



ENERGY STATEMENT – MARCH 2024

MAIDSTONE ROAD

LONDON
N11 2TN

EC  STUDIO XV

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MAIDSTONE ROAD N11 2TL ENERGY STATEMENT

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This report and its content would need to be reviewed and updated during detail design, construction documents and when the units are on site.

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CONTENTS

1. RESPONSE TO COUNCIL COMMENTS ----- 4

2. EXECUTIVE SUMMARY ----- 10

3. ENERGY STATEMENT SUMMARY ----- 14

4. OVERHEATING CHECKLIST ----- 34

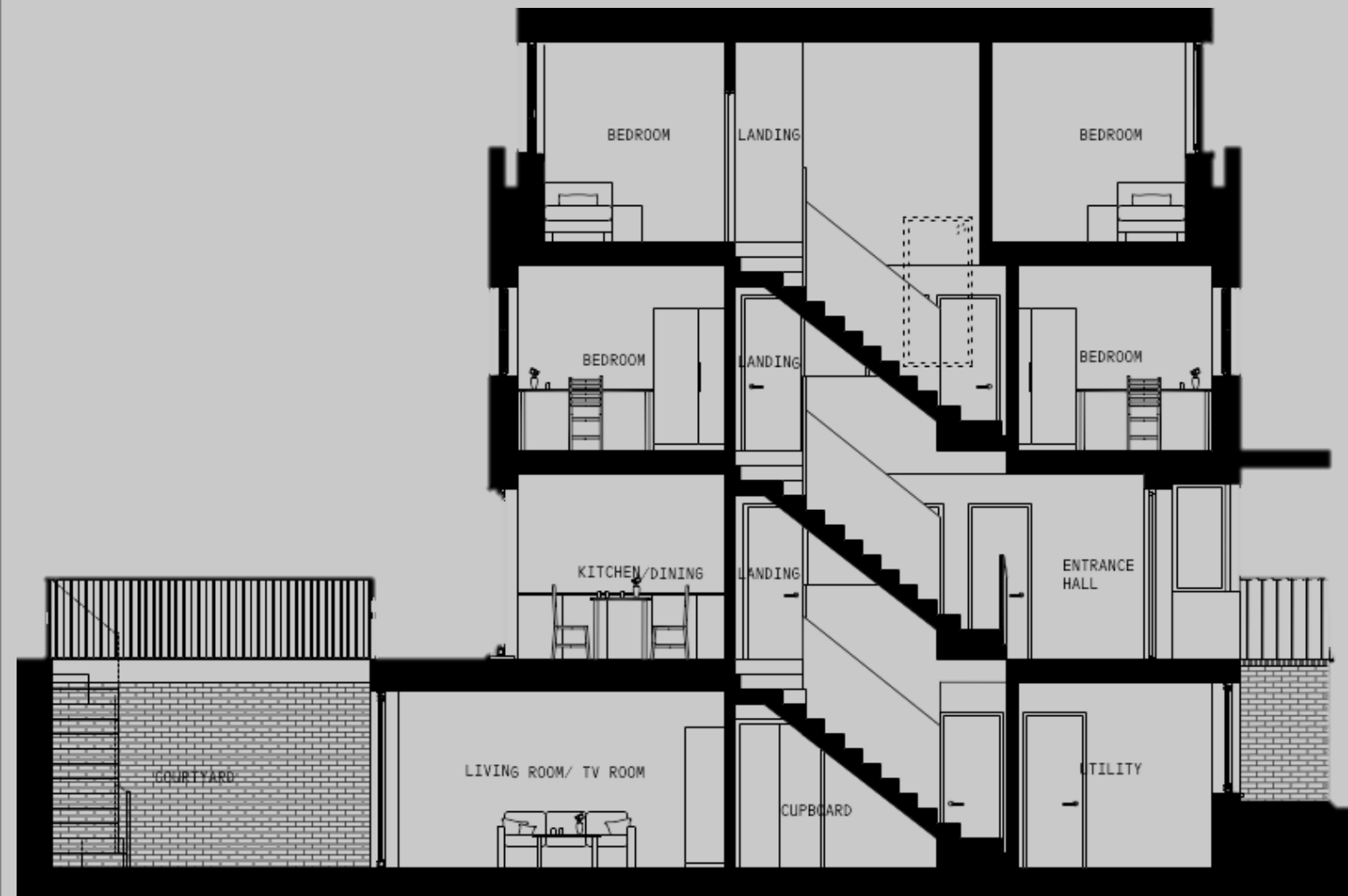
5. CONCLUSIONS ----- 40

6. APPENDIX A PV PANELS ----- 42

7. APPENDIX B: BOILER SAP CALCULATIONS ----- 44



1.0 RESPONSE TO COUNCIL COMMENTS



1.1 ECOSTUDIO XV LTD RESPONSE TO HARINGEY COUNCIL COMMENTS

HARINGEY COUNCIL COMMENT

Planning Application consultation: Carbon Management Response 23/08/2023

Objection Detail.
1. The development achieves a reduction of 74% carbon dioxide emissions on site, which is supported in principle. However, it is recommended to achieve at least 10% CO2 emission reduction under Be Lean scenario and follow the energy hierarchy to maximise on-site reduction in emissions, which will help to avoid high energy bills for occupants. Some clarifications must be provided with regard to the Energy Strategy. Appropriate planning conditions will be recommended once this information has been provided.

ECOSTUDIO XV RESPONSE: The energy statement have been updated so the development will achieve this target, with a be lean / be clean reduction of 46% and be green 40%, giving a total combined reduction of 86%.

HARINGEY COUNCIL COMMENT

ENERGY OVERALL

The overall predicted reduction in CO2 emissions for the development shows an improvement of approximately 74% in carbon emissions with SAP10 carbon factors, from the Baseline development model (which is Part L 2021 compliant). This represents an annual saving of approximately 5.4 tonnes of CO2 from a baseline of 7.2 tCO2/year.

ECOSTUDIO XV RESPONSE: The energy statement have been updated so the development shows an improvement of 86% in carbon emissions with SAP10 carbon factors, from the Baseline development model (which is Part L 2021 compliant). This represents an annual saving of 5.8 tonnes of CO2 from the baseline emissions of 6.7 tCO2/year.

TABLE 01– CARBON DIOXIDE EMISSIONS AFTER EACH STAGE OF ENERGY HIERARCHY.

	ENERGY HIERARCHY	CARBON DIOXIDE EMISSIONS		TOTAL %
		(Tones CO2 per annum)		
		REGULATED	CO2 SAVINGS	
A	Baseline: Part L 2021 of Building Regulations Compliant Development	6.7	-	-
B	After Energy Efficiency (Be Lean)	3.6	3.1	46
C	After Efficient Supply of Energy (Be Clean)	3.6	0	0
D	After Renewable Energy Technologies (Be Green)	0.9	2.7	40
	Cumulative Savings		5.8	
	Carbon shortfall to offset (tCO2	0.9		
	Carbon offset contribution	£95 x 30 years x 1.8 tCO2/year = £2,664.00		



1.1 ECOSTUDIO XV LTD RESPONSE TO HARINGEY COUNCIL COMMENTS

HARINGEY COUNCIL COMMENT

Action:
- Please submit the GLA's Carbon Emission Reporting Spreadsheet.
- Please submit SAP sheets for a representative selection of dwellings/the development for the Baseline, Be Lean and Be Green scenarios.

ECOSTUDIO XV RESPONSE: GLA's Carbon Emission Reporting Spreadsheet and SAP sheets for a representative selection of dwellings/the development for the Baseline, Be Lean and Be Green scenarios in the following [link](#)

HARINGEY COUNCIL COMMENT

Energy Use Intensity / Space Heating Demand

2. Applications are required to report on the total Energy Use Intensity and Space Heating Demand, in line with the GLA Energy Assessment Guidance (June 2022). The Energy Strategy should follow the reporting template set out in Table 5 of the guidance, including what methodology has been used. EUI is a measure of the total energy consumed annually, but should exclude on-site renewable energy generation and energy use from electric vehicle charging.
Actions:
- What is the calculated Energy Use Intensity (excluding renewable energy)? How does this perform against GLA benchmarks, i.e. at 35 kWh/m2/year? Please submit the information in line with the GLA's reporting template.
- What is the calculated space heating demand? How does this perform against the GLA benchmark of 15 kWh/m2/year? Please submit the information in line with the GLA's reporting template.

ECOSTUDIO XV RESPONSE: The Energy Use Intensity (excluding renewable energy) is 9.60 kWh/m2/ year which is less than the GLA benchmark of 35 kWh/m2/ year

TABLE 02– EUI AND SPACE HEATING DEMAND.

Building type	EUI (kWh/m2/year) (excluding renewable energy)	Space Heating Demand (kWh/m2/year)	Methodology used
Residential	9.60	4.79	Part L1 - SAP 10.2 & CIBSE TM54 dwellings / & Landlord Circulation

The calculated space heating demand against the GLA benchmark of 15 kWh/m2/ year is 4.79 kWh/m2/ year.

Therefore, with the proposed energy efficiency measures, the proposed development is well below the EUI and space heating demand.

HARINGEY COUNCIL COMMENT

Energy – Lean

3. A saving of only 2% carbon emission is proposed through improved energy efficiency standards in key elements of the build against Part L2021. Developments should follow the Energy Hierarchy and take a fabric first approach in line with London Plan Policy SI2 and Local Plan Policy SP4. The development relies mostly on ASHP and SolarPV to meet its energy targets and compensate for its poor performance under Be Lean. The following u-values, g-values and air tightness are proposed:

Floor u-value	0.10 W/m²K
External wall u-value	0.11 W/m²K
Roof u-value	0.11 W/m²K
Door u-value	1.00 W/m²K
Window u-value	0.8 W/m²K
G-value	<0.60
Air permeability rate	2 m³/hm² @ 50Pa
Ventilation strategy	Natural ventilation with intermittent extract fans (6no.)
Thermal bridging	Accredited Construction Details
Low energy lighting	100%
Heating system Be Lean only	Condensing combi gas boiler (90.4% efficient)
Fabric energy efficiency improvement	TBC

London Plan Policy SI4 requires developments to minimise adverse impacts on the urban heat island, reduce the potential for overheating and reduce reliance on air conditioning systems. Through careful design, layout, orientation, materials and incorporation of green infrastructure, designs must reduce overheating in line with the Cooling Hierarchy.

Actions:
- The applicant should improve the fabric efficiency and aim for at least 10% CO2 emission reduction under Be Lean. Only a 2% reduction is achieved.
- Mechanical ventilation with heat recovery could be proposed to further reduce heat losses.
- Provide the average % improvement on the FEES.

ECOSTUDIO XV RESPONSE: The Energy statement have been updated so the development will achieve a be lean / be clean reduction of 46% without mechanical ventilation heat recovery and a fabric energy efficiency improvement of 28%. Please refer to table 3 for further details.

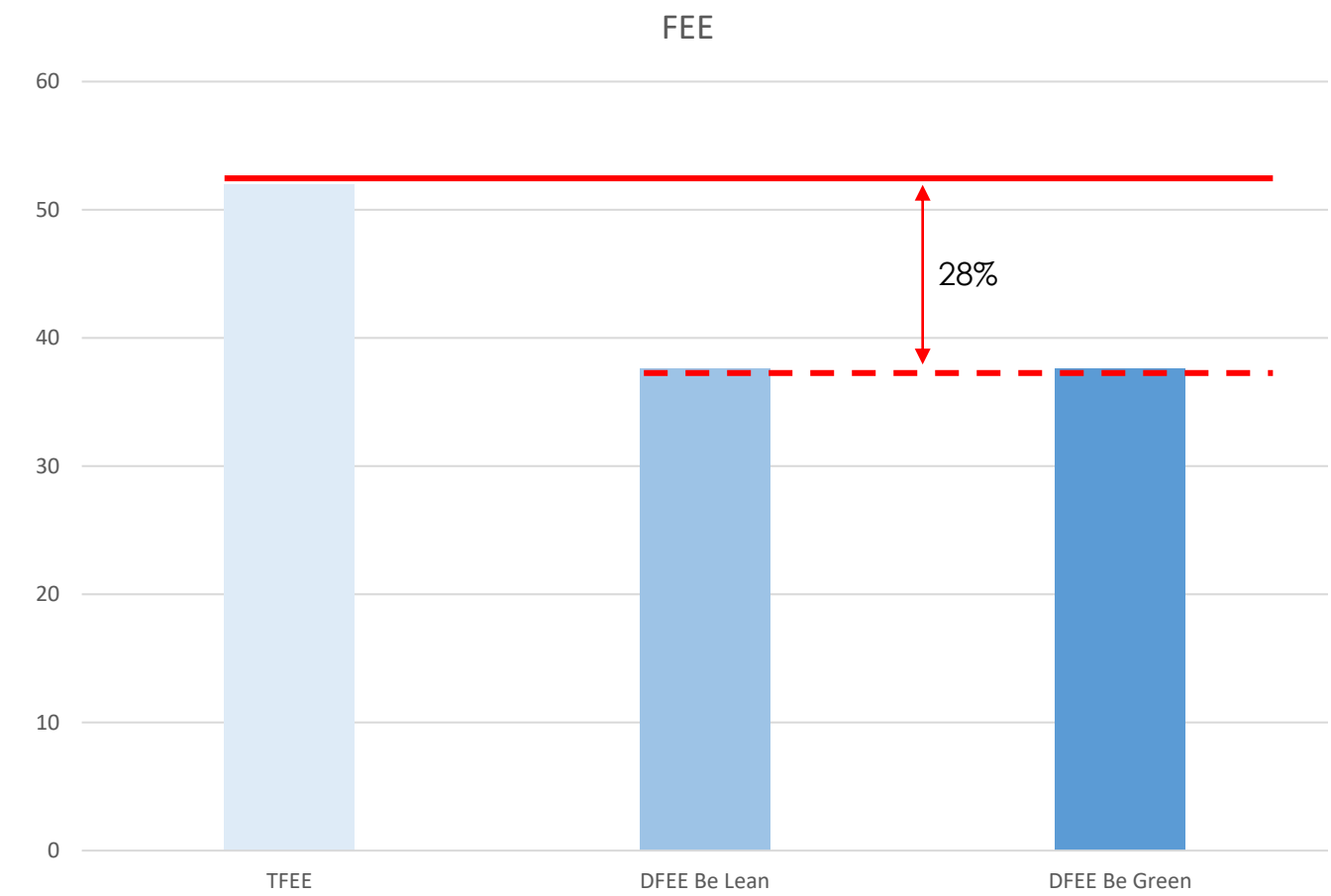


1.1 ECOSTUDIO XV LTD RESPONSE TO HARINGEY COUNCIL COMMENTS

TABLE 03 – FABRIC ENERGY EFFICIENCY.

	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development total	52.00	37.60	28%

FIGURE 19 –FABRIC ENERGY EFFICIENCY



HARINGEY COUNCIL COMMENT

Energy – Clean

The applicant is not proposing any Be Clean measures. The site is not within reasonable distance of a proposed Decentralised Energy Network (DEN). A Combined Heat and Power (CHP) plant would not be appropriate for size of development.

Energy – Green

4. As part of the Be Green carbon reductions, all new developments must achieve a minimum reduction of 20% from on-site renewable energy generation to comply with Policy SP4.

The application has reviewed the installation of various renewable technologies. The report concludes that air source heat pumps (ASHPs) and solar photovoltaic (PV) panels are the most viable options to deliver the Be Green requirement. A total of 5.7 tCO₂ (72%) reduction of emissions are proposed under Be Green measures.

The solar array peak output would be 12.15 kWp, which is estimated to produce around 4.05 kWp per house. The array of 9 panels of 400W each per house would be mounted on a roof.

The individual air-to-water ASHP system(s) (min. SCOP of 3.5) will provide heating to the dwellings through underfloor heating.

ECOSTUDIO XV RESPONSE:

- The Energy statement has been updated so the be green scenario achieves a reduction of 40%
- The air source heat pump and solar photovoltaic panels deliver a total of 5.8 tCO₂ (86%) cumulative savings.
- The solar array peak output would be 9.45 kWp, which is estimated to produce around 4.05 kWp per house. The array of 7 panels of 450W each per house would be mounted with 10 degrees slope above a green roof.
- The individual air-to-water ASHP system(s) (min. SCOP of 3.5) will provide space and domestic hot water heating to the dwellings through underfloor heating.

Actions:

- A living roof should be installed under the solar PV, or if this is not feasible, the roof should be light coloured to reduce solar heat gains and to improve efficiency of the solar panels.

ECOSTUDIO XV RESPONSE: An extensive green roof has been incorporated to the current design proposals with a 100mm substrate.



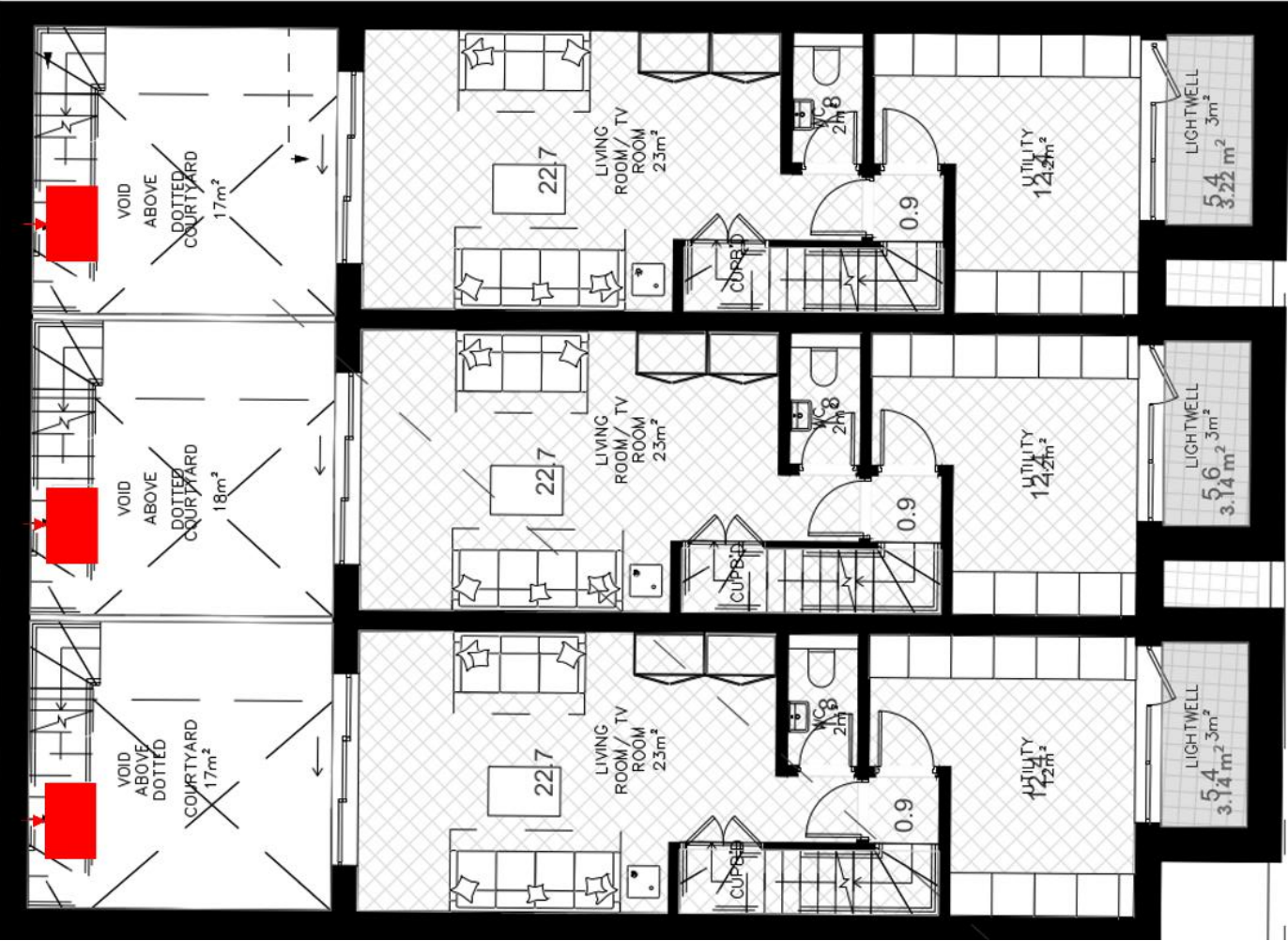
1.1 ECOSTUDIO XV LTD RESPONSE TO HARINGEY COUNCIL COMMENTS

HARINGEY COUNCIL COMMENT

Actions:
- Please identify on the plans where the internal and external parts of the air source heat pumps will be located and how the units will be mitigated in terms of visual and noise impact.

ECOSTUDIO XV RESPONSE: The air source heat pumps will be located in the lower ground floor below the staircase leading into the rear gardens. Please refer to Figure 1 for further details.

FIGURE 01 – AIR SOURCE HEAT PUMP LOCATION



 **AIR SOURCE HEAT PUMP EXTERNAL UNIT**

ECOSTUDIO XV RESPONSE: The noise produced by the external condensing units will be mitigated with ultra quiet systems such as ECODAN R32 ultra quiet PUZ Monobloc Air Source Heat Pumps or equivalent. The space heating and the hot water demand will be met 100% by the proposed heat pump (6 KW). Preliminary sizing has been carried out as shown further below.

HARINGEY COUNCIL COMMENT

Actions:
- How much of the heating/hot water demand will be met by the proposed type of heat pump? If this cannot be met fully, how will this be supplemented?

ECOSTUDIO XV RESPONSE: The space heating and the hot water demand will be met by the proposed heat pump (6 KW).

