BowTieSprong

Net Zero Energy Retrofit

Hagop Heath-Matossian Msc. CPHC

hagop@bowtieconstruction.co.uk

energie sprong uk

Interreg North-West Europe Mustbe0

European Regional Development Fund

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NILAN® OUTSTANDING INDOOR CLIMATE

Itinerary

1 Introduction

2 Fire Safety

3 Final Imagery

4 Life is for Living

5 Getting Technical

6 Resident Engagement

7 Renewables and Services

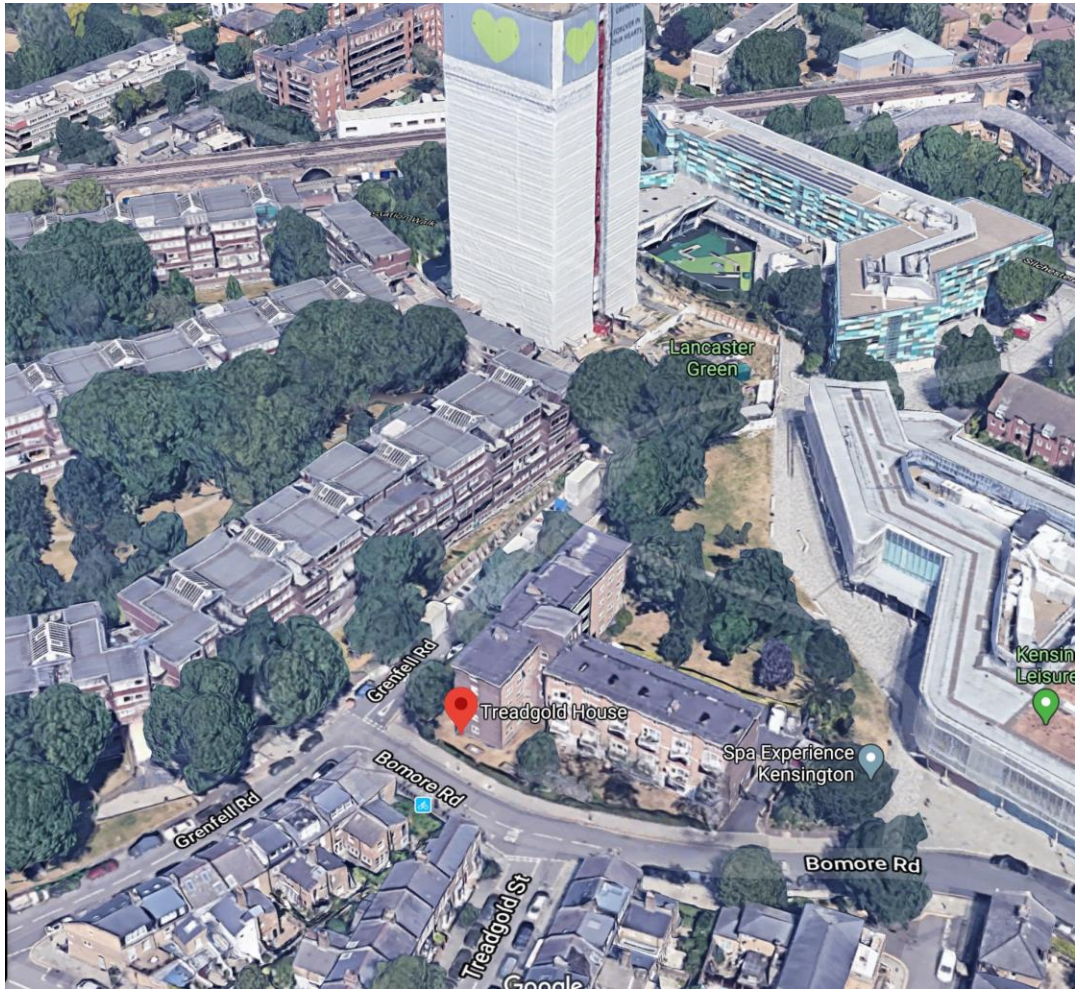
8 Installation Costs

9 Construction Program

10 Consortium Information and Workflow

11 Conclusion and Questions

Treadgold House – Lancaster West Estate



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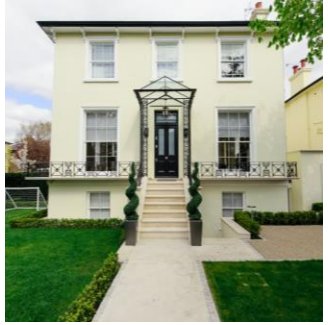
Existing Sketchup File





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London's Passivhaus Retrofit Specialists

Project Lead

Hagop Heath-Matossian
Project Lead

Rafael Delimata
Technical Design

Mircea Ciorapciu
M&E 3D Design

Tom Dudziak
Roof Design

10 completed Passivhaus / 30 completed low-energy refurbishments / Deliver Low-Energy Design & Construction Training

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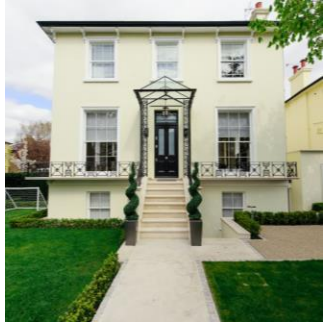



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RIBA LONDON AWARDS 2019
Max Fordham House

Winner X 2

CONSTRUCTING EXCELLENCE
SECBE AWARDS 2019
FINALIST

X 2

GERMAN DESIGN AWARD 2020

Shortlist

Max Fordham House
Camden Town
£1.5M

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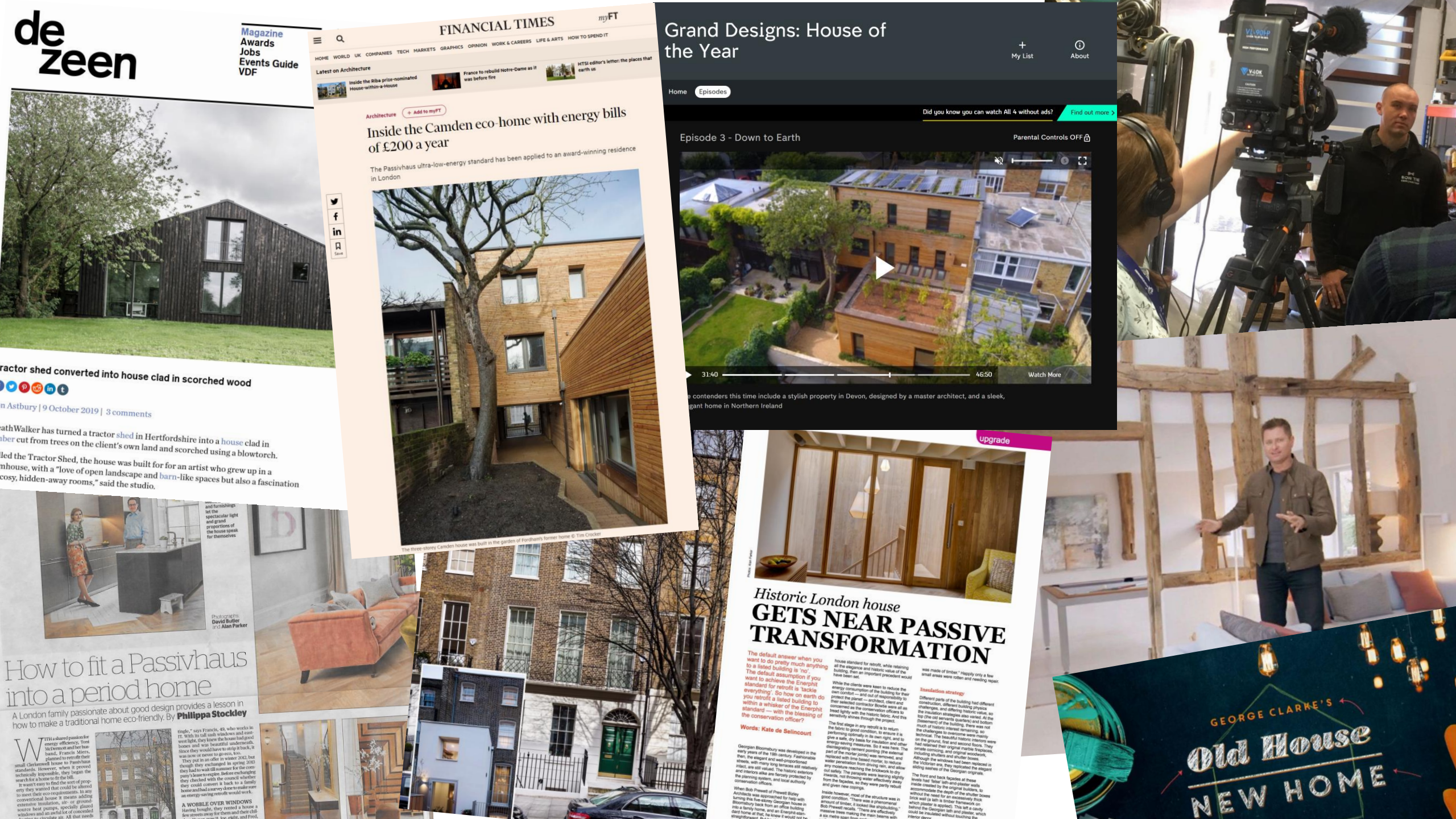

de zeen
Magazine
Awards
Jobs
Events Guide
VDF
ractor shed converted into house clad in scorched wood
n Astbury | 9 October 2019 | 3 comments
eathWalker has turned a tractor shed in Hertfordshire into a house clad in
ber cut from trees on the client's own land and scorched using a blowtorch.
led the Tractor Shed, the house was built for for an artist who grew up in a
mhouse, with a "love of open landscape and barn-like spaces but also a fascination
cosy, hidden-away rooms," said the studio.
How to fit a Passivhaus into a period home
A London family passionate about good design provides a lesson in how to make a traditional home eco-friendly. By Philippa Stockley
A WOBBLE OVER WINDOWS
FINANCIAL TIMES
myFT
HOME WORLD UK COMPANIES TECH MARKETS GRAPHICS OPINION WORK & CAREERS LIFE & ARTS HOW TO SPEND IT
Latest on Architecture
Inside the Riba prize-nominated House-within-a-House
France to rebuild Notre-Dame as it was before fire
HTSI editor's letter: the places that earth us
Architecture
+ Add to myFT
Inside the Camden eco-home with energy bills of £200 a year
The Passivhaus ultra-low-energy standard has been applied to an award-winning residence in London
Save
The three-storey Camden house was built in the garden of Fordham's former home © Tim Crocker
Grand Designs: House of the Year
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e contenders this time include a stylish property in Devon, designed by a master architect, and a sleek,
gant home in Northern Ireland
upgrade
Historic London house
GETS NEAR PASSIVE TRANSFORMATION
The default answer when you want to do pretty much anything to a listed building is 'no'. The default assumption if you want to achieve the Enerphit standard for retrofit is 'tackle everything'. So how on earth do you retrofit a listed building to within a whisker of the Enerphit standard — with the blessing of the conservation officer?
Words: Kate de Selincourt
Insulation strategy
GEORGE CLARKE'S
Old House
NEW HOME


50%


15 KWH /M2
An Introduction to Passivhaus
Sept - Oct 2019
Passionate builders with technical expertise
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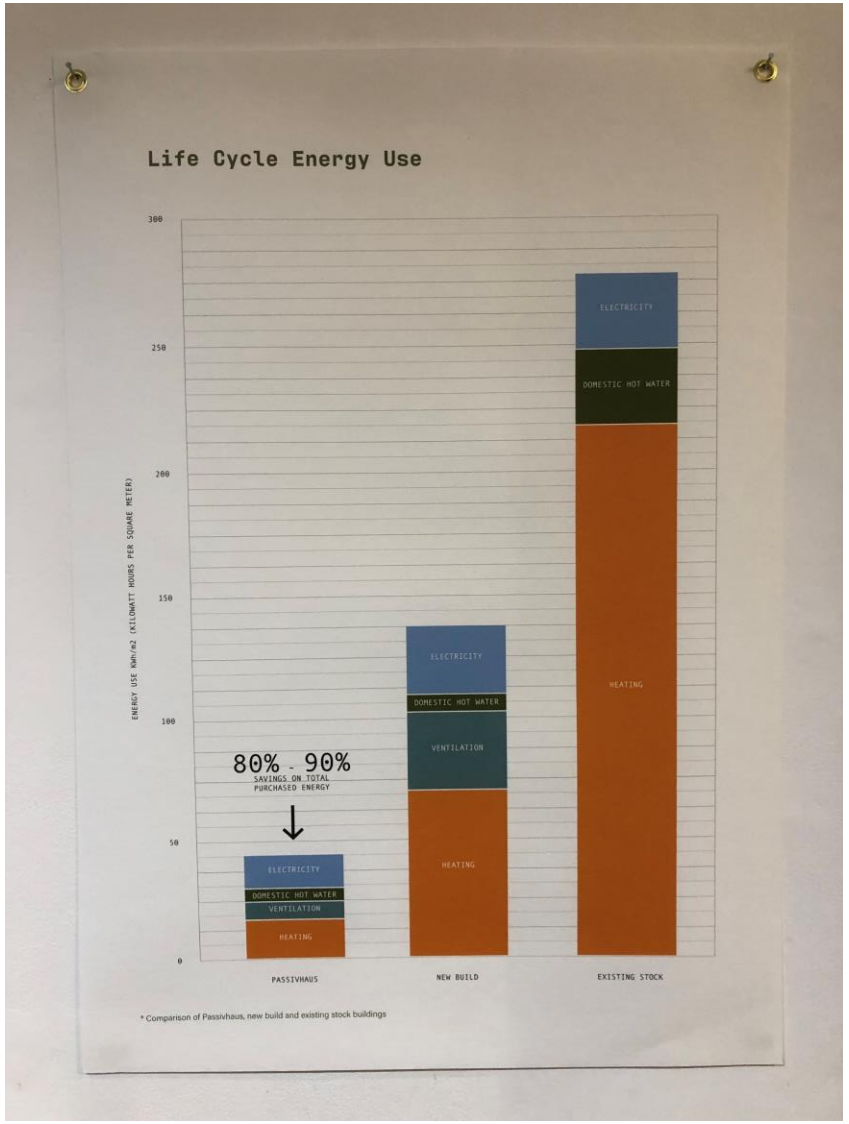
Life Cycle Energy Use
ENERGY USE KWH/M2 (KILOWATT HOURS PER SQUARE METER)
300
250
200
150
100
50
0
80% - 90%
SAVINGS ON TOTAL PURCHASED ENERGY
ELECTRICITY
DOMESTIC HOT WATER
VENTILATION
HEATING
PASSIVHAUS
NEW BUILD
EXISTING STOCK
* Comparison of Passivhaus, new build and existing stock buildings

GSA

Architecture, Graphics & Energy Modelling

John Pratley
Associate Director

Sara Provini
Architect

Nick Beacon
Architect

Architecture, masterplanning and urban design / Large-scale residential retrofit work / EnergieSprong & Passivhaus delivery

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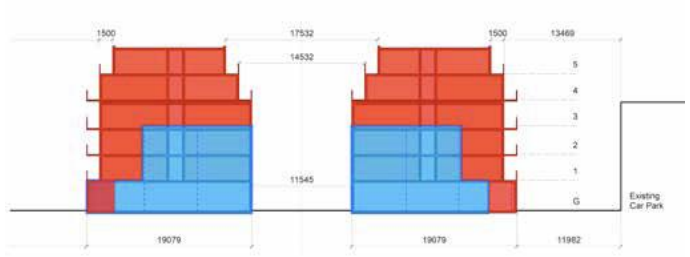

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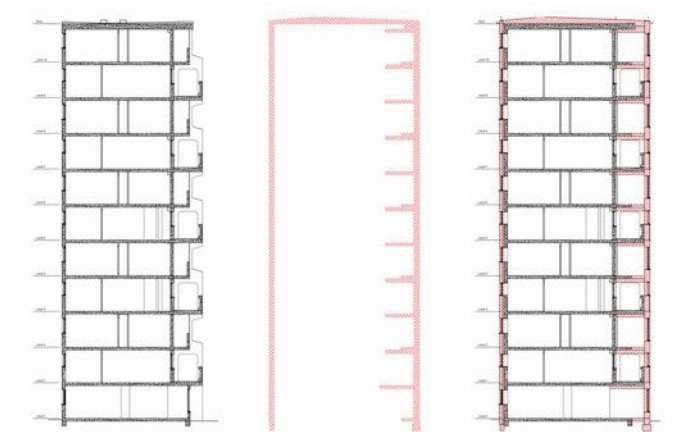

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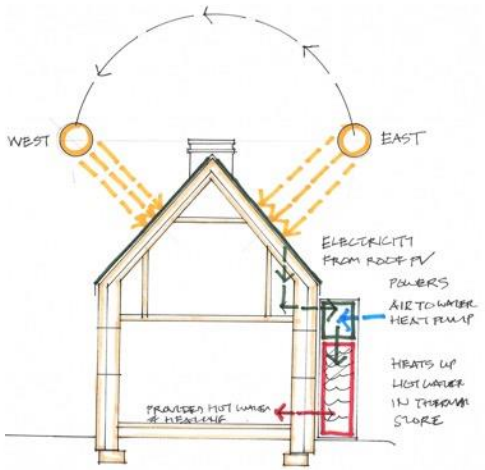

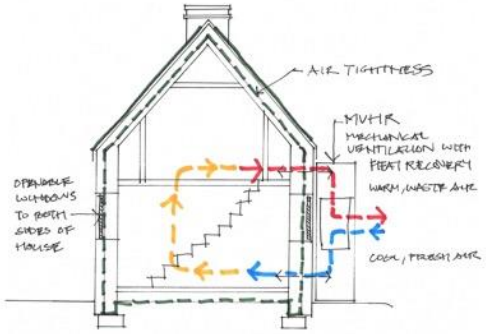

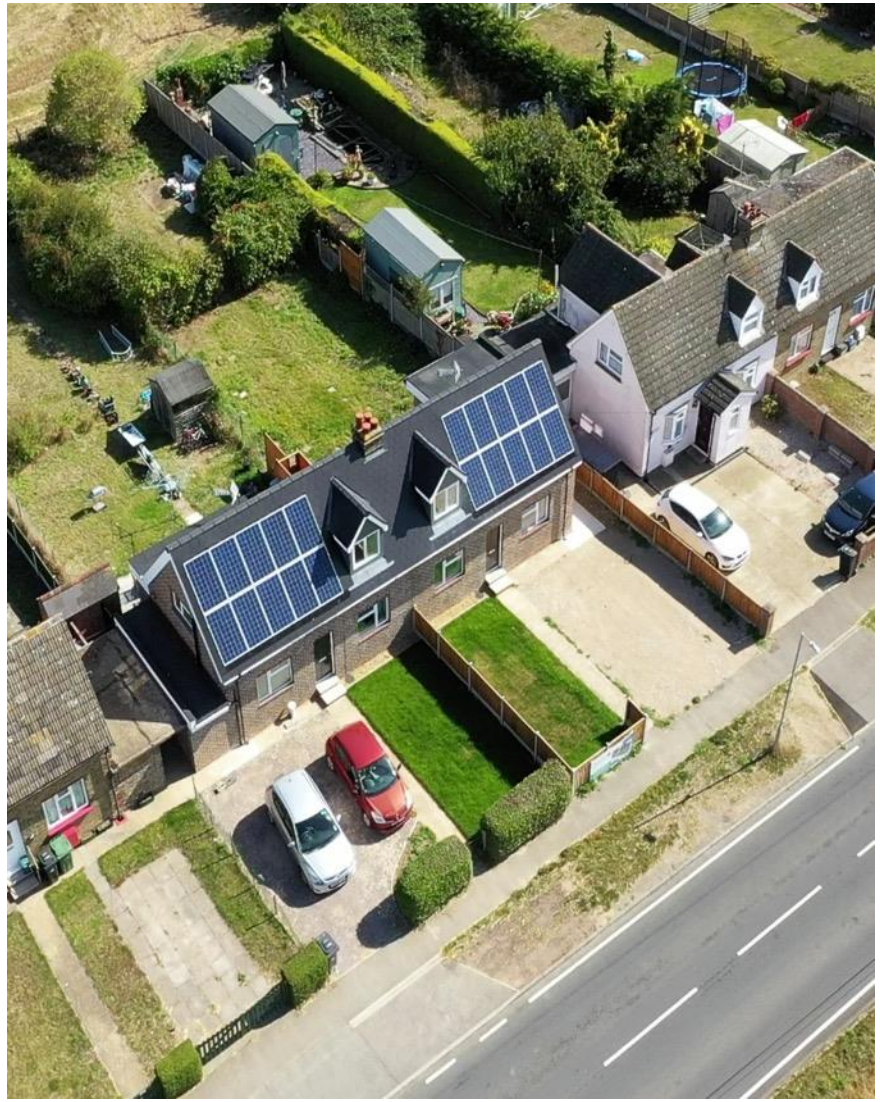

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EWI System supply

Matt Ratcliff
Director

Andres Gonzalez
Technical Director

Brick finish EWI / Cost 25% lower than conventional EWI / Energiesprong supplier

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NILAN®
OUTSTANDING INDOOR CLIMATE

M&E and MVHR Compact Unit Supply

Stuart Laughton
UK Director

Manufacturing combined heat pump and MVHR systems since 2010 / Fitted to 1000's of Passivhaus & 'Hem' EnergieSprong France.

BOW TIE CONSTRUCTION GSA MAUER

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BOW TIE CONSTRUCTION

NILAN®
OUTSTANDING INDOOR CLIMATE

Whole Building Retrofit

The Challenges:

Fit
Adjustment
Installation Duration

Result:

Performance Compromise
Balooning Costs
Occupier Inconvenience

Whole Building Retrofit

BowTieSprong Solution:

Guide System
Passivhaus enhanced design
Futureproofed Service routes
Phased, fast installation

Result:

Excellent Performance
On time & On-budget
Disruption Minimised

Final Imagery

Proposed Sketchup File

Fire Safety

Fire Safety

The Building (Amendment) Regulations which came into force in December 2018 introduce new restrictions on the combustibility of materials contained within external walls of “relevant buildings” in England.

“Relevant buildings” includes residential and institutional buildings that are more than 18m high. Although Treadgold House is 13.2m high, we are treating it as a relevant building due to local sensitivity to the Grenfell tragedy. It is also possible in future that the threshold for relevant buildings will be lowered to 12m. We are also applying it to the roof.

