Savills Engineering & Design Consultancy

Energy Report

38 Grosvenor Gardens, London, SW1W 0EB

DOCUMENT ISSUE

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Contents

1. Executive Summary

Savills Engineering & Design Consultancy has been appointed by CGT Works to provide an energy and carbon study for 38 Grosvenor Gardens, London. The results indicate that by proposing specific recommendations we achieve a significant reduction in carbon and energy generated by the building.

Tables 1, 2 and 3 below display a summary of the carbon, heating/cooling demand and energy assessments respectively.

Carbon Generation Assessment	
Analysis	**kgCO2/m2.annum**
Existing Scenario	41.5
Proposed Scenario	38.0
Savings	8.43%

Table 1 Carbon Assessment

Energy Assessment	
Analysis	**kWh/m2**
Existing Primary Energy	243.23
Proposed Primary Energy	223.21
Savings	8.23%

Table 2 Energy Assessment

Heading & Cooling Demand Assessment	
Analysis	**kWh/m2**
Existing Heating & Cooling Demand	305.17
Proposed Heating & Cooling Demand	254.64
Savings	16.55%

Table 3 Heating & Cooling Demand Assessment

2. Introduction

This report presents the work carried out on 38 Grosvenor Gardens, London in order to examine the carbon and energy generation of the building by comparing an existing with a proposed scenario.

The aims of this project are to:

- Create an existing version of the building that can be used as baseline (benchmark)
- Replace glazing on the front and the back of the building and use this as proposed scenario

The following process was undertaken:

- An IES Virtual Environment (IES VE 2021) model was created to carry out a dynamic analysis of the building, to estimate existing carbon emissions, energy generation and heating/cooling demand.
- Proposed scenario was created by replacing existing glazing with more efficient one.
- We examined the carbon, energy and heating/cooling demand reduction between the two scenarios.

Key data that has been used to prepare this carbon study includes:

- Architectural drawings (floor plans, elevations and sections)
- Input details confirmation from design team
- Glazing specification received by the architect

Information Calculated

- Baseline carbon emissions, energy generation and heating/cooling demand
- Proposed carbon emissions, energy generation and heating/cooling demand
- % of saving on each set of calculation

3. IES VE Modelling – Input Data Analysis

For the purpose of carbon, energy and heating/cooling demand analysis, dynamic energy simulations have been completed.

3D building representation is displayed on Image 1 below, based on architectural drawings received.

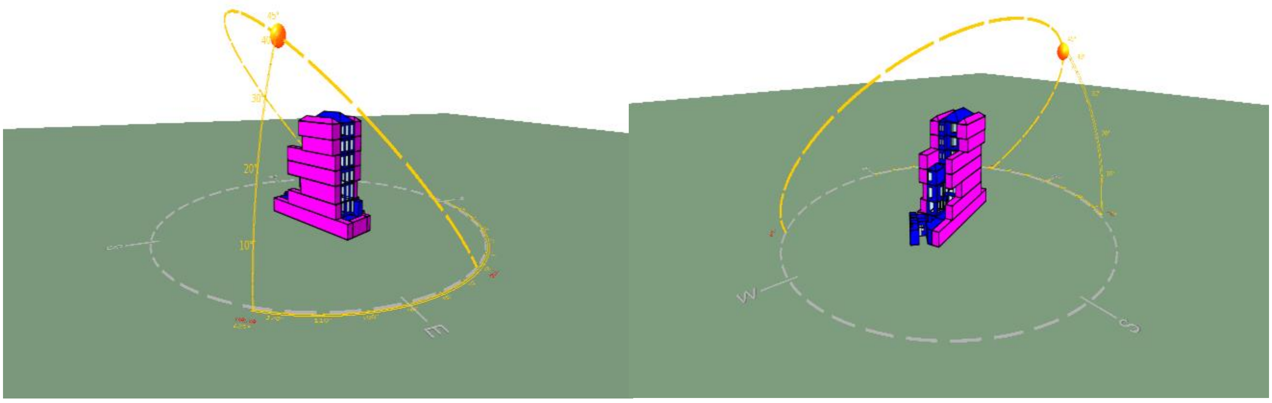

Image 1 3D modelling using IES VE ModelIT suite

BASELINE DYNAMIC SIMULATION – IES VE MODELLING INPUT DATA

Building Fabric Performance

The building envelope performance has been assumed based on the year of construction and the associated Building Regulations document. Information received by the client state that external wall is back on the 1800’s while roof is around 15-20 years old.

Building envelope performance figures are summarized in the following table.

