FIELD WIRING - BE SURE THAT THE FIELD WIRING HAS BEEN CARRIED OUT ACCORDING TO THE INSTRUCTIONS DESCRIBED IN THE CHAPTER'S ELECTRICAL INSTALLATION, ACCORDING TO THE WIRING DIAGRAMS AND ACCORDING TO THE APPLICABLE LEGISLATION.																																																																																																						
THE SYSTEM IS PROPERLY EARTHED AND EARTH TERMINALS ARE TIGHTENED.																																																																																																						
THE FUSES OR LOCALLY INSTALLED PROTECTION DEVICES ARE INSTALLED ACCORDING TO THIS DOCUMENT, AND HAVE NOT BEEN BYPASSED.																																																																																																						
THE POWER SUPPLY VOLTAGE MATCHES THE VOLTAGE ON THE IDENTIFICATION LABEL OF THE UNIT.																																																																																																						
THERE ARE NO DAMAGED COMPONENTS OR SCRIPPED PIPES ON THE INSIDE OF THE DOOR UNIT.																																																																																																						
ONLY FOR MODELS WITH INTEGRATED BACK UP HEATER (FIELD SUPPLY) OR IF THE EXTERNAL BACK UP HEATER KIT (F-B: FACTORY MOUNTED IN THE BACK UP HEATER KIT) IS INSTALLED BACK UP HEATER CIRCUIT BREAKER F18 IS TURNED ON.																																																																																																						
ONLY FOR TANKS WITH BUILT-IN BOOSTER HEATER: BOOSTER HEATER CIRCUIT BREAKER F08 (FIELD SUPPLY) IS TURNED ON.																																																																																																						
THE CORRECT PIPE SIZE IS INSTALLED AND THE PIPES ARE PROPERLY INSULATED.																																																																																																						
THERE ARE NO WATER LEAKS INSIDE THE OUTDOOR UNIT.																																																																																																						
THE SHUT OFF VALVES ARE PROPERLY INSTALLED AND FULLY OPEN.																																																																																																						
FOR MODELS WITH INTEGRATED BACK UP HEATER: THE AUTOMATIC AIR PURGE VALVE (ON THE BACK UP HEATER) IS OPEN. FOR OTHER MODELS: THE MANUAL AIR PURGE VALVE IS CLOSED.																																																																																																						
THE PRESSURE RELIEF VALVE PURGES WATER WHEN OPENED: CLEAN WATER MUST COME OUT.																																																																																																						
THE MINIMUM WATER VOLUME IS GUARANTEED FULL CONDITIONS. SEE TO CHECK THE WATER VOLUME AND FLOW RATE IN 'S.I. PREPARING WATER PIPING'.																																																																																																						
(IF APPLICABLE) THE DOMESTIC HOT WATER TANK IS FILLED COMPLETELY.																																																																																																						
		<table border="1" style="width:100%; border-collapse: collapse;"> <caption>TABLE 3 - MINIMUM WATER VOLUME</caption> <thead> <tr> <th>F</th> <th>THEN THE MINIMUM WATER VOLUME IS:</th> </tr> </thead> <tbody> <tr> <td>HEATING/OFFSET OPERATION AND... PREHEATING ON THE TANK IS POSSIBLE</td> <td>0lts</td> </tr> <tr> <td>PREHEATING ON THE TANK IS NOT POSSIBLE, BUT A BACK UP HEATER (INTERNAL OR EXTERNAL) IS PRESENT</td> <td>10lts</td> </tr> <tr> <td>PREHEATING THIS TANK IS NOT POSSIBLE, THERE IS NO BACK UP HEATER, AND... THE RETURN FLOW TEMPERATURE IS >10°C</td> <td>20lts</td> </tr> <tr> <td>THE RETURN FLOW TEMPERATURE IS >15°C</td> <td>30lts</td> </tr> </tbody> </table>	F	THEN THE MINIMUM WATER VOLUME IS:	HEATING/OFFSET OPERATION AND... PREHEATING ON THE TANK IS POSSIBLE	0lts	PREHEATING ON THE TANK IS NOT POSSIBLE, BUT A BACK UP HEATER (INTERNAL OR EXTERNAL) IS PRESENT	10lts	PREHEATING THIS TANK IS NOT POSSIBLE, THERE IS NO BACK UP HEATER, AND... THE RETURN FLOW TEMPERATURE IS >10°C	20lts	THE RETURN FLOW TEMPERATURE IS >15°C	30lts	<p>OVERVIEW OF PRE-PLUMBED CYLINDER WIRING CONNECTIONS</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>CABLE SECTION 2.5sqft</td> <td>MINIMUM CABLE SECTION 0.75mm², MAXIMUM LENGTH 20M</td> </tr> <tr> <td>CABLE SECTION 0.75mm² TO 1.25mm², MAXIMUM LENGTH 500M APPLICABLE FOR BOTH SINGLE USBR INTERFACE AND DUAL USE INTERFACE CONNECTION</td> <td></td> </tr> <tr> <td>CABLE SECTION 0.75mm² TO 1.25mm², MAXIMUM LENGTH 50M VOLTAGE FREE CONTACT SHALL ENSURE THE MINIMUM APPLICABLE LOAD OF 15 V DC, 10MA</td> <td></td> </tr> <tr> <td>MINIMUM CABLE SECTION 0.75mm², MAXIMUM LENGTH 10M</td> <td>THE THERMISTOR AND CONNECTION WIRE 12W ARE PRE-INSTALLED ON THE DOMESTIC HOT WATER TANK</td> </tr> </table>			CABLE SECTION 2.5sqft	MINIMUM CABLE SECTION 0.75mm ² , MAXIMUM LENGTH 20M	CABLE SECTION 0.75mm ² TO 1.25mm ² , MAXIMUM LENGTH 500M APPLICABLE FOR BOTH SINGLE USBR INTERFACE AND DUAL USE INTERFACE CONNECTION		CABLE SECTION 0.75mm ² TO 1.25mm ² , MAXIMUM LENGTH 50M VOLTAGE FREE CONTACT SHALL ENSURE THE MINIMUM APPLICABLE LOAD OF 15 V DC, 10MA		MINIMUM CABLE SECTION 0.75mm ² , MAXIMUM LENGTH 10M	THE THERMISTOR AND CONNECTION WIRE 12W ARE PRE-INSTALLED ON THE DOMESTIC HOT WATER TANK	<p>CHECKLIST DURING COMMISSIONING</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>THE MINIMUM FLOW RATE IS GUARANTEED IN ALL CONDITIONS. SEE TO CHECK THE WATER VOLUME AND FLOW RATE IN 'S.I. PREPARING WATER PIPING'.</td></tr> <tr><td>TO PERFORM AN AIR PURGE</td></tr> <tr><td>TO PERFORM A TEST RUN</td></tr> <tr><td>TO PERFORM AN ACTUATOR TEST RUN</td></tr> <tr><td>UNDER FLOOR SCORPED DRY OUT FUNCTION: THE UNDER FLOOR SCORPED DRY OUT FUNCTION IS STARTED IF NECESSARY.</td></tr> </table>		THE MINIMUM FLOW RATE IS GUARANTEED IN ALL CONDITIONS. SEE TO CHECK THE WATER VOLUME AND FLOW RATE IN 'S.I. PREPARING WATER PIPING'.	TO PERFORM AN AIR PURGE	TO PERFORM A TEST RUN	TO PERFORM AN ACTUATOR TEST RUN	UNDER FLOOR SCORPED DRY OUT FUNCTION: THE UNDER FLOOR SCORPED DRY OUT FUNCTION IS STARTED IF NECESSARY.																																																																								
F	THEN THE MINIMUM WATER VOLUME IS:																																																																																																					
HEATING/OFFSET OPERATION AND... PREHEATING ON THE TANK IS POSSIBLE	0lts																																																																																																					
PREHEATING ON THE TANK IS NOT POSSIBLE, BUT A BACK UP HEATER (INTERNAL OR EXTERNAL) IS PRESENT	10lts																																																																																																					
PREHEATING THIS TANK IS NOT POSSIBLE, THERE IS NO BACK UP HEATER, AND... THE RETURN FLOW TEMPERATURE IS >10°C	20lts																																																																																																					
THE RETURN FLOW TEMPERATURE IS >15°C	30lts																																																																																																					
CABLE SECTION 2.5sqft	MINIMUM CABLE SECTION 0.75mm ² , MAXIMUM LENGTH 20M																																																																																																					
CABLE SECTION 0.75mm ² TO 1.25mm ² , MAXIMUM LENGTH 500M APPLICABLE FOR BOTH SINGLE USBR INTERFACE AND DUAL USE INTERFACE CONNECTION																																																																																																						
CABLE SECTION 0.75mm ² TO 1.25mm ² , MAXIMUM LENGTH 50M VOLTAGE FREE CONTACT SHALL ENSURE THE MINIMUM APPLICABLE LOAD OF 15 V DC, 10MA																																																																																																						
MINIMUM CABLE SECTION 0.75mm ² , MAXIMUM LENGTH 10M	THE THERMISTOR AND CONNECTION WIRE 12W ARE PRE-INSTALLED ON THE DOMESTIC HOT WATER TANK																																																																																																					
THE MINIMUM FLOW RATE IS GUARANTEED IN ALL CONDITIONS. SEE TO CHECK THE WATER VOLUME AND FLOW RATE IN 'S.I. PREPARING WATER PIPING'.																																																																																																						
TO PERFORM AN AIR PURGE																																																																																																						
TO PERFORM A TEST RUN																																																																																																						
TO PERFORM AN ACTUATOR TEST RUN																																																																																																						
UNDER FLOOR SCORPED DRY OUT FUNCTION: THE UNDER FLOOR SCORPED DRY OUT FUNCTION IS STARTED IF NECESSARY.																																																																																																						
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td></td> <td>DAIKIN ALTHERMA LOW TEMPERATURE MONOBLOC</td> <td></td> <td>3 WAY VALVE EXPLAINED</td> </tr> <tr> <td></td> <td>UNBOXING SMALL MONOBLOC</td> <td></td> <td>SMALL MONOBLOC PRODUCT VIDEO</td> </tr> <tr> <td></td> <td>MM USER GUIDE</td> <td></td> <td></td> </tr> </table>		DAIKIN ALTHERMA LOW TEMPERATURE MONOBLOC		3 WAY VALVE EXPLAINED		UNBOXING SMALL MONOBLOC		SMALL MONOBLOC PRODUCT VIDEO		MM USER GUIDE																																																																																										
	DAIKIN ALTHERMA LOW TEMPERATURE MONOBLOC		3 WAY VALVE EXPLAINED																																																																																																			
	UNBOXING SMALL MONOBLOC		SMALL MONOBLOC PRODUCT VIDEO																																																																																																			
	MM USER GUIDE																																																																																																					
		<p>NOTES</p> <ul style="list-style-type: none"> • AFTER REMOVING THE AIR, AUTOMATIC AIR VENT(S) MUST BE OPEN. • IF GLYCOL IS BEING ADDED TO THE SYSTEM THEN ANTI-FREEZE VALVES MUST NOT BE INSTALLED HOWEVER, ADDITIONAL FLOW SWITCH (EKFLSW2) MUST BE PURCHASE AND INSTALLED IN THE UNIT. • ISOLATION VALVES AND FLUSHING BYPASS CIRCUIT ARE RECOMMENDED FOR THE OUTDOOR UNIT. FLOW ISOLATION VALVE REQUIRED ON OUTDOOR UNIT (SUPPLIED BY OTHERS), DO NOT PRESSURE TEST OR FLUSH THROUGH THE DAIKIN UK EQUIPMENT. • ALL ELECTRICAL WORKS MUST BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT VERSION OF BS7571 AND ANY LOCAL LEGISLATIONS. • EARTH LEAKAGE DETECTION DEVICE IS REQUIRED, THIS MUST BE INVERTER TOLERANT AND RATED AT 30MA. • FOR ADDITIONAL INFORMATION PLEASE REFER TO THE INSTALLER REFERENCE GUIDE (IRG DOWNLOADABLE FROM DAIKIN UK MY.DAIKIN.CO.UK) 	<p>1. THE COPYRIGHT OF THIS DRAWING IS VESTED IN DAIKIN UK AND IT MAY NOT BE REPRODUCED IN WHOLE OR PART OR USED FOR THE MANUFACTURE OF ANY ARTICLES WITHOUT THE EXPRESS PERMISSION OF THE COPYRIGHT HOLDERS.</p> <p>2. WORK TO FIGURED DIMENSIONS ONLY.</p> <p>3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS', SERVICE ENGINEERS AND DAIKIN UK DRAWINGS AND SPECIFICATIONS.</p>			<p>Drawing: Small MonoBloc EDLA 04-08 (1 PHASE)</p> <p>PRE PLUMBED CYLINDER, DOMESTIC HOT WATER & RADIATORS</p>		<p>Drawing Status: PRELIMINARY</p> <p>Telephone: 01932 879 070 (Option 1) Email: heating@daikin.co.uk</p>																																																																																														
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>No.</th> <th>Description</th> <th>Prepared</th> <th>Checked</th> <th>Date</th> </tr> <tr> <td>P4</td> <td>MM WIRING UPDATED</td> <td>MM</td> <td>MM</td> <td>10.12.24</td> </tr> <tr> <td>P3</td> <td>PHASE 2 UPDATES</td> <td>MM</td> <td>MM</td> <td>28.09.24</td> </tr> <tr> <td>P2</td> <td>FLOW SWITCH REFERENCE UPDATE</td> <td>MM</td> <td>MM</td> <td>07.08.24</td> </tr> <tr> <td>P1</td> <td>PRELIMINARY ISSUE</td> <td>MM</td> <td>MM</td> <td>20.02.23</td> </tr> </table>		No.	Description	Prepared	Checked	Date	P4	MM WIRING UPDATED	MM	MM	10.12.24	P3	PHASE 2 UPDATES	MM	MM	28.09.24	P2	FLOW SWITCH REFERENCE UPDATE	MM	MM	07.08.24	P1	PRELIMINARY ISSUE	MM	MM	20.02.23	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>No.</th> <th>Description</th> <th>Prepared</th> <th>Checked</th> <th>Date</th> </tr> <tr> <td>P4</td> <td>MM WIRING UPDATED</td> <td>MM</td> <td>MM</td> <td>10.12.24</td> </tr> <tr> <td>P3</td> <td>PHASE 2 UPDATES</td> <td>MM</td> <td>MM</td> <td>28.09.24</td> </tr> <tr> <td>P2</td> <td>FLOW SWITCH REFERENCE UPDATE</td> <td>MM</td> <td>MM</td> <td>07.08.24</td> </tr> <tr> <td>P1</td> <td>PRELIMINARY ISSUE</td> <td>MM</td> <td>MM</td> <td>20.02.23</td> </tr> </table>			No.	Description	Prepared	Checked	Date	P4	MM WIRING UPDATED	MM	MM	10.12.24	P3	PHASE 2 UPDATES	MM	MM	28.09.24	P2	FLOW SWITCH REFERENCE UPDATE	MM	MM	07.08.24	P1	PRELIMINARY ISSUE	MM	MM	20.02.23	<p>DAIKIN altherma</p>																																															
No.	Description	Prepared	Checked	Date																																																																																																		
P4	MM WIRING UPDATED	MM	MM	10.12.24																																																																																																		
P3	PHASE 2 UPDATES	MM	MM	28.09.24																																																																																																		
P2	FLOW SWITCH REFERENCE UPDATE	MM	MM	07.08.24																																																																																																		
P1	PRELIMINARY ISSUE	MM	MM	20.02.23																																																																																																		
No.	Description	Prepared	Checked	Date																																																																																																		
P4	MM WIRING UPDATED	MM	MM	10.12.24																																																																																																		
P3	PHASE 2 UPDATES	MM	MM	28.09.24																																																																																																		
P2	FLOW SWITCH REFERENCE UPDATE	MM	MM	07.08.24																																																																																																		
P1	PRELIMINARY ISSUE	MM	MM	20.02.23																																																																																																		



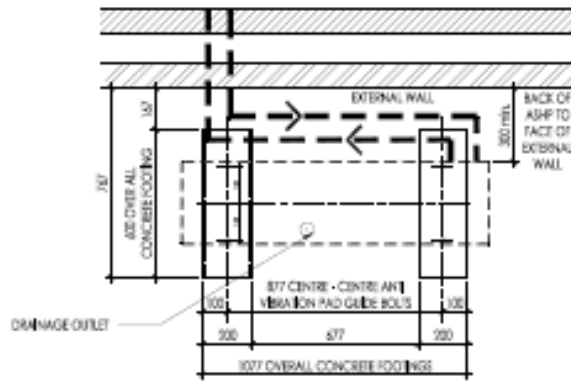
Leason's Learned - Technical



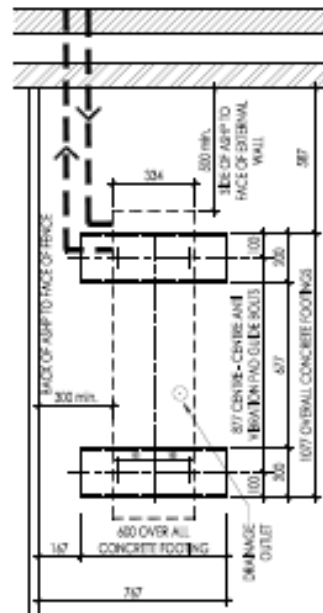
CONCRETE FOOTINGS
SECTION A-A - 1:20



CONCRETE FOOTINGS
SECTION B-B - 1:20



CONCRETE FOOTINGS LAYOUT
(SET OFF REAR WALL) - 1:20



CONCRETE FOOTINGS LAYOUT
(SIDE ON TO REAR WALL) - 1:20

Leason's Learned - Training

Nationwide Training Centers



Search courses



MY ACCOUNT
OPEN AN ACCOUNT | Login

Course by Category ▾

Course by Accreditation ▾

Training Centres

Equipment Sales ▾

About Your Training ▾

Contact Us



One Stop Training Solution



Over 60 Centres Nationwide



Online Offers & Discounts

F-Gas & ODS Regulations - (Category I) Handling Fluorinated Gases and ODS - City & Guilds (2079-II)

This course is a requirement for those carrying out installation, maintenance or servicing of stationary equipment containing F-Gas Refrigerants.



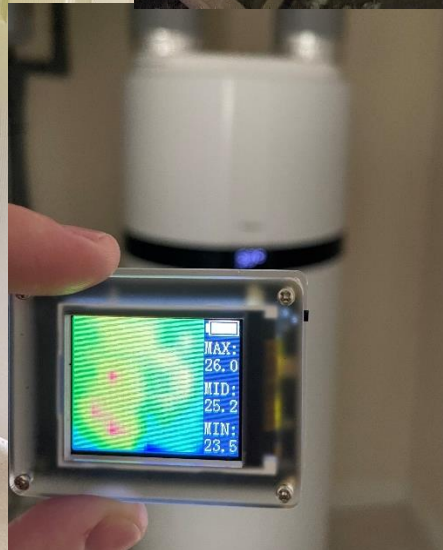
SCAN ME TO BOOK

Leason's Learned - Onsite

- ✓ Train the detail
- ✓ Give the detail
- ✓ Give more detail
- ✓ Check the detail



Leason's Learned – Re-evaluate



- Going well
- How can we improve
- Implement changes



Leason's Learned – Supply Chain

- Heat pump supply 240'000 sqft
- Cylinder supply – 70-80% combi
- Training, merchant & industry
- Customer Care – Aftersales, 650



Leason's Learned - Summary

DAIKIN

Bellway



- ✓ Solid Design
- ✓ Technical Design
- ✓ Training – Ind Wide
- ✓ Site Support
- ✓ Supply & Aftercare
- ✓ Consistency



DAIKIN



Future Homes Standard Essentials

Sponsored by **e-on next**



Feeling the heat: part 1

Nathan Lord
Technical Sales Manager

East Goscote Plumbers Ltd

Future Homes Standard

An Installer's Perspective

Air Source Heat Pump Installation in New Build Properties
Challenges, Learnings & Best Practice

How We Deliver Competency on Every Installation

- We ensure Baxi manufacturer's training is completed before engineers undertake any installation or commissioning work.
- Ongoing technical updates and refresher training
- Experienced supervisors supporting installation teams
- Quality assurance inspections during installation and commissioning
- Standardised installation and commissioning procedures
- Continuous professional development
- Key Learning: Competency remains one of the biggest contributors to performance, reliability and customer satisfaction.



