

Project Ref: PJT10098 – Lister Community School,  
London, Newham, E13

26 January 2024

## REVISED LONDON PLAN ENERGY ASSESSMENT REPORT

Semple & McKillop have undertaken the Stage 4 design of the extension planned at Lister Community School.

The CO<sub>2</sub> emissions after 'Be Lean' and 'Be Clean' measures have been assessed against the baseline CO<sub>2</sub> emissions. Reductions have been recorded after each stage in the energy hierarchy; this will help demonstrate the impact that renewable energy generation has on whole site CO<sub>2</sub> emissions.

## TECHNOLOGY ANALYSIS – SOLAR PHOTOVOLTAICS (PV)

In order to represent a semi-optimal installation, it is taken that a Solar PV array of 60 no. 385 Watt panels can be installed horizontally. On this basis, calculations show that a total installed PV capacity of 23.2 kWp (kilo-Watt peak). Applying the CO<sub>2</sub> emissions factor for grid-displaced electricity (0.233 kg.CO<sub>2</sub>/kWh), this generation corresponds to a CO<sub>2</sub> abatement of 99,570kg.CO<sub>2</sub> per annum.

## REVISED CARBON OFFSET PAYMENT

As of the 1st of October 2016, it is a requirement of the London Plan policy 5.2 that all major developments must achieve the Zero Carbon Standard. This is done by meeting a minimum onsite CO2 reduction of 35% against a Building Regulations L2a (2013) baseline, and then offsetting the remaining emissions via a cash in lieu contribution to the relevant borough.

The As Built Building achieves approximately 50% reduction in CO2 leaving a shortfall of 21.9 tonnes CO2 to achieve zero. A carbon offset cost is calculated below using costings per tonne of CO2 over a lifespan of 30 years as a benchmark. Please find As built BRUKL document appended below.

Total amount to be offset (Tonnes/CO2) = 21.93516

Cost per Tonne (£) = 60

Lifespan (Years) = 30

Total Contribution =  $(21.93516 * 60) * 30$

= £39,484

Yours sincerely,



**Andrew Gingles**

For Semple & McKillop Ltd

Project name

Modular and Portable

Lister Community College

As built

Date: Fri Jan 26 12:11:29 2024

## Administrative information

## Building Details

Address: St Marys Road, Plaidstow, London, E13 9AE

## Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.22

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

## Certifier details

Name: Semple &amp; McKillop LTD

Telephone number: 02890 331700

Address: Unit 4 Eastbank House, 3 Eastbank Road,  
Carryduff, Belfast, BT8 8BDCriterion 1: The calculated CO<sub>2</sub> emission rate for the building must not exceed the target

CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum	19.9
Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	19.9
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum	10.9
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 <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.26	"10000006_W-1"
Floor	0.25	0.2	0.22	"10000006_F"
Roof	0.25	0.16	0.2	"SP00000E_C_A2"
Windows***, roof windows, and rooflights	2.2	1.51	1.8	"SP000041_C_O0"
Personnel doors	2.2	-	-	"No external personnel doors"
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 <sub>a</sub> -Limit = Limiting area-weighted average U-values [W/(m <sup>2</sup> K)] U <sub>a</sub> -Calc = Calculated area-weighted average U-values [W/(m <sup>2</sup> K)] U <sub>i</sub> -Calc = Calculated maximum individual element U-values [W/(m <sup>2</sup> 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 <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	10	2.96

## 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.

<b>Whole building lighting automatic monitoring &amp; targeting with alarms for out-of-range values</b>	YES
<b>Whole building electric power factor achieved by power factor correction</b>	>0.95

### 1- VRF Heating / Cooling - GF - With HRU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	5.42	5.72	-	-	-
<b>Standard value</b>	2.5*	2.6	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					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.					

### 2- ASHP - Radiators With Extract

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.2	-	-	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					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.					

### 3- ASHP - Radiators With HRU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.2	-	-	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					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.					

### 4- ASHP - Radiators

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.2	-	-	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					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.					

### 5- VRF Heating / Cooling - FF - With HRU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	5.94	6.25	-	-	-
<b>Standard value</b>	2.5*	2.6	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					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.					

### 6- Comms Room AC

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.78	3.81	-	-	-
<b>Standard value</b>	2.5*	1	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					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.					

7- VRF Heating / Cooling - SF - With HRU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	5.81	6.25	-	-	-
<b>Standard value</b>	2.5*	2.6	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					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.

