

NET ZERO CARBON VERIFICATION

OF FEILDEN FOWLES' STUDIO, 8 ROYAL STREET, LONDON SE1 7LL

3rd PARTY AUDIT SUMMARY REPORT

06/09/2021 Rev D

1 Introduction

Feilden Fowles Architects have produced a report: "*Feilden Fowles Studio UKGBC Net Zero Carbon Buildings Report*", and a set of supplementary information presenting a body of evidence that aims to demonstrate how the Feilden Fowles Studio building (8 Royal St, SE1 7LL) has achieved net zero carbon for operational energy related emissions for the period April 2019 to March 2020.

Max Fordham were commissioned by Feilden Fowles Architects to audit the evidence presented in the report and supplementary information for consistency with the UKGBC's Net Zero Carbon Buildings Framework for operational energy related emissions.

2 The auditor

The auditor, Max Fordham LLP, is a UK-based sustainability and building services engineering consultancy with 50 years of experience in the design and post-occupancy monitoring of the energy and carbon emissions performance of buildings. Max Fordham have demonstrable knowledge and experience in the details of the UKGBC Net Zero Carbon Building Framework; they have been through process themselves and have achieved UKGBC net zero operational carbon status for their 5-office portfolio [1]. Furthermore, they were part of the task group that developed the UKBGC Renewable Energy Procurement & Carbon Offsetting Guide that forms part of the Framework [2]. The audit and report writing were carried out by Suzanne Goulder (1+ years' relevant experience) and Hareth Pochee (20+ years' relevant experience).

3 The UKGBC Net Zero Carbon Buildings Framework

The UKGBC Net Zero Carbon Buildings Framework was introduced in 2019 and sets out definitions and principles relating to net zero carbon (NZC) buildings for both construction (embodied emissions) and operational energy related emissions. Since its publication in 2019, the UKGBC has published further documents which further develop and, in some cases, superseded information contained within the original framework document. The relevant documents at the time the evidence was submitted are:

- UKGBC Net Zero Carbon Buildings Framework [3]
- Net Zero Carbon: Energy Performance Targets for Offices (specifically for offices targeting net zero carbon in operation) [4]
- Renewable Energy Procurement and Carbon Offsetting Guidance for Net Zero Carbon Buildings [2]

This review considers the operational energy related emissions of Feilden Fowles' Studio, which is an office type building.

The verification and audit process

Currently the requirements for verification and auditing are fairly general; more detailed requirements are in development by UKGBC. The UKGBC set of documents include the following statements:

- “A minimum level of reporting is required to be publicly disclosed...through any publicly accessible information”
- The building developer, owner or occupier should “show their working on how they have achieved net zero carbon”
- “The information should be the subject of third-party auditing to avoid self-made claims”
“Auditing should provide transparency on sources and processes used to determine the net zero carbon balance; however, auditors would not be required to verify specific figures (e.g. checking of energy meters).”

Max Fordham used these principles when undertaking the audit.

4 Requirements for net zero carbon buildings for operational energy related emissions

The definition of “Net Zero Carbon – Operational Energy”, from the UKGBC is:

“When the amount of carbon emissions associated with the building’s operational energy on an annual basis is zero or negative. A net zero carbon building is highly energy efficient and powered from on-site and/or off-site renewable energy sources, with any remaining carbon balance offset” [3]

In their new guidance published in 2021, UKGBC set out requirements for achieving NZC for operational energy [5]. These are summarised as follows:

1. Reduce operational energy use

UKGBC NZC targets for offices was published in 2020 [2]. This document sets out energy performance targets that offices should aim to achieve, as shown in Figure 1 below.

Scope	Metric	Interim Targets			Paris Proof Target
		2020-2025	2025-2030	2030-2035	2035-2050
Whole building energy	kWh _e /m ² (NLA) / year	160	115	90	70
	kWh _e /m ² (GIA) / year	130	90	70	55
	DEC rating	D90	C65	B50	B40
Base building energy	kWh _e /m ² (NLA) / year	90	70	55	35
	kWh _e /m ² (GIA) / year	70	55	45	30
	NABERS UK star rating	4.5	5	5.5	6
Tenant energy	kWh _e /m ² (NLA) / year	70	45	35	35

NLA = net lettable area GIA = gross internal area

Figure 1 – Extract from UKGBC NZC Targets for Offices [4]

NZC can be claimed under the following circumstances

- The building does not meet the interim energy performance targets specified above, however has an action plan to achieve them
- The building achieves or exceeds the interim energy performance targets

2. Increase renewable energy supply

This step aims to encourage all buildings to move towards 100% renewable energy procurement with no fossil fuel usage. At a minimum, there should be a plan in place to phase out fossil fuels by the next system replacement cycle. Ideally buildings will have 100% additional bundled energy procurement only with no indirect fossil fuels, as well as including energy storage, smart controls and flexibility strategies and be designed to operate on renewable energy rather than just procuring it.

3. Offsetting

It is necessary that any fossil fuels or non-additional energy consumption is offset through an approved international or domestic carbon offsetting standard.

