Newcastle City Council

Sustainability Statements

Planning Process Note

November 2021

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Notable contributions to Planning Process Note:
- Greater London Authority (GLA) Energy Assessment Guidance (April 2020)
- The Association of Decentralised Energy (ADE)

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CONTENTS

Part 1: **INTRODUCTION**

1.1 Purpose of the Planning Process Note

The planning system requires developments to be designed to be sustainable and to support the transition to a low carbon future in a changing climate. Within Newcastle upon Tyne (the 'City') this is demonstrated in being a leading authority in taking measures to reduce its carbon footprint and its commitment to be a Net Zero carbon city by 2030.

This Planning Process Note (referred to throughout the document as 'guidance') should be used by developers / applicants, architects and planners to help design developments to ensure they will achieve the City's sustainability ambitions and meet the requirements set out in the City's Local Plan policies directly relating to addressing the impacts of climate change, notably Policy CS16 (Climate Change) of the Core Strategy and Urban Core Plan (CSUCP).

When developing a design or masterplan for a development site, engagement with the Planning section is advised through pre-application meetings. At these meetings, early consideration as to how a design would meet the challenges of climate change by incorporating the measures and approach identified in this guidance document and other supporting guidance is required to demonstrate it is a low or zero carbon development.

Please note: wherever reference to carbon dioxide emissions is referenced in the report, the chemical formula CO2 is used. Any reference to CO2 refers to carbon dioxide equivalent which is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP) by converting amounts of other gases to the equivalent amount of carbon dioxide with the same GWP.

1.2 Policy context

International and National Climate Change Context

The overall objective of the United Nations Framework Convention on Climate Change (UNFCCC) is 'stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human-induced interference in the climate system. The 2015 Paris Agreement was the first comprehensive global agreement to tackle climate change.

Since the 2015 Paris Agreement, which committed signatories to hold global warming to below 2.0°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C, a special report by the Intergovernmental Panel on Climate Change (IPCC) published in 2018 outlined a pressing need to hold global warming at 1.5°C against pre-industrial levels to mitigate risks associated with climate change.

Following the IPCC report, the Government commissioned the UK's Committee on Climate Change (CCC) to assess what this means for current UK targets, policy and obligations. Published in May 2019, the CCC report concluded that the UK can reduce emissions to Net Zero by 2050, and that this could cost less than 2% of the UK's Gross Domestic Product (GDP).

In response to the CCC report, the Government introduced a statutory instrument into parliament on 12th June 2019, to amend the 2008 Climate Change Act and enshrine into law a 2050 Net Zero target for the UK. This was signed into law on 27 June 2019. The UK became the first major economy in the world to make a legally binding commitment to Net Zero greenhouse gas emissions by 2050.

National Planning Policy

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied. The NPPF is a material consideration in the determination of planning applications. The NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development. At a high level this is set out in the United Nations' 17 Global Goals for Sustainable Development in the period to 2030. There are three overarching objectives to sustainable development, namely:

- Economic, by contributing to building a strong, responsive and competitive economy;
- Social, by supporting strong, vibrant and healthy communities; and
- Environmental, by contributing to protecting and enhancing the natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution and mitigating and adapting to climate change, including moving to a low carbon economy.

Chapter 14 of the NPPF (Meeting the Challenge of Climate Change, Flooding and Coastal Change) advises that the planning system should support the transition to a low carbon future and help shape places in a way that contributes to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources; and support renewable and low carbon energy and associated infrastructure.

Local Plan: Core Strategy Urban Core Plan 2010-2030 (CSUCP) and Development and Allocations Plan 2015-2030 (DAP)

Newcastle City Council (the 'Council') adopted the Core Strategy and Urban Core Plan (CSUCP) in 2015. The CSUCP is Part 1 of Newcastle's Local Plan containing the spatial vision, objectives, strategy and policies that will guide the development of Newcastle to be a sustainable, prosperous city and is used to guide all decisions about individual development proposals to 2030 and beyond.

