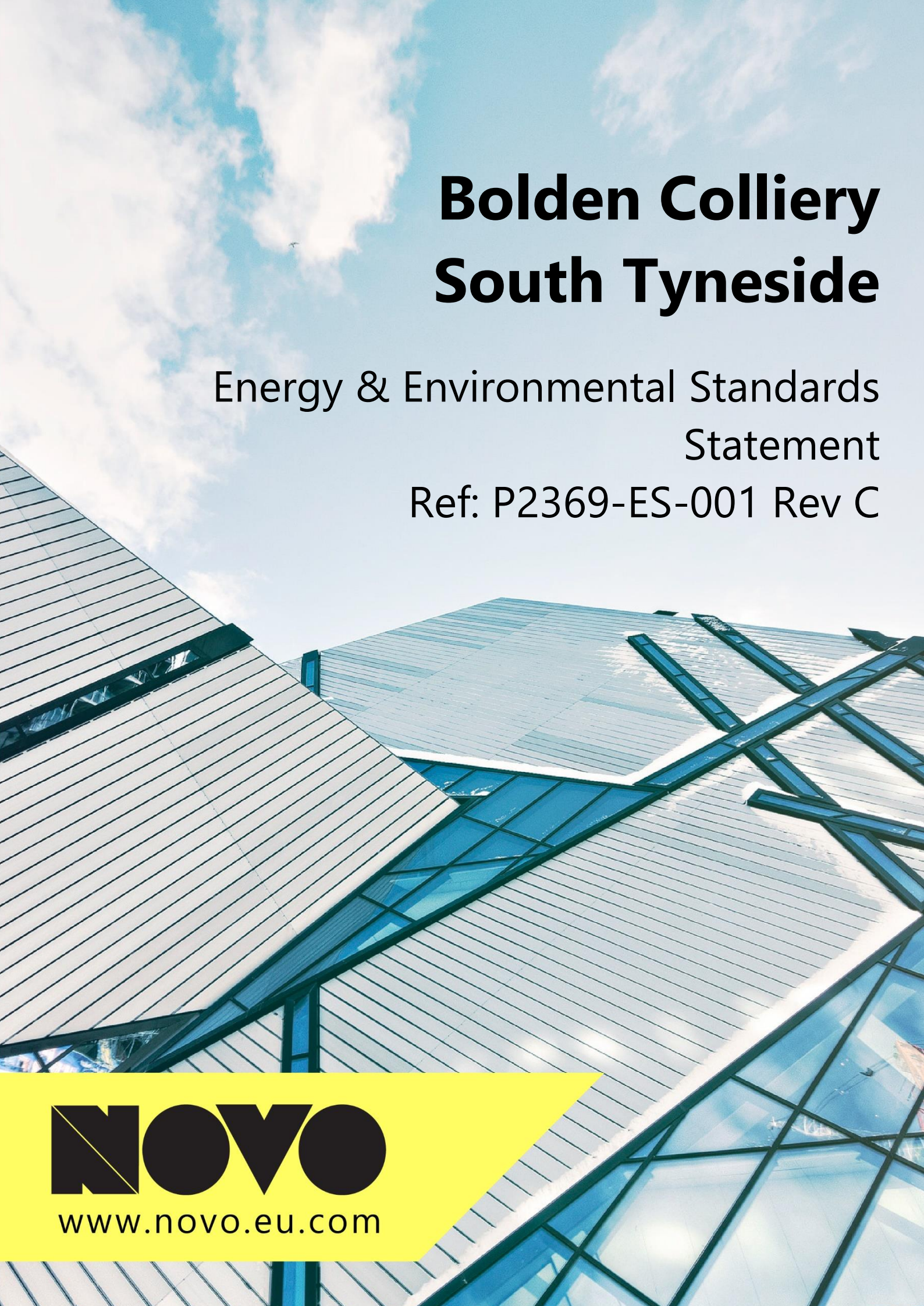
Bolden Colliery
South Tyneside

Energy & Environmental Standards Statement

Ref: P2369-ES-001 Rev C



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AMENDMENT HISTORY

REVISION	DESCRIPTION	DATE	AUTHOR	CHECKED
A	Initial Issue	Oct 2024	A. Smith	C. Pearson
B	Client Comments Update	Oct 2024	A. Smith	C. Pearson
C	Client Comments Update	Oct 2024	A. Smith	C. Pearson

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Appendix A – BRUKL Reports (issued separately)

1 EXECUTIVE SUMMARY

The proposed Care Home development known as Bolden Colliery is located within South Tyneside. As such the policies detailed in South Tyneside Core Strategy and Development Management Policies must be adhered to. This report will directly address policy ST2 and policy DM1 of the South Tyneside Core Strategy and Development Management Policies, ultimately concluding that the development generates 10% of its energy requirements from renewable energy and produces less CO_2 emissions, by adopting sustainable design and construction measures and by supplying energy efficiently.

The methodology for this report will follow the Energy Hierarchy as set out in South Tyneside Core Strategy and Development Management Policies, making improvements to the envelope first, reviewing the results due to these fabric improvements and then reviewing suitable technologies to enhance this design philosophy where feasible.

The proposed fabric specification is described in Table 1 below.

Table 1 Building Fabric Specification

Building Fabric			
Element	**L2: 2021 Limiting U-values (W/m².k)**	**L2: 2021 Notional U-values (W/m².k)**	**Proposed U-values (W/m².k)**
Floors	0.18	0.18	0.11
External Walls	0.26	0.18	0.15
Pitched Roof	0.16	0.15	0.15
Flat Roof	0.18	0.15	0.12
Windows	1.60	1.40	1.30 (G-Value 0.4)
Doors	1.6	1.9	1.60
Air permeability (m²/h.m² @ 50 pa)			
Building Envelope	8.0	3.0	3.0

Regarding the systems used, the development will utilise an all-electric specification including radiators served by an air source heat pump. The hot water cylinders are fed from the same system which will have a SCOP of 3.5 or higher. Furthermore, mechanical ventilation with heat recovery will service the ventilation requirements of each dwelling and will recover circa 90% of heat expelled to the atmosphere. The services strategy will be supplemented by a Photovoltaic (PV) array to supply renewable energy which generates 14.52% of the schemes energy requirements.

In addition to efficient systems, consideration has been given to the reduction of mains potable water usage through efficient water fixtures. This is further detailed in section 4.5 however potable water demand is to be reduced to <16 litres/person/day as per the requirement within Building Regulations.

For the proposed development, the following results have been obtained.

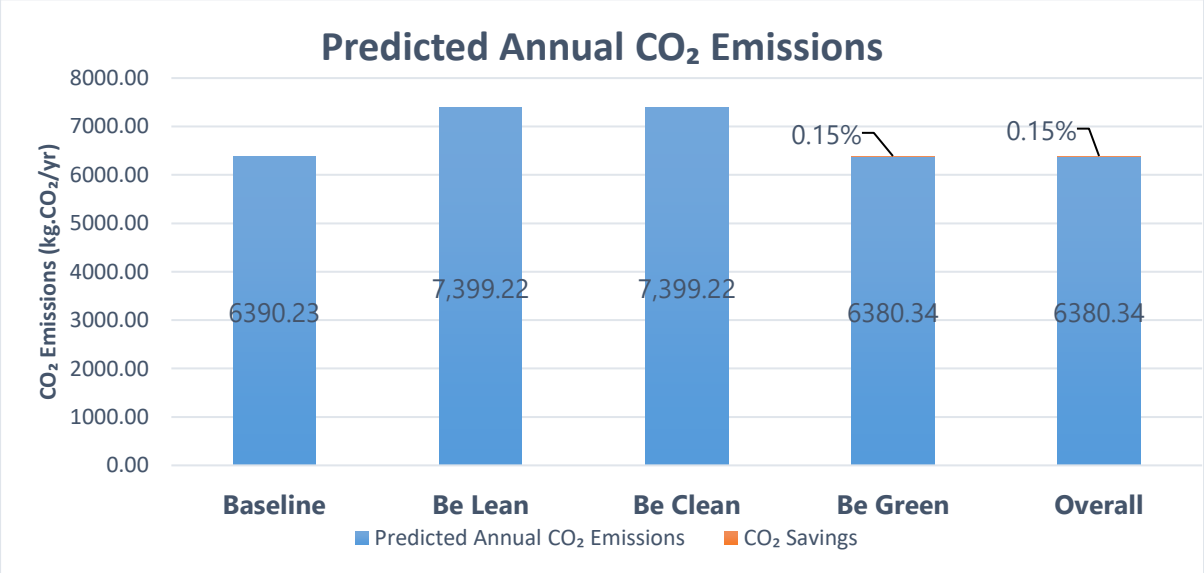
Table 2 As-Designed Building Regulations Part L 2021 Results

Target Emission Rate vs Building Emission Rate	
Target Carbon Dioxide Emission Rate (TER)	6.46 $kgCO_2/m^2.yr$
Building Carbon Dioxide Emission Rate (BER)	6.45 $kgCO_2/m^2.yr$
% Reduction	**0.15%**
Target Primary Energy Rate vs Building Primary Energy Rate	
Target Primary Energy Rate (TPER)	69.68 $kWh/m^2.yr$
Building Primary Energy Rate (DPER)	69.32 $kWh/m^2.yr$
% Reduction	**0.52%**
Energy Consumption by End Use	
Building Energy Consumption	54.76 $kWh/m^2.yr$
Renewable Energy Generation	7.95 $kWh/m^2.yr$
% Energy Generated by Renewables	**14.52%**

As all compliance metrics in Table 2 have been passed it is deemed that the development complies with Part L2 2021 and supports policy ST2 and policy DM1 of the South Tyneside Core Strategy and Development Management Policies.