8- ASHP - DHW

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	3.2	-	-	-	-
<b>Standard value</b>	2.5*	N/A	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					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- SYST0003-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	Hot water provided by HVAC system	0
<b>Standard value</b>	N/A	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	
	A	B	C	D	E	F	G	H	I	Zone	Standard	
<b>ID of system type</b>												
<b>Standard value</b>	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
1.15 Drama Studio	-	-	-	1	-	-	-	-	-	0.8	0.5	
1.10 Drama Studio	-	-	-	1	-	-	-	-	-	0.8	0.5	
1.14 Cleaners Store	-	-	0.4	-	-	-	-	-	-	-	N/A	
1.13 Acc WC	-	-	0.4	-	-	-	-	-	-	-	N/A	
1.06 WC 1	-	-	0.4	-	-	-	-	-	-	-	N/A	
1.06 WC 2	-	-	0.4	-	-	-	-	-	-	-	N/A	
1.06 WC 3	-	-	0.4	-	-	-	-	-	-	-	N/A	
1.12 Changing Room 1	-	-	0.4	-	-	-	-	-	-	-	N/A	
2.28 Acc WC	-	-	0.4	-	-	-	-	-	-	-	N/A	
2.28 WC 1	-	-	0.4	-	-	-	-	-	-	-	N/A	
2.28 WC 2	-	-	0.4	-	-	-	-	-	-	-	N/A	
2.28 WC 4	-	-	0.4	-	-	-	-	-	-	-	N/A	
2.28 WC 3	-	-	0.4	-	-	-	-	-	-	-	N/A	

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			
3.20 ACC WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
3.20 WC 1	-	-	0.4	-	-	-	-	-	-	-	-	N/A
3.20 WC 2	-	-	0.4	-	-	-	-	-	-	-	-	N/A
3.20 WC 4	-	-	0.4	-	-	-	-	-	-	-	-	N/A
3.20 WC 3	-	-	0.4	-	-	-	-	-	-	-	-	N/A
3.05 Cleaners Store	-	-	0.4	-	-	-	-	-	-	-	-	N/A
1.08 Changing Room 2	-	-	0.4	-	-	-	-	-	-	-	-	N/A
1.06 Changing Room 3	-	-	0.4	-	-	-	-	-	-	-	-	N/A
1.06 Changing Room 3	-	-	0.4	-	-	-	-	-	-	-	-	N/A
1.08 Changing Room 2	-	-	0.4	-	-	-	-	-	-	-	-	N/A
1.17 Office	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.04 Office	-	-	-	1	-	-	-	-	-	-	0.82	0.5
2.13 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.14 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.15 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.16 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.08 Recording	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.07 Control	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.06 Recording	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.18 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.19 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.20 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.21 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.26 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.25 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.23 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.24 Practice Room	-	-	-	1	-	-	-	-	-	-	0.81	0.5
3.17 Group Room 1	-	-	-	1	-	-	-	-	-	-	0.84	0.5
3.18 Group Room 2	-	-	-	1	-	-	-	-	-	-	0.84	0.5
3.14 Staff Work Room	-	-	-	1	-	-	-	-	-	-	0.84	0.5
3.15 Intervention Room	-	-	-	1	-	-	-	-	-	-	0.84	0.5
3.16 Isolation Room	-	-	-	1	-	-	-	-	-	-	0.84	0.5
3.04 Office	-	-	-	1	-	-	-	-	-	-	0.81	0.5
3.22 CP Office	-	-	-	1	-	-	-	-	-	-	0.83	0.5
3.23 Counselling Office	-	-	-	1	-	-	-	-	-	-	0.83	0.5
3.24 Counselling Office / Free Space	-	-	-	1	-	-	-	-	-	-	0.83	0.5
3.25 Counselling Office	-	-	-	1	-	-	-	-	-	-	0.83	0.5
3.07 Meeting Room	-	-	-	1	-	-	-	-	-	-	0.82	0.5
3.08 COG Office	-	-	-	1	-	-	-	-	-	-	0.82	0.5
2.12 Classroom	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.11 Staff	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.17 Classroom	-	-	-	1	-	-	-	-	-	-	0.81	0.5
2.22 Classroom	-	-	-	1	-	-	-	-	-	-	0.81	0.5

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		
3.13 SSC		-	-	-	0.9	-	-	-	-	-	0.84	0.5
3.06 Staff Room		-	-	-	0.9	-	-	-	-	-	0.83	0.5

