

Omega B, Hermitage Road
Haringey
London

Energy Statement

Document Ref.: 627.11.2-(EG)-02



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Submitted and Prepared by: Consolux
Date: 18.10.22
Issue: Preliminary
Project No.: 627
Revision: 02

Document History

Author	Purpose	Revision	Date of Issue
P. Jeavons	Planning	Preliminary	29.04.22
E. Galbraith	Planning	Preliminary	18.10.22

Approvals

This document requires the following approvals:

Signed approval forms are filed in the Management section of the project files

Name	Signature	Title	Date of Issue
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R Greenough		Director	18.10.22

Distribution

Name	Organisation	Role

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1.5 Relevant Policies

Key policies are presented below:

Table 1: Relevant Local Planning Policies

Policy	Requirements
Policy SI 1 (Improving air quality)	Development proposals should not lead to further deterioration of existing poor air quality.
Policy SI 2 (Minimising greenhouse gas emissions) of the London Plan (2021)	Major development should be net zero-carbon and minimise emissions in accordance with the following energy hierarchy: be lean, be clean, be green, be seen. A minimum on site reduction of 35% beyond Building Regulations will be required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Any short fall with the zero-carbon target should be addressed through a carbon offset payment. Development referable to the GLA should also calculate whole life-cycle carbon emissions.
Policy SI 3 (Energy infrastructure) of the London Plan (2021)	Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system.
Policy SI 4 (Managing heat risk) of the London Plan (2021)	Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems.
Energy Assessment Guidance (2018; and 2020 draft)	This guidance document explains how to prepare an energy assessment to accompany strategic planning applications referred to the Mayor as set out in London Plan Policy SI 2. It states that the purpose of an energy assessment is to demonstrate that the proposed climate change mitigation measures comply with London Plan energy policies, including the energy hierarchy. Although primarily aimed at strategic planning applications, London boroughs are encouraged to apply the same structure for energy assessments related to non-referable applications and adapt it for relevant scales of development.
Policy SP4 (Working towards a Low Carbon Haringey) of Haringey's Local Plan, Strategic Policies (Updated 2017)	In line with the London Plan policy the Council will promote and require all new developments to take measures to reduce energy and carbon emissions: • A 25% improvement on Part L 2010 (equivalent to a 19% improvement on Part L 2013 and Code Level 4 energy performance). • All new residential and non-residential development shall be zero carbon • All new non-residential development shall be built to at least BREEAM "Very Good" and aim for "Excellent" • All developments to assess, identify and implement, where viable, site wide decentralised energy facilities • Prioritise connection to existing or planned networks where feasible • Exploring ways of implementing sub regional energy networks • All new developments where viable, a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy generation
Policy DM22 (Decentralised Energy) of Haringey's Development Management DPD (July 2017)	Encourages connection to decentralised energy networks
Sustainable Design and Construction SPD (March 2013)	The SPD supports the Local Plan: Strategic Policies (adopted March 2013) and aims to help the Council meet the various obligations for sustainability, environmental quality and carbon reductions targets set at national, regional and local levels.

New Local Plan: First Steps Engagement (November 2020)	The Council is looking to develop a New Local Plan covering the period up to 2037 which will likely replace all existing Local Plan documents with a single document (New Local Plan). Once adopted, the New Local Plan will form part of Haringey's wider 'Development Plan' which is the starting point for determining applications for planning applications. It will also help to deliver the Council's wider aspirations in the Borough Plan and in other local strategies and policies.
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Summary of Key Planning Policy Requirements

The following comprises a summary of the key policy requirements as applied through the Conditions:

- For major applications, new residential development should target "zero carbon"; with at least 35% through on-site measures and residual emissions mitigated through a cash-in-lieu contribution payment. Developments will also be expected to achieve a proportion of this reduction through energy efficiency measures;
- Strategies must align to the energy hierarchy;

2.0 Energy Reduction Strategy

The strategy for reducing energy consumption within the building will follow the energy hierarchy, as shown in Figure 2 (below).

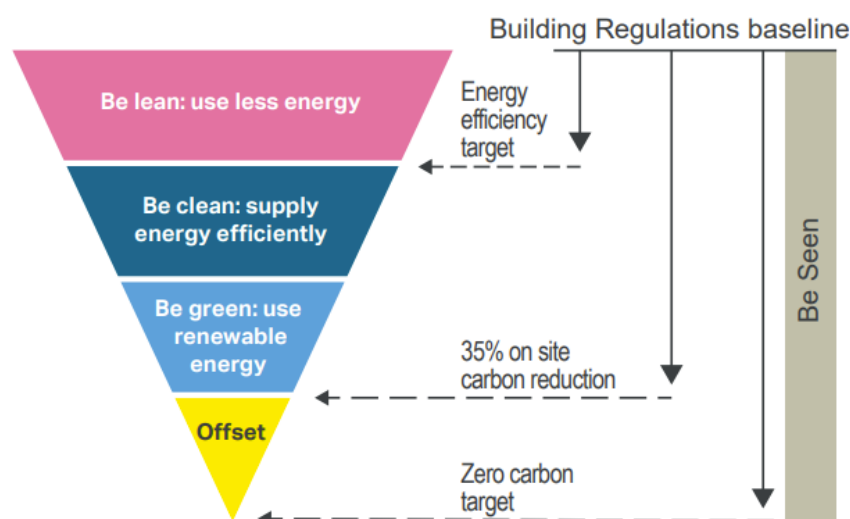


Figure 2: The London Plan Energy Hierarchy

2.1 Reduce Energy Demand

Passive measures included within the design of the building to reduce energy use and the associated CO₂ emissions are;

- Enhanced insulation to the building envelope which exceeds Building Regulation requirements
- Reduced air permeability standard

2.1.1 Enhanced Building Envelope

Limiting heat losses across the entire building envelope will future proof the energy efficiency of the building over its whole life. To achieve this, the fabric thermal U-Value requirements as detailed within Approved Document L2A 2013 of the Building Regulations will be significantly improved upon.

Table 3 shows the U-values required in order to achieve Building Regulations compliance, compared to the targeted values, which far exceed the Building Regulations requirements.