The below graph displays the performance of this development within the Energy Hierarchy.

Figure 1 Energy Hierarchy Overall Results



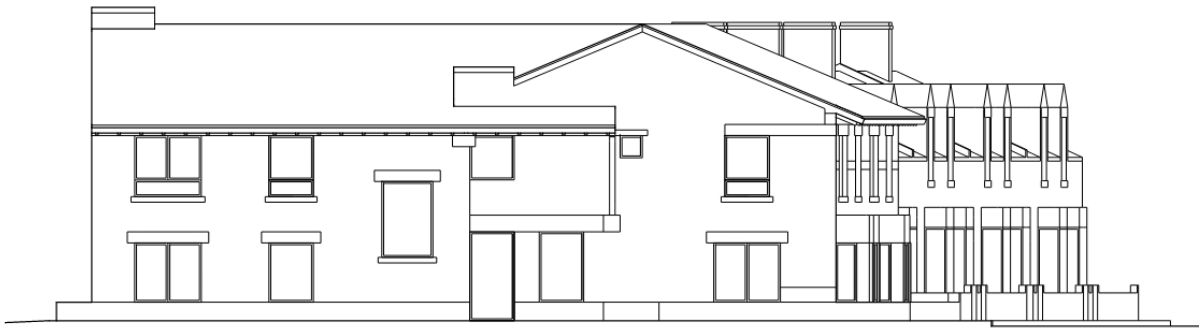
2 INTRODUCTION

2.1 PURPOSE

NOVO Integration Ltd has been appointed as Energy Consultants to produce an Energy and Environmental Standards Statement for Bolden Colliery, South Tyneside.

This is to support the scheme design process, demonstrate Building Regulations Part L compliance and achieve the applicable planning policies set out in the South Tyneside Core Strategy and Development Management Policies.

Figure 2: Bolden Colliery, South Tyneside



This report will outline the following:

1. Assess the proposed development site's estimated CO_2 emissions, it will look into the feasibility of Low Zero Carbon technologies, examining the following aspects relative to LZC/renewable technologies:

    - Energy generated by Renewable/Low Zero Carbon Technologies (LZC)
    - Feasibility assessment for each Renewable/Low Zero Carbon Technologies (LZC)
    - Local Planning Requirements

2. The proposed building fabric and Low Zero Carbon (LZC) design strategy and analysis calculations, with demonstration of how the design is compliant with Part L2 2021 Building Regulations.

2.2 BACKGROUND POLICY DOCUMENTS

The following statements and regulatory guidelines form the policy background to this energy strategy:

- The Kyoto Protocol at the United Nations.
- Framework Convention on Climate Change as negotiated in December 1997 has come into effect on 16 February 2005 following the ratification of the agreement by Russia on 18 November 2004. The Burden Sharing Agreement of the EU mandates a 12.5% reduction in greenhouse gas emissions for the UK by 2008 - 12.
- The Department of Transport and Industry White Paper, titled "Our Energy Future - Creating a Low Carbon Economy", spells out a target for 10% of electricity to be from renewable sources nationally by 2010 and twice this by 2020.

- National Policy Objectives in regard to renewable energy Planning Policy Statement 22: Renewable energy guidance for local governing bodies concerning implementation of renewable energy technologies through appropriate planning.
- The United Kingdom has made commitments that extend beyond this requirement. National Targets are for a reduction to 20% below 1990 CO_2 levels by 2010 and a 60% reduction by 2050.
- Integrating renewable energy into new developments: Toolkit for planners, developers and consultants, September 2004.
- Approved Document Part L Volume 2: Buildings other than Dwellings 2021
- National Planning Policy Framework (July 2021)
  The National Planning Policy Framework is a key part of our reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. In particular point A of paragraph 16 which states the following:

  Plans should:

  a) be prepared with the objective of contributing to the achievement of sustainable development.

  b) be prepared positively, in a way that is aspirational but deliverable

  c) be shaped by early, proportionate, and effective engagement between plan makers and communities, local organisations, businesses, infrastructure providers and operators and statutory consultees

  d) contain policies that are clearly written and unambiguous, so it is evident how a decision maker should react to development proposals

  e) be accessible through the use of digital tools to assist public involvement and policy presentation; and

  f) serve a clear purpose, avoiding unnecessary duplication of policies that apply to a particular area (including policies in this Framework, where relevant).

Another key point of the NPPF is paragraph 8, point C which states the following:

Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

c) an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural

resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

- South Tyneside Core Strategy (June 2007)
- South Tyneside Development Management Policies (December 2011)
- South Tyneside Site-Specific Allocations (April 2012)
- RIBA 2030 Climate Challenge

2.3 SITE DESCRIPTION

The site is located in the Boldens area of Tyne and Wear, the surrounding building make up is predominantly domestic with scattered amenities such as cafes, pubs and takeaways in the immediate vicinity.

Figure 3: Ariel View



2.4 PLANNING POLICY

2.4.1 Local Policy

The locality of the development site means it falls under the jurisdiction of South Tyneside City Council. As such the policies adopted by South Tyneside City Council must be adhered to. The document that details the South Tyneside Core Strategy (2007) and Development Management Policies (2011), throughout the remainder of this report shall be referred to as the South Tyneside Core Strategy and Development Management Policies.

South Tyneside Core Strategy, Policy ST2 – Climate Change:

High quality in sustainable urban living will be promoted by ensuring that:

A) highest standards of urban design are promoted so that buildings and their settings make a positive contribution to the local area;

B) the use of environmentally sound and energy efficient construction materials and operational techniques are achieved and that developers work towards low carbon and zero carbon standards;

C) on-site generation of renewable energy is maximised, with a target of 10% of each scheme's energy requirements;

D) use is made of 'sustainable urban drainage systems' and water conservation features including 'grey water recycling' and other technologies wherever possible;

E) priority is given to alternative modes of transport to the private car, and access by:
- *i) requiring travel plans for developments which would have significant transport implications;*
- *ii) enhancing electronic communication infrastructure;*

F) the need to design out crime and eliminate the fear of crime has been addressed;

G) buildings and their settings are designed to be flexible, enabling them to adapt to future needs and to take into account the needs of all users; and

H) all new development is encouraged to incorporate biodiversity and geological features at the design stage.

South Tyneside Development Management Policies, Policy DM1 – Management of Development:

In determining all applications under the planning Acts we will ensure that, where relevant:

A) the development, including new buildings, extensions and alterations to existing buildings, is designed to convey sensitive consideration of its surroundings, and where possible enhance its local setting and reinforce local identity, having particular regard to scale and proportions, alignment, form, use of materials and architectural detailing;

B) the development is acceptable in relation to any impact on residential amenity;

C) the development protects existing soft landscaping, including trees and hedges, where possible or provides replacement planting where necessary;

D) new development provides well-designed external spaces including streets, squares and parks, where possible linked to the wider green infrastructure network, with hard and soft landscaping to provide a high quality setting for buildings, improve visual amenity, enhance community activity and support the provision of priority natural habitats and species;

E) the design of buildings and external spaces incorporates focal points and landmarks to aid recognition and legibility of the townscape and streetscape, including public art, where possible;

F) the design of advertisements complements the architecture to which it relates and the local context, and is considered as an integral part of the development;

G) the impact of the development is acceptable in relation to highway capacity and safety or includes proposals to mitigate any adverse impacts;

H) new development provides site layouts that facilitate convenient and safe routes between facilities, and prioritises movement by pedestrians and cyclists;

I) the needs of all users for access around sites and into buildings for public use are considered as an integral part of the development;

J) the development is designed to achieve lower carbon emissions, and to be energy efficient and maximise the use of renewable and low carbon energy sources, having greater resilience to the likely affects of climate change, including higher summer temperatures and increased prevalence of flood events. Where relevant, development should incorporate green spaces to mitigate the heating of urban areas and should create and support opportunities for sustainable forms of transport, drainage and waste management;

K) the development is designed to minimise and mitigate localised flood risk, both on site or elsewhere, where this has been identified by the Strategic Flood Risk Assessment, Site-Specific Flood Risk Assessment or Surface Water Management Plan. For any development proposed in a Critical Drainage Area, as identified by the Strategic Flood Risk Assessment, a full flood risk assessment and drainage impact assessment may be required. Development on any sites allocated in Flood Risk Zones will only be permitted in accordance with the findings of a Sequential Flood Risk Assessment;

L) the development does not adversely impact upon air pollution levels, particularly of nitrogen dioxide in the Boldon Lane/Stanhope Road and Leam Lane/Lindisfarne Roundabout Air Quality Management Areas (as shown on the Proposals Map), or any other designated area where air quality objectives are not met or not likely to be met in the foreseeable future or as a result of the proposed development;

M) any risks of contamination have been fully assessed and, where necessary, remediation measures, appropriate to the intended use of the land, are included as part of the development proposals; and

N) the development takes into consideration the potential legacy of mineral workings, particularly in areas of known former mine shafts (see Annex D), and also the existence of landfill sites at Newton Garths, Temple Park, Trow Quarry and Gypsies Green.