"All the materials used within the new external walls and roof construction of the buildings will be either Euro Class A2-s1,d0 or Euro Class A1 tested."

Euro-class EN 13501-1	England, Wales, Northern Ireland	Scotland
A1	Non-combustible	Non-combustible
A2 (or better)	Limited Combustibility	Non-combustible
B-s3, d2 (or better)	0	Low Risk (0)
C-s3, d2 (or better)	1	Medium Risk (1)
D-s3, d2 (or better)	3	High Risk (2 & 3)
E-s3, d2 (or better)	4	Very High Risk
F-s3, d2 (or better)	Not Classified	Very High Risk

	Class	SBI Criteria
Smoke Production	s1	A little or no smoke
	s2	Quite a lot of smoke
	s3	Substantial smoke
Flaming Droplets/Particles	d0	No flaming particles/droplets occur within the evaluation period
	d1	No flaming particles/droplets lasting longer than 10s occur within the evaluation period
	d2	Product does not comply with either of the above

Euro Class A2-s1,d0 or Euro Class A1

Euro-class EN 13501-1	England, Wales, Northern Ireland	Scotland
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	d1	No flaming particles/droplets lasting longer than 10s occur within the evaluation period
	d2	Product does not comply with either of the above

8. Relevant Exclusions:

b) [any part of a roof] connected to an external wall;

c) door frames and doors;

d) electrical installations;

e) insulation and water proofing materials used below ground level;

g) membranes;

h) seals, gaskets, fixings, sealants and backer rods;

i) thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or

j) window frames and glass.

Fire Safety

That list of materials will be reviewed by a suitably competent fire engineer to ensure that they comply with the requirements.

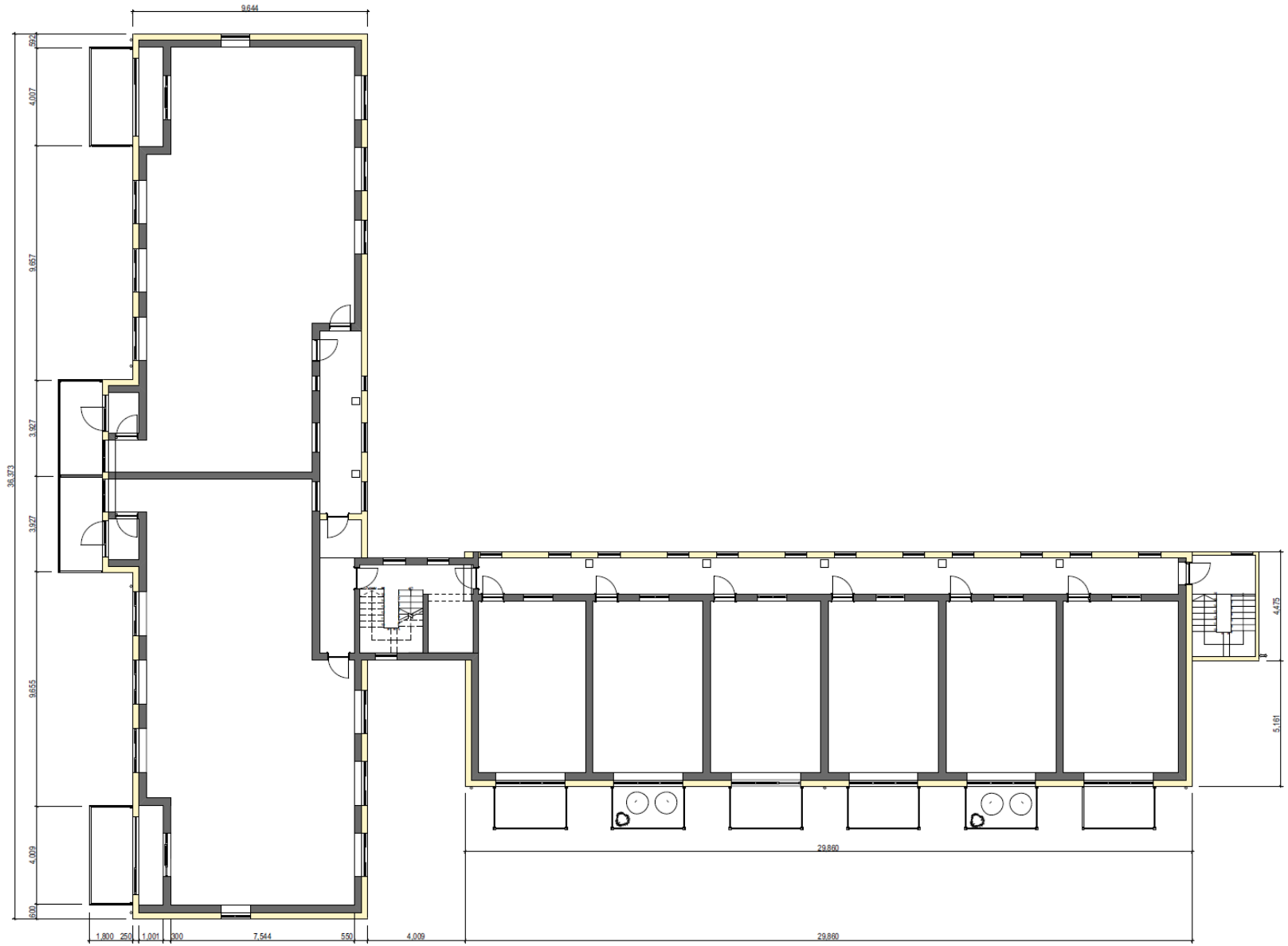
Once reviewed and approved they should be entered into a register of approved materials. The register should describe the basis on which they are considered acceptable (e.g. that is achieves Euro Class A1, or that the material is within the list of exclusions).

The register should form part of the Building Regulations submission, in order to ensure that the relevant Building Control Body can confirm approval to each of the materials.

The site processes will be carefully supervised to ensure that the construction personnel do not use or introduce any non-compliant materials into the external walls even in small quantities.

Part of design team until RIBA stage 4. From Stage 5 a new engineer joins who acts as a clerk of works.

The enclosing of the communal open deck access has required an additional stair to be added to the design proposals to provide safe escape for residents in both directions from a potential fire.



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Life is for Living

"community"

"balconies"

"temperature swings"

"mould and condensation"

"brick finish"

"draughty windows"

"gardening"

Increased and Improved Amenity Space for Every Flat

Block A Balconies & Winter Gardens

Existing 3.72 sq m

Proposed adds 6.46 sq m
totaling **10.2 sq m**

Increased and Improved Amenity Space for Every Flat

Block B Balconies & Winter Gardens

Existing 2.52 sq m

Proposed 4.8 sqm

Increased and Improved Amenity Space for Every Flat

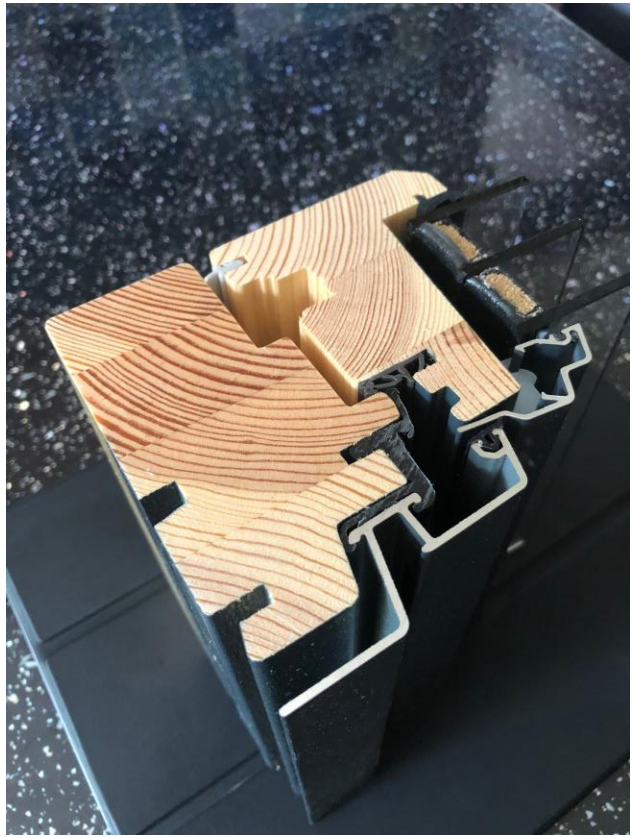
Block B Ground Floor Porch

Existing walkway

Proposed 5.6 sq m Porch

High Security Alu Clad Timber Windows and Doors

Draught-proof with Highest Energy Performance



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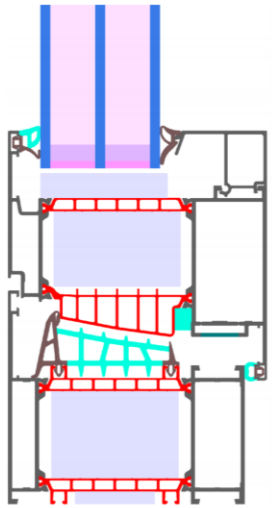
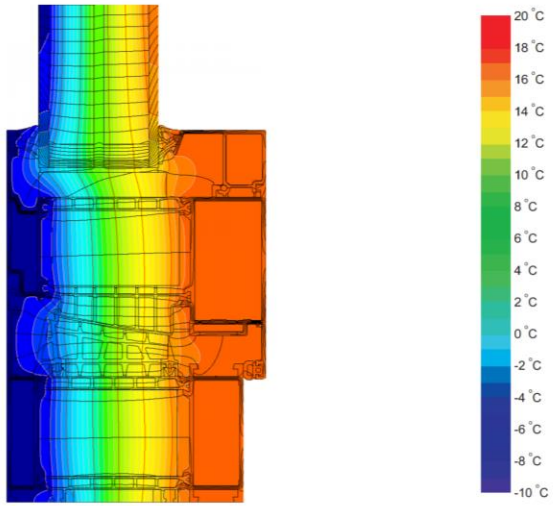
Omitted: Aluminium Windows and Doors

Draught-proof with Highest Energy Performance



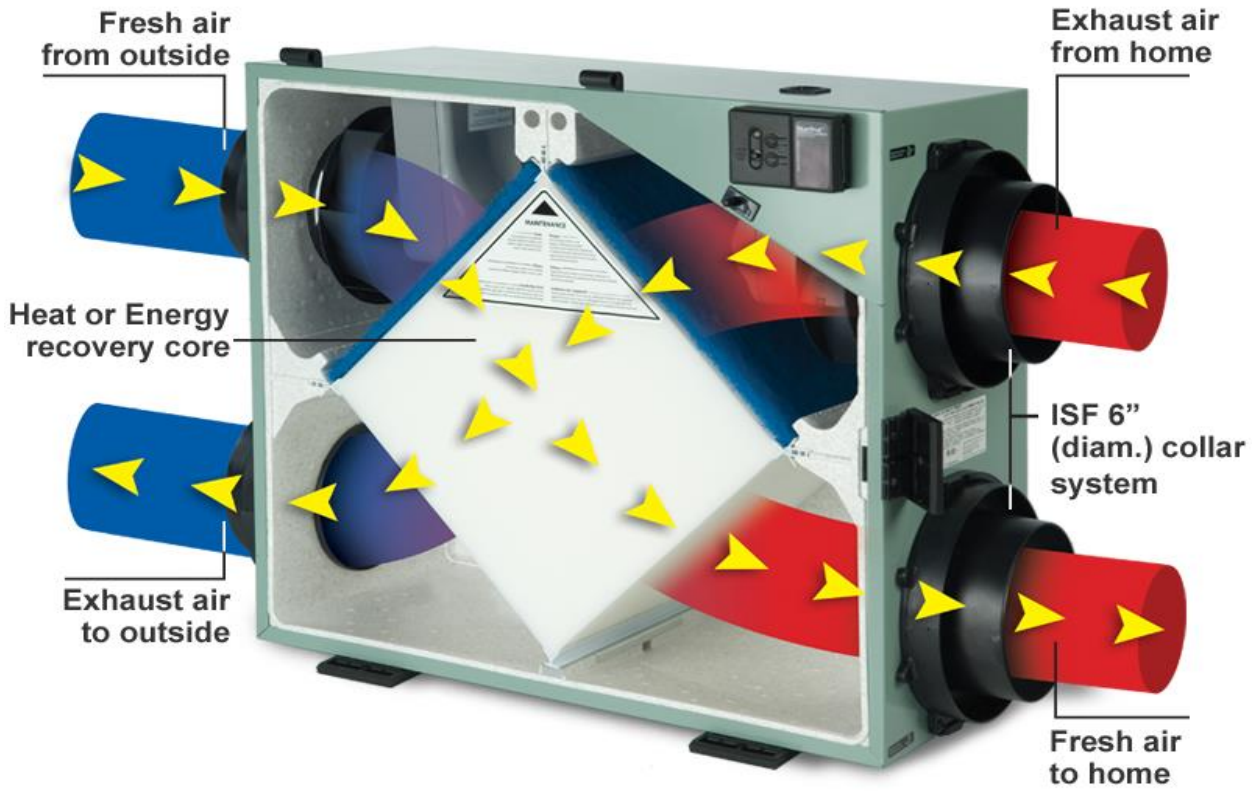
Calculation model

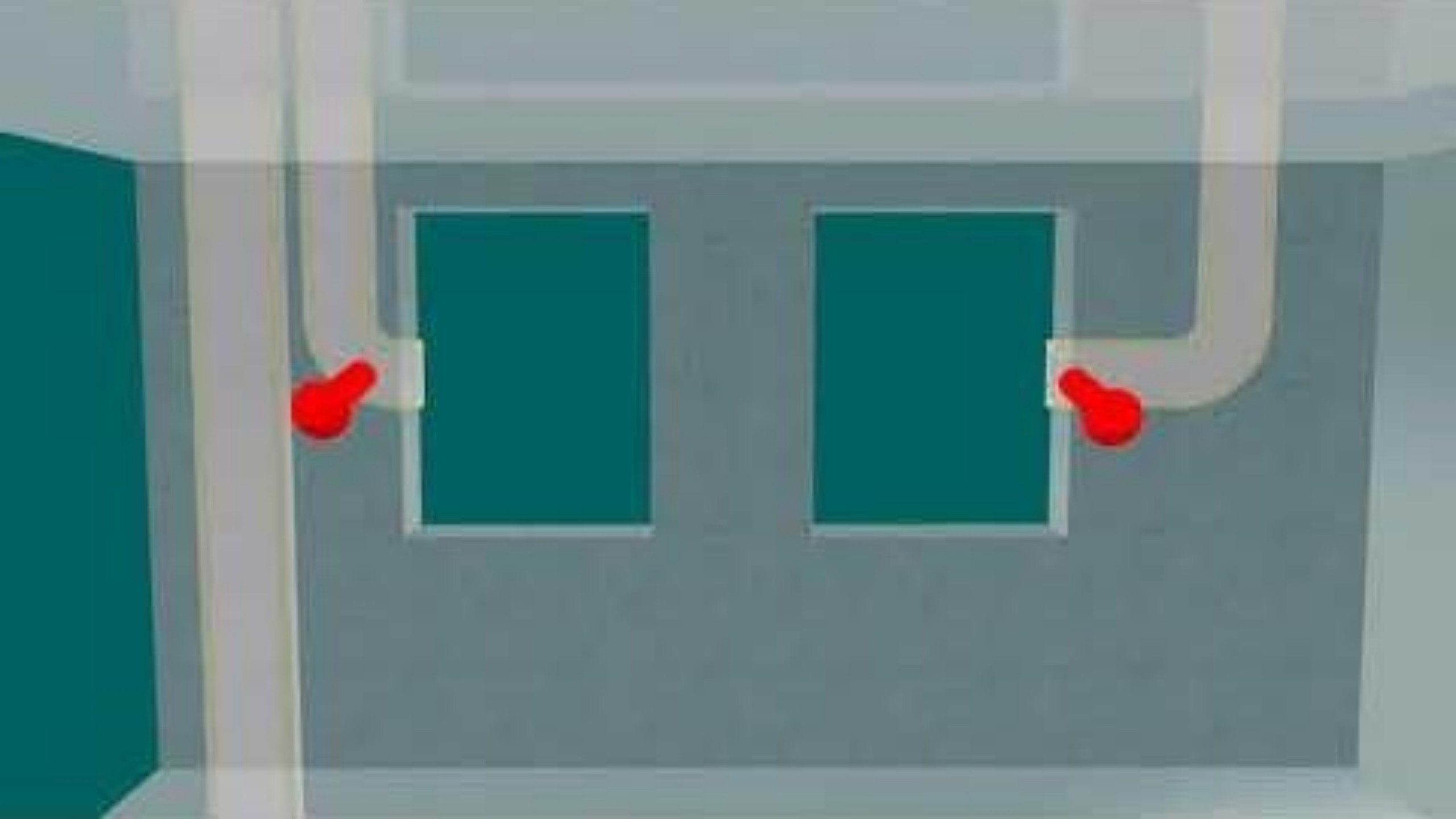


Isothermal

24/7 Clean Filtered Warm Air

Minimal Disruption During Installation





Hot Water heated by Air Source Heat Pump

No Gas Bill or Standing Charge

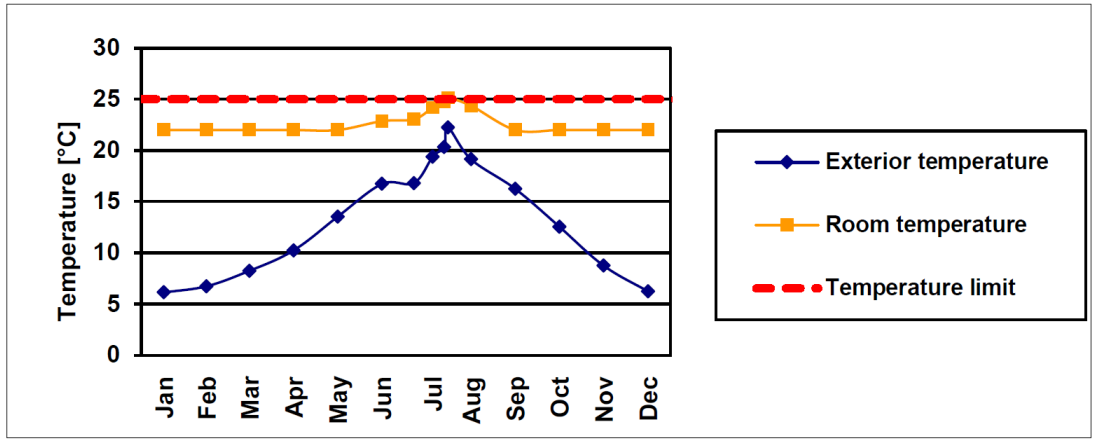
Fuel Poverty Eradicated

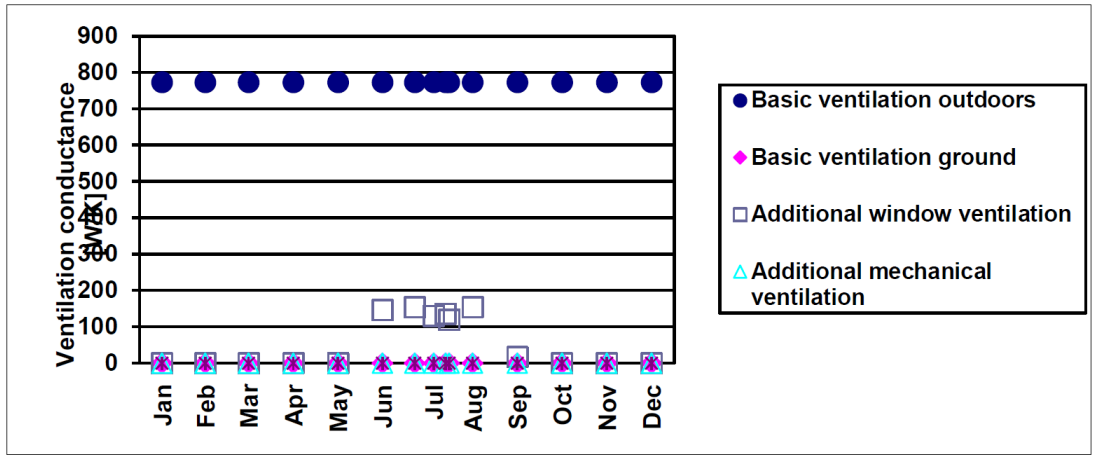
Living Area Constant 21 °

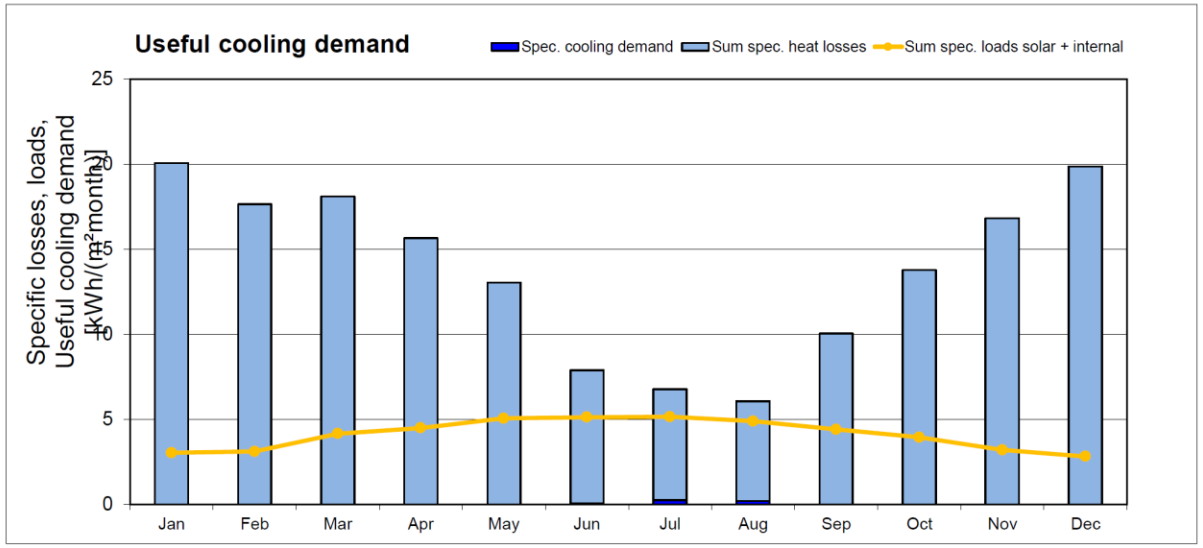
Damp and Mould eradicated: All surfaces > 19°

