WGBC Net Zero Carbon report for the period Jan – Dec 2024

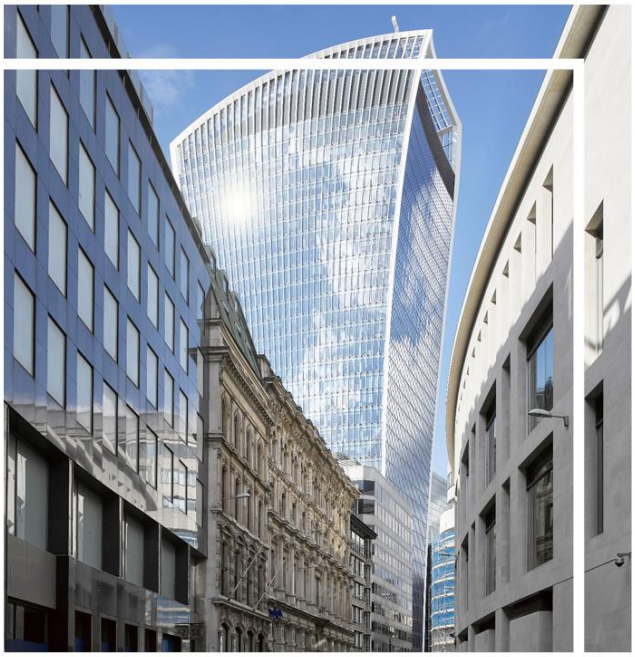
HM NET ZERO CARBON ASSESSMENT

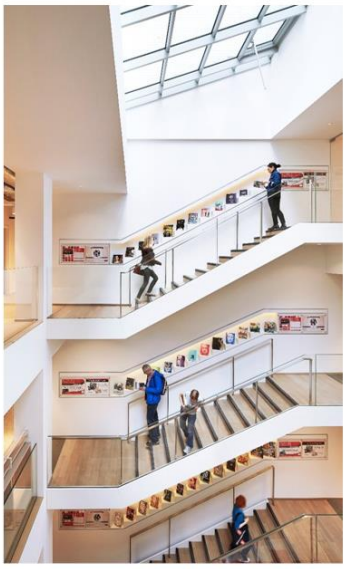
HILSON MORAN

17 December 2025

12345-HML-XX-XX-RP-X-000003

Issue 02





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Issue	Date	Details
01	25/9/2025	ISSUE FOR COMMENT
02	17/12/2025	COMMENTS INCORPORATED FROM GREENLY

Contents

1. Introduction

1.1. Background

Hilson Moran (HM) is an environmental engineering consultancy working on numerous high-profile projects in the UK and around the world. HM provide consultancy on building services, sustainability, energy performance and certification as well as providing consultancy on operational buildings.

On the 30th June 2021, HM joined the WGBC Net Zero Carbon Commitment. Signing the Commitment is the latest step in Hilson Moran's response to the ongoing Climate and Biodiversity Emergency, following the launch of our Climate Manifesto in April 2021.

The Net Zero Carbon Buildings Commitment is developed to recognise and promote advanced climate leadership action from businesses, organisations, cities and subnational governments in decarbonising the built environment, to inspire others to take similar action and remove barriers to implementation.

Since signing up to the commitment our carbon footprint has fallen by around 63% as shown in Figure 1. This is primarily due to moving to a smaller office in Farnborough, upgrading and moving to a new floor in the London office, and partly the impact of hybrid working.