Designing for Installers, Commissioners & Homeowners What we do:

- Separate upstairs and downstairs heating zones – Traditional S Plan
- Familiar programmable room thermostats – Esi, EPH
- Simple and serviceable controls.
- 28mm primary pipe routes considered during design and first fix. Meaning we avoid the need for unsightly trunking outside.
- In-house homeowner guidance videos to provide clear operating instructions around filling loop operation, disinfection cycle and flow temperature/weather compensation set up.
- Key Learning: Design should focus on simplicity, serviceability and homeowner understanding, not just compliance.

Design & Site Considerations

- Adequate cylinder and plant space is critical and access for future servicing must be considered
- Pipework routes should be planned early
- Slab dimensions and positioning agreed before installation including drainage requirements.
- Addition of rebar into slab to allow HP to be locked down to slab to prevent theft.
- GPS Trackers installed into units to prevent theft.
- R290 positioning and clearance requirements – challenges around drainage moving away from R32
- Security during construction



Manufacturer Support Matters

Quality of technical support is paramount

- Availability of commissioning assistance – Technical Helpdesks
- Speed of issue resolution - reduce lead time for repairs
- Installer training provision
- Long-term product support
- Simple homeowner literature
- Easy-to-follow homeowner videos
- Installation videos for engineers
- Commissioning support
- Fault-finding guidance
- Key Learning: The best outcomes are achieved when manufacturers support both installers and homeowners.

Key Takeaways and Looking Forward

- Keep It Simple for Installers and Homeowners
- Choose The Right Partners – Manufacturer's
- Workforce Competency Matters
- Think Ahead: Plant Space, Drainage, R290, slab installation, site security and GPS tracking
- Part O and the implementation of AAHP for heating and cooling – effects on the industry.
- The success of a heat pump installation depends on good design, competent installation, strong manufacturer support and a homeowner who understands the system.



Future Homes Standard Technical Conference

NETWORKING BREAK



Be sure to share your experience on LinkedIn using #FHSready



Future Homes Standard Technical Conference



Fabric first and reactions to SAP 10.3



Ross Holleron
Head of Homes and
Construction
Future Homes Hub



Paul Bainbridge
Technical Director
The FES Group



Matt Crawford
Head of Design and
Technical Standards
Onward Homes



Jason Hewins
New Build Dwellings
Manager
Elmhurst Energy



Danielle Michalska-Morris
Director of Research and
Technical Innovation
Taylor Wimpey



Future Homes Standard Essentials

Sponsored by **e-on next**



Fabric first and reactions to SAP 10.3

JASON HEWINS
New Build Dwellings Manager
Elmhurst Energy

SAP 10.3 and Fabric

Elmhurst Energy



elmhurst
energy

EXCELLENCE
IN ENERGY
ASSESSMENT

SAP 10.3 & HEM

- On 10th February 2026 MHCLG confirmed Future Homes Standard would be with only SAP 10.3 to be used to demonstrate compliance.
- SAP 10.3 is a modified version of the current SAP 10.2 methodology;
 - Uses FHS notional dwelling to set FHS compliance standards
 - Uses updated primary energy and carbon factors
- Intention to provide a smoother transition to the Future Homes Standard whilst the industry adjusts to the Home Energy Model.
- The intent is still for Home Energy Model to replace SAP via a transition.

SAP to HEM Transition

- The FHS consultation responses confirmed the following transition;
 - At least 3 months after the FHS is released (24th March 2026) that HEM will be ready and become an approved methodology for the FHS.
 - Then at least a two year dual running period will begin where SAP and HEM can be used for the FHS.
 - Towards the end of the dual running period MHCLG will give a six month notice that HEM will be taking over from SAP.
 - At the end of the six month period any uncommenced site/plots must be assessed on HEM.

- The notional dwelling contained the following changes for fabric;

	Part L 2021	Part L 2026 (FHS)
Floor (w/m ² k)	0.13	
Wall (w/m ² k)	0.18	
Roof (w/m ² k)	0.11	
Door (w/m ² k)	1	
Window (w/m ² k)	u-1.2, g-0.63	u-1.2, g-same as actual
Airtightness	5 m ³ /m ² /hr @ 50 Pa	4 m ³ /m ² /hr @ 50 Pa
Ventilation	Natural with intermittent fans	Continuous dMEV, 0.15 w/l/s

Opening U-values

- Part L 2021 allows the U-value of a window or door to be determined using standard sizes and configurations.
- In FHS u-value of windows and doors in new homes should be calculated using either;
 - the actual size and configuration of the window or door BS EN ISO 10077-1/10077-2, or
 - measured using the hot box method in BS EN ISO 12567-1/12567-2
- No longer possible to use standard sizes or configurations; every unit configuration will need an individual u-value to be entered.



Future Homes Standard Essentials

Sponsored by **e-on next**



Fabric first and reactions to SAP 10.3

Paul Bainbridge
Technical Director

The FES Group

Paul Bainbridge
Technical Director
The FES Group

The Notional Building

The notional building (reference specification) is detailed in appendix R of the BRE's SAP10.3 Specification document and lists the reference values to be used within the SAP10.3 calculation methodology.

External Walls = 0.18w/m²K

Party Walls = 0.00w/m²K

Floors = 0.13w/m²K

Roofs = 0.11w/m²K

Windows = 1.20W/m²K (g-value and frame factor of actual dwelling)

Doors = 1.00W/m²K

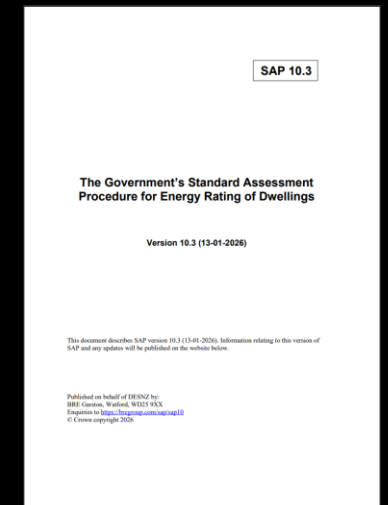
Rooflights = 1.70W/m²K (g-value and frame factor of actual dwelling)

Air Pressure test = 4.00

Ventilation = dMEV decentralised mechanical extract ventilation

Space Heating = ASHP, SCOP 2.5

Renewable Energy = PV @ 40% GFA, 0.22kWp per m² at SE/SW, 45 degrees.



Three Stages to Compliance

Fabric Performance – (DFEE/TFEE)

- **Wall's, Floors, Roof's, Windows, Doors, Air pressure & thermal bridging.**

Energy & Emissions – (DER/TER & DPER/TPER)

- **ASHP, Cylinder, heating controls, WWHR, Smart Hot Water, PV Diverter.**

Renewable Energy – (40% GFA @0.22kWp per 1m2, SE/SW at 45 degrees)

- **Max fit PV, functional requirement Yes or NO.**

Potential Bottlenecks in SAP10.3

SAP Assessors will require some additional information to enable SAP10.3 and Part L 2026 calculations and specifications to be assessed and confirmed.

- **Space Heating & Hot Water Heating, including the make, model & size of the proposed heat source.**
- **Window Specific u-value calculations for each size and casement variation.**
- **PV or max fit designs for all various roof configurations.**

Thank you.

Paul Bainbridge

paul.bainbridge@thefesgroup.com



Future Homes Standard Essentials

Sponsored by **e-on next**



Fabric first and reactions to SAP 10.3

Matt Crawford

Head of Design and Technical Standards

Onward Homes

Onward

Fabric and SAP10.3

Matt Crawford
Head of Design and Technical Standards

Who are Onward Homes

Onward are a Housing Association in Northwest

We own and manage over 36000 homes

We are just completed the 21 – 26 Affordable Homes Programme (AHP)

Submitted a bid to Homes England the new Social and Affordable Homes Programme (SAHP)

For context we will be increasing our delivery to an average of 650 homes a year.



Onward developments

As part of our SAHP bid we have commitments to Homes England on certain deliverables:

- EPC A and B rating
- Percentage of programme delivered in MMC
- Percentage of programme delivered to NDSS

MMC is the preferred delivery of the external fabric.

Dispensation to this will be on our apartment schemes where pre-manufactured value (PMV) will be calculated and reported.



Delivery challenges

- Contractor experience differs
- Standardisation of junction details
- Array of technologies and risks associated i.e., potential approval and mortgage risk
- A continual learning curve / change of mindset
- Investment in my contractors – time / education / house types / collaboration
- Scheme viability and balance between improving our existing portfolio



On site quality

How can I bring our contractors on the journey?

- Facilitating sessions on legislative changes such as BNG and FHBS
- Contractors' QA processes
- Clerk of works undertaking onsite inspections, quality assurance and photo records

This is an industry challenge

Raising the profile of the industry but more importantly improving customer satisfaction and experience of living in an Onward home

Collaborate!





Future Homes Standard Technical Conference



Fabric first and reactions to SAP 10.3



Ross Holleron
Head of Homes and
Construction
Future Homes Hub



Paul Bainbridge
Technical Director
The FES Group



Matt Crawford
Head of Design and
Technical Standards
Onward Homes



Jason Hewins
New Build Dwellings
Manager
Elmhurst Energy



Danielle Michalska-Morris
Director of Research and
Technical Innovation
Taylor Wimpey



Future Homes Standard Technical Conference



Powering up



Dan Neasham
Head of Sustainability
and Performance
Future Homes Hub



Nigel Banks
Technical Director -
Zero Bills & Low
Carbon Homes
Octopus Energy



Jack Brayshaw
Director of Research
and Innovation
Vistry



Neil Fitzsimons
Managing Director
Power On



Nicola Kennedy
Head of Microgrids
E.ON Next



The Future Homes Standard Essentials

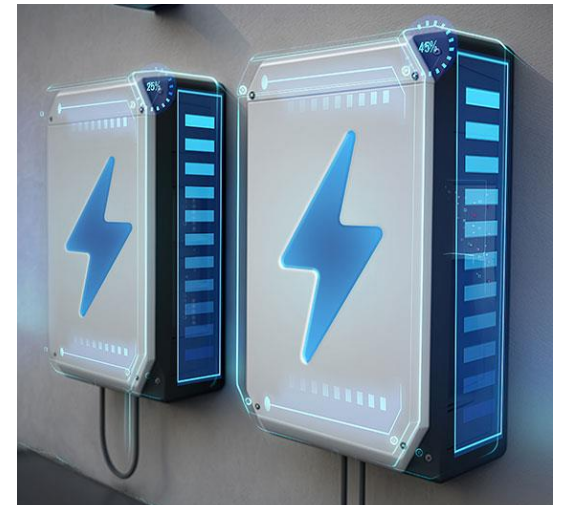
Seven actions to de-risk delivery today



<https://futurehomes.org.uk/future-homes-standard-ready>

Google: [get future homes standard ready](#)

New homes bring new electrical demands



Viability:

Where possible **sites should be assessed**, and **network operator queried before site acquisition**

Programme:

Allow time for assessment, **operator engagement**, design and **possible reinforcement**

Design:

Competent load assessment and design, done early, is **essential to ensure right sized connections**

Commercial:

Consider larger / more substations, **larger POCs**, **down stream network enhancement** and mitigation

Customer:

Customers will **expect to see benefits** so curtailing export (and import) **should be minimised**

A change in approach is needed

Estimate capacity and engage with the network operator early



Choose your delivery model up-front and build your team



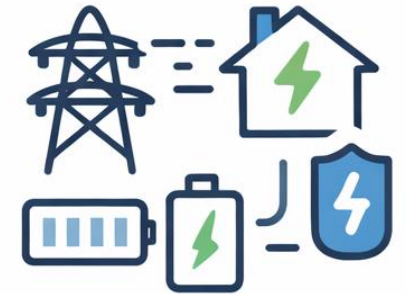
Avoid over or under-assessing the electrical demand

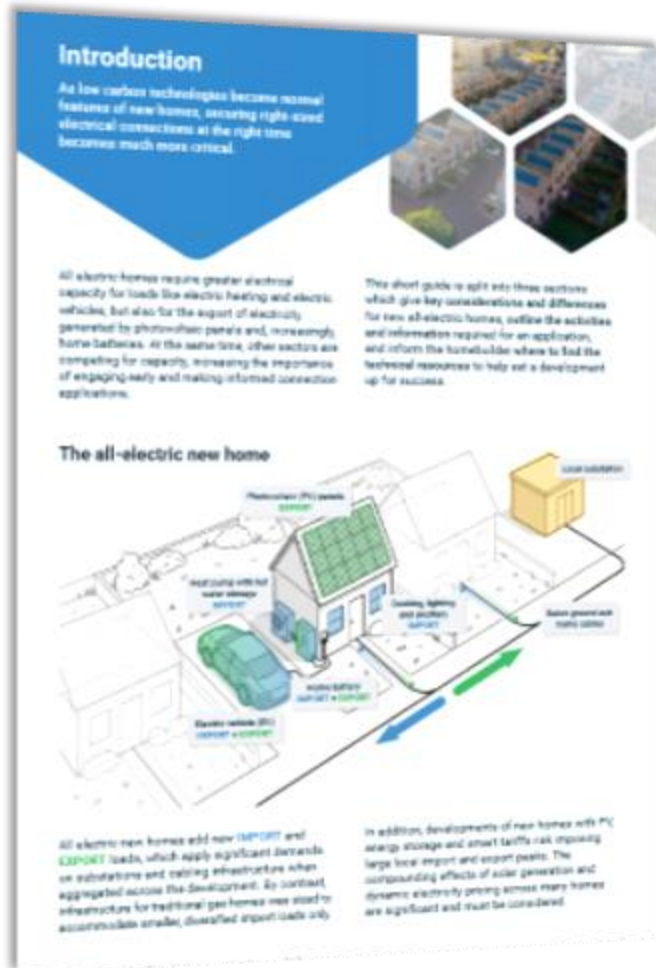


Develop the electrical design with network operator input



Remember: Mitigations to connection constraints exist





- Network operators are very happy to discuss propositions at no cost
- Make sure a competent client agent is engaged early in the process
- Hub guidance is available, with more on the way:

<https://knowledge.futurehomes.org.uk/resource/grid-connections/>



Facilitating resolution of FHS issues - Hub process

Updated: 01-Jun

WORKING DOCUMENT

In Blue - Items added/updated since last issue

Appendix A - FHS ISSUES LOG

Issue ID	Issue Title, Description & Comments	Subject	Grouping	Importance	Urgency	Rating (xU)	Status	Current Action by	Team to action	Suggested Actions	Relevant Doc	Section
4	<p>Guidance for consistency of interpretation of PV 'Max-fit' requirements</p> <p>Related items: #10, #11, #12, #13, #15, #16</p> <p>"5.73(b) An annual output (in kWh) for the building as calculated using the approved methodology at least equal to that of a photovoltaic array covering the reasonably practicable roof area with a panel efficiency of 0.22 kWp/m²"</p>	PV	PV2 - 'Max-fit'	0.9	1	1	1	FHH	PV D&CPG	Future Homes Hub to set up 'PV design and compliance process' group	Part L	Para 5.73(b) & Appendix B
2	<p>Guidance on roof vent acceptable and unacceptable locations</p> <ul style="list-style-type: none"> - length of ductwork may increase if relocate to make way for PV panels. What implications does this have for ventilation system design? - potentially could be quite a few vents, especially if using purge vents for Part O compliance and/or internal downpipes - what 'rules' should be applied around location of vents, especially in 'Max-fit' scenario? 	PV	PV2 - 'Max-fit'	1.0	1	1	1	FHH	PV D&CPG	Future Homes Hub to set up 'PV design and compliance process' group	Part L	
1	<p>Definition of 'electricity is available to residents' in the context of PV on flats</p> <p>What configuration of PV system on a block of flats would meet the requirements? What is the intended definition of 'used for the benefit of the residents' within Para 5.75?</p> <p>"5.75 The system for renewable electricity generation should be designed so that generated electricity is available to residents of the dwellings. In buildings containing dwellings, this could be to individual dwellings and communal spaces where the electricity can be used for the benefit of the residents of the dwellings"</p>	PV	PV5 - For apartments	1.0	1	1	1	FHH	PV D&CPG	<ul style="list-style-type: none"> - FHH to develop/collate list of contender examples - Homebuilders to provide supporting evidence - Future Homes Hub to set up FHS Apartments' Group at which this can be discussed 	Part L	Para 5.75
1	<p>Definition of the "curtilage of the building" in the context of Requirement L3</p> <p>What is the definition of "curtilage of the building"? This is not a defined term in Part L. Requirement L3: "... within the boundaries of the curtilage of the building".</p>	PV	PV6 - General	1.0	1	1	1	MHCLG	MHCLG	Clarification sought from MHCLG	Part L	Requirement L3 & Para 5.70 & 5.71
1	<p>Required PV calculation in the context of a detached garage roof</p> <ul style="list-style-type: none"> - confirmation detached garage is excluded in area for 40% requirement (as current SAP10 conventions)? - would detached garage be part of the area required to have PV as part of 'Max-fit'? 	PV	PV6 - General	1.0	1	1	1	MHCLG	MHCLG	Clarification sought from MHCLG	Part L	



Future Homes Standard Essentials

Sponsored by **e-on next**



Powering up

Jack Brayshaw

Director of Research and Innovation

Vistry

FHS Technical Conference

Powering Up

Jack Brayshaw, Director of Research and Innovation

Vistry

**Bovis Homes**
Est. 1885

Linden
Homes

**COUNTRYSIDE**
Homes

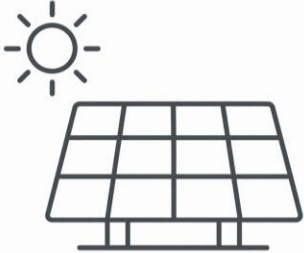
Countryside
Partnerships

Understanding the Challenges

Import



Export



Import Challenges – Key Lessons



1. Air Source Heat Pumps (ASHPs)
2. Electrical Network Requirements
3. Removal of Gas Infrastructure

Import Challenges - Scenarios

Site Size	Previous Gas Demand	FHS Demand	Reinforcement	Number of Secondary Substations	Primary Substations
70 Plots	105KVA	245KVA	Possible	1	No
150 plots	225 KVA	525KVA	Likely	1 or 2	No
250 Plots	375KVA	875KVA	Likely	2	Possible
680 Plots	1020KVA	2380KVA	Likely	4 or 5	Likely

Export Challenges – Key Lessons



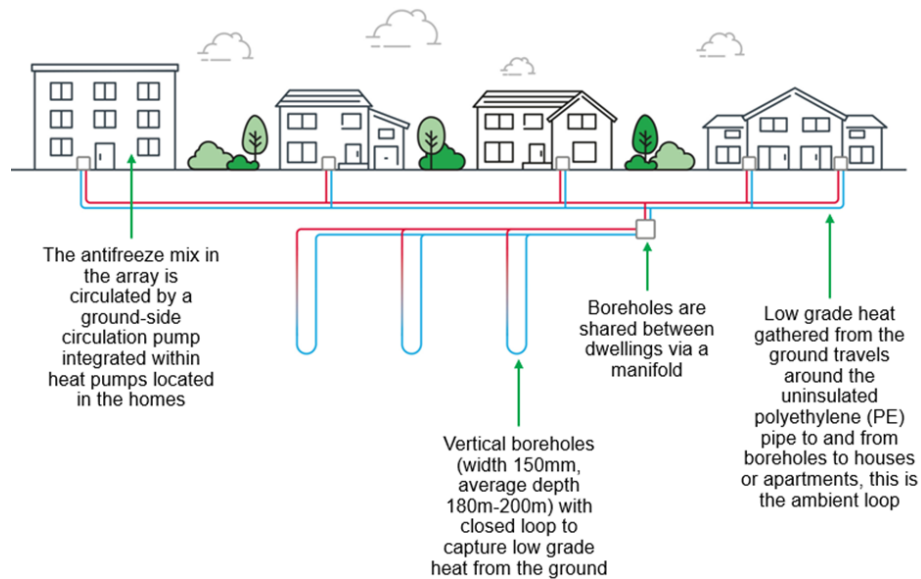
1. Growing export capability at plot level
2. Concentrated export patterns
3. Shift in network design requirements
4. Implications for infrastructure design

Import / Export Challenges – Mitigation

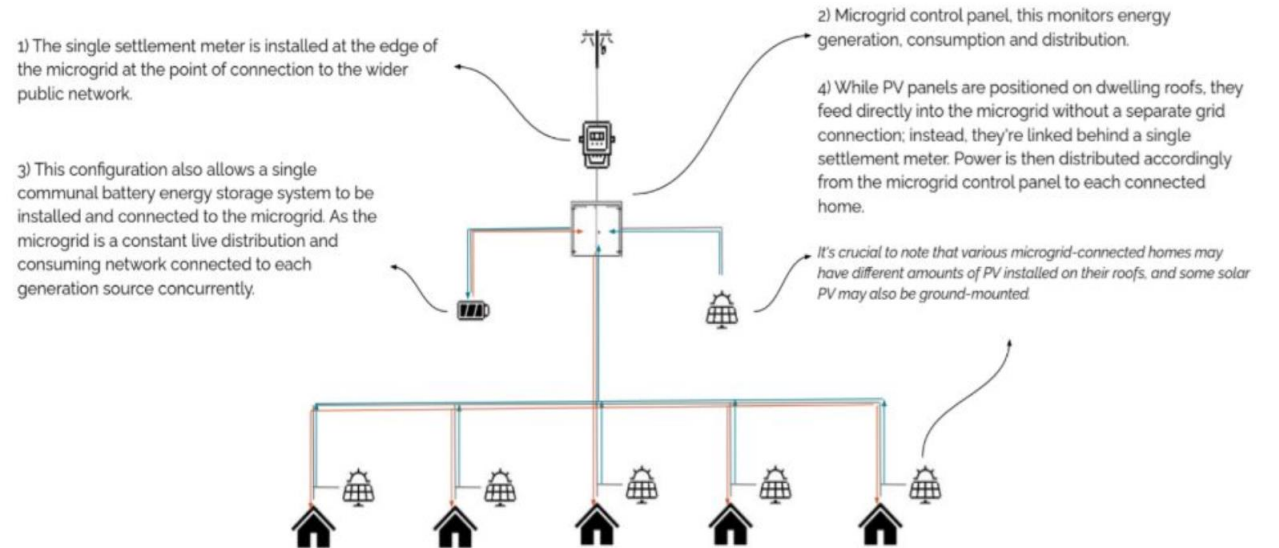
- 1. Provide ASHP technical data early** - Avoid conservative load assumptions that can lead to late-stage increases in demand and unplanned network reinforcement.
- 2. Provide Solar PV details upfront** - Early clarity on PV specifications helps ensure it is factored into capacity assessments and reduces risk of delays or network constraints.
- 3. Engage early on substation positioning** - Optimising locations at the outset can reduce the need for additional substations and improve overall network efficiency.

