energycouncil
engineering sustainable buildings

As Built Energy Statement

Ref: Z11115

Flats 1-20
Celestia Court
147 Upper Chorlton Road
Manchester
M167SP

for

QA Construction



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Executive Summary

This Energy Statement has been developed to discharge condition 10 of planning application ref: 109830/FO/2015/S1. Condition 10 states:

> 10) The development hereby approved shall be implemented in full accordance with the measures as set out within the environmental sustainability statement referenced Energy Assessment (EAL Consult),and stamped as received by the City Council as local planning authority on 19th August 2015, including: measures to secure predicted carbon emissions and the attainment of specified environmental efficiency and performance. Within 3 months of the completion of the construction of the authorised development a verification statement shall be submitted to and approved in writing, by the City Council as local planning authority, confirming the incorporation of the specified measures at each phase of the construction of the development, including dated photographic documentary evidence of the implementation and completion of required works.
>
> Reason - In order to minimise the environmental impact of the development pursuant to policies SP1, T1-T3, EN4-EN7 and DM1 of the Core Strategy for the City of Manchester and the principles contained within The Guide to Development in Manchester SPD (2007) and the National Planning Policy Framework.

Condition 10 references EAL's Energy Assessment, which used a combination of air source heat pumps and photovoltaic panels to meet MCC's policy of 15% improvement in CO2 emissions, based on 2010 building regs ADL1A. EAL's report significantly exceed MCC's policy and provided a 47% improvement on 2013 building regs ADL1A. EAL's energy statement was fundamentally unachievable due to 1) financial constraints (ASHP are expensive), 2) restricted site and siting/location of ASHP is not possible and 3) external air source condensing units and their associated noise issues would create other environmental concerns to the occupants and neighbours. QA Construction have therefore pursued a variation to the EAL energy strategy with the aim of meeting MCC's policies SP1, T1-T3, EN4-EN7 and DM1.

The as built energy strategy included an improvement to the thermal fabric, low air leakage rates and 28kWp PV located on the roof of the development. This resulted in:

- A 16.7% improvement on ADL1A 2013 based on the attached SAP calcs and block compliance.
- This equates to a 22.7% uplift on ADL1A 2010 regs. (6% uplift between 2013 and 2010 regs)
- This exceeds MCC's policy requirements and this development is therefore compliant with MCC policy condition 10.

1. Methodology

The first step of the energy strategy assessment has been to undertake as built certified energy assessments to confirm building regs ADL1A compliance and for production of the EPCs. The baseline energy assessment is the Target Emission Rate as defined by ADL1A. The energy hierarchy has been followed as detailed below:

1. Be Lean *A reduction in energy use as a result of passive design and energy efficiency*
Thermal performance of envelope (U values) Glazing design Airtight construction Efficient mechanical ventilation Variable speed fans and pumps Efficient lighting
2. Be Clean *A focus on supplying energy to the development through efficient means*
Connect to low carbon heat networks (where practical) Develop site wide heat network from single energy centre (where practical) On site CHP (where practical)
3. Be Green *The installation of renewable technologies to meet energy demand where possible*
Utilise and integrate renewable energy technologies, in this case 28kWp Photovoltaic panels.

The development has been provided with energy savings through the use of thermal improvements to fabric (a 'fabric first' approach), followed by other clean energy solutions (energy efficiency improvements, efficient heating and hot water etc.) and finally the use of renewable energy technologies. This hierarchy complements the integrated approach to the sustainable energy objectives of Manchester City Council's Planning Policies.

2. Renewable Energy Technologies

Energy Council have reviewed options for the use of on-site renewable energy/ Low or Zero Carbon Technology (LZT) in line with Manchester City Council's policy aspirations and photovoltaic panels have been chosen

2.1. Photovoltaics (PV)

Photovoltaic panels convert sunlight into electricity to run lights and appliances. Photovoltaic panels use cells to convert light into electricity. A PV cell normally consists of 1 or 2 layers of a semi conducting material such as silicon. When light shines on a cell it generates energy causing electricity to flow, the higher the light intensity is, the more electricity flows.

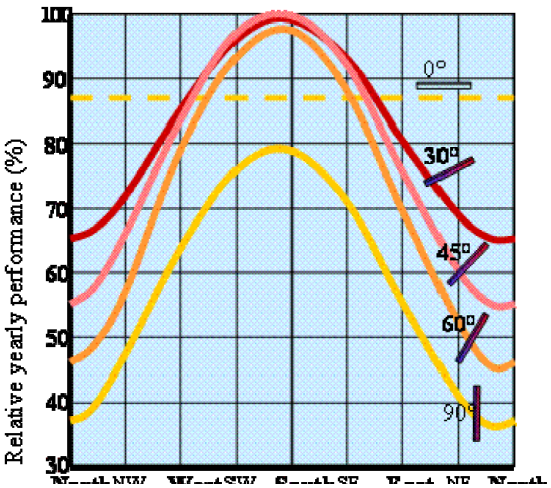


Figure 1 - Performance of photovoltaic panel orientation

The amount of energy PV cells generate is referred to as Kilowatt Peak (KWp). PV arrays now come in a variety of shapes and colours, ranging from grey 'solar tiles' that look like roof tiles to panels and transparent cells that you can use on conservatories and glass to provide shading as well as generating electricity. Solar panels are not light and the roof must be strong enough to take their weight, especially if the panel is placed on top of existing tiles. For flat roofs the panels can be mounted on A-frames to give the optimum angle. The optimum panel inclination for solar collection is 35°, oriented due south; however panels that are inclined between 35° and 45° and oriented south of west or east are generally suitable. If solar collectors are oriented away from due South then a larger surface area will be required to generate a set amount of energy.