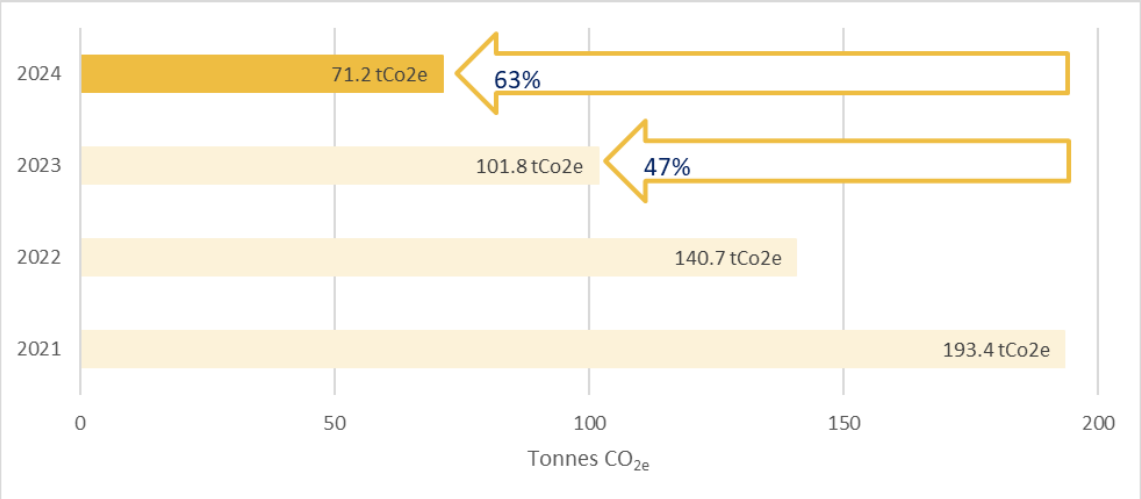


Figure 1 HM Carbon Footprint

1.2. Purpose

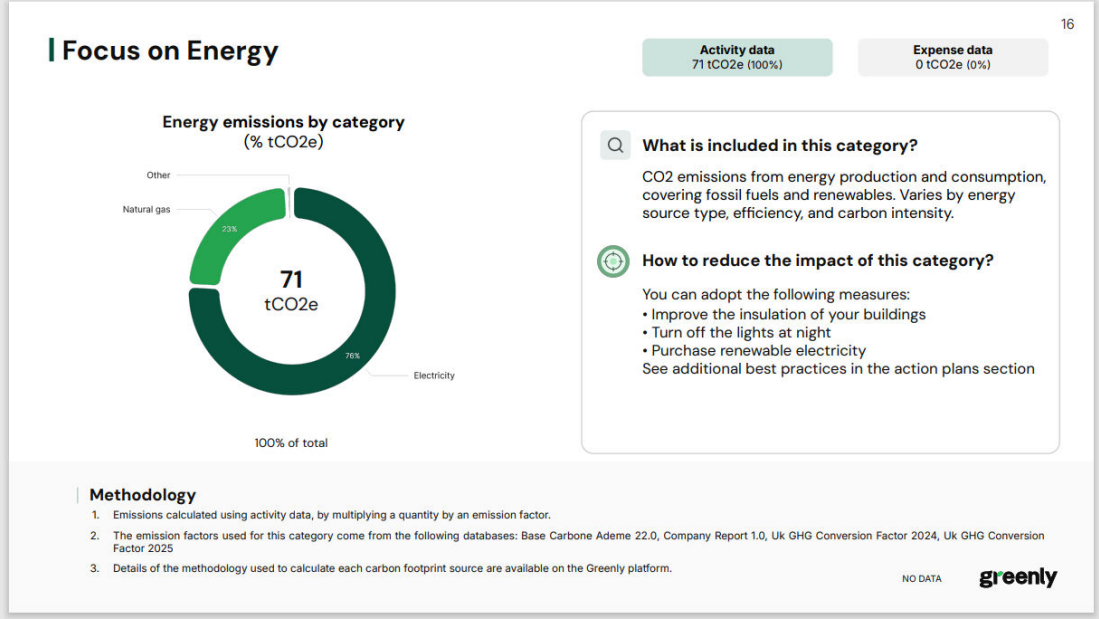
The report assesses the annual operational energy demand and carbon emissions for all our offices, in line with the requirements of the WGBC Net Zero Carbon Commitment.

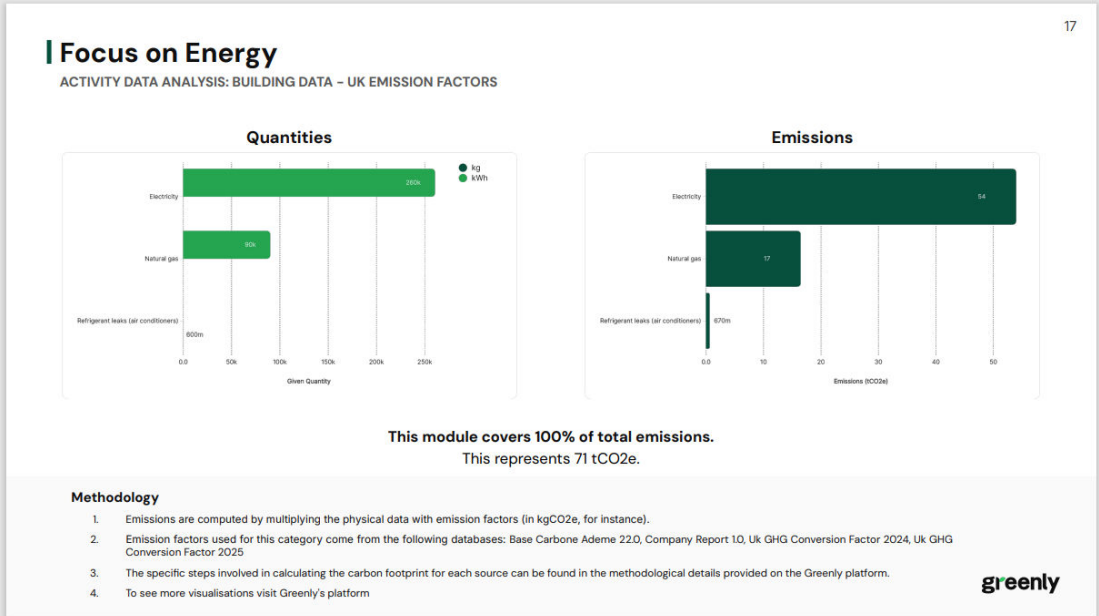
1.3. Structure

Following this introductory section, Section 2 describes the offices occupied by HM. Section 3 sets out the assessment methodology. Section 4 assesses HM energy and carbon emissions for 2024.

1.4. Independent Verification

This report has been independently verified by Greenly. Greenly is a carbon management platform that helps companies measure, reduce, report, and offset their carbon emissions. Greenly also offers a range of services such as carbon accounting, life cycle assessment. Below are screenshots of pages 16 and 17 from their report dated 4/11/25.





2. HM Offices

During 2024, HM leased office space in the following locations:

- London 3rd floor, Shackleton House, London Bridge, London up until May 2024 and then moved to London 2nd floor within the same building
- Farnborough The Hub, Farnborough Business Park, Hampshire
- Manchester 7th Floor, Neo, Manchester
- Cambridge Nine Hills Road, Cambridge

Table 1 Office data

	Floor area	Staff (FTE)	Notes
London (3rd flr) London (2nd flr)	1,199 m² 1,208 m²	123.4	Leased office (from Jan – May) Leased office (from May – December)
Farnborough	215 m²	53.5	Space within a serviced office
Manchester	263 m²	28.3	Leased office
Cambridge	Circa 9.5m²	2 desks	2 out of 18 desks within serviced office (82.5m²)

In line with the WGBC convention the Cambridge office has been excluded from this assessment as this is a small, serviced office. See the Appendices for more details on each office.

3. Basis of carbon footprint assessment

3.1. Floor areas

Floor areas are based on areas contained within our leasing information.

3.2. Energy Data

In line with WGBC, the measurement methodology for each office is as follows:

Table 2 Measurement Methodology

	London	Farnborough	Manchester
Tenants Electricity	AMR[1]	RBD [4]	AMR [2]
Heating	WBD [3]	RBD [4]	AMR [2]
Cooling	RBD[5]	RBD [4]	

AMR = Actual Meter readings, WBD = Whole Building Data, RBD = Regional Building Data

1. *Monthly meter readings taken for each office. The meters are read manually and entered into the HM Master Utility Spreadsheet.*
2. *Monthly meter readings taken by our landlord and forwarded to us before being entered into the HM Master Utility Spreadsheet.*
3. *The Landlord has assessed the heating energy in kWh for each month for our London office for 2023.*
4. *See Section 3.2.1 for details*

3.2.1. Regional Building Data

The regional building data for the London office cooling has been derived from Section 20.3 of CIBSE Guide F (2012). This sets out delivered energy use for good practice and typical offices for four office types:

- Type 1: cellular naturally ventilated
- Type 2: open plan naturally ventilated
- Type 3: 'standard' air conditioned
- Type 4: 'prestige' air conditioned

The London office is likely to be classified as either Type 3 or 4. This assessment is based on the office being classed as 'Type 4 – typical' as a worst-case assessment of the energy demand.

