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Proposed extension to existing  
office block  
Everest House, Sopers Road,  
Cuffley, Potters Bar En6 4SG

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## Energy Statement

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Roger Law  
WEA Ltd  
October 2023

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## **1.0 Executive summary**

### **1.1 The Application**

This energy strategy has been prepared to quantify the energy options for a proposed extension to an existing office three storey office block. The proposed works comprise a reconfiguration of the existing roof and extending it to create an additional floor for office use, a small side infill extension from ground to second floors as well as some external improvements to the façade of the building including cladding. The extension would result in an additional 531m<sup>2</sup> of office floor space (Class E). This report will set out a strategy to achieve the aims and objectives of Welwyn Hatfield Borough Council's District Plan 2005, Welwyn Hatfield Draft Local Plan Proposed Submission (August 2016) Incorporating The Proposed Main Modifications (January 2023), specifically Policies SP10 & SADM13.

### **1.2 Policy and Drivers**

This strategy summarises the relevant planning policies and requirements applicable to the development in relation to Energy and Carbon Emissions as specified in Welwyn Hatfield's Plans & Policies highlighted in section 1.1 above and the pre-application report (13/07/23)

Briefly Policy SP10 sets out the strategic approach to promoting more environmentally sustainable development within the borough, supported by more detailed criteria set out in SADM 13.

SADM 13 sets out the Sustainability requirement for non-residential developments:

1. all major development proposals must demonstrate that they have sought to maximise opportunities for renewable and low carbon sources of energy supply where consistent with other Local Plan policies.
2. All non-residential development with a floorspace of 1,000 square metres or more will be required to meet at least BREEAM 'Excellent' unless it is demonstrated that it is not technically feasible or viable to do so, in which case such proposals will be required a "Very Good" rating.

The Development has been assessed to determine the estimated regulated energy requirements and associated CO<sub>2</sub> emissions, using AD L2B 2021.

### **1.3 BREEAM**

The proposed development has a floor area below the 1,000m<sup>2</sup> requirement of SADM 13.

No BREEAM pre-assessment is required.

## 1.4 Passive Design & Energy Efficiency Measures

A range of passive design and energy efficiency measures will be incorporated into the development, including:

- Suitable glazing ratio and low emissivity glass to balance heat losses, heat gains and daylight ingress.
- Fabric insulation levels achieving improvements over Building Regulations Part L2B (2021) minimum standards.
- 100% low energy lighting
- Lighting controls as appropriate to anticipated occupancy levels & patterns.

## 1.5 On-Site Renewable Energy Generation

A preliminary feasibility assessment of integrating low and zero carbon energy systems has been undertaken. This assessment has been based upon the floor layout plans dated April 2023. Based upon the results of the assessment it has been estimated that roof mounted PV panels would be the option technically most suited to this development.

It is anticipated that no further reduction in site-wide regulated CO2 emissions on the Building Regulations Part L2 'baseline' would be achieved via on-site renewable energy generation and that the proposed measures will achieve a **22.6% reduction** in site-wide regulated CO2 emissions beyond the basecase.

A summary of the results, extracted from the AD L2B 2021 SBEM reports follows:

	Kgs/year	Annual Saving Kgs	% Savings
<b>A - Baseline</b>	6,626	-	-
<b>B - Be Lean</b>	6,100	526	8.62
<b>C - Be Clean</b>	6,100	526	8.62
<b>D - Be Green</b>	5,129	1,137	22.59
<b>Cumulative on-site savings</b>		1,137	

## 2.0 Current planning policy and guidance

The following outlines the regulatory and planning policy requirements applicable to the development.

### 2.0.1 Approved Document Part L

Part L of the Building Regulations is the mechanism by which government is driving reductions in the regulated CO2 emissions from new buildings and extensions.

This proposal is for an extension to an existing building and has been assessed using AD L2B 2021.