Fabric Information	Values (W/m2L)
External Wall	2.2
Ground Floor	1.62
Roof	0.25
Front Glazing U value and g value / double glazing	1.6 (0.4)
Back Glazing U value and g value / single glazing	5.59 (0.62)

Table 4 Building Fabric Performance

Air permeability to 25 m3/hm2@50 Pa based on year of construction and on EPC conventions 7.1 guidance.

Electrical Information

- Based on site visit images lamp type is LED
- No lighting controls or daylight sensors available
- LOR is default at 0.5
- Power factor is less than 0.9 and we do not allow provision for metering and warn out of range values based.

Mechanical Information

- Gas Boiler Vaillant Eco Plus type on 94% seasonal efficiency
- Instantaneous electric DHW with efficiency of 1
- AC heating and cooling in the office areas with 2.5 COP/3 EER/4.5 SEER

- AHU for ventilation with plate heat exchanger on 65% efficiency and 1.6 W/l/s SFP
- Extraxt SFP is 0.5 W/l/s
- No HVAC controls

PROPOSED DYNAMIC SIMULATION – IES VE MODELLING INPUT DATA

Building fabric performance

The main and only difference between the existing and the proposed scenario is the glazing upgrade both to the front and the back of the building, which will have an impact to the building's air tightness.

Building envelope performance figures for the proposed scenario are summarized in the following table.

Fabric Information	Values (W/m2K)
External Wall	2.2
Ground Floor	1.62
Roof	0.25
Front Glazing U value and g value / Pilkington	0.9 (0.53)
Back Glazing U value and g value / SGG	0.9 (0.47)

Table 5 Building Fabric Performance

Air permeability to 15 m3/hm2@50 Pa glazing improvements, that will make the building more air tight

4. Carbon & Energy Analysis

Based on the input data above the assessment comparison between existing and proposed scenario resulted in the following findings.

Table 1 Heating and cooling demand assessment

Table 2 Energy assessment

4.1. Carbon Assessment

By upgrading the windows on the proposed scenario we manage to achieve an 8.2% CO2/m2 reduction per annum or 3.4kgCO2/m2 per annum. Table 6 below displays the findings while image 2 below shows a graphic representation of this saving.

Carbon Generation Assessment	
Analysis	**kgCO2/m2.annum**
Existing Scenario	41.5
Proposed Scenario	38.0
Savings	8.43%

Table 6 Carbon Reduction Assessment

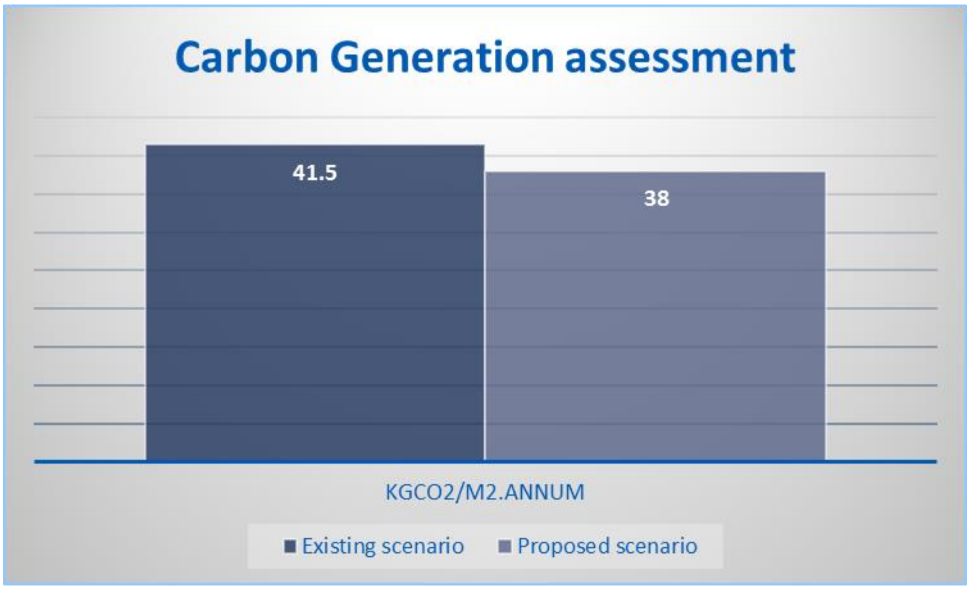

Image 3 Carbon Reduction Comparison

4.2. Energy Assessment

By upgrading the windows on the proposed scenario we manage to achieve an 8.14% energy consumption reduction per m2 per annum or 19.8 kWh/m2 per annum. Table 7 below displays the findings while image 3 below shows a graphic representation of this saving.