Table 3 CIBSE Guide F – Cooling delivered energy

	Good practice (kWh/m²)	Typical (kWh/m²)
Type 3: 'standard' air conditioned	14	31
Type 4: 'prestige' air conditioned	21	**41**

No energy data is available for The Hub in Farnborough. It is proposed to use CIBSE Guide F benchmark for a typical Type 3 office as a worst case in energy performance.

Table 4 CIBSE Guide F – Gas and Electricity Benchmarks

	Good practice (kWh/m²)	Typical (kWh/m²)
Type 3: 'standard' air conditioned Gas	97	178
Type 3: 'standard' air conditioned Elec	128	226

3.3. Fugitive Emissions from refrigerant systems

A small split DX systems are used to cool the server rooms within the London office. The leakage of refrigerant gas from these systems has been estimated using guidance from the EPA Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression, and Industrial Gases (2014) where:

Emissions from operation = C * (x/100) * T

Where: C = refrigerant capacity

X = Annual leakage rate in percent of capacity

T = Time of year system during reporting period

Table 3 of the EPA guidance suggests that 10% is a suitable leakage rate for residential and commercial AC including heat pumps from 0.5 – 100kg.

Table 5 Server room split DX systems

	Refrigerant type	Refrigerant charge (C)	Leakage (X)	Usage (T)	Leakage
London (3rd flr)	R410A	5.0 kg	10%	42%	0.21 kg
London (2nd flr)	R32	6.7 kg	10%	58%	0.39 kg

3.4. Carbon Factors

Conversion factors for natural gas and mains electricity have been taken from the UK Government GHG Conversion Factors for Company Reporting for 2024.

Table 6 CO_2 Conversion Factors

Electricity generated	0.20705 $kgCO_2e/kWh$
Natural Gas (kWh gross CV)	0.18290 $kgCO_2e/kWh$
(R410a)	1924 $kgCO_2/kg$
Refrigerants (R32)	677 $kgCO_2/kg$

4. Energy Consumption and Carbon Emissions

The energy and carbon emissions for the Farnborough, London and Manchester offices is set out below:

Table 7 Energy Consumption

	Gas	Electricity	Gas	Electricity
	kWh	kWh	kWh/m²	kWh/m²
London	52,063	173,936	43	144
Farnborough	38,285	48,590	178	226
Manchester		38,373		146
Total	**90,348**	**260,899**		

Table 8 Carbon emissions

	Gas	Electricity	Gas	Electricity
	$kgCO_2e$	$kgCO_2e$	$kgCO_2e$ /m²	$kgCO_2e$ /m²
London	9,522	36,014	8	30
Farnborough	7,002	10,061	33	47
Manchester		7,945		30
Total	**16,525**	**54,019**		

Table 9 WGBC reporting

	Gas	Electricity	Scope 1[1]	Scope 2
	MWh	MWh	tCO_2e	tCO_2e
Overall	90.4	222.5	17.1	54

1 Scope 1 includes gas and fugitive emissions

Table 10 Fugitive emissions

	Leakage	Emissions
	$kgCO_2e$	tCO_2e
Refrigerant leaks	677	0.7

More detailed information for each office can be found in the appendices.

Appendix 1 - London Office

The Shackleton House office is located within Hays Galleria in London Bridge. It is understood that the buildings were originally warehouses that were converted to offices in the 1980's. The Hays Galleria is a Grade II listed structure.

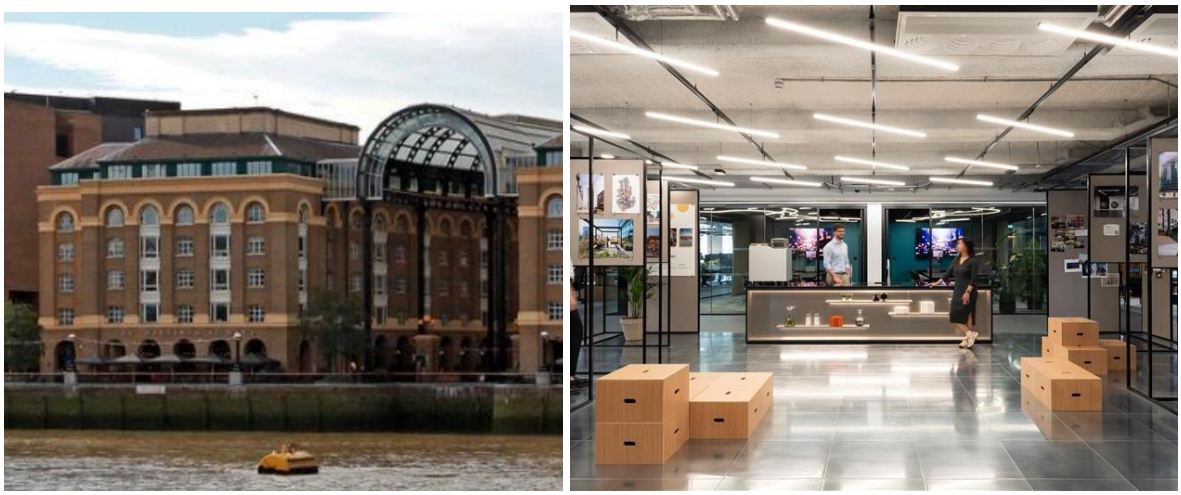


Figure 2 Images of Shackleton House

HM has occupied the 3rd floor since 2005. In May 2024, after renovations were completed, HM moved to the 2nd floor, now known as the 'Living Lab'. This office space is designed to test systems and optimizations, allowing us to learn and improve within our own environment. The move occurred five months into the current reporting year. During the initial months of occupation, HM experienced metering issues on the second floor (from June 2024 through to the end of the reporting year). For this reason, reference is made to the estimated reading calculations provided in Appendix 4.