Temperature Never Above 26°

Guaranteed By Design







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Streamlined, Attractive, Desirable Building

Façade hallmarks co-designed with residents

Teambuilding Activities Spark Friendships, Celebrate Diversity & Build Community

Outside the Scope

Lift replacement, additional lift installation

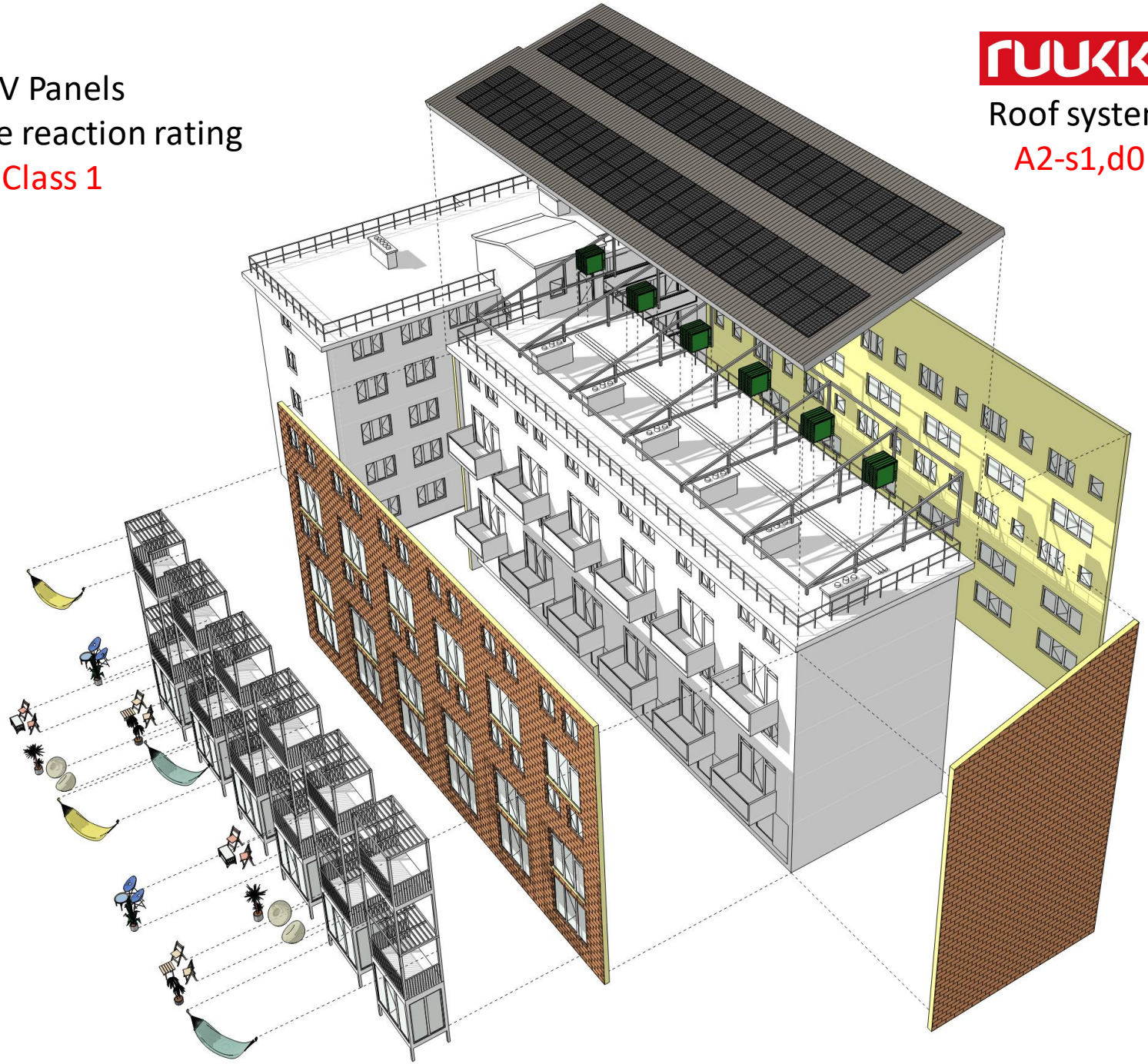
Internal Refurbishment, kitchens, bathrooms, etc.

Relocating building entryway

Landscaping

Getting Technical

PV Panels
Italian fire reaction rating
Class 1



RUUKKI
Roof system
A2-s1,d0

Windows
& doors
Excluded

Steel ventilation ducting
Not ignitable

Galavised
steel balcony
not ignitable.
Melt point
1375°

MAUER
External wall panels
A2-s1,d0

Wall Panel Specification

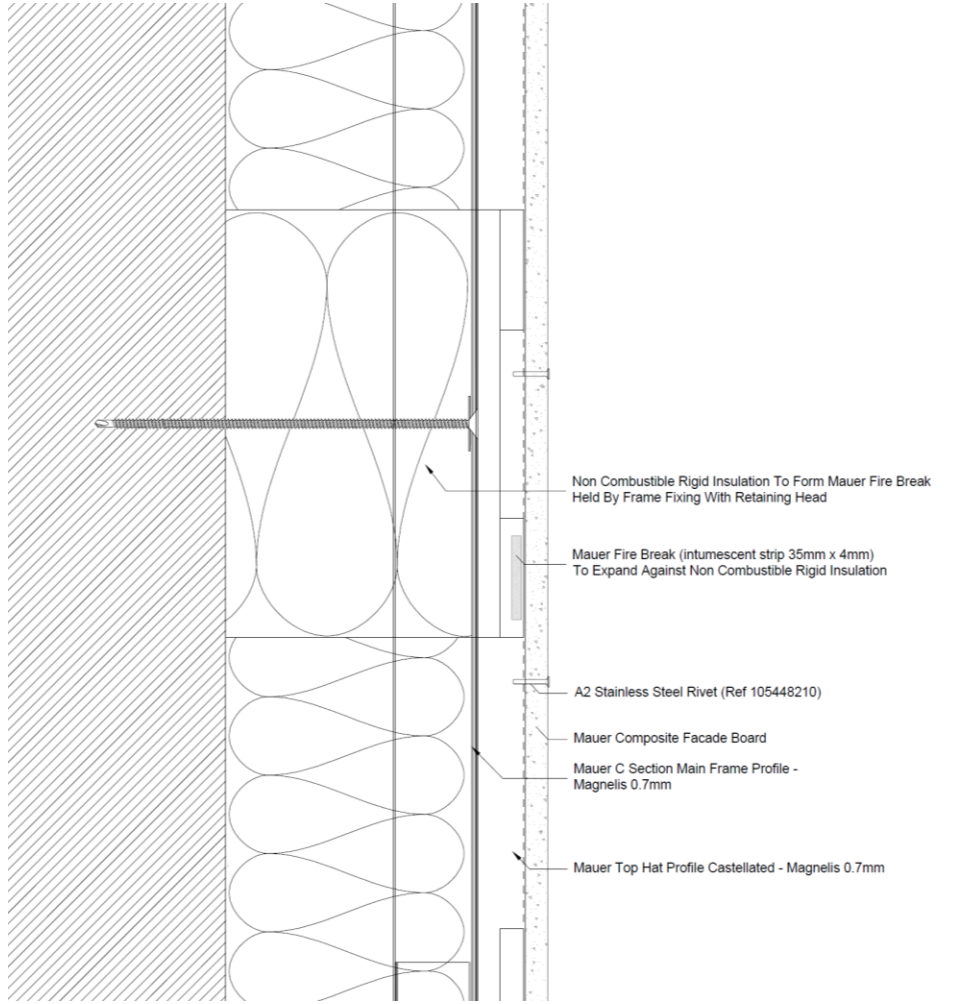
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Internal plaster	0.500					15
brick inner leaf	0.800					100
Blown insulation in cavity	0.028	concrete floor slab?	2.100	cavity wall ties		50
brick outer leaf	0.800					100
Blown mineral wool	0.034	Assume some bridging		Mauer framing/fixing 600 c/c	0.130	200
CS Facade Board	0.250					15

Percentage of sec. 1	Percentage of sec. 2	Percentage of sec. 3	Total
95%	0.0%	5.0%	48.0 cm

U-value supplement W/(m²K)

U-value: 0.132 W/(m²K)

Fire rating: A2-s1,d0

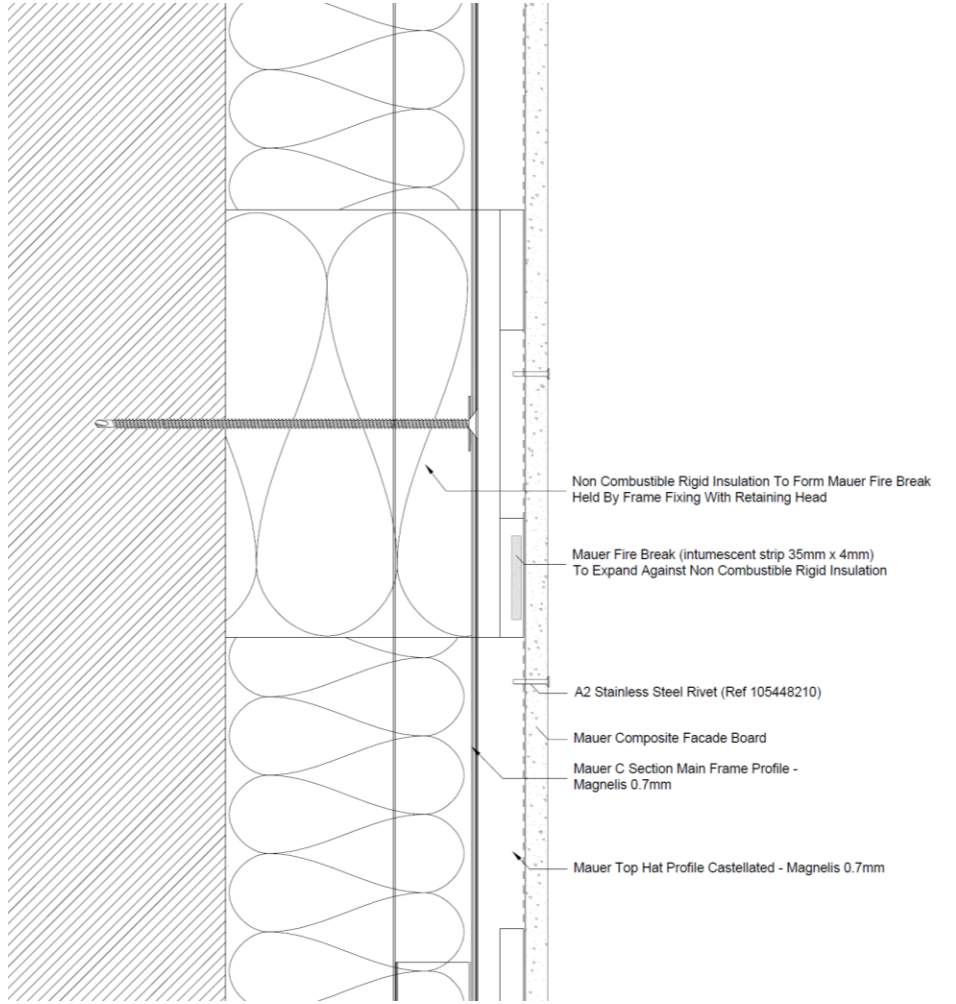


Wall Panel Specification

U-value: **0.132** W/(m²K)

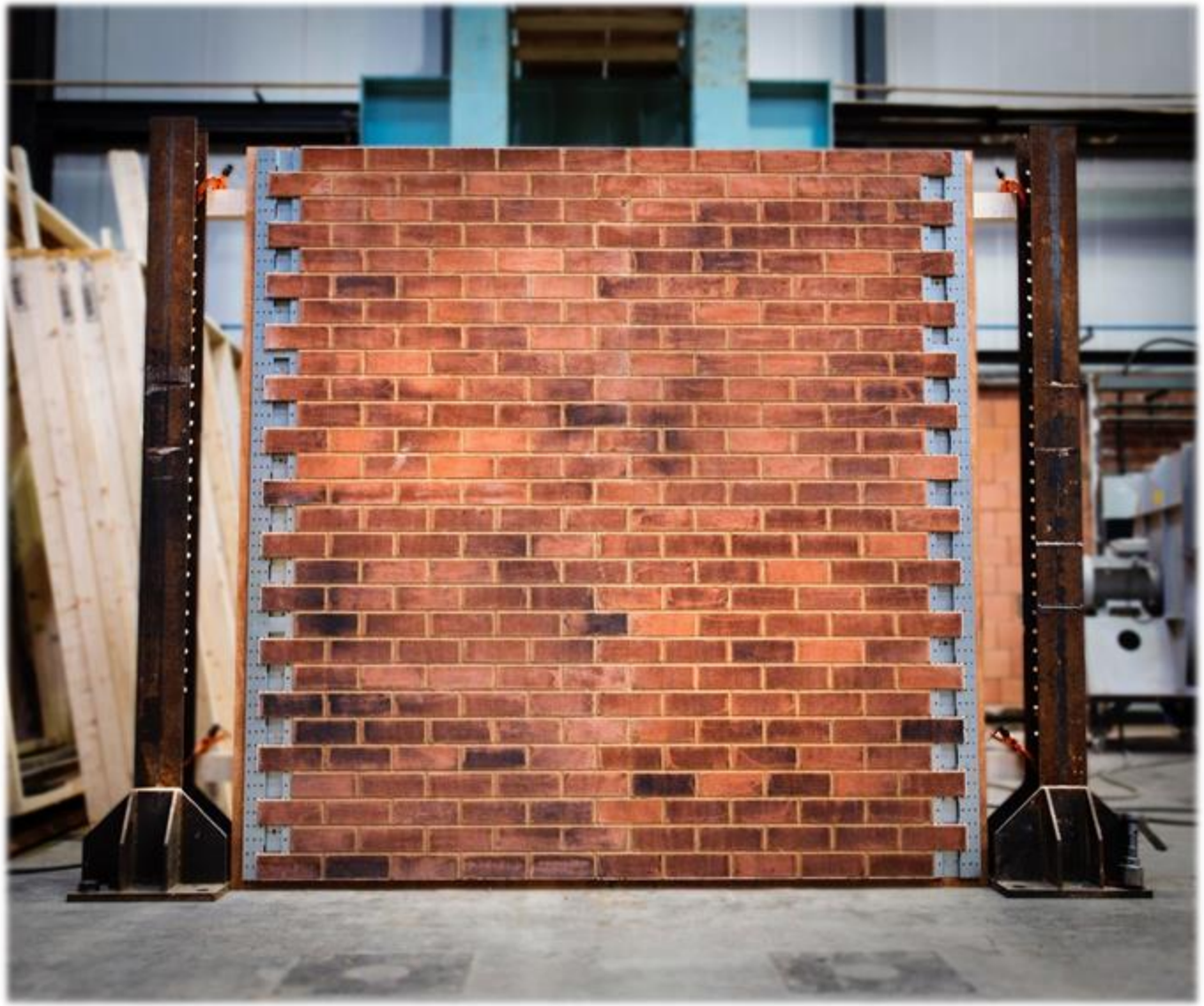
Business as usual (Building Regs Part L):
Refurbishment: 0.30 W/m2K
New-build: 0.16 W/m2K

Exceeds refurbishment building regs
by **more than 100%**



MAUER

Matt Ratcliff
Director



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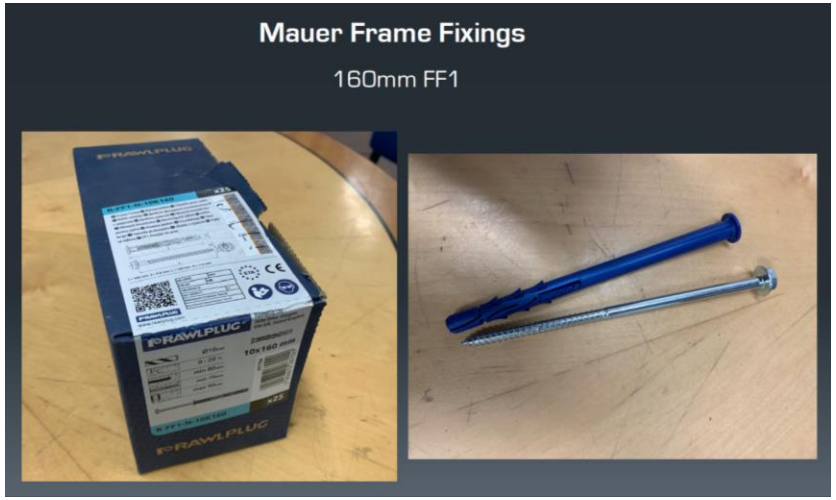
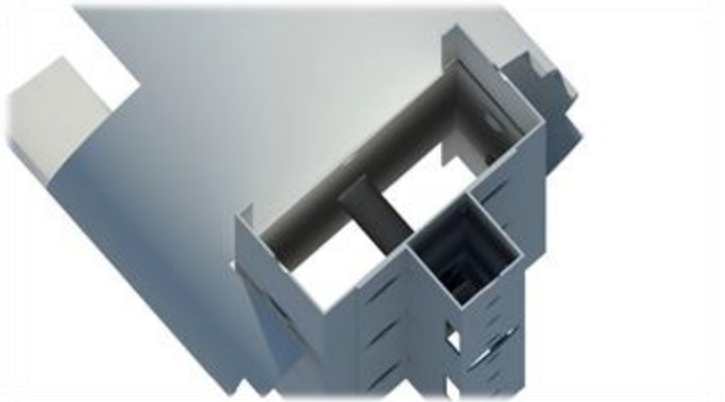
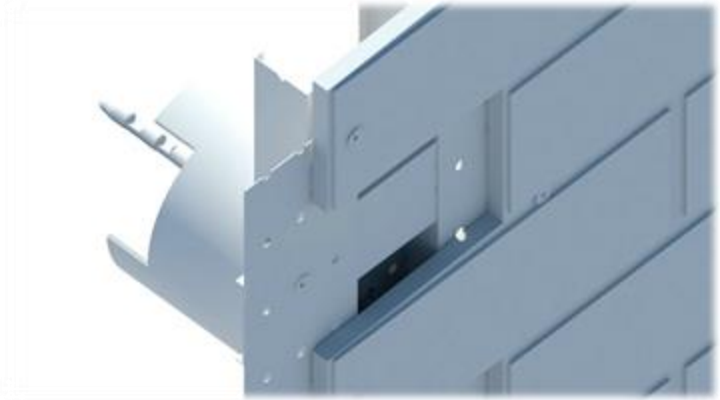


- Fixed to Brick and maybe concrete slab depending on Structural engineers advice
- Mauer spacer – thermal bridge free
- No foundations required





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Conventional EWI Systems

- Base Profile
- **Adhesive Mortar**
- Insulation
- Fixings
- **Base Coat**
- Mesh
- **Primer**
- **Top/Finish Coat**

MAUER EWI System

- Eliminates Virtually ALL Wet Trades on site

- Creates a 12-month annual window of opportunity for installation, currently not realised by any conventional system

MAUER

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Supply Chain

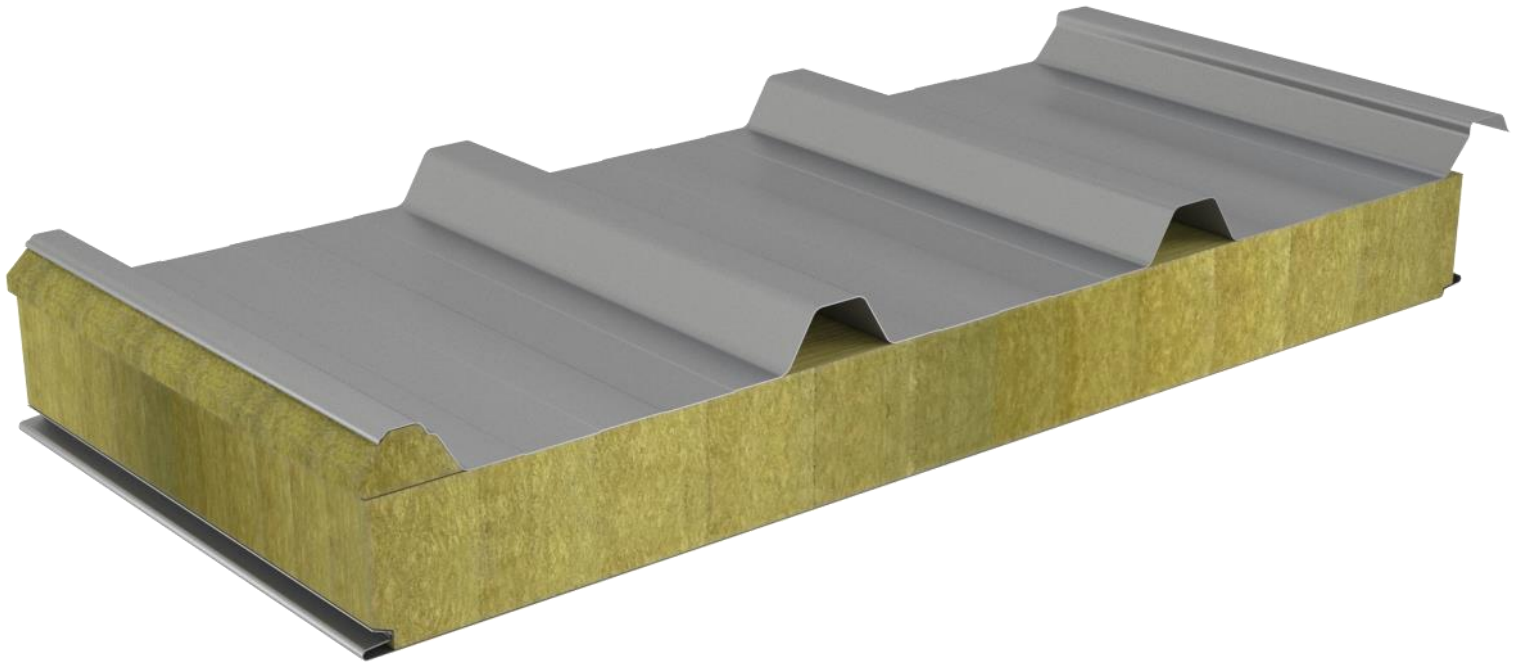
Potential to reduce prices by 20% if volume of orders achieved – multiple Treadgold sized blocks. As an off-site manufactured product volume is key to efficiency of production, and installation.

All system elements manufactured in Blackburn. Bigger contracts would lead to a local panel assembly base with jobs and skills development.
This could be in Kensington & Chelsea or Ealing.