Piloting Potential

Networked Ground Source Heat Pumps



Smartgrids



Thank you

Vistry

Bovis Homes
Est. 1885

Linden
Homes


COUNTRYSIDE
Homes

Countryside
Partnerships



Future Homes Standard Essentials

Sponsored by **e-on next**



Powering up

Nigel Banks

Technical Director - Zero Bills & Low Carbon Homes

Octopus Energy

Getting connections right: *The electricity supplier's perspective*

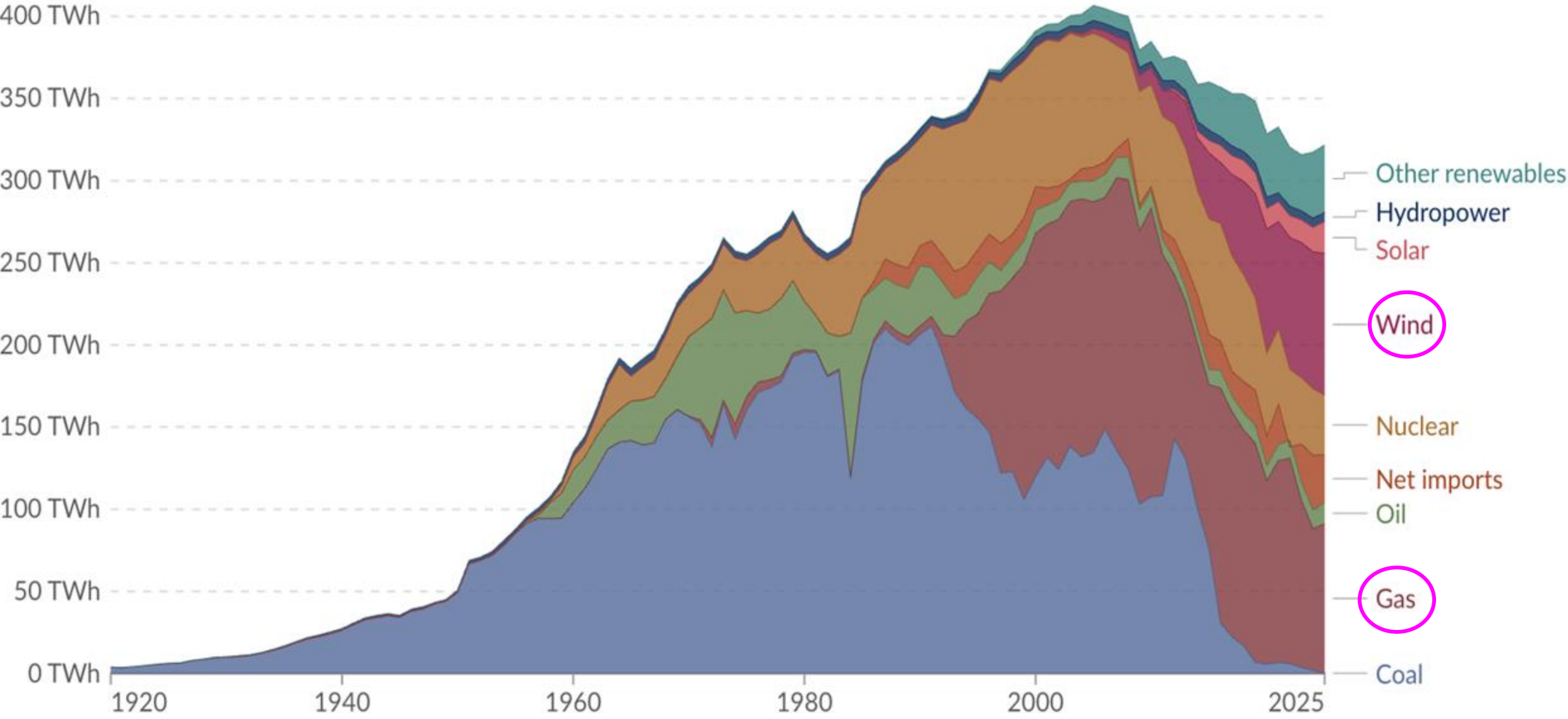
Nigel Banks

Technical Director, Octopus Energy

octopusenergy

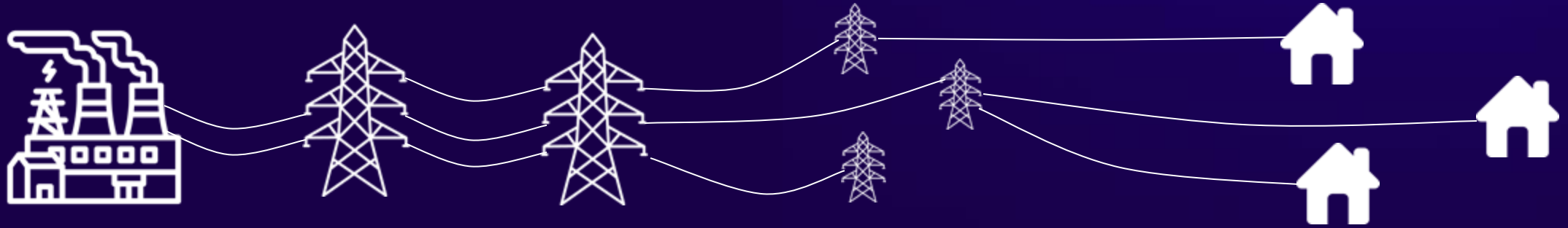


The electricity grid has transformed... and still is changing



The energy landscape is shifting – from static to decentralised

Before

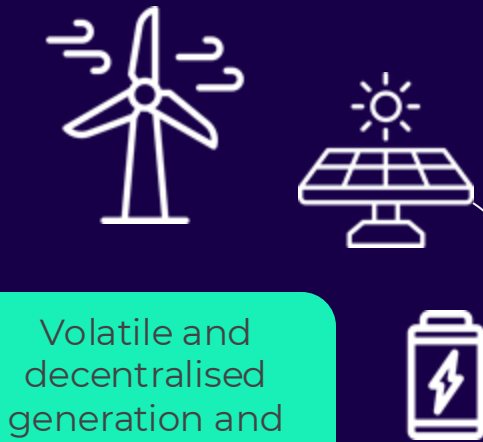


Dispatchable fossil fuel generation

Linear transmission and distribution

Static consumption by the end consumer

Now



Volatile and decentralised generation and storage

Optimised system operations & network energy flows



Unlock flexible, dispatchable home demand

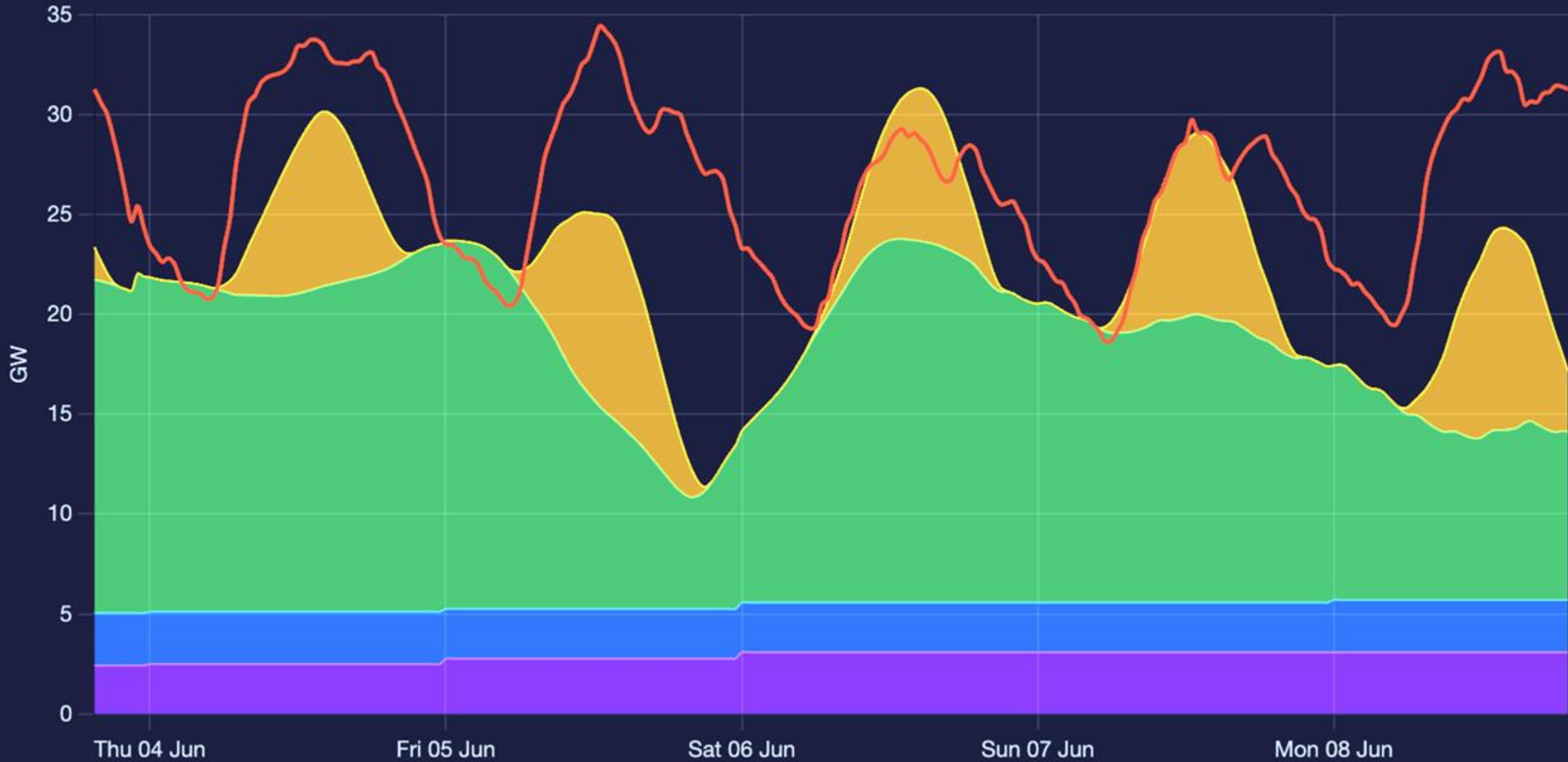


Offer customers **next-generation tariffs** & energy products

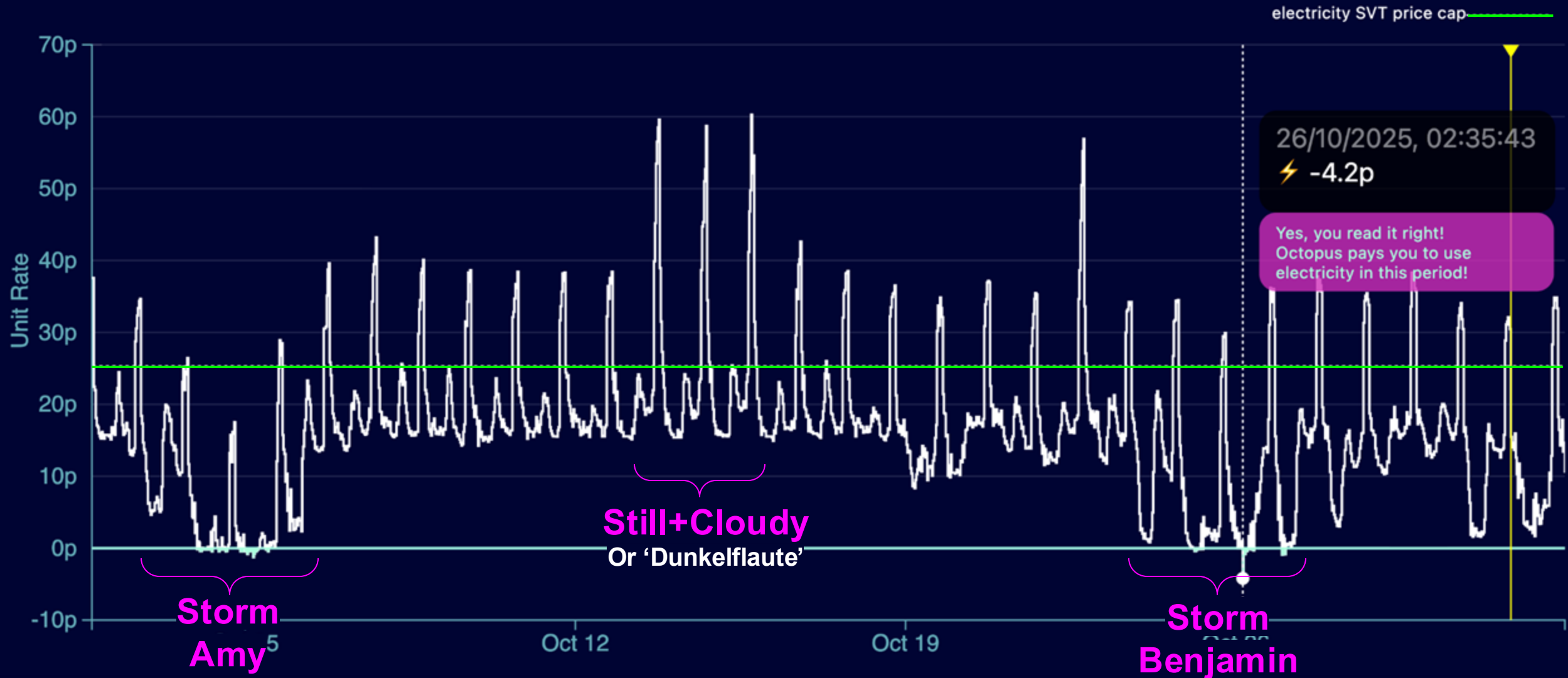


Generation forecast

— Demand — Solar — Wind — Biomass — Nuclear



How the price of electricity changed through October 2025





Agile Octopus

Perfect for anyone who can shift their electricity use outside of peak times



Octopus Tracker

Britain's first tariff to truly follow the wholesale price of energy



Octopus Go

No Intelligent-compatible car or charger? Get four hours of cheap electricity a night for your home and car.



Octopus Outgoing

Check out our fixed and agile tariffs perfect for exporting energy to the grid.



octopus FAN CLUB



Octopus Flux

An import and export tariff giving you the best rates for consuming and selling your energy.



Snug Octopus

The Intelligent tariff for storage heaters. We charge your storage heaters at the cheapest and greenest times of the day, whilst supporting the grid.



Intelligent Octopus Go for electric cars

Super cheap EV smart charging and six hours of cheap home electricity a night



Cosy Octopus

The smart electricity tariff designed to keep heat-pump homes toasty and energy bills cheaper.



Shape Shifters: Trio

Unlock 21 hours of cheaper electricity - every single day

Join hundreds of businesses making big savings with Trio.