Table 2: Part L U-Value comparison

Building Element	AD L2A limiting U- Value (W/m2.K)	AD L1A limiting U- Value (W/m2.K)	Target U-Value (W/m2.K)
Roof	0.25	0.20	0.11
Wall	0.35	0.30	0.18
Exposed Floor	0.25	0.25	0.15
Personnel Doors	2.2	2.0	1.60
Windows	2.2	2.0	1.30

2.1.2 Reduced Air Permeability

A significant percentage of heat loss from buildings is due to air infiltration associated with poor air tightness. By improving on the air tightness of the building it is possible to reduce infiltrations rates and thus reduce the heat losses, energy use and the associated CO2 emissions.

The building shall be constructed to improved building air tightness criteria beyond the level required to comply with the Building Regulations. Table 3 shows the comparison of the targeted air permeability for the building against the allowable maximum limit set within Approved Document L2A of the Building Regulations.

Table 3: Air Permeability Standard

Building Regulation Document	Maximum allowable air permeability (m3/m2/hr at 50 Pascals)	Targeted air permeability (m3/m2/hr at 50 Pascals)	Percentage Improvement %
Approved Document L2A 2016	10	3	70%

2.2 Energy Efficiency

To ensure energy efficiency within the building, it is proposed to ensure all plant within the building will have efficient outputs, in order to reduce energy wastage. This will be in the form of, but not limited to, the use of:

- LED light fittings throughout
- Selected plant with high efficiency
- Ventilation fans with lower SFP

Alongside this, control systems will be employed to ensure energy usage within the building will be adequately monitored and regulated.

2.3 Low & Zero Carbon Energy Sources

Low Carbon Technologies

In line with the Energy Hierarchy, consideration has been given to the use of low carbon technologies in advance of renewables. Currently, there is an absence of a district energy network (DEN) in close proximity to the Site, therefore it is proposed that provision is given on site for the future connection to a DEN when one becomes available.

Furthermore, Combined Heat and Power (CHP) systems generate electrical energy and provide the waste heat from the process to be used on site. They are typically gas-powered but can be run off alternative fuel sources. CHP is an efficient means to supply heat in developments, providing significant carbon savings. However, CHP no longer provides a low carbon option when considered in the context of a decarbonising electricity grid. Therefore, although a centralised CHP

is considered a potentially feasible and viable technology for the site, it is not proposed for the hot water or space heating of the development.

Renewable Technologies

In line with the Energy Hierarchy, consideration has also been given to the incorporation of renewable technologies and it is proposed to include:

- Air Source Heat Pumps (ASHPs) to meet space heating requirements of the commercial spaces, as well as for both the space heating and hot water in the residential spaces.
- It is proposed that a small area of PV will be specified to offset the energy use from the communal (Landlord) spaces of the building.

2.4 Energy Strategy Summary

This energy statement has been undertaken with a view to exploring the most viable option(s) that would reduce on site emissions by at least 35% relative to Part L 2013.

Table 4 highlights that the energy measures that have been deemed suitable for the residential scheme.

Table 4: Energy Strategy Measures Checklist

Maximised Potential of Building Orientation and Massing	Yes
Maximised Potential of Natural Shading for Cooling	Yes
Increased Building Fabric Performance above Building Regulations	Yes
Connect to an Existing Energy Network	No
Create an Energy Network	No
Communal Heating / Hot Water Network	Yes
Efficient Individual Heating Systems	Yes
Efficient Lighting Strategy	Yes
Efficient Plant selection (Ventilation etc)	Yes
Photovoltaics	Yes
Air Source Heat Pump	Yes
Solar Thermal	No
Combined Heat and Power	No
Ground Source Heat Pump	No
Wind Turbine	No
Biomass Boiler	No

The use of ASHPs has been identified as the most appropriate LZC technology, along with an extent of PV.

3.0 Recommendations and Conclusions

This analysis of the proposed Hermitage Road development has been performed with the aim of highlighting sustainable design principles and identifying potential opportunities for the use of renewable energy and low/zero carbon technologies. Methods and technologies have been highlighted which provide an energy efficient development.

Based on the assumptions contained within this report, it is recommended that the aforementioned technology options be incorporated to enable the proposed development to meet the requirements of the policies identified, since the benefits of these outweigh other alternatives.

Be Lean – Reduce the Demand for Energy

The development has been designed to include passive design measures to reduce the demand for energy.

Passive measures included within the design of the accommodation block to reduce energy use and the associated CO2 emissions are;

- Enhanced insulation to the building envelope which exceeds Building Regulation requirements

- Reduced air permeability standard

All building fabric properties throughout the development are proposed to be in excess of the Part L1A and L2A notional building, helping to further reduce heating and cooling demands.

Be Clean – Supplying Energy Efficiently

No District Energy Networks have been identified in the immediate vicinity of the site; however, it is noted that this remains a policy preference for the Council. The provision for future connection to a DEN will therefore be incorporated into the development.

Be Green – Renewable Energy

ASHPs are proposed for space heating and hot water for the residential component of the development, as well as on space heating only for the commercial areas.

A proportion of flat roof will be available as part of the proposed development and solar technologies are therefore proposed as a means of satisfying the majority of energy requirements for the communal spaces; offsetting a portion of the unregulated energy demand.

Carbon Emissions

Energy modelling has been undertaken using SAP and SBEM and the carbon savings delivered by each of the three steps of the Energy Hierarchy have been estimated (indicative outputs are included in the appendices).

Table 5: CO2 Emissions after Each Stage of the Energy Hierarchy (SAP 10) – Residential

	Carbon Dioxide Emissions (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline	44.8	24.8
After energy demand reduction	38.7	24.8
After CHP	38.7	24.8
After renewable energy	16.7	24.8

Table 6: Regulated CO2 Savings from Each Stage of the Energy Hierarchy – Residential

	Regulated Carbon Dioxide Savings	
	(Tonnes CO ₂ per annum)	%
Savings from energy demand reduction	6.1	14%
Savings from CHP	0.0	0%
Savings from renewable energy	22.0	49%
Total Cumulative Savings	28.1	63%

Table 7: CO2 Emissions after Each Stage of the Energy Hierarchy (SAP 10) – Non-Domestic

	Carbon Dioxide Emissions (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline	20.4	9.1
After energy demand reduction	15.6	9.1
After CHP	15.6	9.1
After renewable energy	8.8	9.1

Table 8: Regulated CO2 Savings from Each Stage of the Energy Hierarchy – Non-Domestic

	Regulated Carbon Dioxide Savings	
	(Tonnes CO ₂ per annum)	%
Be lean: savings from energy demand reduction	4.8	23%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	6.8	33%
Total Cumulative Savings	11.6	57%

Table 9: Regulated CO2 Savings from Each Stage of the Energy Hierarchy – Site wide

	Regulated Carbon Dioxide Savings	
	(Tonnes CO ₂ per annum)	%
Savings from energy demand reduction	10.9	17%
Savings from CHP	0.0	0%
Savings from renewable energy	28.8	44%
Total Cumulative Savings	39.8	61%

A copy of the GLA Carbon Emission Reporting Spreadsheet is appended to this report outlining the savings at each stage of the Energy Hierarchy.