Current Project – Nottingham City Council (Nottingham City Homes) delivering the social impact Mauer commits to on each and every project.

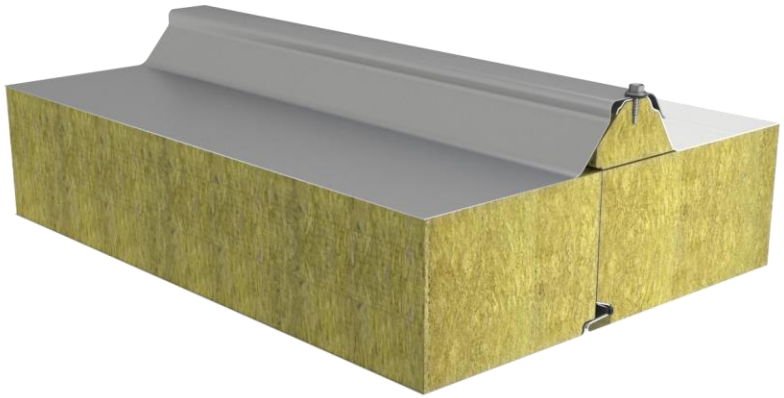
- Recruited locally, with support from NCC and NCH
- 18 positions appointed July 2020, with a view to scaling up from March 2021

Roof Specification

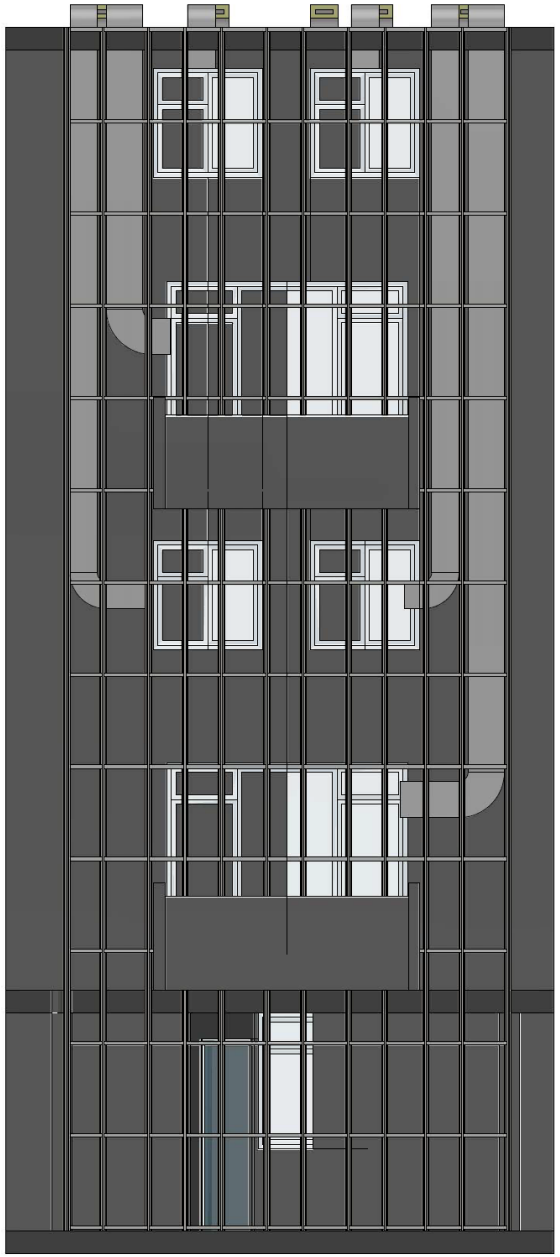


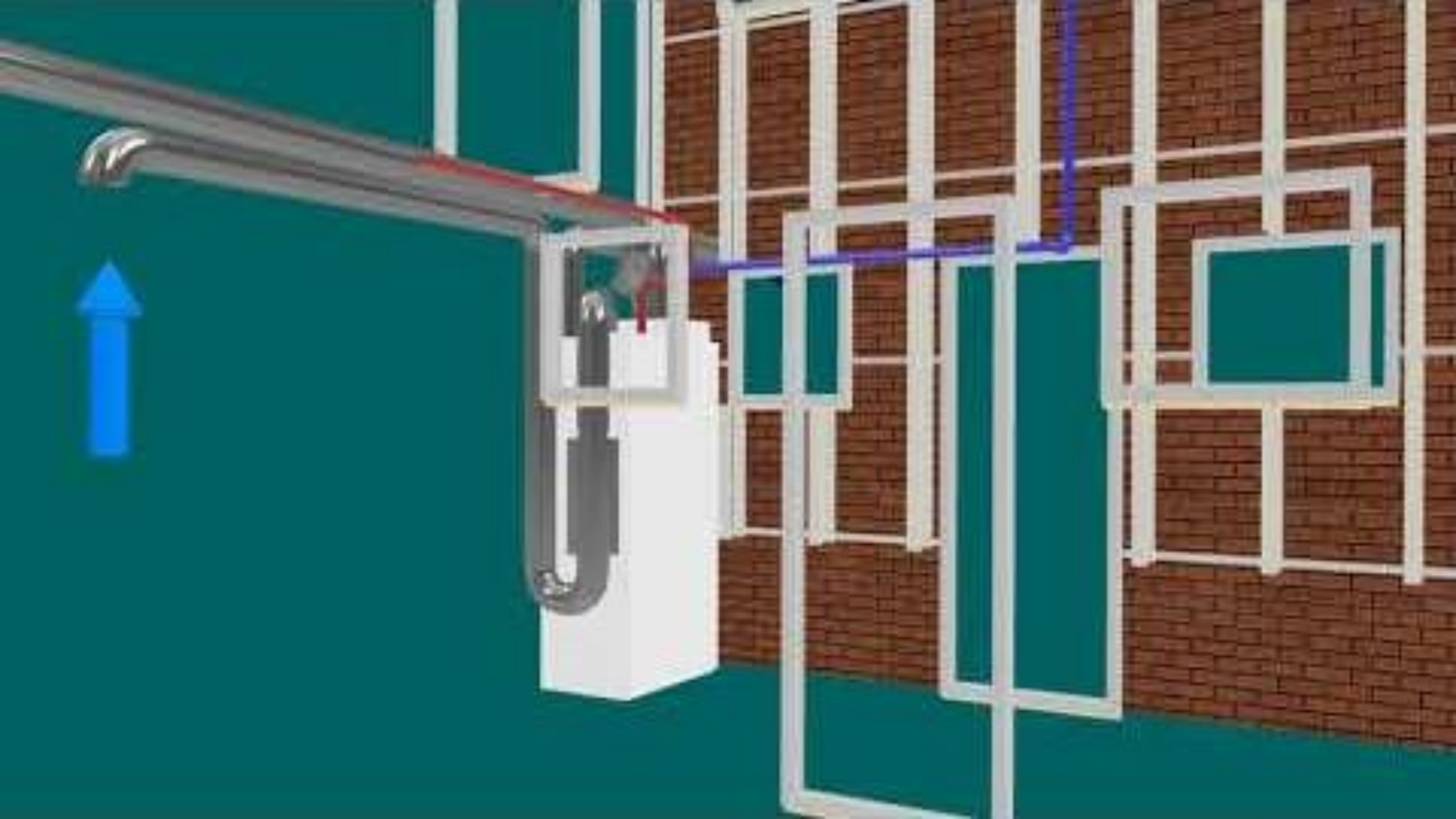
Ruuki SANDWICH PANEL SPC W 190/150

U-value (W/m^{2}K): 0.27
Fire rating: A2-s1,d0



Ventilation Routes

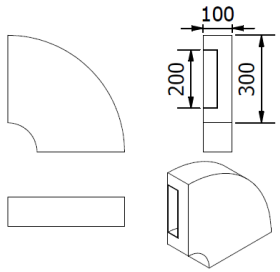




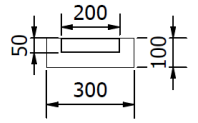
PARTS LIST

ITEM	QTY	DESCRIPTION	Duct_Length
1	1	Generic Model	
2	4	Duct 200 x 50 Elbow	
3	1	Panel Structure	
4	1	Duct 200 x 50 with 50mm Insulation	450.000 mm
5	1	Duct 300 x 50 with 50mm Insulation	8200.000 mm
6	2	Duct 300 x 50 Elbow	
7	1	Panel Structure 2	
8	1	Duct 2 x 200 x 50 with 50mm Insulation	6200.00 mm & 8200.00 mm
9	10	Elbow 200 x 50 90 deg	
10	2	Elbow 300 x 50 90 deg	
11	2	Elbow 2 x 200 x 50 90 deg	
12	1	Duct 200 x 50 with 50mm Insulation	450.000 mm
13	1	Duct 200 x 50 with 50mm Insulation	200.000 mm
14	1	Duct 300 x 50 with 50mm Insulation	650.000 mm
15	1	Duct 300 x 50 with 50mm Insulation	3100.000 mm
16	1	Duct 300 x 50 with 50mm Insulation	200.000 mm
17	1	Duct 300 x 50 with 50mm Insulation	6000.000 mm
18	1	Duct 300 x 50 with 50mm Insulation	460.000 mm
19	1	Duct 300 x 50 with 50mm Insulation	6000.000 mm
20	2	Duct 300 x 50 with 50mm Insulation	350.000 mm
21	1	Duct 300 x 50 with 50mm Insulation	2850.000 mm
22	1	Duct 2 x 200 x 50 with 50mm Insulation	6200.00 mm & 8200.00 mm

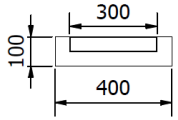
Duct 200 x 50 Elbow
(1 : 15)



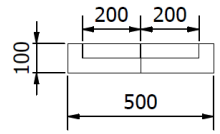
Duct 200 x 50
(1 : 15)



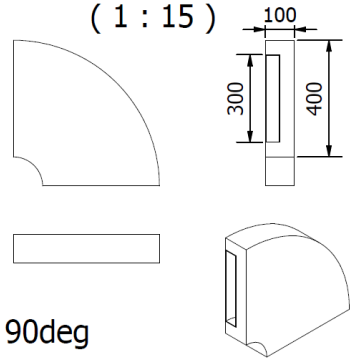
Duct 300 x 50
(1 : 15)



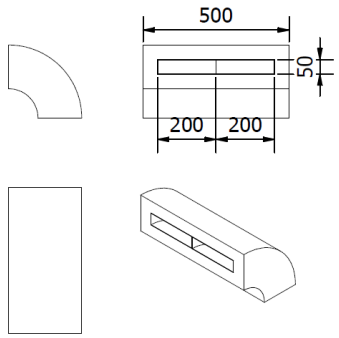
Duct 2 x 200 x 50
(1 : 15)



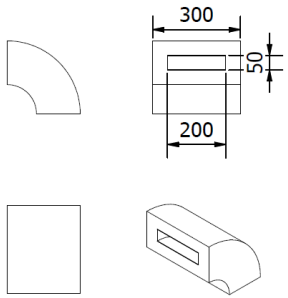
Duct 300 x 50 Elbow
(1 : 15)



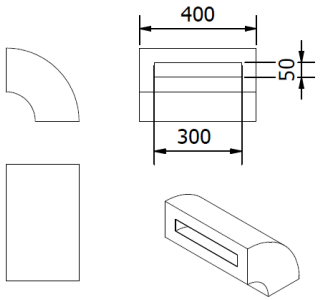
Duct 2 x 200 x 50 90 deg
(1 : 15)



Duct 200 x 50 Elbow 90deg
(1 : 15)



Duct 300 x 50 Elbow 90deg
(1 : 15)



DESIGNED BY	CHECKED BY	APPROVED BY	DATE		DATE	
Mircea					17/06/2020	

Treadgold House Assembly	ISSUE	SHEET
		5 / 5

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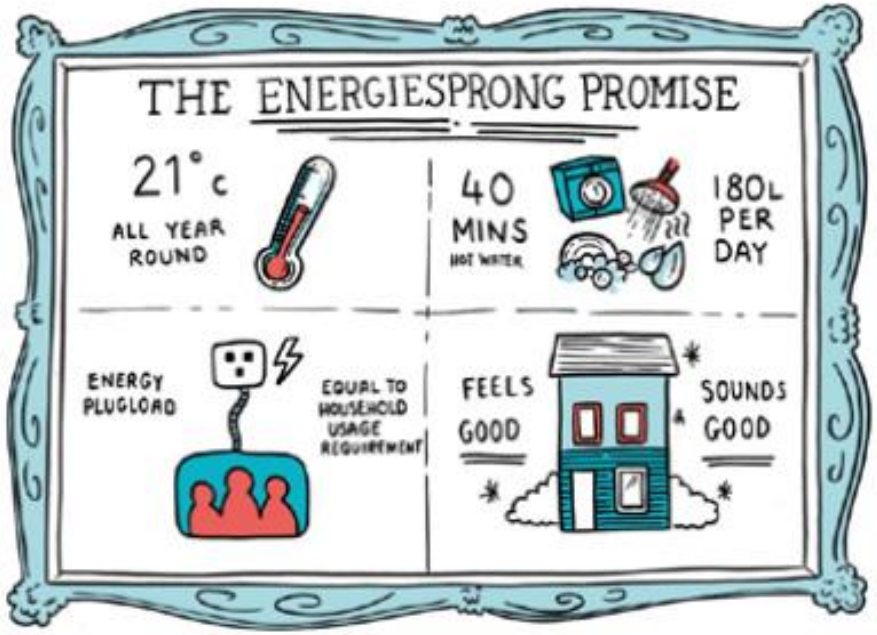
Perimeter Insulation



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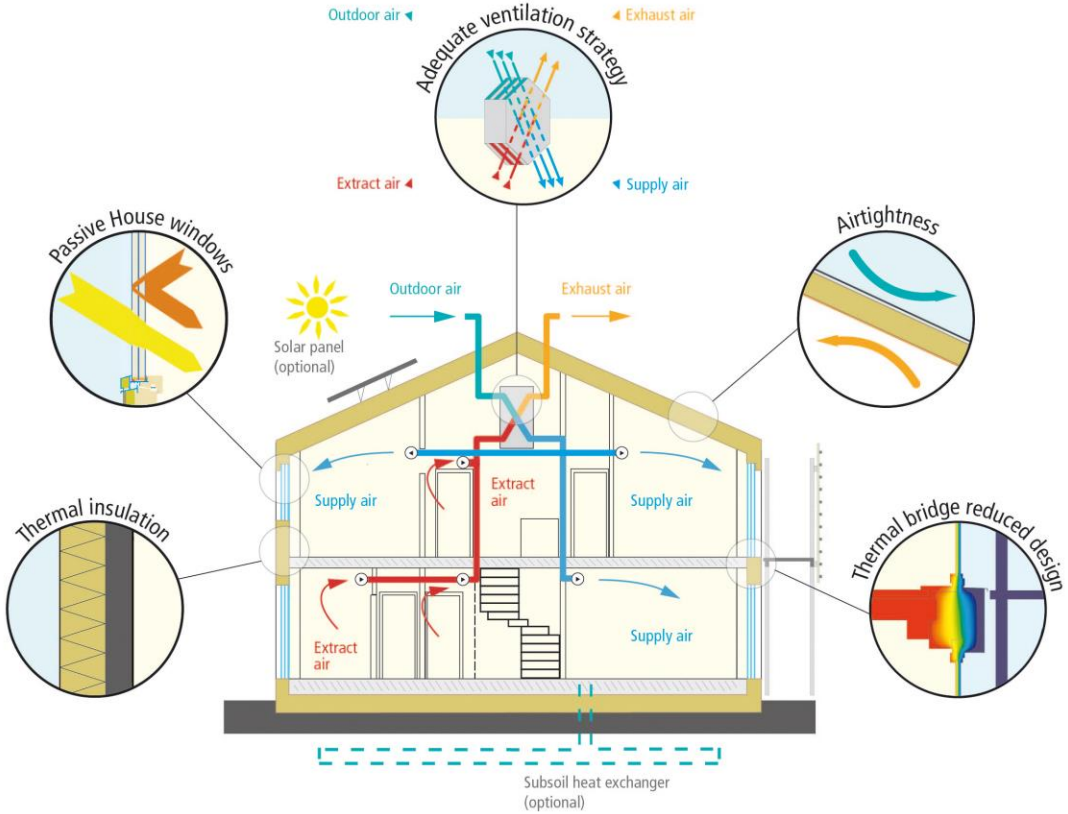

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EnerPHit standard

The EnerPHit standard relates to refurbishment projects only:

Air-tightness	1.0 ach @ 50 Pa (n50)	Comfort
Surface temp (windows)	>17° C	Comfort
Summer overheating	Max 10% >25° C	Comfort
Vent	~30 m^3/hr.person	Comfort
Heating	25 kWh/m^2yr @20C Or 10 W/m^2 Heating Load	Energy
Primary Energy	120 kWh/m^2yr	Energy

10

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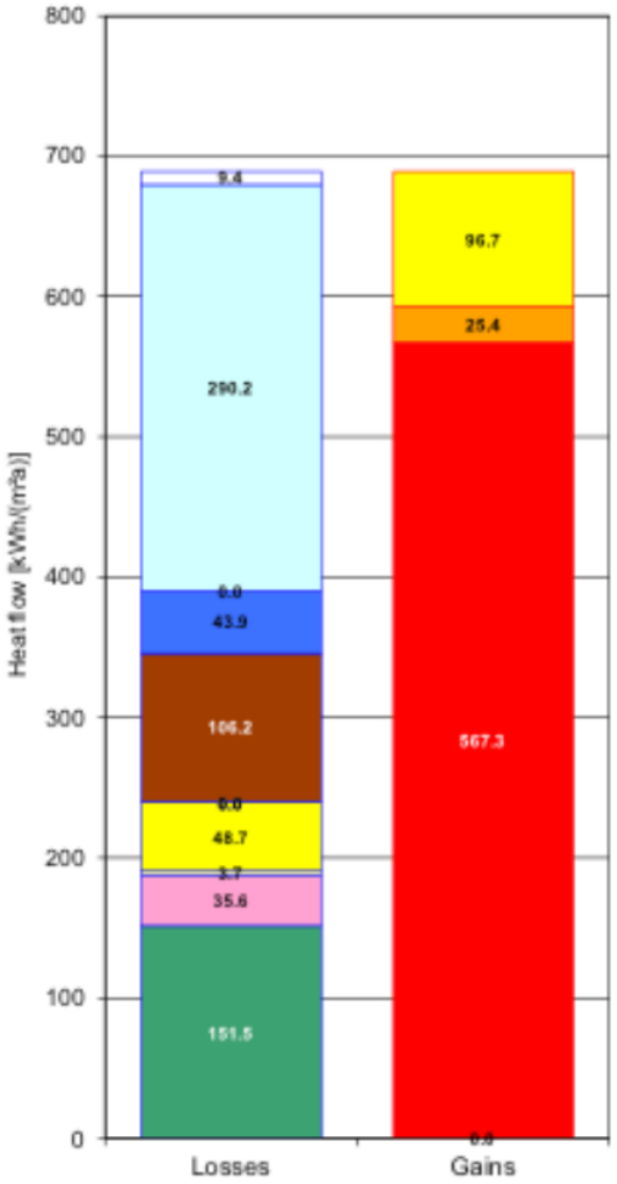
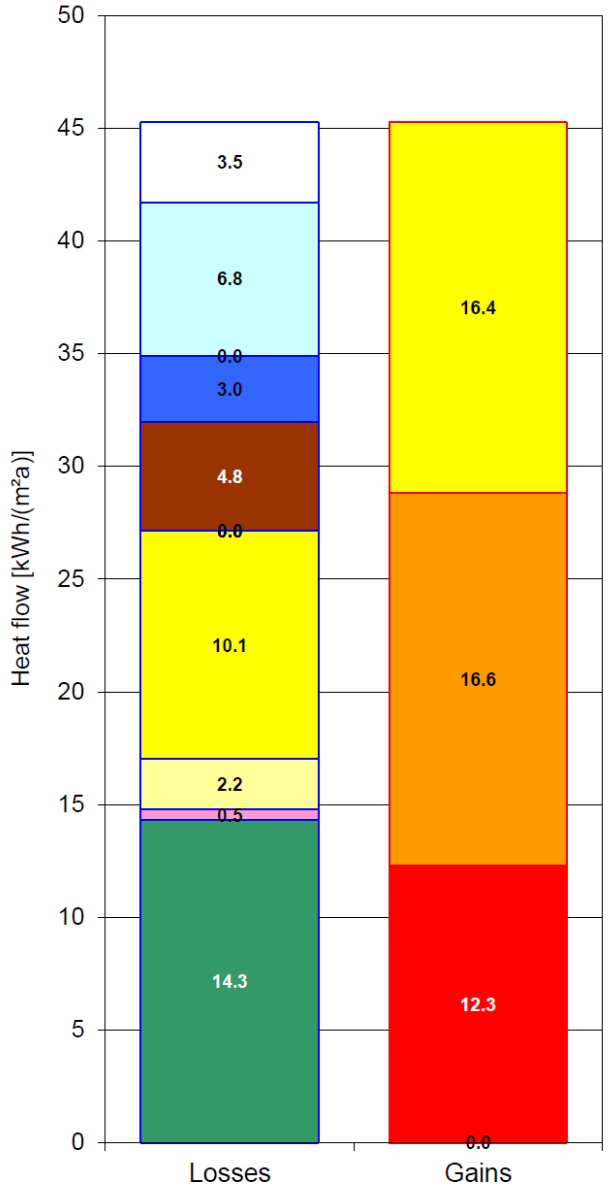
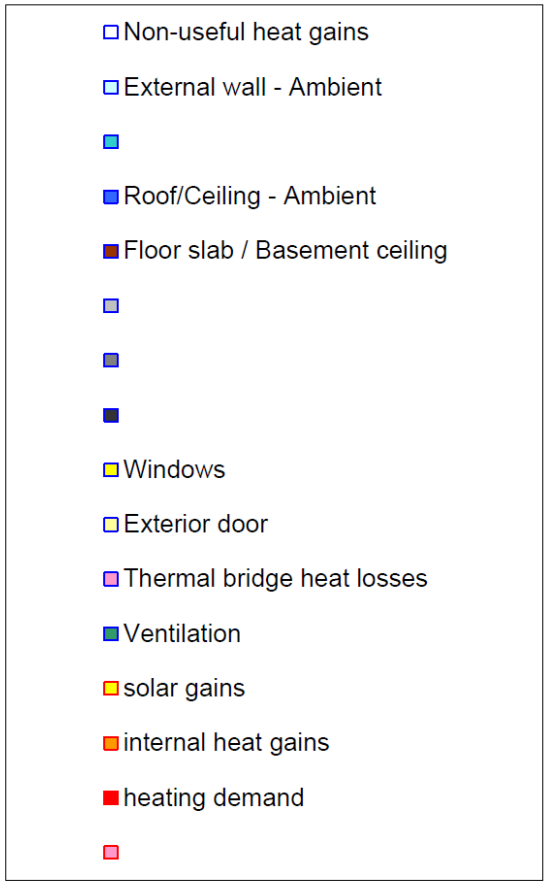
Before