## 2.02 National & Local Guidance

The National Planning Policy Framework states that planning and development must be responsive and resilient to environmental risks and climate change and seek to protect and enhance other aspects of the natural environment, objectives which the National Planning Policy Framework states are central to sustainable development. Paragraph 93 of the National Planning Policy Framework states that the planning system can help achieve radical reductions in greenhouse gas emissions and increase the delivery of renewable and low carbon energy. The UK Climate Change Act 2008 aims to reduce CO2 emissions by at least 80% below 1990 levels by 2050, and 50% by 2025. Analysis by the Committee on Climate Change, who recommend carbon reduction targets to the UK Government, indicate that the UK is not on track to achieve a 50% reduction by 2025. The UK's fifth carbon budget now sets a target of a 57% reduction on 1990 levels by 2030. The impacts associated with a changing climate relate to increased summer temperatures, increased winter precipitation and more extreme weather events. The indirect impacts of droughts, heat waves and prolonged/more intense precipitation upon the built environment are likely to include increased overheating of buildings and urban environments, increased flood risk, a decline in water resource availability and quality, and less stable ground conditions for buildings and other infrastructure. The natural and built environment will therefore need to both mitigate climate change by reducing emissions and also be designed to cope with future, not historical, climatic conditions wherever information and data enables this. To achieve these objectives, the National Planning Policy Framework requires Local Plans to adopt proactive strategies to mitigate and adapt to climate change.

The local requirements are dealt with by the Plans & Policies highlighted in section 1.1.

Additionally, the development is covered by the Northaw and Cuffley Neighbourhood Plan 2022-2026 (May 2023). Policy E2: Sopers Road states that:

1. Employment uses (including Class E, B2 and B8) will be supported at Sopers Road provided that they:
  - are of an appropriate scale;
  - respect the character of the village; and
  - do not provide significant adverse impacts on the road network or to local residential amenities.
2. Development proposals for higher employment floorspace densities at Sopers Road, including through larger replacement or expanded buildings, will be supported providing that the buildings do not exceed the height of the existing commercial properties.

### 3.0 Statement of Energy Use

#### 3.1 Energy

This strategy outlines how the dwellings will have a reduced impact on climate change by reducing CO2 emissions associated with energy use in buildings.

The Energy and CO2 appraisal is based on the following approach, in line with Welwyn Hatfield's Plans and Policies

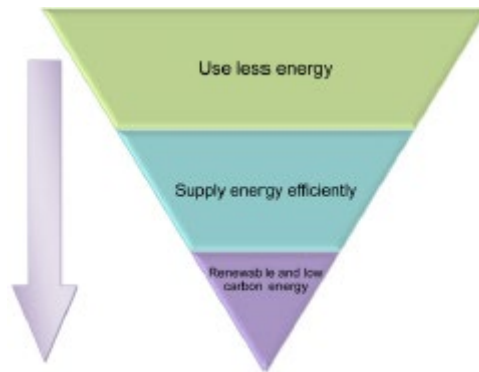


Figure 1: Energy Hierarchy

The strategic approach to the design has been to reduce demand for energy prior to the consideration of integrating Low or Zero Carbon (LZC) technologies, since controlling demand is the most effective way of reducing energy requirements and CO2 emissions.

Further reductions are ensured through the specification of high efficiency building services to limit losses in energy supply, storage, and distribution. After the inclusion of passive design and energy efficiency measures, various options have been investigated to reduce CO2 emissions associated with energy supply. The feasibility of LZC technologies has been investigated in line with the policy aspirations and as part of the Energy Strategy submitted in support of the application.

#### 3.2 Carbon Factors

The following AD L2B 2021 compliant CO2 emission factors in table below were used to convert the energy requirement figures into CO2 emissions.

Emission factor (kgCO2/kWh)	
Fuel	
Gas	0.210
Electricity	0.233

Building Regulations Part L2 2021 CO2 Emission Factor

## **4.0 The Assessment - Be Lean**

The following sections detail the passive design and energy efficiency measures that have been considered, and those that will be implemented.

