energie sprong uk

West Walk, Sneinton

Pilot Project

Nottingham City Homes

Melius Homes

Energiesprong is a new-build and whole house refurbishment approach including guaranteed whole-home measured energy consumption, as opposed to modelled performance.

AFFORDABLE

Financed from energy + maintenance savings at target cost of £60 - £65K

DESIGN

Looks & feels good – regeneration and refurbishment

NON-INTRUSIVE

Refurbishment within two weeks – occupants stay in their homes

ASSURED QUALITY

30+ years performance guaranteed


WEST WALK
NAIL BAR
NICOL SHOP
SNEINTON ROAD

West Walk

City side

West Walk

West Walk

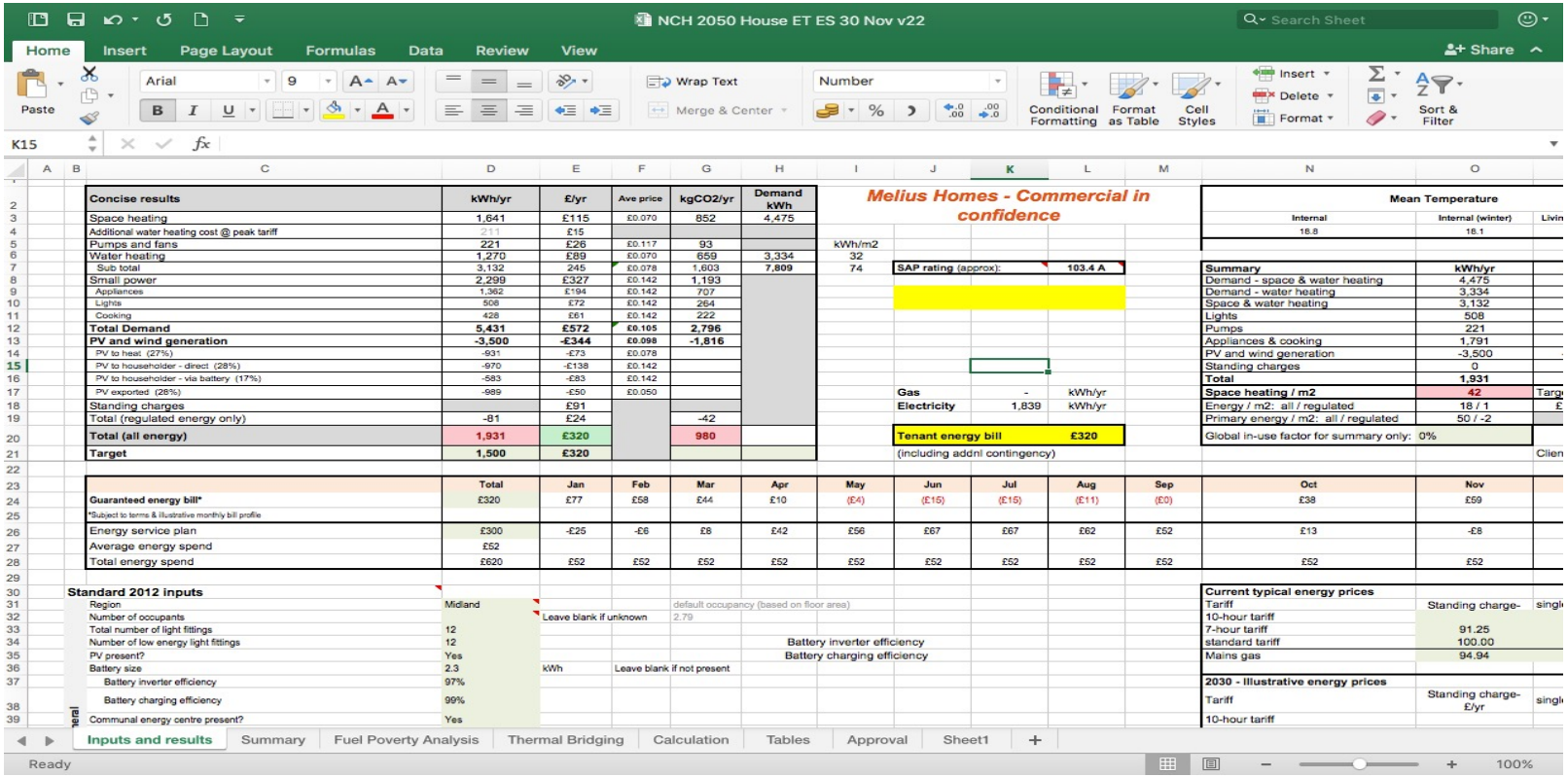
Energy centre
(serves 25 properties)