FIGURE 02 –SPACE HEATING REQUIREMENTS FROM SAP WORKSHEET

3. Heat losses and heat loss parameter													
Doors (1)									2.1200	1.0000	2.1200	(26)	
Windows (1)									44.1300	0.7752	34.2093	(27)	
groundFloor								35.6800	0.1000	3.5680	20.0000	713.6000	(28a)
exposeWall								2.5000	0.1100	9.0750	190.0000	15675.0000	(29a)
basementWall								5.9800	0.1100	5.0578	190.0000	8736.2000	(29a)
exposedRoof								36.6800	0.1100	4.0348	9.0000	330.1200	(30)
Total area of external elements:												290.0600	(31)
partyWall								75.5100	0.0500	3.7755	180.0000	13591.8000	(32)
Fabric heat loss:												66.1374	(33)
Heat capacity:												39906.1200	(34)
Thermal mass parameter:												507.3887	(35)
Thermal bridges:												7.4603	(36)
Total fabric heat loss :												73.5977	(37)
		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Vent loss	41.7484	41.4697	41.1965	39.9132	39.6731	38.5553	38.5553	38.3483	38.9859	39.6731	40.1588	40.6666	(38)
Heat transfer coeff	115.3461	115.0674	114.7942	113.5109	113.2708	112.1530	112.1530	111.9460	112.5836	113.2708	113.7565	114.2643	(39)
Heat transfer coeff (average)												113.5097	(39)
HLP	1.4666	1.4630	1.4596	1.4432	1.4402	1.4260	1.4260	1.4233	1.4315	1.4402	1.4464	1.4528	(40)
HLP (average)												1.4432	(40)
Days in month	31.0000	28.0000	31.0000	30.0000	31.0000	30.0000	31.0000	31.0000	30.0000	31.0000	30.0000	31.0000	(41)
heat pump calculation Output power												5180.0000	

FIGURE 03 – JANUARY WATER HEATING REQUIREMENTS FROM SAP WORKSHEET

4. Water heating energy requirements													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Assumed occupancy													2.4367 (42)
Average daily hot water use (litresVday)													122.0445 (43)
Mixer shower usage	65.0759	64.0980	62.6729	59.9462	57.9340	55.6901	54.4146	55.8289	57.3792	59.7886	62.5738	64.8266	(42a)
Bath usage	28.1080	27.6906	27.1027	26.0188	25.2072	24.3073	23.8212	24.4049	25.0405	26.0035	27.1097	28.0130	(42b)
Other usage	39.5847	38.1453	36.7058	35.2664	33.8269	32.3875	32.3875	33.8269	35.2664	36.7058	38.1453	39.5847	(42c)
Daily hot water use	132.7687	29.9338	126.4814	121.2315	116.9682	112.3849	110.6233	114.0608	117.6861	122.4979	127.8287	132.4243	(44)
Energy content	210.2731	85.0240	194.3972	165.9598	157.4617	138.1903	133.7893	141.2310	145.1187	166.2285	182.1155	207.3445	(45)
Energy content(annual)													2027.1336 (45)
Distribution loss	31.5410	27.7536	29.1596	24.8940	23.6193	20.7285	20.0684	21.1847	21.7678	24.9343	27.3173	31.1017	(46)
Cylinder volume													150.0000 (47)
Measured cylinder loss (kWhVday)													1.4000 (48)
Temperature factor													0.5400 (49)
Energy lost from water storage (kWhVday)													0.7560 (50)
Energy lost from cylinder in kWhVday													0.7560 (55)
Total storage loss	23.4360	21.1680	23.4360	22.6800	23.4360	22.6800	23.4360	23.4360	22.6800	23.4360	22.6800	23.4360	(56)
Net storage loss	23.4360	21.1680	23.4360	22.6800	23.4360	22.6800	23.4360	23.4360	22.6800	23.4360	22.6800	23.4360	(57)
Primary loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(59)
Combi loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(61)
Total	233.7091	206.1920	217.8332	188.6398	180.8977	160.8703	157.2253	164.6670	167.7987	189.6645	204.7955	230.7805	(62)



1.1 ECOSTUDIO XV LTD RESPONSE TO HARINGEY COUNCIL COMMENTS

TABLE 04 –WATER HEATING CALCULATED DEMAND

WATER HEATING CALCULATED DEMAND (KW)
$DHW\ DEMAND = \frac{233\ KWH/month}{30\ days}$ $DHW\ DEMAND = \frac{7.76\ KWH}{12\ hours} = 0.64\ KW$

TABLE 05 –HEAT PUMP CAPACITY

COMBINED DEMAND KW	HEAT PUMP CAPACITY KW
5.82	6.00

HARINGEY COUNCIL COMMENT

Actions:

- Applications should demonstrate how they might take a demand-side response to reducing energy use. Has battery storage for the solar PV system been considered or justify why this is not proposed.

ECOSTUDIO XV RESPONSE: Due to the poor economics, limited space for storage, the consequent need for a battery storage for the solar PV system is not a viable technology for this scheme.

HARINGEY COUNCIL COMMENT

Carbon Offset Contribution

5. A carbon shortfall of 1.8 tCO2/year remains. The remaining carbon emissions will need to be offset at £95/tCO2 over 30 years.

ECOSTUDIO XV RESPONSE: After improvements a carbon shortfall of 0.9 tCO2/year remains. The remaining carbon emissions will need to be offset at £95/tCO2 over 30 years.

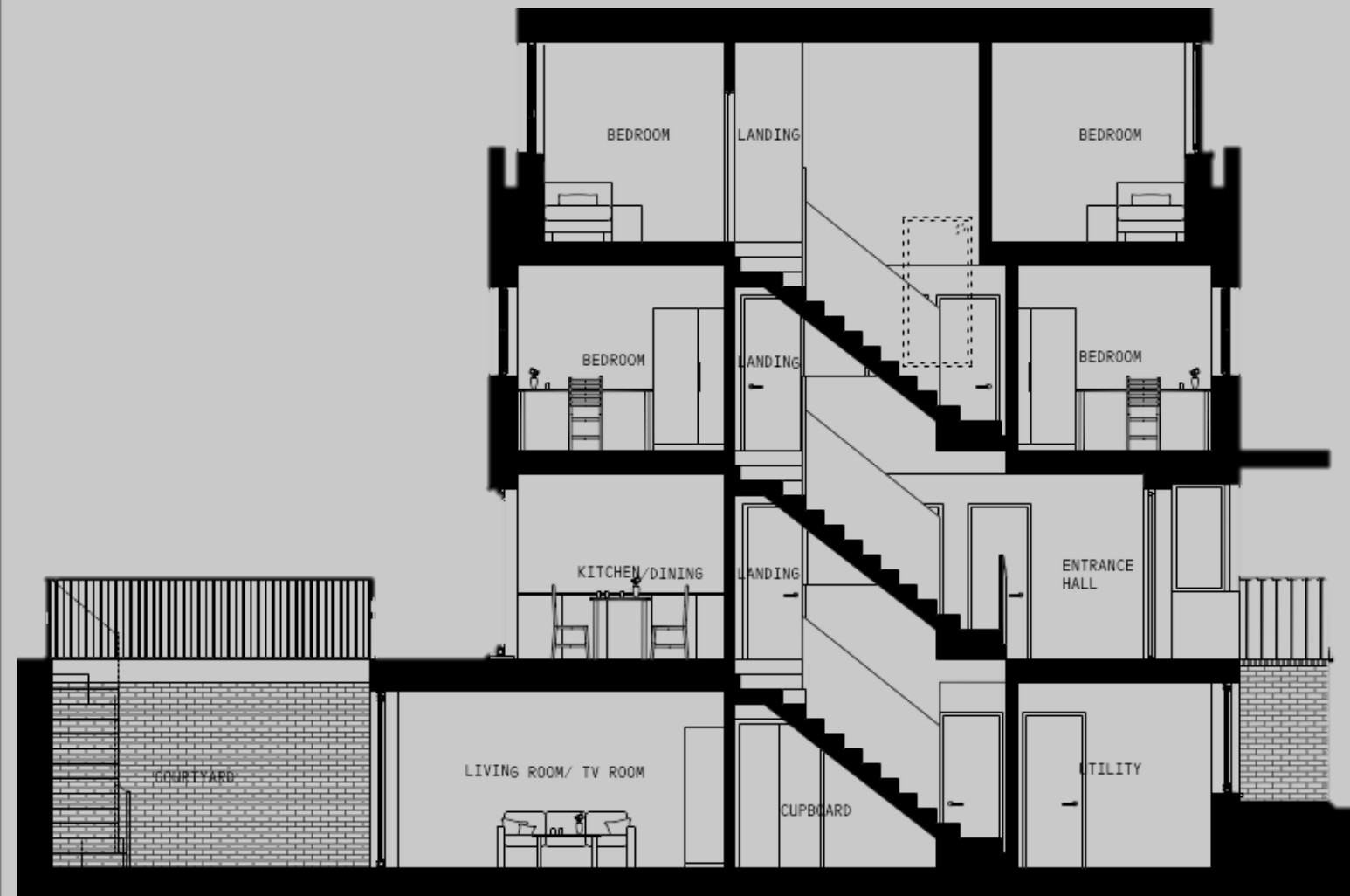
FIGURE 04 – CASH IN LIEU CONTRIBUTION TO ACHIEVE ZERO CARBON

Cash in-lieu contribution (£)	2,664	
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*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development



1.0 EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

The purpose of this document is to demonstrate compliance of the proposed development located at 24 and 26 Maidstone Lane, N11 2TL towards the Energy requirements as listed below in the local, regional and national policies.

ECostudio LTD has been commissioned by vPPR Architects in order to provide an updated Energy Statement in accordance with:

- London Borough of Haringey.
- Approved Document L of Building Regulations, Volume 1: Dwellings v 2021
- Major of London Guidance for Energy Statements, April 2020
- The Mayor's London Plan Approved Document L of Building Regulations, Volume 1: Dwellings v 2021

This report outlines the specifications for maximizing the environmental performance of the proposed development.

The proposed development consists in erection of 3 semi-detached houses, with basement and two stories. Each unit has 4 beds with communal parking and private gardens.

As per the London Borough of Haringey Local Plan, it will expect that all the developments meet the carbon emission reduction requirements set out in the London Plan:

- Residential developments are expected to be able to achieve on-site savings beyond the minimum 35% improvement (be lean, clean and green).

This report provides a summary on how the residential development will achieve this target, with a be lean / be clean reduction of 46% and be green 40%, giving a total combined reduction of 86%.

ENERGY HIERARCHY BE LEAN / BE CLEAN

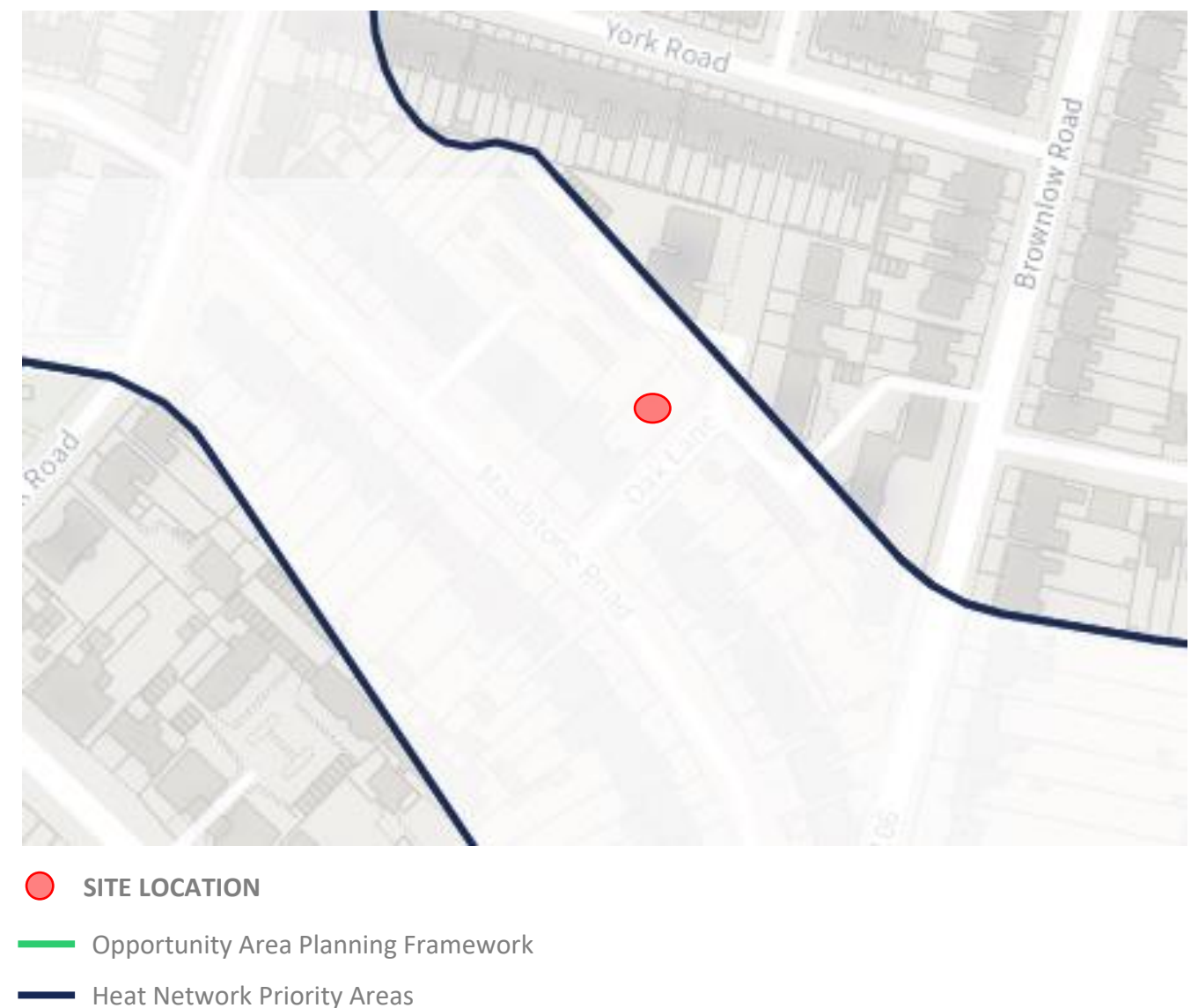
The development will achieve Approved Document L of Building Regulations, Volume 1: Dwellings v 2021 for Residential Building Regulations compliance by implementing all possible energy efficiency and energy conservation measures, before any renewable energy system is incorporated to the design.

The residential development will achieve a reduction of **46%** in carbon dioxide emissions for all regulated emissions under the Be Lean / Be Clean scenario. This has been calculated following the London Plan Guidance for Energy Statements applicable to refurbishments and extensions.

The development is far from the decentralized energy network for potential district heating. Therefore, claiming reduction in the carbon emissions, based on the connection to the local district heating is not feasible. Please refer to Figure 1 for further details.

The use of CHP is not viable on a scheme of this size. Instead the target reduction is achieved using the energy efficiency measures and the provision of on-site renewable energy technology.

FIGURE 05 – LONDON HEAT MAP SHOWING THE SITE LOCATION IN THE RED CIRCLE



EXECUTIVE SUMMARY

BE GREEN

The residential development will achieve a 40% CO2 emissions reductions just under the be Green scenario from:

- 1no electric ASHP for space heating per dwelling
- 7no PV panels of 450W each: 0.45 kWp x7 = 3.15/loip/ kWp per house

This equates = 9.45 kWp for the 3no houses in total.

The residential development will have a combined reduction in CO2 emissions when compared with the baseline of 86%. Please refer to figure 04 for further details.

Using the GLA Carbon Emissions reporting for residential developments, the cash in lieu contribution using the recommended price of £95 per tonne of CO2 would be £2,664.00

FIGURE 07 – CASH IN LIEU CONTRIBUTION TO ACHIEVE ZERO CARBON

Cash in-lieu contribution (£)	2,664	
*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab		

FIGURE 06 – THE LONDON PLAN ENERGY HIERARCHY

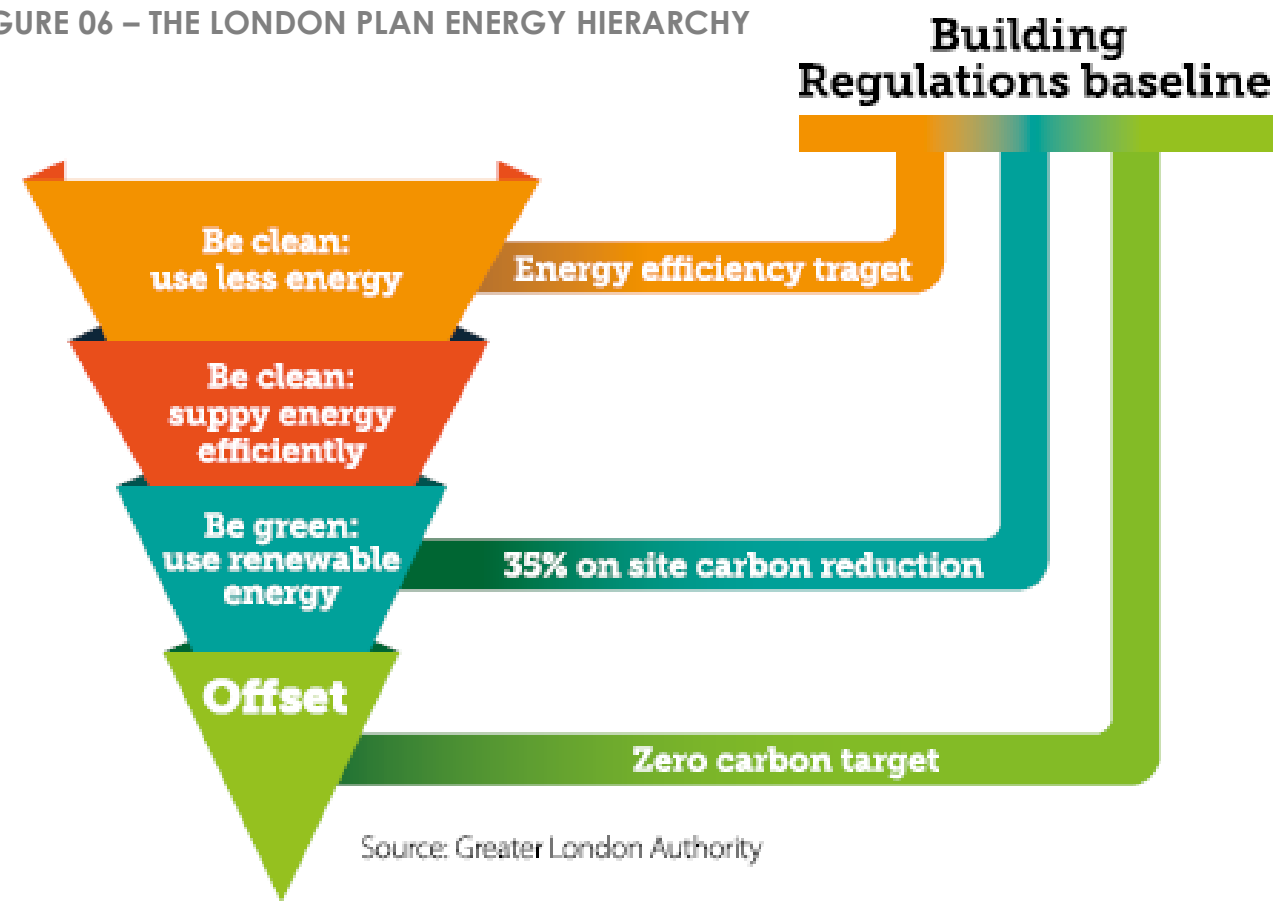
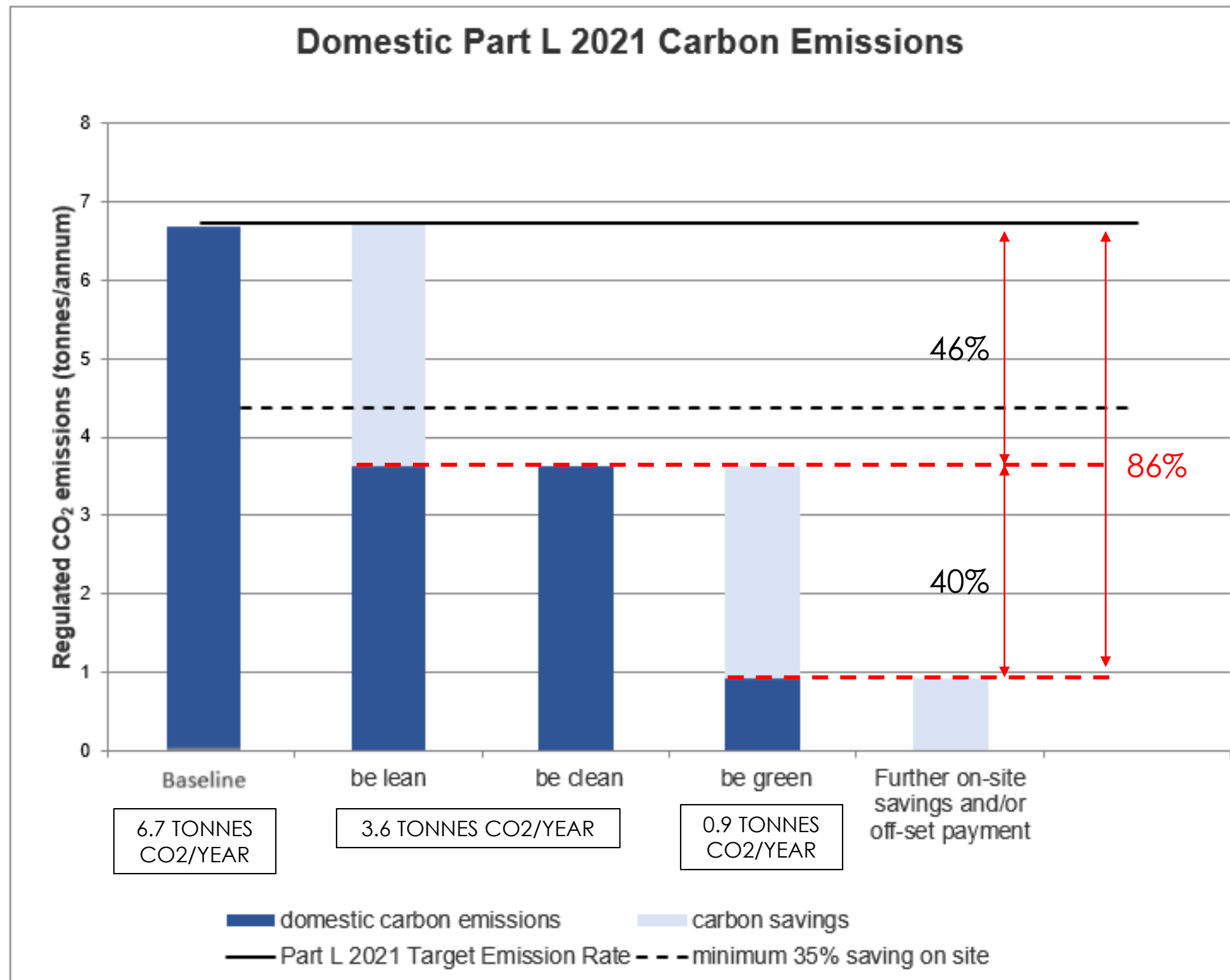