### **4.2 Glazing Ratio**

The development has taken a 'fabric first' approach to reducing energy demand and CO2 emissions. Glazing on the south, east and west facing facades can lead to beneficial solar gains in winter months, whilst glazing on northerly orientations will typically lose heat. All glazing will be thermally efficient, using low emissivity glass and argon filled double glazed units, with a glazing G-value of 0.36 for the windows in the two south facing offices to prevent overheating, for all other windows the G value is 0.50.

### **4.3 Thermal Insulation**

Where required, demand for space heating can be significant. However, the demand can be significantly reduced through the provision of an efficient thermal envelope, by reducing the thermal transmittance of the building envelope where appropriate and reduce heating and cooling requirements.

The new dwellings will be construction using U values that are lower than those noted in the Building Regulation (2021 Part L2).

### **4.4 Fabric Air Permeability**

Fabric air permeability is a measure of the volume of air that can penetrate through the fabric of a building, leading to ventilation heat loss and gain.

High air permeability can lead to uncomfortable drafts and dramatically increase the demand for space heating in winter, and space cooling in summer, when the air flow works in reverse with cool air escaping from the building.

As the extension is dealt with by ADL2B, no air testing is required, but the construction team will ensure that best practice is followed by appropriately sealing the building to prevent the passage of air, during the construction.

### **4.5 Ventilation**

Mechanical ventilation will only be present in any toilets, showers and kitchen areas provided in accordance with Approved Document F.

Air conditioning will be available throughout the office areas.

### **4.6 Lighting**

With improving insulation levels reducing space heating demand, coupled with low water heating consumption due to point of use systems, lighting is a significant contributor to overall energy use.

To reduce lighting demand all fitting will be LED or other low energy luminaires and where appropriate lighting controls will be provided to restrict burning hours.

#### **4.7 Input U Values**

Initial SBEM calculations has been completed using the following U Values.

	AD L2B 2021 Table 4.1	Design U values
Roof (slope & Flat)	0.18	0.14
Walls	0.26	0.20
Floor	0.18	0.18
Windows & Doors	1.6	1.2

### **5.0 The Assessment - Be Clean**

The following looks at the infrastructure and clean energy supply measures that have been considered for the dwelling to further reduce regulated CO2 emissions and outlines any technologies that may be implemented.

#### **5.1 Infrastructure**

The infrastructure, including decentralised energy networks and on-site technologies, can be the key to achieving the target reduction in regulated CO2 emissions beyond the requirements of the Building Regulations ADL2 2022

#### **5.2 Decentralised Energy Networks**

There are no existing or planned heat networks in the near vicinity, therefore connection to an existing heat network is not an option.

#### **5.3 On-Site Technologies**

CHP is not a viable option for this development due to seasonality of the heat demand pattern whereby summer heat demand will only be for the provision of hot water.

### **6.0 Be Green**

The renewable energy generation measures that have been considered, and those which will be implemented are considered below.

Renewable technologies harness energy from the environment and convert this to a useful form. Many renewable technologies are available. However, not all these are commercially viable or appropriate for the development.

The current building is provided with electric panels heaters and air conditioning to the office areas. Non-occupied areas have panel heaters. Water heating is mostly provided by local of point of use water heaters.

To provide continuity it is proposed that the new extensions will mirror these systems.

In accordance with the Local Plan & Policies it is proposed to provide a renewable energy source on site. There are several options, not all of which are suitable. The following table summarises the options.