GSHP

Large thermal store

Battery storage

West Walk The energy model, bespoke but based on BREDEM:



NCH 2050 House ET ES 30 Nov v22

Melius Homes - Commercial in confidence

Concise results	kWh/yr	£/yr	Ave price	kgCO2/yr	Demand kWh
Space heating	1,641	£115	£0.070	852	4,475
Additional water heating cost @ peak tariff	-	£15			
Pumps and fans	221	£26	£0.117	93	
Water heating	1,270	£89	£0.070	659	3,334
Sub total	3,132	245	£0.078	1,603	7,809
Small power	2,299	£327	£0.142	1,193	
Appliances	1,362	£194	£0.142	707	
Lights	508	£72	£0.142	264	
Cooking	428	£61	£0.142	222	
Total Demand	**5,431**	**£572**	**£0.105**	**2,796**	
PV and wind generation	**-3,500**	**-£344**	**£0.098**	**-1,816**	
PV to heat (27%)	-931	-£73	£0.078		
PV to householder - direct (28%)	-970	-£138	£0.142		
PV to householder - via battery (17%)	-583	-£83	£0.142		
PV exported (28%)	-989	-£50	£0.050		
Standing charges		£91			
Total (regulated energy only)	-81	£24		-42	
Total (all energy)	**1,931**	**£320**		**980**	
Target	**1,500**	**£320**			

kWh/m2: 32, 74

SAP rating (approx): 103.4 A

Gas - kWh/yr

Electricity 1,839 kWh/yr

Tenant energy bill £320

(including addnl contingency)

Mean Temperature

Internal	Internal (winter)
18.8	18.1

Summary	kWh/yr
Demand - space & water heating	4,475
Demand - water heating	3,334
Space & water heating	3,132
Lights	508
Pumps	221
Appliances & cooking	1,791
PV and wind generation	-3,500
Standing charges	0
Total	**1,931**
Space heating / m2	42
Energy / m2: all / regulated	18 / 1
Primary energy / m2: all / regulated	50 / -2
Global in-use factor for summary only:	0%

	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Guaranteed energy bill*	£320	£77	£58	£44	£10	(£4)	(£15)	(£15)	(£11)	(£0)	£38	£59
*Subject to terms & illustrative monthly bill profile												
Energy service plan	£300	-£25	-£6	£8	£42	£56	£67	£67	£62	£52	£13	-£8
Average energy spend	£52											
Total energy spend	£620	£52	£52	£52	£52	£52	£52	£52	£52	£52	£52	£52

Standard 2012 inputs

Region	Midland		default occupancy (based on floor area)
Number of occupants		Leave blank if unknown	2.79
Total number of light fittings	12		
Number of low energy light fittings	12		Battery inverter efficiency
PV present?	Yes		Battery charging efficiency
Battery size	2.3	kWh	Leave blank if not present
Battery inverter efficiency	97%		
Battery charging efficiency	99%		
Communal energy centre present?	Yes		

Current typical energy prices

Tariff	Standing charge-
10-hour tariff	
7-hour tariff	91.25
standard tariff	100.00
Mains gas	94.94

2030 - Illustrative energy prices

Tariff	Standing charge- £/yr
10-hour tariff	

Inputs and results | Summary | Fuel Poverty Analysis | Thermal Bridging | Calculation | Tables | Approval | Sheet1

Ready 100%

Rollout

Nottingham City Homes
Melius Homes

Project update

Learnings from carrying out whole house retrofit

Energiesprong:
Nottingham City Homes 2050

60 homes have been retrofitted in Nottingham

173 homes have been retrofitted using the Energiesprong approach across nine schemes in the UK, with more to follow in 2022/23

Studio Partington

Energiesprong:
Nottingham City Homes 2050

Thinking about the detail led to:

- Improved urban design
- Strengthened communities
- A stronger sense of security and place

"***Before it [the home] looked like a rabbit hutch – it looks like a proper home now***"