Table 11 Key Facts

Owned or leased	Leased	
Leased area	3rd floor = 1,199 m² (from Jan – May 2024) 2nd floor= 1,208m2 (from May onwards)	
Tenants Electricity	Recharged via landlord	Read manually by HM (recently have gained access to the optimised platform)
Heating	Communal gas boilers. Mikrofil Ethos 350 Gas boilers (Seasonal efficiency = 95.6%)	Energy usage for our floor area calculated by landlord
Cooling	Communal Chillers Daikin Chiller DWSC087L (COP @100% = 6.243)	No energy data available

On floor	Fan Coil units	
Lighting	LED to all areas	Lighting power density = 4.5W/m² - floor 2
EPC	B (38) – floor 2	247-0830-4457-2794-0909 Valid until 28 October 2034
Green certification	Floor 2 has obtained BREEAM excellent	

Table 12 sets out the energy data for the London office.

Table 12 London Energy Data

	Tenants Electricity Meter kWH	Tenancy Electricity Consumption kWh	Tenancy Gas Consumption kWh	Tenancy Cooling Energy kWh
04/01/2024	1,452,936 A	17,447 A	8,144 A	3,688 R
05/02/2024	1,470,383 A	15,185 A	5,826 A	3,061 R
02/03/2024	1,485,568 E	15,185 A	5,704 A	3,610 R
09/04/2024	1,500,752 A	17,481 A	4,703 A	4,145 R
24/05/2024	1,518,233 A	7,389 E	3,461 A	4,566 R
01/06/2024	7,389 E*	7,389 E	4,066 A	4,372 R
01/07/2024	7,389 E*	7,389 E	2,902 A	7,166 R
01/08/2024	7,389 E*	7,389 E	3,162 A	3,840 R
01/09/2024	7,389 E*	7,389 E	2,559 A	4,136 R
01/10/2024	7,389 E*	7,389 E	2,916 A	4,059 R
01/11/2024	7,389 E*	7,389 E	3,752 A	3,373 R
01/12/2024	7,389 E*	7,389 E	4,868 A	3,513 R
Totals (kWh)	**7,479,595**	**124,409**	**52,063**	**49,528**
Totals (kWh/m²)	**6,192**	**103.0**	**43.1**	**41.0**

A = actual reading, E = estimated reading*, R = based on regional building data (See Section 3.2.1)

*For reference to the estimated reading calculations, please see Appendix 1.

The office energy performance sits between CIBSE Guide F typical and good practice.

Figure 3 Energy usage compared against CIBSE Guide F benchmarks

Appendix 2 - Farnborough Office

The Farnborough office is located in the Hub, Fowler Avenue, Farnborough Business Park, Farnborough. The building was constructed in the late 1930's and was originally an airport departures lounge and control tower. The building has been completely renovated, with HM leasing part of the 1st floor from Regus.

Figure 4 Image of The Hub

HM have occupied this building since October 2022.

Table 13 Key Facts

Owned or leased	Leased	
Leased area	Part of 1st floor = 215 m²	
Tenants Electricity	Not known	
Heating	Communal gas boilers.	
Cooling	Communal Chillers.	
On floor	4 pipe fan coil units	
Lighting	LED lighting to all areas	
EPC	D (89)	9494-3077-0517-0800-3921 Valid until 9/6/29
Green certification	BREEAM In Use 55.3% Very Good	BIU00005549-1.0 Valid until 14/8/23

As no energy data is available from our Landlord, energy usage is based on CIBSE Guide F benchmarks for a Typical Practice Type 3 air conditioned office. This is very much considered to be a

worst-case scenario. See section 3.2.1 for more details. Table 14 sets out the energy data for The Hub.

Table 14 The Hub Energy Data

	Tenants gas consumption kWh	Tenants Electricity consumption kWh
01/01/2024	5,835 R	4,049 R
01/02/2024	5,191 R	4,049 R
01/03/2024	4,797 R	4,049 R
01/04/2024	3,510 R	4,049 R
01/05/2024	2,384 R	4,049 R
01/06/2024	1,185 R	4,049 R
01/07/2024	673 R	4,049 R
01/08/2024	760 R	4,049 R
01/09/2024	1,389 R	4,049 R
01/10/2024	2,691 R	4,049 R
01/11/2024	4,329 R	4,049 R
01/12/2024	5,542 R	4,049 R
Totals (kWh)	**38,285**	**48,590**
Totals (kWh/m²)	**178**	**226**

A = actual reading, E = estimated reading, R = based on regional building data (See Section 3.2.1)

Appendix 3 - Manchester Office

The Manchester office is located on the 5th floor of the Neo Building in Piccadilly, Manchester.

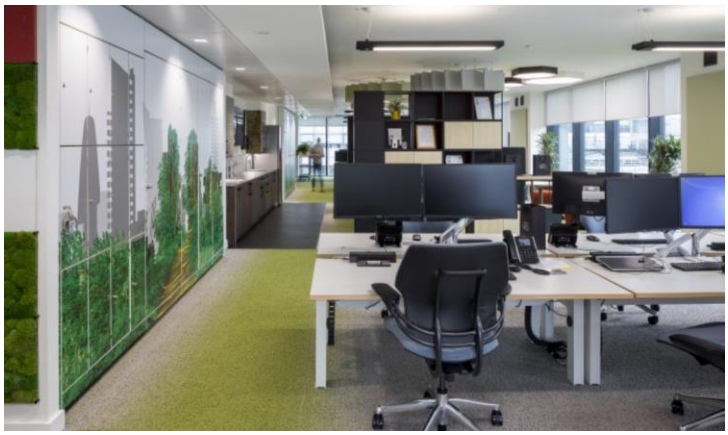



Figure 5 Images of Neo

HM have occupied this building since 2017. HM were involved in the base build renovation works and designed the fitout for our floor. This office is certified to the Well Gold standard.

Table 15 Key Facts

Owned or leased	Leased	
Leased area	Part of 5th Floor = 263 m²	
Tenants Electricity	Direct contract	Tenants elec meter read by landlord
Heating	VRF	Condenser elec meter read by landlord
Cooling	VRF	
On floor	VRF	
Lighting	LED lighting to all areas	
EPC	B (49)	0240-3907-0303-2471-4070 Valid until 1/8/27
Green certification		

Table 16 sets out the energy data for the Manchester office.