Overall, the proposed energy strategy is considered consistent with the National Planning Policy Framework, London Plan and policies of the Council. When implemented, the scheme will provide an efficient and low carbon development.

4.0 Appendices

4.1 GLA Summary Tables

SAP 2012 Performance

SAP 10.0 Performance

Domestic

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	50.6	55.3
After energy demand reduction (be lean)	46.8	55.3
After heat network connection (be clean)	46.8	55.3
After renewable energy (be green)	37.1	55.3

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	3.8	8%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	9.6	19%
Cumulative on site savings	13.4	27%
Annual savings from off-set payment	37.1	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	1,113	-
Cash in-lieu contribution (£)	105,781	

*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

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings

	Carbon Dioxide Emissions for domestic buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	44.8	24.8
After energy demand reduction (be lean)	38.7	24.8
After heat network connection (be clean)	38.7	24.8
After renewable energy (be green)	16.7	24.8

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: Savings from energy demand reduction	6.1	14%
Be clean: Savings from heat network	0.0	0%
Be green: Savings from renewable energy	22.0	49%
Cumulative on site savings	28.1	63%
Annual savings from off-set payment	16.7	-
	(Tonnes CO ₂)	
Cumulative savings for off-set payment	500	-
Cash in-lieu contribution (£)	47,489	

*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

Non-domestic

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	33.4	20.2
After energy demand reduction (be lean)	23.2	20.2
After heat network connection (be clean)	23.2	20.2
After renewable energy (be green)	19.6	20.2

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	10.2	30%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	3.7	11%
Total Cumulative Savings	13.8	41%
Annual savings from off-set payment	19.6	-
(Tonnes CO ₂)		
Cumulative savings for off-set payment	588	-
Cash in-lieu contribution (£)	55,856	

*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

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon Dioxide Emissions for non-domestic buildings (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations Compliant Development	20.4	9.1
After energy demand reduction (be lean)	15.6	9.1
After heat network connection (be clean)	15.6	9.1
After renewable energy (be green)	8.8	9.1

Table 4: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Be lean: savings from energy demand reduction	4.8	23%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	6.8	33%
Total Cumulative Savings	11.6	57%
Annual savings from off-set payment	8.8	-
(Tonnes CO ₂)		
Cumulative savings for off-set payment	264	-
Cash in-lieu contribution (£)*	25,076	

*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

SITE-WIDE

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2013 baseline	84.0		
Be lean	70.0	14.0	17%
Be clean	70.0	0.0	0%
Be green	56.7	13.3	16%
Total Savings	-	27.3	32%
	-	CO ₂ savings off-set (Tonnes CO ₂)	-
Off-set	-	1,701.4	-

	Total regulated emissions (Tonnes CO ₂ / year)	CO ₂ savings (Tonnes CO ₂ / year)	Percentage savings (%)
Part L 2013 baseline	65.2		
Be lean	54.3	10.9	17%
Be clean	54.3	0.0	0%
Be green	25.5	28.8	44%
Total Savings	-	39.8	61%
	-	CO ₂ savings off-set (Tonnes CO ₂)	-
Off-set	-	763.8	-

4.2 SAP & SBEM Outputs (Be Green)

Block Compliance WorkSheet: Omega B Be Green

User Details

Assessor Name: Stroma FSAP Stroma Number: Software Version: Version: 1.0.5.51

Calculation Details

Dwelling	DER	TER	DFEE	TFEE	TFA
Flat 1	11.97	25.26	38.6	47.5	77.5
Flat 6	13.08	25.24	39.8	41.4	59.7
Flat 22	14.57	27.65	44	44.8	50.8
Flat 27	11.57	23.98	35.8	43	79.8
Flat 30	13.88	26.99	38	41.9	50
Flat 40	14.8	28.16	53.3	56.4	73.7

Calculation Summary

Total Floor Area	391.50
Average TER	26.07
Average DER	13.17
Average DFEE	41.60
Average TFEE	46.26
Compliance	Pass
% Improvement DER TER	49.48
% Improvement DFEE TFEE	10.07

DER WorkSheet: New dwelling design stage

User Details:

Assessor Name: Stroma FSAP 2012 Stroma Number: Software Version: Version: 1.0.5.51

Property Address: Flat 1

Address :

1. Overall dwelling dimensions:

	Area(m ²)	Av. Height(m)	Volume(m ³)
Ground floor	77.5 (1a) x	3.35 (2a) =	259.62 (3a)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+....(1n)	77.5 (4)		
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)+....(3n) =	259.62 (5)

2. Ventilation rate:

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0	0 (6a)
Number of open flues	0	0	0	0	0 (6b)
Number of intermittent fans				0	0 (7a)
Number of passive vents				0	0 (7b)
Number of flueless gas fires				0	0 (7c)

Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) = 0 - (5) = 0 (8)

If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16)

Number of storeys in the dwelling (ns) 0 (9)
Additional infiltration [(9)-1]x0.1 = 0 (10)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction 0 (11)

If both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal use 0.35

If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0

If no draught lobby, enter 0.05, else enter 0

Percentage of windows and doors draught stripped

Window infiltration 0.25 - [0.2 x (14) ÷ 100] = 0 (12)
Infiltration rate (8) + (10) + (11) + (12) + (13) + (15) = 0 (13)
Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area 0 (14)
If based on air permeability value, then (18) = [(17) ÷ 20] x (8), otherwise (18) = (16) 0 (15)
Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used 0 (16)