After





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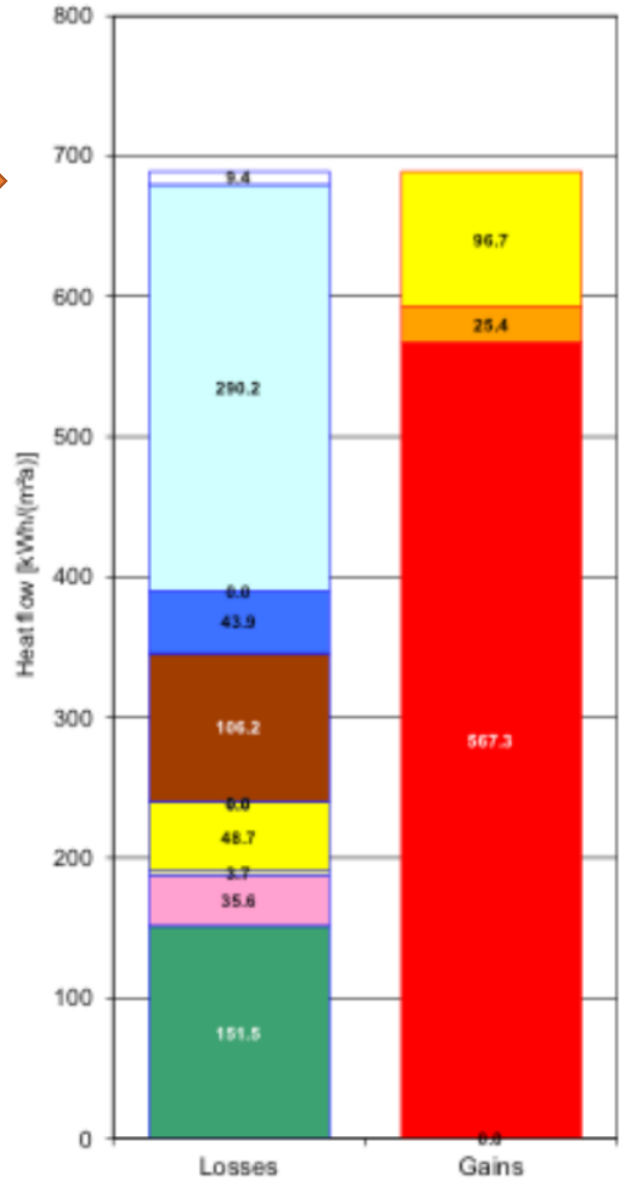
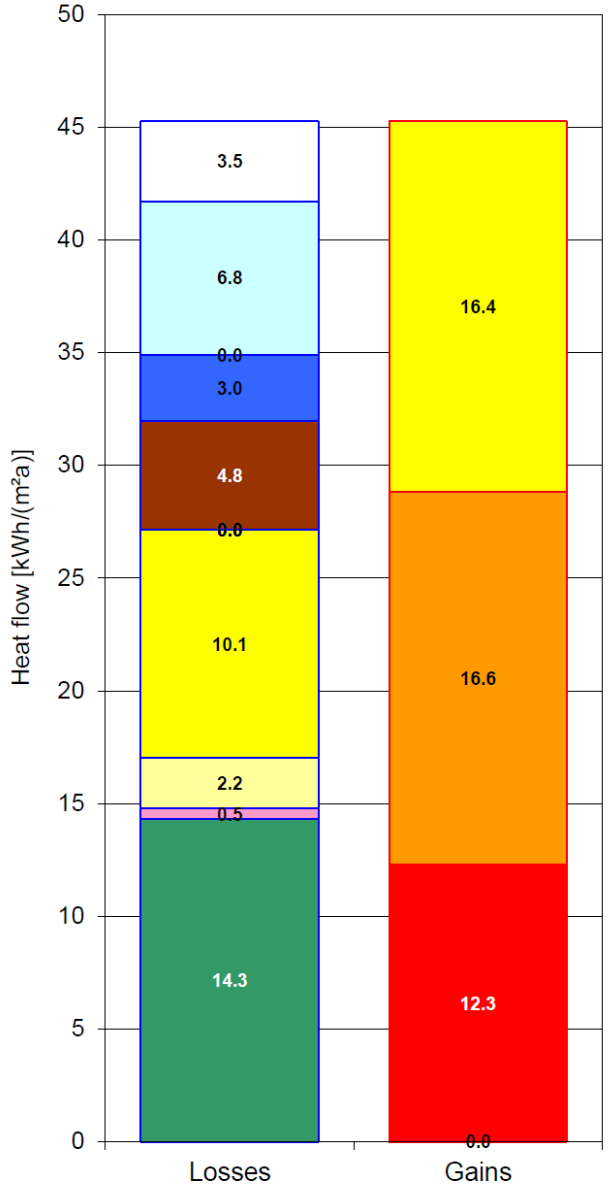
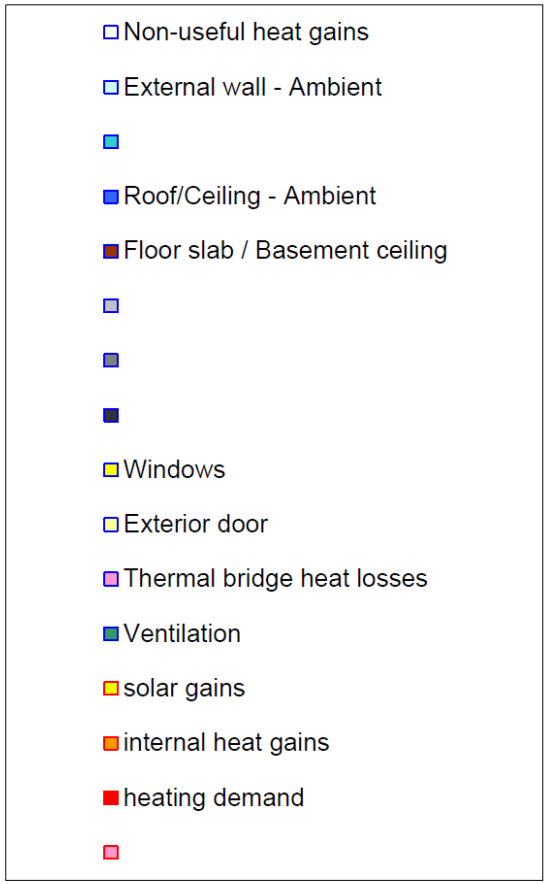
Before



After





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PHPP EnergieSprong Model 1

Heat Demand	Pump Eff	kWh/a	
960	2.2	923	Space Heating
From PHPP		1153	Hot Water
14.2kWh/m2a		201	MVHR etc
x	1,518 household P	2300	Household / Appliances ES
TFA=1217.69m2		**4577**	**Total Energy Demand**
AV TFA = 67.65m2		**2320**	**PV Generation**
		65%	% PV Gen. Used
		0%	% Battery Used
		1508	**Renewable Energy Used**
		3069	Import Needed

		kWh/Yr		
NO EnergieSprong	<1500 kWh/Yr	2257	Net Zero Target	
YES Backstops	<40kWh/m2/Yr	12.9	Space Heating Demand	AV GIA= 74.4

0.1401		Tariff per kWh
0.1741		Standing Charge
£ 493.51		Cost of Imported Energy
£ -		Energy Plan p.a.
£ 493.51		**Annual Energy Cost (inc. EP)**
£ 41.13		Monthly Energy Cost (inc. EP)
£ 1,200.00	assumed	**Existing Energy Cost**
£ 100.00		Monthly Existing Energy Cost
£ 706.49		Annual Saving
£ 58.87		Monthly Saving

PHPP EnergieSprong Model 2

Heat Demand	Pump Eff	kWh/a		
960	2.2	923	Space Heating	
From PHPP		1153	Hot Water	
14.2kWh/m2a		201	MVHR etc	
x	1,518 household PH	1518	Household / Appliances	PH
TFA=1217.69m2		**3795**	**Total Energy Demand**	
AV TFA = 67.65m2		**2320**	**PV Generation**	
		65%	% PV Gen. Used	
		0%	% Battery Used	
		1508	**Renewable Energy Used**	
		2287	Import Needed	
		kWh/Yr		
YES EnergieSprong	<1500 kWh/Yr	1475	Net Zero Target	
YES Backstops	<40kWh/m2/Yr	12.9	Space Heating Demand	AV GIA= 74.4
		0.1401	Tariff per kWh	
		0.1741	Standing Charge	
		£ 383.96	Cost of Imported Energy	
		£ -	Energy Plan p.a.	
		£ 383.96	**Annual Energy Cost (inc. EP)**	
		£ 32.00	Monthly Energy Cost (inc. EP)	
	assumed	**£ 1,200.00**	**Existing Energy Cost**	
		£ 100.00	Monthly Existing Energy Cost	
		£ 816.04	Annual Saving	
		£ 68.00	Monthly Saving	

BOW TIE CONSTRUCTION GSA MAUER NILAN OUTSTANDING INDOOR CLIMATE Interreg North-West Europe Mustbe0

PHPP EnergieSprong Model 1

Heat Demand	Pump Eff	kWh/a	
960	2.2	923	Space Heating
From PHPP		1153	Hot Water
14.2kWh/m2a		201	MVHR etc
x	1,518 household P	2300	Household / Appliances ES
TFA=1217.69m2		**4577**	**Total Energy Demand**
AV TFA = 67.65m2		**2320**	**PV Generation**
		65%	% PV Gen. Used
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		1508	**Renewable Energy Used**
		3069	Import Needed

		kWh/Yr		
NO EnergieSprong	<1500 kWh/Yr	2257	Net Zero Target	
YES Backstops	<40kWh/m2/Yr	12.9	Space Heating Demand	AV GIA= 74.4

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£ 1,200.00	assumed	**Existing Energy Cost**
£ 100.00		Monthly Existing Energy Cost
£ 706.49		Annual Saving
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PHPP EnergieSprong Model 2

Heat Demand	Pump Eff	kWh/a		
960	2.2	923	Space Heating	
From PHPP		1153	Hot Water	
14.2kWh/m2a		201	MVHR etc	
x	1,518 household PH	1518	Household / Appliances	PH
TFA=1217.69m2		**3795**	**Total Energy Demand**	
AV TFA = 67.65m2		**2320**	**PV Generation**	
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		1508	**Renewable Energy Used**	
		2287	Import Needed	

		kWh/Yr		
YES EnergieSprong	<1500 kWh/Yr	1475	Net Zero Target	
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£ 1,200.00	assumed	**Existing Energy Cost**
£ 100.00		Monthly Existing Energy Cost
£ 816.04		Annual Saving
£ 68.00		Monthly Saving

Very Close to Passivhaus EnerPHit Performance:

Specific building characteristics with reference to the treated floor area

				Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area m²	1217.7				
Space heating	Heating demand kWh/(m²a)	12	≤	20	-	yes
	Heating load W/m²	12	≤	-	-	
Space cooling	Cooling & dehum. demand kWh/(m²a)	-	≤	-	-	-
	Cooling load W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C) %	3	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg) %	0	≤	20		yes
Airtightness	Pressurization test result n_{50} 1/h	3.0	≤	1.0		no
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	151	≤	-		-
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	64	≤	45	60	no
	Generation of renewable energy (in relation to projected building footprint area) kWh/(m²a)	139	≥	60	123	

[2] Empty field: Data missing; '-': No requirement

BOW TIE CONSTRUCTION GSA MAUER NILAN OUTSTANDING INDOOR CLIMATE Interreg North-West Europe Mustbe0

Very Close to Passivhaus EnerPHit Performance:

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				Criteria	Alternative criteria	Fullfilled?[2]
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	Heating load W/m²	12	≤	-	-	
Space cooling	Cooling & dehum. demand kWh/(m²a)	-	≤	-	-	-
	Cooling load W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C) %	3	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg) %	0	≤	20		yes
Airtightness	Pressurization test result n_{50} 1/h	3.0	≤	1.0		no
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	151	≤	-		-
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	64	≤	45	60	no
	Generation of renewable energy (in relation to projected building footprint area) kWh/(m²a)	139	≥	60	123	

[2] Empty field: Data missing; '-': No requirement

Better than new-build Passivhaus Performance:

Specific building characteristics with reference to the treated floor area

				Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area m²	1217.7				
Space heating	Heating demand kWh/(m²a)	12	≤	20	-	yes
	Heating load W/m²	12	≤	-	-	
Space cooling	Cooling & dehum. demand kWh/(m²a)	-	≤	-	-	-
	Cooling load W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C) %	3	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg) %	0	≤	20		yes
Airtightness	Pressurization test result n_{50} 1/h	3.0	≤	1.0		no
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	151	≤	-		-
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	64	≤	45	60	no
	Generation of renewable energy (in relation to projected building footprint area) kWh/(m²a)	139	≥	60	123	

[2] Empty field: Data missing; '-': No requirement

BOW TIE CONSTRUCTION GSA MAUER NILAN OUTSTANDING INDOOR CLIMATE Interreg North-West Europe Mustbe0

Treadgold House BowTieSprong	**12.3 kWh / m2 / annum**
Passivhaus house	15 kWh / m2 / annum
Passivhaus EnerPHit refurb	25 kWh / m2 / annum
New-build Flat (Part L)	90 kWh / m2 / annum
New-build detached house (Part L)	150 kWh / m2 / annum
1950s Flat	220 kWh / m2 / annum
Victorian House	250 kWh / m2 / annum
Period UK Property (1600 – 1890)	350 kWh / m2 / annum

Metering

Energy is networked – Buildings are networked – People are networked

Metering

1. We must measure how buildings perform in real-life.

Metering

1. We must measure how buildings perform in real-life.

2. We must manage the interaction between buildings and energy systems.

Metering

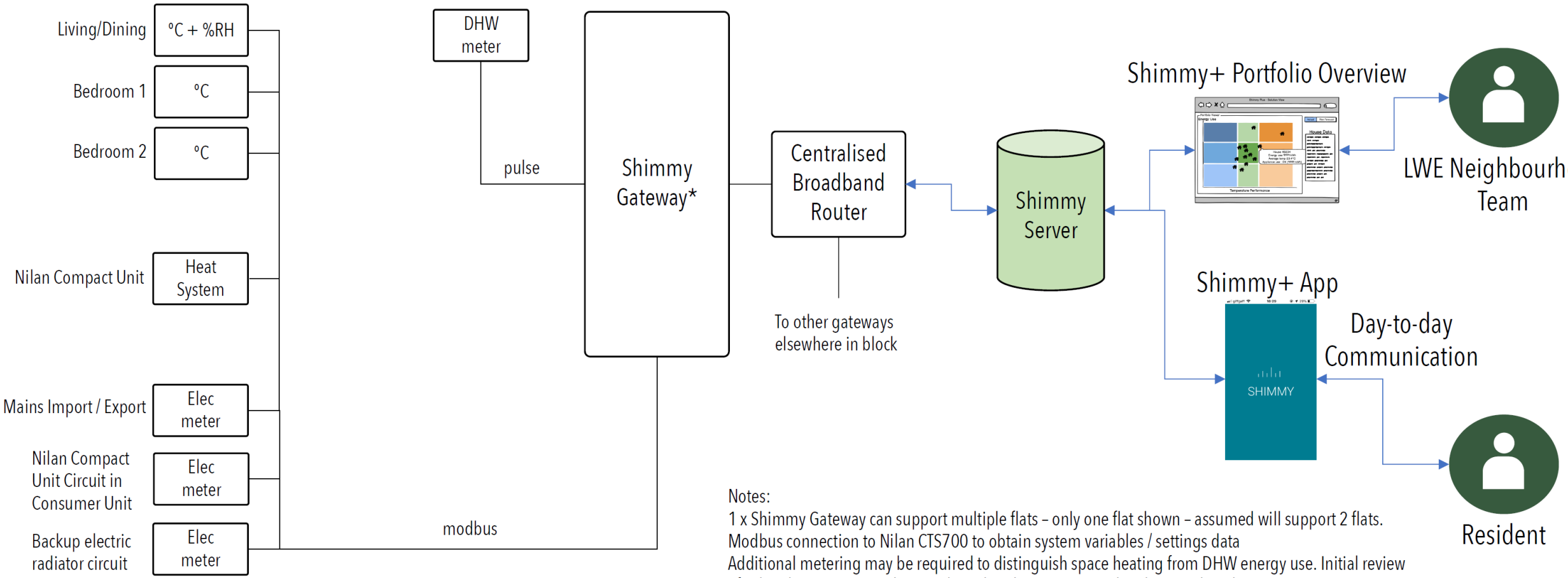
1. We must measure how buildings perform in real-life.

2. We must manage the interaction between buildings and energy systems.

3. People, their choices and behaviours are fundamental - we must communicate effectively.
   - People affect buildings and buildings affect people
   - People affect people – all long-term behaviours are social
   - People are diverse – there is not one set of behaviours
   - Resilient communities are built from personal contact & relationships

BowTieSprong Treadgold House: Example Flat Monitoring Design v2

Carnego Systems



Notes:
1 x Shimmy Gateway can support multiple flats – only one flat shown – assumed will support 2 flats.
Modbus connection to Nilan CTS700 to obtain system variables / settings data
Additional metering may be required to distinguish space heating from DHW energy use. Initial review of Nilan documentation doesn't show that this is monitored in the unit directly.
Assumes all backup electric radiators are together on a separate circuit
Additional metering may be required on centralised PV system.

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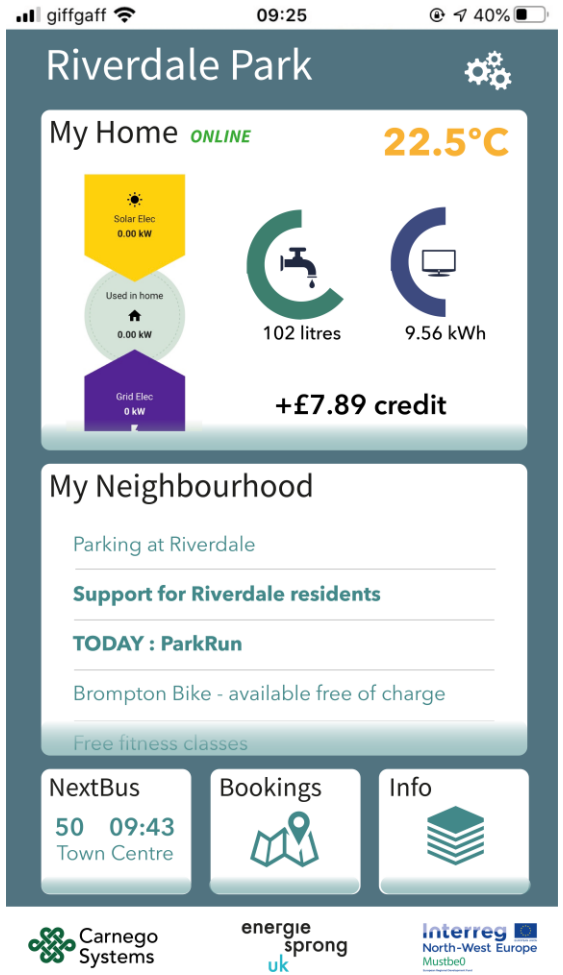

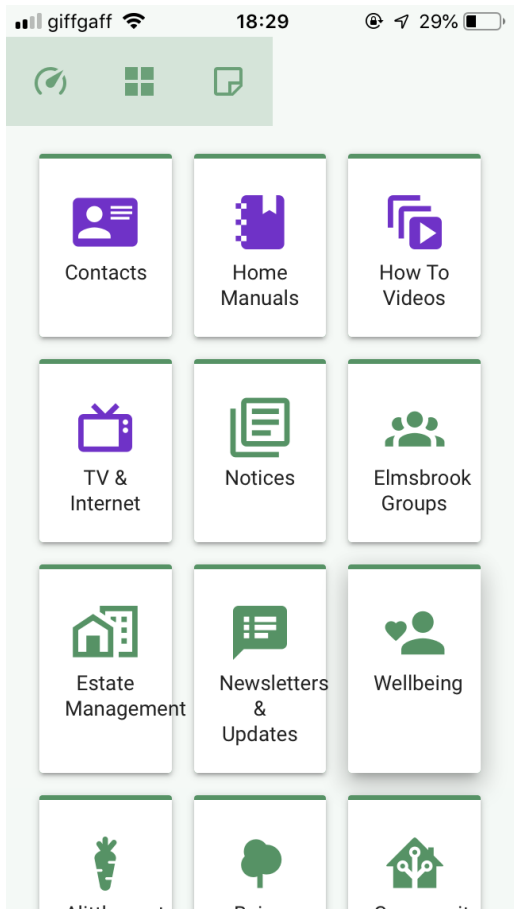

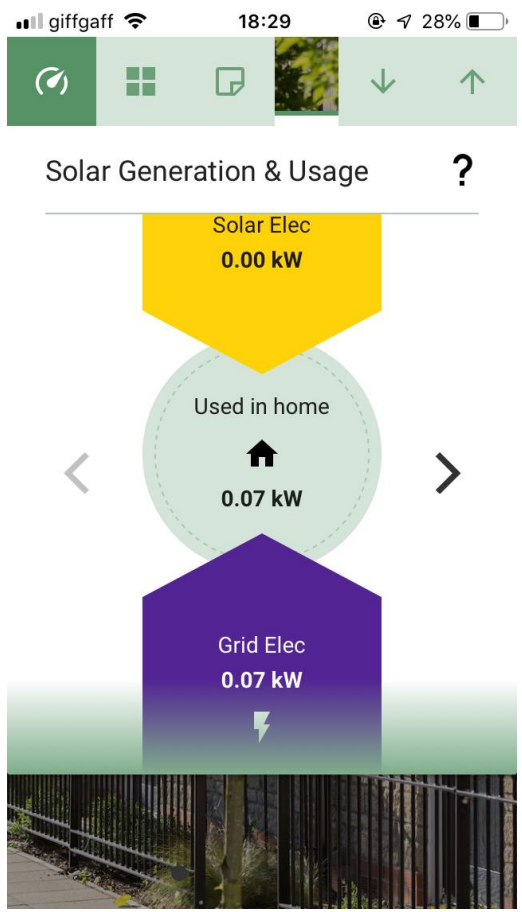

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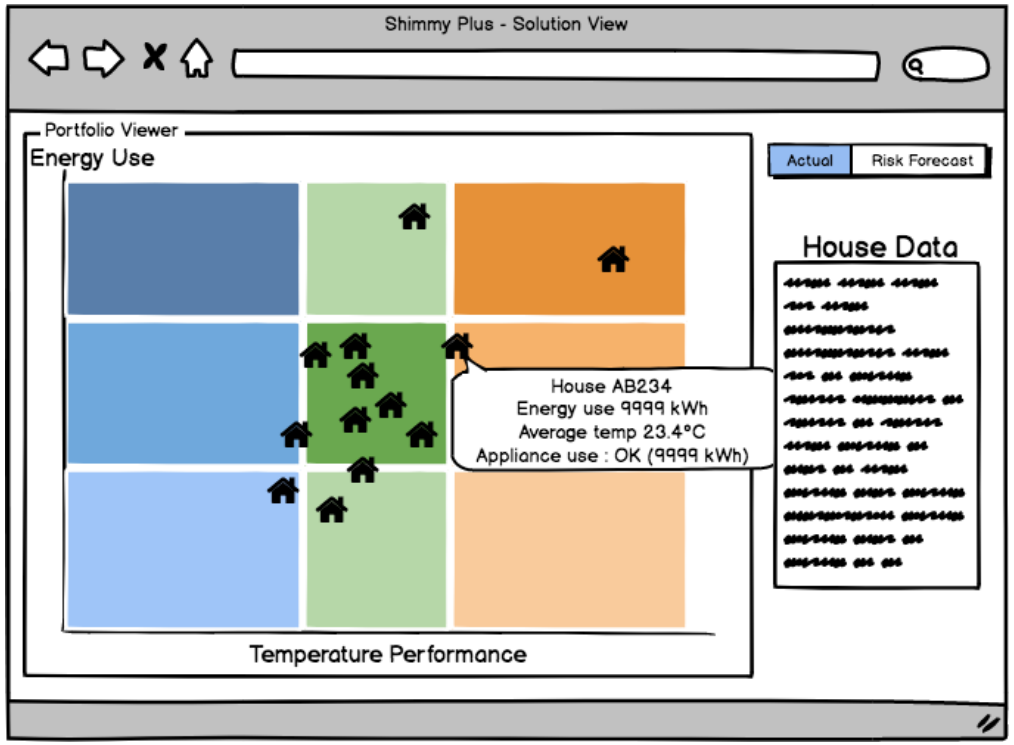
Shimmy+
for portfolio management