As the Appointed Energy Assessors this report predominantly addresses sections ST2: B&C and DM1: J.

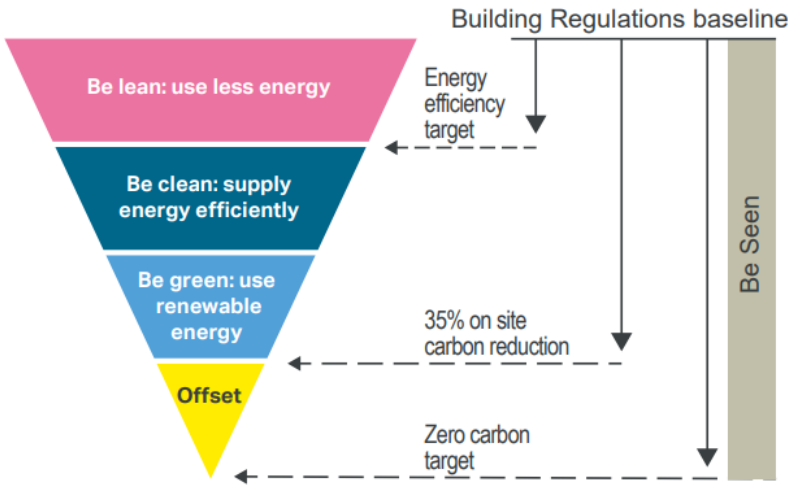
2.4.2 Energy Hierarchy

As part of the Sustainability and Energy analysis of the development Energy Hierarchy has been used as a means of structuring the sustainable design process.

We have taken this approach in order to properly address the South Tyneside Local Plan Policies which promote low carbon design, assessment of connection to CHP and consideration of other low – zero carbon technologies.

An overview of the Energy Hierarchy is provided below:

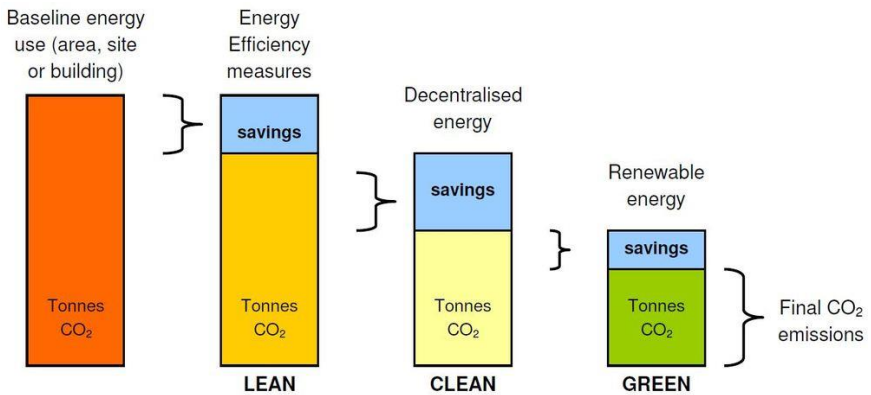
Figure 4: Energy Hierarchy Diagram



The development Energy strategy has adopted the following design ethos:

- **BE LEAN** – By using less energy and taking into account the further energy efficiency measure in comparison to the baseline building.
- **BE CLEAN** – By supplying energy efficiently. The clean building looks at further carbon dioxide emission savings over the lean building by taking into consideration the use of decentralise energy via CHP.
- **BE GREEN** – By integrating renewable energy into the scheme which can further reduce the carbon dioxide emission rate.

Figure 5: Energy Hierarchy Example Graph



2.5 BUILDING REGULATIONS

Compliance with Part L 2021 Vol 2: Buildings other than dwellings is required.

To comply with these regulations 2nr compliance metrics must be met, these are:

1) The Dwelling Emission Rate must be lower than the Target Emission Rate
2) The Dwelling Primary Energy Rate must be lower than the Target Primary Energy Rate

The non-domestic regulations do not have a fabric efficiency target in the same vein as the domestic regulations however, a set of limiting fabric u-values must be achieved as a minimum.

The following are some key extracts from ADL2 detailing the requirements of the regulations, for full details please refer to Part L Volume 2 2021: Buildings other than dwellings.

Regulations

Methodology of calculation of the energy performance

24. (1) The Secretary of State shall approve—

(a) a methodology of calculation of the energy performance of buildings, including methods for calculating asset ratings and operational ratings of buildings; and

(b) ways in which the energy performance of buildings, as calculated in accordance with the methodology, shall be expressed.

(2) In this regulation—

"asset rating" means an energy performance indicator determined from the amount of energy estimated to meet the different needs associated with a standardised use of the building; and

"operational rating" means an energy performance indicator determined from the amount of energy consumed during the occupation of a building over a period of time and the energy demand associated with a typical use of the building over that period.

Minimum energy performance requirements for new buildings

25. Minimum energy performance requirements shall be approved by the Secretary of State, calculated and expressed in accordance with the methodology approved pursuant to regulation 24, for—

(a) new buildings (which shall include new dwellings), in the form of target CO_2 emission rates;

(b) new dwellings, in the form of target fabric efficiency rates; and

(c) new buildings in the form of target primary energy rates.

Nearly zero-energy requirements for new buildings

25B. Where a building is erected, it must be a nearly zero-energy building.

CO_2 emission rates for new buildings

26. Where a building is erected, it shall not exceed the target CO_2 emission rate for the building that has been approved pursuant to regulation 25, applying the methodology of calculation and expression of the energy performance of buildings approved pursuant to regulation 24.

Fabric energy efficiency rates for new dwellings

26A. Where a dwelling is erected, it shall not exceed the target fabric energy efficiency rate for the dwelling that has been approved pursuant to regulation 25, applying the methodology of calculation and expression of the energy performance of buildings approved pursuant to regulation 24.

Target primary energy rates for new buildings

26C. Where a building is erected it must not exceed the target primary energy rate for the building which has been approved pursuant to regulation 25(c), applying the methodology of calculation and expression of the energy performance of buildings approved pursuant to regulation 24.

Regulation *continued*

CO_2 emission rate calculations

27. (1) This regulation applies where a building is erected and regulation 26 applies.

(2) Not later than the day before the work starts, the person carrying out the work shall give the local authority a notice which specifies—

(a) the target CO_2 emission rate for the building, calculated and expressed in accordance with the methodology approved pursuant to regulation 24,

(b) the CO_2 emission rate for the building as designed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24, and

(c) a list of specifications to which the building is to be constructed.

(3) Not later than five days after the work has been completed, the person carrying out the work shall give the local authority—

(a) a notice which specifies—

(i) the target CO_2 emission rate for the building, calculated and expressed in accordance with the methodology approved pursuant to regulation 24,

(ii) the CO_2 emission rate for the building as constructed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24, and

(iii) whether the building has been constructed in accordance with the list of specifications referred to in paragraph (2)(c), and if not a list of any changes to those specifications; or

(b) a certificate of the sort referred to in paragraph (4) accompanied by the information referred to in sub-paragraph (a).

(4) A local authority are authorised to accept, as evidence that the requirements of regulation 26 have been satisfied, a certificate to that effect by an energy assessor who is accredited to produce energy performance certificates for that category of building.

(5) In this regulation, "specifications" means specifications used for the calculation of the CO_2 emission rate.

Fabric energy efficiency rate calculations

27A. (1) This regulation applies where a dwelling is erected and regulation 26A applies.

(2) Not later than the day before the work starts, the person carrying out the work shall give the local authority a notice which specifies—

(a) the target fabric energy efficiency rate for the dwelling, calculated and expressed in accordance with the methodology approved pursuant to regulation 24;

(b) the fabric energy efficiency rate for the dwelling as designed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24; and

(c) a list of specifications to which the dwelling is to be constructed.

(3) Not later than five days after the work has been completed, the person carrying out the work shall give the local authority—

(a) a notice which specifies—

(i) the target fabric energy efficiency rate for the dwelling, calculated and expressed in accordance with the methodology approved pursuant to regulation 24;

(ii) the fabric energy efficiency rate for the dwelling as constructed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24; and

(iii) whether the dwelling has been constructed in accordance with the list of specifications referred to in paragraph (2)(c), and if not a list of any changes to those specifications; or

(b) a certificate of the sort referred to in paragraph (4) accompanied by the information referred to in sub-paragraph (a).

(4) A local authority is authorised to accept, as evidence that the requirements of regulation 26A have been satisfied, a certificate to that effect by an energy assessor who is accredited to produce energy performance certificates for that category of building.

(5) In this regulation, "specifications" means specifications used for the calculation of the fabric energy efficiency rate.

Regulation *continued*

Target primary energy rate calculations for new buildings

27C. (1) This regulation applies where a building is erected.

(2) Not later than the day before the work starts, the person carrying out the work must give the local authority a notice which specifies—

(a) the target primary energy rate for the building calculated and expressed in accordance with the methodology approved pursuant to regulation 24;

(b) the calculated target primary energy rate for the building as designed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24; and

(c) the list of specifications to which the building is to be constructed.