Number of sides sheltered 2 (17)
Shelter factor (20) = 1 - [0.075 x (19)] = 0.85 (18)
Infiltration rate incorporating shelter factor (21) = (18) x (20) = 0.13 (19)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average wind speed from Table 7	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7

Wind Factor (22a)m = (22)m ÷ 4

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average wind speed from Table 7	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7

Wind Factor (22a)m = (22)m ÷ 4

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average wind speed from Table 7	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7

Wind Factor (22a)m = (22)m ÷ 4

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average wind speed from Table 7	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7

Wind Factor (22a)m = (22)m ÷ 4

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average wind speed from Table 7	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7

Wind Factor (22a)m = (22)m ÷ 4

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average wind speed from Table 7	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7

Wind Factor (22a)m = (22)m ÷ 4

DER WorkSheet: New dwelling design stage

Adjusted infiltration rate (allowing for shelter and wind speed) = (21a) x (22a)m

0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15
------	------	------	------	------	------	------	------	------	------	------	------

Calculate effective air change rate for the applicable case

If mechanical ventilation:

If exhaust air heat pump using Appendix N, (23b) = (23a) x Fmv (equation (H5)) , otherwise (23b) = (23a)

If balanced with heat recovery: efficiency in % allowing for in-use factor (from Table 4h) =

a) If balanced mechanical ventilation with heat recovery (MVHR) (24a)m = (22b)m + (23b) x [1 - (23c) + 100]

(24a)m= 0.28 0.28 0.27 0.26 0.25 0.24 0.24 0.24 0.24 0.25 0.26 0.27 (24a)

b) If balanced mechanical ventilation without heat recovery (MV) (24b)m = (22b)m + (23b)

(24b)m= 0 0 0 0 0 0 0 0 0 0 0 0 (24b)

c) If whole house extract ventilation or positive input ventilation from outside

if (22b)m < 0.5 x (23b), then (24c) = (23b); otherwise (24c) = (22b) m + 0.5 x (23b)

(24c)m= 0 0 0 0 0 0 0 0 0 0 0 0 (24c)

d) If natural ventilation or whole house positive input ventilation from loft

if (22b)m = 1, then (24d)m = (22b)m otherwise (24d)m = 0.5 + [(22b)m² x 0.5]

(24d)m= 0 0 0 0 0 0 0 0 0 0 0 0 (24d)

Effective air change rate - enter (24a) or (24b) or (24c) or (24d) in box (25)

(25)m= 0.28 0.28 0.27 0.26 0.25 0.24 0.24 0.24 0.24 0.25 0.26 0.27 (25)

3. Heat losses and heat loss parameter:

ELEMENT	Gross area A _m ²	Openings m ²	Net Area A _m ²	U-value W/m ² K	A x U (W/K)	k-value kJ/m ² ·K	A x k kJ/K
Windows Type 1	2.47			x 1/[(1.3) + 0.04] =	3.05		
Windows Type 2	5.7			x 1/[(1.3) + 0.04] =	7.04		
Windows Type 3	3.76			x 1/[(1.3) + 0.04] =	4.65		
Windows Type 4	3.76			x 1/[(1.3) + 0.04] =	4.65		
Walls	87	15.69	71.31	x 0.15 =	10.7		
Total area of elements, m ²			87				

* for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2

** include the areas on both sides of internal walls and partitions

Fabric heat loss, W/K = S (A x U) (26)...(30) + (32) = 30.09 (33)

Heat capacity Cm = S(A x k) ((28)...(30) + (32) + (32a)...(32e) = 4991.7 (34)

Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K Indicative Value: Low 100 (35)

For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f can be used instead of a detailed calculation.

Thermal bridges: S (L x Y) calculated using Appendix K 3.48 (36)

if details of thermal bridging are not known (36) = 0.05 x (31)

Total fabric heat loss (33) + (36) = 33.57 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
23.99	23.72	23.45	22.08	21.81	20.44	20.44	20.17	20.99	21.81	22.36	22.9

(38)m= 23.99 23.72 23.45 22.08 21.81 20.44 20.44 20.17 20.99 21.81 22.36 22.9 (38)

Heat transfer coefficient, W/K (39)m = (37) + (38)m

57.56	57.29	57.01	55.65	55.38	54.01	54.01	53.74	54.56	55.38	55.92	56.47
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Average = Sum(39).../12= 55.58 (39)

DER WorkSheet: New dwelling design stage

Heat loss parameter (HLP), W/m²K

(40)m = (39)m ÷ (4)

0.74	0.74	0.74	0.72	0.71	0.7	0.7	0.69	0.7	0.71	0.72	0.73
------	------	------	------	------	-----	-----	------	-----	------	------	------

Average = Sum(40).../12= 0.72 (40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

(41)m= 31 28 31 30 31 30 31 31 30 31 30 31 (41)

4. Water heating energy requirement: kWh/year:

Assumed occupancy, N

if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9) 2.41 (42)

if TFA ≤ 13.9, N = 1

Annual average hot water usage in litres per day Vd,average = (25 x N) + 36 91.53 (43)

Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more than 125 litres per person per day (all water use, hot and cold)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
100.68	97.02	93.36	89.7	86.03	82.37	82.37	86.03	89.7	93.36	97.02	100.68

Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43)

(44)m= 100.68 97.02 93.36 89.7 86.03 82.37 82.37 86.03 89.7 93.36 97.02 100.68 (44)

Total = Sum(44)... = 1098.31

Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d)

(45)m= 149.3 130.58 134.75 117.48 112.72 97.27 90.14 103.43 104.67 121.98 133.15 144.59 (45)

Total = Sum(45)... = 1440.06

If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61)

(46)m= 22.4 19.59 20.21 17.62 16.91 14.59 13.52 15.51 15.7 18.3 19.97 21.69 (46)

Water storage loss:

Storage volume (litres) including any solar or WWHRS storage within same vessel 180 (47)

If community heating and no tank in dwelling, enter 110 litres in (47)

Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47)

Water storage loss:

a) If manufacturer's declared loss factor is known (kWh/day): 0 (48)

Temperature factor from Table 2b 0 (49)

Energy lost from water storage, kWh/year (48) x (49) = 180 (50)

b) If manufacturer's declared cylinder loss factor is not known:

Hot water storage loss factor from Table 2 (kWh/litre/day) 0.01 (51)

If community heating see section 4.3

Volume factor from Table 2a 0.87 (52)

Temperature factor from Table 2b 0.6 (53)

Energy lost from water storage, kWh/year (47) x (51) x (52) x (53) = 0.97 (54)

Enter (50) or (54) in (55) 0.97 (55)

Water storage loss calculated for each month ((56)m = (55) x (41)m

(56)m= 30.09 27.18 30.09 29.12 30.09 29.12 30.09 30.09 29.12 30.09 29.12 30.09 (56)

If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) - (H11)] ÷ (50), else (57)m = (56)m where (H11) is from Appendix H

(57)m= 30.09 27.18 30.09 29.12 30.09 29.12 30.09 30.09 29.12 30.09 29.12 30.09 (57)

Primary circuit loss (annual) from Table 3 0 (58)

Primary circuit loss calculated for each month (59)m = (58) + 365 x (41)m

(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)

(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

DER WorkSheet: New dwelling design stage

Combi loss calculated for each month (61)m = (60) + 365 x (41)m

(61)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 (61)

Total heat required for water heating calculated for each month (62)m = 0.85 x (45)m + (46)m + (57)m + (59)m + (61)m

(62)m= 202.66 178.77 188.1 169.11 166.08 148.9 143.49 156.79 156.3 175.33 184.78 197.95 (62)

Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)

(add additional lines if FGHRs and/or WWHRs applies, see Appendix G)

(63)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 (63)

Output from water heater

(64)m= 202.66 178.77 188.1 169.11 166.08 148.9 143.49 156.79 156.3 175.33 184.78 197.95 (64)

Output from water heater (annual) = 2068.25

Heat gains from water heating, kWh/month 0.25 x [(0.85 x (45)m + (61)m] + 0.8 x [(46)m + (57)m + (59)m]

(65)m= 92.33 81.97 87.49 80.37 80.16 73.65 72.65 77.07 76.11 83.24 85.58 90.76 (65)

include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating

5. Internal gains (see Table 5 and 5a):

Metabolic gains (Table 5), Watts

(66)m= 120.69 120.69 120.69 120.69 120.69 120.69 120.69 120.69 120.69 120.69 120.69 120.69 (66)

Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5

(67)m= 19.09 16.96 13.79 10.44 7.8 6.59 7.12 9.25 12.42 15.77 18.41 19.62 (67)

Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5

(68)m= 214.14 216.36 210.76 196.84 183.79 169.65 160.2 157.98 163.58 175.5 190.55 204.69 (68)

Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5

(69)m= 35.07 35.07 35.07 35.07 35.07 35.07 35.07 35.07 35.07 35.07 35.07 35.07 (69)

Pumps and fans gains (Table 5a)

(70)m= 0 0 0 0 0 0 0 0 0 0 0 0 (70)

Losses e.g. evaporation (negative values) (Table 5)

(71)m= -96.55 -96.55 -96.55 -96.55 -96.55 -96.55 -96.55 -96.55 -96.55 -96.55 -96.55 -96.55 (71)

Water heating gains (Table 5)

(72)m= 124.09 121.98 117.59 111.62 107.75 102.29 97.65 103.59 105.71 111.88 118.86 121.99 (72)

Total internal gains = (66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m

(73)m= 416.53 414.5 401.34 380.1 358.55 337.73 324.18 330.03 340.91 362.36 387.02 405.5 (73)

6. Solar gains:

Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.

Orientation: Access Factor Table 6d Area m² Flux Table 6a g Table 6b FF Table 6c Gains (W)

North 0.9x 0.77 x 5.7 x 10.63 x 0.56 x 0.8 = 18.82 (74)

North 0.9x 0.77 x 5.7 x 20.32 x 0.56 x 0.8 = 35.96 (74)

North 0.9x 0.77 x 5.7 x 34.53 x 0.56 x 0.8 = 61.11 (74)

North 0.9x 0.77 x 5.7 x 55.46 x 0.56 x 0.8 = 98.15 (74)

North 0.9x 0.77 x 5.7 x 74.72 x 0.56 x 0.8 = 132.22 (74)

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North 0.9x 0.77 x 5.7 x 79.99 x 0.56 x 0.8 = 141.55 (74)

North 0.9x 0.77 x 5.7 x 74.68 x 0.56 x 0.8 = 132.15 (74)

North 0.9x 0.77 x 5.7 x 59.25 x 0.56 x 0.8 = 104.84 (74)

North 0.9x 0.77 x 5.7 x 41.52 x 0.56 x 0.8 = 73.47 (74)

North 0.9x 0.77 x 5.7 x 24.19 x 0.56 x 0.8 = 42.81 (74)

North 0.9x 0.77 x 5.7 x 13.12 x 0.56 x 0.8 = 23.21 (74)

North 0.9x 0.77 x 5.7 x 8.86 x 0.56 x 0.8 = 15.69 (74)

East 0.9x 0.77 x 2.47 x 19.64 x 0.56 x 0.8 = 15.06 (76)

East 0.9x 0.77 x 3.76 x 19.64 x 0.56 x 0.8 = 22.93 (76)

East 0.9x 0.77 x 2.47 x 38.42 x 0.56 x 0.8 = 29.46 (76)

East 0.9x 0.77 x 3.76 x 38.42 x 0.56 x 0.8 = 44.85 (76)

East 0.9x 0.77 x 2.47 x 63.27 x 0.56 x 0.8 = 48.52 (76)

East 0.9x 0.77 x 3.76 x 63.27 x 0.56 x 0.8 = 73.86 (76)

East 0.9x 0.77 x 2.47 x 92.28 x 0.56 x 0.8 = 70.76 (76)

East 0.9x 0.77 x 3.76 x 92.28 x 0.56 x 0.8 = 107.72 (76)

East 0.9x 0.77 x 2.47 x 113.09 x 0.56 x 0.8 = 86.72 (76)

East 0.9x 0.77 x 3.76 x 113.09 x 0.56 x 0.8 = 132.02 (76)

East 0.9x 0.77 x 2.47 x 115.77 x 0.56 x 0.8 = 88.78 (76)