Figure 5.3: Diagram showing Energy Hierarchy

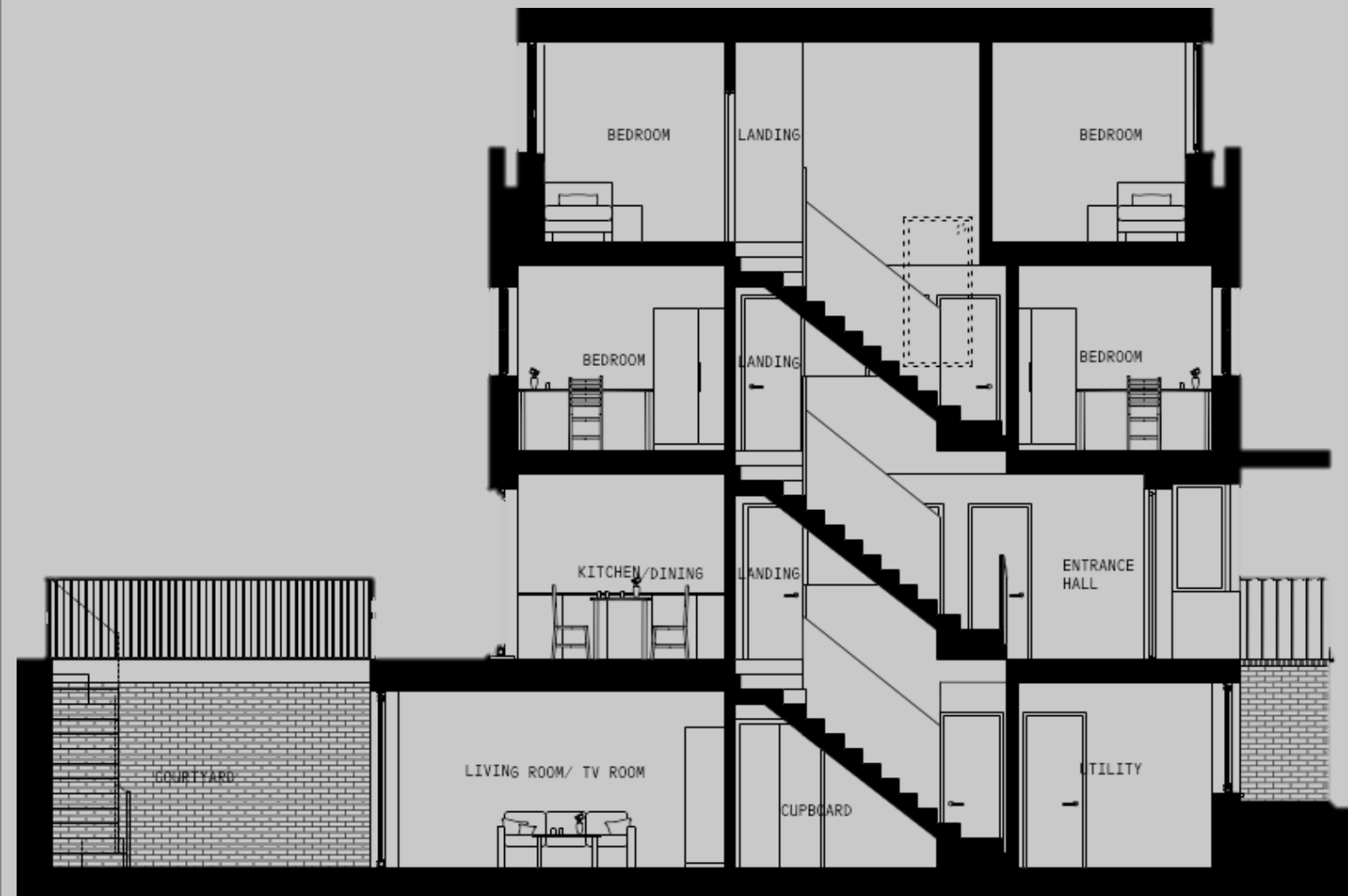


EXECUTIVE SUMMARY

FIGURE 08 – ENERGY HIERARCHY GRAPH



2.0 ENERGY STATEMENT SUMMARY



FLOOR PLANS - AS PROPOSED

FIGURE 09 – BASEMENT PLAN

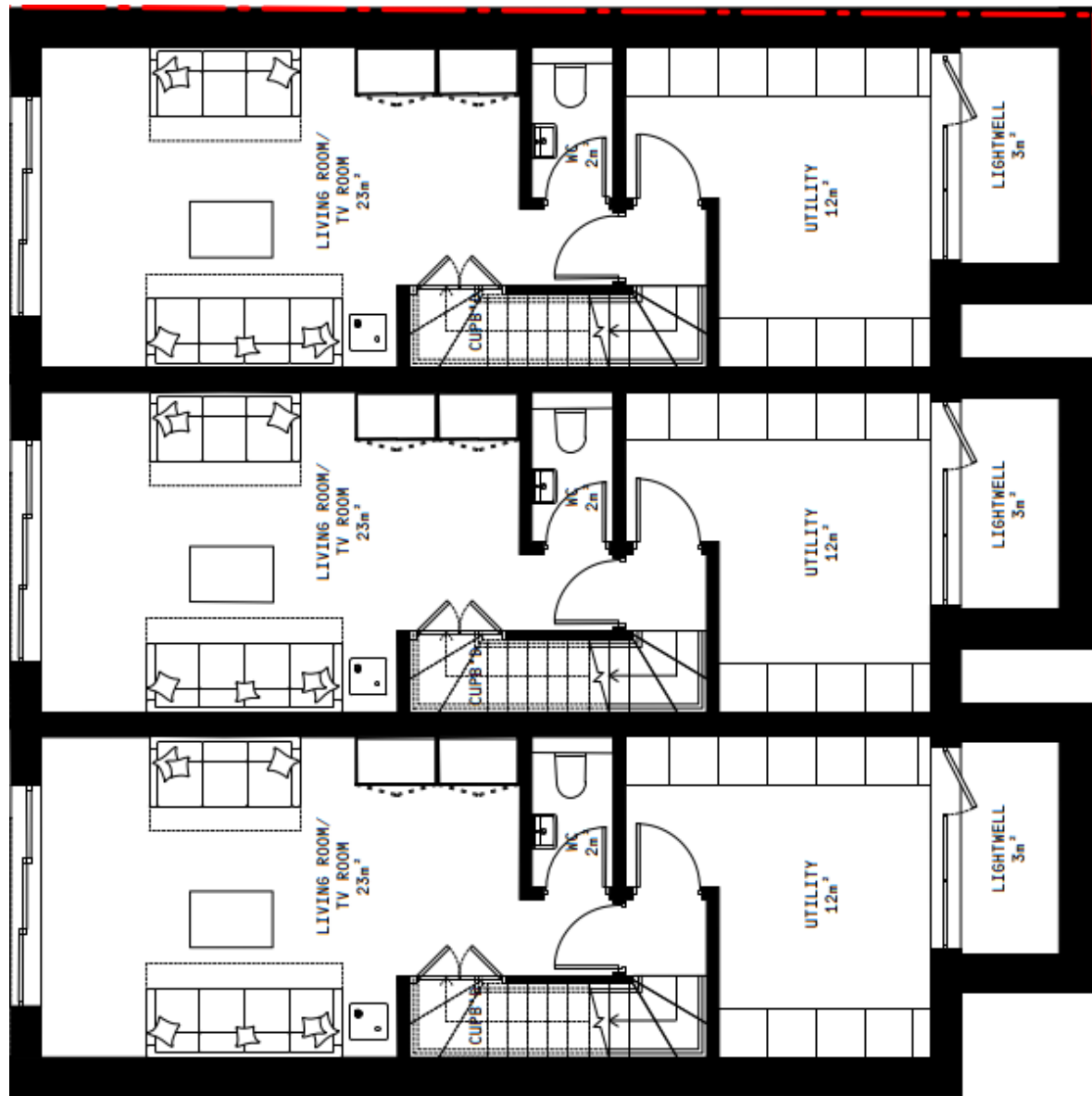
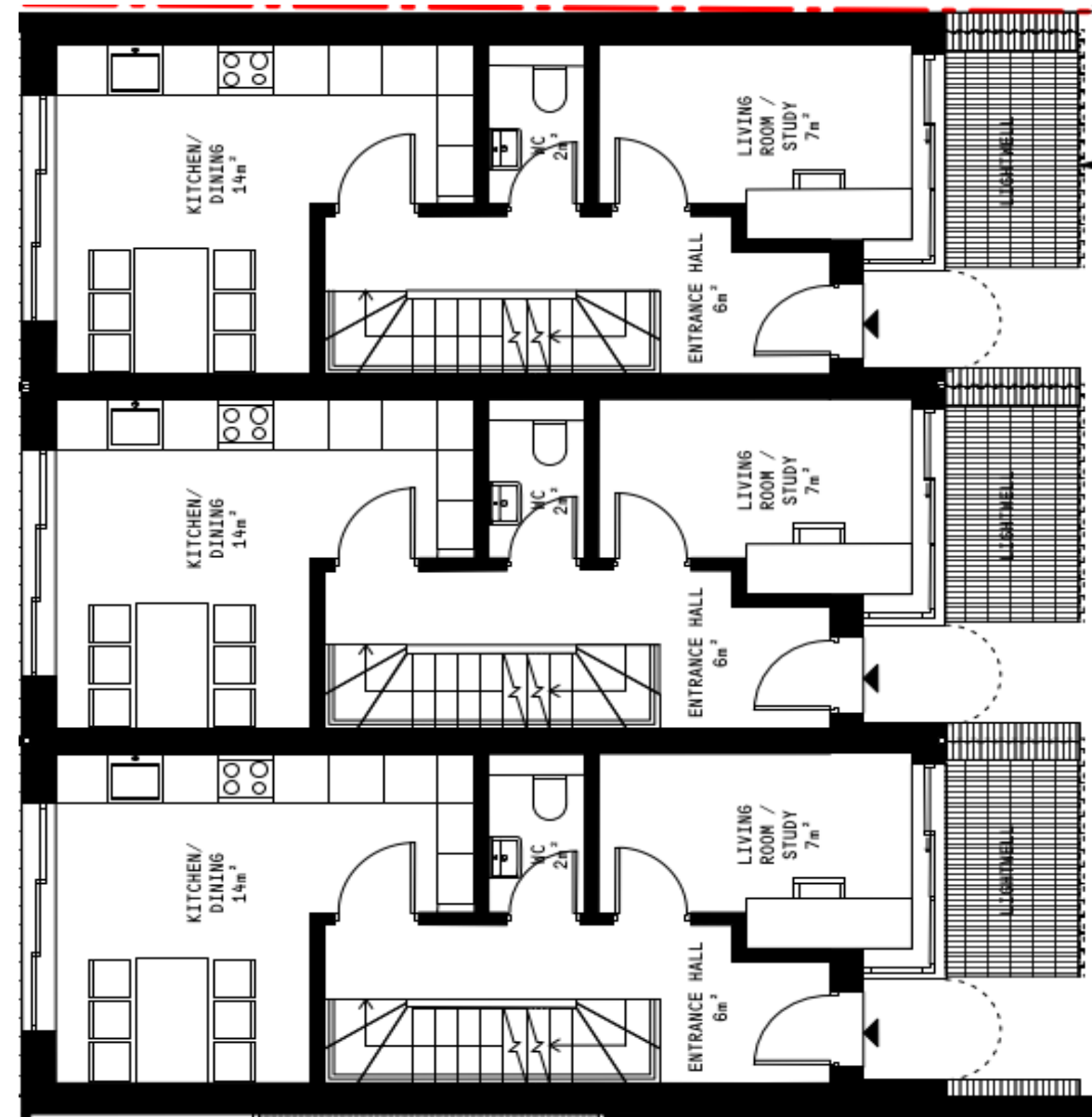


FIGURE 10 – GROUND FLOOR PLAN



FLOOR PLANS - AS PROPOSED

FIGURE 11 – FIRST FLOOR PLAN

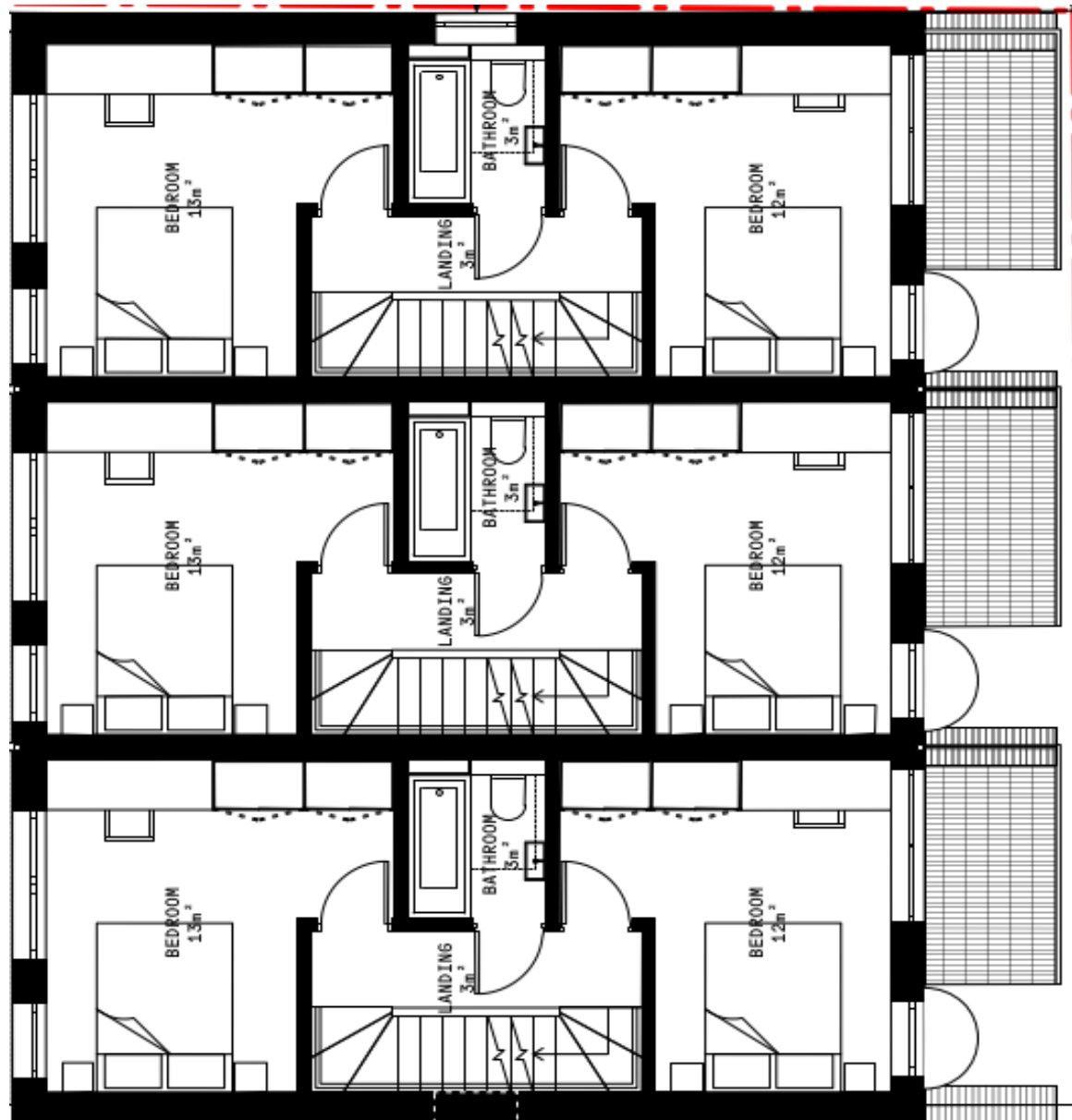
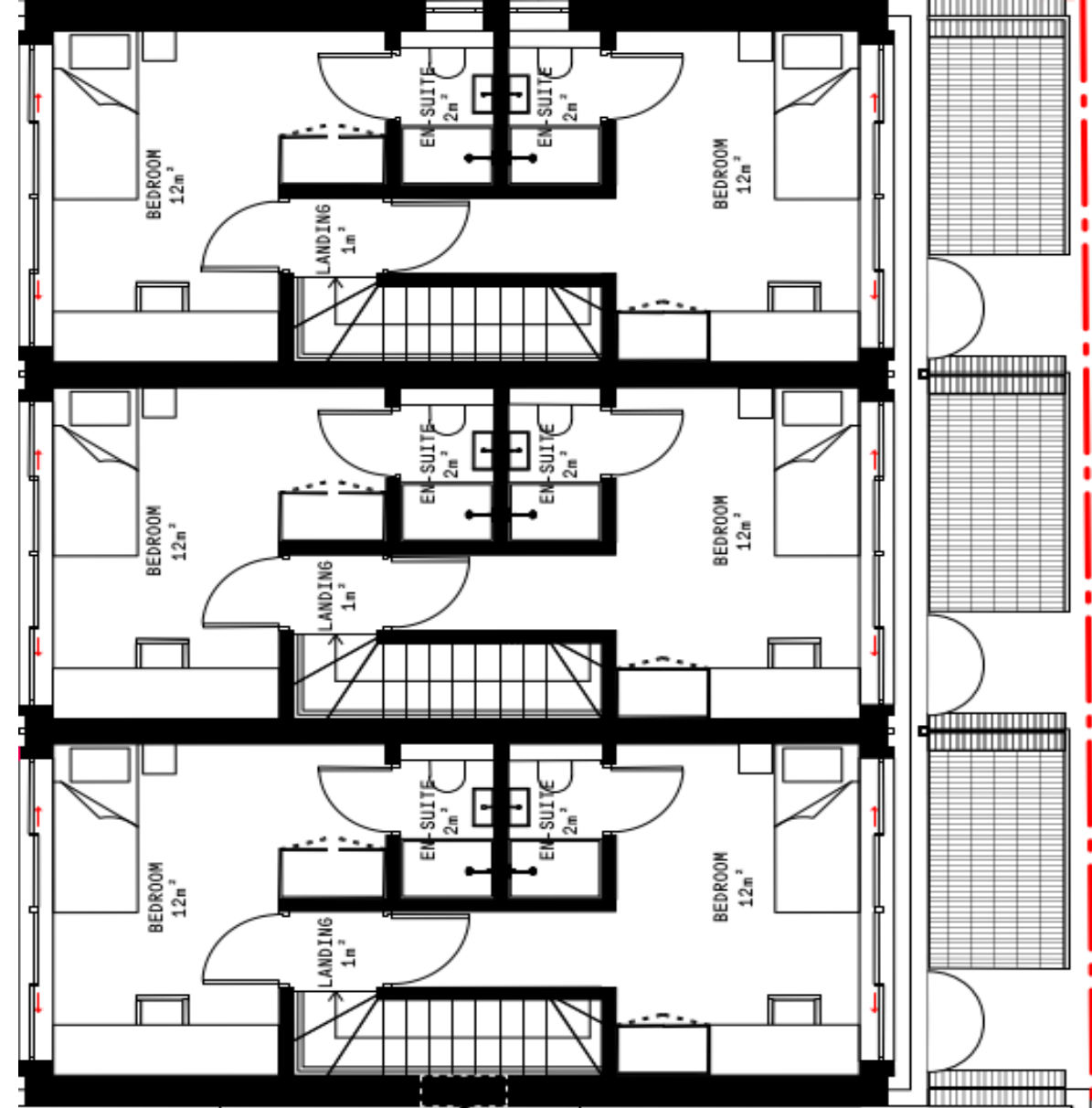
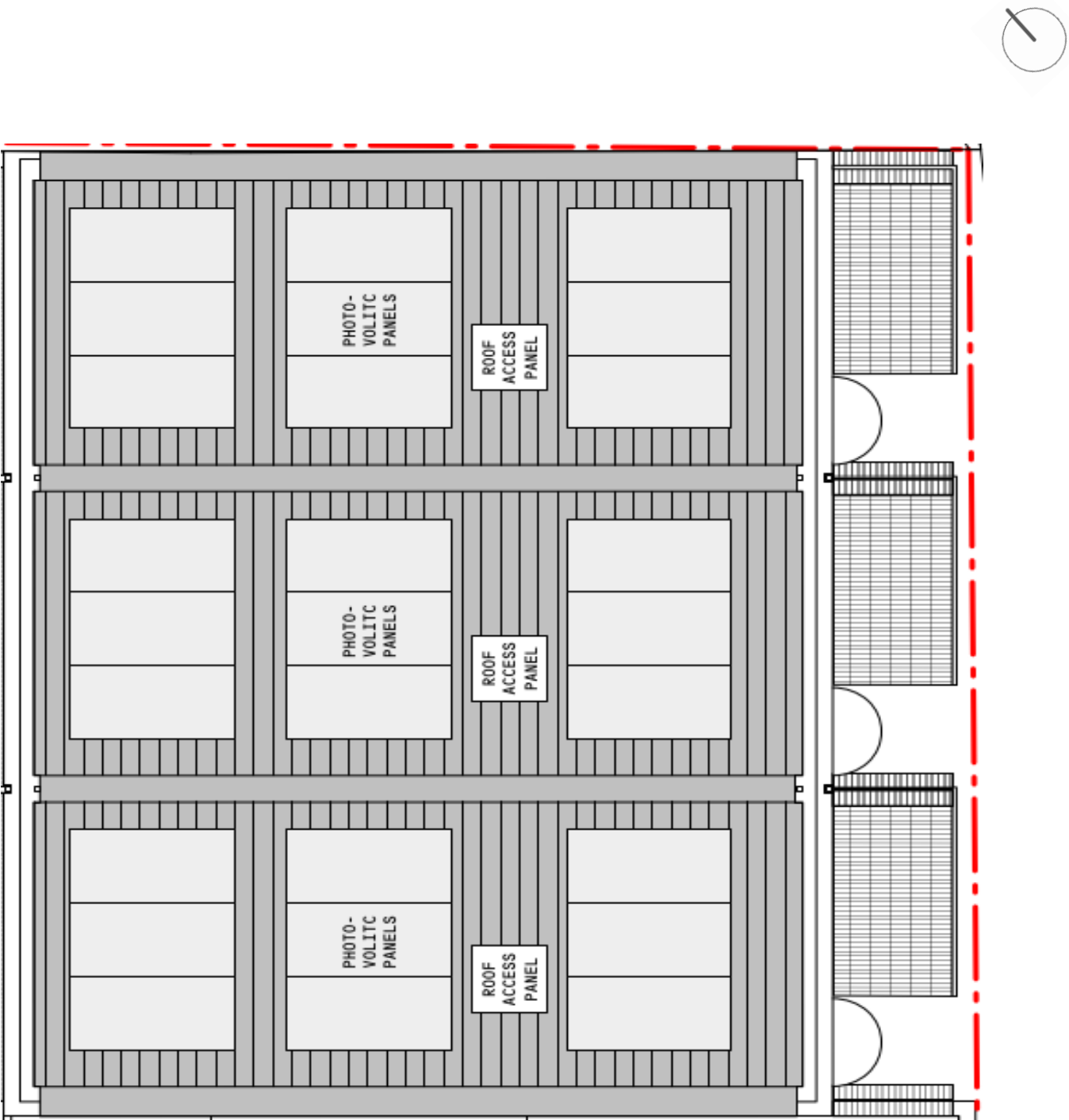


FIGURE 12 – SECOND FLOOR PLAN



FLOOR PLANS - AS PROPOSED

FIGURE 13 – ROOF PLAN



ENERGY STATEMENT

This Energy Statement has been prepared in line with the Energy Hierarchy, Energy Use and Carbon Emissions have been calculated following these standards:

- London Borough of Haringey.
- Approved Document L of Building Regulations, Volume 1: Dwellings v 2021
- Major of London Guidance for Energy Statements, April 2020
- The Mayor's London Plan Part L 2021

For this preliminary assessment, the baseline was analysed using SAP 10 version 1.0.52 - JPA.