4. Public disclosure

All buildings achieving NZC for operational energy must publicly disclose information with third-party verification using the UKGBC's minimum reporting template. This disclosure includes total energy consumption, annual CO₂e emissions and carbon offsetting approach taken.

5 Documents Reviewed

- Feilden Fowles' Studio UKGBC Net Zero Carbon Buildings Report 16/08/2021, Rev E
- Energy bills April 2019-March 2020 included in attachments of email sent by Matthew Glen to Suzanne Goulder 25/02/2021

6 Audit Summary

Building energy use estimates

The report submitted states that electrical energy consumption of the building for the year April 2019 – March 2020 is 20,862kWh, which is consistent with previous years' energy usage. Given the studio is 100% electric, this accounts for the entirety of the energy usage. Energy consumption estimates are based on monthly estimated meter readings from the supplier, Green Energy UK.

Two actual meter readings are available for the year – invoice number 51419647 confirms that the meter reading 42,340kWh was taken on the 20th May 2019, and invoice number 51594603 confirms that the meter reading of 52,167kWh was taken on 8th January 2020. Averaging on a per month basis, this gives an annual energy usage of 15,394kWh. Hence, the estimated annual energy usage of 20,862kWh appears slightly higher than anticipated, but appears reasonable and consistent with the readings taken.

Building floor area (GIA)

The building floor area is a key element of the energy target metric.

The report submitted describes how the GIA has been calculated as "measured inside external walls.". The report also includes plans with a scale. The figure reported is 149m² for the total area of the office. Although we haven't explicitly checked this figure, it appears reasonable given the information provided.

Reduce operational energy use: interim energy performance targets

The report submitted states that Feilden Fowles' studio consumed 132.9kWh_e/m²GIA/yr. Given the building is owned fully by Feilden Fowles, the UKGBC Offices Energy Target Whole Building Energy Target has been used for comparison. The reported building energy consumption slightly exceeds UKGBC NZC target for 2020-25, of 130kWh_e/m²GIA/yr. However, Feilden Fowles report does include a proposed action plan to improve the energy performance of the building.

Action plan for energy performance improvement

The submitted report describes the proposals for future building energy improvements. Feilden Fowles are planning to redevelop and relocate the building in 2022. That is, the proposals include dismantling the building, and re-assembling it at a new address. Planning permission for this is currently being sought. It is proposed that the work would incorporate building fabric and services energy efficiency improvements once the building has been relocated and re-built. Further details can be found in the *Building Improvements* section of Feilden Fowles' report (page 16).

Renewable energy supply and offsetting

The building uses 100% electricity, with electric oil-filled heaters to provide heating. During the period being assessed, the electricity supply was from Green Energy UK (tariff name Green Energy). Copies of electricity bills were provided to verify this information. The Green Energy UK tariff meets the UKGBC criteria for being a "100% renewable high-quality green tariff, therefore, no offsetting is required.

However, Feilden Fowles have chosen to go beyond the UKGBC framework and will voluntarily offset the equivalent emissions which would have been generated had their electricity supplier not met the UKGBC requirements, at a price of £100/tCO_{2e}. It is their ambition to sequester more carbon than they currently emit by investing into UK woodland creation schemes.

Public disclosure

Feilden Fowles state that their report will be made publicly available on their website, alongside this 3rd party audit summary report.

7 Conclusion

Our audit concludes that the approach taken by Feilden Fowles for their studio building (8 Royal St, SE1 7LL) is consistent with the requirements of the UKGBC Net Zero Carbon Framework for net zero operational energy related carbon emissions, for the period April 2019 to March 2020. Therefore, net zero carbon has been achieved in line with UKGBC's Net Zero Carbon Buildings Framework for the scope and dates stated.

8 References

- [1] Max Fordham, "We're Net Zero Carbon!," Feb 2020. [Online]. Available: <https://www.maxfordham.com/mf-net-zero/were-net-zero-carbon>. [Accessed 2021].
- [2] UKGBC, "Renewable Energy Procurement & Carbon Offsetting Guidance for Net Zero Carbon Buildings," 2021. [Online]. Available: <https://www.ukgbc.org/wp-content/uploads/2021/03/Renewable-Energy-Procurement-Carbon-Offsetting-Guidance-for-Net-Zero-Carbon-Buildings.pdf>.
- [3] UKGBC, "Net Zero Carbon Buildings:A Framework Definition," 2019. [Online]. Available: <https://www.ukgbc.org/wp-content/uploads/2019/04/Net-Zero-Carbon-Buildings-A-framework-definition.pdf>.
- [4] UKGBC, "Net zero carbon: energy performance targets for offices," 2020. [Online]. Available: <https://www.ukgbc.org/wp-content/uploads/2020/01/UKGBC-Net-Zero-Carbon-Energy-Performance-Targets-for-Offices.pdf>.
- [5] UKGBC, "Net Zero Carbon Buildings:Levels of performance," 2021. [Online]. Available: <https://www.ukgbc.org/wp-content/uploads/2021/03/Net-Zero-Carbon-levels-of-performance.pdf>.