Joan Warbuton, Nottingham City Homes tenant

Studio Partington

Energiesprong:
Nottingham City Homes 2050

The contractor signs a performance guarantee, ensuring that the in-use energy use and generation are in line with the approved design

The only way to provide this guarantee is to closely monitor the energy consumption and other metrics after the project is complete

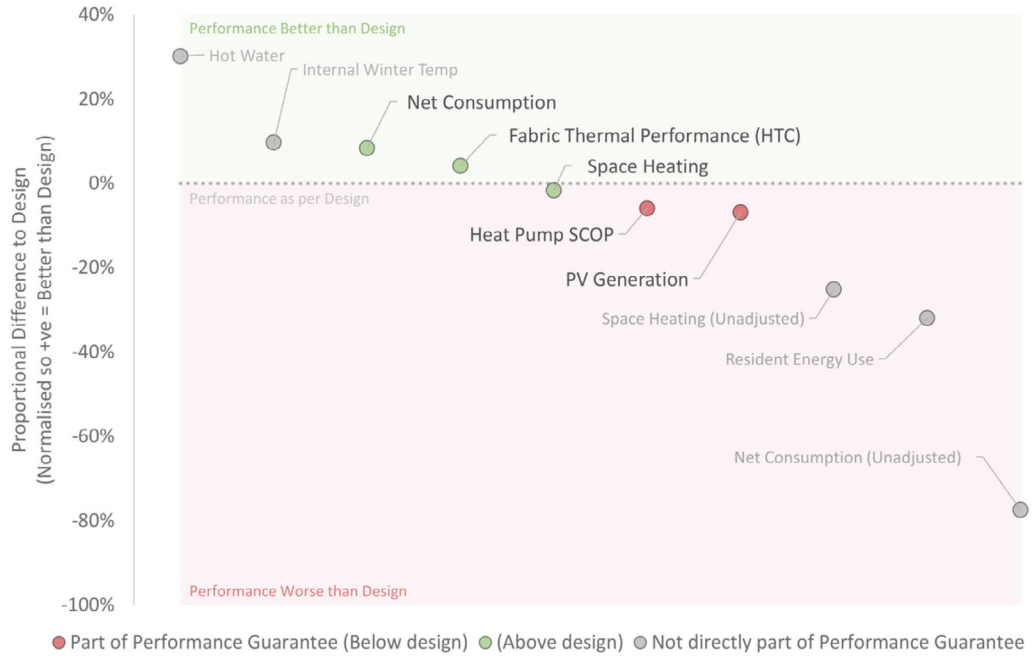


Figure 2: Summary performance statistics - Energiesprong UK pilot projects

71%
71% of properties had a measured fabric thermal performance within +15% of the design value

-70%
Properties are using 70% less energy on average than other local homes

48
For the measured properties, average adjusted space heating energy consumption was 48 kWh/m²/yr

Studio Partington

Energiesprong:
Nottingham City Homes 2050

Six years of continuous learning from Nottingham Energiesprong pilot projects

Installation period reduced by 60%

Cost reduction circa 45%

Studio Partington

Energiesprong:
Nottingham City Homes 2050

Range of suppliers and approaches tested including different ways of manufacturing facades

Highlighted how unequipped the supply chain is

Resulted in Melius Homes establishing advanced MMC factory in Nottingham (closed panel timber frame)

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Energiesprong:
Nottingham City Homes 2050

Three different M&E approaches:

Full communal energy system with private wire electricity and communal heating

Communal ground source with individual heat pumps and batteries

In the current scheme, individual air source heat pumps with battery storage

Studio Partington

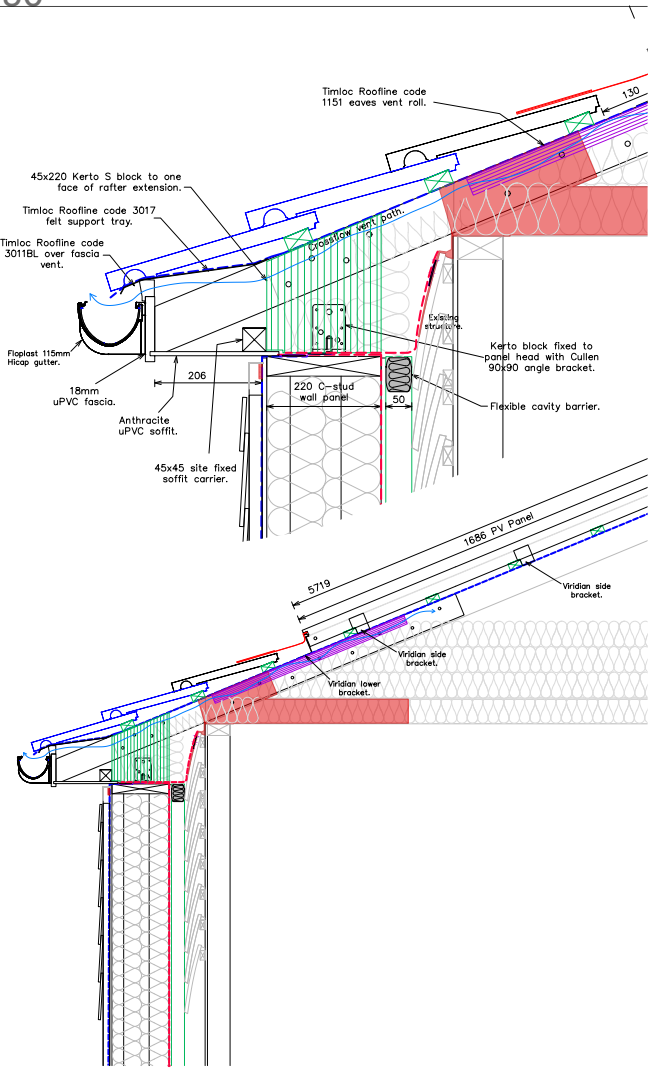
Energiesprong:
Nottingham City Homes 2050

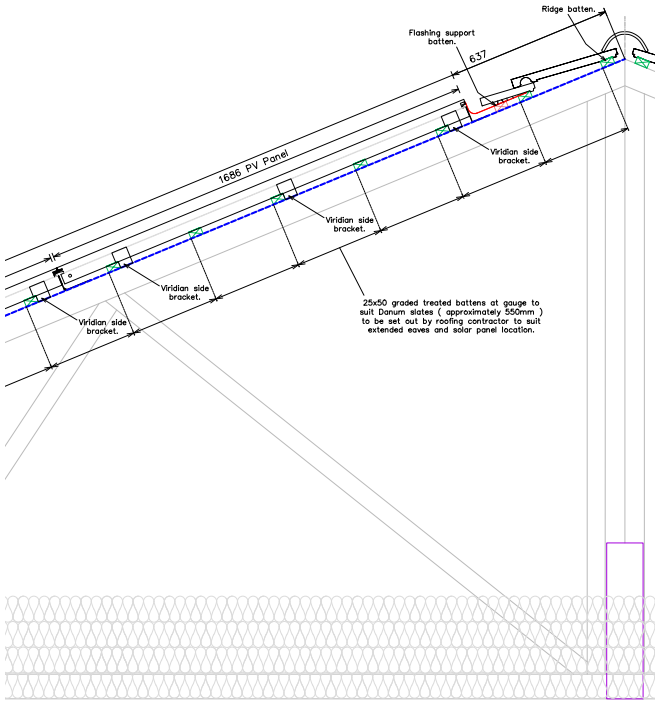
Project has been procured as a series of pilots due to funding

Has led to continuous learning

However, lack of scale and purchasing power has been an issue

For example, with roof finish / PV detailing





Rev	Description	Date	Initial
A	First issue.	11/07/22	PC

Melius Homes Limited
Harvey Road
Bilborough
Nottingham NG3 3BB
www.meliushomes.co.uk
Better Living.

CLIENT
Nottingham City Homes.

PROJECT
MH004-03
NCH 2050 Rollout
Phase 3, St. Peters.

PROPERTY TYPE
House type 04B & 04C.

DRAWING TITLE
Roof detail section.