Table 16 Manchester Energy Data

	Tenants electricity meter kWh	Tenants electricity kWh	Tenants Condenser Meter kWh	Tenants Condenser kWh
01/01/2024	150,117 A	2,566	114,954 A	1,594
01/02/2024	152,683 A	1,861	116,547 A	1,199
01/03/2024	154,543 A	2,477	117,746 A	946
01/04/2024	157,020 A	1,918	118,692 A	898
01/05/2024	158,938 A	2,376	119,590 A	463
01/06/2024	161,314 A	2,289	120,053 A	372
01/07/2024	163,603 A	2,411	120,425 A	421
01/08/2024	166,013 A	2,304	120,846 A	639
01/09/2024	168,317 A	2,428	121,485 A	743
01/10/2024	170,745 A	2,172	122,228 A	1,288
01/11/2024	172,917 A	2,070	123,516 A	1,436
01/12/2024	174,986 A	2,070	124,952 A	1,436
01/01/2025	177,056 A		126,388 A	
Totals (kWh)		**26,939**		**11,434**
Totals (kWh/m^2)		**102.4**		**43.5**

A = actual reading, E = estimated reading, R = based on regional building data (See Section 3.2.1)

The office energy performance is better than CIBSE Guide F good practice.

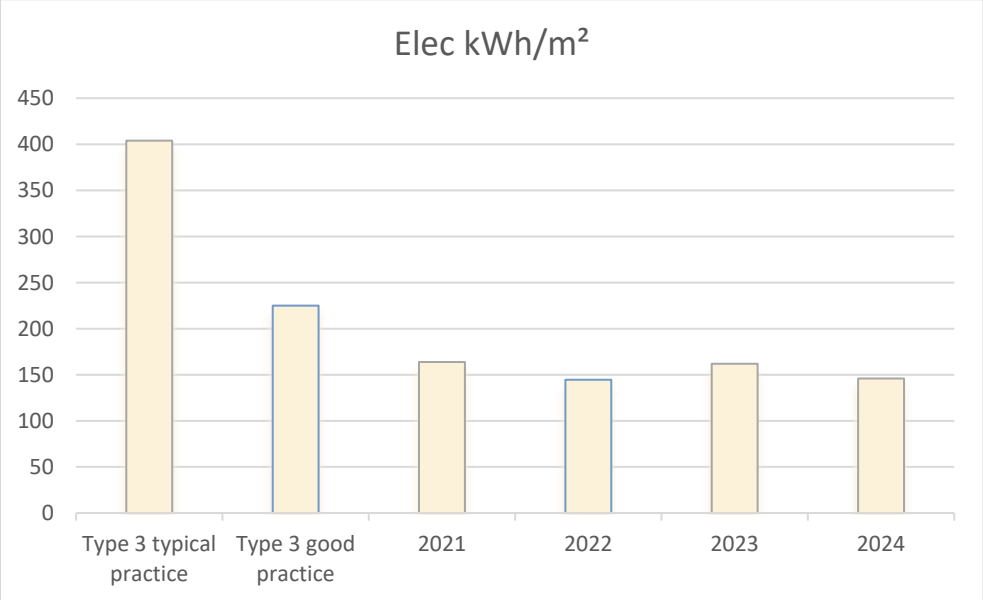


Figure 6 Electricity usage compared against CIBSE Guide F benchmarks

Appendix 4 – Living Lab Energy Estimate

MEMO

TO:	John Deasy
CC:	Dawn King, Tony Mayo; Anna Tsoumi, Vince Ugarow
FROM:	Steve Johnson
DATE:	19/12/2024
FILE REF:	241217 Living Lab energy assessment
SUBJECT:	Analysis of Energy usage for the Living Lab

1. Introduction

We took possession of the Living Lab in early May 2024 and officially opened the office on the 20th May 2024. Due to issues with the landlords metering system, we do not have reliable meter readings for most of 2024.

In order to prepare our energy and carbon reporting for the WGBC Net Zero Building commitment, we need to make an assessment of our energy usage. This paper sets out the proposed approach for assessing our energy usage.

2. Meters

2.1. Electrical Meters

The 2nd floor has the following electrical meters:

- Block A DB/A1/T/2/P1 Total
    - Block A DB/A1/T/2/P1 Lighting (Not working)
    - Block A DB/A1/T/2/P1 Mechanical
- Block A DB/A1/T/2/P2 Total (Low Level Power)
    - Block A DB/A1/T/2/P2 Bottom Section (Not used)
    - Block A DB/A1/T/2/P2 Top Section
- Block A DB/A1/T/2/PDU Total

The landlord has provided a remote meter reading system from Optimised Energy. The Optimised Energy website is showing reliable data for the above meters from the 1/10/24. Prior to this date, there is only data for the low-level power and the PDU meters (although there are many missing days). See Appendix A for printouts from Optimised Energy.

Manual readings have also been taken on the 10/10/24, 19/11/24 and 3/12/24. It is understood that meter readings were taken on the date of PC, but these cannot be found.

2.2. Heat meters

The 2nd floor heating and cooling PHX's are fitted with heat meters. Currently we have no visibility of these meters.