The Dwelling Emissions Rate (DER) was multiplied by the total m2 of the proposed unit.

This study has been made to predict the most accurate Dwelling Emissions Rate (DER) against the Target Emissions Rate (TER).

BASELINE

The baseline energy and CO2 emissions have been calculated for scheme, as the proposed development would be assessed under Approved Document L of Building Regulations. **The baseline has been calculated as per SAP 10.2.**

This has been calculated following the London Plan Guidance for Energy Statements applicable to new build.

BE LEAN / BE CLEAN

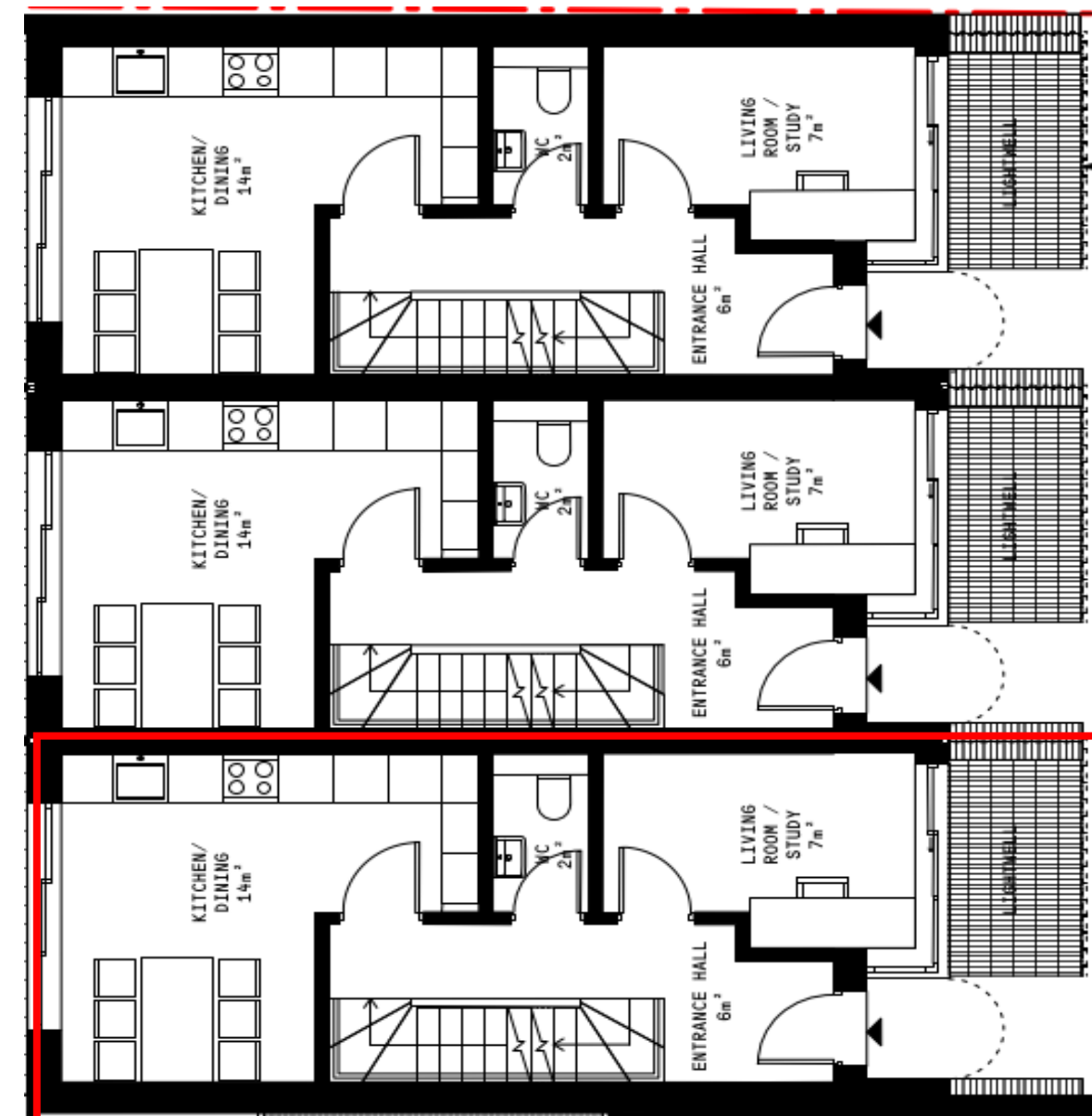
The development will achieve Approved Document L of Building Regulations, Volume 1: Dwellings v 2021 Building Regulations compliance by implementing all possible energy efficiency and energy conservation measures, before any renewable energy system is incorporated to the design.

The proposed development will achieve a reduction in carbon dioxide emissions for all regulated emissions under the Be Lean / Be Clean scenario of **46%**.

The development is far from the decentralized energy network for potential district heating. Therefore, claiming reduction in the carbon emissions, based on the connection to the local district heating is not feasible. Please refer to Figure 1 for further details.

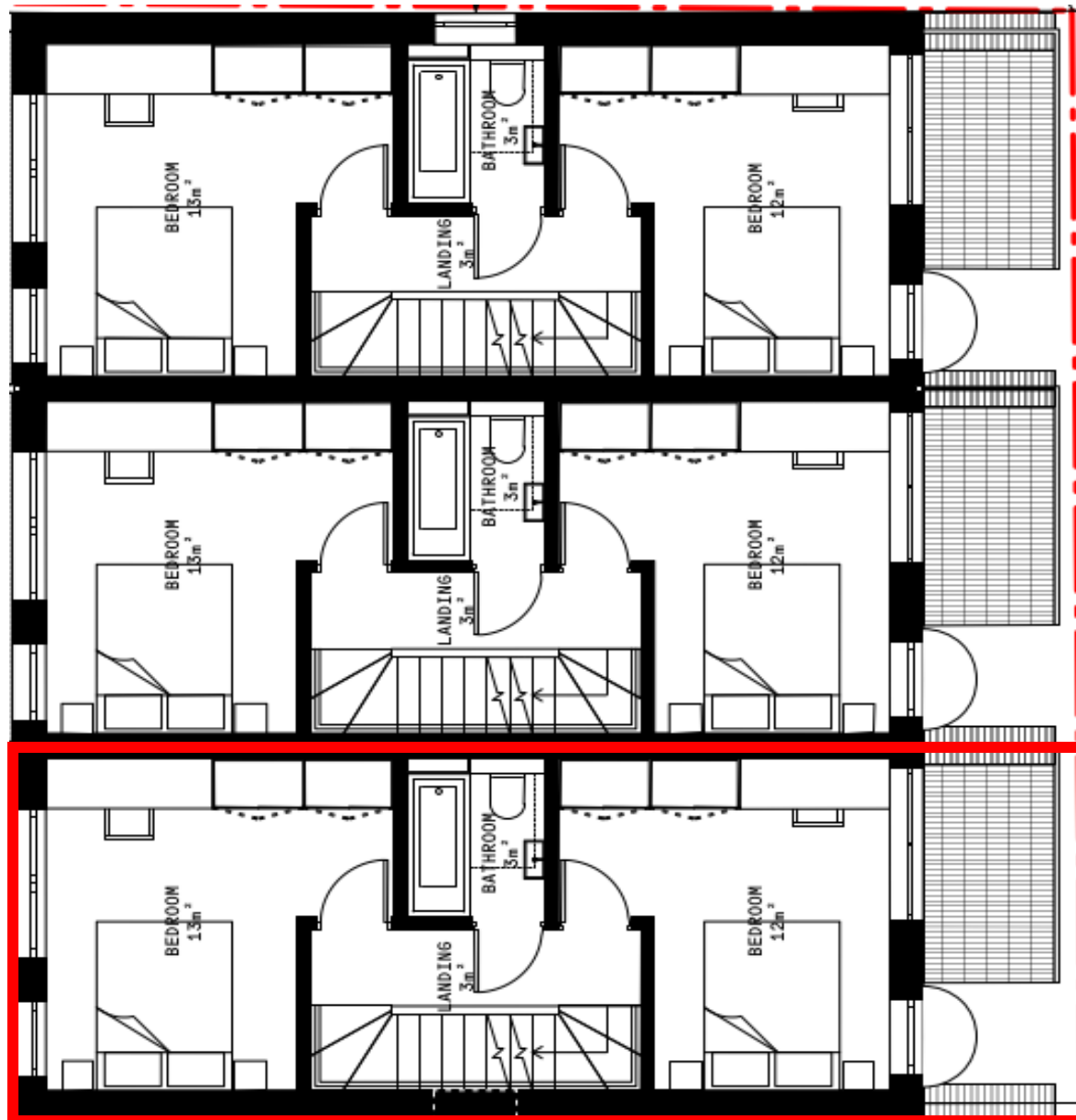
The use of CHP is not viable on a scheme of this size. Instead the target reduction is achieved using the energy efficiency measures and the provision of on-site renewable energy technology.

FIGURE 14- WORST CASE GROUND FLOOR PLAN



ENERGY STATEMENT - METHODOLOGY

FIGURE 15 – WORST CASE: FIRST FLOOR PLAN



BE GREEN

The proposed development will achieve a **40%** CO₂ emissions reductions just under the be green scenario, when compared to the Be Lean / Be Clean scenario.

Once all energy efficiency and energy conservation measures have been incorporated to the design, on-site renewable energy technologies have been used to reduce energy and carbon emissions. The required CO₂ emissions reductions has been achieved from:

- o 1no ASHP from electricity per dwelling.
- o 7no PV panels of 450W each: 0.45 kWp x7 = 3.15 kWp per house

This equates = 9.45 kWp in total

The residential development will have a combined reduction in CO₂ emissions when compared with the baseline of 86%. Please refer to figure 04 for further details.

Using the GLA Carbon Emissions reporting for residential developments, the cash in lieu contribution using the recommended price of £95 per tonne of CO₂ would be £2,664.00

To estimate the energy use of the residential development, ECOstudio has used approved SAP 10 version 1.0.2.7 - JPA.

This enables accurate energy and carbon emission figures for both the 'as proposed' situation, and also the 'baseline' conditions.

The specification as proposed is based on a series of simulations to achieve the lowest possible energy use and carbon emissions. See Tables 01no to 08no for the outline specifications. The proposed fabric standards exceed the requirements of Building Regulations.

ENERGY STATEMENT - CONSTRUCTION SPECIFICATIONS

TABLE 06 –SPECIFICATIONS- BUILDING ENVELOPE-MODELLING INPUTS

ELEMENT	U-VALUES (W/m²K)	FURTHER INFORMATION
External Walls	0.11 W/m²K	Improved U-value from Table 1.1 Summary of notional dwelling specification for new dwelling, Approved Document L of Building Regulations, Volume 1: Dwellings v 2021.
Ground Floor	0.10 W/m²K	Improved U-value from Table 1.1 Summary of notional dwelling specification for new dwelling, Approved Document L of Building Regulations, Volume 1: Dwellings v 2021.
Roof	0.10 W/m²K	Improved U-value from Table 1.1 Summary of notional dwelling specification for new dwelling, Approved Document L of Building Regulations, Volume 1: Dwellings v 2021.
Internal Partitions	0.00 W/m²K	Medium dense block partitions finished with plaster, skim and paint.
Upper Floor:	0.00 W/m²K	-
Windows	0.8 W/m²K	Triple glazed windows
Thermal Bridging	0.03	Accredited construction details. Bespoke accredited construction calculations may need to be carried out by ECOstudioXV during detail design stage to achieve the stated HTB value.
Air permeability	2.0 m³/hm²@50Pa	An air pressure test will need to be carried out before completion.

TABLE 07 –SAP SPECIFICATIONS- BUILDING ENVELOPE –GLAZING INPUTS- RESIDENTIAL

ROOM	U-VALUE (W/m²K) Including Frame	G-VALUE	LT VALUE
All Rooms	0.8	<0.60	>0.7

TABLE 08 – APPROVED DOCUMENT L OF BUILDING REGULATIONS, VOLUME 1: DWELLINGS V 2021

ELEMENT	SYSTEM TYPE/VALUE	FURTHER INFORMATION
Cooling	NONE	
Heating BE LEAN BE CLEAN	Underfloor Heating via ASHP	• ASHP with flow temperature ≥ 35°C • Fuel: Electricity • SCOP: 3.57 • 6 KW
Heating BE GREEN	Underfloor via ASHP system	• Fuel: Electricity • Underfloor heating
Heating Controls	YES	Time and Temperature zone control Electricity smart meter present
Secondary heating	-	• None
Ventilation	Natural ventilation with intermittent 6no extract fans	• Chimneys :0 • Open flues: 0 • Flue less gas fires: 0
Overheating	-	• Windows fully open • Cross ventilation possible • White roller blinds to all rooms
Lighting		• Low energy fixed lighting outlets: 19 • 110 lm/W General Lighting
Domestic Hot Water	Combination boiler	• Instantaneous from main boiler
	Instantaneous water heating	• Electric

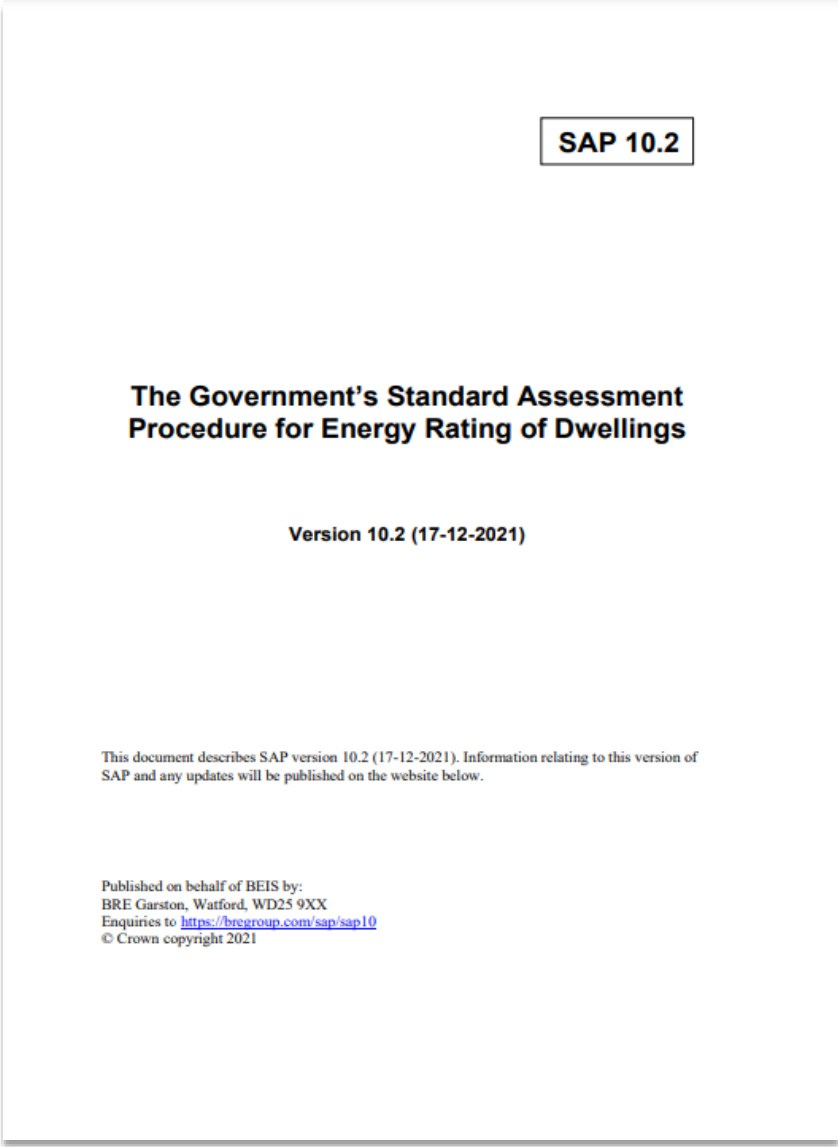


ENERGY STATEMENT - CONSTRUCTION SPECIFICATIONS

TABLE 09 –APPROVED DOCUMENT L OF BUILDING REGULATIONS, VOLUME 1: DWELLINGS V 2021
1 SAP SPECIFICATIONS- BUILDING ENVELOPE – MODELLING INPUTS (CONTINUED)

ELEMENT	SYSTEM TYPE/VALUE	FURTHER INFORMATION
Ventilation	Toilets extract and kitchen hood only	Supply Specific Fan Power: 0.30 Wl/S
Renewables	BE LEAN/ BE CLEAN	None
	BE GREEN It is estimated that the most feasible on-site renewable systems would be:	Air Source Heat Pumps (ASHPs), will provide space heating SCoP: 3.57 7no PV panels of 450W each: 0.45 kWp x7 = 3.15 kWp per house This equates = 9.45 kWp in total This would achieve a reduction of 40% in carbon emissions of all regulated emissions.

FIGURE 17 –SAP 10.2 VERSION 10.2 FOR BASELINE AND PROPOSED EMISSIONS



ENERGY STATEMENT - CONSTRUCTION SPECIFICATIONS

TABLE 10 – THERMAL BRIDGES CALCULATION SAP 10.2 – MODELLING INPUTS

K1 REF	JUNTION	JUNCTION PRESENT	USE	JUNCTION REF.	ACD	DEFAULT	EACD REF. NO.	EACD	CD REF. MO.	CD BLOCK K=
E1	STEEL, LINTEL BASEPLATE PERFORATED				0.50	1.00				
E2	OTHER LINTELS (INCLUDING STEEL)				0.30	1.00				
E3	SILL	Y	ACD		0.04	0.08				
E4	JAMB	Y	ACD		0.05	0.10				
E5	GROUND FLOOR (NORMAL)				0.16	0.32				
E19	GROUND FLOOR (INVERTED)				0.07					
E20	EXPOSED FLOOR (NORMAL)				0.32					
E21	EXPOSED FLOOR (INVERTED)				0.32					
E22	BASEMENT FLOOR	Y	ACD		0.07					
E6	INTERNAL FLOOR BETWEEN DWELLINGS	Y	ACD		0.07	0.14				
E7	PARTY FLOOR BETWEEN DWELLINGS				0.07	0.14				
E8	BALCONY WITHIN DWELLINGS (CONTINUOUS INSULATION)				0.00	0.00				
E9	BALCONY BETWEEN DWELLINGS (CONTINUOUS INSULATION)				0.02	0.04				
E23	BALCONY (SUPPORT PENETRATES INSULATION)				none	1.00				
E10	EAVES (INSULATION AT CEILING LEVEL)				0.06	0.12				
E24	EAVES (INSULATION AT CEILING LEVEL INVERTED)				none	0.24				
E11	EAVES (INSULATION AT RAFTER LEVEL)				0.04	0.08				
E12	GABLE (INSULATION AT CEILING LEVEL)				0.24	0.48				
E13	GABLE (INSULATION AT RAFTER LEVEL)				0.04	0.08				
E14	FLAT ROOF				0.04	0.08				
E15	FLAT ROOF WITH PARAPET				0.28	0.56				
E16	CORNER NORMAL	Y	ACD		0.09	0.18				
E17	CORNER INVERT				-0.09	0.00				
E18	PARTY WALL BETWEEN DWELLINGS	Y	ACD		0.06	0.12				
E25	STAGGERED PARTY WALL BETWEEN DWELLINGS				none	0.12				

These are tables of all the junctions in the ACD list. The table shows which junctions are present in this building with a “Y” in the 1st column. Extra columns are available for Enhanced ACDs (EACD) and Constructive Details values (CD) should they wish to be used.

Only the Accredited Construction Detail column values where used for the proposed development analysis and should be followed through detail design, construction documents and construction



ENERGY STATEMENT - CONSTRUCTION SPECIFICATIONS

TABLE 11 – THERMAL BRIDGES CALCULATION SAP 10.2 – MODELLING INPUTS (CONTINUED)

K1 REF	JUNTION WITH PARTY WALL	JUNCTION PRESENT	USE	JUNCTION REF.	ACD	DEFAULT	EACD REF. NO.	EACD	CD REF. MO.	CD BLOCK K=
P1	GROUND FLOOR	Y	ACD		0.08	0.16				
P6	GROUND FLOOR INVERTED				none	0.07				
P2	INTERNAL FLOOR WITHIN DWELLING	Y	ACD		0.00	0.04				
P3	INTERNAL FLOOR BETWEEN DWELLINGS				0.00	0.04				
P7	EXPOSED FLOOR (NORMAL)				none	0.16				
P8	EXPOSED FLOOR (INVERTED)				none	0.24				
P4	ROOF (INSULATION AT CEILING LEVEL)				0.12	0.24				
P5	ROOF (INSULATION AT RAFTER LEVEL)				0.02	0.04				

These are tables of all the junctions in the ACD list. The table shows which junctions are present in this building with a “Y” in the 1st column. Extra columns are available for Enhanced ACDs (EACD) and Constructive Details values (CD) should they wish to be used.