DRAWING NUMBER
03_H4_4_SE_02_MH006

DATE	DRAWN	CHECKED
05/07/22	PC	CI

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Energiesprong:
Nottingham City Homes 2050

The second pilot used PV built into a thermally-insulated roof cassette, also manufactured off-site

However, monitoring showed this performed no better than refurbishing the existing roofs

In the current scheme, existing roof tiles are being reused around PV panels

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Energiesprong:
Nottingham City Homes 2050

Reduction in quality of finishes:

UPVC copings, flashings and rainwater goods

Fibre cement trim window surrounds

Moved away from PPC aluminium due to six-eight weeks lead time, cost (£250 a window) and difficultly when the occasional frame arrived damaged

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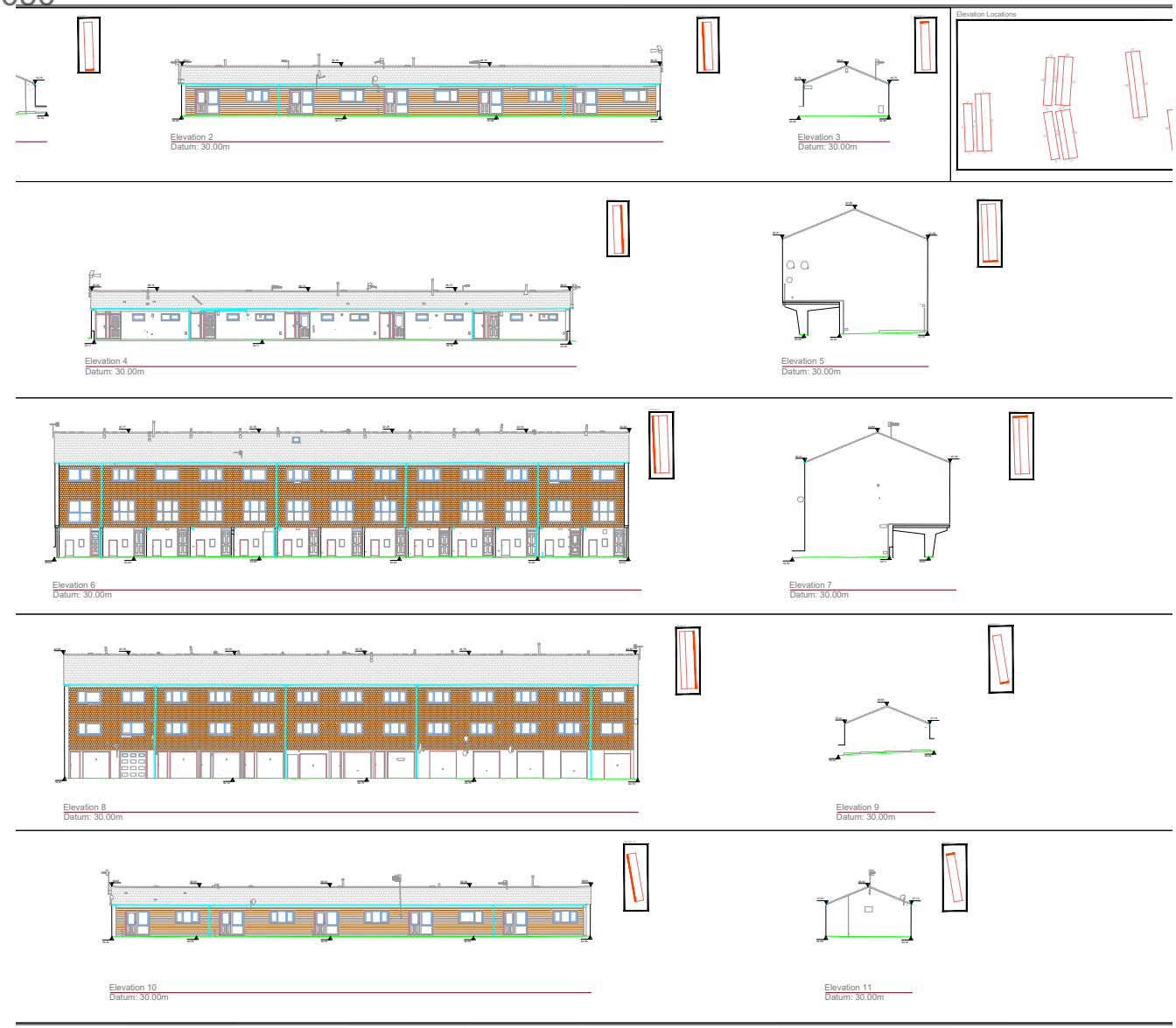
Energiesprong:
Nottingham City Homes 2050