East 0.9x 0.77 x 3.76 x 115.77 x 0.56 x 0.8 = 135.14 (76)

East 0.9x 0.77 x 2.47 x 110.22 x 0.56 x 0.8 = 84.52 (76)

East 0.9x 0.77 x 3.76 x 110.22 x 0.56 x 0.8 = 128.66 (76)

East 0.9x 0.77 x 2.47 x 94.68 x 0.56 x 0.8 = 72.6 (76)

East 0.9x 0.77 x 3.76 x 94.68 x 0.56 x 0.8 = 110.52 (76)

East 0.9x 0.77 x 2.47 x 73.59 x 0.56 x 0.8 = 56.43 (76)

East 0.9x 0.77 x 3.76 x 73.59 x 0.56 x 0.8 = 85.9 (76)

East 0.9x 0.77 x 2.47 x 45.59 x 0.56 x 0.8 = 34.96 (76)

East 0.9x 0.77 x 3.76 x 45.59 x 0.56 x 0.8 = 53.22 (76)

East 0.9x 0.77 x 2.47 x 24.49 x 0.56 x 0.8 = 18.78 (76)

East 0.9x 0.77 x 3.76 x 24.49 x 0.56 x 0.8 = 28.59 (76)

East 0.9x 0.77 x 2.47 x 16.15 x 0.56 x 0.8 = 12.39 (76)

East 0.9x 0.77 x 3.76 x 16.15 x 0.56 x 0.8 = 18.85 (76)

West 0.9x 0.77 x 3.76 x 19.64 x 0.56 x 0.8 = 22.93 (80)

West 0.9x 0.77 x 3.76 x 38.42 x 0.56 x 0.8 = 44.85 (80)

West 0.9x 0.77 x 3.76 x 63.27 x 0.56 x 0.8 = 73.86 (80)

West 0.9x 0.77 x 3.76 x 92.28 x 0.56 x 0.8 = 107.72 (80)

West 0.9x 0.77 x 3.76 x 113.09 x 0.56 x 0.8 = 132.02 (80)

West 0.9x 0.77 x 3.76 x 115.77 x 0.56 x 0.8 = 135.14 (80)

West 0.9x 0.77 x 3.76 x 110.22 x 0.56 x 0.8 = 128.66 (80)

West 0.9x 0.77 x 3.76 x 94.68 x 0.56 x 0.8 = 110.52 (80)

West 0.9x 0.77 x 3.76 x 73.59 x 0.56 x 0.8 = 85.9 (80)

West 0.9x 0.77 x 3.76 x 45.59 x 0.56 x 0.8 = 53.22 (80)

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West	0.9x	0.77	x	3.76	x	24.49	x	0.56	x	0.8	=	28.59	(80)
West	0.9x	0.77	x	3.76	x	16.15	x	0.56	x	0.8	=	18.85	(80)

Solar gains in watts, calculated for each month													(83)m = Sum(74)m , (82)m	
(83)m=	79.73	155.12	257.35	384.36	482.98	500.61	474	398.49	301.71	184.2	99.17	65.78		(83)
Total gains – internal and solar (84)m = (73)m + (83)m , watts														
(84)m=	496.26	569.62	658.09	764.47	841.53	838.34	798.17	728.52	642.62	546.56	486.18	471.28		(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (°C)

Utilisation factor for gains for living area, h1,m (see Table 9a)

Utilisation factor for gains for living area, $U_{l,m}$ (see Table 9a)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(86) $m=$	0.95	0.92	0.86	0.73	0.57	0.4	0.3	0.34	0.55	0.8	0.92	0.96

Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)

(87)m=	19.68	19.93	20.3	20.69	20.9	20.98	20.99	20.99	20.93	20.63	20.11	19.66	(87)
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Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)

(88)m=	20.3	20.31	20.31	20.32	20.33	20.34	20.34	20.35	20.34	20.33	20.32	20.32	(88)
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Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)

(89)m=	0.94	0.91	0.84	0.7	0.53	0.36	0.25	0.29	0.5	0.78	0.91	0.95	(89)
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Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)

(90)m=	18.52	18.88	19.39	19.94	20.21	20.32	20.34	20.34	20.27	19.87	19.14	18.49	(90)
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fLA = Living area - (4) = 0.34 (91)

Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 – fLA) × T2

(92)m=	18.92	19.24	19.7	20.2	20.45	20.55	20.57	20.56	20.5	20.13	19.48	18.89	(92)
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Apply adjustment to the mean internal temperature from Table 4e, where appropriate

(93)m=	18.92	19.24	19.7	20.2	20.45	20.55	20.57	20.56	20.5	20.13	19.48	18.89	(93)
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8. Space heating requirement

Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate the utilisation factor for gains using Table 9a

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
--	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Utilisation factor for gains, hm:

(94)m=	0.93	0.89	0.83	0.7	0.54	0.38	0.27	0.3	0.51	0.77	0.89	0.94	(94)
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Useful gains, hmGm, W = (94)m x (84)m

(95)m=	460.79	509.71	545.04	534.92	453.69	315.27	212.88	221.74	330.6	419.99	434.9	441.53	(95)
--------	--------	--------	--------	--------	--------	--------	--------	--------	-------	--------	-------	--------	------

Monthly average external temperature from Table 8

(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)
--------	-----	-----	-----	-----	------	------	------	------	------	------	-----	-----	------

Heat loss rate for mean internal temperature, Lm, W = [(39)m x (93)m – (96)m]

(97)m=	841.69	821.42	752.8	628.65	484.4	321.27	214.16	223.79	349.09	527.9	692.08	829.56	(97)
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Space heating requirement for each month, kWh/month = 0.024 x [(97)m – (95)m] x (41)m

(98)m=	283.39	209.47	154.57	67.49	22.85	0	0	0	0	80.28	185.17	288.7	(98)
--------	--------	--------	--------	-------	-------	---	---	---	---	-------	--------	-------	------

Total per year (kWh/year) = Sum(98)... (98) = 1291.9 (98)

Space heating requirement in kWh/m²/year

(99)	16.67	(99)
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9b. Energy requirements – Community heating scheme

This part is used for space heating, space cooling or water heating provided by a community scheme.