(3) Not later than five days after the work has been completed, the person carrying out the work must give the local authority—

(a) a notice which specifies—

(i) the target primary energy rate for the building calculated and expressed in accordance with the methodology approved pursuant to regulation 24;

(ii) the calculated target primary energy rate for the building as constructed, calculated and expressed in accordance with the methodology approved pursuant to regulation 24; and

(iii) whether the building has been constructed in accordance with the list of specifications referred to in paragraph (2)(c), and if not a list of any changes to those specifications; or

(b) a certificate of the sort referred to in paragraph (4) accompanied by the information referred to in sub-paragraph (a).

(4) A local authority is authorised to accept, as evidence that the requirements of regulation 26C have been satisfied, a certificate to that effect by an energy assessor who is accredited to produce energy performance certificates for that category of building.

(5) In this regulation, "specifications" means specifications used for the calculation of the target primary energy rate.

2.5.1 RIBA 2030 Climate Challenge

In addition to the upcoming fuel carbon factors, this Energy Strategy has also given consideration to the RIBA 2030 Climate Challenge.

The RIBA 2030 Climate Challenge sets out a number of Sustainable Outcome targets including:

- Operational Energy
- Embodied Carbon
- Potable Water Use

It also sets out a number of best practice Health Targets including:

- Overheating
- Daylighting
- CO_2 Levels
- Total VOC's (Volatile Organic Compounds)
- Formaldehyde

The RIBA 2030 Climate Challenge was created following the RIBA Council vote on 29th June 2019 to join the global declaration of an environmental and climate emergency. These targets are none binding and still under development as RIBA discusses these metrics further with industry bodies before the targets are finalised. They do however make a useful resource for best practice given that these targets were developed to address the current climate emergency, therefore, although the targets are non-binding they have been considered where appropriate.

Figure 6: RIBA 2030 Climate Challenge Target Metrics

RIBA 2030 Climate Challenge target metrics for domestic buildings

RIBA Sustainable Outcome Metrics	Current Benchmarks	2020 Targets	2025 Targets	2030 Targets	Notes
Operational Energy kWh/m²/y	146 kWh/m² /y (Ofgem benchmark)	< 105 kWh/m²/y	< 70 kWh/m²/y	< 0 to 35 kWh/m²/y	UKGBC Net Zero Framework 1. Fabric First 2. Efficient services, and low-carbon heat 3. Maximise onsite renewables 4. Minimum offsetting using UK schemes (CCC)
Embodied Carbon $kgCO_2e/m^2$	1000 $kgCO_2e/m^2$ (M4i benchmark)	< 600 $kgCO_2e/m^2$	< 450 $kgCO_2e/m^2$	< 300 $kgCO_2e/m^2$	RICS Whole Life Carbon (A-C) 1. Whole Life Carbon Analysis 2. Using circular economy Strategies 3. Minimum offsetting using UK schemes (CCC)
Potable Water Use Litres/person/day	125 l/p/day (Building Regulations England and Wales)	< 110 l/p/day	< 95 l/p/day	< 75 l/p/day	CIBSE Guide G

RIBA 2030 Climate Challenge target metrics for non-domestic buildings

RIBA Sustainable Outcome Metrics	Current Benchmarks	2020 Targets	2025 Targets	2030 Targets	Notes
Operational Energy kWh/m²/y	225 kWh/m²/y DEC D rated (CIBSE TM46 benchmark)	< 170 kWh/m²/y DEC C rating	< 110 kWh/m²/y DEC B rating	< 0 to 55 kWh/m²/y DEC A rating	UKGBC Net Zero Framework 1. Fabric First 2. Efficient services, and low-carbon heat 3. Maximise onsite renewables 4. Minimum offsetting using UK schemes (CCC)
Embodied Carbon $kgCO_2e/m^2$	1100 $kgCO_2e/m^2$ (M4i benchmark)	< 800 $kgCO_2e/m^2$	< 650 $kgCO_2e/m^2$	< 500 $kgCO_2e/m^2$	RICS Whole Life Carbon (A-C) 1. Whole Life Carbon Analysis 2. Using circular economy Strategies 3. Minimum offsetting using UK schemes (CCC)
Potable Water Use Litres/person/day	>16 l/p/day (CIRA W11 benchmark)	< 16 l/p/day	< 13 l/p/day	< 10 l/p/day	CIBSE Guide G

RIBA 2030 Climate Challenge target metrics for all buildings

Best Practice Health Metrics		References
Overheating	25-28 °C maximum for 1% of occupied hours	CIBSE TM52, CIBSE TM59
Daylighting	> 2% av. daylight factor, 0.4 uniformity	CIBSE LG10
CO_2 levels	< 900 ppm	CIBSE TM40
Total VOCs	< 0.3 mg/m^3)	Approved Document F
Formaldehyde	< 0.1 mg/m^3)	BREEAM

Above is an extract showing the target metrics for domestic and non-domestic buildings. Particularly relevant to this report are the "Operational Energy" and "Potable Water Use" targets as through a fabric first approach, low/zero carbon technology and use of renewables these issues have been considered.

The Embodied Carbon target is addressed as far as our capacity as the Sustainability Consultant is concerned however in order to fully tackle the Whole Life Carbon of the building using Circular Economy Strategies; consideration of Embodied Carbon will be required by all parties involved with the design, construction and operation of each block, particularly parties with ISO14001 accreditation.

We have endeavoured to achieve the targets outlined through the fabric first approach combined with Low Carbon technology and efficient fittings all of which are detailed further in this report.

3 DESIGN PARAMETERS

3.1 METHODOLGY

Part L Volume 2 is applicable which sets the standard for carbon emissions for new buildings other than dwellings.

In order to demonstrate compliance, the following must be achieved:

(i) The CO_2 emission and Primary Energy Rates must not exceed the targets

To demonstrate compliance the actual buildings emission rate is compared to the national buildings emission rate and must be at least equal to or less than the target emission rate. The same applies with primary energy demand.

The actual buildings emission rate is calculated when the building is modelled using approved software and the proposed construction values are detailed, for example, u-values, efficiency of M&E plant, etc. following this exercise the software will generate a notional building, the notional building has the same layout as the actual building, but the construction values and energy performance of the M&E equipment is pre-set, this allows the software to generate a target emission rate (TER) for the actual building, the TER is the anticipated emission rate from the notional building.

The same process is applied to how the Target Primary Energy Rate (TPER) is generated which the actual Building Primary Energy rate must achieve (BPER).

The BER/BPER is then compared to the TER/ TPER and if it is equal to or lower than then the building is deemed to comply with Part L 2021 Building Regulations.

This process needs to be completed and issued to Building Control at the "As-Designed" Stage to demonstrate to Building Control that the proposals for the building comply with the criteria.

(ii) Limits on Design Flexibility

Each element of the construction has pre-set performance limits within the document; these are generally split into 2 categories, an average value and an upper limit value which cannot be exceeded.

To demonstrate compliance with this element then the CO_2 and Primary Energy Rate must be achieved with no individual element exceeding the upper limit set for performance.

(iii) Limiting the Effects of Solar Gains in Summer

It is a requirement to demonstrate that solar gains have been limited during the summer period to either reduce the need for air conditioning; or to reduce the installed capacity of any air conditioning system that is installed.

To demonstrate compliance an assessment of the solar gains must be undertaken, the actual building results are then compared to a pre-defined standard and if the performance of the actual building is no worse than that of the pre-defined building then it is deemed to comply.

(iv) Provisions for Energy-Efficient Operation of the Building

The owner of the building should be provided with sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

This is generally achieved by the production of a building logbook.

3.2 ARCHITECTURAL DRAWINGS BY 31/44 ARCHITECTS

Table 3 Architects Drawing Schedule

Drawing Number	Drawing Contents
PL_1001	Proposed Location Plan
PL_1010	Proposed Ground Floor
PL_1011	Proposed First Floor
PL_1012	Proposed Roof Plan
PL_2000	Proposed Sections
PL_2001	Proposed Sections
PL_2002	Proposed Sections
PL_3000	Proposed Elevations
PL_3001	Proposed Elevations
PL_3002	Proposed Elevations
PL_3003	Proposed Elevations

3.3 FUEL

Table 4 Fuel Factors SAP 2012 and SAP 10 Applied Within Part L Calculation

kgCO$_2$/kWh	SAP 2012	SAP 10.1
Gas:		
mains gas	0.216	0.210
bulk LPG	0.241	0.241
bottled LPG	0.241	0.241
bottled LPG (no contract)	0.241	0.241
LPG subject to Special Condition 18	0.241	0.241
biogas (including anaerobic digestion)	0.098	0.024
Liquid fuel:		
heating oil	0.298	0.298
biodiesel from any biomass source	0.123	0.038
biodiesel from vegetable oil only	0.083	0.018
appliances able to use mineral oil or biodiesel	0.298	0.298
B30K	0.245	0.220
bioethanol from any biomass source	0.140	0.105
Solid fuel:		
house coal	0.394	0.395
anthracite	0.394	0.395
manufactured smokeless fuel	0.433	0.366
wood logs	0.019	0.028
wood pellets (in bags for secondary heating)	0.039	0.053
wood pellets (bulk supply for main heating)	0.039	0.053
wood chips	0.016	0.023
dual fuel appliance (mineral and wood)	0.226	0.087
Electricity:		
standard tariff	0.519	0.136
7-hour tariff (high rate)	0.519	0.136
7-hour tariff (low rate)	0.519	0.136
10-hour (high rate)	0.519	0.136
10-hour (low rate)	0.519	0.136
18-hour (high rate)	0.519	0.136
18-hour (low rate)	0.519	0.136
24-hour heating tariff	0.519	0.136
electricity exported to grid	0.519	0.136
electricity, any tariff	0.519	0.136
Community heating schemes:		
heat from boilers - mains gas	0.216	0.210
heat from boilers - LPG	0.241	0.241
heat from boilers - oil	0.331	0.335
heat from boilers that can use mineral oil or biodiesel	0.331	0.335
heat from boilers using biodiesel from any biomass source	0.123	0.038
heat from boilers using biodiesel from vegetable oil only	0.083	0.018
heat from boilers - B30D	0.269	0.269
heat from boilers - coal	0.380	0.375
heat from electric heat pump	0.519	0.136
heat from boilers - waste combustion	0.047	0.074
heat from boilers - biomass	0.031	0.029
heat from boilers - biogas (landfill or sewage gas)	0.098	0.024
waste heat from power station	0.058	0.015
geothermal heat source	0.041	0.011
heat from CHP	as above	0.011
electricity generated by CHP	0.519	0.136
electricity for pumping in distribution network	0.519	0.136

3.4 BASELINE CO_2 EMISSIONS

For the purpose of this report the baseline energy use and CO2 emissions are calculated based on the 'Notional Dwelling' requirements specified in the Building Regulations L2 2021 (Table 1.1).