Figure 2 - Photovoltaic array on a pitched roof

The cost to install PV is typically £1,000 - £1,500 per kWp for 'on-roof' panel systems.
In this instance, 28kWp solar photovoltaic panels have been installed on this development

3. Conclusion

Following the 'Be Lean, Be Clean, Be Green' hierarchy, the building provides a 16.7% carbon reduction from the calculated baseline regulated energy emissions ADL1A 2013.

The approach for the development was to embed sustainability into the heart of the development through a range of design measures based on the 'Be Lean, Be Clean, Be Green' design hierarchy. Measures included:

1) Enhanced building fabric to meet Building Regulation ADL1A 2016
2) Heating and hot water is provided a 100% efficient electricity
3) Efficient lighting strategy primarily using LED type fittings.
4) Efficient mechanical extract ventilation.
5) 28kWp PV located on the roof of the development

3.1. Summary Headlines

- A passive fabric-first approach was considered to be the most appropriate solution based on the financial constraints of the development.
- An overall 16.7% improvement on ADL1A 2013 has been achieved based on the attached SAP calcs and block compliance (below). This equates to a 22.7% uplift on ADL1A 2010 regs, which exceeds MCC's policy requirements of 15.0% on ADL1A 2010 regs.

BLOCK COMPLIANCE
Calculation Type: New Build (As Built)

Design SAP
elmhurst energy

Block Reference	000004	Issued on Date	07/03/2019
Block Name	bLOCK 1		
Assessor Details	Mr. Matthew Gibson, Energy Council, Tel: 01617621055, matthew.gibson@energycouncil.co.uk	Assessor ID	H176-0001
Client			

Block Compliance Report - DER

Block Reference: 000004		Block Name: bLOCK 1		
Property-Assessment Reference	Multiplier	Floor Area (m^2)	DER ($kgCO_2/m^2$)	TER ($kgCO_2/m^2$)
Z11115-Z11115_1	1	77.24	22.19	24.84
Z11116-Z11116_1	1	77.24	20.67	23.93
Z11117-Z11117_1	1	69.24	22.89	25.31
Z11118-Z11118_1	1	69.24	24.78	26.34
Z11119-Z11119_1	1	68.85	16.20	21.04
Z11120-Z11120_1	1	68.85	17.31	21.80
Z11121-Z11121_1	1	70.77	16.26	21.33
Z11122-Z11122_1	1	70.77	17.82	22.27
Z11123-Z11123_1	1	77.47	16.52	20.43
Z11124-Z11124_1	1	77.47	16.16	19.62
Z11125-Z11125_1	1	76.65	16.47	21.24
Z11126-Z11126_1	1	77.65	19.04	22.40
Z11127-Z11127_1	1	77.47	16.52	20.43
Z11128-Z11128_1	1	77.47	15.15	19.62
Z11129-Z11129_1	1	76.65	16.47	21.24
Z11130-Z11130_1	1	77.65	19.04	22.40
Z11131-Z11131_1	1	77.47	21.93	25.14
Z11132-Z11132_1	1	77.47	20.42	24.23
Z11133-Z11133_1	1	76.65	20.14	24.37
Z11134-Z11134_1	1	77.65	21.91	25.42
Totals:	20	1499.92	377.89	453.40
Average DER = 18.88 $kgCO_2/m^2$			PASS	
Average TER = 22.66 $kgCO_2/m^2$				

BLOCK COMPLIANCE
Calculation Type: New Build (As Built)

Design SAP
elmhurst energy

Block Compliance Report - DFEE

Block Reference: 000004		Block Name: bLOCK 1		
Property-Assessment Reference	Multiplier	Floor Area (m^2)	DFEE ($kWh/m^2/yr$)	TFEE ($kWh/m^2/yr$)
Z11115-Z11115_1	1	77.24	37.70	44.79
Z11116-Z11116_1	1	77.24	35.05	41.72
Z11117-Z11117_1	1	69.24	37.37	44.03
Z11118-Z11118_1	1	69.24	42.03	47.51
Z11119-Z11119_1	1	68.85	24.96	29.50
Z11120-Z11120_1	1	68.85	27.28	32.06
Z11121-Z11121_1	1	70.77	25.74	31.11
Z11122-Z11122_1	1	70.77	28.97	34.31
Z11123-Z11123_1	1	77.47	27.77	30.02
Z11124-Z11124_1	1	77.47	26.53	27.24
Z11125-Z11125_1	1	76.65	26.89	32.51
Z11126-Z11126_1	1	77.65	32.68	36.73
Z11127-Z11127_1	1	77.47	27.60	30.02
Z11128-Z11128_1	1	77.47	24.23	27.24
Z11129-Z11129_1	1	76.65	26.85	32.51
Z11130-Z11130_1	1	77.65	32.56	36.73
Z11131-Z11131_1	1	77.47	38.45	45.86
Z11132-Z11132_1	1	77.47	35.26	42.79
Z11133-Z11133_1	1	76.65	34.18	43.04
Z11134-Z11134_1	1	77.65	37.86	46.84
Totals:	20	1499.92	629.96	736.56
Average DFEE = 31.51 $kWh/m^2/yr$			PASS	
Average TFEE = 36.84 $kWh/m^2/yr$				