DER WorkSheet: New dwelling design stage

Fraction of space heat from secondary/supplementary heating (Table 11) '0' if none

Fraction of space heat from community system 1 – (301) =

The community scheme may obtain heat from several sources. The procedure allows for CHP and up to four other heat sources; the latter includes boilers, heat pumps, geothermal and waste heat from power stations. See Appendix C.

Fraction of heat from Community heat pump

Fraction of total space heat from Community heat pump (302) x (303a) =

Factor for control and charging method (Table 4c(3)) for community heating system

Distribution loss factor (Table 12c) for community heating system

Space heating

Annual space heating requirement

Space heat from Community heat pump (98) x (304a) x (305) x (306) =

Efficiency of secondary/supplementary heating system in % (from Table 4a or Appendix E)

Space heating requirement from secondary/supplementary system (98) x (301) x 100 ÷ (308) =

Water heating

Annual water heating requirement

If DHW from community scheme:

Water heat from Community heat pump (64) x (303a) x (305) x (306) =

Electricity used for heat distribution 0.01 x [(307a)...(307e) + (310a)...(310e)] =

Cooling System Energy Efficiency Ratio

Space cooling (if there is a fixed cooling system, if not enter 0) = (107) – (314) =

Electricity for pumps and fans within dwelling (Table 4f):

mechanical ventilation – balanced, extract or positive input from outside

warm air heating system fans

pump for solar water heating

Total electricity for the above, kWh/year = (330a) + (330b) + (330g) =

Energy for lighting (calculated in Appendix L)

Total delivered energy for all uses (307) + (309) + (310) + (312) + (315) + (331) + (332)...(237b) =

12b. CO2 Emissions – Community heating scheme

CO2 from other sources of space and water heating (not CHP)

Efficiency of heat source 1 (%) If there is CHP using two fuels repeat (363) to (366) for the second fuel

CO2 associated with heat source 1 [(307b)+(310b)] x 100 ÷ (367b) x

Electrical energy for heat distribution [(313) x

Total CO2 associated with community systems (363)...(366) + (368)...(372)

CO2 associated with space heating (secondary) (309) x

CO2 associated with water from immersion heater or instantaneous heater (312) x

Total CO2 associated with space and water heating (373) + (374) + (375) =

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

CO2 associated with heat source 1

Electrical energy for heat distribution

Total CO2 associated with community systems

CO2 associated with space heating (secondary)

CO2 associated with water from immersion heater or instantaneous heater

Total CO2 associated with space and water heating

CO2 associated with space heating (not CHP)

Efficiency of heat source 1 (%)

DER WorkSheet: New dwelling design stage

CO2 associated with electricity for pumps and fans within dwelling (331)) x	0.52	=	102.74	(378)
CO2 associated with electricity for lighting (332))) x	0.52	=	174.98	(379)
Energy saving/generation technologies (333) to (334) as applicable Item 1	0.52	x 0.01 =	0	(380)
Total CO2, kg/year sum of (376) ... (382) =			927.45	(383)
Dwelling CO2 Emission Rate (383) ÷ (4) =			11.97	(384)
EI rating (section 14)			89.85	(385)

DRAFT

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Omega B Be Green

As designed

Date: Wed Apr 27 14:39:09 2022

Administrative information

Building Details

Address: Hermitage Road, Haringey, London, N4 1NA

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: Pete Jeavons

Telephone number: -

Address: -, London, -

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	13
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	13
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	8
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _o Limit	U _o Calc	U _i Calc	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	"B0000000_W1"
Floor	0.25	0.15	0.15	"B0000000_F"
Roof	0.25	0.11	0.11	"B0000000_C"
Windows***, roof windows, and rooflights	2.2	1.3	1.3	"L0000002_W1_O0"
Personnel doors	2.2	1.6	1.6	"L000000E_W1_O4"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"
U _o Limit = Limiting area-weighted average U-values [W/(m ² K)]			U _i Calc = Calculated maximum individual element U-values [W/(m ² K)]	
U _o Calc = Calculated area-weighted average U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs.				
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.				
*** Display windows and similar glazing are excluded from the U-value check.				
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Split system

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	5.5	-	-	-
Standard value	2.5*	2.6	N/A	N/A	N/A

Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system

YES

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

1- SYST0002-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
Photography Studio_B01	-	1.1	-	-	-	-	-	-	-	-	-	N/A
Commercial B_B01	-	1.1	-	-	-	-	-	-	-	-	-	N/A
Commercial A_B01	-	1.1	-	-	-	-	-	-	-	-	-	N/A
Commercial 01_L00	-	1.1	-	-	-	-	-	-	-	-	-	N/A
Commercial 04_L00	-	1.1	-	-	-	-	-	-	-	-	-	N/A
Commercial Unit 06_L00	-	1.1	-	-	-	-	-	-	-	-	-	N/A
Commercial 03_L00	-	1.1	-	-	-	-	-	-	-	-	-	N/A
Commercial_07_L01	-	1.1	-	-	-	-	-	-	-	-	-	N/A
Commercial_08_L01	-	1.1	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting

		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
Plant Room_B01		110	-	-	256
Photography Studio_B01		110	-	-	170