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
1.01 Dance Studio		251	-	-	421
1.15 Drama Studio		123	-	-	380
1.10 Drama Studio		118	-	-	506
1.14 Cleaners Store		153	-	-	4
1.13 Acc WC		-	228	-	40
1.06 WC 1		-	797	-	7
1.06 WC 2		-	735	-	7
1.06 WC 3		-	797	-	7
1.12 Changing Room 1		-	121	-	80
2.28 Acc WC		-	200	-	40
2.28 WC 1		-	699	-	7
2.28 WC 2		-	694	-	7
2.28 WC 4		-	980	-	7
2.28 WC 3		-	691	-	7
3.20 ACC WC		-	200	-	40
3.20 WC 1		-	258	-	19
3.20 WC 2		-	258	-	19
3.20 WC 4		-	258	-	26
3.20 WC 3		-	258	-	19
3.05 Cleaners Store		-	291	-	26
1.08 Changing Room 2		-	231	-	19
1.06 Changing Room 3		-	196	-	23
1.06 Changing Room 3		-	188	-	144
1.08 Changing Room 2		-	223	-	122
1.17 Office		94	-	-	177
2.04 Office		97	-	-	172
2.13 Practice Room		150	-	-	49
2.14 Practice Room		139	-	-	49
2.15 Practice Room		140	-	-	49
2.16 Practice Room		140	-	-	49
2.08 Recording		147	-	-	133
2.07 Control		142	-	-	70
2.06 Recording		186	-	-	70
2.18 Practice Room		140	-	-	49
2.19 Practice Room		139	-	-	49
2.20 Practice Room		140	-	-	49
2.21 Practice Room		149	-	-	49

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
2.26 Practice Room		158	-	-	49
2.25 Practice Room		151	-	-	49
2.23 Practice Room		143	-	-	49
2.24 Practice Room		143	-	-	49
3.17 Group Room 1		98	-	-	133
3.18 Group Room 2		93	-	-	132
3.14 Staff Work Room		101	-	-	100
3.15 Intervention Room		111	-	-	70
3.16 Isolation Room		111	-	-	70
3.04 Office		68	-	-	172
3.22 CP Office		103	-	-	103
3.23 Counselling Office		102	-	-	103
3.24 Counselling Office / Free Space		145	-	-	100
3.25 Counselling Office		138	-	-	70
3.07 Meeting Room		75	-	-	137
3.08 COG Office		96	-	-	173
Lift		100	-	-	9
1.03 Prop Dressing Room		105	-	-	15
1.02 Dance Store		128	-	-	11
2.01 Circulation		-	126	-	244
2.30 Plant Room		148	-	-	13
Lift		100	-	-	9
2.09 Store		148	-	-	12
Lift		100	-	-	9
3.09 Store		153	-	-	9
3.10 Exam Store		153	-	-	9
3.11 Finance Store		148	-	-	7
3.02 Maintenance Access		153	-	-	7
1.11 Circ		-	106	-	122
1.04 Circulation		-	84	-	146
1.09 Circ		-	89	-	171
2.05 Circulation		-	93	-	73
2.10 Circulation		-	105	-	122
3.21 Circulation		-	135	-	49
3.03 Circulation		-	100	-	98
3.12 Circulation		-	77	-	167
3.19 Circulation		-	73	-	244
2.27 Circulation		-	101	-	196
Stair 2		-	153	-	214
Stair 1		-	316	-	147
2.12 Classroom		104	-	-	300
2.11 Staff		131	-	-	138
2.17 Classroom		103	-	-	300



General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	<b>Standard value</b>	60	60	22	
2.22 Classroom		103	-	-	300
2.31 Plant Space		100	-	-	17
3.13 SSC		94	-	-	266
3.06 Staff Room		105	-	-	500

**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?
1.01 Dance Studio	N/A	N/A
1.15 Drama Studio	NO (-65.1%)	NO
1.10 Drama Studio	NO (-50.1%)	NO
1.17 Office	NO (-85.4%)	NO
2.04 Office	NO (-85%)	YES
2.13 Practice Room	NO (-82.8%)	NO
2.14 Practice Room	N/A	N/A
2.15 Practice Room	N/A	N/A
2.16 Practice Room	N/A	N/A
2.08 Recording	NO (-82.8%)	NO
2.07 Control	N/A	N/A
2.06 Recording	N/A	N/A
2.18 Practice Room	N/A	N/A
2.19 Practice Room	N/A	N/A
2.20 Practice Room	N/A	N/A
2.21 Practice Room	NO (-74.4%)	NO
2.26 Practice Room	NO (-85.3%)	NO
2.25 Practice Room	N/A	N/A
2.23 Practice Room	N/A	N/A
2.24 Practice Room	N/A	N/A
3.17 Group Room 1	NO (-64.7%)	NO
3.18 Group Room 2	NO (-74.7%)	YES
3.14 Staff Work Room	NO (-64.1%)	NO
3.15 Intervention Room	NO (-48.8%)	YES
3.16 Isolation Room	NO (-49.2%)	YES
3.04 Office	NO (-64.3%)	NO
3.22 CP Office	NO (-78.4%)	NO
3.23 Counselling Office	NO (-78.1%)	NO
3.24 Counselling Office / Free Space	NO (-64.7%)	NO
3.25 Counselling Office	N/A	N/A
3.07 Meeting Room	NO (-83.9%)	NO
3.08 COG Office	NO (-77.4%)	NO
2.12 Classroom	NO (-65.7%)	NO
2.11 Staff	NO (-74.3%)	NO
2.17 Classroom	NO (-56.1%)	NO
2.22 Classroom	NO (-48.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2.31 Plant Space	NO (-31.4%)	YES
3.13 SSC	NO (-63.2%)	NO
3.06 Staff Room	NO (-45.9%)	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**