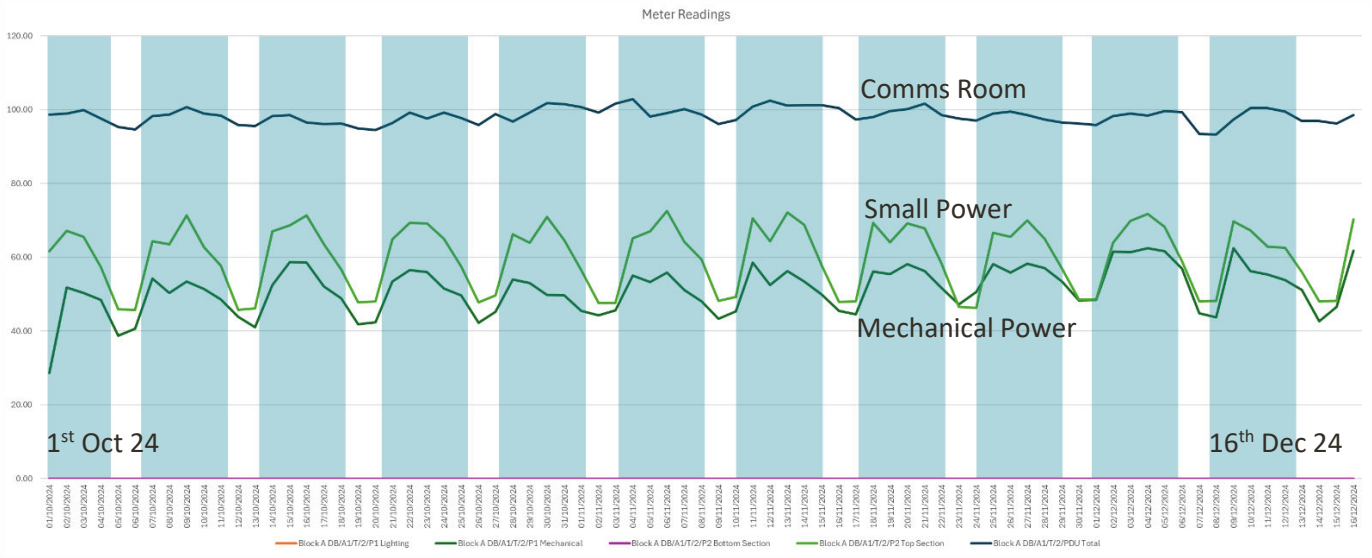
2.3. Gas meter

Since 2021, the landlord has provided monthly gas consumption apportioned to our office. This is normally issued to us in the 1st or 2nd quarter of each year.

3. Estimate of Energy Consumption

3.1. Metered data

The daily electricity meter readings have been extracted from the Optimised website for the period from the 1st October to the 16th December. It can be seen from the graph below that the weekly readings are reasonably consistent. It is anticipated that these loads are reasonably consistent throughout the year.



The Optimised daily readings have been checked against our manual readings and provides a good correlation. The slight differences are due to the times of day the manual readings were taken.

	Optimised 10/10/24 – 2/12/24	Optimised 11/10/24 – 3/12/24	HM Manual Readings 10/10/24 – 3/12/24
Block A DB/A1/T/2/P1 Mechanical	2,765.9 kWh	2775.9 kWh	2,770 kWh
Block A DB/A1/T/2/P2 Total (Low Level Power)	3,238.5 kWh	3,245.6 kWh	3,246 kWh
Block A DB/A1/T/2/PDU Total	5,320.5 kWh	5320.5 kWh	5,326 kWh

From the daily data, we have assessed the average weekly energy consumption for each meter in the table below:

Meter	Electricity Consumption (5/10/24 – 13/12/24) (10 Weeks)	Average Weekly Consumption
Block A DB/A1/T/2/P1 Lighting	(Not working)	(Not working)
Block A DB/A1/T/2/P1 Mechanical	3,613.3 kWh	361.3 kWh
Block A DB/A1/T/2/P2 Total (Low Level Power)	4,213.1 kWh	421.3 kWh
Block A DB/A1/T/2/PDU Total	6,885.7 kWh	688.6 kWh
Total	**14,712.1 kWh**	**1471.2 kWh**

We have occupied the 2nd floor since early May which equates to 33 weeks.

Therefore, our estimate of the electricity consumption is 1471.2 kWh x 33 wks = **48,549.6 kWh**

3.2. Lighting Consumption

The lighting meter is not working. The landlord has been informed and we are awaiting a date for this to be replaced / repaired. Using the following very crude calculation, we have estimated the lighting energy:

Description	Units	Output	Source
Office area	m^2	1,208	Lease
Lighting power density	W/ m^2	5.34	Area weighted average from Fagerhalt lighting calcs
Occupied hours per day	hrs	10	
Occupied days per week	days	5	
Lighting energy per week	kWh	**322.5**	

On this basis the lighting energy for the whole year is predicted to be **16,771 kWh**. This calculation ignores that the benefits of daylight dimming and occupancy controls, etc.

A CIBSE TM54 analysis has been carried out to predict the energy usage within the Living lab. This analysis has used EDSL TAS software to predict the energy consumption based on the installed plant and equipment. This predicts the annual lighting consumption as **16,643 kWh**.

For the purposes of this energy assessment, it is proposed to use the TM54 lighting energy.

Therefore, the lighting energy = 16,643 / 52 * 33 = **10,561.9 kWh.**

3.3. Total energy consumption

The total energy consumption is assessed as: 48,549.6 kWh + 10,561.9 kWh = **59,111.5 kWh.**

4. Predicted Annual Consumption

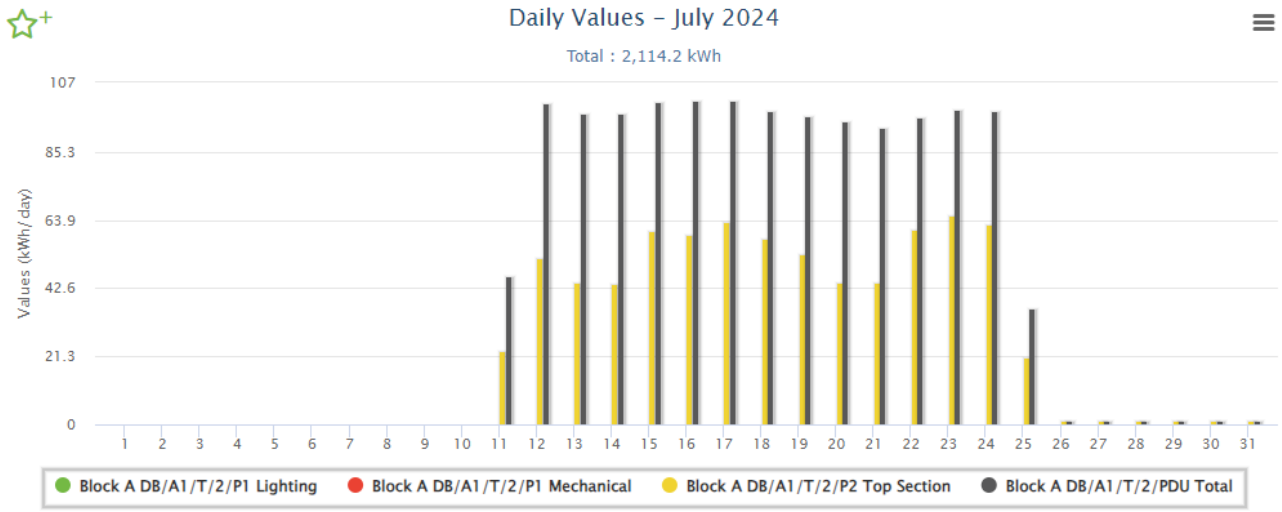
Based on the above estimate the annual consumption is predicted to be **93,146 kWh.**