Table 5 Baseline Building Fabric

Building Fabric			
Element	**L1A: 2021 Limiting U-values (W/m².k)**	**L1A: 2021 Notional U-values (W/m².k)**	**Proposed U-values (W/m².k)**
Floors	0.18	0.18	-
External Walls	0.26	0.18	-
Pitched Roof	0.16	0.15	-
Flat Roof	0.18	0.15	
Windows	1.60	1.40	-
Doors	1.6	1.9	-
Air permeability (m²/h.m² @ 50 pa)			
All dwellings	8.0	3.0	-

The following table details the notional baseline CO_2 regulated emissions for the development. The target emission rates (TER's) in the above figures combined with the total floor area were used to produce the baseline CO_2 emissions below.

Table 6 Estimated Baseline Carbon Emissions SAP 10 Building Regulations

Building Services	**Baseline CO2 Emissions (kg CO_2/m2)**
Total regulated emissions (heating, hot water, lighting, fans & pumps)	6390.23

A block compliance baseline carbon emission result is presented above, produced by the IES VE software.

By using low u-values and high-performance materials to reduce greenhouse emissions and improve energy efficiency; the Be Lean stage of this report addresses policy ST2 and policy DM1 of the South Tyneside Core Strategy and Development Management Policies, as well as being in accordance with Paragraph 8 of the National Planning Policy Framework (NPPF) by reducing CO_2 emissions and supporting a low carbon economy.

Section 4 below will now detail how the reduction between the building emission rate (BER) and the target emission rate (TER) has been achieved.

4 ENERGY STRATEGY

4.1 ENERGY EFFICIENT DESIGN

This section outlines the design energy efficient measures taken to minimise the building's energy demand and therefore reduce energy use and CO_2 emissions further than the baseline notional building, often referred to as the 'Fabric First' approach.

The energy efficient measures include:

a) Inclusion of better U-values than the minimum U-values set in the ADL2
b) Designing for a buildings air permeability exceeding ADL2 target values
c) Utilising the highly efficient heating and hot water systems
d) Utilising low energy efficient lighting such as LED lighting

The table below outlines the improvements made to the building fabric elements compared against both the Building Regulations limiting U-values and the 'Notional Building' U-values which the baseline is derived from.

Table 7 Proposed Building Fabric Specification

Building Fabric			
Element	**L2: 2021 Limiting U-values (W/m².k)**	**L2: 2021 Notional U-values (W/m².k)**	**Proposed U-values (W/m².k)**
Floors	0.18	0.18	0.11
External Walls	0.26	0.18	0.15
Pitched Roof	0.16	0.15	0.15
Flat Roof	0.18	0.15	0.12
Windows	1.60	1.40	1.30
Doors	1.6	1.9	1.60
Air permeability (m²/h.m² @ 50 pa)			
All dwellings	8.0	3.0	3.0

4.1.1 Heating Demand

The heating energy demand will be reduced by providing high performance insulation of the building envelope as well as a low Air Permeability Target to minimise heat losses.

At the Be Lean stage, radiators and hot water cylinders served by an Air Source Heat Pump have been specified for the heating and hot water demand, this is to take advantage of their low fuel carbon factor and their delivery efficiencies which stand at 350%. Further reductions in heating demand will occur via the installation of mechanical ventilation with heat recovery (MVHR) which can pre-heat incoming supply air using recovered heat from exhaust air.

4.1.2 Ventilation

As mentioned above, supply and extract ventilation will be provided via MVHR, the heat recovery efficiency of this system will stand at around 90% (final efficiency may vary as the design progresses). There will also be natural ventilation methods available to occupants via openable windows/balcony doors.

4.1.3 Lighting

The proposed light fittings will be low energy efficient fittings, in this instance LED fittings only throughout. For Part L compliance the lighting efficacy for each fitting type will stand at 100lm/w or higher.

4.1.4 Embodied Carbon

All materials used within the construction of the development will have embodied carbon within them, taking into consideration manufacturing processes and supply chains. It is assumed that the developer will seek to procure materials and construction elements with appropriate sustainable accreditations, for example FSC for timber, ISO:140001 accreditations where applicable etc, to minimise the use of high embodied carbon within the building.

4.2 CO_2 REDUCTIONS AFTER FABRIC FIRST APPROACH

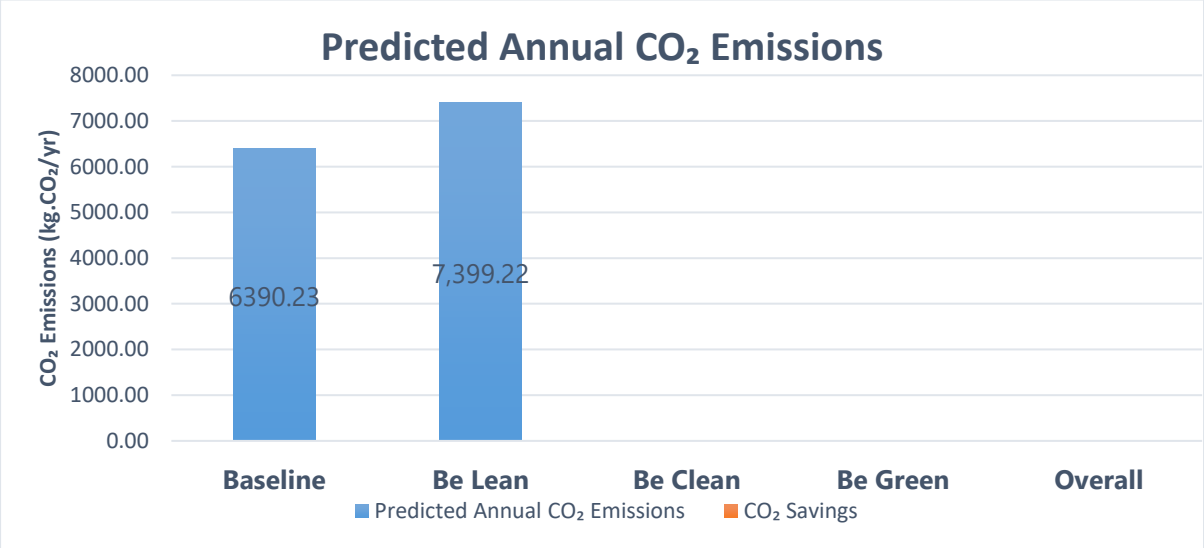
The following table demonstrates the reduction in CO_2 emissions based on an area weighted average calculation utilising a fabric first approach please note, as stated earlier, the Part L2 baseline calculation now always includes PV, a fair comparison cannot be made against the fabric first result which does not include any PV.

Figure 7: Be Lean Stage CO_2 Emission Results

Regulated Emissions	Baseline CO_2 Emissions	Fabric First Building CO_2 Emissions	CO_2 Emission Savings	% reduction in CO_2 Emissions
kg of CO2/m2.yr	6.46	7.48	0	0%
kg of CO2/m2	6,390.23	7,399.22	0	0%

The above table shows that, in terms of CO2 emissions the fabric first result does not reduce building emissions over the baseline target CO_2 emissions. This is a direct result of the fabric efficiency measures and all electric systems detailed above. In keeping with the Energy Hierarchy, this result does not include any renewable technology, this will be further assessed at the Be Green stage.

Figure 8: Be Lean Stage CO_2 Emission Results



4.3 CLEANER ENERGY - CHP & DECENTRALISED ENERGY NETWORKS

The Energy Hierarchy encourages the use of a CHP system and/or the connection to District Heating system to reduce CO_2 emissions further.

4.3.1 CHP

The Energy Hierarchy identifies combined heat and power (CHP) as a method of producing heat and electricity with much lower emissions than separate heat and power. Also, it encourages the creation of district heating systems supplied by CHP.