Technology	Criteria	Assessment	Overall suitability
<b>Ground Source Heat Pump</b>	Insufficient space for horizontal coil or separation of multiple boreholes	Insufficient space for horizontal coil. Boreholes are not an option	Not suitable
<b>Air Source Heat Pump</b>	Sufficient space for ASHP and auxiliary equipment Sufficient distance between installation and neighbours to avoid noise disturbance if located at rear of property	No internal heating distribution network is proposed	Not Suitable
<b>Solar PV</b>	Suitable roof orientation, lack of shading Limited roof space	Sufficient roof space available	Suitable
<b>Solar thermal</b>	Suitable roof orientation, lack of shading. Insufficient roof space if no PV provided. Year-round hot water demand. Compatibility with proposed heating system.	All water heating to be point of use	Not suitable
<b>Wind turbines</b>	In sufficient wind speed. Area not free from obstructions / causes of turbulence. Space for roof mounted unit only. Insufficient distance between installation and neighbours to <i>avoid</i> noise disturbance	High density urban location with insufficient wind speed. Potential noise and vibration issues.	Not suitable

For this extension, the options for providing on-site renewable technologies, is limited to single option - Solar PV. The initial SBEM modelling indicates that a total of 10kWp of PV is required.

## 7.0 Conclusions

This Energy Strategy has demonstrated **that, using passive measures and 10kWp of roof mounted PV panels, the site will achieve an estimated 22.6% reduction in**



**site-wide regulated CO2 emissions beyond the requirements of the Base Case scenario.**

## **APPENDICES**

### **Initial SBEM 2021 L2b assessment reports**

Base Case

Use Less Energy

Renewable Energy

## Project name

**NOTIONAL Extension Cuffley Place (Base) As designed**

Date: Fri Oct 27 15:34:33 2023

## Administrative information

## Building Details

**Address:** NOTIONAL 3rd Floor Extension, Cuffley Place,  
Sopers Road, Cuffley, POTTERS BAR, EN6 4SG

## Certifier details

**Name:** Simon Uden

**Telephone number:** 07515442665

**Address:** upenergy.co.uk, Exeter,

## Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v6.1.e.0

**Interface to calculation engine:** DesignBuilder SBEM

**Interface to calculation engine version:** v7.1.4

**BRUKL compliance module version:** v6.1.e.0

**Foundation area [m<sup>2</sup>]:** 199.09

The CO<sub>2</sub> emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> annum	3.47
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> annum	8.32
Target primary energy rate (TPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	36.43
Building primary energy rate (BPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	87.34
Do the building's emission and primary energy rates exceed the targets?	BER > TER   BPER > TPER

## The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	First surface with maximum value
Walls*	0.26	0.26	0.26	00 Exclude - 00 store_W_6
Floors	0.18	0.18	0.18	00 Exclude - 00 store_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.18	0.18	00 Exclude - 00 store_R_5
Windows** and roof windows	1.6	1.6	1.6	00 Exclude - 00 store_G_7
Rooflights***	2.2	-	-	No external rooflights
Personnel doors <sup>^</sup>	1.6	1.6	1.6	03 - circ1_D_7
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	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>i</sub>-Calc = Calculated maximum individual element 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)]

\* 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. \*\*\* Values for rooflights refer to the horizontal position.

<sup>^</sup> For fire doors, limiting U-value is 1.8 W/m<sup>2</sup>K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	8	15

## Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

### 1- Electric Panel

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	1	-	-	-	-
<b>Standard value</b>	N/A	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>					NO

### 2- AC Split System SEER 5 COP 2.5

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.5	5	-	-	-
<b>Standard value</b>	2.5*	5	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					NO

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

### 1- POU No store

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	1	-
<b>Standard value</b>	1	N/A

## Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
03 - wc1a	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc2a	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc2b	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc3	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - tea1	0.3	-	-	-	-	-	-	-	-	-	-	N/A