Importance of surveying (laser scanning) each property

External survey is the basis of planning elevations and gives general set up of panels, including things like windows and rainwater goods



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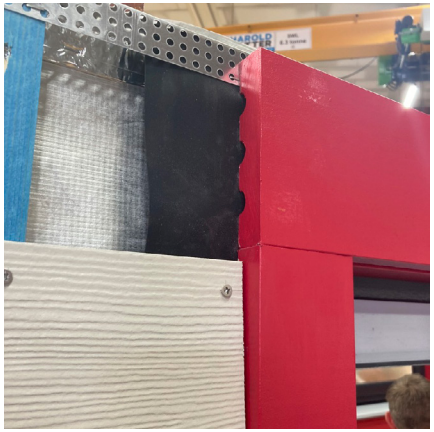
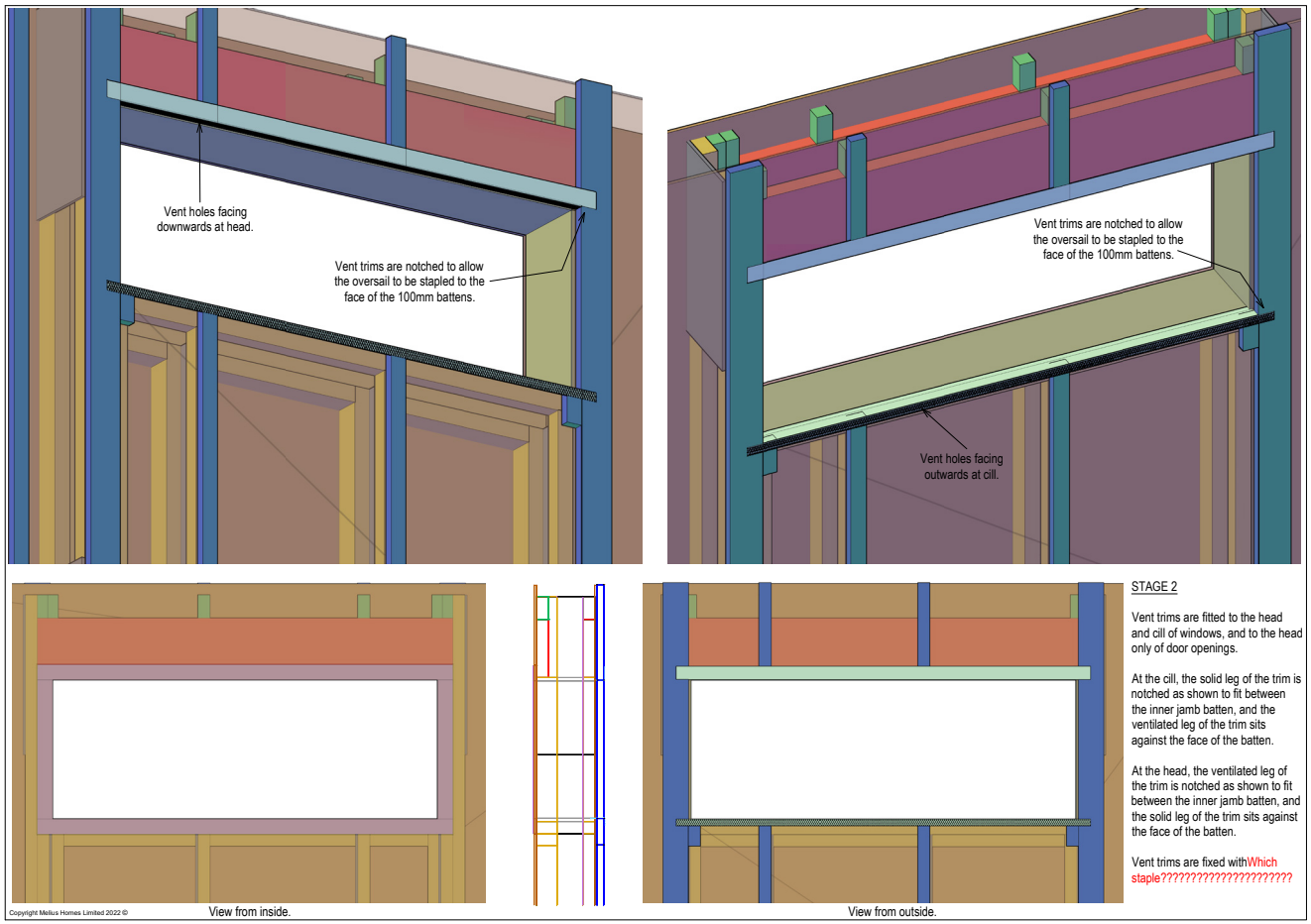
Energiesprong:
Nottingham City Homes 2050

The devil is in the (window surround) detail!