- Web-based performance management system for landlords, solution providers, architects and engineers
- Detailed data collected in near-real time
- Automated comparison of design model to in-use performance.
- One data set for all – tailored views
- Reports and alerts

- Live new-build system being extended for EnergieSprong retrofits



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Renewables & Services

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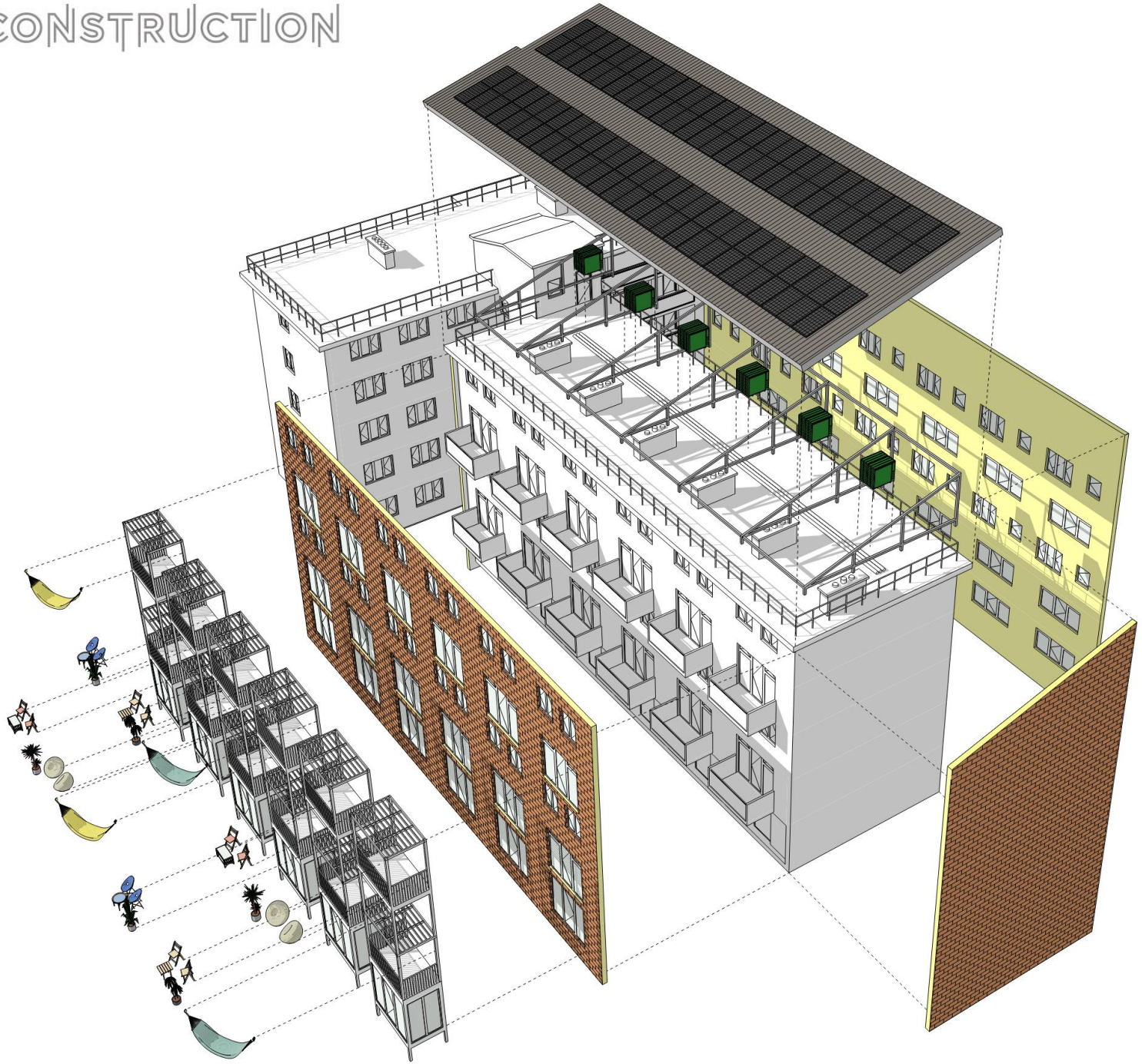

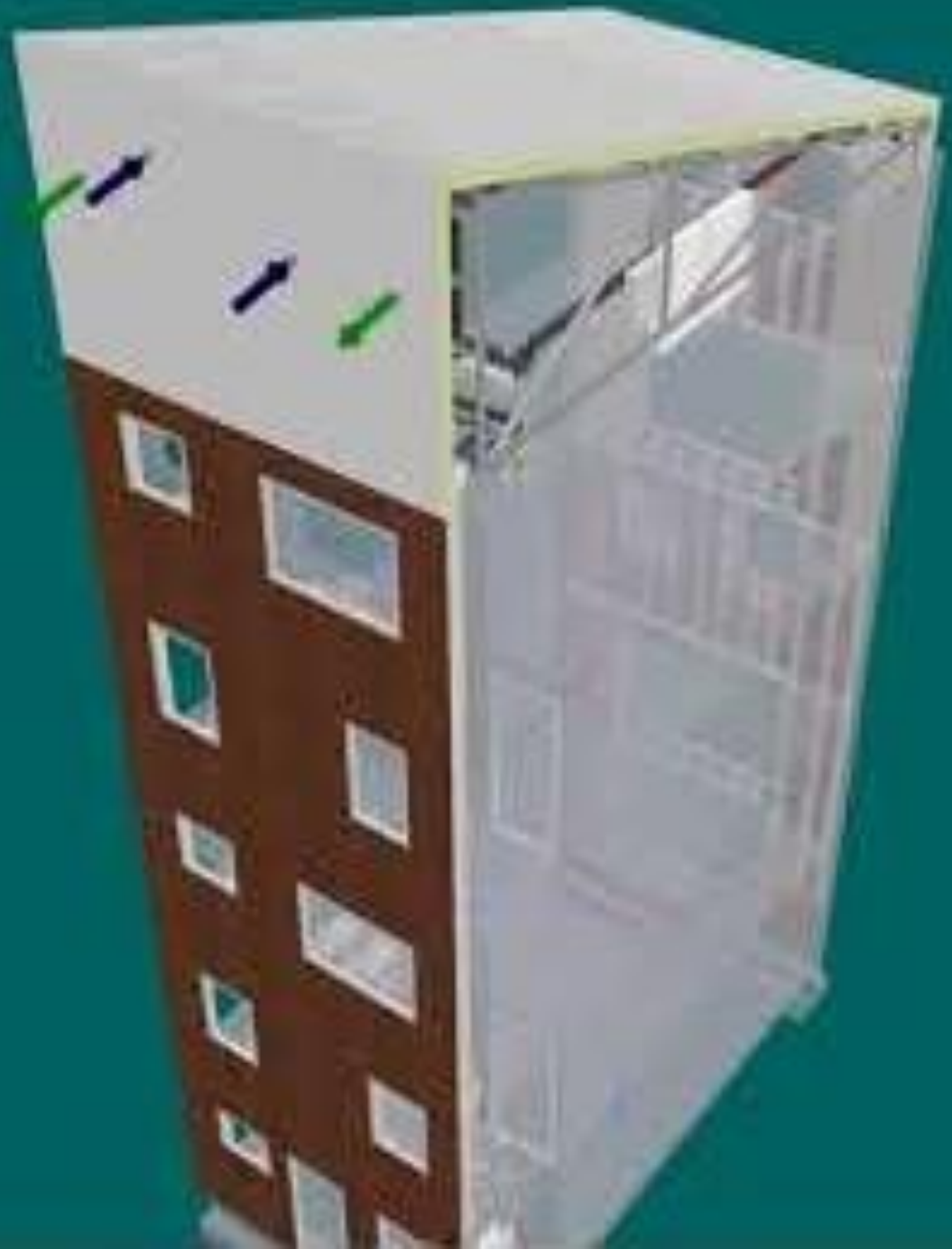

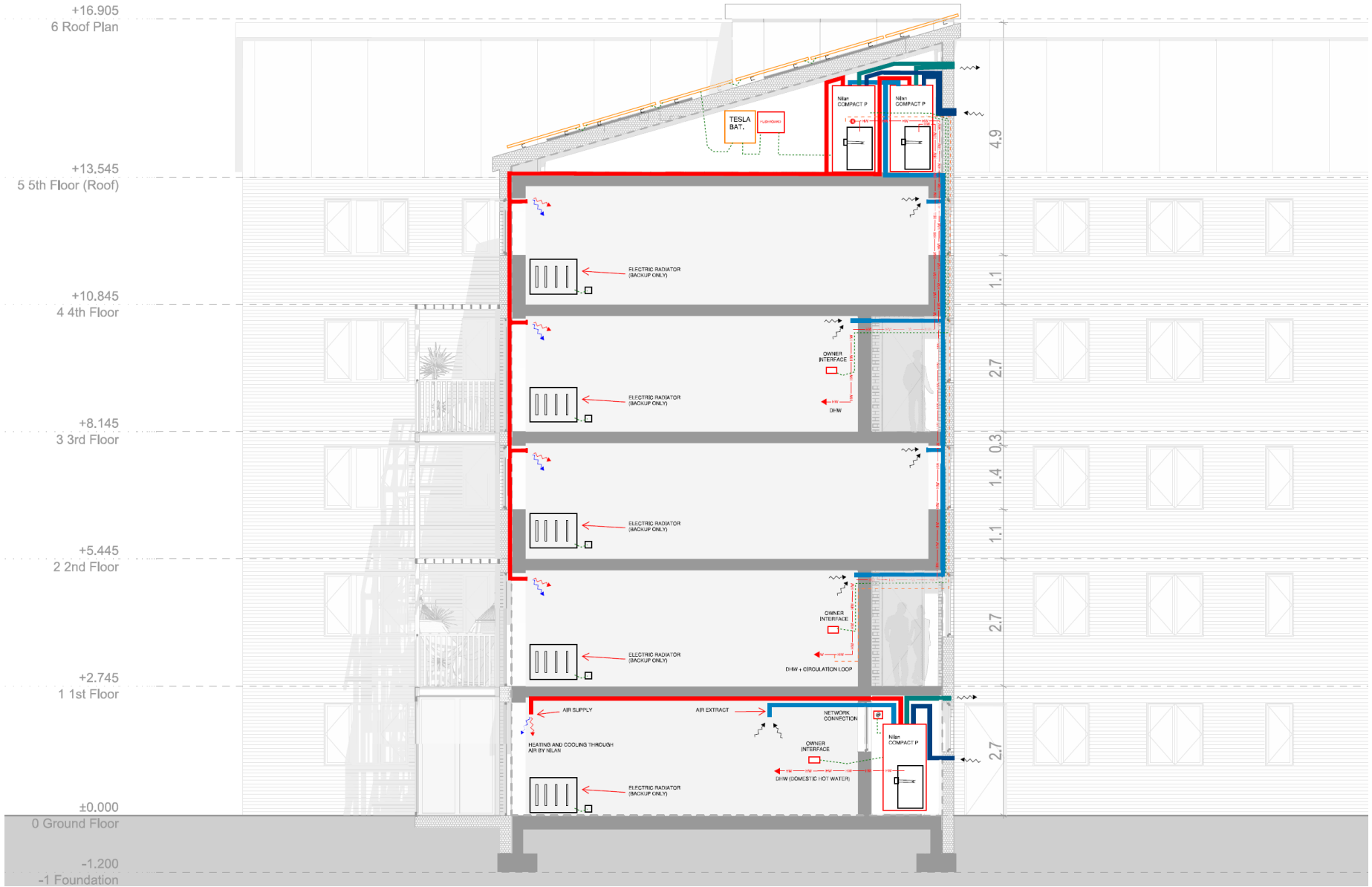

180 Litre Hot Water Tank
Wet Radiators replaced with backup direct electric

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A

Heat Recovery Ventilation Heat Exchanger

Heat Recovery Ventilation Heat Exchanger

Air Source Heat Pump
Air to air heater

Heat Recovery Ventilation Heat Exchanger

Air Source Heat Pump
Air to air heater

Hot Water Cylinder
Immersion Heater

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TOP SECRET!

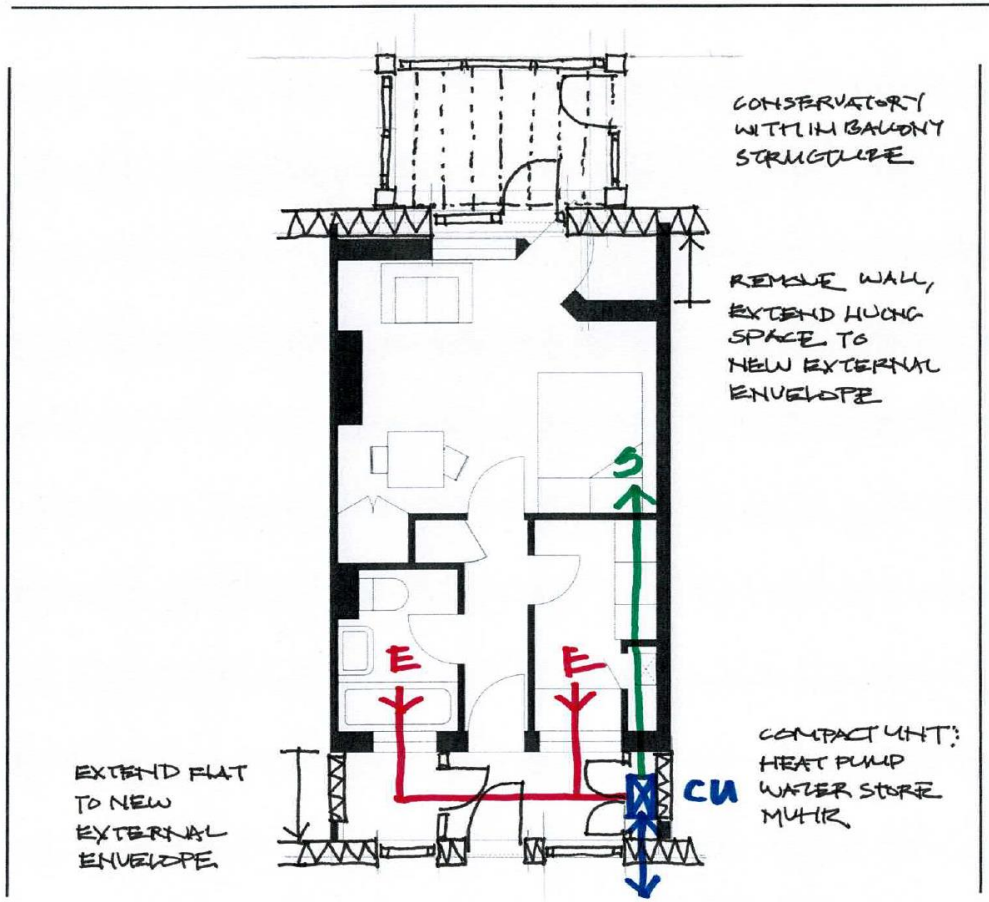
Heat Network

ARUP

"With such a low heat demand of 12 kWh/m2/annum, not economically feasible to connect to heat network.

With microgeneration on-site, even less so.

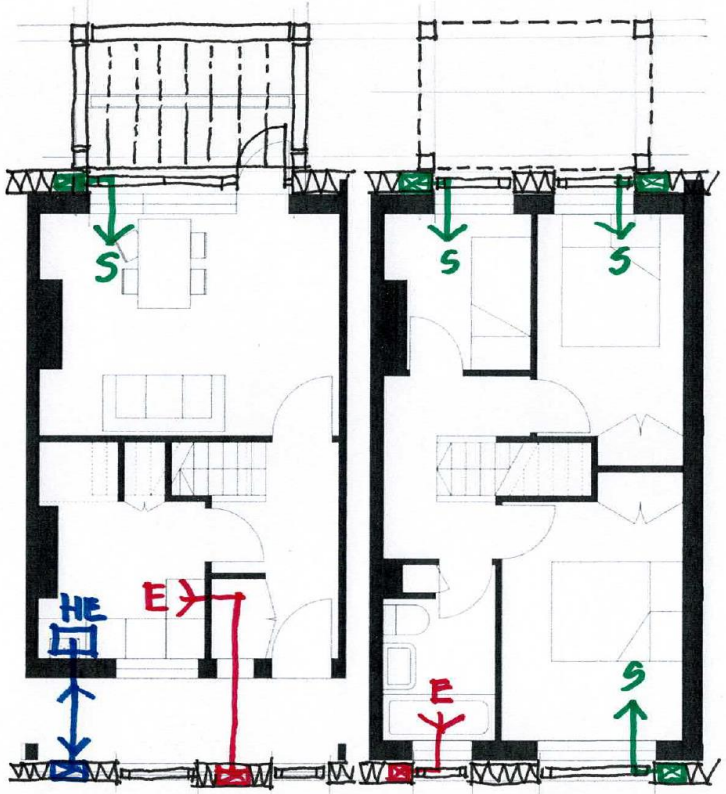
Any connection would be via heat transfer unit in the service loft"