Zone name	General lighting and display lighting	General luminaire	Display light source	
		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	<b>Standard value</b>	95	80	0.3
00 Exclude - 00 store		95	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	<b>Standard value</b>	95	80	0.3
03 - stairs1		95	-	-
03 - wc1a		95	-	-
03 - wc2a		95	-	-
03 - wc2b		95	-	-
03 - stairs2		95	-	-
03 - wc3		95	-	-
03 - stairs3		95	-	-
03 - circ1		95	-	-
03 - circ2		95	-	-
03 - tea1		95	-	-
03 - off3		95	-	-
03 - off6		95	-	-
03 - off7		95	-	-
03 - off9		95	-	-
03 - off10		95	-	-
03 - off1		95	-	-
03 - off2a		95	-	-
03 - off2b		95	-	-
03 - off4		95	-	-
03 - off5		95	-	-
03 - off8		95	-	-

**The spaces in the building should have appropriate passive control measures to limit solar gains in summer**

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03 - tea1	NO (-77.4%)	NO
03 - off3	YES (+28.4%)	NO
03 - off6	NO (-10%)	NO
03 - off7	NO (-10.2%)	NO
03 - off9	YES (+16.9%)	NO
03 - off10	NO (-31.7%)	NO
03 - off1	NO (-6.4%)	NO
03 - off2a	NO (-31.9%)	NO
03 - off2b	NO (-31.9%)	NO
03 - off4	NO (-10%)	NO
03 - off5	NO (-11%)	NO
03 - off8	NO (-24.1%)	NO

**Regulation 25A: Consideration of high efficiency alternative energy systems**

<b>Were alternative energy systems considered and analysed as part of the design process?</b>	<b>NO</b>
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

	Actual	Notional
Floor area [m <sup>2</sup> ]	796.4	796.4
External area [m <sup>2</sup> ]	1505.5	1505.5
Weather	LON	LON
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	15	3
Average conductance [W/K]	632.26	566.09
Average U-value [W/m <sup>2</sup> K]	0.42	0.38
Alpha value* [%]	17.45	22.6

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

## Building Use

### % Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
<b>100</b>	<b>Offices and Workshop Businesses</b>
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	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	33.28	13.02
Cooling	5.91	4.37
Auxiliary	0.12	0.16
Lighting	15.11	6.85
Hot water	2.13	2.13
Equipment*	33.08	33.08
<b>TOTAL**</b>	<b>56.55</b>	<b>26.52</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	0	2.25
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>2.25</i>

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

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	264.64	176.09
Primary energy [kWh <sub>PE</sub> /m <sup>2</sup> ]	87.34	36.43
Total emissions [kg/m <sup>2</sup> ]	8.32	3.47

## 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] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Natural Gas</b>									
<b>Actual</b>	184.5	18.8	64.1	0	0.4	0.8	0	1	0
<b>Notional</b>	97.1	31.9	20.1	0	0.6	1.34	0	----	----
<b>[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
<b>Actual</b>	183.9	103.4	21.9	8.1	0	2.33	3.55	2.5	5
<b>Notional</b>	98.8	94.7	10.4	6	0	2.64	4.4	----	----

### 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

## Project name

**Proposed Extension Cuffley Place**

As designed

Date: Fri Oct 27 16:19:59 2023

## Administrative information

## Building Details

**Address:** 3rd Floor Extension, Cuffley Place, Sopers Road,  
Cuffley, POTTERS BAR, EN6 4SG

## Certifier details

**Name:** Simon Uden

**Telephone number:** 07515442665

**Address:** upenergy.co.uk, Exeter,

## Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v6.1.e.0

**Interface to calculation engine:** DesignBuilder SBEM

**Interface to calculation engine version:** v7.1.4

**BRUKL compliance module version:** v6.1.e.0

**Foundation area [m<sup>2</sup>]:** 199.09

The CO<sub>2</sub> emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> annum	3.45
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> annum	7.66
Target primary energy rate (TPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	36.22
Building primary energy rate (BPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	80.57
Do the building's emission and primary energy rates exceed the targets?	BER > TER   BPER > TPER

## The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	First surface with maximum value
Walls*	0.26	0.2	0.2	00 Exclude - 00 store_W_6
Floors	0.18	0.18	0.18	00 Exclude - 00 store_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.14	0.14	00 Exclude - 00 store_R_5
Windows** and roof windows	1.6	1.2	1.2	00 Exclude - 00 store_G_7
Rooflights***	2.2	-	-	No external rooflights
Personnel doors <sup>^</sup>	1.6	1.6	1.6	03 - circ1_D_7
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	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>i</sub>-Calc = Calculated maximum individual element 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)]

\* 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. \*\*\* Values for rooflights refer to the horizontal position.