ZERO BILLS

PAY NOTHING FOR 5 YEARS octopusenergy



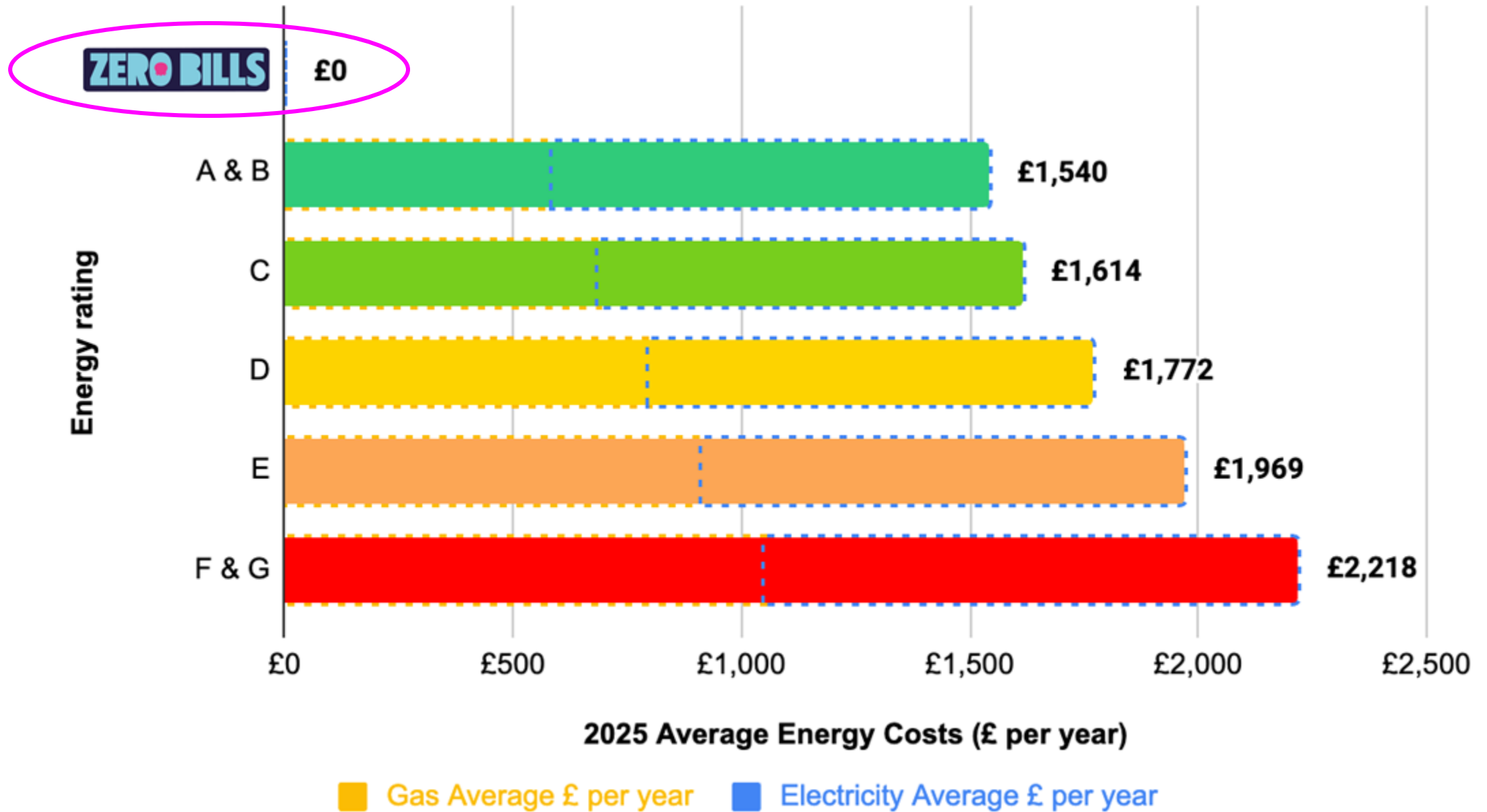
POWERPACK



octopusenergy

TENANT POWER

Unlocking bills savings well beyond “EPC A” rated homes



Zero Bills: Example Installation:



+ Solar PV



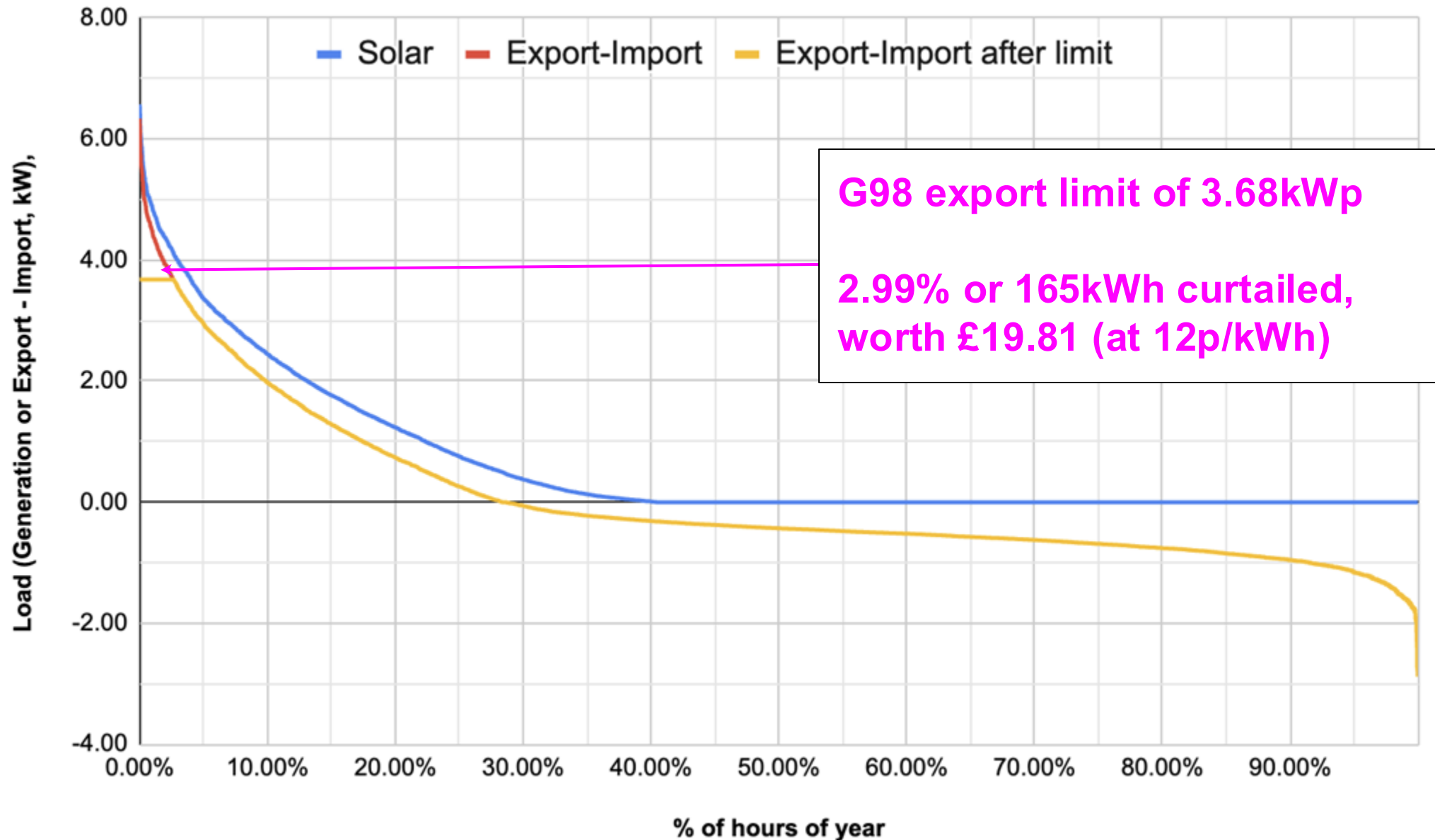
+ Home Battery

+ EV charger

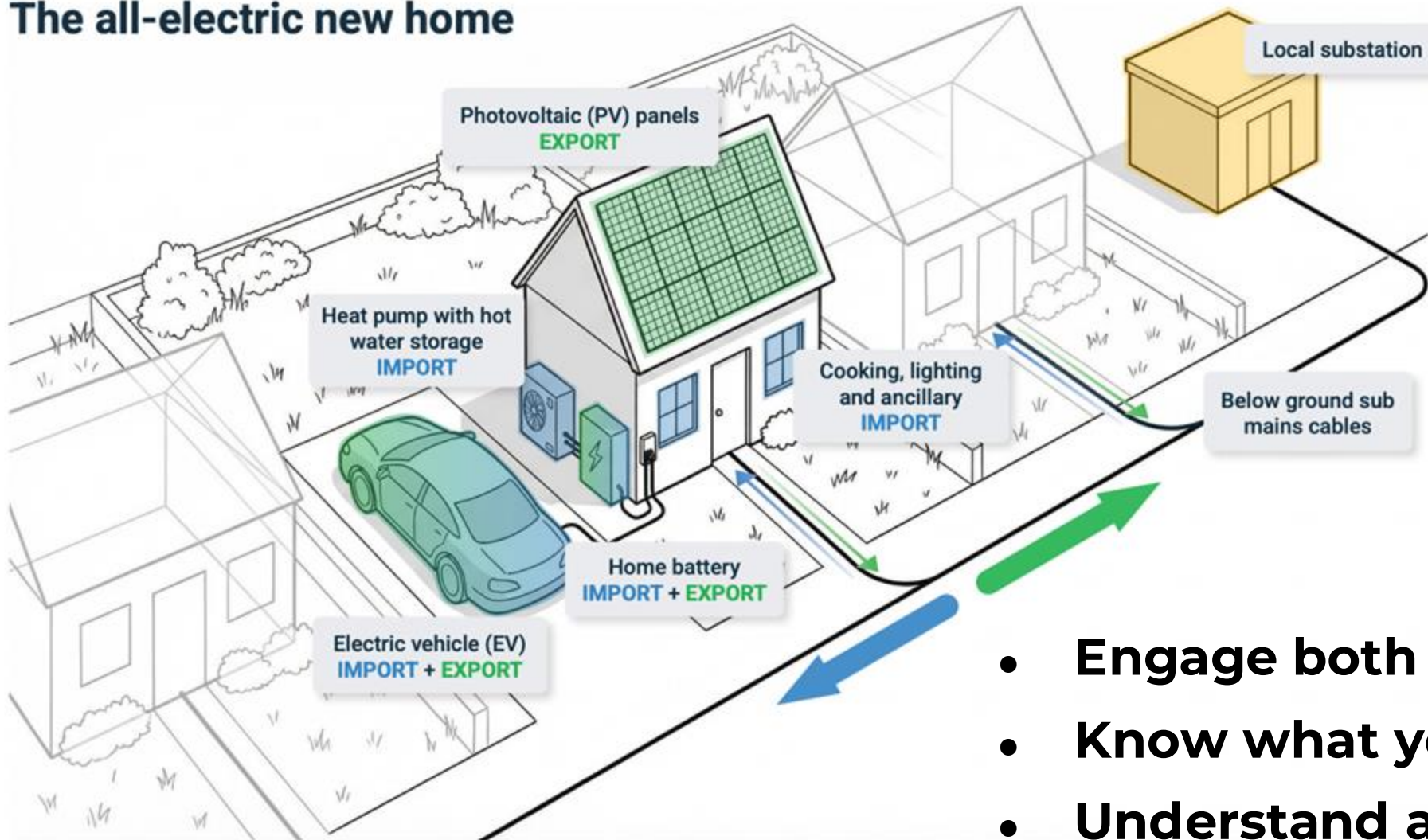


+ Heat Pump!

Semi-D house, 10kWp solar (split N&S), Leeds 2017 solar profile, new build spec, ASHP, No EV load profile (averaged), No BESS



FHH Guidance on Grid connections for The all-electric new home



- Engage both DNO & iDNOs early
- Know what you are asking for
- Understand any constraints
- Mitigations exist & can be implemented with enough time



LOVE &
POWER



nigel.banks@octoenergy.com
07837 516349



Future Homes Standard Essentials

Sponsored by **e-on next**



Powering up

Nicola Kennedy
Head of Microgrids

E.ON Next



Future Homes Standard Technical Conference

Sponsored by **e-on next**



Powering up

Neil Fitzsimons
Managing Director

Power On



POWER ON

Future Homes Standard

Technical Conference - Powering up

Tuesday 9 June, Leeds Beckett University

Electricity Water Wastewater Fibre Heat Gas

All Utilities. One Provider.



A vertical line with three circular nodes at the top, middle, and bottom. A horizontal line extends from the middle node to the left, connecting to the BUUK infrastructure logo. The top node is connected to the POWER ON logo, and the bottom node is connected to the gtc logo.

POWER ON[®]

Multi-utility infrastructure solutions for high-rise residential, commercial, retail and industrial sectors.



Multi-utility infrastructure for low density housing developments.

The Brands Behind the Group: Asset & Retail

POWER ON[®]

enco
the electricity network co.

Electricity, Network Company

Asset ownership,
maintenance
of electricity networks

**Independent
Water Networks**

Independent Water Networks Ltd

Retail brand, asset
ownership, maintenance
and support of water and
wastewater networks

metropolitan

Metropolitan

Asset ownership,
maintenance and
support of heat and
cooling networks

ofnl
Open Fibre Networks

Open Fibre Networks Ltd

Asset ownership,
maintenance and
support of fibre networks

gtc
pipelines limited

Gas Pipelines Limited

Asset ownership,
maintenance of gas
networks

leveline

Offer consumers
access to energy
flexibility markets – a
key enabler for energy
Net Zero

passiv

Offer consumers
products that increase
efficiency of heating,
cooling, Battery and
EV charging systems

Evolution of Electricity Connections Market

Connections Market Competition

2000/04

Utilities Act 2000

- Ofgem consult on arrangements for IDNOs & first licences granted to IDNOs in 2004

2008/09

2008 First GSOP standards in place for IDNOs/ICPs

- Competition Test progress reviewed under DPCR5
- Incorporated Rights (land rights) starts to be rolled out
- Boundary metering decision from Ofgem

2013

Competition Test assessment by Ofgem

- To determine if further action was need to open the market

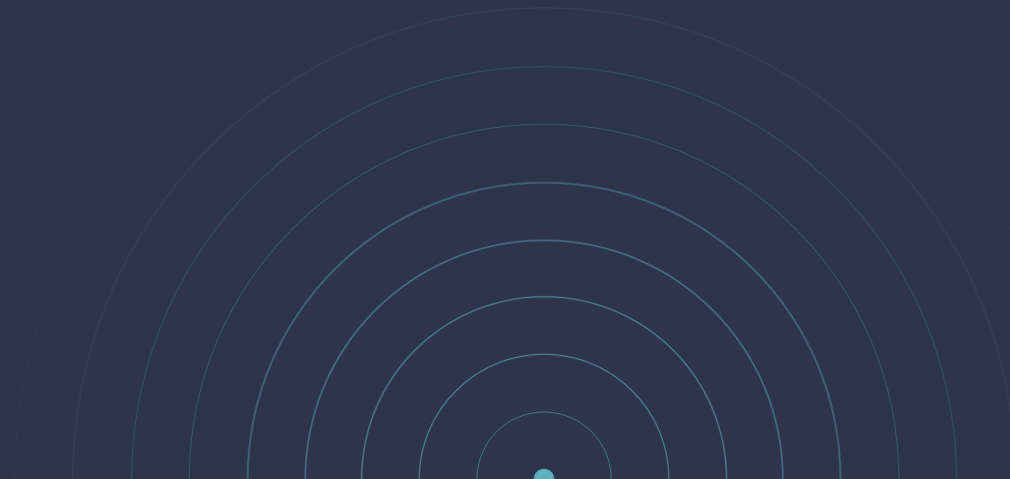
2015/->

Competition in Connections Code Of Practice

- Self-determination of points of connection & design approval
- Self-connect processes in place for LV and HV connections.
- Self-serve processes start to be implemented around DNOs



Future Homes Standard – Implications for Housebuilders (Power)



Future Homes Standard – Implications for Housebuilders (Power)



- ⦿ **Higher demand per home**
Electrification (heat pumps, EVs) → **higher loads (ADMD)** → fewer plots per substation
- ⦿ **More infrastructure required**
More/larger substations and network upgrades → **land, cost and design implications**
- ⦿ **Greater connection risk**
Higher likelihood of **reinforcement and longer connection lead times**
- ⦿ **Two-way networks emerging**
Solar + EVs → networks must handle **both import and export peaks**
- ⦿ **Peak-driven design challenges**
Winter heating & summer export → **capacity driven by extreme peak scenarios**
- ⦿ **Smarter energy solutions needed**
Growing role for **flexibility, active networks and battery storage**

KEY TAKEAWAY

Power capacity and timing becoming a critical constraint

Early, integrated energy planning is **essential to avoid delays and cost escalation**

Your heat strategy matters - Alternative lower electricity demand heating solutions are available



Future Homes Standard Technical Conference



Powering up



Dan Neasham
Head of Sustainability
and Performance
Future Homes Hub



Nigel Banks
Technical Director -
Zero Bills & Low
Carbon Homes
Octopus Energy



Jack Brayshaw
Director of Research
and Innovation
Vistry



Neil Fitzsimons
Managing Director
Power On



Nicola Kennedy
Head of Microgrids
E.ON Next



Future Homes Standard Technical Conference

LUNCH BREAK



Be sure to share your experience on LinkedIn using #FHSready



Future Homes Standard Technical Conference



Fresh thinking on ventilation & IAQ



Ross Holleron
Head of Homes and
Construction
Future Homes Hub



Kelly Butler
Director of External
Affairs
BEAMA



Matt Crawford
Head of Design and
Technical Standards
Onward Homes



Debbie Haynes
Carbon Reduction &
Sustainability
Manager
OX Place



Future Homes Standard Essentials

Sponsored by **e-on next**



Fresh thinking on ventilation & IAQ

Ross Holleron
Head of Homes and Construction
Future Homes Hub

Fresh thinking on ventilation & IAQ

FHS Technical Conference

June 2026



Ventilation as a critical building service

FHS Ready Essentials to de-risk delivery today



Ventilation in new homes

Where to start for homebuilders

A new guide developed from within the Ventilation Implementation Group

Good ventilation is essential to healthy, comfortable & energy-efficient homes

- New homes become more airtight, ventilation more critical
- If not effective, increased risk of poor indoor air quality, condensation etc
- Success is more than selecting products or meeting minimum airflow rates

Ventilation should be treated as a critical building service

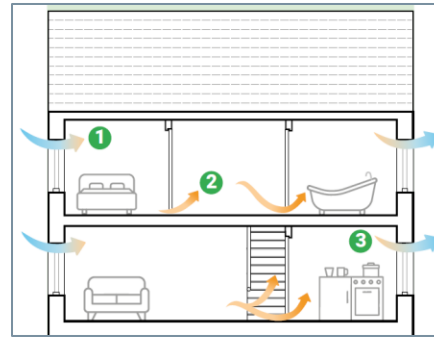
- Same as structure, fire safety, fabric & heating systems
- Considered alongside airtightness strategy
- A challenge across the entire delivery process



Structured around main stages & key decisions

Five good practice principles for reliable ventilation

- 1 Ventilation is a whole-dwelling system
- 2 Strategy should align with dwelling airtightness
- 3 A named ventilation designer should be stated
- 4 Installation by a competent person must follow the design
- 5 Measured performance should be verified



Responsibility & competency

- Defining good design
- Design to procurement
- Installation & site coordination
- Commissioning & handover

For ventilation systems to work:

- 1 **Outdoor air needs to enter**
Outdoor air must enter the dwelling through background ventilators, such as trickle vents, or mechanical supply terminals.
- 2 **Air needs to move through the dwelling**
Air must move between rooms via door undercuts or transfer grilles. Obstruction of these paths disrupts airflow.
- 3 **Stale air needs to be removed**
Depending on strategy, moisture and pollutants are removed via continuous extract or through a combination of background ventilators with intermittent extract.