Construction sequence can be highly controlled in the factory

Melius Homes 11-stage window installation manual





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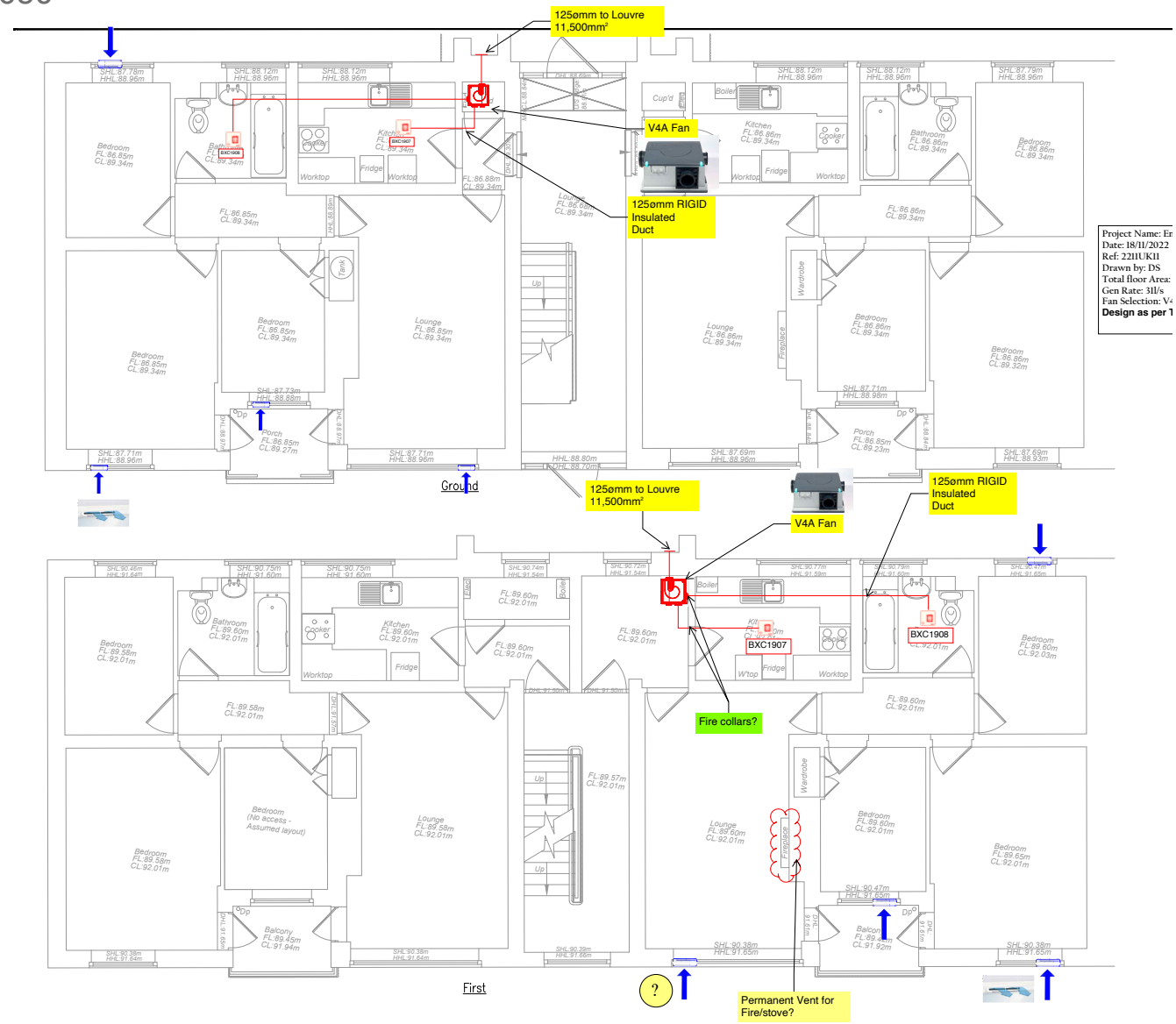
Nottingham City Homes 2050