The implementation of a CHP strategy should be decided according to good practice design. Key factors for the efficient implementation of the CHP system are:

- Development with high heating load for the majority of the year
- CHP operation based on maximum heat load for minimum 10 hours per day
- CHP operation at maximum capacity of 90% of its operating period

A CHP system will not be considered for this development due to the following reasons:

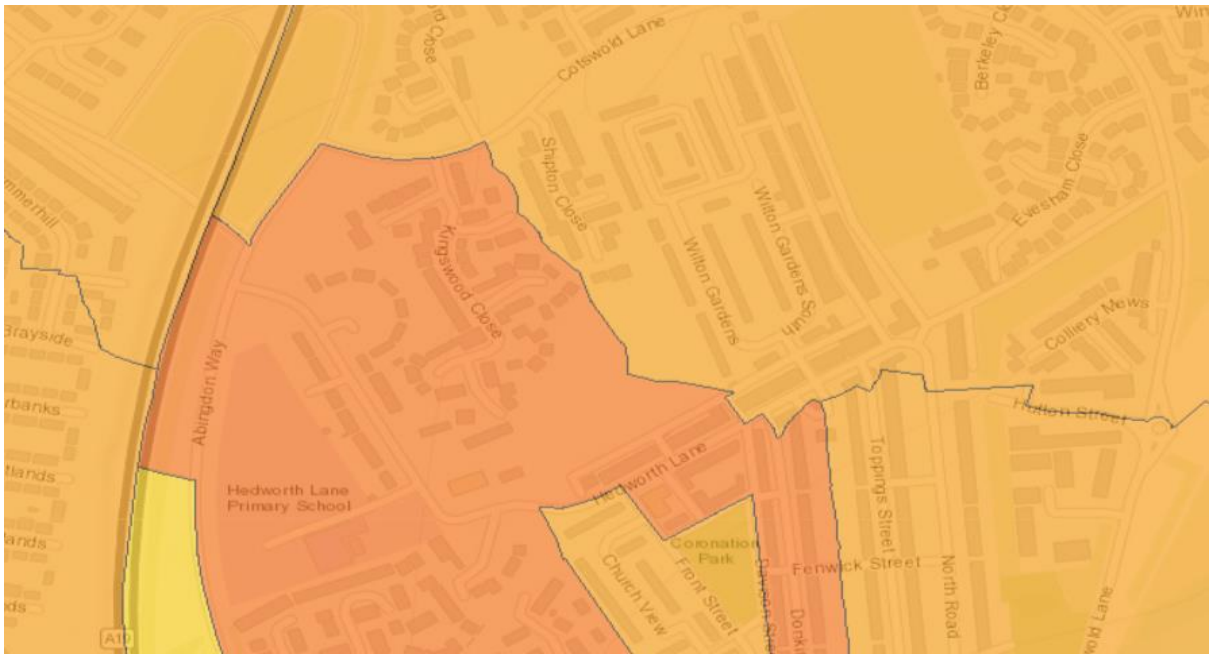
- Due to restrictions on site space would be limited for the level of plant required for a CHP system, which would require accumulators, additional boiler power, pumps, pressurisation units etc.
- Pollution discharged from the CHP unit may not be appropriate given the site locality and the number of people passing the site given its location within a residential area.
- Noise pollution is a consideration given the function of the development and its proximity to other surrounding buildings.
- Economic viability is heavily dependent on the constant demand for heat and power, as well as the price of electricity and gas.

Hence, the implementation of a CHP strategy is not recommended for this development. As a result, no CO_2 reduction can be achieved as part of the Be Clean section of the Energy Hierarchy.

4.3.2 Decentralised Energy Network

The feasibility of connecting into an existing heating network or providing the building with its own combined heat and power plant has been assessed through the use of UK CHP Development Map, for Salford as for a District Heating network.

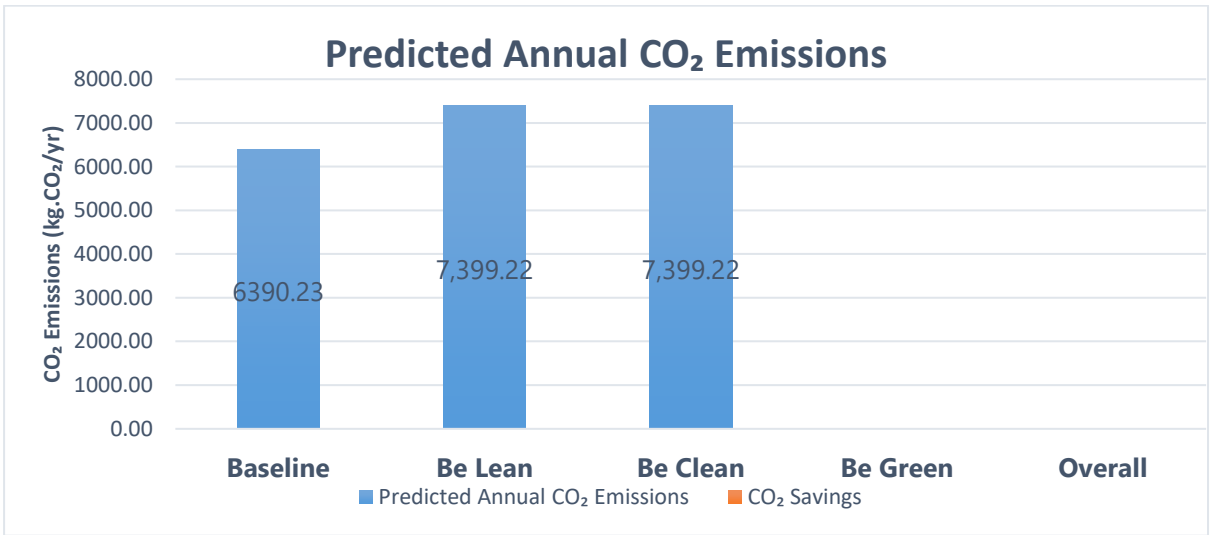
Figure 9: CHP Development Map – Local Heat Loads



Presently the total heat loads within the area are medium-high and there are no connections nearby from which the site could connect to.

As such no additional CO_2 reduction can be observed at the Be Clean stage, this is described in the graph below:

Figure 10: Be Clean Carbon Emissions Estimated Result



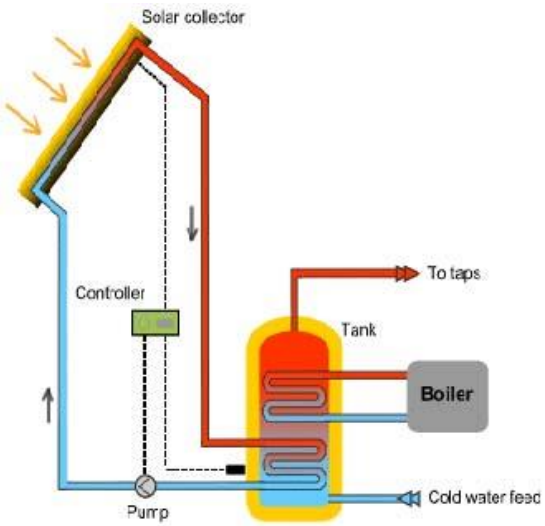
4.4 LOW & ZERO CARBON TECHNOLOGIES

4.4.1 General

Low and zero carbon (LZC) technologies are systems that generate energy with either zero or reduced CO2 emissions when compared against traditional energy generation methods.

The alternative LZC technologies have been assessed in relation to the development and their viability assessed. Some of the LZCs are intrinsically unsuitable due to the development type and location whereas others are potentially viable.

Figure 11: Solar Thermal Diagram



4.4.2 Solar Water Heating

Solar thermal panels utilise the sun energy to generate hot water for use within the building. The panels are commonly provided in either flat plate or evacuated tube arrangements. The panels are ideally located facing south at an approximate 30° inclination angle in areas where they are not subjected to shade.

This system alone would not generate a large enough CO_2 reduction in proportion to other comparable technologies. This technology has also been discounted due to the inflated cost of installation with regard to additional pipe runs, maintenance requirements and the significant roof area that would be required.

4.4.3 Wind Turbines

Wind turbines generate electrical energy derived from kinetic energy provided by the local wind resource. The performance of wind turbines depends greatly on the wind speed and turbulence that in turn is influenced by the terrain and installation height.

Figure 12: Typical Small Scale 6kW Wind Turbine



The use of wind turbines on the development will also have a significant visual impact on the location and neighbouring buildings, as well as low frequency noise source and hence it is likely to meet opposition within the local area.

In very simplistic terms, space for such a large technology on this development site cannot be considered.

For the reasons detailed above wind turbines are not considered viable for the development.

4.4.4 Photovoltaic Cells (PV)

Photovoltaic (PV) panels utilise the sun's energy to generate electricity. The optimum location for PV panels is south facing at an approximate 30° inclination angle in areas where they are not subjected to shade.

Figure 13: PV Examples



Photovoltaic panels have been included in the design in order to achieve compliance with the Target Primary Energy Rating metric now mandatory within Part L2 2021. The size of the installation may vary,

and the number of panels requirement may change as the design progresses and a final panel specification has been chosen.

The final installed kWp distribution will be assigned based on compliance with Part L2 regulations and planning requirements set out in policy DM1 of the South Tyneside Core Strategy. The final EPC ratings, BER and BPER values per for the development may therefore change as the design progresses.

At this stage each dwelling has been assigned a specific amount to achieve Part L2 requirements, equating to around 7864.14kWh. The proposed amount also results in renewable energy generation for the development achieving 14.52% of the scheme's energy requirements which satisfies the 10% target set out in policy DM1 of the South Tyneside Core Strategy.