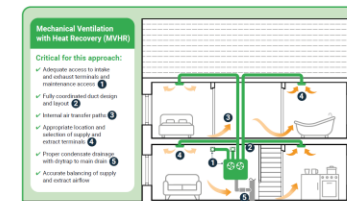
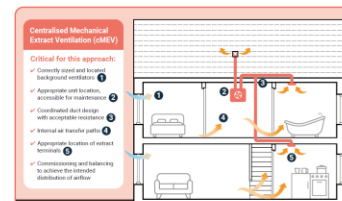
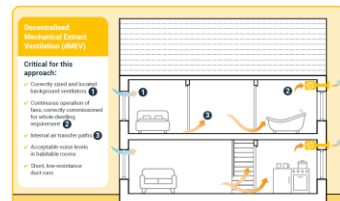
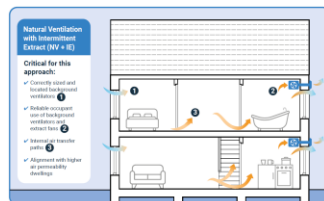
Value of verification & learning from homes in use



- **Independent verification**
 - Commissioning is frequently by installers
 - Verification changes behaviour
 - Taking a proportionate approach
 - CPS vs other compliance routes
- **In-use performance and occupant feedback**
 - Performance is determined in use
 - All important occupant interaction

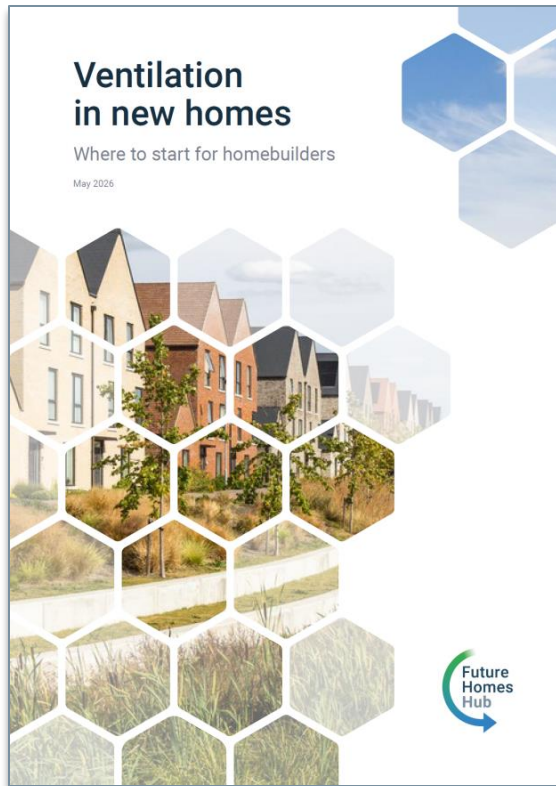


© OX Place



Ventilation in new homes

Where to start for homebuilders



Download it now from the FHH Knowledge Centre

- **Supporting web page developing where you will find**
 - Examples robust design packs
 - Links to CPS and Independent training courses
 - Homebuilder case studies



- A** Introduction
- B** Getting ventilation right
- C** Defining good ventilation design
- D** From design to procurement
- E** Installation and site coordination
- F** Commissioning and handover
- G** Verification
- H** Learning from homes in use



Future Homes Standard Technical Conference

LUNCH BREAK



Be sure to share your experience on LinkedIn using #FHSready



Future Homes Standard Technical Conference



Fresh thinking on ventilation & IAQ



Ross Holleron
Head of Homes and
Construction
Future Homes Hub



Kelly Butler
Director of External
Affairs
BEAMA



Matt Crawford
Head of Design and
Technical Standards
Onward Homes



Debbie Haynes
Carbon Reduction &
Sustainability
Manager
OX Place



Future Homes Standard Essentials

Sponsored by **e-on**
next



Fresh thinking on ventilation & IAQ

Ross Holleron
Head of Homes and Construction
Future Homes Hub

Fresh thinking on ventilation & IAQ

FHS Technical Conference

June 2026



Ventilation as a critical building service

FHS Ready Essentials to de-risk delivery today



Ventilation in new homes

Where to start for homebuilders

A new guide developed from within the Ventilation Implementation Group

Good ventilation is essential to healthy, comfortable & energy-efficient homes

- New homes become more airtight, ventilation more critical
- If not effective, increased risk of poor indoor air quality, condensation etc
- Success is more than selecting products or meeting minimum airflow rates

Ventilation should be treated as a critical building service

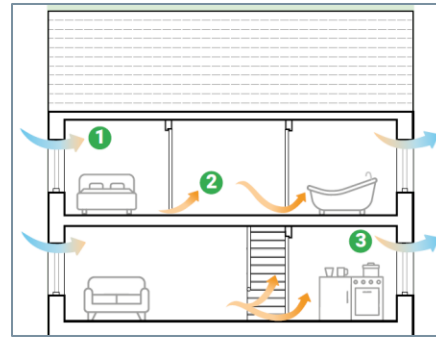
- Same as structure, fire safety, fabric & heating systems
- Considered alongside airtightness strategy
- A challenge across the entire delivery process



Structured around main stages & key decisions

Five good practice principles for reliable ventilation

- 1 Ventilation is a whole-dwelling system
- 2 Strategy should align with dwelling airtightness
- 3 A named ventilation designer should be stated
- 4 Installation by a competent person must follow the design
- 5 Measured performance should be verified



Responsibility & competency

- Defining good design
- Design to procurement
- Installation & site coordination
- Commissioning & handover

For ventilation systems to work:

- 1 **Outdoor air needs to enter**
Outdoor air must enter the dwelling through background ventilators, such as trickle vents, or mechanical supply terminals.
- 2 **Air needs to move through the dwelling**
Air must move between rooms via door undercuts or transfer grilles. Obstruction of these paths disrupts airflow.
- 3 **Stale air needs to be removed**
Depending on strategy, moisture and pollutants are removed via continuous extract or through a combination of background ventilators with intermittent extract.

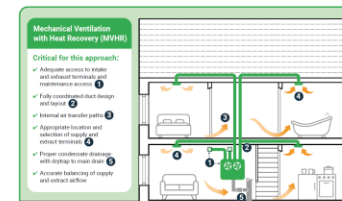
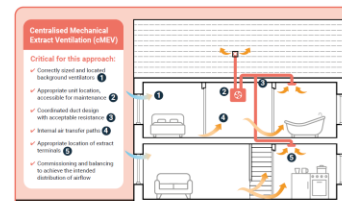
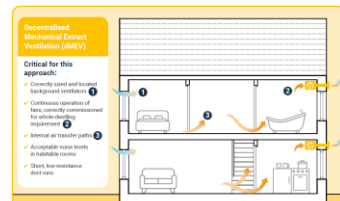
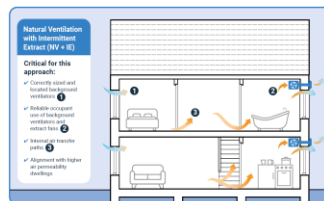
Value of verification & learning from homes in use



- **Independent verification**
 - Commissioning is frequently by installers
 - Verification changes behaviour
 - Taking a proportionate approach
 - CPS vs other compliance routes
- **In-use performance and occupant feedback**
 - Performance is determined in use
 - All important occupant interaction

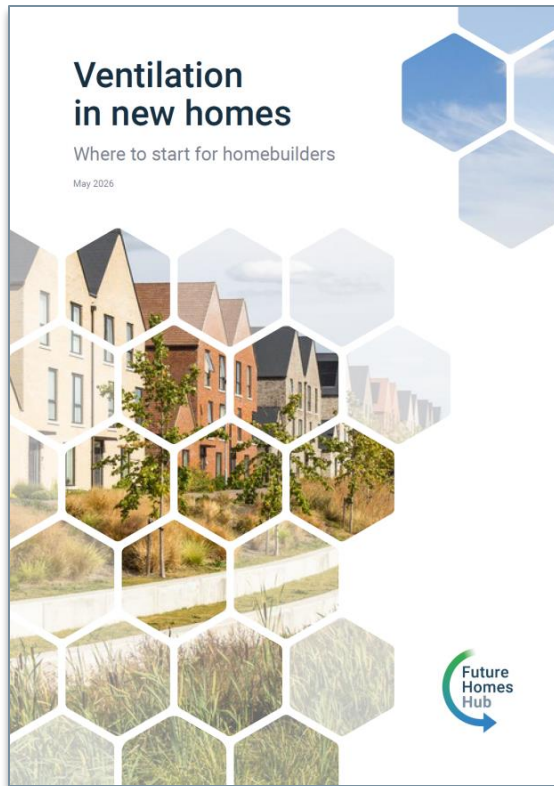


© OX Place



Ventilation in new homes

Where to start for homebuilders



Download it now from the FHH Knowledge Centre

- **Supporting web page developing where you will find**
 - Examples robust design packs
 - Links to CPS and Independent training courses
 - Homebuilder case studies



- A** Introduction
- B** Getting ventilation right
- C** Defining good ventilation design
- D** From design to procurement
- E** Installation and site coordination
- F** Commissioning and handover
- G** Verification
- H** Learning from homes in use



Future Homes Standard Essentials

Sponsored by **e-on next**



Fresh thinking on ventilation & IAQ

Matt Crawford
Head of Design and Technical Standards
Onward Homes

Onward

Fresh thinking on ventilation

Matt Crawford
Head of Design and Technical Standards

Onward Homes

We are a housing association based in the Northwest

We own and manage over 36000 homes

We have completed the 2021/26 Affordable Homes Programme (AHP)

Submitted a bid to Homes England the new Social and Affordable Homes Programme (SAHP)

Our ambition is to increase delivery to an average of 650 homes a year



Onward developments

Procurement of our schemes:

- Package deals
- Land led opportunities
- Section 106 purchases

On package deals and land led schemes we have the potential to negotiate:

- The Onward design brief – MMC
- Onward house types / contractors house types
- Group deals on manufacturers
- Viability issues

Section 106 purchases – we get what we get



Onward standardisation

Onward design brief and standard house types

- An Onward product
- Consistency and standard product
- Ventilation designs and duct runs
- Standardise junction details

Key considerations:

- Economies of scale against standardisation
- Long term replacement and maintenance
- Like for like replacement or a mix of products



On site construction quality

We have over 20 active sites

- We work with national and regional contractors / SMEs, micro contractors and house builders
- Working with companies with limited resources
- Many rely on the design team for compliance
- Still being offered masonry - some don't like change!
- Others are constantly on a learning and improving around fabric efficiency.

Ensuring quality and customer satisfaction:

- In-house clerk of works
- On site testing and commissioning
- Regulatory sign offs





Future Homes Standard Essentials

Sponsored by **e-on next**



Fresh thinking on ventilation & IAQ

Debbie Haynes
Carbon Reduction & Sustainability Manager
OX Place

OX Place

Ventilation & IAQ – fresh thinking

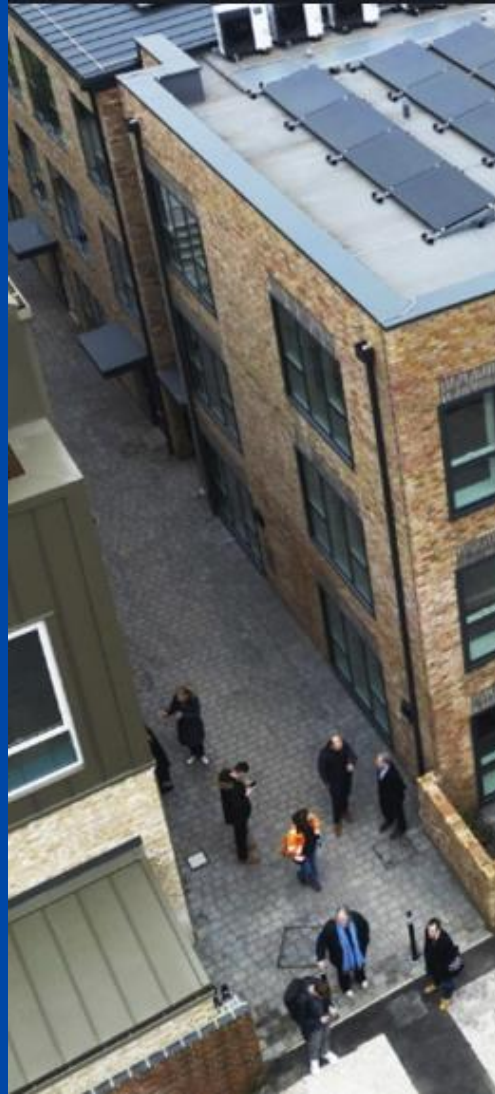
Debbie Haynes, Carbon Reduction Manager

June 2026



OX Place: Development Company of Oxford City Council

- Building over 2,000 new homes in the next ten years
- Social rent and shared ownership

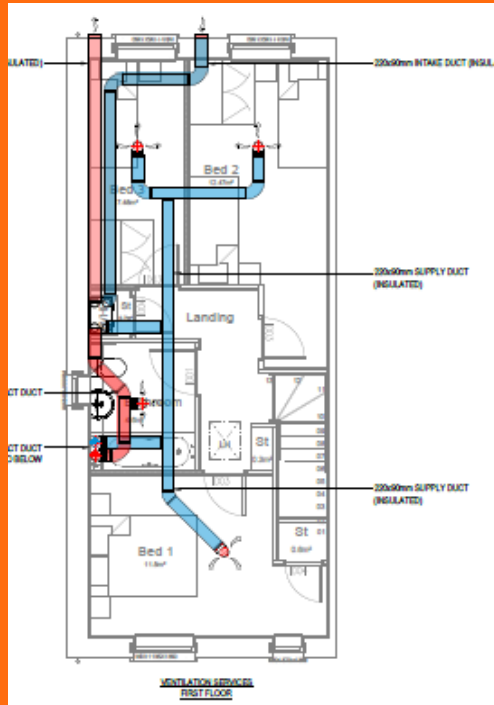


- Building to Future Homes Standard for 3 years
- Heat pumps, Solar PV and mechanical ventilation standard
- Air tightness 3-4 m³/h m²
- Employ Energy Quality Assurance service

Energy Quality Assurance

Reducing the performance gap

Design stages



Stage 1–2:

- Review architectural drawings, ERs, M&E drawings and specifications.
- Highlight early performance risks and record them for follow-up.

Stage 3–4:

- Check proposed energy systems are appropriately designed, sized, and coordinated
- Review contractor design information, specifications, SAP modelling, and product data.
- Provide a Risk register for the design team to address

Energy Quality Assurance

Reducing the performance gap

Construction stage



Stage 5: Construction

- **Site inspections focused on high-risk performance issues**
- **On-site training and practical guidance**
- **Monitor, prioritise, and mitigate performance risks**

Stage 6: Handover & Close Out

- **Airtightness, ASHP/ Ventilation commissioning test.**
- **Review test results, reporting and recommendations.**
- **Confirm compliance with energy strategy and performance standards.**

Air tightness and Ventilation

Part F – mechanical ventilation

Air tightness strategy

Air tightness training

Site checks

Testing

NOTE: As defined in Appendix A, **less airtight dwellings** are **dwellings** which have one of the following.

- A design **air permeability** higher than $5\text{m}^3/(\text{h}\cdot\text{m}^2)$ at 50Pa.
- An as-built **air permeability** higher than $3\text{m}^3/(\text{h}\cdot\text{m}^2)$ at 50Pa.

WHY PARGE COATING MATTERS

- Brick and block (especially aggregate blocks) walls are not naturally airtight – full of micro-leakage paths
- Mortar joints leak and deteriorate over time; individually small, but across a whole house = major leakage
- Without sealing, thousands of small leaks combine into a major performance gap
- Solution: a continuous parge layer or liquid membrane make walls airtight



Parge coat = simple, continuous airtightness for masonry

- Blowerproof:** Liquid Brush Membrane or Airtightness Membrane & Vapour Control
- Partel:** VARA FLUID Brush or VARA FLUID Spray
- Passive House Systems (PHS):** Airtight Liquid Membrane
- Soudal:** Soudatight LQ



Ventilation and benefits of Energy QA

Siting units

Checks, calcs and feedback at
design stage

Site visit

Post commissioning checks



Insufficient ~6 mm internal door undercut identified during verification

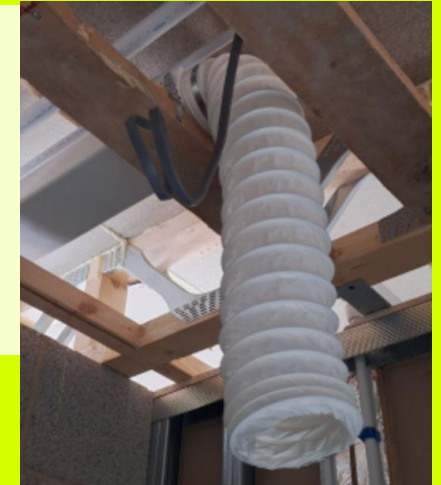


Door undercuts corrected to 10 mm



There should be trickle vents on all habitable rooms but NOT on kitchens, WCs or bathrooms.

“Using flexible ducting into rigid ductwork – flexible liable to get damaged”



“The drawings show extensive use of rectangular ducting. This carries significantly higher pressure losses than circular ducting.... Circular ductwork should be used wherever possible, especially for intake and exhaust runs.”



Building Performance Evaluation –

10 houses; ASHP, AT 2-4 and Centralised MEV (met Part F)

Data collection (5 houses)

- Monitor energy use, temperature and humidity in five homes over six months including the heating season.

Relative Humidity

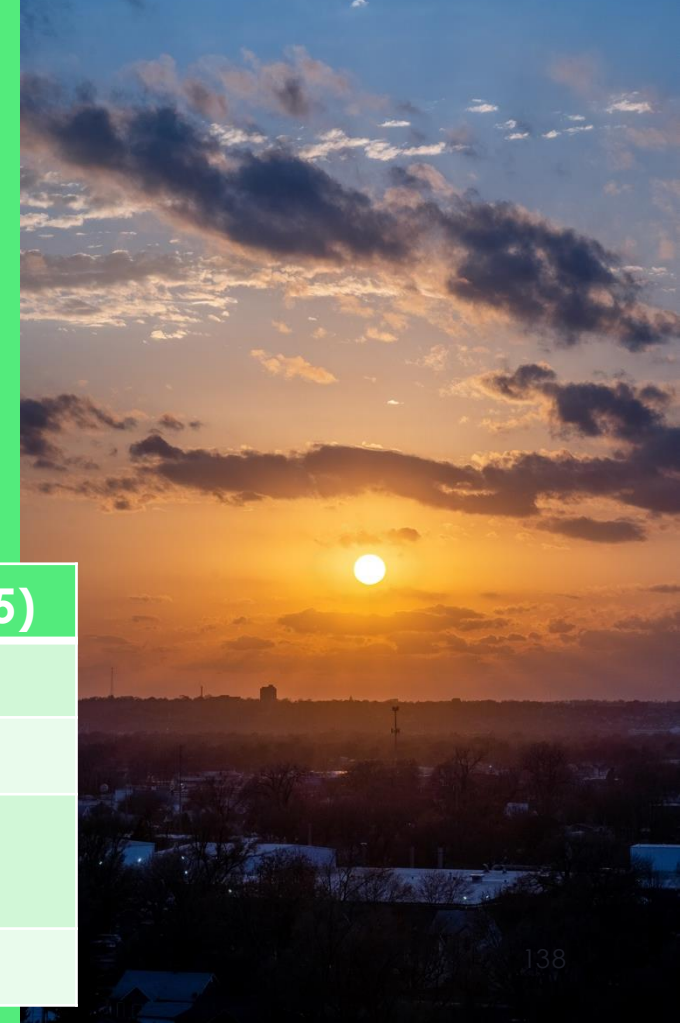
- Moisture conditions are generally well controlled but vary at room level, particularly in bedrooms
- There is no evidence of sustained moisture risk across the dwellings

Overall

- Suggest performance is primarily influenced by heating strategies, zoning and occupancy patterns, rather than systemic issues with building fabric or ventilation systems.

Residents feedback (8 Surveys)

	Average score (/5)
Comfort	4.4
Air Quality	4.1
Summer Temperature	3.3
Healthy	4.9





 Click to connect

 Click to follow

 Click to like

 Click to follow

 Click to subscribe

Homes for living

Homes for life

We do homes for all. Whether you want to rent, buy outright, or get a foot on the property ladder through shared ownership, we have a home for you.