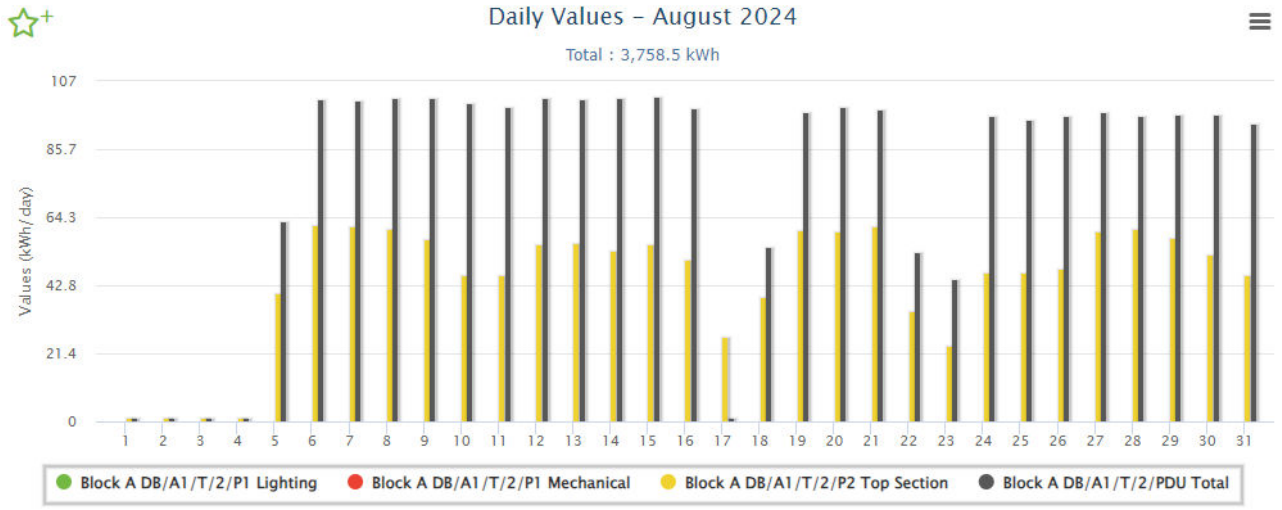
5. Conclusion

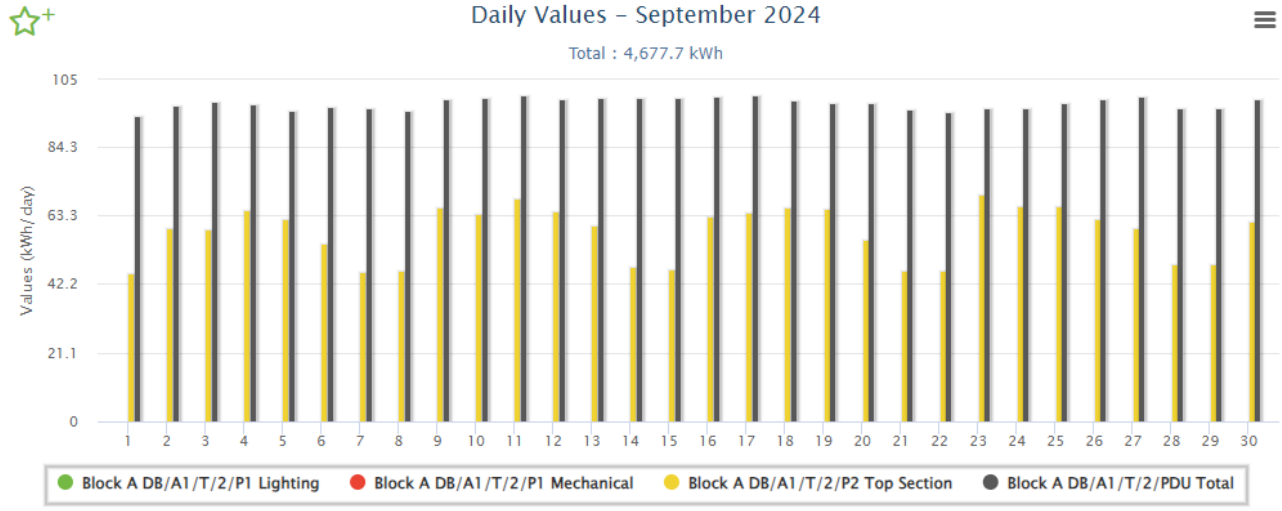
With such little metered data available, it is difficult to predict with confidence the energy consumption of the Living lab. From the CIBSE TM 54 analysis the annual consumption is predicted to be **96,574 kWh.** Our estimated annual consumption compares favourably to the TM54 prediction.

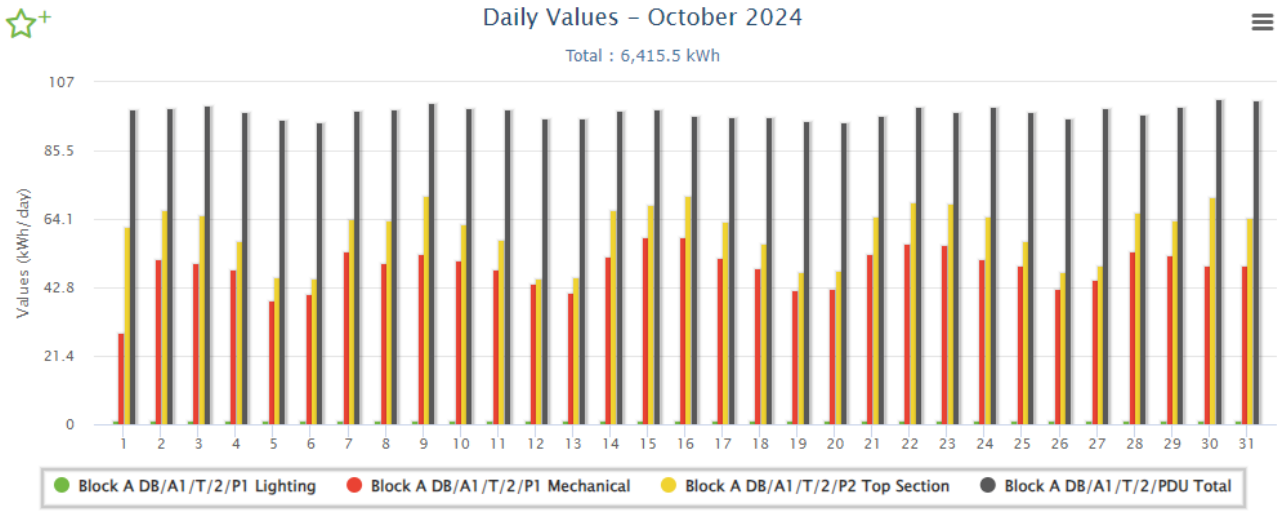
It is therefore considered that the approach taken to estimate of the energy usage is acceptable for the purposes of the WGBC energy assessment.