Table 8 Estimated PV Specification

Orientation	Panel Efficiency	Approx PV Area m2
NW	21.5%	12.9
SW	21.5%	38.7

4.4.5 Source Heating and Cooling

The Air Source Heat Pumps can be linked with indoor units to heat and cool the space. Heat pumps use electricity as fuel, however, their efficiency in both heating and cooling modes can be over 4 times as efficient as electrical panel heating, meaning for every 1KW of electricity you can achieve 4kW of heating depending on unit sizes etc.

This option therefore has good flexibility in terms of installation. The outdoor units can be located anywhere and are not dependent on orientation. They need to be externally mounted and in a local compound to be safe.

This technology has therefore been proven as feasible and will be utilised to provide heating and domestic hot water.

4.4.6 Biomass Boiler

Biomass is considered to be a renewable fuel source as the CO_2 absorbed during the growth period is assessed as being approximately equal to the CO_2 emitted during combustion and hence deemed "carbon neutral". Biomass for boilers is typically wood either in chip or pellet form.

Biomass boilers require fuel storage together with associated transportation and delivery to the store location.

Figure 14: Biomass Example



With the minimal plant areas available for a biomass generator combined with the logistics and increase in pollution from wood pellet deliveries/transportation, biomass generators have not been included in this Energy Strategy.

For the above reasons, the use of a biomass boiler plant is not considered viable for the development.

4.4.7 Fuel Cell

The fuel cell technology essentially converts chemical energy into both electrical and heat energy. The cell needs to be continually supplied with hydrogen (derived from either a piped or storage source) and oxygen (derived from air) that are combined and the chemical reaction produce electrical energy, heat energy and water vapour.

The fuel cell requires a hydrogen fuel source that can either be from a piped source (not currently available) or from stored gas. However, the more usual approach currently in the UK is to use natural gas in order to generate the hydrogen required to operate the fuel cell.

Fuel cells have various commercial and technical limitations. There is a high initial capital cost together with there being few established suppliers and a very limited specialist design, installation, and maintenance capabilities.

Certain fuel cell elements require regular replacement imposing a significant on-going cost implication. The fuel cells themselves are generally large, heavy and require fresh air ventilation.

Due to the initial capital cost, space requirements and on-going maintenance costs fuel cells are not considered viable for this development.

4.5 WATER

The development will be designed to reduce mains/potable water and include water efficient devices and equipment. This will comprise of efficient water fixtures (low flow taps and showers, dual flush WCs and low volume baths) to reduce potable water demand to <16 litres/person/day as per the requirement within Building Regulations.

As stated previously <16 litres/person/day is the 2020 target in the RIBA 2030 Climate Challenge and the next target 2025 is <13 litres/person/day, this surpasses the requirement of Part G and we will use our best endeavour to reach this target.

This will be done using low flow rate sanitaryware and the use of flow restrictors throughout the development.

An example of the flow rates and capacities that could potentially be used are as follows. Please note these are a guide at this stage and actual figures may differ at the time of construction. However, they will fall within the required level:

- WC – Dual Flush – 6/3 Litre Flush capacity
- Wash hand basin taps – 5 L/min
- Kitchen sink taps – 7L/min
- Shower – 7L/min

4.6 CHOSEN RENEWABLE SOLUTION

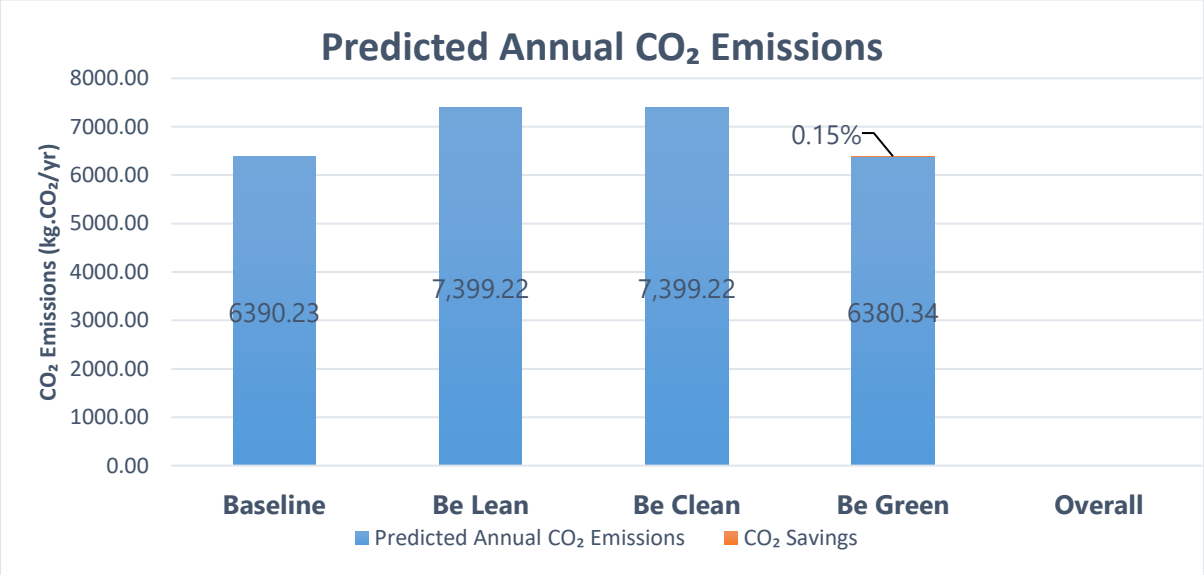
Following the above review of various LZC technology the chosen solution for this strategy is to use Air Source Heat Pumps to provide heating and domestic hot water. Further to this the current mechanical and electrical design will be supplemented with photovoltaic (PV) technology. This will supply renewable energy which accounts for 14.5% of the total energy requirements for the development, ensuring compliance with Part L 2021 and policy DM1 of the South Tyneside Core Strategy which promotes the use of low/zero carbon technology and outlines a 10% target for on-site renewable energy generation.

Table 9 Renewable Energy Generation

Building Energy Consumption by End Use	
Building Energy Consumption	54.76 kWh/m^2.yr
Renewable Energy Generation	7.95 kWh/m^2.yr
% Energy Generated by Renewables	**14.52%**

The CO_2 reduction for the Be Green stage of the Energy Hierarchy is displayed below:

Figure 15: Be Green Carbon Emissions Estimated Results



4.7 PRIMARY ENERGY DEMAND & RIBA 2030 CLIMATE CHALLENGE

In order to calculate the energy demand for the entire development in kWh/yr the following is required.

The energy demand is made up of the following factors:

- Energy for space heating
- Energy for space cooling
- Energy for water heating
- Energy for ventilation
- Energy for lighting
- Energy generated by renewables

This is more specifically the Primary, Regulated Energy Demand given the fabric, considering the above factors.

The estimated primary energy demand results are displayed in the below table for the development

Table 9 Primary Energy Demand

Unit	**Energy Demand** kWh_{PE}/m^2
Whole Development	69.32

This is an improvement on the current benchmark target of 69.68 $kWh/m^2/yr$ and achieves the current RIBA 2030 Climate Challenge 2025 Target of < 70 $kWh/m^2/yr$. It is worthy of note however that RIBA intends to work with professional bodies to finalise their target metrics which may change as those discussions progress.

Figure 16: RIBA 2030 Climate Challenge Domestic Target Metrics

RIBA 2030 Climate Challenge target metrics for domestic buildings

RIBA Sustainable Outcome Metrics	Current Benchmarks	2020 Targets	2025 Targets	2030 Targets	Notes
Operational Energy kWh/m²/y	146 kWh/m² /y (Ofgem benchmark)	< 105 kWh/m²/y	< 70 kWh/m²/y	< 0 to 35 kWh/m²/y	UKGBC Net Zero Framework 1. Fabric First 2. Efficient services, and low-carbon heat 3. Maximise onsite renewables 4. Minimum offsetting using UK schemes (CCC)
Embodied Carbon $kgCO_2e/m^2$	1000 $kgCO_2e/m^2$ (M4i benchmark)	< 600 $kgCO_2e/m^2$	< 450 $kgCO_2e/m^2$	< 300 $kgCO_2e/m^2$	RICS Whole Life Carbon (A-C) 1. Whole Life Carbon Analysis 2. Using circular economy Strategies 3. Minimum offsetting using UK schemes (CCC)
Potable Water Use Litres/person/day	125 l/p/day (Building Regulations England and Wales)	< 110 l/p/day	< 95 l/p/day	< 75 l/p/day	CIBSE Guide G

As stated in section 2.5.2 The Embodied Carbon target is addressed only as far as our capacity as the Sustainability Consultant is concerned.

In order to fully tackle the Whole Life Carbon of the building using Circular Economy Strategies; consideration of Embodied Carbon will be required by all parties involved with the design, construction and operation of the development, particularly parties with ISO14001 accreditation.
The RIBA 2030 Climate Challenge targets are ultimately non-binding however indicate good practice; we have therefore endeavoured to achieve the targets outlined.

5 ENVIRONMENTAL STANDARDS STATEMENT

It is best practice to incorporate Environmental Standards within the design of such a development. Being mindful of the design standard issues often compliments the Energy Strategy and the Sustainability aspects of the design and this planning report.