Future Homes Standard Technical Conference



Fresh thinking on ventilation & IAQ



Ross Holleron
Head of Homes and
Construction
Future Homes Hub



Kelly Butler
Director of External
Affairs
BEAMA



Matt Crawford
Head of Design and
Technical Standards
Onward Homes



Debbie Haynes
Carbon Reduction &
Sustainability
Manager
OX Place



Future Homes Standard Technical Conference



Feeling the heat: part 2



Dan Neasham
Head of Sustainability
and Performance
Future Homes Hub



Jerry Gorman
National Sales
Manager - New Build
NIBE



Sean Hall
Group Architectural M
anager
Bellway Homes Ltd



Mark Lufkin
Chief Product Officer
Wondrwall



Adam Tkacz
Business
Development Director
- Sustainable Heat
GTC



The Future Homes Standard Essentials

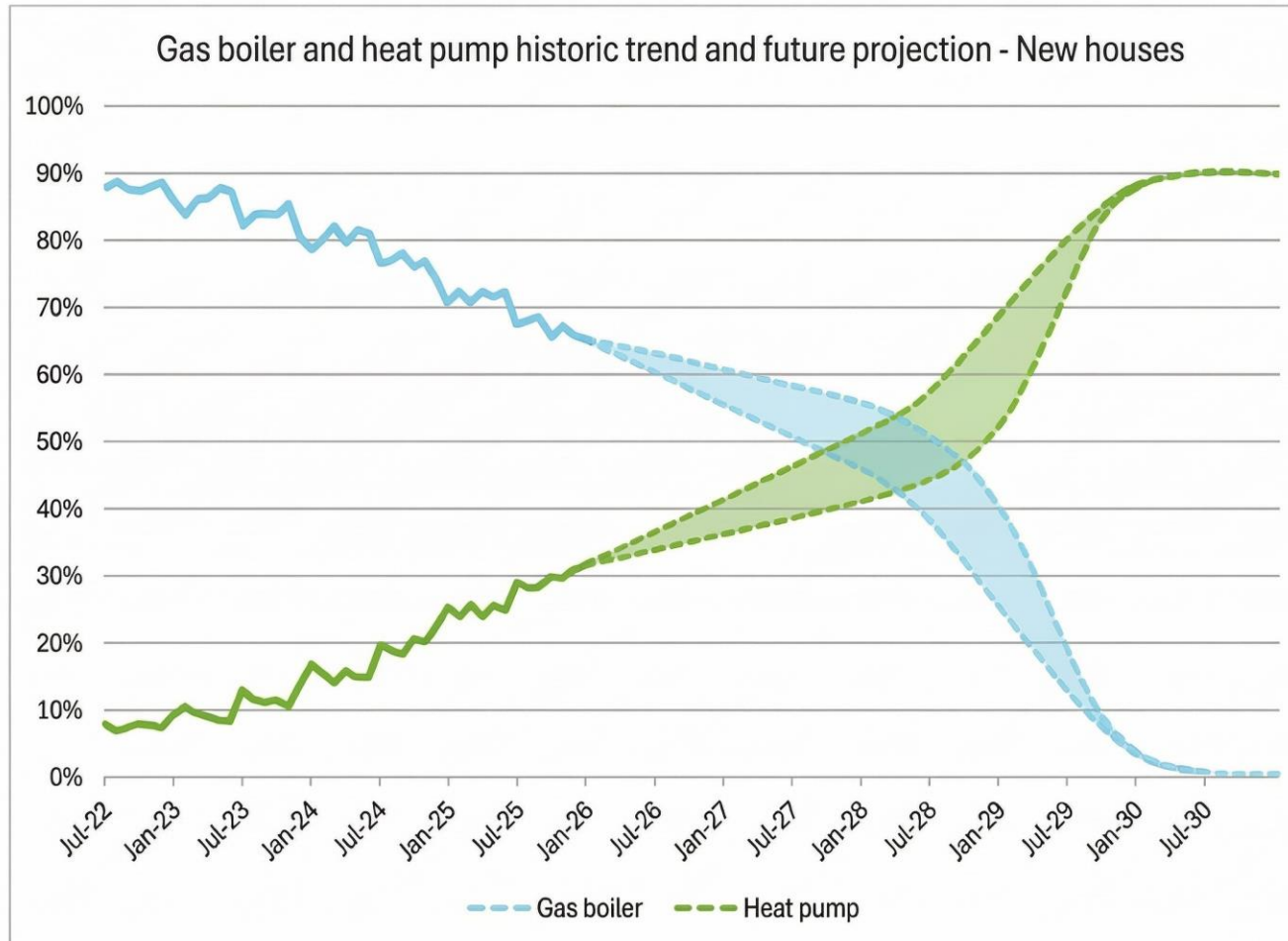
Seven actions to de-risk delivery today



<https://futurehomes.org.uk/future-homes-standard-ready>

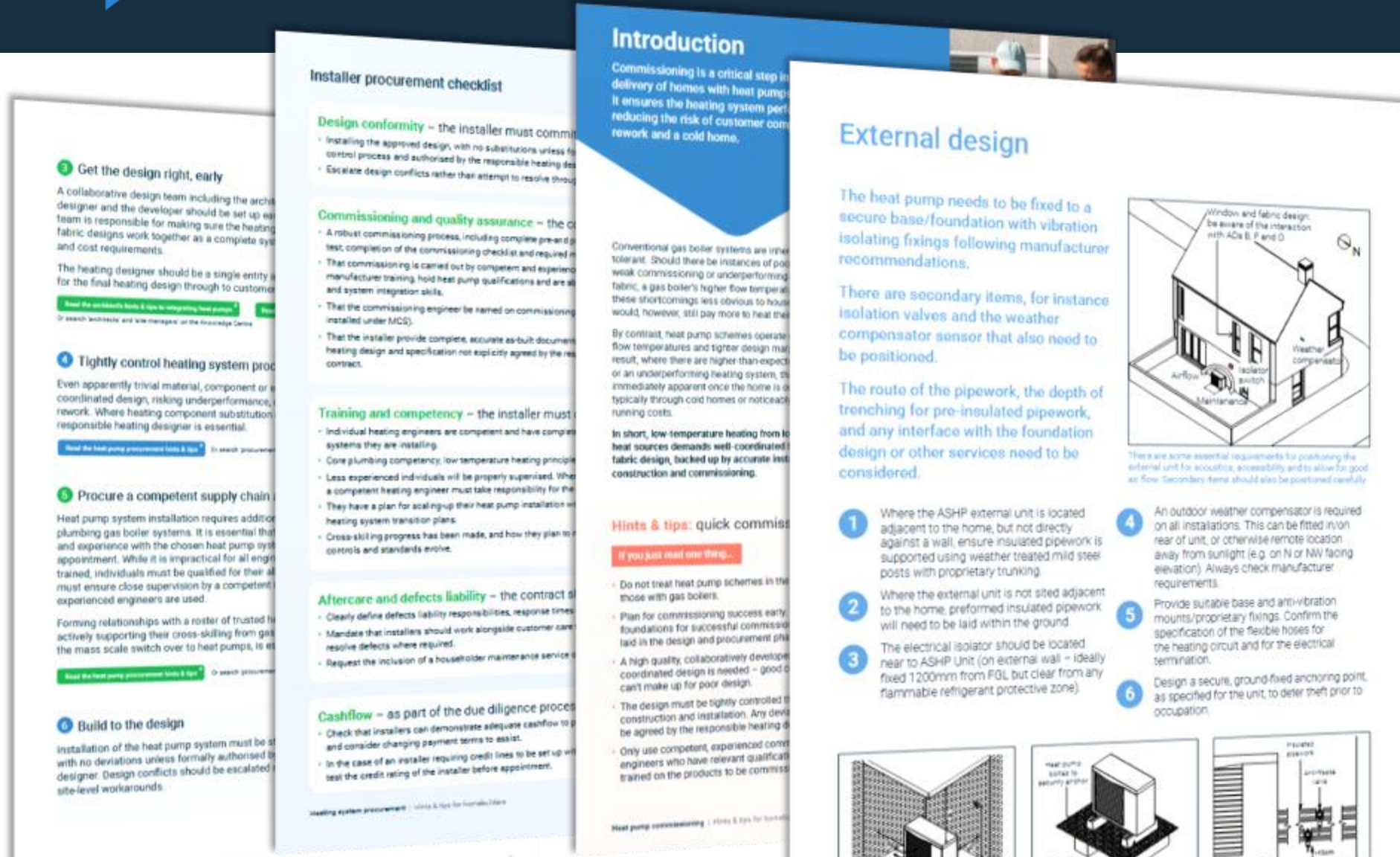
Google: [get future homes standard ready](#)

The sector is already scaling up



We must de-risk delivery in advance of adoption of heat pumps at scale under FHS

Some of our heat pump guidance



Including:

- Heat pump delivery guide
- Architect's heat pump hints and tips
- Heat pump procurement guide
- Heat pump commissioning guide

Non-heat pump solutions guidance on the way

Heating solutions focus 1/2

- Exhaust air heat pump
- Hot water heat pump
- Smart hot water cylinders
- Direct electric heating
- Infrared heating



Heat networks:

- 4G with HIU
- 5G with apartment heat pumps



Facilitating resolution of FHS issues - Hub process

Updated: 01-Jun

WORKING DOCUMENT

In Blue - Items added/updated since last issue

Appendix A - FHS ISSUES LOG

Issue ID	Issue Title, Description & Comments	Subject	Grouping	Importance	Urgency	Rating (xU)	Status	Current Action by	Team to action	Suggested Actions	Relevant Doc	Section
4	<p>Guidance for consistency of interpretation of PV 'Max-fit' requirements</p> <p>Related items: #10, #11, #12, #13, #15, #16</p> <p>"5.73(b) An annual output (in kWh) for the building as calculated using the approved methodology at least equal to that of a photovoltaic array covering the reasonably practicable roof area with a panel efficiency of 0.22 kWp/m²"</p>	PV	PV2 - 'Max-fit'	0.9	1	1	1	FHH	PV D&CPG	Future Homes Hub to set up 'PV design and compliance process' group	Part L	Para 5.73(b) & Appendix B
2	<p>Guidance on roof vent acceptable and unacceptable locations</p> <ul style="list-style-type: none"> - length of ductwork may increase if relocate to make way for PV panels. What implications does this have for ventilation system design? - potentially could be quite a few vents, especially if using purge vents for Part O compliance and/or internal downpipes - what 'rules' should be applied around location of vents, especially in 'Max-fit' scenario? 	PV	PV2 - 'Max-fit'	1.0	1	1	1	FHH	PV D&CPG	Future Homes Hub to set up 'PV design and compliance process' group	Part L	
1	<p>Definition of 'electricity is available to residents' in the context of PV on flats</p> <p>What configuration of PV system on a block of flats would meet the requirements? What is the intended definition of 'used for the benefit of the residents' within Para 5.75?</p> <p>"5.75 The system for renewable electricity generation should be designed so that generated electricity is available to residents of the dwellings. In buildings containing dwellings, this could be to individual dwellings and communal spaces where the electricity can be used for the benefit of the residents of the dwellings"</p>	PV	PV5 - For apartments	1.0	1	1	1	FHH	PV D&CPG	<ul style="list-style-type: none"> - FHH to develop/collate list of contender examples - Homebuilders to provide supporting evidence - Future Homes Hub to set up FHS Apartments' Group at which this can be discussed 	Part L	Para 5.75
1	<p>Definition of the "curtilage of the building" in the context of Requirement L3</p> <p>What is the definition of "curtilage of the building"? This is not a defined term in Part L. Requirement L3: "... within the boundaries of the curtilage of the building".</p>	PV	PV6 - General	1.0	1	1	1	MHCLG	MHCLG	Clarification sought from MHCLG	Part L	Requirement L3 & Para 5.70 & 5.71
1	<p>Required PV calculation in the context of a detached garage roof</p> <ul style="list-style-type: none"> - confirmation detached garage is excluded in area for 40% requirement (as current SAP10 conventions)? - would detached garage be part of the area required to have PV as part of 'Max-fit'? 	PV	PV6 - General	1.0	1	1	1	MHCLG	MHCLG	Clarification sought from MHCLG	Part L	



Future Homes Standard Technical Conference



Feeling the heat: part 2

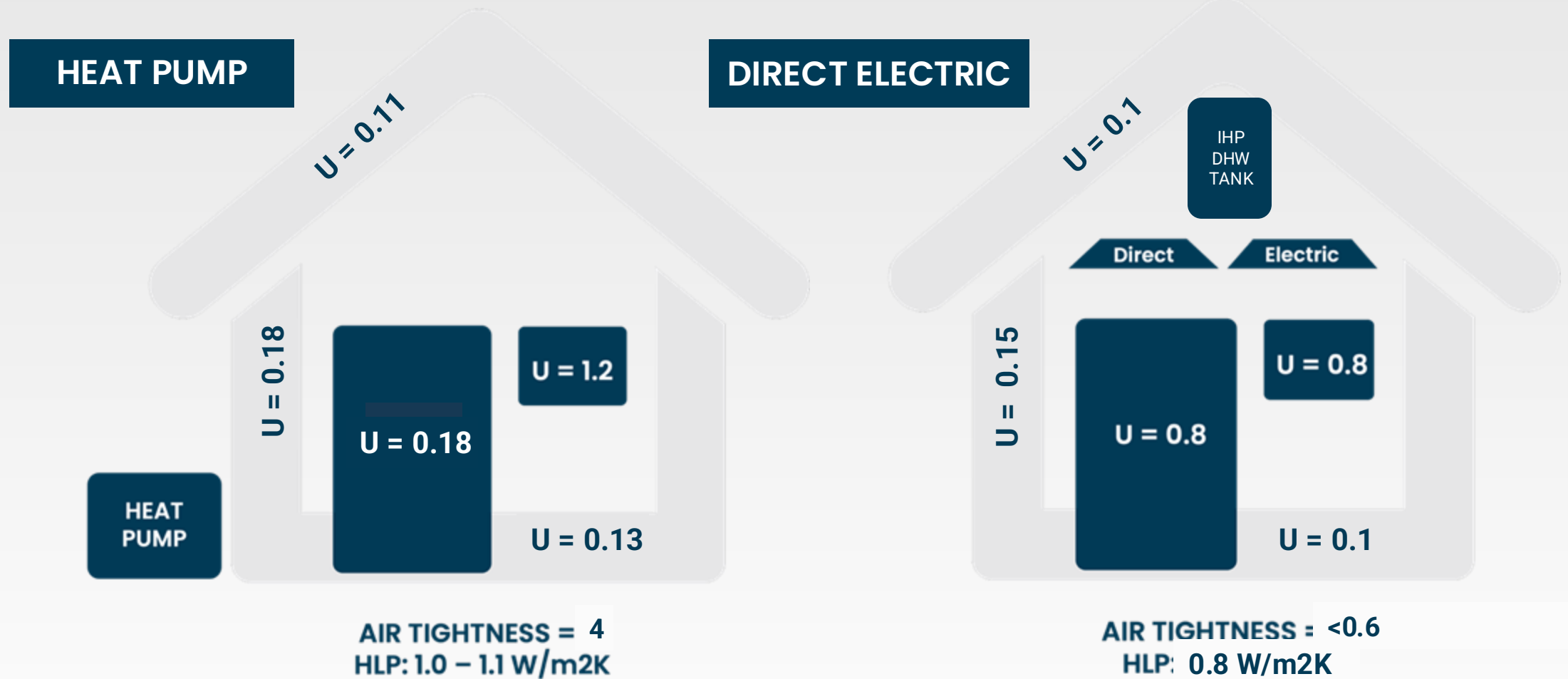
Mark Lufkin
Chief Product Officer
Wondrwall

wondrwall

FEEL THE HEAT: PART 2

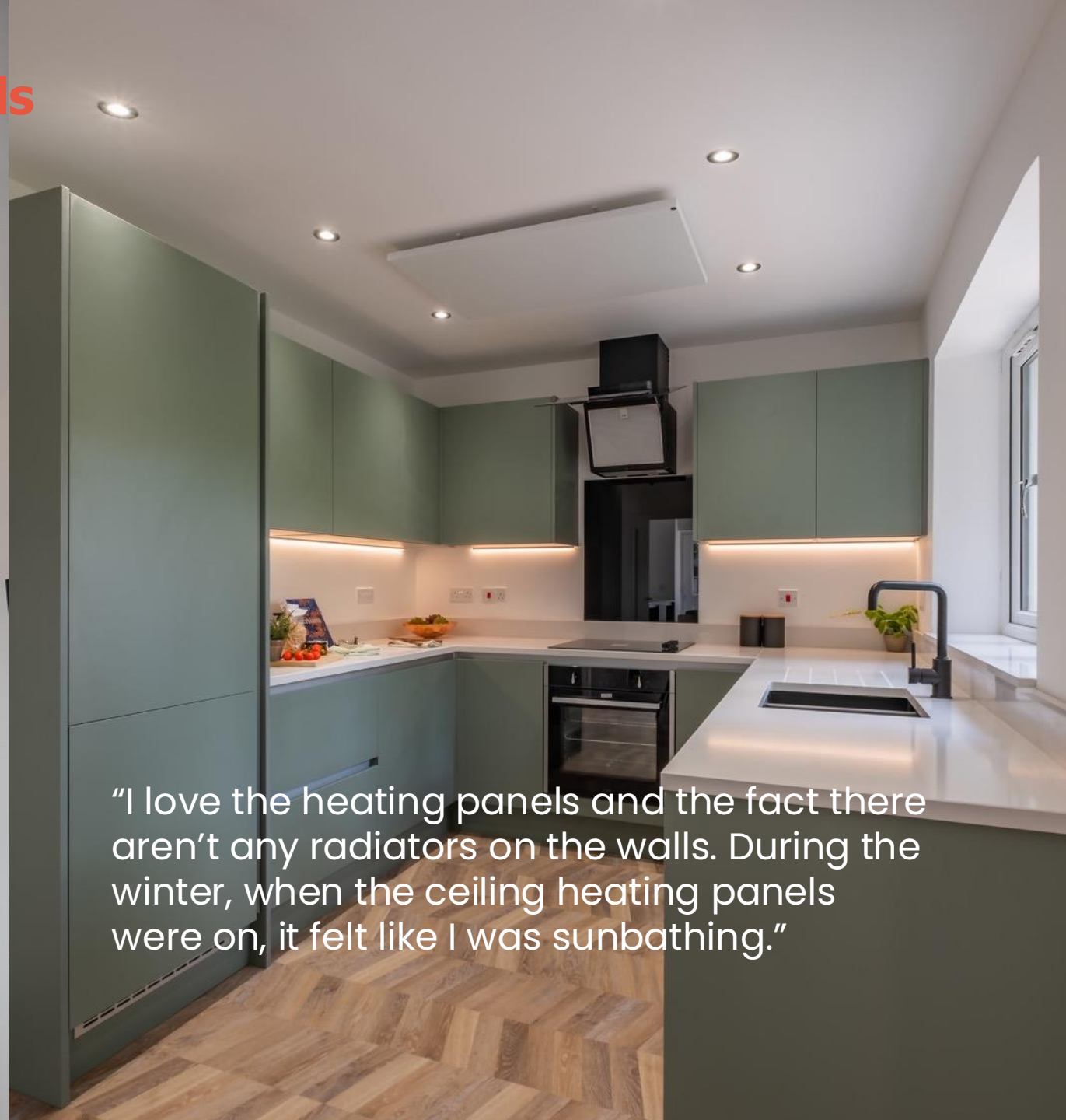


Heating efficiency is fabric and heating system





Intelligent Multi-Zone Heating Panels



"I love the heating panels and the fact there aren't any radiators on the walls. During the winter, when the ceiling heating panels were on, it felt like I was sunbathing."

Smart Controls **Heat and Hot Water**

Reduce energy consumption by not heating empty homes and rooms.

Shift heating and hot water to cheaper electricity.

Integrate all systems to maximise benefits and avoid conflict.

Think about connectivity.



Intelligent Multi-Zone Heating **Storage** **Heaters**



Time Of Use Tariffs

Storage heating with offpeak energy
Hot water tank as thermal store
Don't forget appliances

Which heating system to choose?

wondrwall

HEAT PUMP

Annual maintenance
Consumers need to learn
15-year life
Higher replacement costs

External unit
Plumbing for heating & hot water
MCS certified
Complex design & installation

VS

DIRECT ELECTRIC

No maintenance
Easy for consumers to adopt
30-year life
Lower replacement costs

No external unit
80% less plumbing
Any electrician
Simple design & installation



Design and Install

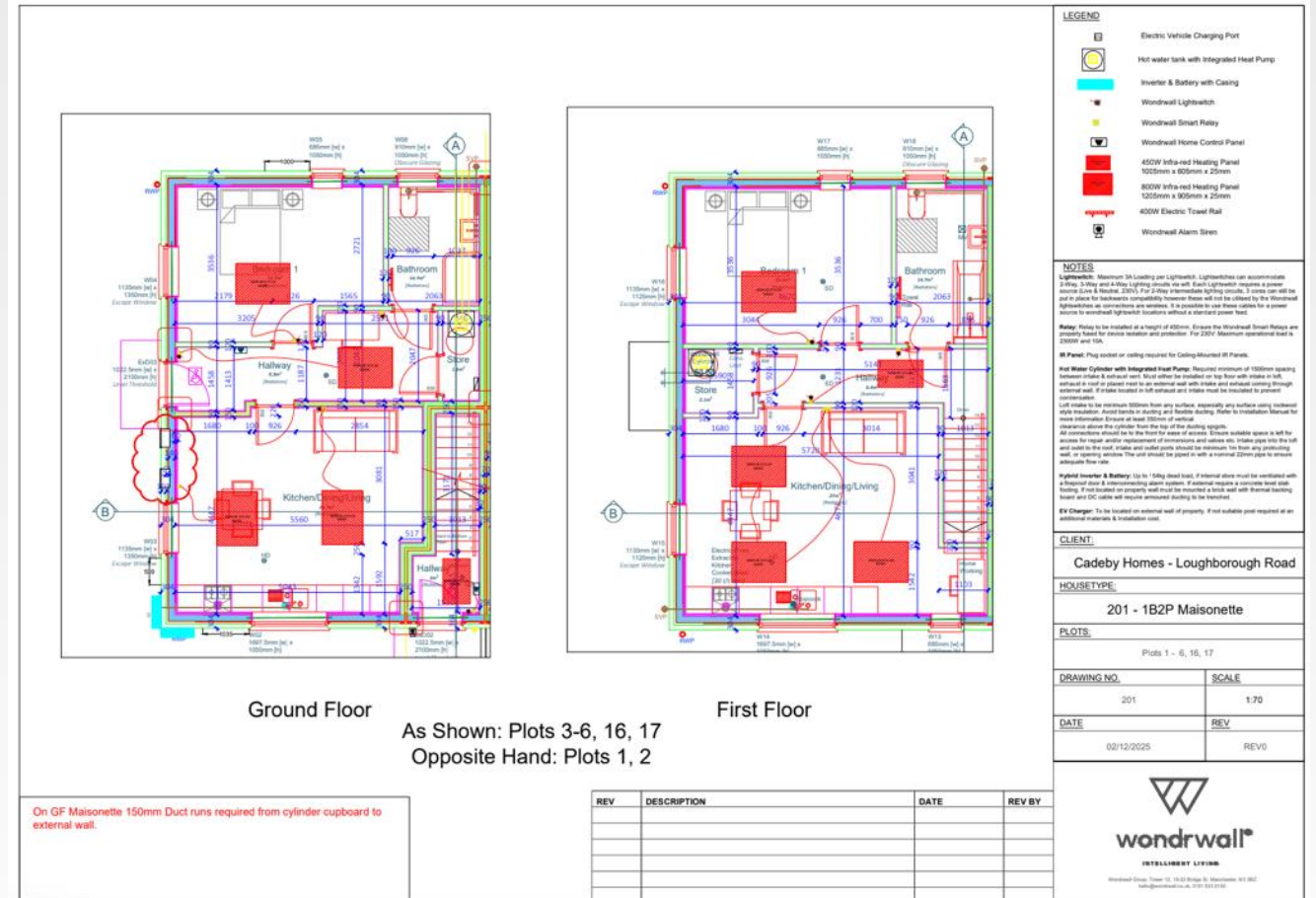
Manufacturers will provide designs.