Only the Accredited Construction Detail column values where used for the proposed development analysis and should be followed through detail design, construction documents and construction

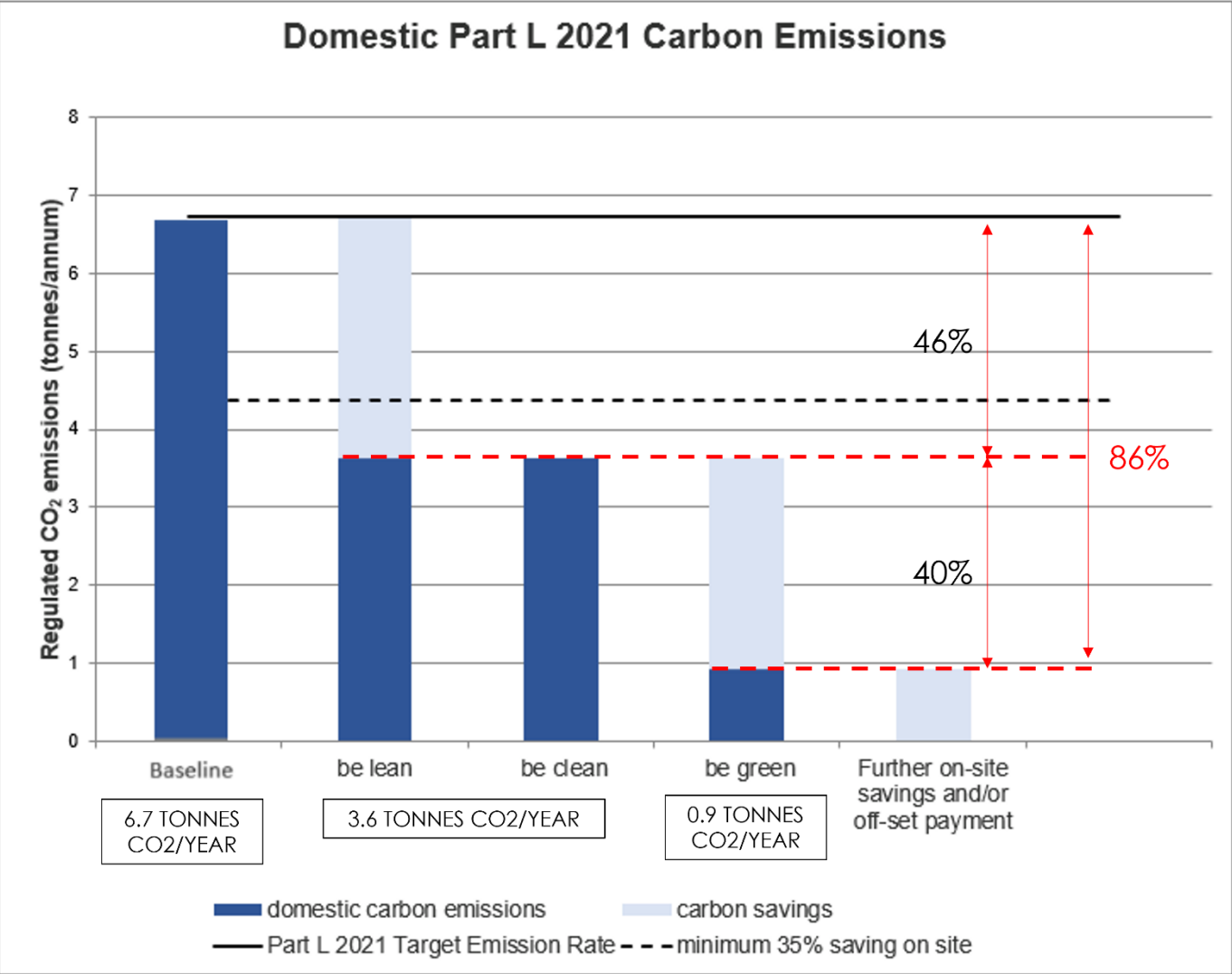
TABLE 12 – THERMAL BRIDGES CALCULATION SAP 10.2 – MODELLING INPUTS FOR NEW EXTENSION (CONTINUED)

K1 REF	JUNTION WITH ROOF OR A ROOM IN A ROOF	JUNCTION PRESENT	USE	JUNCTION REF.	ACD	DEFAULT	EACD REF. NO.	EACD	CD REF. MO.	CD BLOCK K=
R1	HEAD				none	0.08				
R2	SILL				none	0.06				
R3	JAMB				none	0.08				
R4	RIDGE (VAULTED CEILING)				none	0.08				
R5	RIDGE INVERTED				none	0.04				
R6	FLAT CEILING				none	0.06				
R7	FLAT CEILING (INVERTED)				none	0.04				
R8	ROOF WALL (RAFTER)				none	0.06				
R9	ROOF WALL (FLAT CEILING)				none	0.04				



THE BASELINE STANDARD

FIGURE 16 –CO2 EMISSIONS REDUCTIONS FOLLOWING THE GLA ENERGY HIERARCHY



The tables 05 and 06 below show the energy use in kWh/ year and kg/CO2/year for the Baseline condition and the As Proposed standard for the whole development, which incorporates the Energy Efficiency measures, but not the renewables.

TABLE 13 – CARBON DIOXIDE EMISSIONS AFTER EACH STAGE OF ENERGY HIERARCHY.

ID	ENERGY HIERARCHY	CARBON DIOXIDE EMISSIONS		TOTAL
		(Tones CO2 per annum)		
		REGULATED	UNREGULATED	
A	Baseline: Part L 2021 of Building Regulations Compliant Development	6.7	1.9	8.6
B	After Energy Efficiency (Be Lean)	3.6	1.7	5.3
C	After Efficient Supply of Energy (Be Clean)	3.6	1.7	5.3
D	After Renewable Energy Technologies (Be Green)	0.9	1.7	2.6

TABLE 14– REGULATED CARBON DIOXIDE SAVINGS FROM EACH STAGE OF THE ENERGY HIERARCHY.

ID	ENERGY HIERARCHY	REGULATED CARBON DIOXIDE SAVINGS	
		(Tones CO2 per annum)	(%)
A-B	Savings from Energy Efficiency (Be Lean)	3.1	46%
B-C	Savings from Efficient Supply of Energy (Be Clean)	0.0	0.0%
C-D	Savings from Renewable Energy Technologies(Be Green)	2.7	40%
A-D	Total Cumulative Savings	5.8	86%



THE BASELINE STANDARD

TABLE 15 – FABRIC ENERGY EFFICIENCY.

	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development total	52.00	37.60	28%

FIGURE 19 –FABRIC ENERGY EFFICIENCY

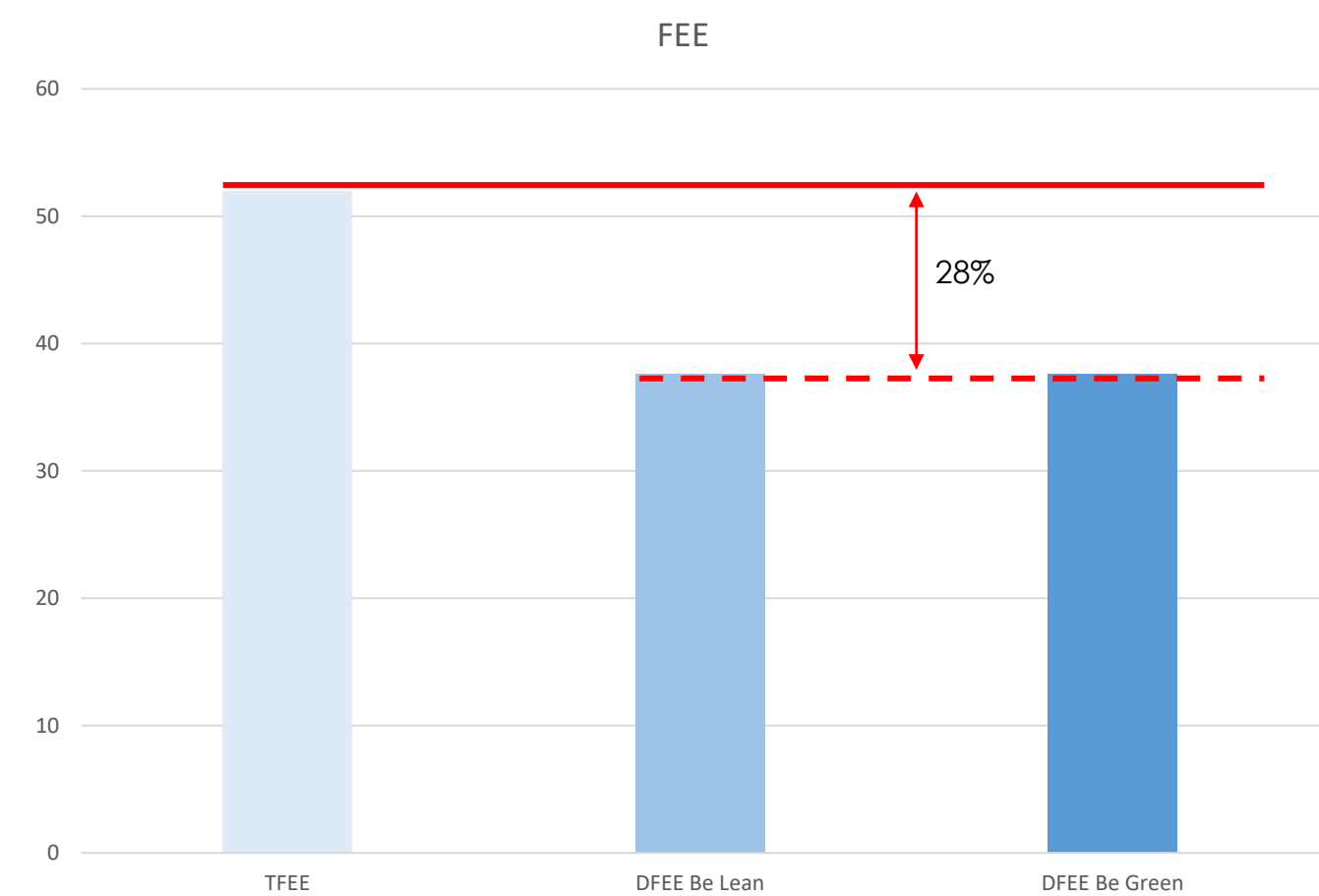


TABLE 16 –SPACE HEATING REQUIREMENTS

Space heating demand (kWh/m2/year) (excluding renewable energy)
4.79

TABLE 17 –ENERGY USE INTENSITY

EUI (kWh/m2/year) (excluding renewable energy)
9.60

FIGURE 18 –SPREADSHEET RESULTS

Residential predicted energy use				Results	
Building type	GIA (m²)	Space heating demand	Annual Electricity Use	EUI (kWh/m²/year) (excluding renewable energy)	Space heating demand (kWh/m²/year) (excluding renewable energy)
Residential use (total)	447	2143.1699	4295.759	9.603753633	4.791347865
Landlord Circulation (in Residential Blocks)					
Total	447.3	2143.1699	4295.759		



LOW CARBON AND LOW EMISSION ENERGY SOURCES

FIGURE 17 –WIND GENERATORS



RENEWABLE OPTIONS

According to the London Housing Design Guide: where feasible, development proposals should incorporate on-site renewable energy generation to reduce carbon dioxide emissions. Renewable energy generation methods include solar thermal systems, biomass-fuelled heating and/or power, ground source heating and cooling, air source heat pumps, photovoltaics, wind power, and renewable energy from waste.

WIND GENERATORS

The economics of wind are driven by two factors: wind flow and rotor diameter, with economies of scale acting strongly in favour of turbines with a capacity of greater than 1MW. Micro-wind is defined as units of less than 4m diameter, having an output of up to 3.5kW.

Another performance factor, particularly relevant to micro wind power is quality of wind flow. Poor wind flow can have a detrimental effect on output levels, efficiency and unit longevity. Poor wind quality is often experienced in urban locations, where neighbouring buildings disrupt turbine operation. The height of the turbine installation relative to neighbouring buildings will help to determine efficiency – ideally, they should be 9m above other obstructions within 100m. It is important to have a detailed survey of the proposed site before proceeding with a wind turbine. Even then small changes in location can have a large effect on the output of the turbine.

A further disadvantage with wind turbines is noise generation.

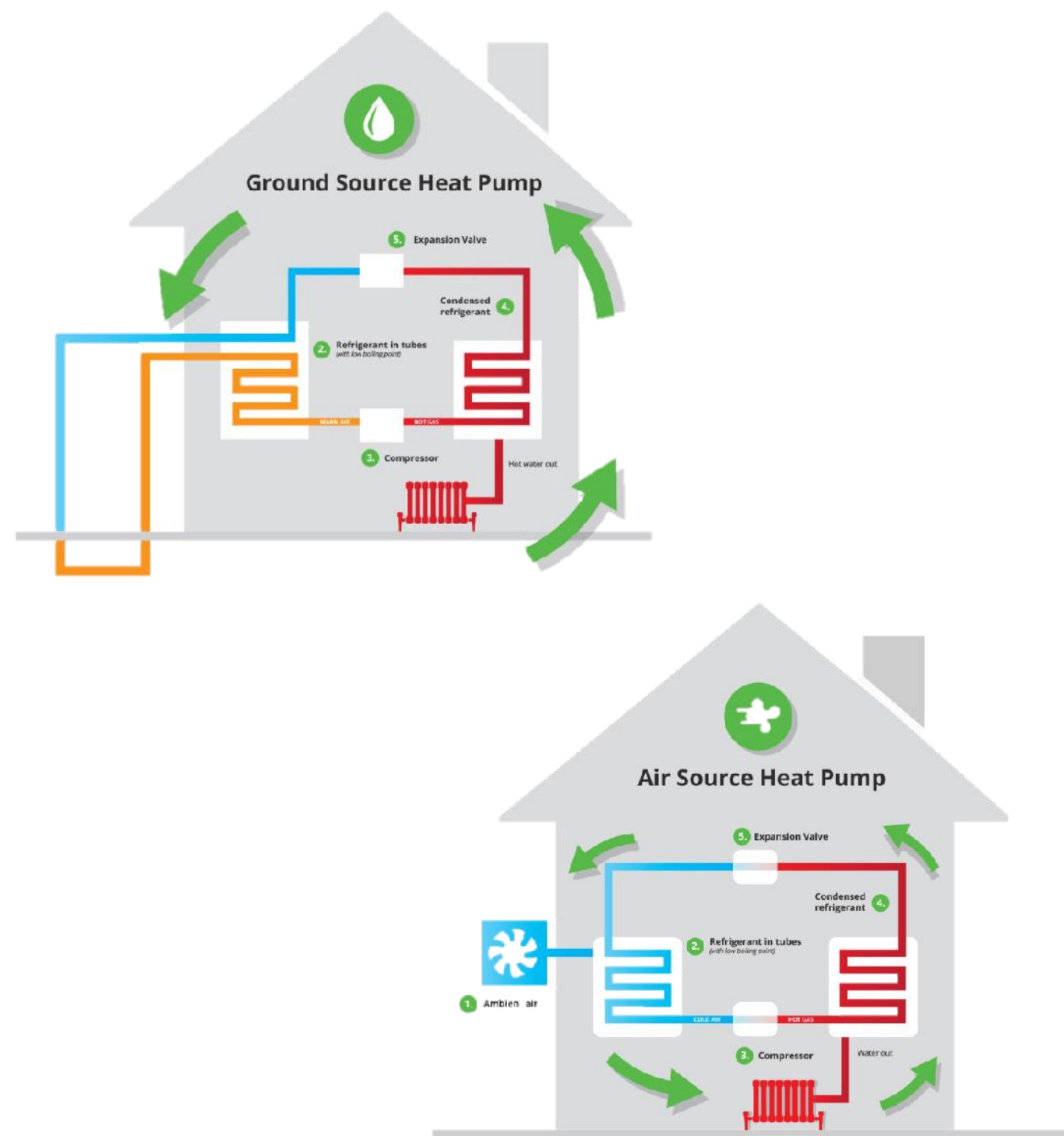
Further issues surrounding turbines consider the visual impact of the units in areas such as this. A turbine would require planning permission, and would probably be not well received by neighbours.

This is an urban site. The average wind speed on this site is low and makes the viable use of a turbine less possible.

Therefore, the energy for the energy statement has excluded wind turbines as a feasible technology.

LOW CARBON AND LOW EMISSION ENERGY SOURCES

FIGURE 18 –GROUND AND AIR SOURCE HEAT PUMP SYSTEMS



GROUND SOURCE HEAT PUMP

Ground source heat pumps are used to extract heat from the ground to provide space and water heating. Heat pumps take in heat at a certain temperature and release it at a higher temperature, using the same process as a refrigerator. Fluid is circulated through pipes buried in the ground and pass through a heat exchanger in the heat pump that extracts heat from the fluid. The heat pump raises the temperature of the fluid via the compression cycle to supply hot water to the building as with a normal boiler. The ground pipe system can be horizontal or vertical. The system works most efficiently with underfloor heating.

Key to the effectiveness of GSHP is the pipe system. This can either be a "slinky" style pipe buried in trenches a couple of meters deep, or in much deeper boreholes. Generally, the "slinky" type needs a greater site area which is available on this site.

GSHP are much more efficient than gas boilers, therefore use a lot less energy. However, electricity is more carbon dense than gas, and so some of that benefit is reduced. Nevertheless, overall the use of a GSHP should reduce the amount of CO₂ emitted on the site; similarly with running costs. Although GSHP can be 350+% efficient, that is 3 ½ more efficient than a gas boiler, the cost of electricity is also about 3 ½ the cost of gas, therefore there tends not to be significant running cost saving.

GSHPs are more expensive to install than a traditional gas system. **Therefore, this technology is not suitable for this scheme.**

AIR SOURCE HEAT PUMP

An ASHP works in an identical way to a GSHP. The difference comes in achieving the temperature difference in the system fluids. The GSHP uses the difference in temperature found as you go deeper into the earth. An ASHP uses the difference in air temperatures. Typically, an ASHP is much less efficient than a GSHP. A default efficiency for a GSHP is 350%, whereas for an ASHP it is 300%.

An ASHP is much cheaper to install than a GSHP when there are no ground works, although usually an external condenser unit must be sited on the building.

For the commercial use where there is significant cooling required, and only a minority demand for space heating the use of ASHP becomes viable. There is a saving in the CO₂ emissions, although there is a slight increase in running costs.

This technology is suitable for proposed development.

The noise produced by the external condensing units will be mitigated with ultra quiet systems such as ECODAN R32 ultra quiet PUZ Monobloc Air Source Heat Pumps or equivalent.

LOW CARBON AND LOW EMISSION ENERGY SOURCES

PUZ-WM60VAA(-BS)

Ecodan R32
Monobloc Air Source Heat Pump

OUTDOOR UNIT		PUZ-WM60VAA(-BS)
HEAT PUMP SPACE HEATER - 55°C	ErP Rating	A++
	η_{is}	142%
	SCOP (MCS)	3.57
HEAT PUMP SPACE HEATER - 35°C	ErP Rating	A+++
	η_{is}	190%
	SCOP (MCS)	4.81
HEAT PUMP COMBINATION HEATER - Large Profile ¹	ErP Rating	A+
	η_{wh}	145%
	Capacity (kW)	6.0
HEATING ² (A-7/W35)	Power Input (kW)	1.88
	COP	3.20
OPERATING AMBIENT TEMPERATURE (°C DB)		-20 ~ +35
SOUND DATA ³	Pressure Level at 1m (dBA)	45
	Power Level (dBA) ⁴	58
WATER DATA	Pipework Size (mm)	22
	Flow Rate (l/min)	17
	Water Pressure Drop (kPa)	8.0
DIMENSIONS (mm)	Width	1050
	Depth	480
	Height	1020
WEIGHT (kg)		98
ELECTRICAL DATA	Electrical Supply	220-240v, 50Hz
	Phase	Single
	Nominal Running Current [MAX] (A) ⁵	5.68 [13]
	Fuse Rating - MCB Sizes (A) ⁶	16
REFRIGERANT CHARGE (kg) / CO ₂ EQUIVALENT (t)	R32 (GWP 675)	2.2 / 1.49

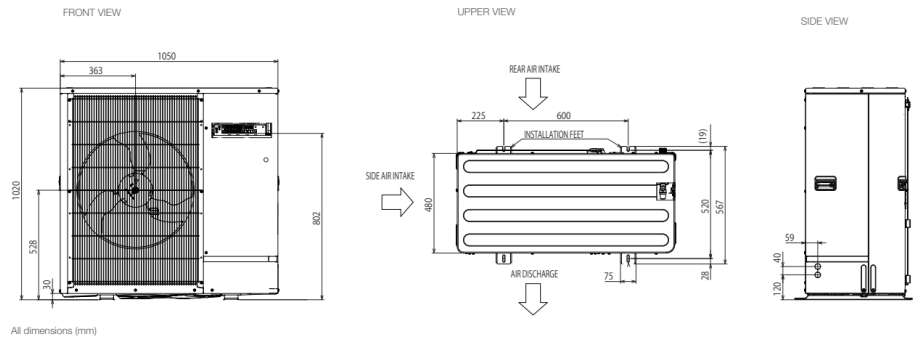
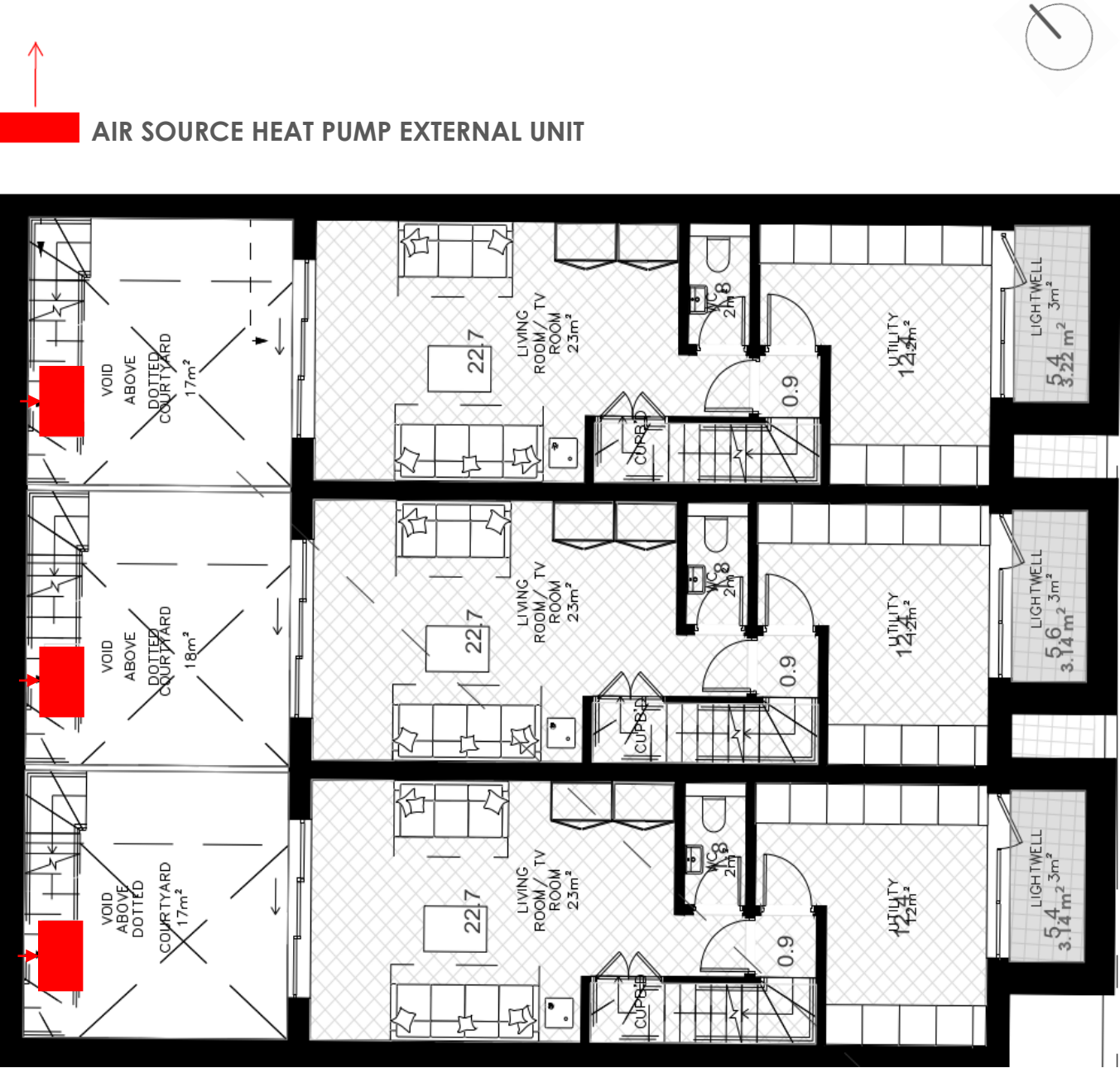


FIGURE 19 –AIR SOURCE HEAT PUMP SYSTEMS LOCATION OF EXTERNAL UNITS



This can only be used for planning purposes. The calculations and specifications included in this report are ONLY for Planning Stage and cannot be used for detail design, construction documents or construction.