MVHR is too expensive

Not going to pay for itself when making whole life decision

Demand-controlled centralised MEV (Aereco) with relative humidity sensitive air inlets more compatible for retrofit



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Energiesprong:
Nottingham City Homes 2050

Pre- and post-retrofit analysis:

Get monitoring systems installed early to provide ‘before and after’ data (Carnego Systems)

Occupant satisfaction surveying

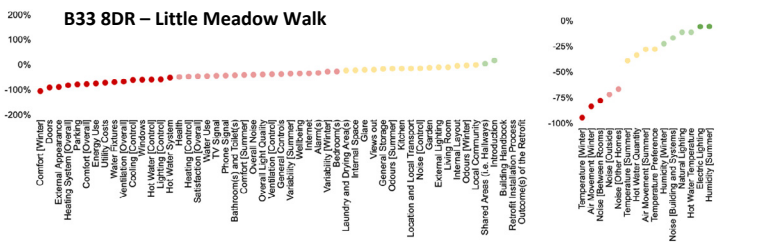
Overheating risk analysis

Less than 11 summer days a year are over a comfort temperature of 26°C in all monitored rooms

Detailed Analysis

Pertinent issues (*more than 25% worse than benchmark / target scores*) in order of severity:

Comfort [Winter], Doors, Views out, **External Appearance**, **Hot Water System**, **Satisfaction [Overall]**, **Health**, **Wellbeing**, **Utility Costs**, Parking, Water Fixtures, General Storage, **Hot Water [Control]**, **Energy Use**, **General Controls**, **Glare**, **Temperature [Winter]**, **Air Movement [Winter]**, **Noise [Outside]**, Noise [Between Rooms], Noise [Other Homes], **Humidity [Winter]**, **Comfort [Summer]**, **Heating [Control]**, **Odours [Winter]**, Bathroom(s) and Toilet(s), Internal Space, Internet, Lighting [Control], Overall Light Quality, External Lighting, Local Community, **Ventilation [Overall]**, Alarm(s), Bedroom(s), Shared Areas (i.e. Hallways), **Overall Noise**, Location and Local Transport, **Heating System [Overall]**, Water Use, TV Signal, **Noise [Control]**, **Comfort [Overall]**, Electric Lighting, **Temperature [Summer]**, **Humidity [Summer]**



Pertinent issues (*more than 25% worse than benchmark / target scores*) in order of severity:

Comfort [Winter], Doors, **External Appearance**, **Heating System [Overall]**, Parking, **Comfort [Overall]**, **Energy Use**, **Utility Costs**, Water Fixtures, **Ventilation [Overall]**, **Cooling [Control]**, **Windows**, **Hot Water [Control]**, Lighting [Control], **Hot Water System**, **Temperature [Winter]**, **Air Movement [Winter]**, Noise [Between Rooms], **Noise [Outside]**, **Noise [Other Homes]**, **Health**, **Heating [Control]**, **Satisfaction [Overall]**, Water Use, TV Signal, Phone Signal, Bathroom(s) and Toilet(s), **Comfort [Summer]**, **Overall Noise**, Overall Light Quality, **Ventilation [Control]**, **General Controls**, **Variability [Summer]**, **Wellbeing**, Internet, Alarm(s), **Variability [Winter]**, Bedroom(s), **Temperature [Summer]**, **Hot Water Quantity**, **Air Movement [Summer]**

“Occupants are the best (albeit uncalibrated) sensor of building performance that we have.”

Zachary Gill, Net Zero Technical Analyst, Energiesprong UK

Studio Partington

Energiesprong:
Nottingham City Homes 2050

Specialists working in peoples' homes while occupied e.g., clearing up and returning heat, power, and drainage at the end of each day, sticking to programme

£££
Additional cost for retrofit in interaction with residents

Costly when access cannot be arranged leading to inefficiencies on site

Studio Partington

Conclusion

Retrofit is too fiddly to be done at scale

Benefits of setting up local factory to employment, training, tradespeople mental health

Questions