Support sub-contractors.

Generally, only a one-off exercise.

The person you talk to is not necessarily the one that does the install.

Make sure sub-contractors have done what they were supposed to.



Customer Care Best Practice

Customer care is a journey, not a one off event.

Setup everything before the consumers move in.

Check everything has been installed correctly and is working.

Demo everything to them when they move in.

Proactive communications when they are living and using the home.

Best in class with connected homes and remote technical support and diagnostics.





Future Homes Standard Technical Conference

Sponsored by **e-on next**



Feeling the heat: part 2

Sean Hall

Group Architectural Manager

Bellway Homes Ltd

Feeling the Heat: Part 2

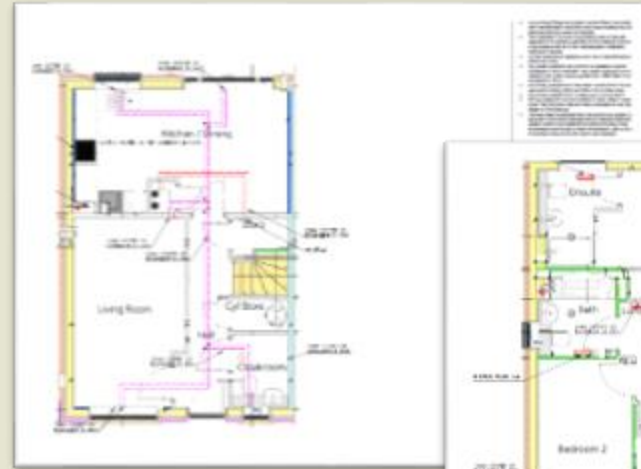
Sean Hall Group Architectural Manager

Bellway

Design

Installation Details

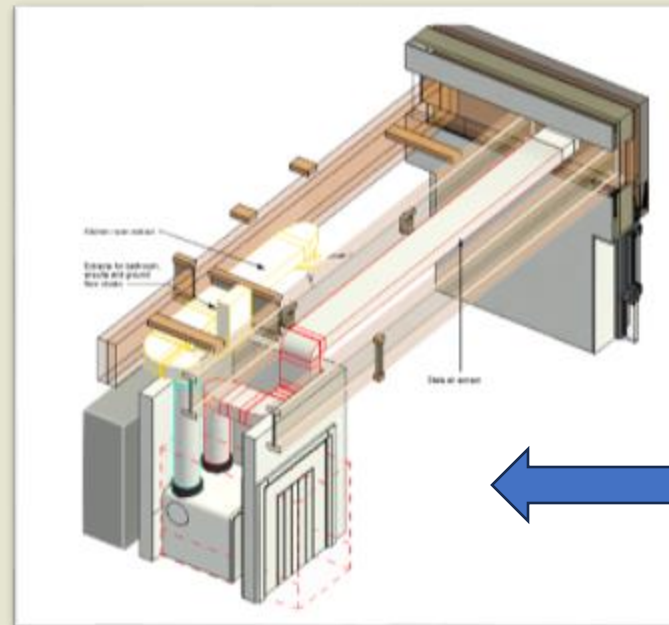
- Plumbing and electrical schematics
- QR codes for support during installation (if provided)
- Can it be installed?



Equipment schedule

System Parameters

Control Strategy



We produced the 3D detail as we needed further information to help aid installation

Installation

MCS accredited

Manufacturers installation details

Plumbing and Electrical Schematics

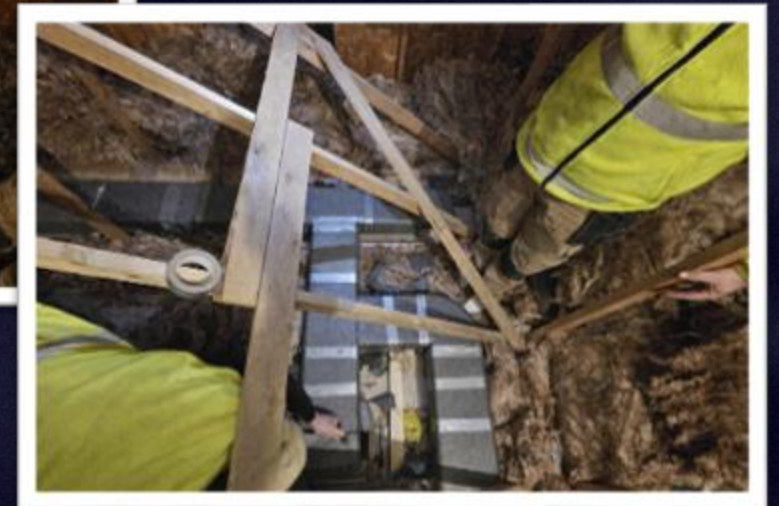
Proposed design – no assumptions



Before



After



Commissioning

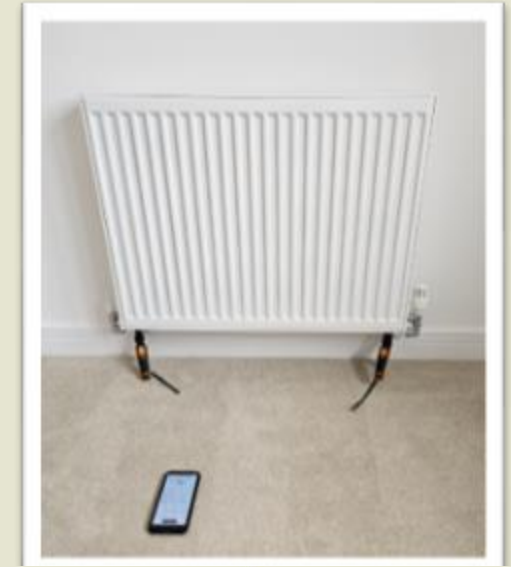
Components installed as specified

System controls set up correctly

Flush and fill and the system purged of air

Heating system balanced

Correct Delta T being achieved



Customer Handover

Customer Demo of how the system operates

Handover packs

- User manuals
- Troubleshooting
- Commissioning documents
- Future Maintenance and Servicing





Future Homes Standard Technical Conference



Feeling the heat: part 2



Dan Neasham
Head of Sustainability
and Performance
Future Homes Hub



Jerry Gorman
National Sales
Manager - New Build
NIBE



Sean Hall
Group Architectural M
anager
Bellway Homes Ltd



Mark Lufkin
Chief Product Officer
Wondrwall



Adam Tkacz
Business
Development Director
- Sustainable Heat
GTC



Future Homes Standard Technical Conference

NETWORKING BREAK



Be sure to share your experience on LinkedIn using #FHSready



Future Homes Standard Technical Conference



Learning by doing



Ross Holleron
Head of Homes and
Construction
Future Homes Hub



Jack Brayshaw
Director of Research
and Innovation
Vistry



Professor David Glew
Head of Sustainable
Buildings
Leeds Beckett
University



Olivia Greenhalgh
Sustainability Manager
First Choice Homes
Oldham



Future Homes Standard Technical Conference

Sponsored by **e-on next**



Learning by doing

Professor David Glew
Head of Sustainable Buildings
Leeds Beckett University

LEARNING BY DOING

Dave Glew,

Director of Leeds Sustainability Institute
Leeds University

Future Homes Standard Technical Conference

Tuesday 9 June, Leeds Beckett University
Wednesday 17 June, Central Hall Westminster



LEEDS BECKETT UNIVERSITY
LEEDS SUSTAINABILITY
INSTITUTE

Council's Low-Carbon Standard

(High performance with traditional approaches)

What does “good” learning look like?



**Phase 1
Pre Construction**

- Design review

**Phase 2
During Construction**

- As-built design review
- Construction process review

**Phase 3
Post Construction and Occupation**

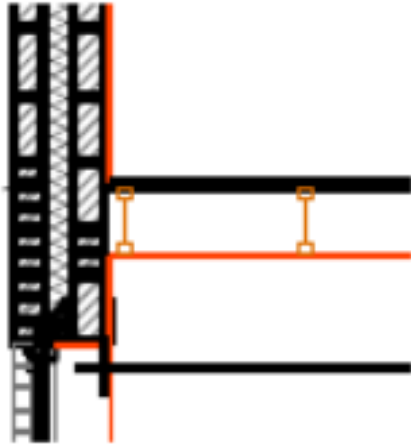
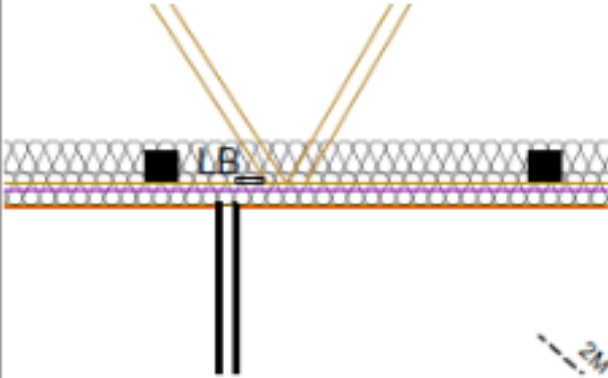
- Whole building fabric performance tests
- Elemental fabric performance tests
- Airtightness tests

- Post-occupancy electricity monitoring
- Post-occupancy temperature monitoring
- Post-occupancy humidity monitoring



Phase 1, Design

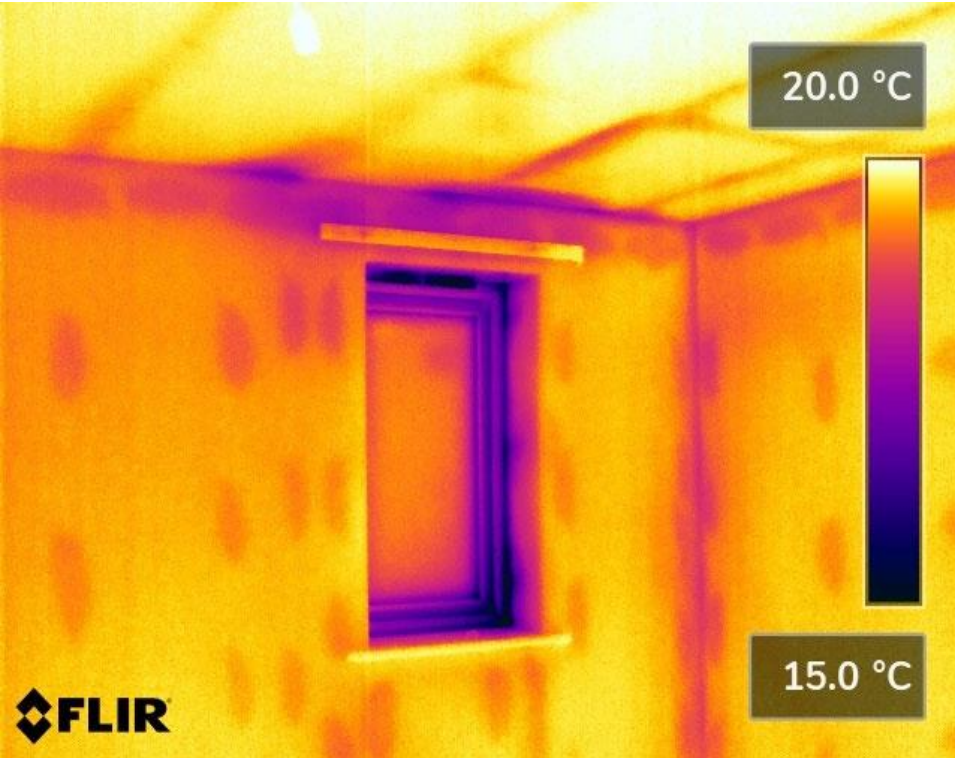
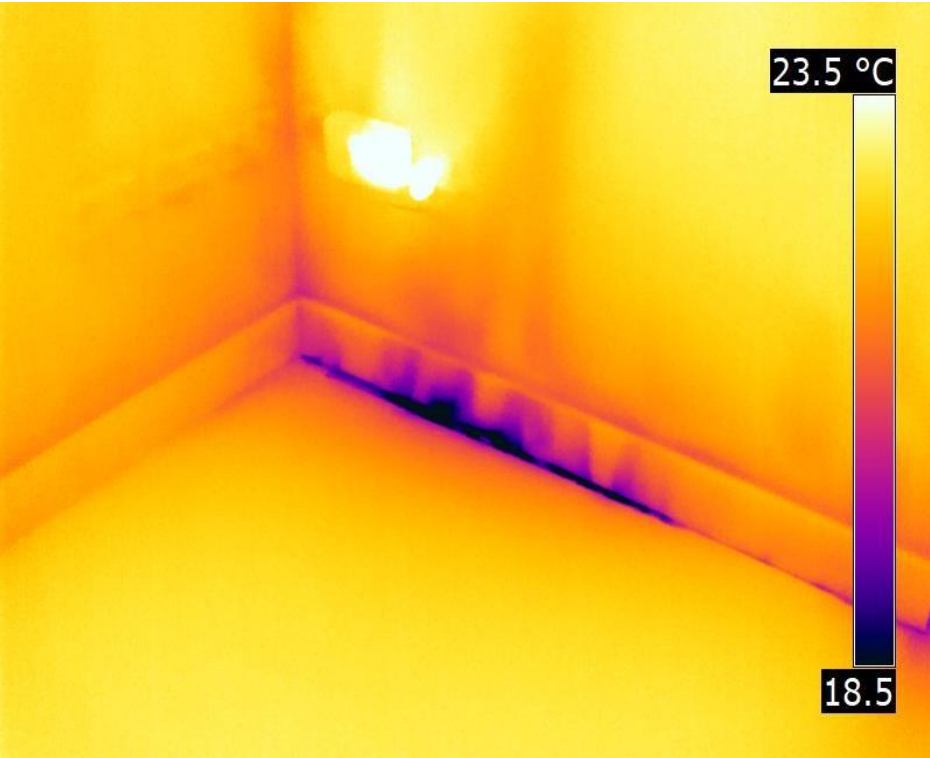
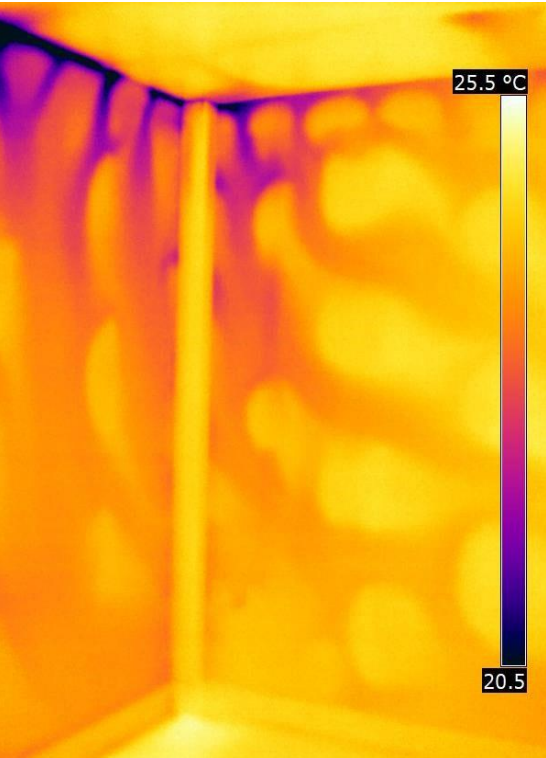


 A cross-sectional diagram of a wall and floor junction. On the left, a vertical wall section is shown with insulation and an air barrier (red line). On the right, floor joists are shown with an air barrier (red line) running horizontally across them. The air barrier is shown as a continuous line, with some details of how it is fastened to the joists.	<p>Air barrier: if it is dry-lining how is it made continuous to prevent air exchange between cavity and intermediate floor void?</p> <p>How is the end intermediate floor joist sealed around?</p>
 A cross-sectional diagram of a room perimeter. It shows a floor slab with insulation (hatched area) and an air barrier (red line). A truss bracing junction is shown with two diagonal members meeting at a central point. The air barrier is shown as a continuous line across the floor and up the wall. A label 'LB' is present near the air barrier. A dashed line with '2M' indicates a specific detail or measurement.	<p>How is the air barrier made continuous at room perimeters?</p> <p>How is insulation at truss bracing junction treated to limit thermal bridging?</p>