LOW CARBON AND LOW EMISSION ENERGY SOURCES

FIGURE 20 –SOLAR WATER HEATING SYSTEM

**SOLAR WATER HEATING**

Solar water heating systems use the energy from the sun to heat water stored in a hot water cylinder inside the building. The amount of savings from solar thermal is determined by the level of hot water use.

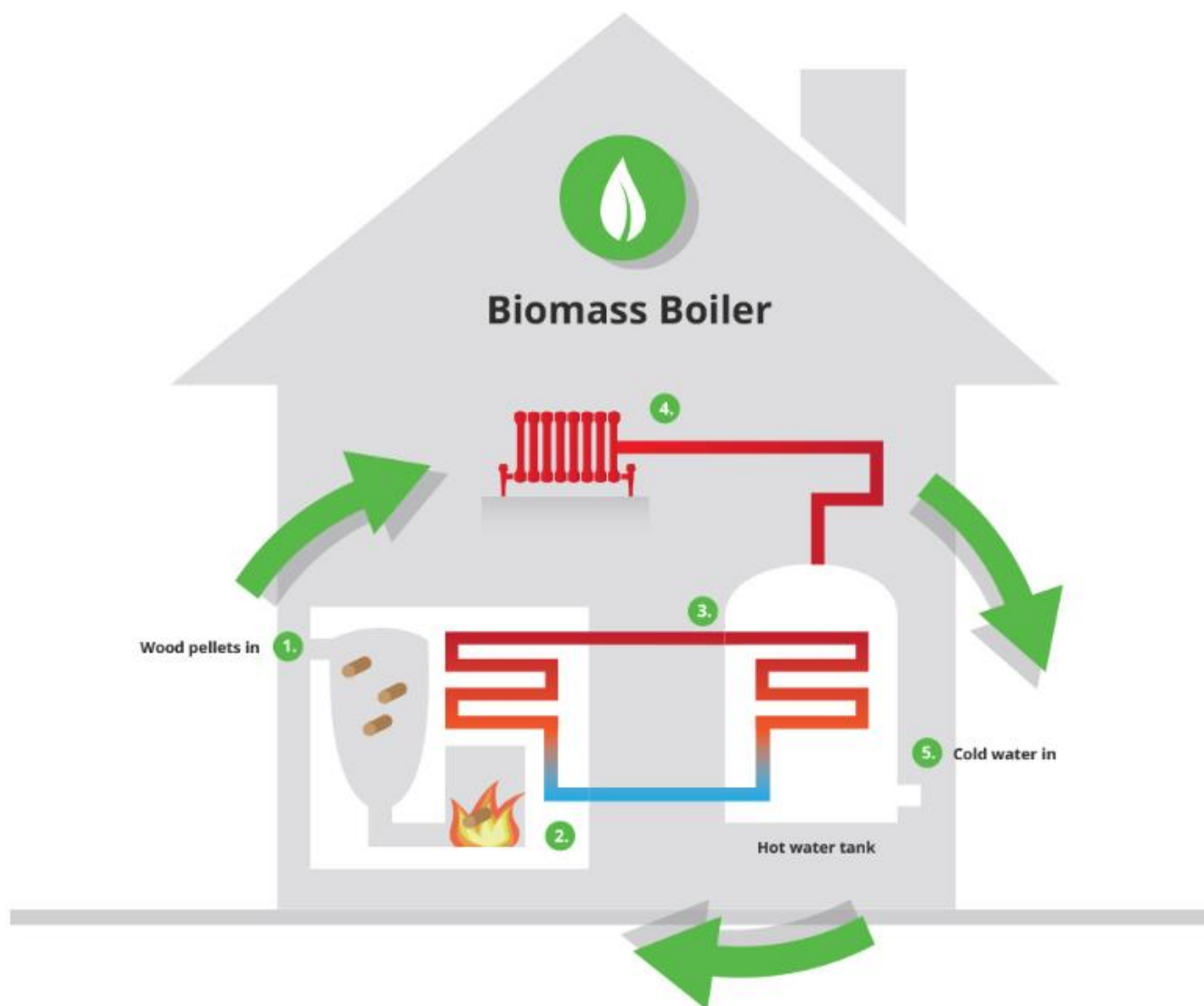
The roof area available for solar panels is the same as for PV. However, the area of panel required is determined by the hot water use. Depending on the type of panel – flat plate glazed, or evacuated tube, there is an optimum area needed for the hot water use. Flat plate glazed panels tend to be less efficient but cheaper than the evacuated tubes. Most installations use the flat plate glazed panels. Such a system would require a cylinder internally which would use up space.

The reductions in carbon emissions over the efficient hot water system proposed will not be great. Similarly, the savings over the proposed system will not be significant. In addition, there is no comparable feed-in tariff for solar thermal systems as there is for PV, therefore the simple payback will be in excess of 80 years, and well beyond the systems expected life of 25 years.

Therefore, this energy strategy has excluded solar water heating as a feasible technology.

LOW CARBON AND LOW EMISSION ENERGY SOURCES

FIGURE 21—BIOMASS HEATING SYSTEM.



BIOMASS HEATING

Bio mass is a form of stored solar energy. Plants use the sun's energy to grow and during this process absorb CO₂. When burnt the stored energy and stored CO₂ is released. Biomass fuels are considered virtually carbon neutral because unlike fuels such as gas, oil and coal, if not burnt the CO₂ would be released anyway as the plant material rotted. Therefore, there is no addition to CO₂ in the environment.

Typical biomass fuels include Wood; straw; energy crops; sewage; waste materials. It is a proven technology and has been in use for many years, particularly in northern European countries.

Biomass plants can vary from small manual fed systems, to large fully automatic systems. The most common is wood chips or pellets.

Biomass boilers are much more common in large communal systems, and are often designed to operate alongside back up gas boilers. Typically, the biomass boiler operating on the constant loads, such as hot water, with the back-up gas boilers which have faster reaction times to cope with the variable loads.

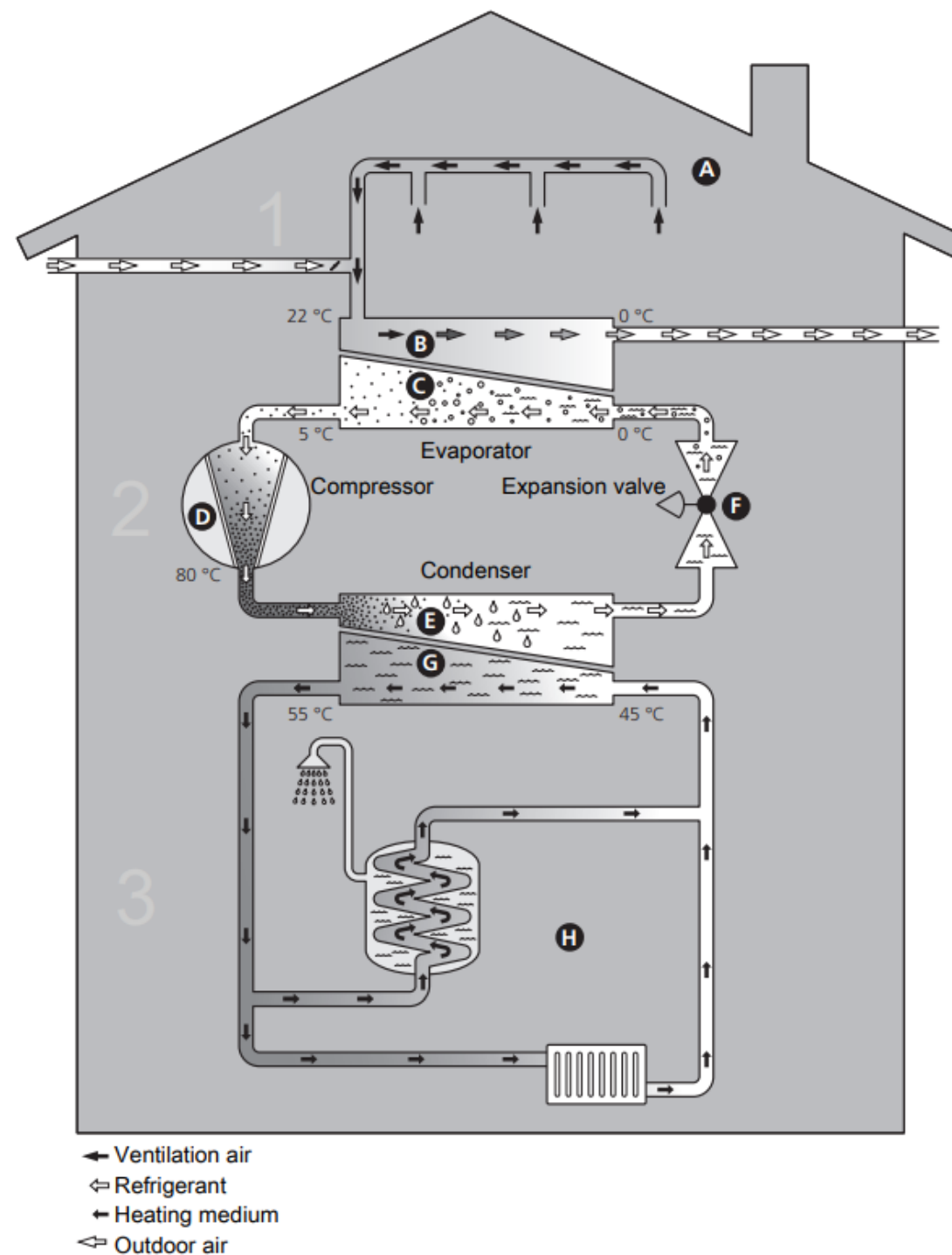
Another key factor of these boilers is that a large fuel store is required. A store is usually sized according to the lorry that is to deliver the fuel, and to minimize the number of deliveries over the year. Therefore, access for large vehicles is required. There is also the need for higher levels of maintenance than there are with gas boilers.

Another important point is the clean air act. Under this Act Local Authorities control the burning of fuels likely to cause smoke. Most urban areas are Smokeless Zones where only authorized smokeless fuels can be burnt. Almost no biomass fuels are authorized as 'smokeless'. However, some biomass fuels can be used provided that an Exempt Appliance is used. Many biomass boilers qualify. However, there will be the need for a chimney, and to work closely with the local authority to ensure any proposed system complies.

Due to the poor economics, limited space for storage, the consequent need for a chimney and related issues on air quality this is not a viable technology for this scheme.

LOW CARBON AND LOW EMISSION ENERGY SOURCES

FIGURE 22 –EXHAUST AIR HEAT PUMP SYSTEM



EXHAUST AIR HEAT PUMP

Exhaust air heat pump uses the heat that is in the building's ventilation air to heat up the accommodation. The conversion of the air's energy to heating occurs in three different circuits. Free heating energy is retrieved from the outgoing air (1, in figure 22) from the accommodation and transported to the heat pump. The heat pump increases the retrieved heat's low temperature to a high temperature in the refrigerant circuit, (2, in figure 22). The heat is distributed around the house in the heating medium circuit (3, in figure 22).

An exhaust air heat pump is a profitable solution for new builds of up to 200 m² and sometimes even bigger than that. Using mechanical exhaust air ventilation enables to reduce heating and hot water costs by a third or more compared to a conventional electric boiler. Energy costs can be reduced using renewable energy.

This technology is not suitable for this scheme.

LOW CARBON AND LOW EMISSION ENERGY SOURCES

FIGURE 23—PHOTOVOLTAICS



PHOTOVOLTAIC (PV) PANELS

Photovoltaic systems convert energy from the sun into electricity through semi-conductor cells mounted in collector panels. The panels are connected to an inverter to turn the DC output into AC for use in the building to which they are attached and to be fed back into the grid when not required.

Any power generated by the PV panels has a proportionally high saving in terms of CO₂, as the fuel saved is electricity, which is a carbon dense fuel.

In general PV panels will produce more electricity during the day, therefore typically a majority percentage of the generated electricity will be exported. In order to achieve running cost savings, one must find an energy supplier who will purchase this generated electricity. Currently the amount paid for this electricity is quite low sometimes 3p/kWh.

Outputs are usually measured in Kilowatt Peak (kWp). This is the max kW that the panel could produce under perfect conditions.

PV TILES

Traditional PV panels could fail to satisfy aesthetic requirements. Quadratic solar roof tiles with a sub-construction are laid directly onto the sub-roof structure in a scale pattern, replacing conventional roof tiles. Solar roof tiles full all the functions of the roof cladding in terms of strength, durability and weather resistance – with the clear benefit of clean electricity production. The solar roof blends seamlessly into the roofscape, making it the ideal solution for new buildings and energy renovations

- Solar tiles replace conventional tiles
- Can be used from a roof pitch of three degrees (if necessary with a sub-roof)
- Output per square metre: up to 162 watts peak
- Performance guarantee: 25 years

LOW CARBON AND LOW EMISSION ENERGY SOURCES

FIGURE 24 –ROOF LAYOUT WITH PVS PANELS



MAXEON 5 COM

POWER RANGE: 430-450 W | EFFICIENCY: Up to 22.2%

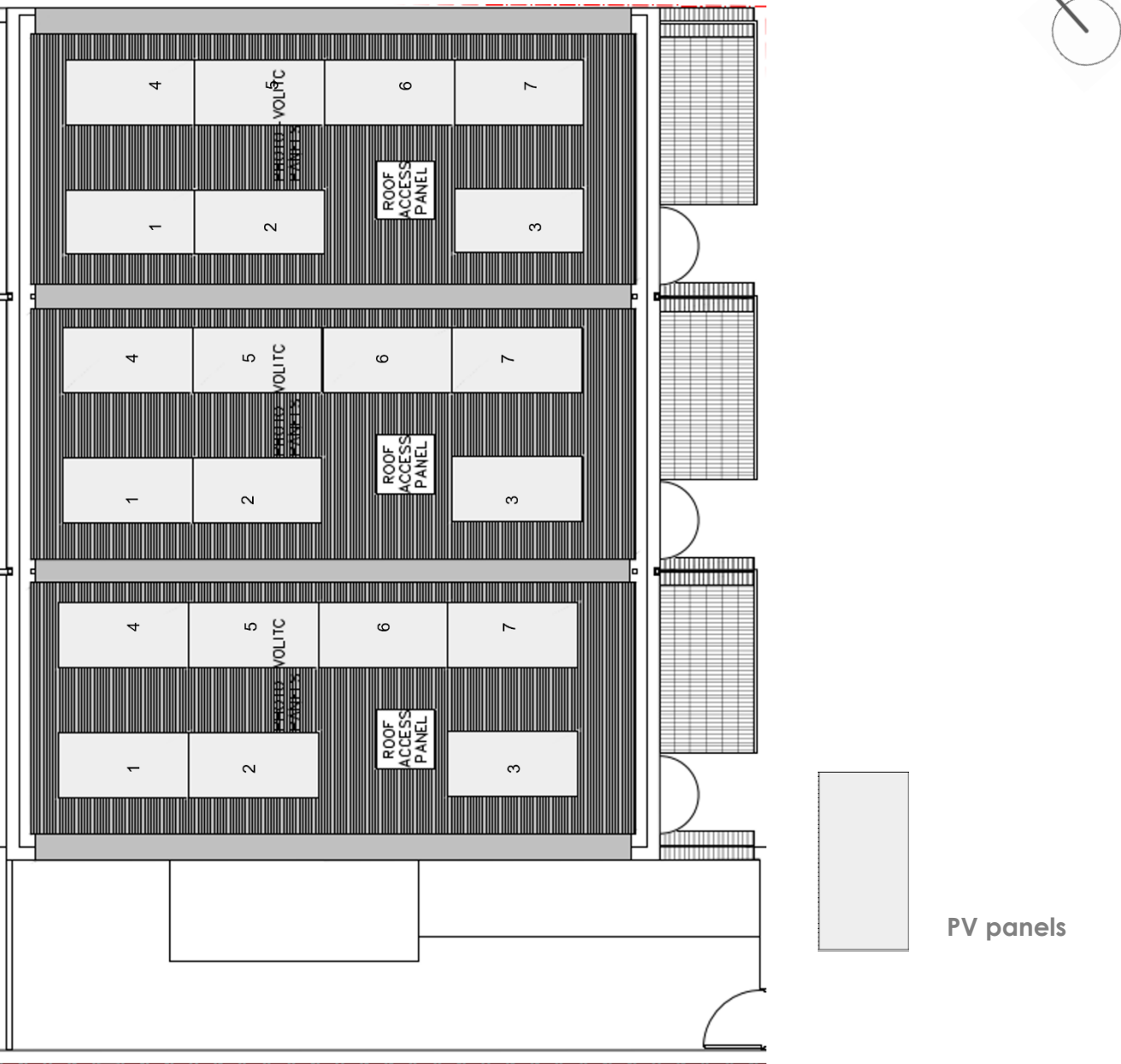
Electrical Data			
	SPR-MAX5-450-COM	SPR-MAX5-440-COM	SPR-MAX5-430-COM
Nominal Power (P _{nom}) ¹⁰	450 W	440 W	430 W
Power Tolerance	+5/0%	+5/0%	+5/0%
Panel Efficiency	22.2%	21.7%	21.2%
Rated Voltage (V _{mpp})	44.0 V	43.4 V	42.7 V
Rated Current (I _{mpp})	10.2 A	10.2 A	10.1 A
Open-Circuit Voltage (V _{oc}) (+/-3%)	51.9 V	51.69 V	51.2 V
Short-Circuit Current (I _{sc}) (+/-3%)	11.0 A	10.9 A	10.9 A
Max. System Voltage	1000 V IEC		
Maximum Series Fuse	20 A		
Power Temp Coef.	-0.29% / ° C		
Voltage Temp Coef.	-136 mV / ° C		
Current Temp Coef.	5.7 mA / ° C		

The residential development will have flat roofs and the PVs would be installed horizontal facing south west.

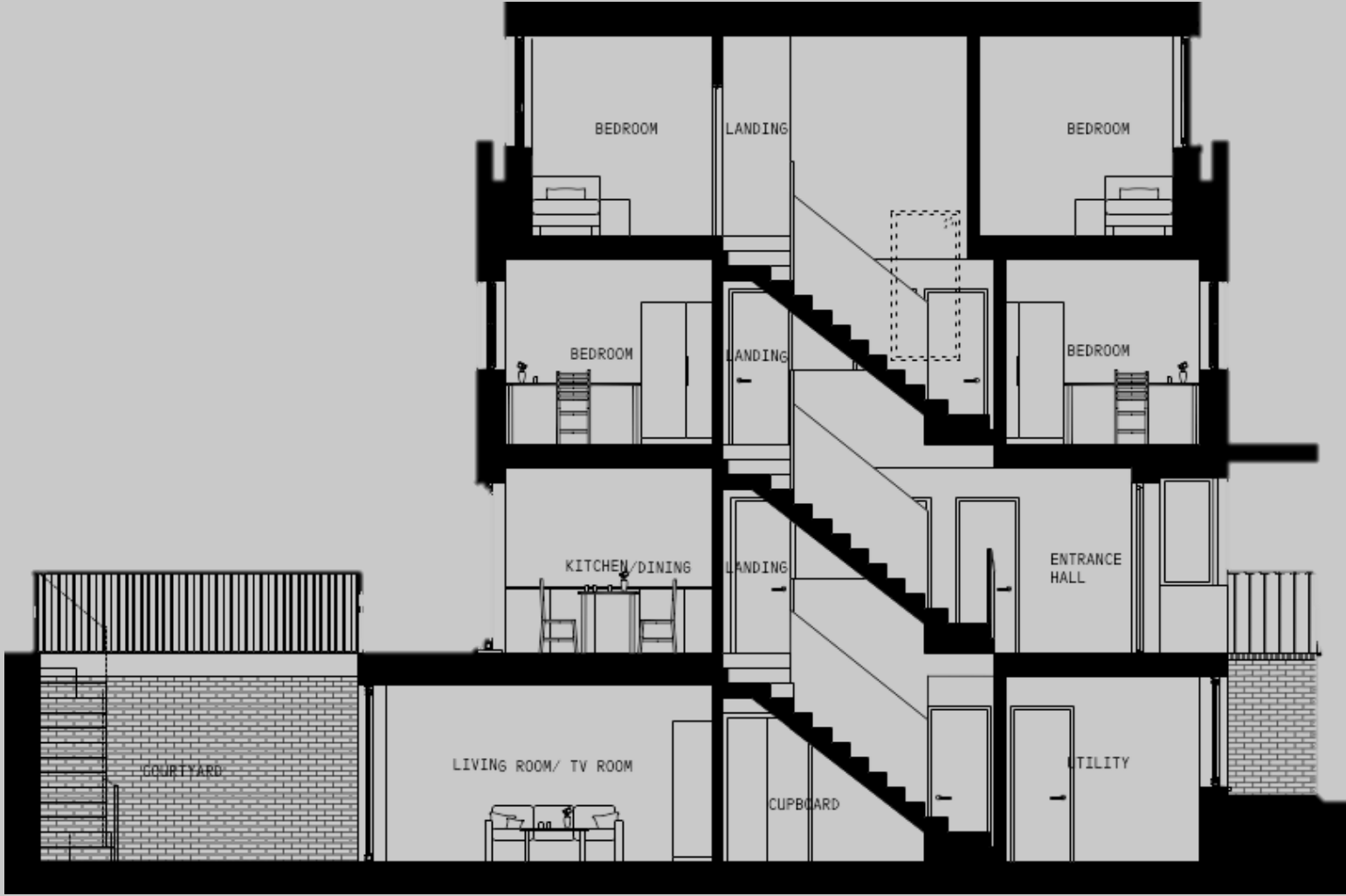
- o **7no PV panels of 450W each: 0.45 kWp x7 = 3.15 kWp per house**

This equates = 9.45 kWp in total per 3 houses

This would achieve a combined reduction with other energy efficiency measures of **86%** in carbon emissions of all regulated emissions.