<sup>^</sup> For fire doors, limiting U-value is 1.8 W/m<sup>2</sup>K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	8	15

## Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

### 1- Electric Panel

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	1	-	-	-	-
<b>Standard value</b>	N/A	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>					NO

### 2- AC Split System SEER 5 COP 2.5

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.5	5	-	-	-
<b>Standard value</b>	2.5*	5	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					NO

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

### 1- POU No store

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	1	-
<b>Standard value</b>	1	N/A

## Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
03 - wc1a	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc2a	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc2b	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc3	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - tea1	0.3	-	-	-	-	-	-	-	-	-	-	N/A

Zone name	General lighting and display lighting		General luminaire	Display light source	
	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]	
	<b>Standard value</b>	95	80	0.3	
00 Exclude - 00 store	95	-	-	-	



General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	<b>Standard value</b>	95	80	0.3
03 - stairs1		95	-	-
03 - wc1a		95	-	-
03 - wc2a		95	-	-
03 - wc2b		95	-	-
03 - stairs2		95	-	-
03 - wc3		95	-	-
03 - stairs3		95	-	-
03 - circ1		95	-	-
03 - circ2		95	-	-
03 - tea1		95	-	-
03 - off3		95	-	-
03 - off6		95	-	-
03 - off7		95	-	-
03 - off9		95	-	-
03 - off10		95	-	-
03 - off1		95	-	-
03 - off2a		95	-	-
03 - off2b		95	-	-
03 - off4		95	-	-
03 - off5		95	-	-
03 - off8		95	-	-

**The spaces in the building should have appropriate passive control measures to limit solar gains in summer**

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03 - tea1	NO (-77.4%)	NO
03 - off3	NO (-7.6%)	NO
03 - off6	NO (-10%)	NO
03 - off7	NO (-10.2%)	NO
03 - off9	NO (-15.8%)	NO
03 - off10	NO (-31.7%)	NO
03 - off1	NO (-6.4%)	NO
03 - off2a	NO (-31.9%)	NO
03 - off2b	NO (-31.9%)	NO
03 - off4	NO (-10%)	NO
03 - off5	NO (-11%)	NO
03 - off8	NO (-24.1%)	NO

**Regulation 25A: Consideration of high efficiency alternative energy systems**

<b>Were alternative energy systems considered and analysed as part of the design process?</b>	<b>NO</b>
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

	Actual	Notional
Floor area [m <sup>2</sup> ]	796.4	796.4
External area [m <sup>2</sup> ]	1505.5	1505.5
Weather	LON	LON
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	15	3
Average conductance [W/K]	482.45	566.09
Average U-value [W/m <sup>2</sup> K]	0.32	0.38
Alpha value* [%]	22.87	22.6

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

## Building Use

### % Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
<b>100</b>	<b>Offices and Workshop Businesses</b>
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	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	28.94	13.02
Cooling	5.95	4.37
Auxiliary	0.12	0.16
Lighting	15.11	6.85
Hot water	2.13	2.13
Equipment*	33.08	33.08
<b>TOTAL**</b>	<b>52.25</b>	<b>26.52</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	0	2.4
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>0</i>	<i>2.4</i>

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

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	237.7	176.09
Primary energy [kWh <sub>PE</sub> /m <sup>2</sup> ]	80.57	36.22
Total emissions [kg/m <sup>2</sup> ]	7.66	3.45