GROUND FLOOR FLAT SHOWING SERVICES INTERVENTIONS

GSA 27.05.20

NEW BALCONY CONSTRUCTED OUTSIDE NEW EXTERNAL ENVELOPE



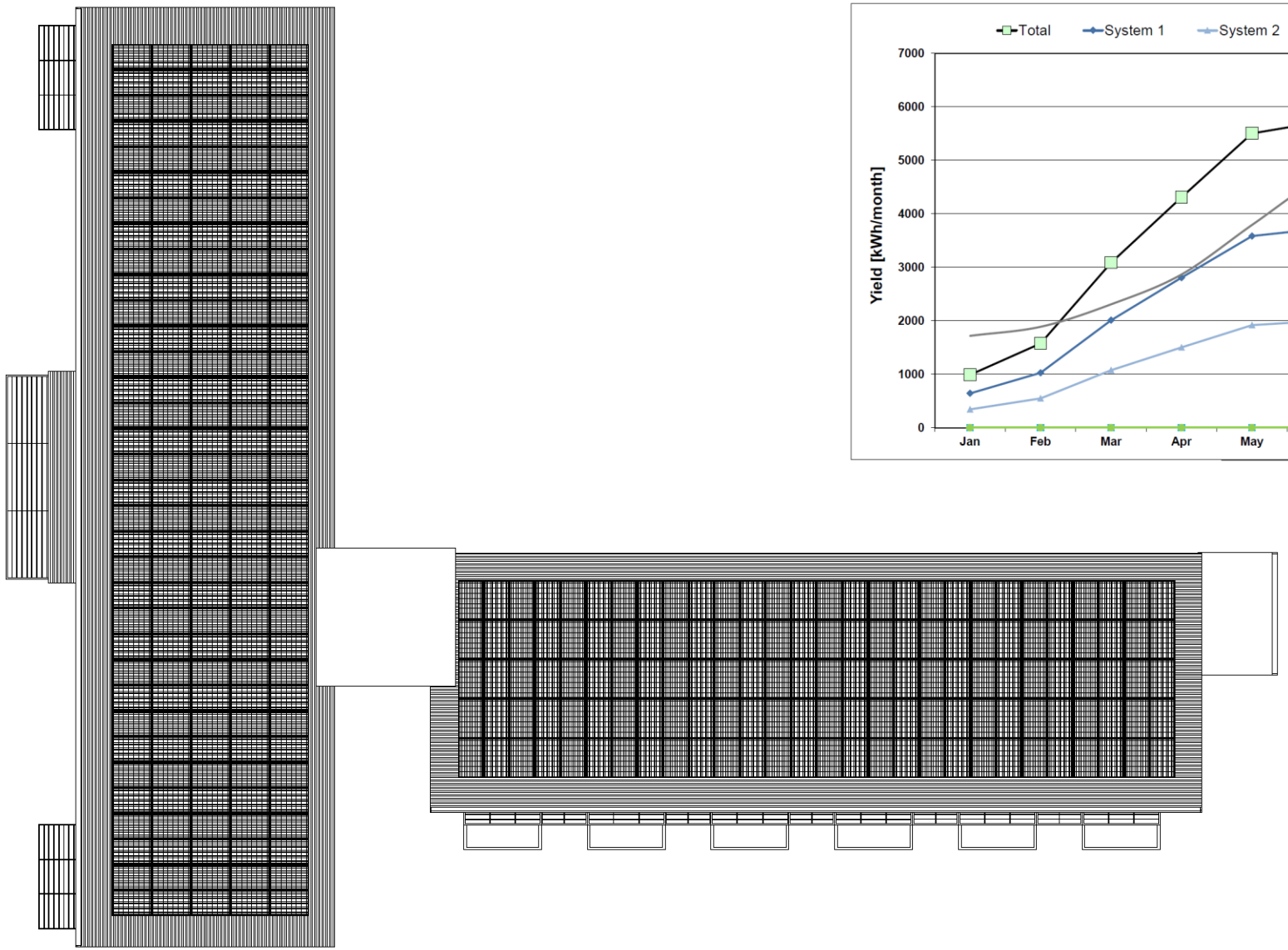
HEAT EXCHANGER LOCATED IN KITCHEN, REPLACING GAS BOILER

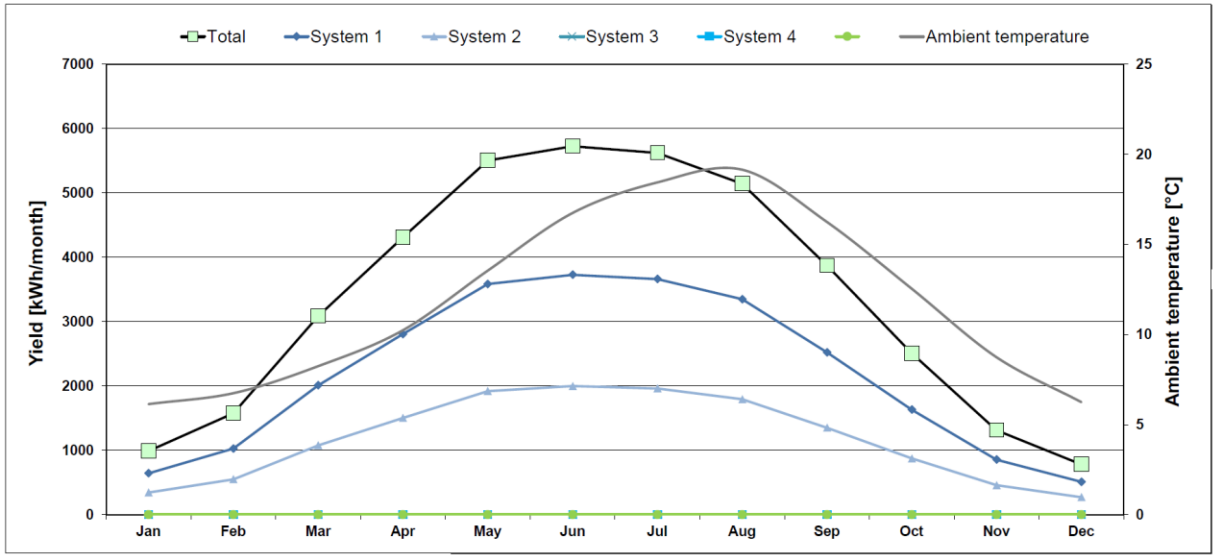
ALL AIR DUCTS & HOT WATER PIPEWORK IN EXTERNAL WALL PANELS FROM ROOF PLANTROOM ABOVE

MAISONETTE FLOOR PLAN SHOWING SERVICES INTERVENTIONS

GSA 27.05.20

Solar PV	Panels	Total power			
Block B - 5 Rows x 27 Sunpower MAX 2 360Wp panels	135	48.6 kWp	41,760 kWh/a	south facing	20 deg
Block A - 5 Rows x 34 Sunpower MAX 2 360Wp panels	170	61.2 kWp	42,653 kWh/a	west facing	20 deg





BOW TIE CONSTRUCTION

GSA

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NILAN
OUTSTANDING INDOOR CLIMATE

Interreg
North-West Europe
Mustbe0

Solar PV	Panels	Total power				
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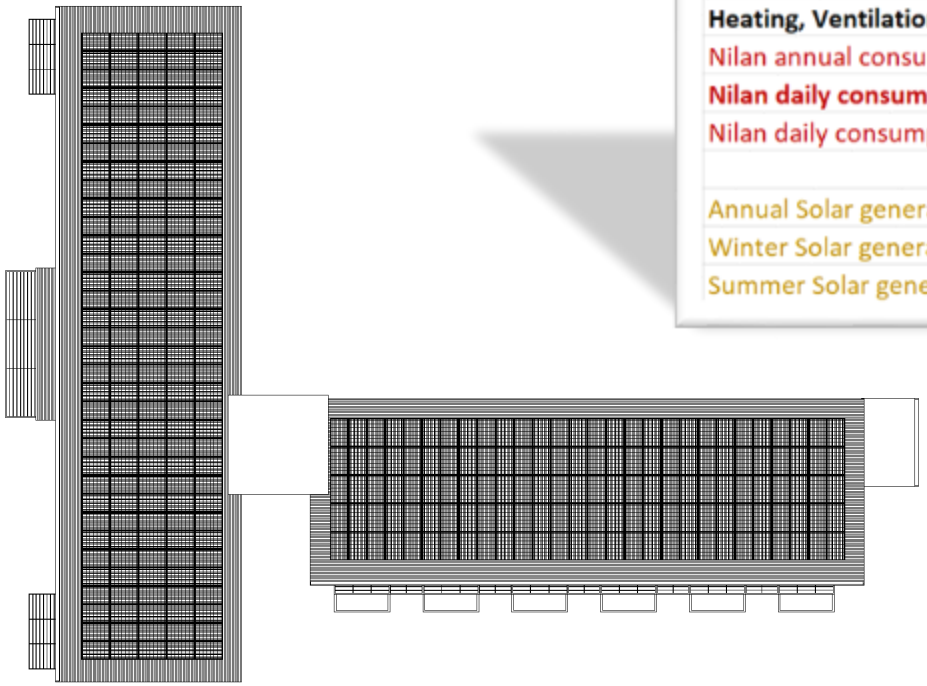
Block A - 5 Rows x 34 Sunpower MAX 2 360Wp panels	170	61.2	kWp	42,653	kWh/a	west facing
Total panels kWp		**109.8**	**kWp**			
Summer peak generation per day (PHPP)		381.73	kWh			
Winter trough generation per day (PHPP)		52.20	kWh			
Annual Generation (PHPP)		84413.00	kWh			
daily generation (average)		231.27	kWh			
Battery						
1 x Battery array of 12 Power Walls		1262.00	kWh			
Heating, Ventilation & Hot Water Power Consumption						
Nilan annual consumption per flat (PHPP)		2277	KWh			
Nilan daily consumption per flat (PHPP)		**6.24**	**kWh**			
Nilan daily consumption overall (PHPP)		237.06	kWh			
Annual Solar generation as a fraction of Nilan usage		98%	kWh			
Winter Solar generation as a fraction of Nilan usage		22%	kWh			
Summer Solar generation as a fraction of Nilan usage		161%	kWh			



BOW TIE CONSTRUCTION GSA MAUER NILAN OUTSTANDING INDOOR CLIMATE Interreg North-West Europe Mustbe0

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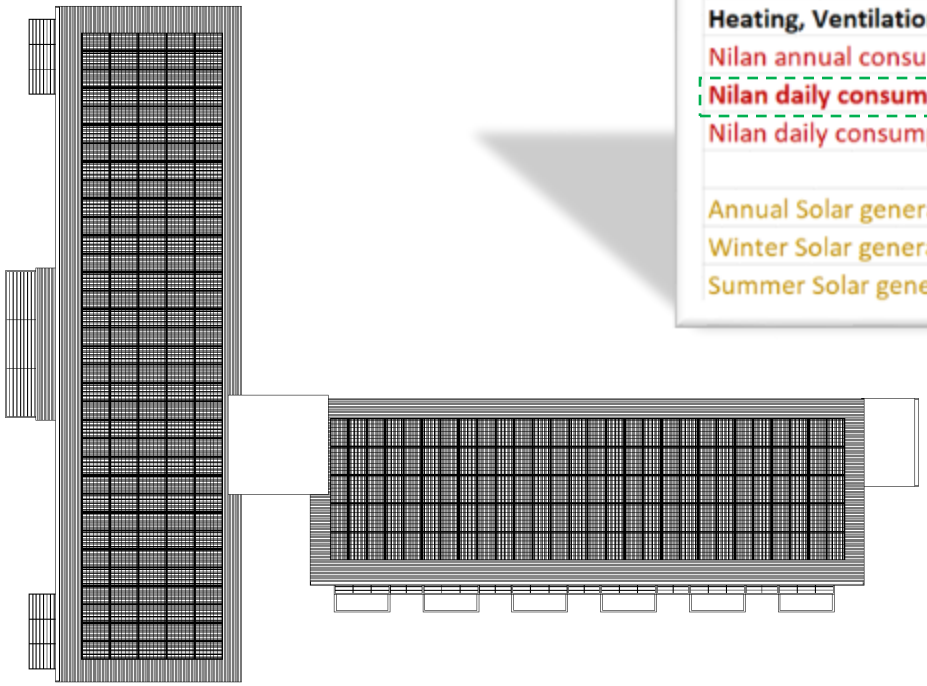
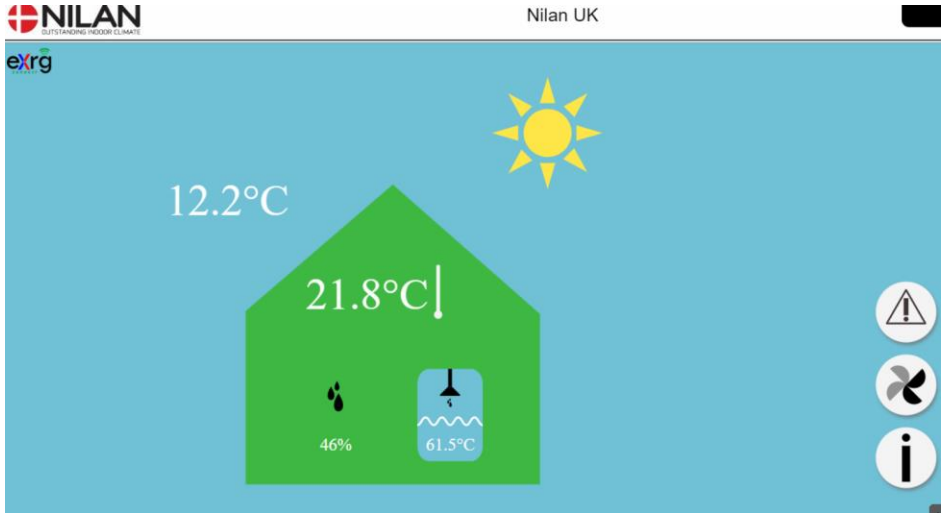
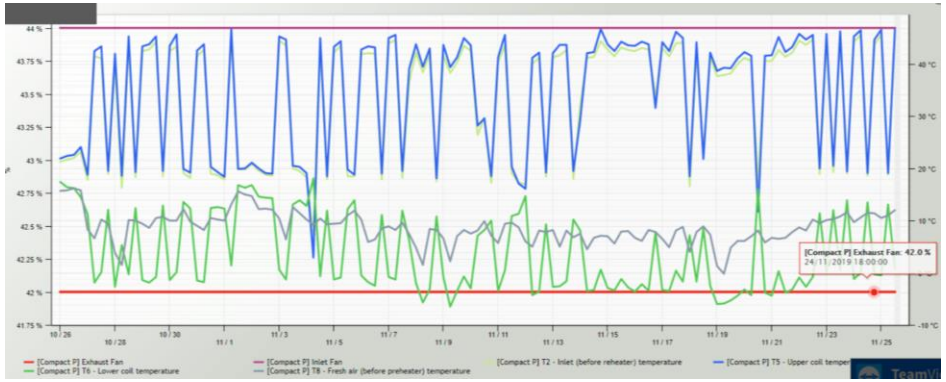
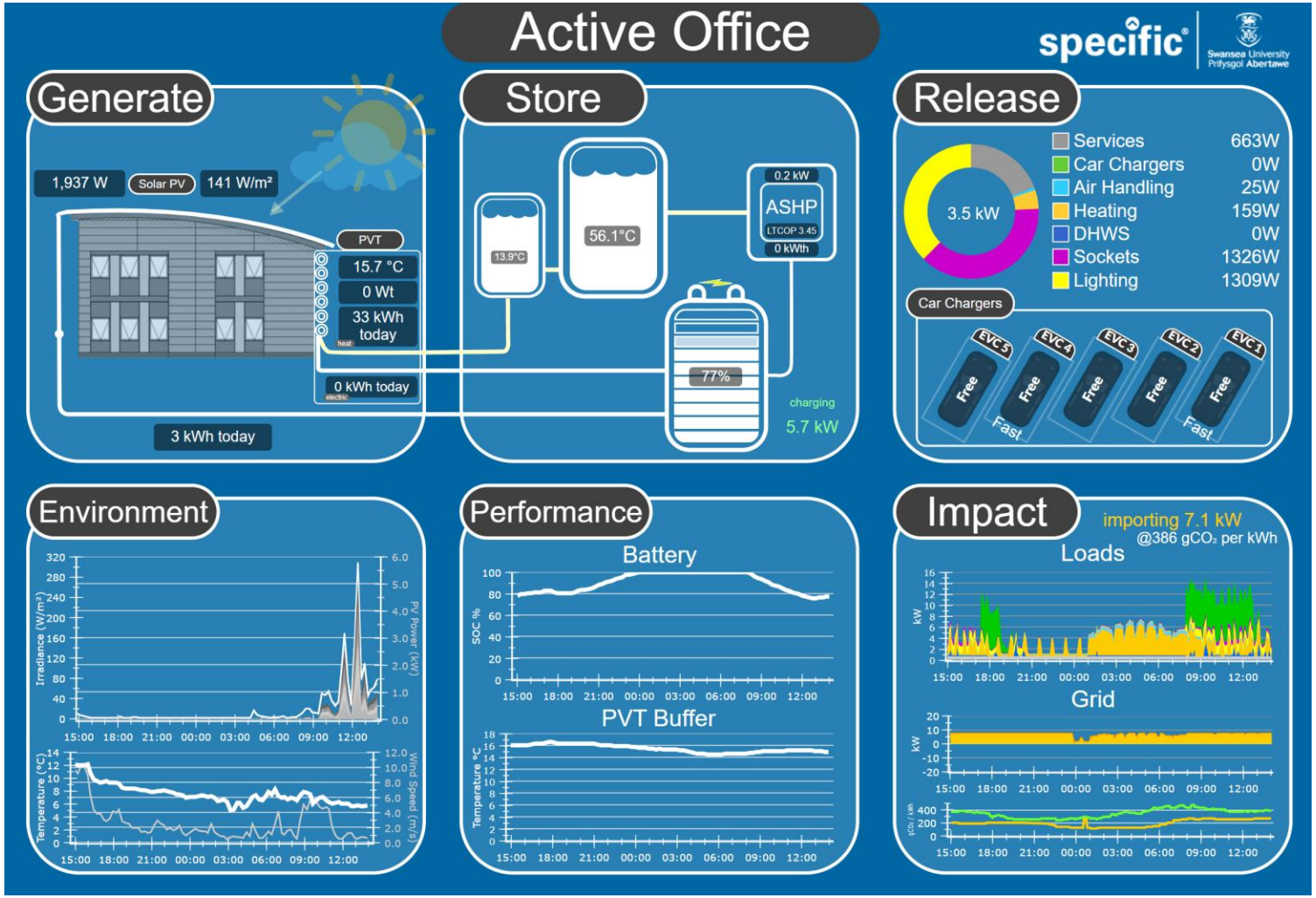


BOW TIE CONSTRUCTION GSA MAUER NILAN OUTSTANDING INDOOR CLIMATE Interreg North-West Europe Mustbe0

Demonstrator Monitoring







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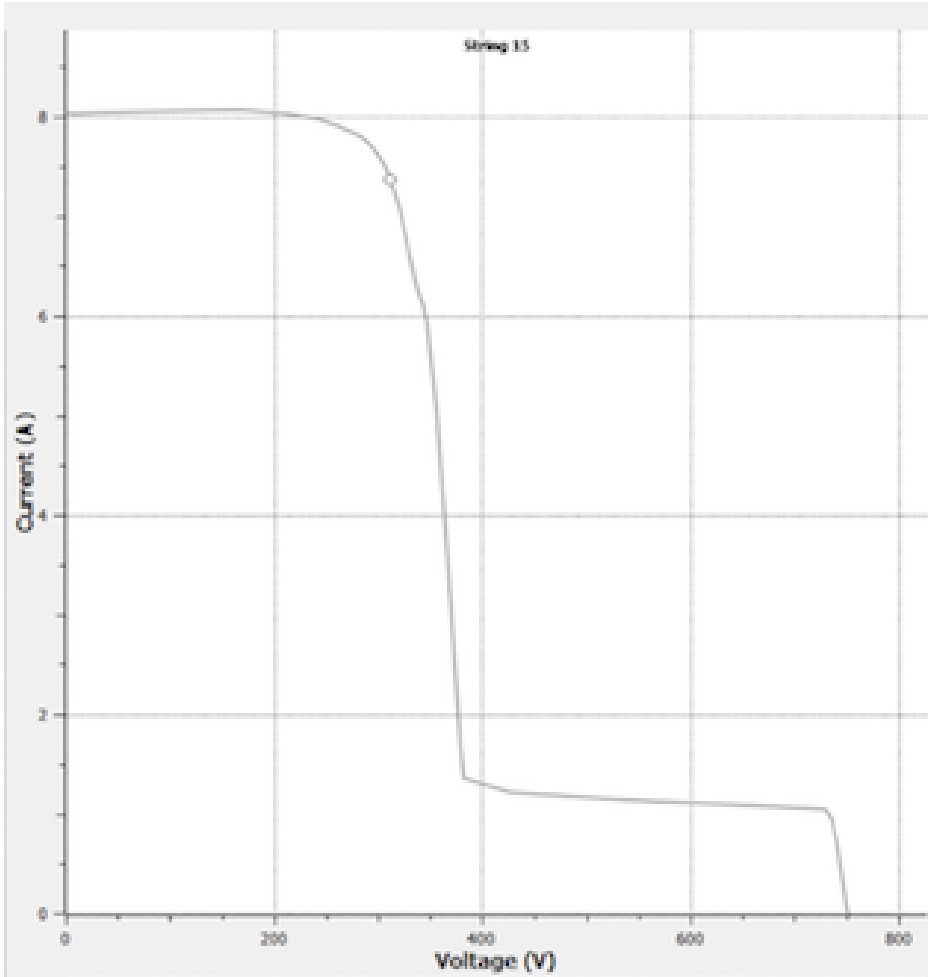
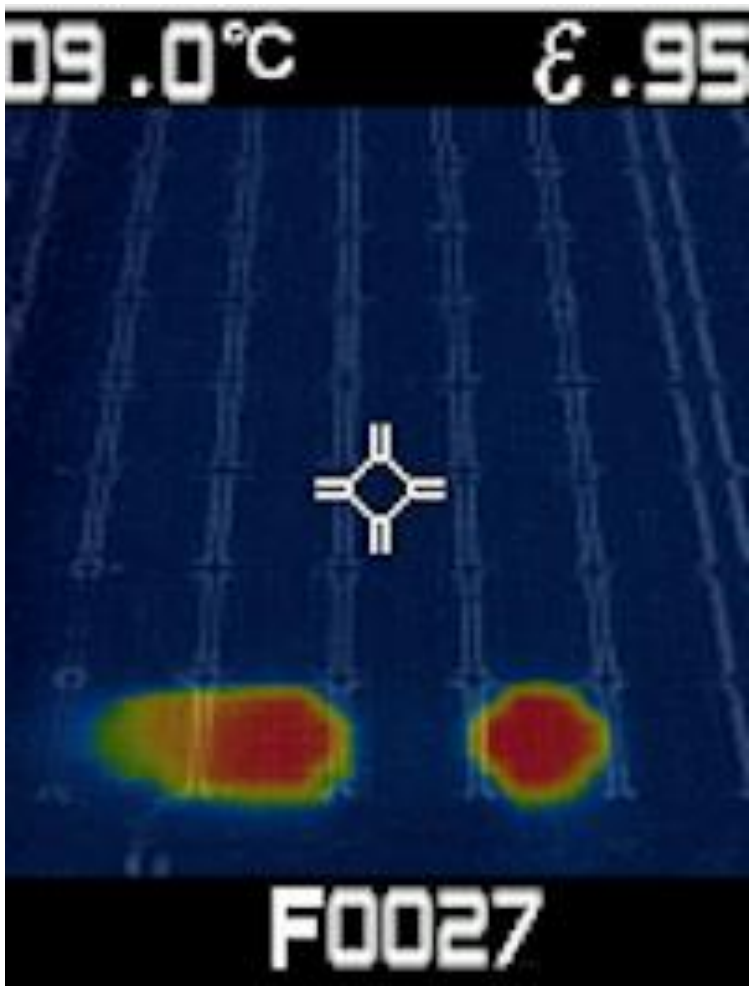
Performance Monitoring





BOW TIE CONSTRUCTION GSA MAUER NILAN OUTSTANDING INDOOR CLIMATE Interreg North-West Europe Mustbe0