5.0 OVERHEATING
CHECKLIST



5.0 OVERHEATING CHECKLIST

Due to improved building regulations that prevent heat loss in the winter, new buildings and retrofits in advertently increase the risk of overheating in the summer months.

Climate change which has increased the number of unusually hot summers then more people could find they are living in homes which reach uncomfortable or excessive temperatures for periods of days, weeks or months. Lightweight construction with low thermal mass, increased insulation, uncontrolled solar gain, low air tightness, single sided and limited ventilation, can contribute to overheating.

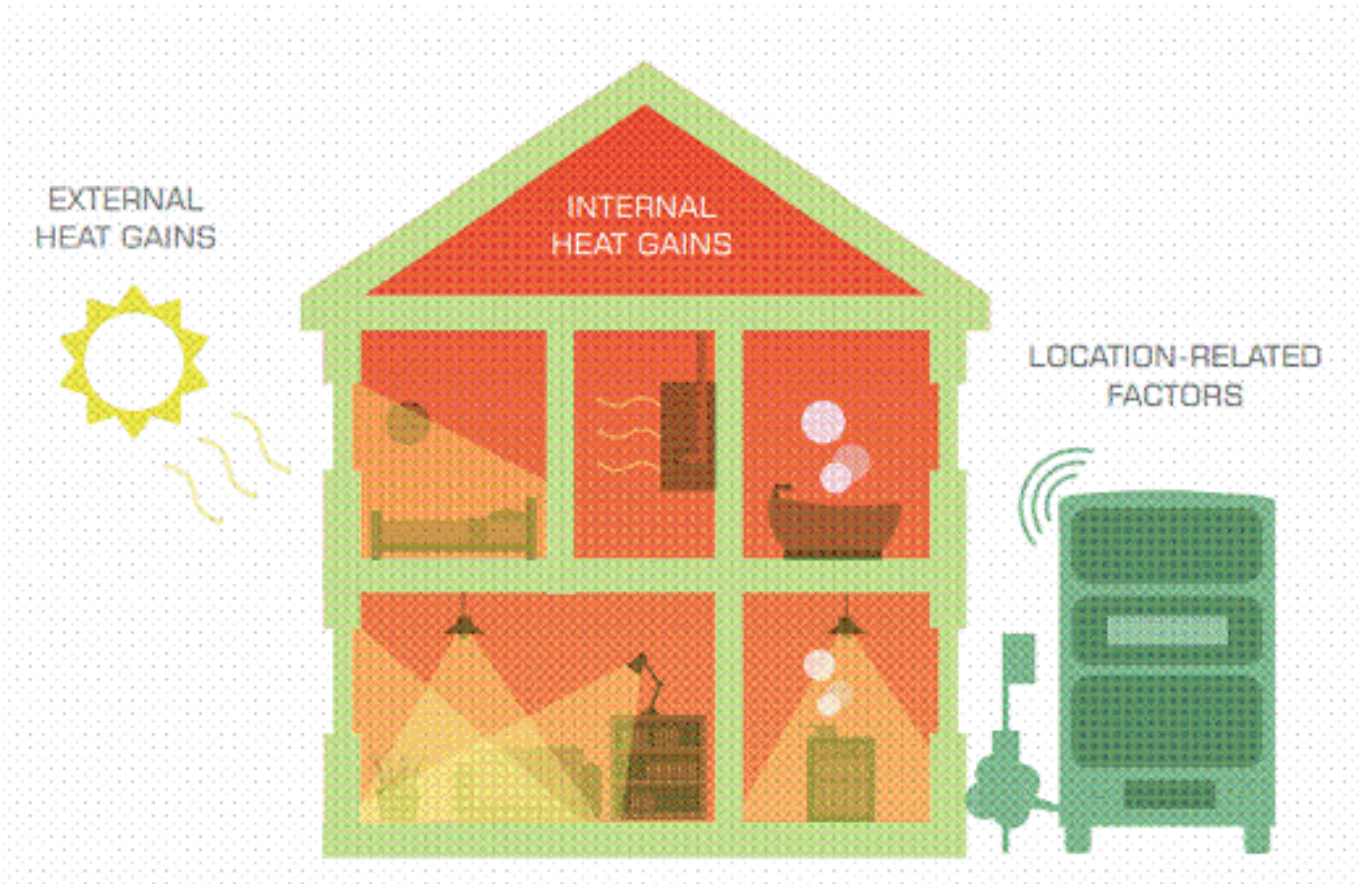
There is evidence that overheating is already occurring in certain types of buildings, and that this can lead to a loss of well-being, ill health, and in extreme cases, fatalities.

At pre-planning stage, it is recommended that an Overheating Checklists is prepared to ensure that the design has incorporated passive strategies to reduce their risk. These strategies follow the cooling hierarchy developed by the Cambridgeshire County Council. These are now accepted as per good practices to prevent overheating in the UK.

The following tables are being completed in order to assess overheating:

Table 1: "Site Features affecting vulnerability to overheating"

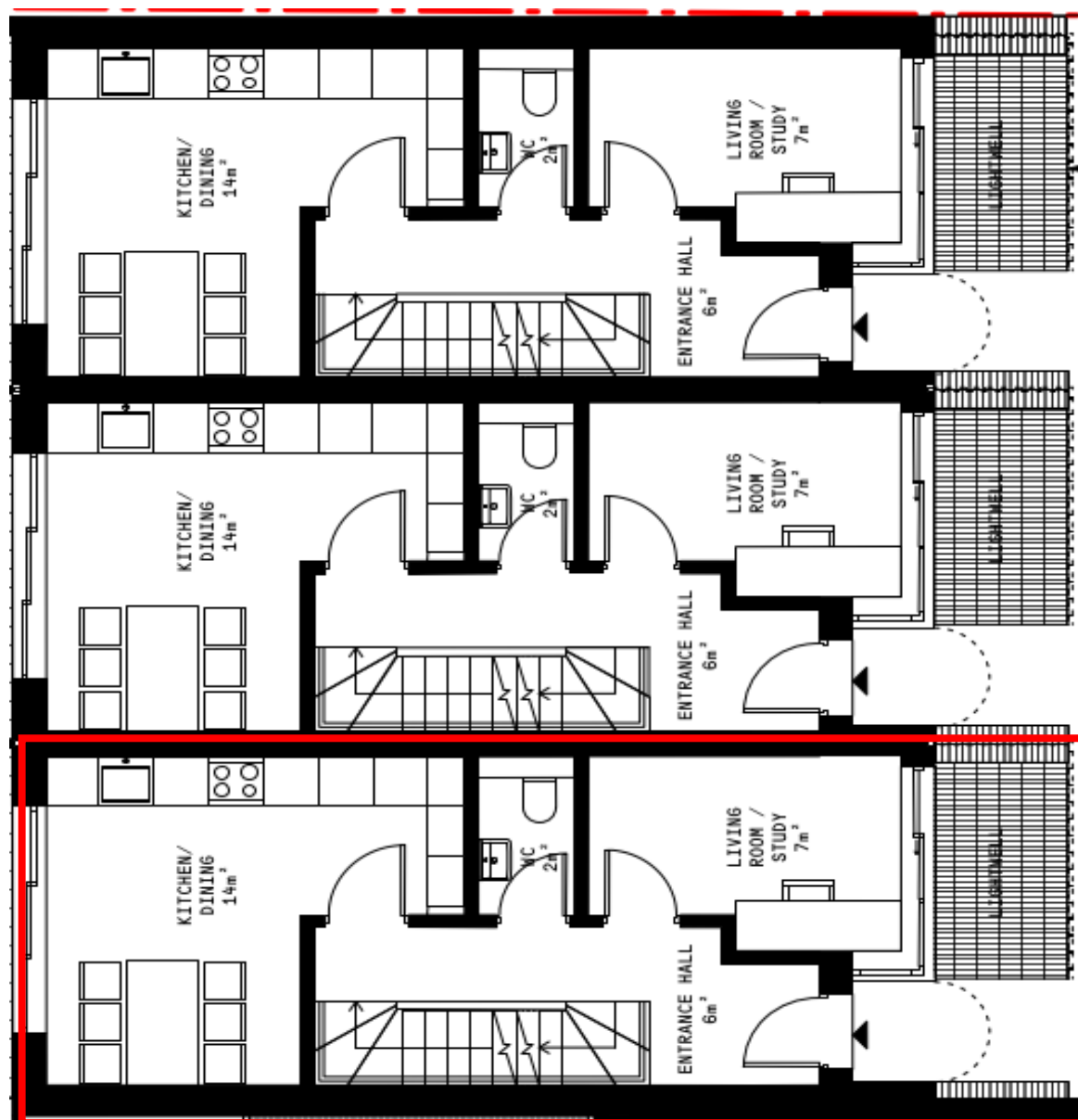
Table 2: "Design features implemented to mitigate overheating risk".



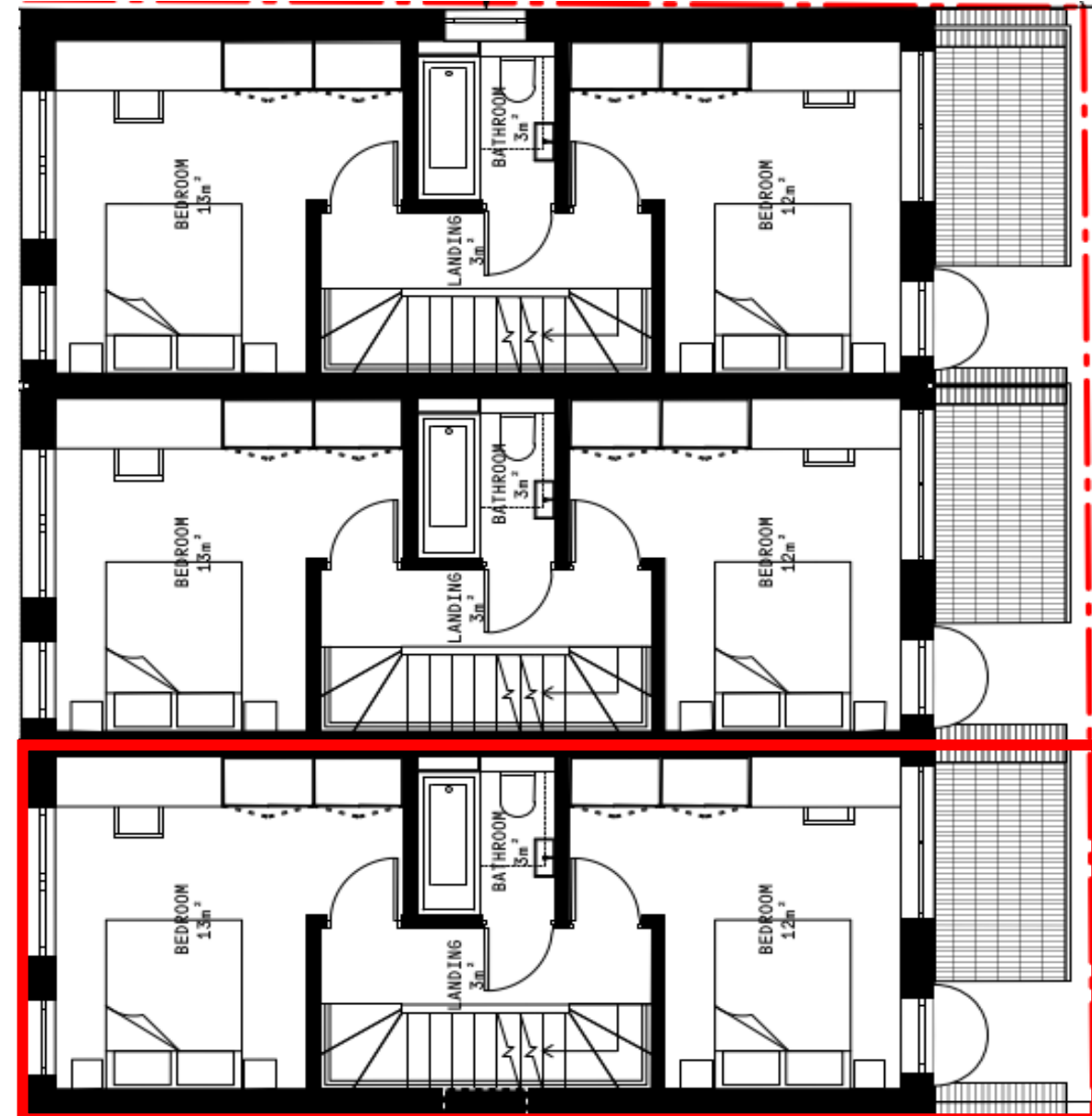
5.0 OVERHEATING CHECKLIST

FIGURE 25 – WORST CASE USED FOR THE SAP ASSESSMENT

GROUND FLOOR



FIRST FLOOR



5.0 OVERHEATING CHECKLIST

TABLE 18 - SITE FEATURES AFFECTING VULNERABILITY TO OVERHEATING		YES/NO	ADDITIONAL COMMENTS
SITE LOCATION	Urban within a high density conurbation	YES	
	Peri-urban	NO	
AIR QUALITY AND/OR NOISE SENSITIVITY ARE ANY OF THE FOLLOWING IN THE VICINITY OF BUILDINGS?	Busy Roads / A Roads	NO	
	Railways/Overground /DLR	NO	
	Airport/Flight path	NO	
	Industrial Uses / Waste Facility	NO	
PROPOSED BUILDING USE	Will any buildings be occupied by vulnerable peoples (e.g. elderly disabled, young children)?	YES*	*This depends on various factors and is unknown at this stage.
	Are residents likely to be at home during the day (e.g. students)?	YES*	*This depends on various factors and is unknown at this stage.
DWELLING ASPECT	Are there any single aspect units?	NO	
GLAZING RATIO	Is the glazing ratio (glazing: internal floor area) greater than 25%?	YES	
	If yes, is this to allow acceptable levels of daylighting?	YES	
LANDSCAPING	Will deciduous trees be provided for summer shading (to windows and pedestrian routes)?	YES	
	Will green roofs be provided?	YES	Intensive green roof with 100 mm substrate
	Will other green or blue infrastructure be provided around buildings for evaporative cooling	YES	planters, gardens, shrubs, trees
SECURITY ARE THERE ANY SECURITY ISSUES THAT COULD LIMIT OPENING OF WINDOWS FOR VENTILATION?	Single Storey ground floor units	NO	
	Vulnerable areas identified by the Police Architectural Liaison Officer	UNKNOWN	The proposed development will have open spaces with plants for evaporative cooling.
	Other	NO	



5.0 OVERHEATING CHECKLIST

TABLE 19 - DESIGN FEATURES IMPLEMENTED TO MITIGATE OVERHEATING RISK		YES/NO	ADDITIONAL COMMENTS
MATERIALS	Have high albedo (light colour) materials been specified?	YES	
DAYLIGHTING	What is the average daylight factor range?	Kitchen/ Dinning TARGET 2%: 2.2%	
		Living Room TARGET 1.5%: 5.88%	
		Bedroom 01 TARGET 1%: 4.44%	
WINDOW OPENING WHAT IS THE EXTENT OF THE OPENING?	Fully openable	YES	
	Limited (e.g. for security, safety, wind loading reasons)	YES*	
SECURITY	Where there are security issues (e.g. ground floor flats) has an alternative night time natural ventilation method been provided (e.g. ventilation grates)?	NO	

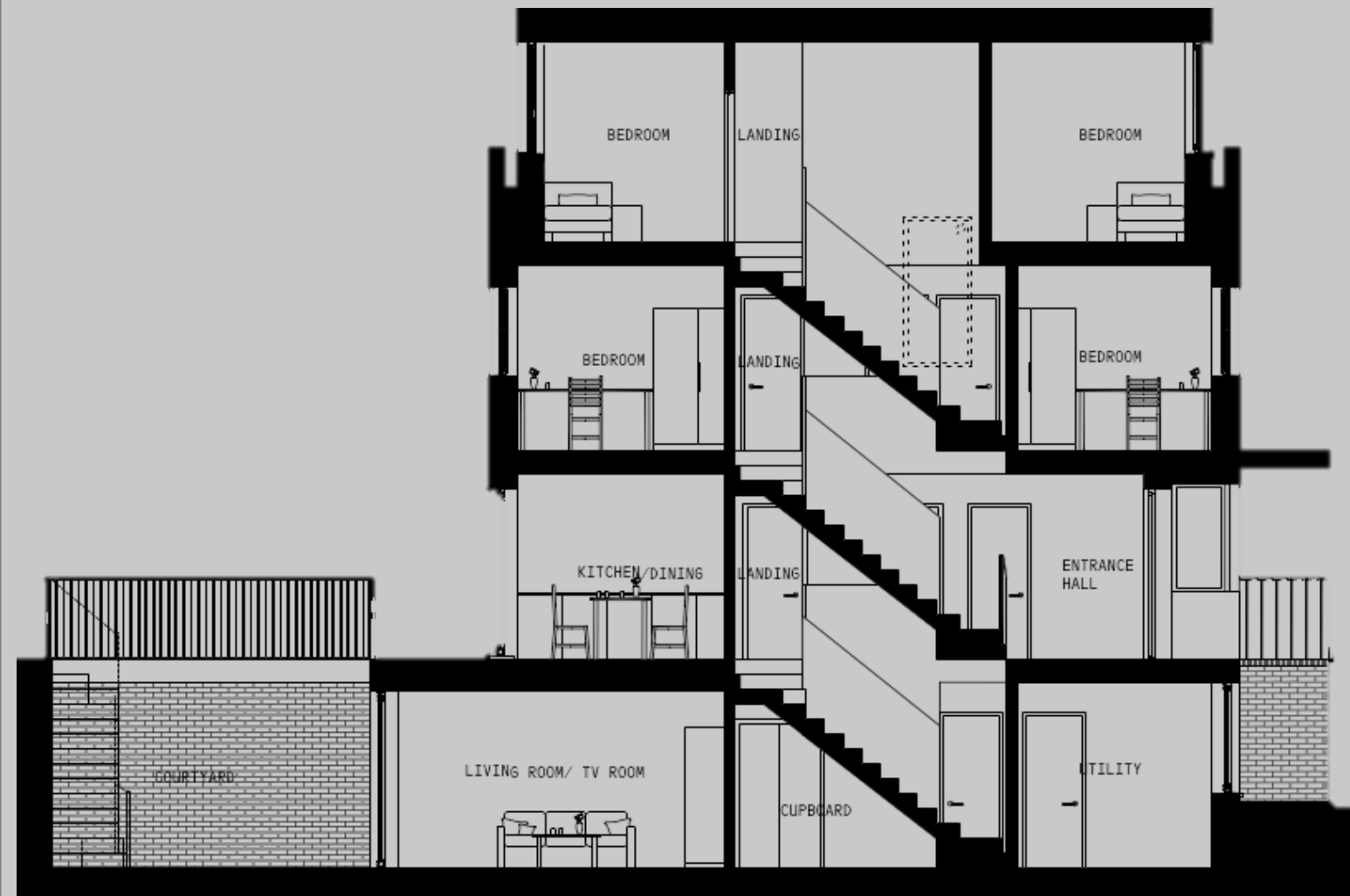


5.0 OVERHEATING CHECKLIST

TABLE 20 - DESIGN FEATURES IMPLEMENTED TO MITIGATE OVERHEATING RISK		YES/NO	ADDITIONAL COMMENTS
Shading	Is there any external shading?	NO	
	Is there any internal shading?	NO	
Glazing Specification	Is there any solar control glazing?	NO	
Ventilation What is the ventilation strategy?	Natural - Background	YES	Cross ventilation within building.
	Natural - Purge	YES	
	Mechanical - Background (e.g. MVHR)	NO	
	Mechanical - Purge	NO	
	What is the average design air change rate	10 litres per second per person.	
Heating System	Is communal heating present?	NO	
	What is the flow/return temperature?	N/A	
	Have horizontal pipe runs been minimised?	N/A	



3.0 CONCLUSION



CONCLUSION

The purpose of this document is to demonstrate compliance of the proposed development located at 24 and 26 Maidstone Lane, N11 2TL towards the Energy requirements as listed below in the local, regional and national policies.

ECostudio LTD has been commissioned by vPPR Architects in order to provide an updated Energy Statement in accordance with:

- London Borough of Haringey.
- Approved Document L of Building Regulations, Volume 1: Dwellings v 2021
- Major of London Guidance for Energy Statements, April 2020
- The Mayor's London Plan Part L 2021

This report outlines the specifications for maximizing the environmental performance of the proposed development.