## HVAC Systems Performance

System Type	Heat dem MJ/m <sup>2</sup>	Cool dem MJ/m <sup>2</sup>	Heat con kWh/m <sup>2</sup>	Cool con kWh/m <sup>2</sup>	Aux con kWh/m <sup>2</sup>	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
<b>[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Natural Gas</b>									
<b>Actual</b>	167.2	18.9	58.1	0	0.4	0.8	0	1	0
<b>Notional</b>	97.1	31.9	20.1	0	0.6	1.34	0	----	----
<b>[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
<b>Actual</b>	152.7	104	18.2	8.1	0	2.33	3.55	2.5	5
<b>Notional</b>	98.8	94.7	10.4	6	0	2.64	4.4	----	----

### Key to terms

Heat dem [MJ/m <sup>2</sup> ]	= Heating energy demand
Cool dem [MJ/m <sup>2</sup> ]	= Cooling energy demand
Heat con [kWh/m <sup>2</sup> ]	= Heating energy consumption
Cool con [kWh/m <sup>2</sup> ]	= Cooling energy consumption
Aux con [kWh/m <sup>2</sup> ]	= 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

## Project name

**Proposed Extension Cuffley Place (+ PV)**

As designed

Date: Fri Oct 27 16:23:46 2023

## Administrative information

## Building Details

**Address:** 3rd Floor Extension, Cuffley Place, Sopers Road,  
Cuffley, POTTERS BAR, EN6 4SG

## Certifier details

**Name:** Simon Uden

**Telephone number:** 07515442665

**Address:** upenergy.co.uk, Exeter,

## Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v6.1.e.0

**Interface to calculation engine:** DesignBuilder SBEM

**Interface to calculation engine version:** v7.1.4

**BRUKL compliance module version:** v6.1.e.0

**Foundation area [m<sup>2</sup>]:** 199.09

The CO<sub>2</sub> emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> annum	3.45
Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> annum	6.44
Target primary energy rate (TPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	36.22
Building primary energy rate (BPER), kWh <sub>PE</sub> /m <sup>2</sup> annum	66.48
Do the building's emission and primary energy rates exceed the targets?	BER > TER   BPER > TPER

## The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U <sub>a</sub> -Limit	U <sub>a</sub> -Calc	U <sub>i</sub> -Calc	First surface with maximum value
Walls*	0.26	0.2	0.2	00 Exclude - 00 store_W_6
Floors	0.18	0.18	0.18	00 Exclude - 00 store_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.14	0.14	00 Exclude - 00 store_R_5
Windows** and roof windows	1.6	1.2	1.2	00 Exclude - 00 store_G_7
Rooflights***	2.2	-	-	No external rooflights
Personnel doors <sup>^</sup>	1.6	1.6	1.6	03 - circ1_D_7
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	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>i</sub>-Calc = Calculated maximum individual element 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)]

\* 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. \*\*\* Values for rooflights refer to the horizontal position.

<sup>^</sup> For fire doors, limiting U-value is 1.8 W/m<sup>2</sup>K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa	8	15

## Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

### 1- Electric Panel

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	1	-	-	-	-
<b>Standard value</b>	N/A	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>					NO

### 2- AC Split System SEER 5 COP 2.5

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
<b>This system</b>	2.5	5	-	-	-
<b>Standard value</b>	2.5*	5	N/A	N/A	N/A
<b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>					NO

\* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

### 1- POU No store

	Water heating efficiency	Storage loss factor [kWh/litre per day]
<b>This building</b>	1	-
<b>Standard value</b>	1	N/A

## Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	ID of system type	SFP [W/(l/s)]									HR efficiency	
		A	B	C	D	E	F	G	H	I	Zone	Standard
	<b>Standard value</b>	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
03 - wc1a	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc2a	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc2b	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - wc3	0.3	-	-	-	-	-	-	-	-	-	-	N/A
03 - tea1	0.3	-	-	-	-	-	-	-	-	-	-	N/A