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

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

	Actual	Notional
Area [m <sup>2</sup> ]	2012.4	2012.4
External area [m <sup>2</sup> ]	4504.6	4504.6
Weather	LON	LON
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	3	3
Average conductance [W/K]	1039.15	1778.06
Average U-value [W/m <sup>2</sup> K]	0.23	0.39
Alpha value* [%]	15.13	11.73

\* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

## Building Use

### % Area Building Type

A1/A2 Retail/Financial and Professional services
A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
B1 Offices and Workshop businesses
B2 to B7 General Industrial and Special Industrial Groups
B8 Storage or Distribution
C1 Hotels
C2 Residential Institutions: Hospitals and Care Homes
C2 Residential Institutions: Residential schools
C2 Residential Institutions: Universities and colleges
C2A Secure Residential Institutions
Residential spaces
D1 Non-residential Institutions: Community/Day Centre
D1 Non-residential Institutions: Libraries, Museums, and Galleries
<b>100 D1 Non-residential Institutions: Education</b>
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/m<sup>2</sup>]

	Actual	Notional
Heating	2.73	6.03
Cooling	1.67	3.13
Auxiliary	6.21	4.74
Lighting	9.5	13.55
Hot water	10.74	11.93
Equipment*	12.84	12.84
<b>TOTAL**</b>	<b>30.87</b>	<b>39.37</b>

\* 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/m<sup>2</sup>]

	Actual	Notional
Photovoltaic systems	9.08	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

## Energy & CO<sub>2</sub> Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	110.21	155.55
Primary energy* [kWh/m <sup>2</sup> ]	92.37	117.85
Total emissions [kg/m <sup>2</sup> ]	10.9	19.9

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

## HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
<b>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</b>									
Actual	36	43.9	1.9	2.3	3.8	5.32	5.19	5.42	6.95
Notional	79.9	66.7	9.1	6.9	2.4	2.43	2.7	----	----
<b>[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</b>									
Actual	55.3	47.6	5.1	0	21.1	3.01	0	3.2	0
Notional	75.3	110	8.6	0	27.1	2.43	0	----	----
<b>[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</b>									
Actual	14.5	94.6	1.3	0	7.5	3.01	0	3.2	0
Notional	26.4	109.6	3	0	4.6	2.43	0	----	----
<b>[ST] No Heating or Cooling</b>									
Actual	62.2	32.6	0	0	0	0	0	0	0
Notional	94.4	84.7	0	0	0	0	0	----	----
<b>[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</b>									
Actual	89.1	60.2	8.2	0	2	3.01	0	3.2	0
Notional	115.1	105.4	13.2	0	1.2	2.43	0	----	----
<b>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</b>									
Actual	3.4	115.5	0.2	5.6	7.2	5.83	5.76	5.94	7.71
Notional	2.6	101.8	0.3	7.9	4.5	2.43	3.6	----	----
<b>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Natural Gas</b>									
Actual	73.4	26	5.5	1.4	0	3.71	5.08	3.78	6.8
Notional	105.4	4.8	12.1	0.4	0	2.43	3.6	----	----
<b>[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity</b>									
Actual	9.4	112.5	0.5	5.6	6.7	5.7	5.61	5.81	7.51
Notional	8.3	96.8	0.9	7.5	4.5	2.43	3.6	----	----

### Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= 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 <sub>i-Typ</sub>	U <sub>i-Min</sub>	Surface where the minimum value occurs*
Wall	0.23	0.16	"SP000000_W6_A0"
Floor	0.2	0.16	"ST000000_F_A0"
Roof	0.15	0.16	"SP000000_C"
Windows, roof windows, and rooflights	1.5	1.5	"SP000000E_W2_O0"
Personnel doors	1.5	-	"No external personnel doors"
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 <sub>i-Typ</sub> = Typical individual element U-values [W/(m <sup>2</sup> K)]		U <sub>i-Min</sub> = Minimum individual element U-values [W/(m <sup>2</sup> K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	5	2.96