The proposed development consists in erection of 3 semi-detached houses, with basement and two stories. Each unit has 4 beds with communal parking and private gardens.

As per the London Borough of Haringey Local Plan, it will expect that all the developments meet the carbon emission reduction requirements set out in the London Plan:

- Residential developments are expected to be able to achieve on-site savings beyond the minimum 35% improvement (be lean, clean and green).

This report provides a summary on how the residential development will achieve this target, with a be lean / be clean reduction of 46% and be green 40%, giving a total combined reduction of 86%.

ENERGY HIERARCHY BE LEAN / BE CLEAN

The development will achieve Approved Document L of Building Regulations, Volume 1: Dwellings v 2021 for Residential Building Regulations compliance by implementing all possible energy efficiency and energy conservation measures, before any renewable energy system is incorporated to the design.

The residential development will achieve a reduction of **46%** in carbon dioxide emissions for all regulated emissions under the Be Lean / Be Clean scenario. This has been calculated following the London Plan Guidance for Energy Statements applicable to refurbishments and extensions.

The development is far from the decentralized energy network for potential district heating. Therefore, claiming reduction in the carbon emissions, based on the connection to the local district heating is not feasible. Please refer to Figure 1 for further details.

The use of CHP is not viable on a scheme of this size. Instead the target reduction is achieved using the energy efficiency measures and the provision of on-site renewable energy technology.

BE GREEN

The proposed development will achieve a **40%** CO2 emissions reductions just under the be Green scenario from:

- o **1no ASHP per dwelling**
- o **7no PV panels of 450W each: 0.45 kWp x 7 = 3.15 kWp per house**

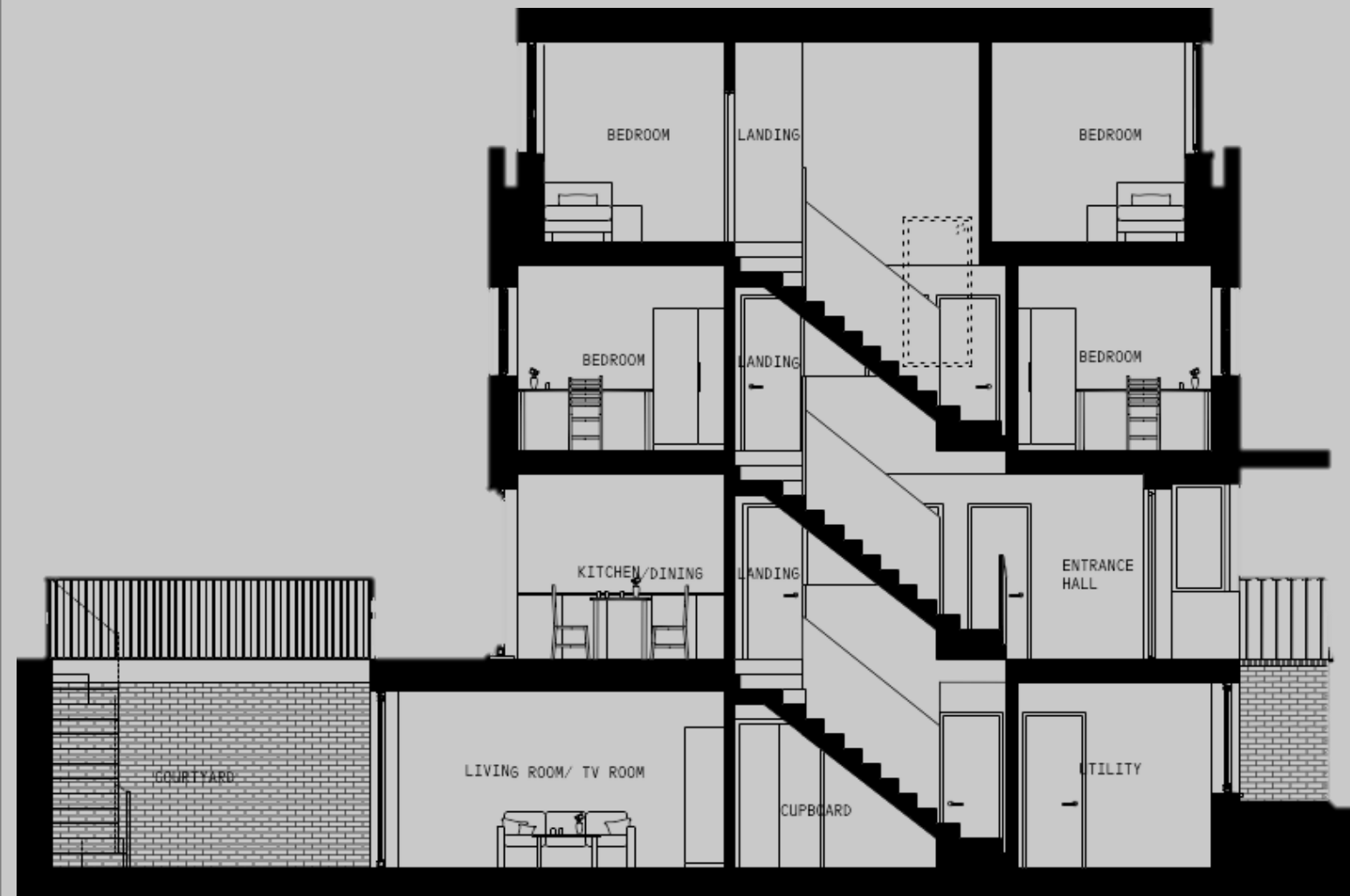
This equates = 9.45 kWp in total per 3 houses

The proposed development will have a combined reduction in CO2 emissions when compared with the baseline of 86%. Please refer to figure 04 and figure 05 for further details.

Using the GLA Carbon Emissions reporting for residential developments, the cash in lieu contribution using the recommended price of £95 per tonne of CO2 would be £2,664.00



4.0 APPENDIX A- PV DETAILS



PV PANELS

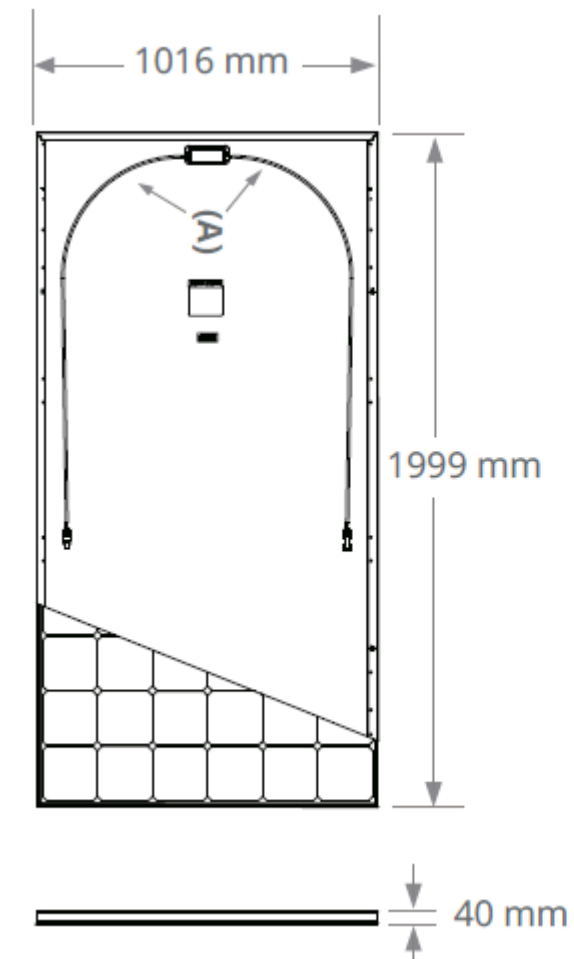
MAXEON 5 COM

POWER RANGE: 430-450 W | EFFICIENCY: Up to 22.2%

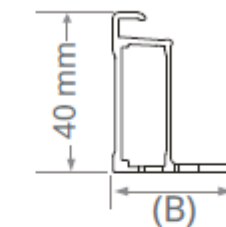


Electrical Data

	SPR-MAX5-450-COM	SPR-MAX5-440-COM	SPR-MAX5-430-COM
Nominal Power (P _{nom}) ¹⁰	450 W	440 W	430 W
Power Tolerance	+5/0%	+5/0%	+5/0%
Panel Efficiency	22.2%	21.7%	21.2%
Rated Voltage (V _{mpp})	44.0 V	43.4 V	42.7 V
Rated Current (I _{mpp})	10.2 A	10.2 A	10.1 A
Open-Circuit Voltage (V _{oc}) (+/-3%)	51.9 V	51.69 V	51.2 V
Short-Circuit Current (I _{sc}) (+/-3%)	11.0 A	10.9 A	10.9 A
Max. System Voltage		1000 V IEC	
Maximum Series Fuse		20 A	
Power Temp Coef.		-0.29% / °C	
Voltage Temp Coef.		-136 mV / °C	
Current Temp Coef.		5.7 mA / °C	



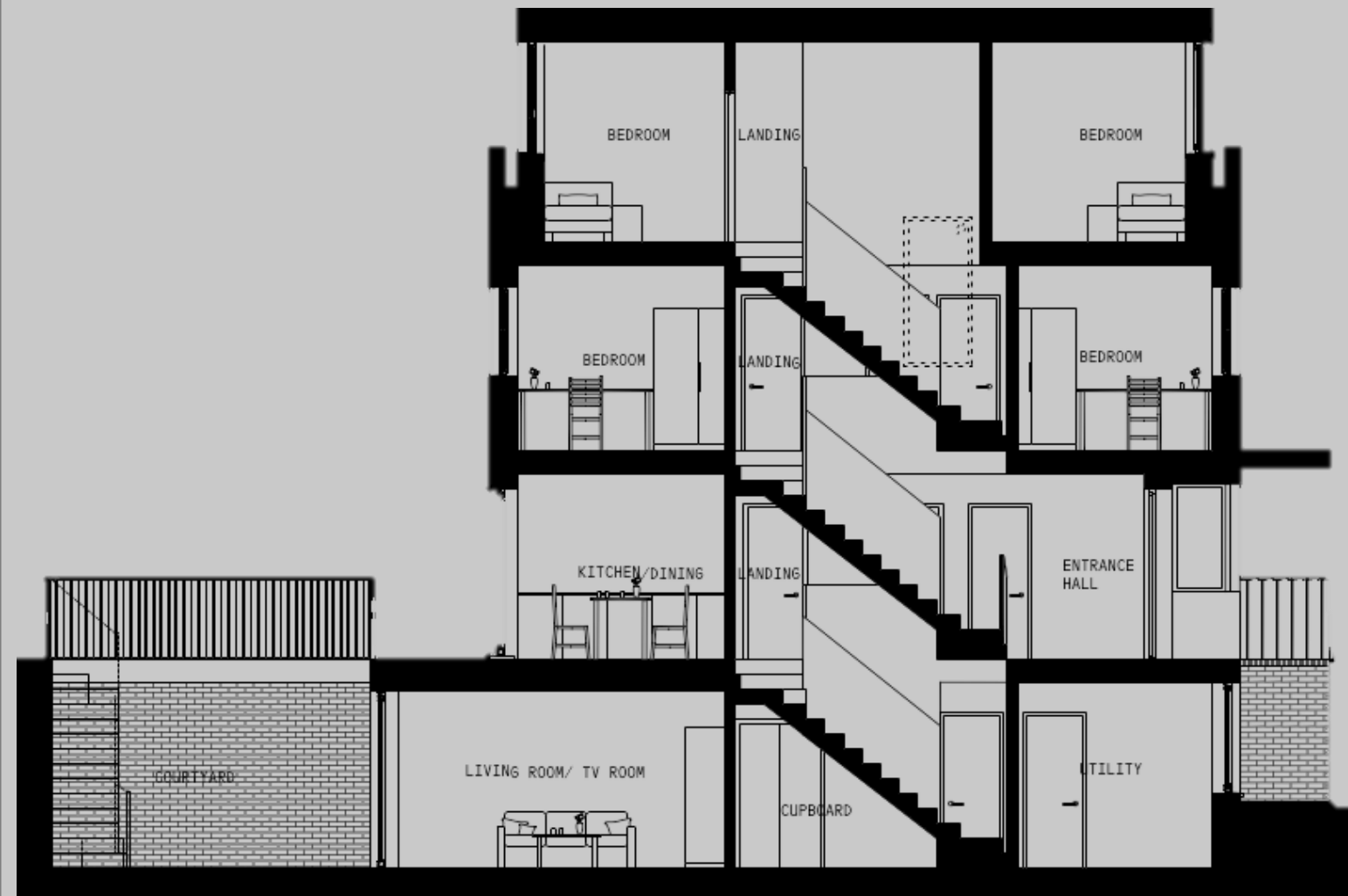
FRAME PROFILE



(A) Cable Length:
1320 mm +/-10 mm

(B) Long Side: 32 mm
Short Side: 24 mm

5.0 APPENDIX B - SAP CALCULATIONS



APPENDIX B: SAP CALCULATIONS

FIGURE 26 – SAP CALCULATIONS, BE LEAN

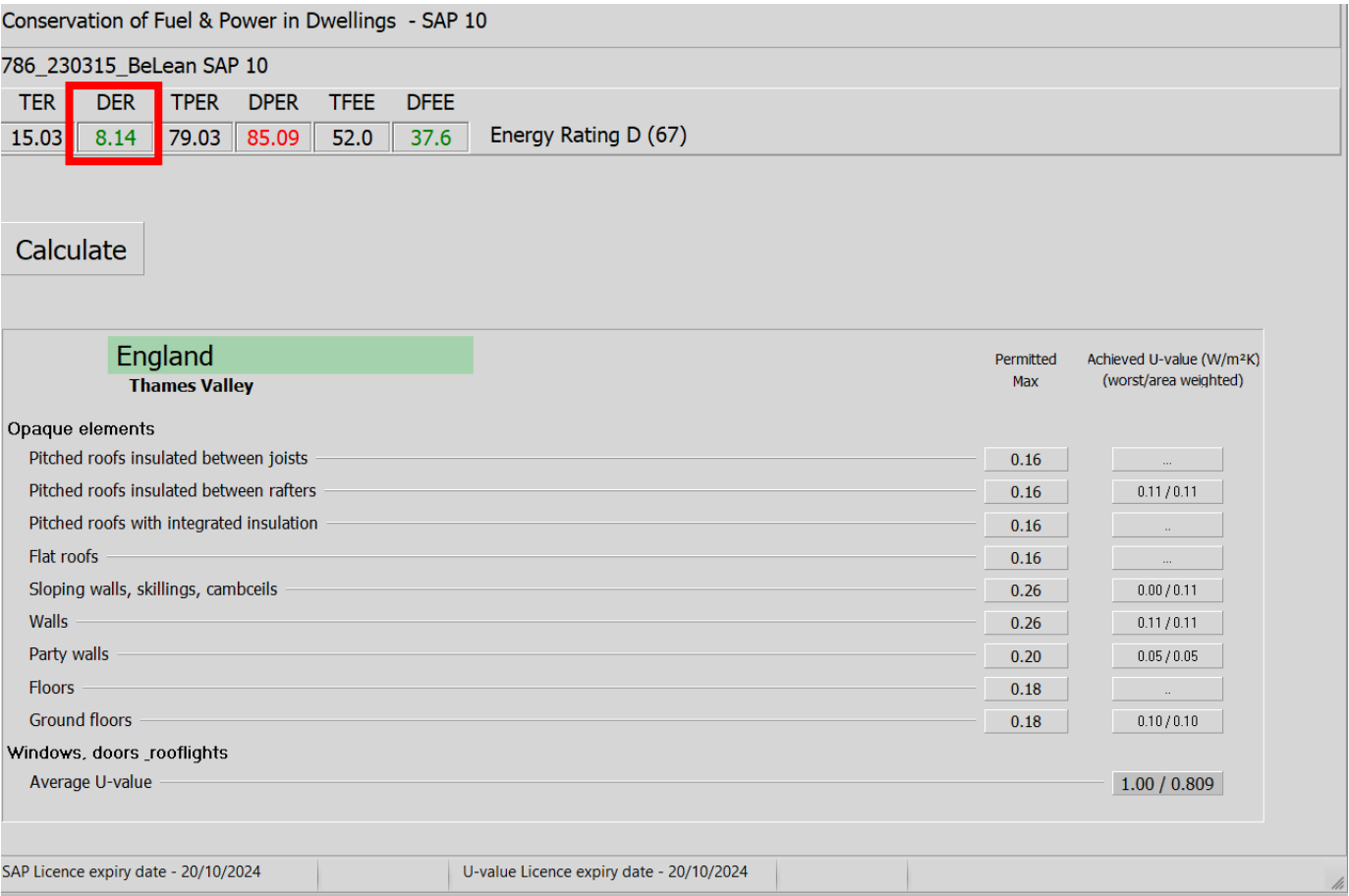
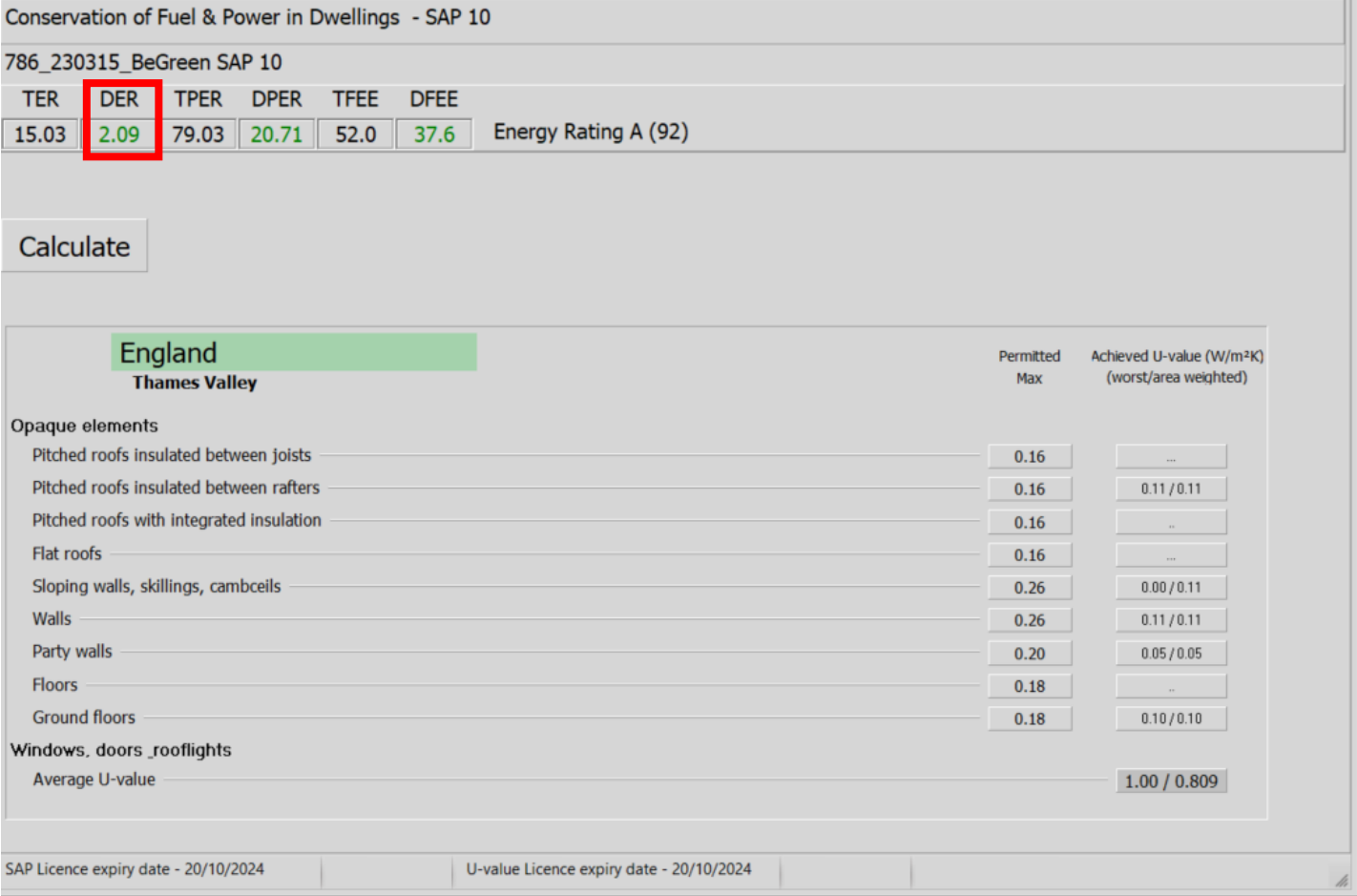
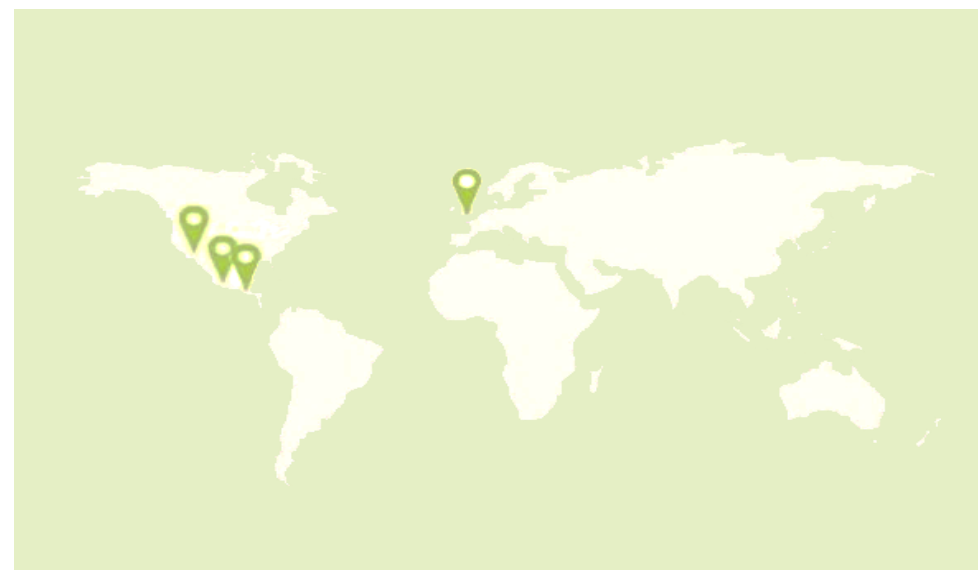


FIGURE 27 – SAP CALCULATIONS, BE GREEN





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