Some elements described within the environmental standards section fall outside the remit of NOVO Integration Ltd and as such will be incorporated within other parties' appointments. This report will however summarise and reference other third-party reports where applicable to aid with addressing all applicable elements of the Environmental Standards.

The various topics covered within the environmental standards sections are as follows:

- Energy Efficiency
- Renewable Energy
- Environmental Design
- Water Management and Weather Resilience
- Waste Management
- Construction Management
- Waterways

Each element will be summarised how the development will achieve this, and any relevant third-party reports referenced accordingly.

Please note that where assumptions have been made of specific reports being carried out, confirmation of these reports from the developer will be required. Reference only is made within this report.

Any reports referenced within this section does not confirm that these reports are either required or have been or will be carried out and are assumptions of such only.

5.1 ENERGY EFFICIENCY

The South Tyneside Local Plan states that in summary, all new developments should endeavour to reduce their CO_2 emission by particular targets as discussed previously in this report.

However, the principals highlighted within the section are carried through into the design.

Section 4 Energy Strategy of this report details specifically how the proposed design of the development including the fabric, mechanical and electrical services will use passive, energy efficient and low carbon technologies throughout with emphasis on a fabric first approach to minimise the CO_2 emissions and meet the targets set in the South Tyneside Core Strategy and Development Management Policies.

The Energy Strategy describes how the development follows the Energy Hierarchy approach which many local authorities advocate the use of.

5.2 RENEWABLE ENERGY

South Tyneside Core Strategy and Development Management Policies encourage the use of Low Zero Carbon technologies, this again follows the Hierarchical approach.

This is to encourage opportunities to reduce the energy demand via the use of onsite renewable technologies to improve energy security for occupants of the site and export of surplus energy back to the grid.

Various opportunities and different technologies should be investigated to determine the most viable and appropriate technology for the site in question.

Again section 4 of this report deals with the Energy Hierarchical approach to Energy and the use of renewable technology. Many different technology opportunities have been investigated and discounted where applicable and included where appropriate.

Following these in-depth reviews of varying renewable technologies, Photovoltaic Panels have been deemed viable and appropriate for the development.

5.3 ENVIRONMENTAL DESIGN

This element encourages developers to use the Building Research Establishment Assessment Method (BREEAM) to assess environmental performance or Code for Sustainable homes depending on whether the development is residential or non-residential in nature. Code for Sustainable Homes is not applicable to this development.

5.4 WATER MANAGEMENT AND WEATHER RESILIENCE

Thoughtful design to reduce the levels of pollution within the city's watercourses, as well as mitigating the effects of flooding should significant storms present themselves in the future should be considered.

As such a Flood Risk Assessment and Drainage Strategy Report will be produced to demonstrate the methodology as to how the development will manage excessive water in times of storms etc to minimise the risk of flooding to the development and surrounding areas.

It is anticipated that any excessive rainwater will be dealt with through the use of attenuation other methodologies falling line with SUDs techniques to improve flows and quality of the surface water run-off.

Water Usage has been covered earlier within this report under section 4.6 and describes how the development will utilise low flow / volume sanitaryware to reduce the amount of water consumed and comply with the Building Regulations Part G but also aspires to achieve the target metrics described in the RIBA 2030 Climate Challenge.

5.5 WASTE MANAGEMENT

It is understood that the Construction Waste Management Plan will be prepared to ensure that all aspects of waste production, deliveries, noise, dust pollution etc are all accounted for and reasonably mitigated.

There is potential for the Waste Management Strategy to be reviewed by Building Management during the lifetime of the building for opportunities to improve the procedures and will also review areas where reductions in waste, or an increase in recycling waste can be made. This will form part of a Construction Management Plan which will likely be required by a condition attached to any planning permission.

The design of designated areas for waste and recyclable waste once construction has been completed for the use of the occupants has and will be carefully considered, not only in terms of capacity but allowances made for access for collections.

These areas will have designated areas for recyclable waste which will encourage further responsibility to be taken by the occupiers to separate their own waste accordingly.

5.6 CONSTRUCTION MANAGEMENT

Best practices encourage environmentally friendly construction methods and materials which in effect reduces energy consumption.

This standard also encourages best practices during construction to prevent or limit damage to the environment and to make sure these measures are not being abused during the full construction phase.

It is assumed that the contractor will be responsible for providing a comprehensive construction management plan containing all procedures on site and methodologies for a safe, environmentally conscious, and efficient construction period.

6 CONCLUSIONS

The Energy Strategy for the proposed development Bolden Colliery has adopted a hierarchical approach of using passive and low energy design technologies to reduce the baseline energy demand and hence CO_2 emissions followed by the feasibility of the application of low and zero carbon technologies as appropriate.

This is supported by the Part L Thermal Modelling Calculations to provide compliance in England with the Building Regulations Part L2, BRUKL reports have been produced for the development and can be found in Appendix A (issued separately).

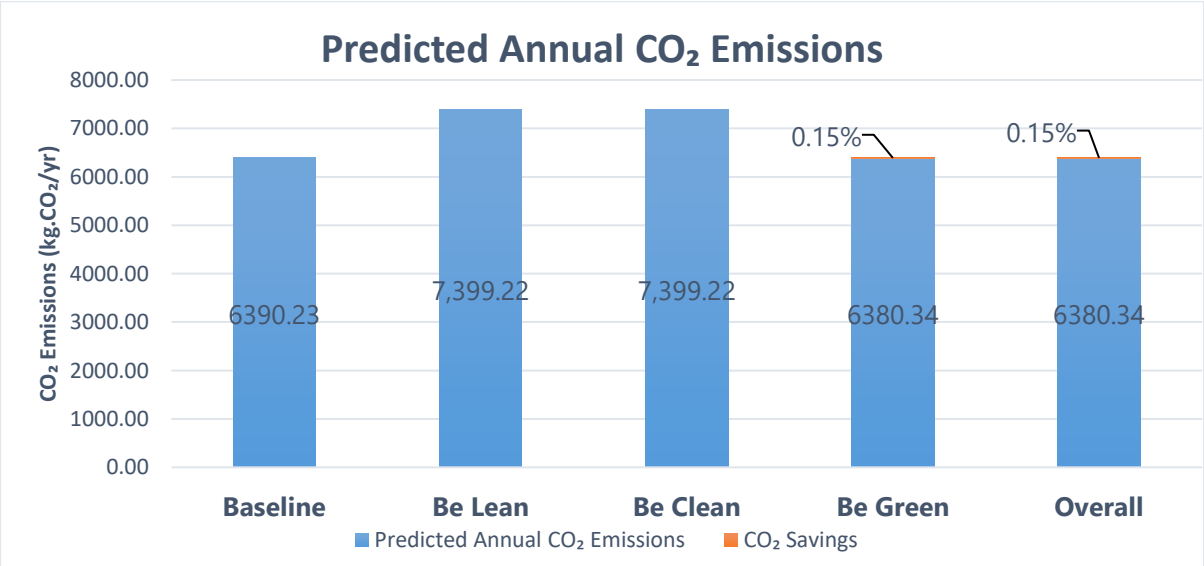
The analysis has shown that by incorporating passive and low energy design measures, there is a reduction of 0.15% over the development's annual CO_2 baseline emissions, therefore achieving Part L 2021 compliance as well as complying with policy ST2 and policy DM1 of South Tyneside Core Strategy and Development Management Policies.

This is achieved by incorporation of the following elements:

- Improved thermal transmittance U-valued as depicted.
- MVHR ventilation
- All-electric Air Source Heat Pump heating and hot water
- PV array supplying circa 7864.14kWh total across the site
- Low building air leakage rate (3.0 m^3/h/m2 at a pressure differential of 50 Pa)
- Low energy lighting to achieve efficacies of 100+lm/w for each fitting type
- Low flow aerated showerheads and basin tap inserts to reduce water consumption
- Reducing mains/potable water via water efficient devices and equipment

A 'Fabric First' approach has been used in this strategy then, following the stages of the Energy Hierarchy, CHP and district heating has been assessed followed by a study of various low and zero carbon technologies. The graph below demonstrates the results for each stage of the Energy Hierarchy.

Figure 17: Overall CO_2 Emissions Reduction Results



6 CONCLUSIONS

A 0.15% overall reduction in CO_2 emissions can be observed. Furthermore, consideration has also been given to the RIBA 2030 Climate Challenge Targets with respect to domestic operational energy, embodied carbon and potable water use. Although RIBA plans on developing their targets further with UK professional bodies in order to obtain concrete benchmarks; we have made every effort to reach the current baselines prescribed as we share RIBA's urgency and enthusiasm in addressing the current Environment and Climate Emergency.

To summarise, the present 0.15% reduction in CO_2 has been achieved through the use of high-performance materials to improve the building fabric u-values, by incorporating an Air Source Heat Pump to serve radiators and hot water cylinders for heating and hot water, and the use of MVHR for ventilation. Photovoltaic Panels will supply renewable energy which generates 14.52% of the developments predicted energy requirements and efficient low energy lighting will be used throughout; low flow rate fixtures and fittings will be used to reduce water consumption. It is therefore the conclusion of this report that the requirements of Part L 2021 have been met as well as policy ST2 and policy DM1 of South Tyneside Core Strategy and Development Management Policies.

7 APPENDICES

Appendix A – BRUKL Reports (issued separately)