Zone name	General lighting and display lighting	General luminaire	Display light source	
		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	<b>Standard value</b>	95	80	0.3
00 Exclude - 00 store		95	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m <sup>2</sup> ]
	<b>Standard value</b>	95	80	0.3
03 - stairs1		95	-	-
03 - wc1a		95	-	-
03 - wc2a		95	-	-
03 - wc2b		95	-	-
03 - stairs2		95	-	-
03 - wc3		95	-	-
03 - stairs3		95	-	-
03 - circ1		95	-	-
03 - circ2		95	-	-
03 - tea1		95	-	-
03 - off3		95	-	-
03 - off6		95	-	-
03 - off7		95	-	-
03 - off9		95	-	-
03 - off10		95	-	-
03 - off1		95	-	-
03 - off2a		95	-	-
03 - off2b		95	-	-
03 - off4		95	-	-
03 - off5		95	-	-
03 - off8		95	-	-

**The spaces in the building should have appropriate passive control measures to limit solar gains in summer**

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03 - tea1	NO (-77.4%)	NO
03 - off3	NO (-7.6%)	NO
03 - off6	NO (-10%)	NO
03 - off7	NO (-10.2%)	NO
03 - off9	NO (-15.8%)	NO
03 - off10	NO (-31.7%)	NO
03 - off1	NO (-6.4%)	NO
03 - off2a	NO (-31.9%)	NO
03 - off2b	NO (-31.9%)	NO
03 - off4	NO (-10%)	NO
03 - off5	NO (-11%)	NO
03 - off8	NO (-24.1%)	NO

**Regulation 25A: Consideration of high efficiency alternative energy systems**

<b>Were alternative energy systems considered and analysed as part of the design process?</b>	<b>NO</b>
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

	Actual	Notional
Floor area [m <sup>2</sup> ]	796.4	796.4
External area [m <sup>2</sup> ]	1505.5	1505.5
Weather	LON	LON
Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa]	15	3
Average conductance [W/K]	482.45	566.09
Average U-value [W/m <sup>2</sup> K]	0.32	0.38
Alpha value* [%]	22.87	22.6

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

## Building Use

### % Area Building Type

	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
<b>100</b>	<b>Offices and Workshop Businesses</b>
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	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	28.94	13.02
Cooling	5.95	4.37
Auxiliary	0.12	0.16
Lighting	15.11	6.85
Hot water	2.13	2.13
Equipment*	33.08	33.08
<b>TOTAL**</b>	<b>52.25</b>	<b>26.52</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	9.65	2.4
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>9.65</i>	<i>2.4</i>

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

	Actual	Notional
Heating + cooling demand [MJ/m <sup>2</sup> ]	237.7	176.09
Primary energy [kWh <sub>PE</sub> /m <sup>2</sup> ]	66.48	36.22
Total emissions [kg/m <sup>2</sup> ]	6.44	3.45

## HVAC Systems Performance

System Type	Heat dem MJ/m <sup>2</sup>	Cool dem MJ/m <sup>2</sup>	Heat con kWh/m <sup>2</sup>	Cool con kWh/m <sup>2</sup>	Aux con kWh/m <sup>2</sup>	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
<b>[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Natural Gas</b>									
<b>Actual</b>	167.2	18.9	58.1	0	0.4	0.8	0	1	0
<b>Notional</b>	97.1	31.9	20.1	0	0.6	1.34	0	----	----
<b>[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity</b>									
<b>Actual</b>	152.7	104	18.2	8.1	0	2.33	3.55	2.5	5
<b>Notional</b>	98.8	94.7	10.4	6	0	2.64	4.4	----	----

### Key to terms

Heat dem [MJ/m <sup>2</sup> ]	= Heating energy demand
Cool dem [MJ/m <sup>2</sup> ]	= Cooling energy demand
Heat con [kWh/m <sup>2</sup> ]	= Heating energy consumption
Cool con [kWh/m <sup>2</sup> ]	= Cooling energy consumption
Aux con [kWh/m <sup>2</sup> ]	= 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