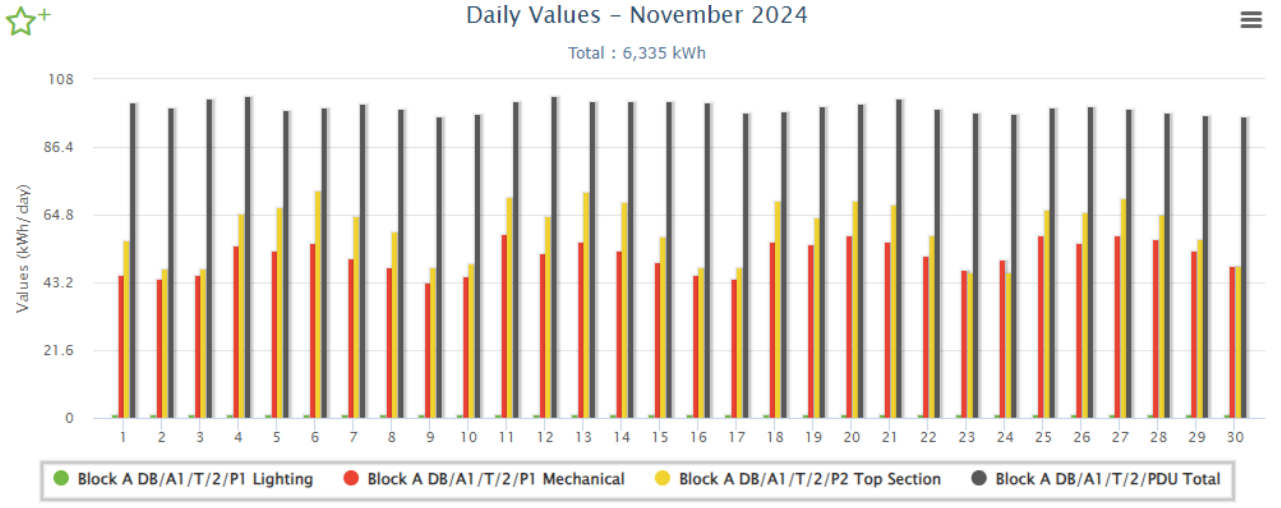
Appendix A – Optimise Energy Meter Readings

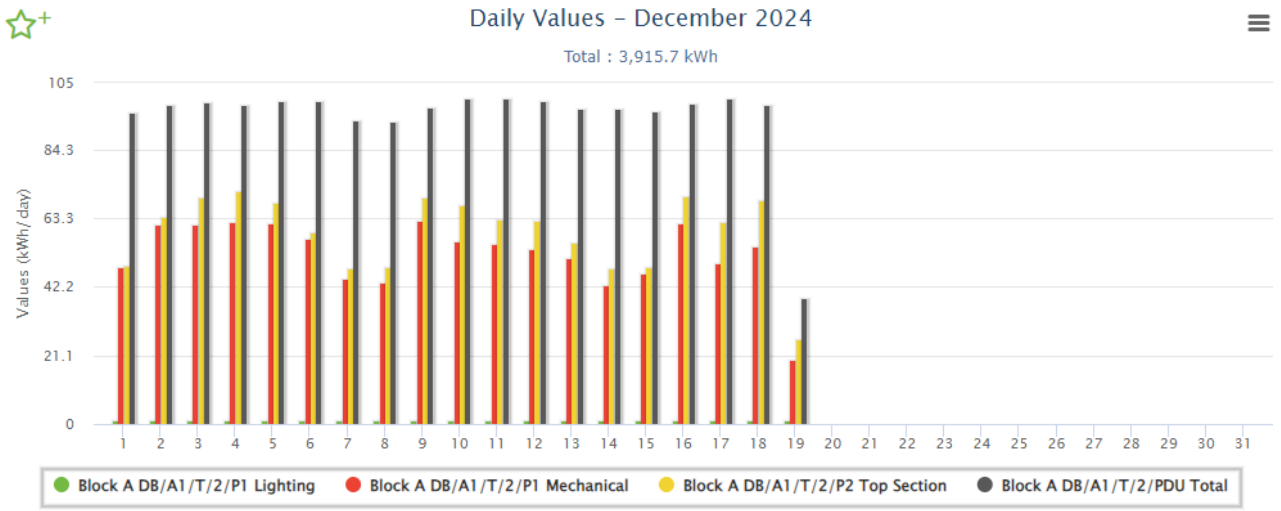







Daily Values – October 2024
Total : 6,415.5 kWh
Values (kWh/day)
107
85.5
64.1
42.8
21.4
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Block A DB/A1/T/2/P1 Lighting
Block A DB/A1/T/2/P1 Mechanical
Block A DB/A1/T/2/P2 Top Section
Block A DB/A1/T/2/PDU Total


Daily Values – November 2024
Total : 6,335 kWh
Values (kWh/day)
108
86.4
64.8
43.2
21.6
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Block A DB/A1/T/2/P1 Lighting
Block A DB/A1/T/2/P1 Mechanical
Block A DB/A1/T/2/P2 Top Section
Block A DB/A1/T/2/PDU Total


Daily Values – December 2024
Total : 3,915.7 kWh
Values (kWh/day)
105
84.3
63.3
42.2
21.1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Block A DB/A1/T/2/P1 Lighting
Block A DB/A1/T/2/P1 Mechanical
Block A DB/A1/T/2/P2 Top Section
Block A DB/A1/T/2/PDU Total

Hilson Moran

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