General lighting and display lighting

		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
WC_B01	-	-	110	-	96
WC_B01	-	-	110	-	99
Stairs D_B01	-	-	110	-	40
Resi Lobby_B01	-	-	110	-	52
Stairs C_B01	-	-	110	-	37
Resi Bin Store B_B01	-	-	110	-	73
Commercial B_B01	110	-	-	-	498
Commercial Circulation_B01	-	-	110	-	111
Lift B_B01	-	-	110	-	44
Lightwell_B01	-	-	110	-	26
Lightwell_B01	-	-	110	-	36
Commercial A_B01	110	-	-	-	419
WC_B01	-	-	110	-	22
Kitchen_B01	-	-	110	-	175
Stairs B_B01	-	-	110	-	38
Car Park_B01	-	-	110	-	714
Lift A_B01	-	-	110	-	30
Resi Bin Store A_B01	-	-	110	-	76
Stairs A_B01	-	-	110	-	40
Commercial Bin Store_B01	-	-	110	-	75
Lobby_B01	-	-	110	-	32
Resi Reception Office_L00	-	-	110	-	32
Commercial 01_L00	110	-	-	-	231
Commercial 04_L00	110	-	-	-	446
Stairs B_L00	-	-	110	-	30
Commercial Lift_L00	-	-	110	-	18
Stairs C_L00	-	-	110	-	33
Commercial Unit 06_L00	110	-	-	-	603
Stairs D_L00	-	-	110	-	27
WC_L00	-	-	110	-	49
Resi Circulation_L00	-	-	110	-	187
WC_L00	-	-	110	-	40
Good Lift_L00	-	-	110	-	24
Kitchen Cafe_L00	-	-	110	-	50
Commercial 03_L00	110	-	-	-	393
WC Cafe_L00	-	-	110	-	47
Cycle Store_L00	-	-	110	-	67
Stairs/Lifts A_L00	110	-	-	-	111
WC_L00	-	-	110	-	95
Commercial Foyer_L00	-	-	110	-	239
Stairs C_L01	-	-	110	-	23
Commercial Lift_L01	-	-	110	-	27
Goods Lift_L01	-	-	110	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
Stairs B_L01	-	-	110	-	34
WC_L01	-	-	110	-	73
Kitchen_L01	-	-	110	-	211
Commercial_07_L01	110	-	-	-	486
Commercial_08_L01	110	-	-	-	450
Commercial_L01_circulation	110	-	-	-	316

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Plant Room_B01	N/A	N/A
Photography Studio_B01	N/A	N/A
WC_B01	N/A	N/A
WC_B01	N/A	N/A
Stairs D_B01	N/A	N/A
Resi Lobby_B01	N/A	N/A
Stairs C_B01	N/A	N/A
Resi Bin Store B_B01	N/A	N/A
Commercial B_B01	N/A	N/A
Commercial Circulation_B01	N/A	N/A
Lift B_B01	N/A	N/A
Lightwell_B01	N/A	N/A
Lightwell_B01	N/A	N/A
Commercial A_B01	N/A	N/A
WC_B01	N/A	N/A
Kitchen_B01	N/A	N/A
Stairs B_B01	N/A	N/A
Car Park_B01	N/A	N/A
Lift A_B01	N/A	N/A
Resi Bin Store A_B01	N/A	N/A
Stairs A_B01	N/A	N/A
Commercial Bin Store_B01	N/A	N/A
Lobby_B01	N/A	N/A
Resi Reception Office_L00	YES (+10.8%)	NO
Commercial 01_L00	NO (-24.7%)	NO
Commercial 04_L00	NO (-23.1%)	NO
Stairs B_L00	N/A	N/A
Commercial Lift_L00	N/A	N/A
Stairs C_L00	N/A	N/A
Commercial Unit 06_L00	NO (-50%)	NO
Stairs D_L00	N/A	N/A
WC_L00	N/A	N/A
Resi Circulation_L00	NO (-40.4%)	NO
WC_L00	N/A	N/A

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Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Good Lift_L00	N/A	N/A
Kitchen Cafe_L00	N/A	N/A
Commercial 03_L00	NO (-51.7%)	NO
WC Cafe_L00	NO (-30.5%)	NO
Cycle Store_L00	NO (-72.1%)	NO
Stairs/Lifts A_L00	NO (-17.7%)	NO
WC_L00	N/A	N/A
Commercial Foyer_L00	NO (-57.1%)	NO
Stairs C_L01	N/A	N/A
Commercial Lift_L01	N/A	N/A
Goods Lift_L01	N/A	N/A
Stairs B_L01	N/A	N/A
WC_L01	N/A	N/A
Kitchen_L01	NO (-48%)	NO
Commercial_07_L01	YES (+14.2%)	NO
Commercial_08_L01	NO (-90.7%)	NO
Commercial_L01_circulation	NO (-93.1%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

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Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	2450.5	2450.5		A1/A2 Retail/Financial and Professional services A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
External area [m ²]	3200.6	3200.6	100	B1 Offices and Workshop businesses
Weather	LON	LON		B2 to B7 General Industrial and Special Industrial Groups B8 Storage or Distribution
Infiltration [m ³ /hm ² @ 50Pa]	3	4		C1 Hotels
Average conductance [W/K]	801.23	1121.99		C2 Residential Institutions: Hospitals and Care Homes C2 Residential Institutions: Residential schools C2 Residential Institutions: Universities and colleges C2A Secure Residential Institutions
Average U-value [W/m ² K]	0.25	0.35		Residential spaces
Alpha value* [%]	23.5	25.7		D1 Non-residential Institutions: Community/Day Centre D1 Non-residential Institutions: Libraries, Museums, and Galleries D1 Non-residential Institutions: Education D1 Non-residential Institutions: Primary Health Care Building D1 Non-residential Institutions: Crown and County Courts D2 General Assembly and Leisure, Night Clubs, and Theatres Others: Passenger terminals Others: Emergency services Others: Miscellaneous 24hr activities Others: Car Parks 24 hrs Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.47	6.04
Cooling	2.43	3.7
Auxiliary	0.64	0.4
Lighting	7.39	14.46
Hot water	1.48	1.72
Equipment*	20.17	20.17
TOTAL**	15.42	26.31

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	91.19	100.74
Primary energy* [kWh/m ²]	47.33	75.52
Total emissions [kg/m ²]	8	13

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type	Heat dem MJ/m ²	Cool dem MJ/m ²	Heat con kWh/m ²	Cool con kWh/m ²	Aux con kWh/m ²	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	55.2	36	3.5	2.4	0.6	4.41	4.11	4.5	5.5
Notional	52.8	47.9	6	3.7	0.4	2.43	3.6	---	---

Key to terms

Heat dem [MJ/m ²]	= Heating energy demand
Cool dem [MJ/m ²]	= Cooling energy demand
Heat con [kWh/m ²]	= Heating energy consumption
Cool con [kWh/m ²]	= Cooling energy consumption
Aux con [kWh/m ²]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i,Typ}	U _{i,Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	"B0000000_W1"
Floor	0.2	0.15	"B0000000_F"
Roof	0.15	0.11	"B0000000_C"
Windows, roof windows, and rooflights	1.5	1.3	"L0000002_W1_O0"
Personnel doors	1.5	1.6	"L0000000E_W1_O4"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"
U _{i,Typ} = Typical individual element U-values [W/(m²K)]			U _{i,Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3

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