Installation Costs

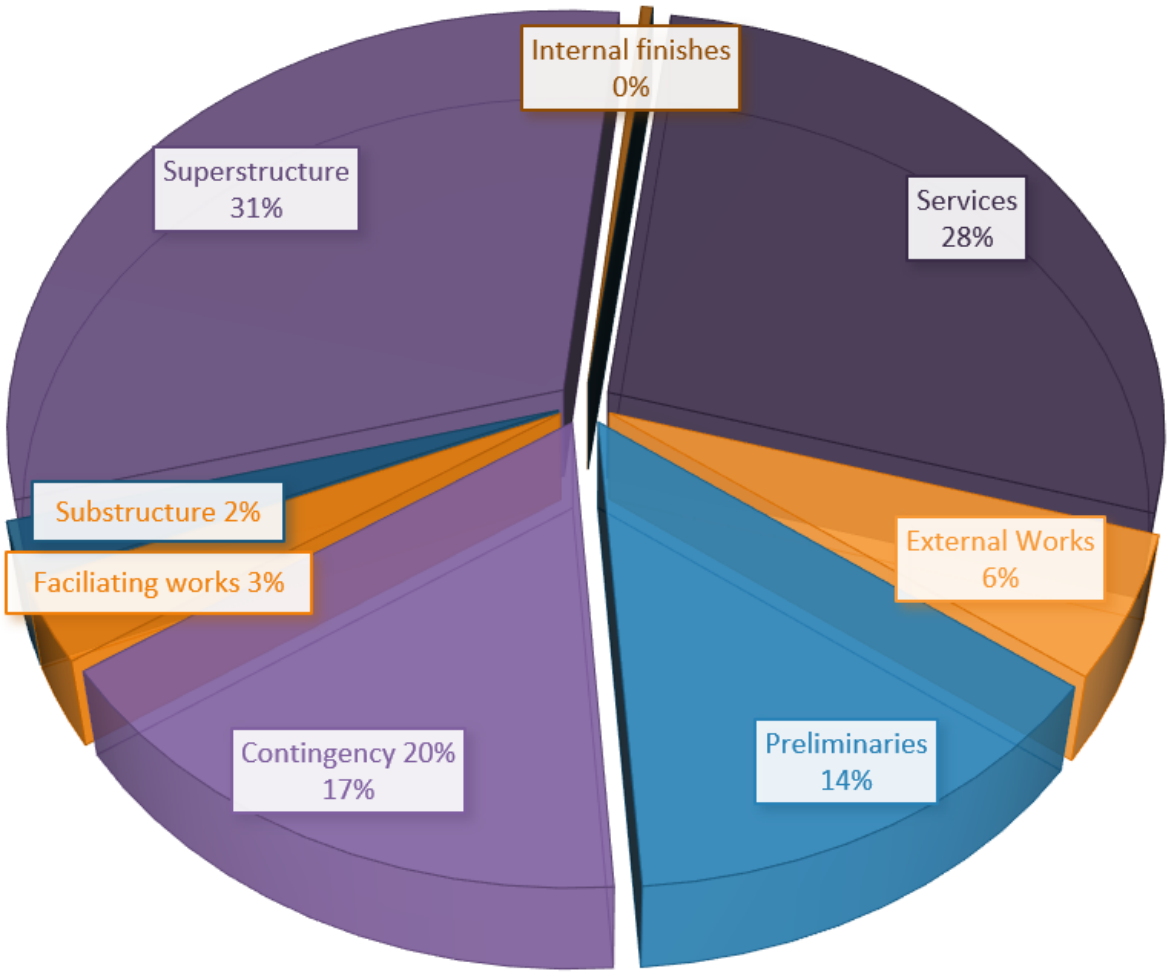
Treadgold House
BowTieSprong

BOW TIE CONSTRUCTION

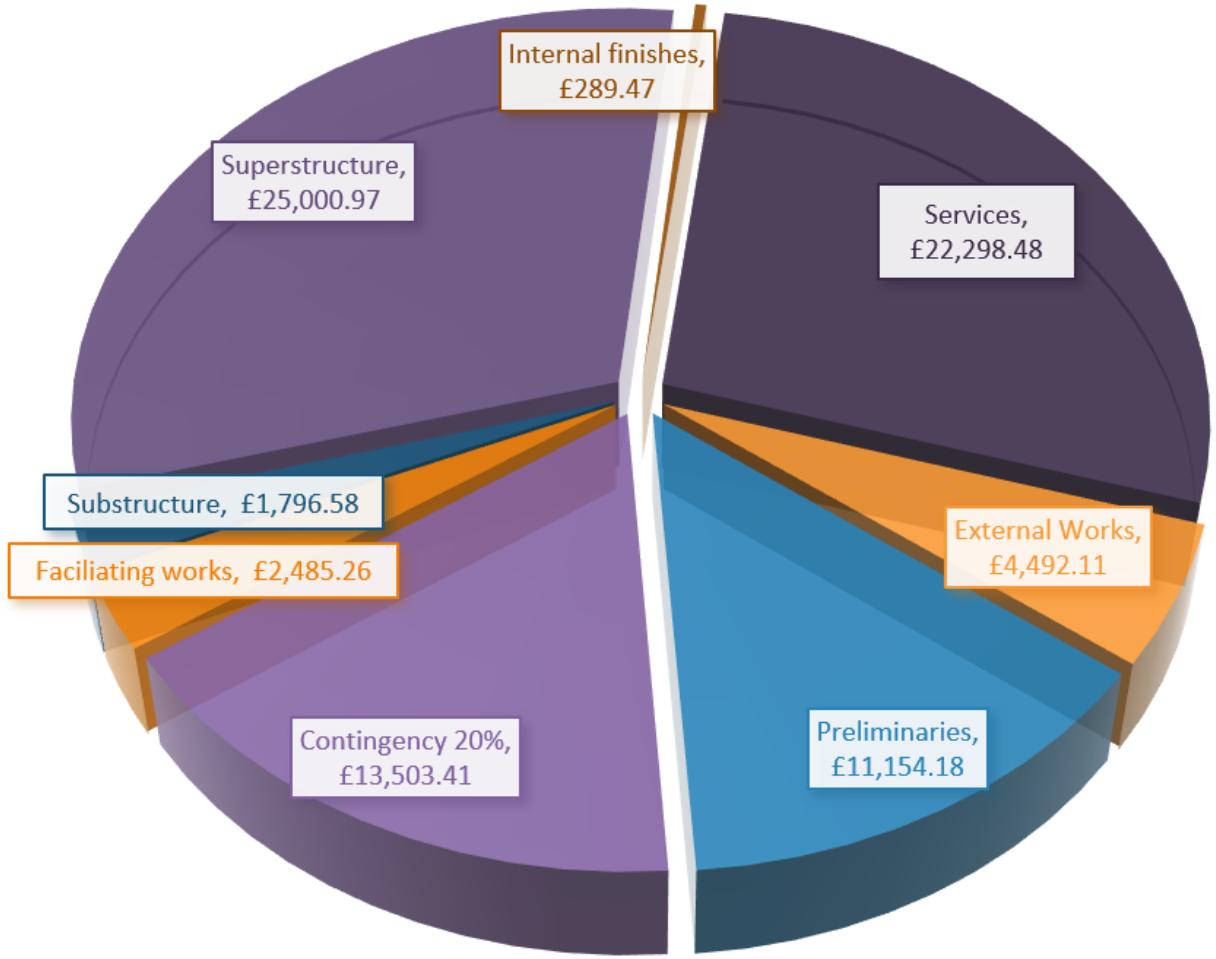
Date 25-Jun-20

Ref	Description	Total	Per flat
1	Faciliating works	£ 94,440.00	£ 2,485.26
2	Substructure	£ 68,270.00	£ 1,796.58
3	Superstructure	£ 950,037.00	£ 25,000.97
4	Internal finishes	£ 11,000.00	£ 289.47
5	Fittings, furnishings and equipment	£ -	
6	Services	£ 847,342.29	£ 22,298.48
7	External Works	£ 170,700.00	£ 4,492.11
8	Preliminaries	£ 423,859.00	£ 11,154.18
9	Contingency 20%	£ 513,129.66	£ 13,503.41
	Treadgold House BowTieSprong Grand Total	£ 3,078,777.94	ex VAT
	per flat		£ 81,020.47
	Planned maintenance spend years 1-30 eliminated by BowTieSprong retrofit	£ 1,622,658.00	ex VAT
	per flat		£ 42,701.53

COST BREAKDOWN %



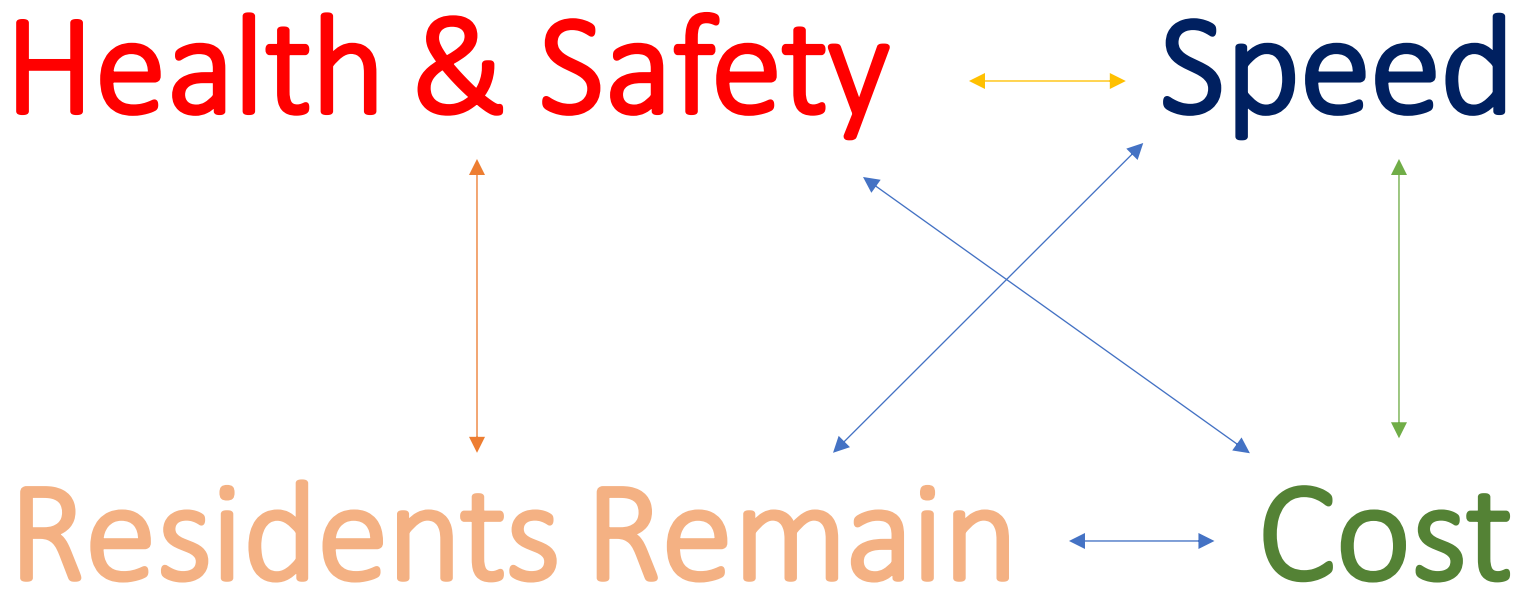
COSTS PER FLAT



BOW TIE CONSTRUCTION GSA MAUER NILAN OUTSTANDING INDOOR CLIMATE Interreg North-West Europe Mustbe0

Show Excel File

Construction Program


Health & Safety
Speed
Residents Remain
Cost

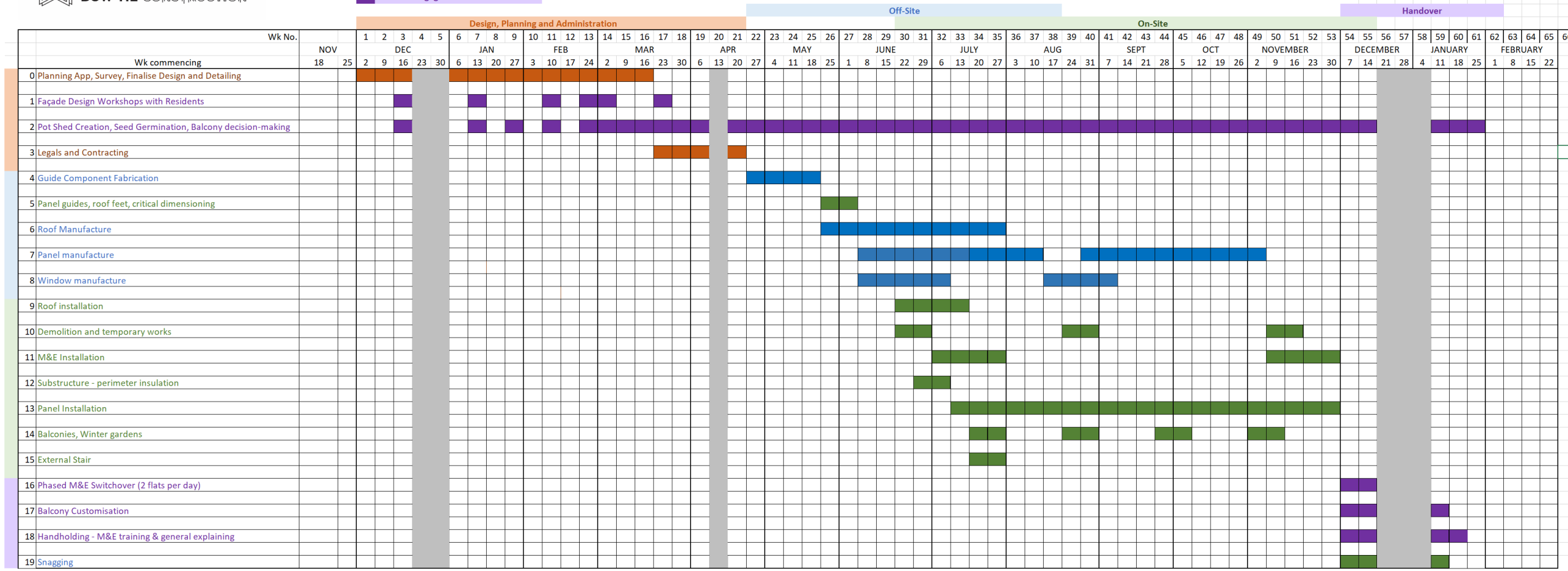
BowTieSprong Treadgold House

Draft Programme of Works

BOW TIE CONSTRUCTION

Stage Key:

- Design, Planning and Administration
- Off-site
- On-site
- Resident Engagement & Handover



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Low Operational Carbon Installation

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Warranties and Service Plan

MAUER External Wall	30+ Year Lifecycle Guarantee – KIWA BDA Certified System 60+ Year Lifecycle Guarantee – Assessment Completed
RUUKKI Roof	5 year guarantee on structure and Insulation 30 year guarantee on roof coating
NILAN OUTSTANDING INDOOR CLIMATE Hot Water, MVHR	2 Year guarantee followed by service plan included in costing Predicted 20 year lifespan, Some units aged 35 still functioning
Balcony	10 Year defects guarantee

SUNPOWER®
Solar Panels

25 year guarantee
25 year power warranty: up to 92% output in year 25

Carnego Systems
Metering

2 year guarantee on hardware and software followed by service plan included in costing

TESLA
ENERGY
Battery System

10 year guarantee on defects and ability to maintain 80% charge

Service Provider:

BowTieSprong

10 Year Warranty

BOW TIE CONSTRUCTION

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Joint Venture between installer and key suppliers
One point of contact for warranty and service issues

BowTieSprong

Years 11 - 30

Annual service plan

Interreg North-West Europe
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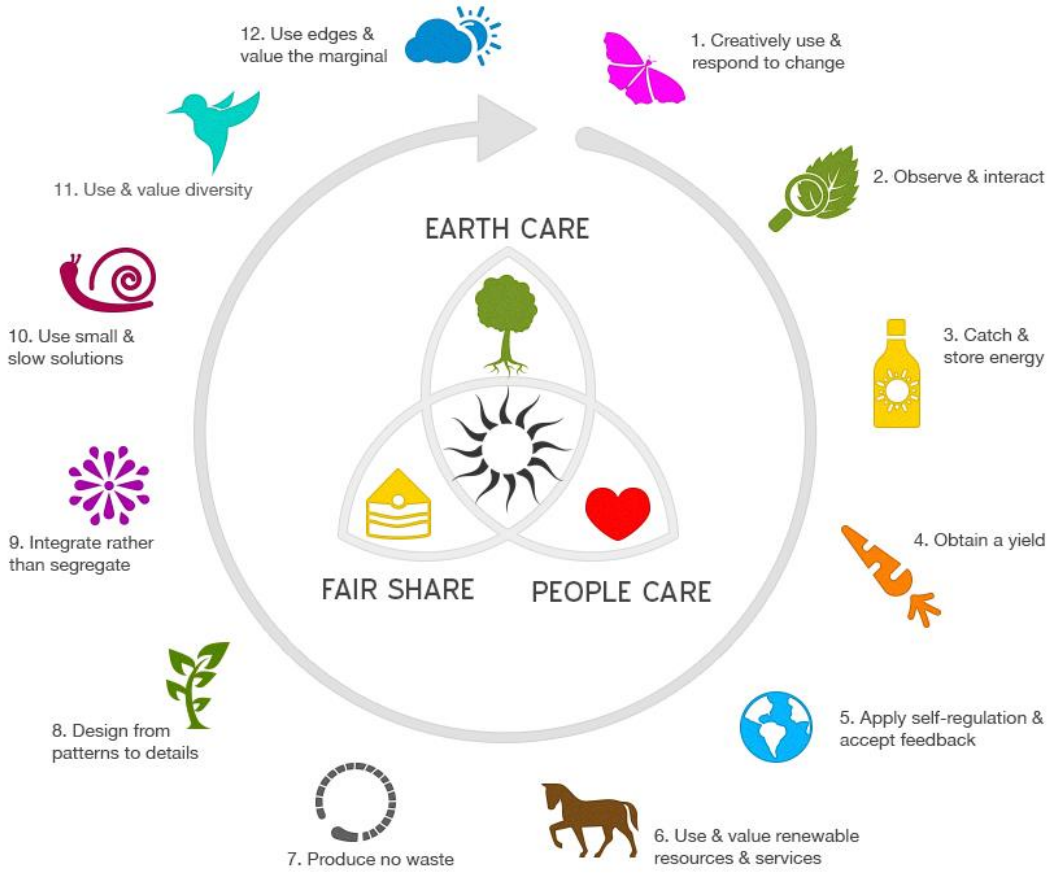
European Regional Development Fund

Resident Engagement

Permaculture Principles



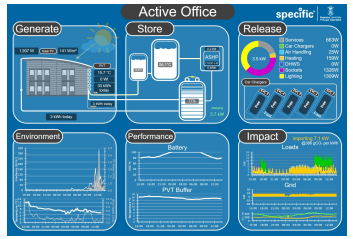
Resident Placemaking and Teambuilding

Balcony Customisation

Seed 2 Plant

Façade Hallmarking

4th Strand? Performance Communication on Social Media?



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Balconies

BOW TIE CONSTRUCTION

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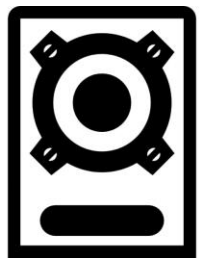
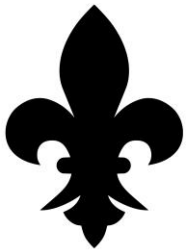
Façade Hallmarking





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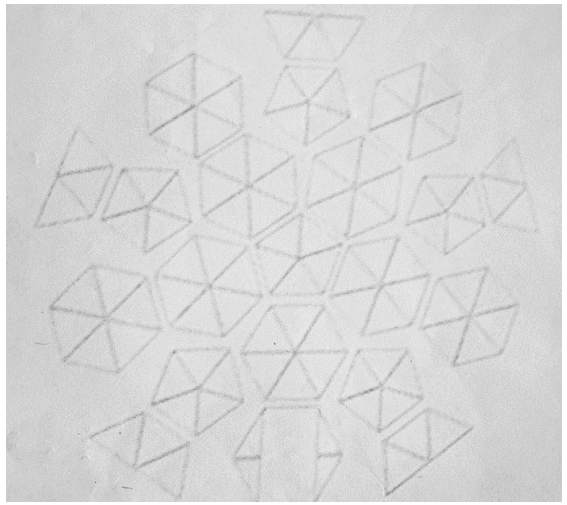
Seed 2 Plant



BOW TIE CONSTRUCTION

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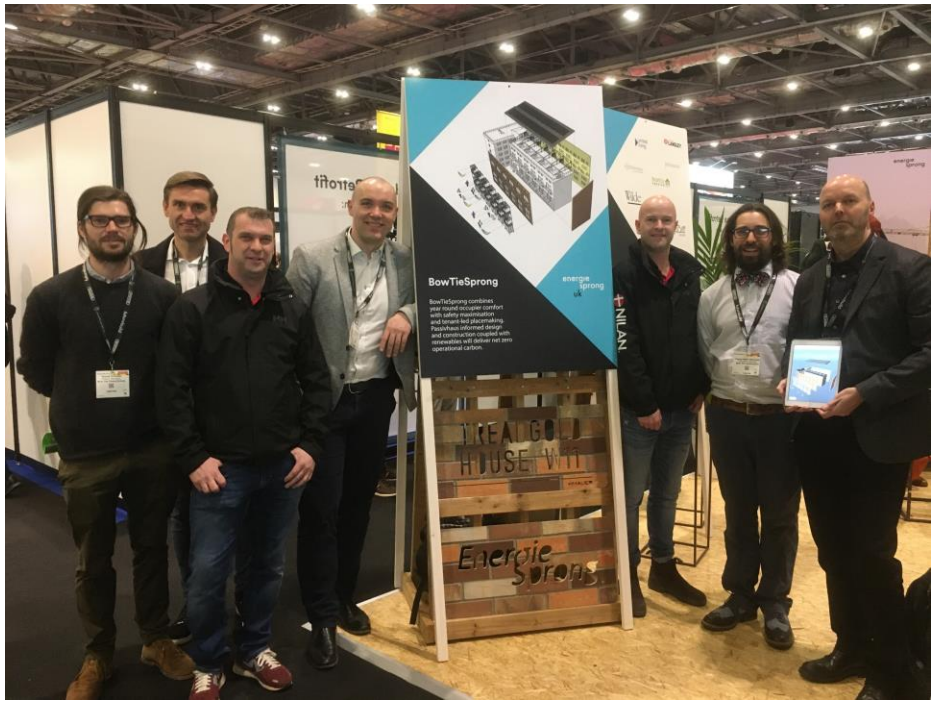
Resident Co-Design of these activities is essential

Work & Information Flow


BowTieSprong
NILAN

The wider Lancaster West Estate and beyond...

BOW TIE CONSTRUCTION GSA MAUER NILAN OUTSTANDING INDOOR CLIMATE Interreg North-West Europe Mustbe0

Conclusion and Questions

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energie sprong uk

Interreg
EUROPEAN UNION
North-West Europe
Mustbe0
European Regional Development Fund

Thank you for listening

Hagop Heath-Matossian Msc.

Business Development Manager- Passive House Consultant - Project Lead

hagop@bowtieconstruction.co.uk

@bowtiecon

'Bow Tie Construction'