Energy Assessment	
Analysis	**kWh/m2**
Existing Primary Energy	243.23
Proposed Primary Energy	223.21
Savings	8.23%

Table 7 Energy Assessment

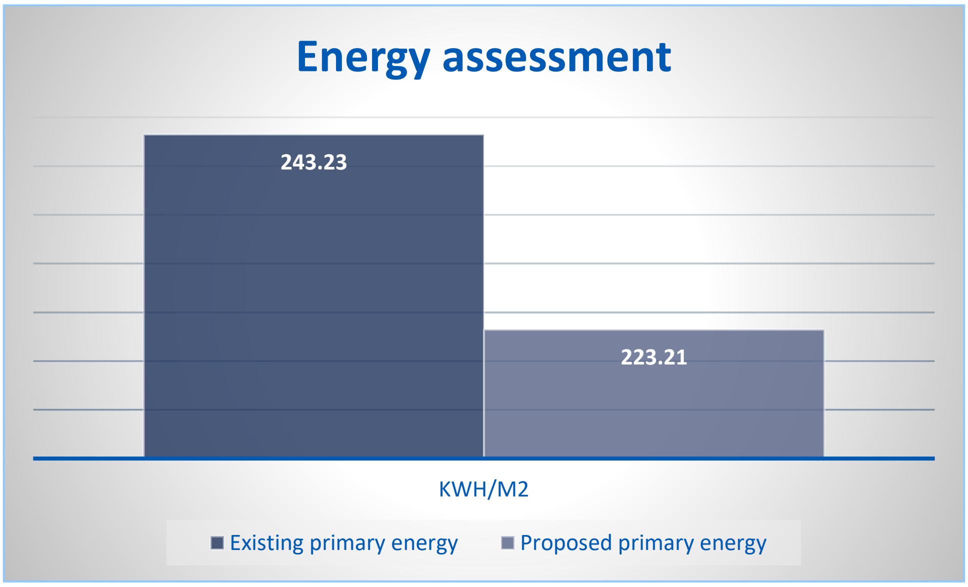

Image 3 Energy Assessment Comparison

4.3. Heating & Cooling demand assessment

Heating and cooling demand is reduced significantly by replacing the glazing elements on the front and the back of the building. Table 8 and image 4 display this reduction in load demand between the two scenarios.

Heating & Cooling Demand Assessment	
Analysis	**MJ/m2**
Existing Heating & Cooling Demand	305.17
Proposed Heating & Cooling Demand	254.64
Savings	16.55%

Table 8 Load Demand Assessment

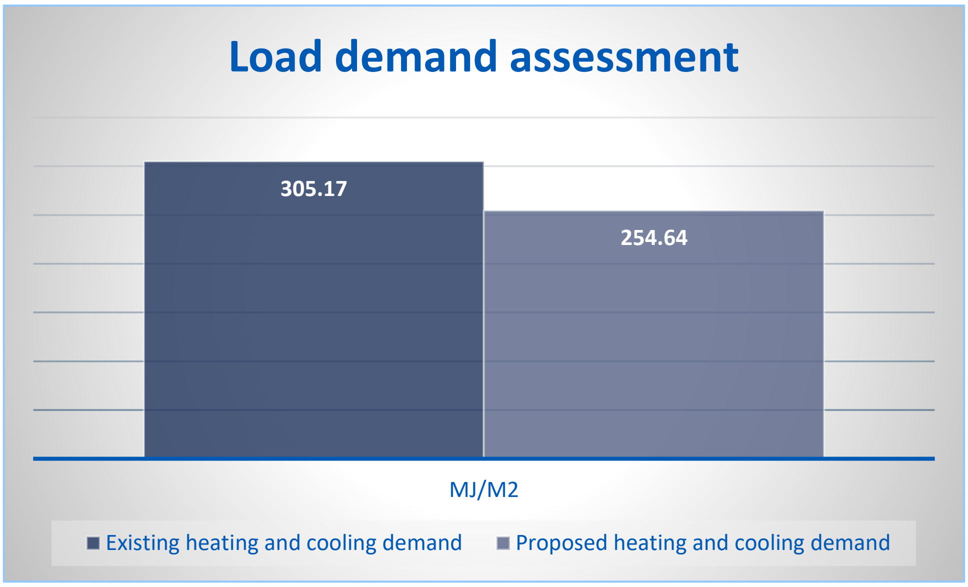

Image 4 Load Demand Reduction

5. Summary / Conclusions

The main purpose of this assessment was to examine the impact on carbon, energy and load by replacing existing glazing with more efficient one. Front and back windows have been replaced by efficient double glazed units that assisted us to reduce the air leakage along with the savings in carbon, energy and load.

As a conclusion we can state that the building achieves an approximate 8% reduction in carbon and energy just by replacing the windows and a circa 16% reduction in heating and cooling load demand.

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