Phase 2, Construction - observations



Phase 2, Construction - BPE



Phase 2, Construction – advanced BPE



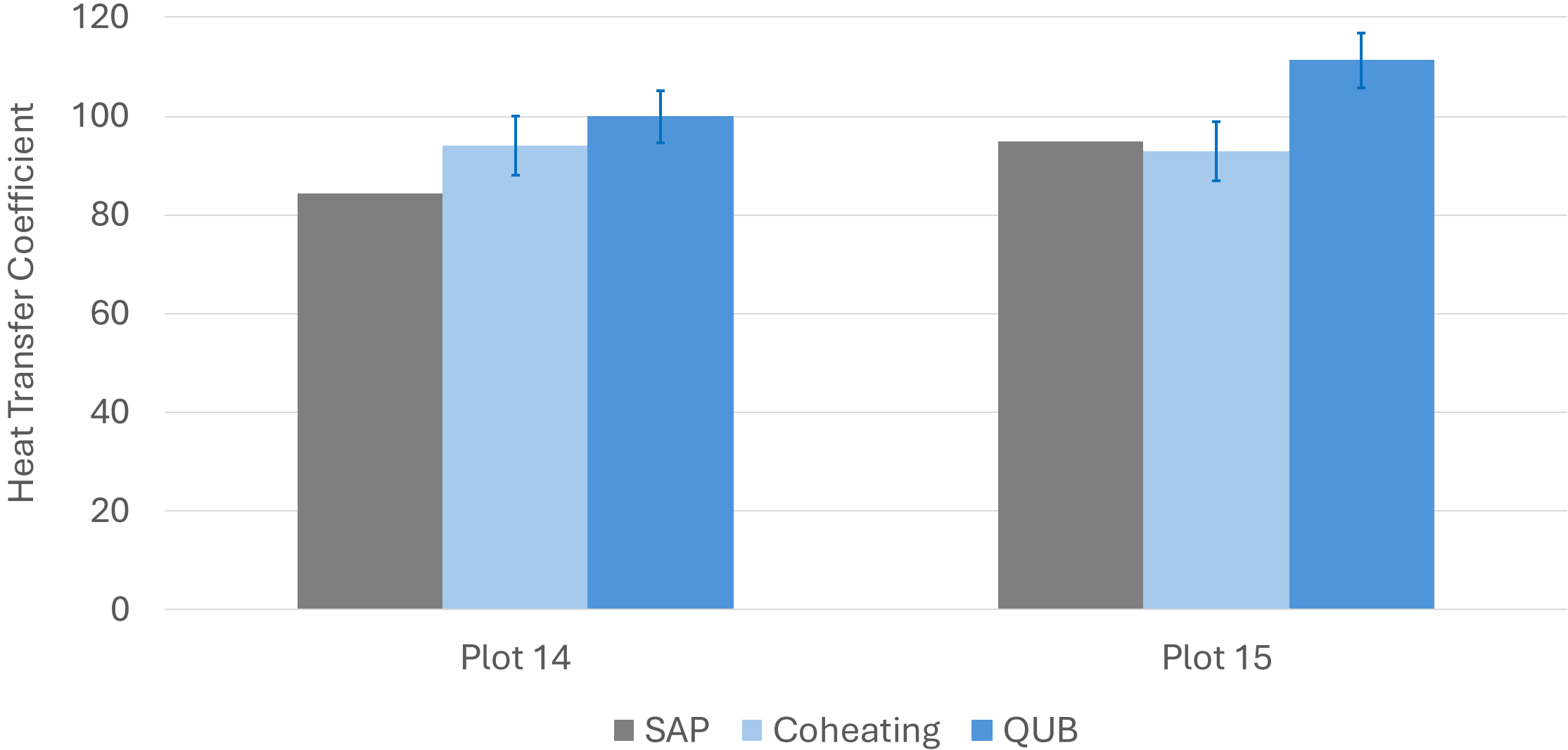
Temperature Sensor

Thermostatic controller

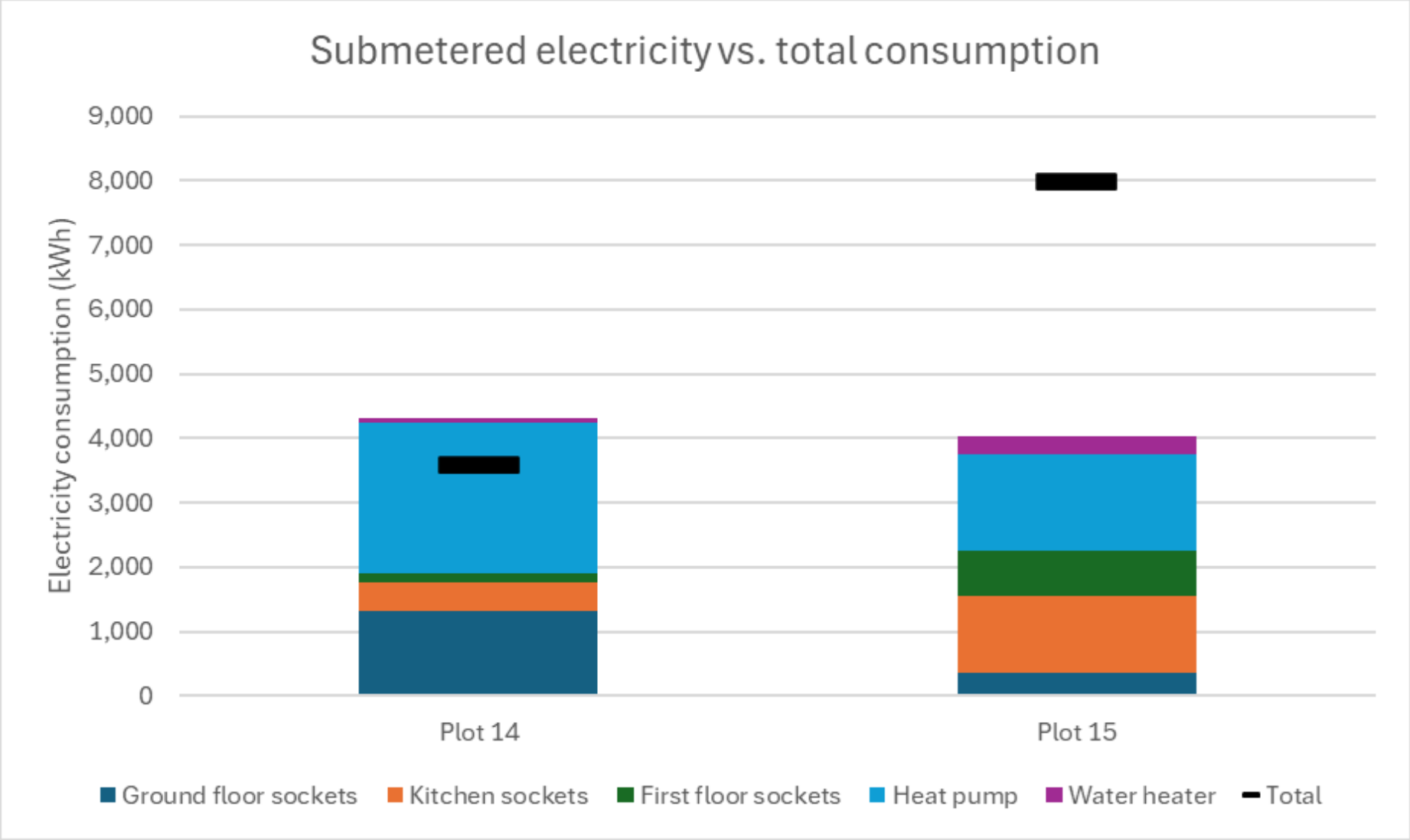
Electric heater

Circulation Fan

Phase 2, Construction – performance gap



Phase 3, Post occupancy – (sub)metering



Phase 3, Post occupancy - compliance



Table 3-1: Outputs from CIBSE TM52 overheating analysis

	Plot 14 living room	Plot 14 bedroom	Plot 15 living room	Plot 15 bedroom
Criterion 1: $\leq 3\%$ of hours over T_{\max}	Pass	Pass	Pass	Pass
Criterion 2: Weighted exceedence ≤ 6	Pass	Pass	Pass	Fail
Criterion 3: ΔT not more than 3°C	Pass	Pass	Pass	Pass
Overall: Must not fail against two or more criteria	Pass	Pass	Pass	Pass

Phase 3, Post occupancy - occupants



“The noise of that thing outside [and] noise from the heat system in the tank upstairs. Like a...like a....constant humming noise and then it’ll go off obviously when the heating’s off, you can hear the difference.”

“No, just leave it. It just looks after itself.”

“Well it’s got to be red hot in the house obviously to get your water. Now it’s 21 degrees in here and I’ve got it on 23, I’ve set it on 23 but if I don’t, they’ll be no hot water.”

“Yeah. Red hot. Fine.”

“We can’t have a bath each. You know, I’ve got to have a bath then she’s got to have a shower because there’s not enough hot water for two baths straight after each other.”



Learning by doing...

- Effective design and build QA
- Deeper BPE (sub sample?)
- Data vs information
- Mechanism to rectify
- Every occupant is different

Council gained...

- Validation of performance
- Improved design & process
- Confidence in their standard
- Lessons for future
- Visibility

LEARNING BY DOING

Dave Glew,

Director of Leeds Sustainability Institute
Leeds University

Future Homes Standard Technical Conference

Tuesday 9 June, Leeds Beckett University
Wednesday 17 June, Central Hall Westminster



LEEDS BECKETT UNIVERSITY
LEEDS SUSTAINABILITY
INSTITUTE

What does good learning look like?

- *Purposeful & planned*
- *Resourced & buy in (norm)*
- *Detailed enough & scalable*
- *Start before start, end after end*
- *Mechanism to rectify problems*
- *Standardised?*

NOT: “We are doing some monitoring...”



Future Homes Standard Essentials

Sponsored by **e-on next**



Learning by doing

Olivia Greenhalgh

Sustainability Manager

Vistry

OUR HOMES

PROPERTY TYPES

HOUSES | 49%

FLATS | 43%

BUNGALOWS | 4%

MAISONETTES | 3%

AGE OF OUR STOCK



LARGEST AGE GROUP:
51% BUILT BETWEEN 1965-1980

ENERGY PERFORMANCE



64.5%
HOMES EPC C OR ABOVE

SAP 70.9
AVERAGE ENERGY EFFICIENCY RATING

OUR CUSTOMERS

11,324

CURRENT TENANTS

WEST VALE DEVELOPMENT



2018



2025



WEST VALE DEVELOPMENT

SUSTAINABLE HOMES AT A GLANCE

COLDHURST, OLDHAM



£21m
INVESTMENT

88
AFFORDABLE HOMES

62
AFFORDABLE RENT APARTMENTS

26
SHARED OWNERSHIP HOUSES



88
HOMES



100%
OFF-GAS



88
AIR SOURCE HEAT PUMPS



34
HOMES



54
HOMES

33
EV CHARGE POINTS

TIMBER FRAME CONSTRUCTION

HIGH PERFORMANCE INSULATION



2,809
TREES, SHRUBS, HEDGES & PLANTS



NATIVE PLANTING



WILDFLOWER MEADOWS



BIODIVERSITY HABITAT



96%
WASTE DIVERTED FROM LANDFILL





SOCIAL VALUE & COMMUNITY ENGAGEMENT

WEST VALE DEVELOPMENT



LOCAL EMPLOYMENT

NEARLY
100
JOBS CREATED



APPRENTICESHIPS
& STUDENT
PLACEMENTS



IN COLLABORATION
WITH OLDHAM
COLLEGE



COMMUNITY INVESTMENTS



£9,500
INVESTED IN
TREE INSPECTIONS
& PLANTING



£63,500
INVESTED IN
ALLEYWAY CLEAN-UPS
& COMMUNAL GARDEN
OVERHAULS



RESIDENT INVOLVEMENT



WEST VALE RESIDENT ENGAGEMENT PANEL

Incorporating local
feedback into the
development process



LEISURE SPACE ENHANCEMENT



NEW PLAY AREA



Safe outdoor activity
for existing and
new residents

Learning by doing – lessons from Westvale

Resident engagement

- Early and throughout
- Make the changes meaningful

Heating and hot water

- Spec demos
- Info packs for resident

Ventilation

- Consider before fabric
- Excess heat strategy

R+M

- Engage with DLO at spec stage
- Define specs to align to FHS for pipeline



Future Homes Standard Essentials

Sponsored by **e-on next**



Learning by doing

Jack Brayshaw

Director of Research and Innovation

Vistry

FHS Technical Conference

Learning By Doing

Jack Brayshaw, Director of Research and Innovation

Vistry

**Bovis Homes**
Est. 1885

Linden
Homes

**COUNTRYSIDE**
Homes

Countryside
Partnerships

Learning lessons through doing

Carefully trialling future technology and specifications across the Group

1

Net Zero Carbon Homes (regulated energy)
Site: Europa Way Triangle, Leamington Spa
Region: VP West Midlands
Number of units: 54

2

Net Zero Carbon Homes (regulated energy)
Site: Stoneleigh View, Kenilworth
Region: VP West Midlands
Number of units: 310

3

District GSHPs
Site: Romney House, Bristol
Region: VP West

4

Community Heat Hub (communal ASHP & hot water)
Site: The Gateway, Bexhill
Region: Kent
Number of units: 801 homes, school, sports pavilion and community centre

5

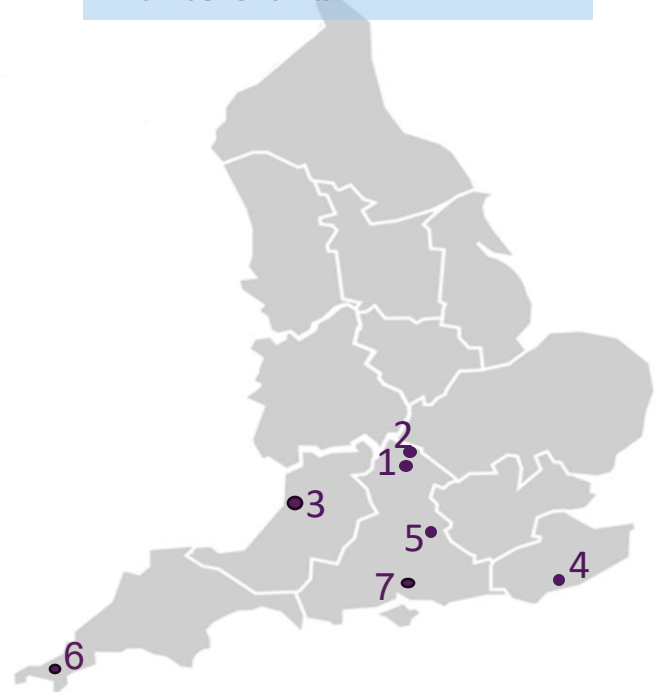
Air Source Heat Pumps
Site: Reading Golf Club
Region: Vistry Thames Valley
Number of units: 211

6

Low carbon homes & air source heat pumps
Site: Tolgus Farm, Redruth
Region: VP South West
Number of units: 185

7

AECB Design (Passivhaus)
Site: Parcel 6 North Whiteley
Region: VP Drew Smith
Client: Winchester City Council
Number of units: 54



High Level Learnings - Customer Awareness and Acceptance



High Level Learnings - Skills and Training



High Level Learnings - Infrastructure



High Level Learnings – Technical & Planning



Design – New Vistry Collection

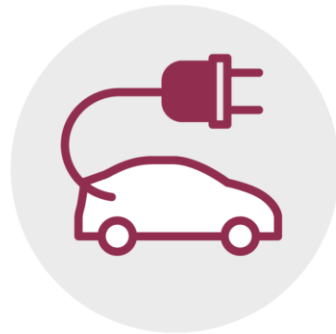


Learning lessons and providing business support

Vistry Group

Future Homes Standard: what we know so far

Hannah Rapson, Technical Innovation



Integrating renewable technology

Going Electric

Thinking of making the switch to an Electric Vehicle? Many of our new homes which have an associated parking space will have a charging point, which is compatible with any electric vehicle. Meaning if you switch to an Electric Vehicle or already own one, you won't have to worry about installation costs.**

**In some homes where your allocation parking space is in a covered car park the cabling for an EV charger will be laid but no charger will be installed.

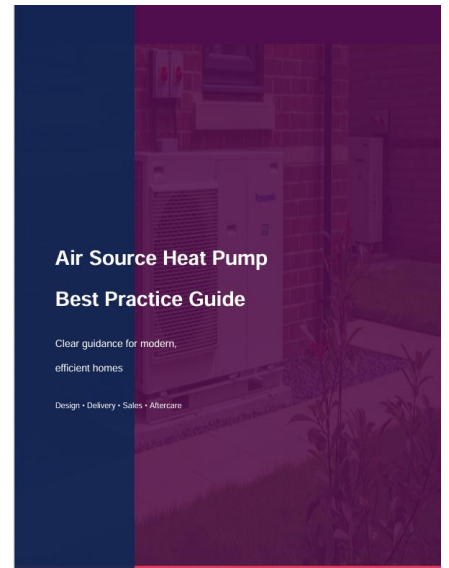
Powered by green energy

Many of our houses enjoy the benefit that sunshine brings with PV solar panels that make your new home less reliant on grid energy, which in turn helps you to reduce your electricity bills. How much you save will depend on your electricity usage vs how much electricity your panels are generating.

What's more if the panels generate more electricity than the home uses then you may be able to sell the energy back to the grid.

Over the next couple of years, we are also increasing our use of renewable energy sources across our developments, so our homes will be less dependent on gas and diesel. Not only that but we are ensuring our current homes are future proofed for our customers. So, if you want to make your home even greener by installing an Air Source Heat pump, the hardware behind the scenes will already be installed in your home.*

*Additional hot water cylinder required upon installation.



Future Homes Standard (Part L 2026)

What we know now

Jack Brayshaw, Director of Research and Innovation

Vistry



Beyond FHS – Learning by doing



WATER EFFICIENT SHOWER

SAVE WATER. SAVE ENERGY. EVERY DAY.

Designed to reduce water usage without compromising performance. Enjoy a powerful, refreshing shower while conserving our most precious resource.

- LOW FLOW RATE**
Uses as little as 6-7 litres per minute vs. standard showers (12-15 L/min)
- WATER SAVING**
Saves up to 50% more water than conventional showers
- HIGH PERFORMANCE**
Advanced nozzle design delivers strong, even water flow
- ENERGY EFFICIENT**
Uses less hot water, reducing energy bills and carbon footprint
- SUSTAINABLE CHOICE**
Better for the environment, better for your home

HOW MUCH CAN YOU SAVE?

UP TO **9,000** LITRES OF WATER PER YEAR*

That's enough to fill **180+** WATER BOTTLES (1.5L)

Small change. Big Impact. Choose a water efficient shower today.

*Savings based on a family of 4, showering for 8 minutes a day. Actual savings may vary.



An industry-proposed amendment to The Building Regulations 2010

Whole life carbon

INDUSTRY-PROPOSED DOCUMENT

Z

Z1 Carbon assessments

Z2 Carbon intensity

OVERHEATING & COOLING

Creating comfortable, healthy and resilient buildings in a changing climate

WHAT CAUSES OVERHEATING?
Modern buildings can trap heat, especially during hot weather.

- SOLAR GAINS**
Heat from the sun enters through roofs, walls and windows
- INTERNAL HEAT**
Appliances, lighting and occupancy generate heat
- POOR VENTILATION**
Stale air and lack of cool air movement increase indoor temperatures
- HIGH HEAT RETENTION**
Materials that absorb and store heat release it slowly, keeping buildings warm for longer

IMPACTS OF OVERHEATING

- DISCOMFORT**
Poor indoor comfort and disrupted sleep
- HEALTH RISKS**
Heat stress can lead to serious health problems
- REDUCED PRODUCTIVITY**
Harder to concentrate, lower performance at work and school
- HIGHER ENERGY USE**
Increased reliance on mechanical cooling

Overheating is a growing risk due to climate change. Designing buildings to stay cool is essential.

COOLING STRATEGIES
A combination of passive design and efficient systems can keep buildings cool and comfortable.

PASSIVE DESIGN – REDUCE HEAT, IMPROVE COMFORT

- EXTERNAL SHADING**
Use overhangs, louvers, blinds and trees to block direct sun
- NATURAL VENTILATION**
Encourage cross-ventilation and stack effect to remove hot air and bring in cool air
- HIGH PERFORMANCE FABRIC**
Good insulation, low solar gain glazing and airtightness help keep heat out
- GREEN INFRASTRUCTURE**
Trees, green roofs and plants cool the air and reduce the urban heat island effect
- THERMAL MASS**
Use materials that absorb heat during the day and release it at night

EFFICIENT ACTIVE SYSTEMS – WHEN NEEDED

- ENERGY EFFICIENT COOLING**
Use high efficiency systems and set appropriate temperature controls
- HEAT RECOVERY VENTILATION**
Bring in fresh air while recovering cool energy from inside
- SMART CONTROLS**
Use sensors, automation and shading controls to respond to conditions

KEY TAKEAWAYS

- Design early: Consider overheating from the start of the project
- Prioritise passive solutions: They use less energy and work all the time
- Adapt to local climate: Every location is different – design for the future
- Think about people: Comfort, health and wellbeing come first
- Plan for a changing climate: Buildings need to be resilient to hotter summers ahead

Thank you

Vistry

Bovis Homes
Est. 1885

Linden
Homes


COUNTRYSIDE
Homes

Countryside
Partnerships



Future Homes Standard Technical Conference



Learning by doing



Ross Holleron
Head of Homes and
Construction
Future Homes Hub



Jack Brayshaw
Director of Research
and Innovation
Vistry



Professor David Glew
Head of Sustainable
Buildings
Leeds Beckett
University



Olivia Greenhalgh
Sustainability Manager
First Choice Homes
Oldham



Future Homes Standard Essentials

Sponsored by **e-on next**



David Adams

Strategic Advisor

Future Homes Hub



The Future Homes Standard Essentials

Seven actions to de-risk delivery today



<https://futurehomes.org.uk/future-homes-standard-ready>

Google: get future homes standard ready



User specific guidance - published





Get FHS Ready Webinars and Podcasts

Fridays 1-2pm

Available in Hub members area

Future Homes Standard Reflections

Lead early, learn fast, share lessons

Delivering homes with heat pumps

Ventilation in New Homes

Build as designed

Prioritize grid availability

Getting heating design right (part 1)

19 June

Getting heating design right (part 2)

3 July

Commission with care

10 July

Own the customer journey

17 July

Evolve your design

September





Thank you

Save the date

Future Homes Annual Conference on 2nd December



Be sure to share your experience on LinkedIn using #FHSready