Strategic Objective SO11 of the CSUCP is to reduce CO2 emission from development and future growth while adapting to the issues, mitigating adverse impacts and taking advantage of the opportunities presented by climate change. Chapter 12 of the CSUCP focuses on People and Place, recognising that attractive, high quality places and environments contribute to many aspects of a vibrant and successful city, including health and well-being, and encouraging businesses to locate and invest. It also recognises the challenges of climate change, specifically the ability to meet today's needs without compromising the ability of future generations to do the same.

Policy CS16 (Climate Change) of the CSUCP specifically requires development to demonstrate it is resilient to the effects of climate change by setting out six broad criteria against which development will be assessed to ensure it is sustainable and able to function and address the impacts of climate change. This guidance sets out how Newcastle Cityouncil will assess development against the policy when determining a planning application and will assist applicants in preparing the content of the Sustainability Statement to support a planning application.

Policy CS16 should be read alongside other Local Plan polices that also cover matters raised in Policy CS16, such as:

- Policy DM20 (Design) which also requires development to incorporate measures to address impacts of climate change and adverse microclimatic conditions;
- Policy DM26 (Flood Risk and Water Management) requires sustainable drainage measures; and
- Policy DM27 (Green Infrastructure) requires development to incorporate green infrastructure solutions climate change mitigation measures.
- Transport policies including: CS13; UC5; UC6; UC7; UC9; UC10; DM10; DM11; and DM12.

Newcastle City Council Climate Change Strategy

Newcastle City Council recognises the critical role it must play for the City to mitigate its harmful emissions and adapting to the impacts of climate change to protect the City's residents and infrastructure.

In April 2019, Newcastle City Council declared a Climate Emergency. The Climate Emergency declaration made the commitment to create a new Climate Change Strategy with the aim of achieving Net Zero status by 2030 and to establish a Climate Change Convention.

Newcastle's Climate Emergency Declaration (3rd April 2019)

- Declare a 'Climate Emergency'
- Update the 2010 Newcastle Declaration on Climate Change by pledging to make Newcastle upon Tyne carbon neutral by 2030, taking into account both production and consumption emissions
- Call on the Government to provide powers and resources to make the 2030 target possible
- Work with other Government bodies and Non Governmental Organisations (NGOs) to determine and implement best practice methods to limit Global Warming to less than 1.5°C
- Work with partners across the city and region to deliver this new goal through all relevant strategies and plans recognising that the Council cannot deliver on this ambition alone
- Ensure that representatives on the Tyne and Wear Pensions Fund continue to lobby for further disinvestment in fossil fuels
- Report to Council as soon as possible on the actions the Cabinet will take to address this emergency

In September 2020, Newcastle City Council published a 'Net Zero Newcastle – 2030 Action Plan' which set out the strategy for how the City can achieve its ambition to achieve Net Zero by 2030. Over 100 Priority Actions were identified across three key themes ('Energy', 'Transport' and 'Adaptation and Sustainability') to address emissions from all sectors of the city and to deliver our ambitious aim to be a Net Zero Newcastle by 2030.

Building Regulations

Regulation 25B of the Building Regulations 2010 states: "Where a building is erected, it must be a nearly zero-energy building". For new buildings owned and occupied by public authorities, the coming-into-force date for Regulation 25B was 1st January 2019. For all other buildings, the coming-into-force date for Regulation 25B was 31 December 2020.

Compliance with this requirement is achieved by both:

- Meeting the Target Emission Rate required under Regulation 26; and
- Undertaking an analysis of the technical, environmental and economic feasibility of using high-efficiency alternative systems, which include decentralised energy supply systems based on energy from renewable sources and taking this analysis into account as required by Regulation 25A.

The Government has recently undertaken consultations on both a Future Homes Standard and a Future Buildings Standard. These are a set of standards that will complement the Building Regulations to ensure new homes and non-domestic developments respectively will produce significantly lower CO2 emissions by enhancing Part L (Conservation of fuel and power) and Part F (ventilation) of the Building Regulations.

The change to standards should go some way towards tackling climate change and act as a roadmap to reach the national legally-binding Net Zero commitment by 2050.

Policy CS16 Climate Change

Policy CS16 seeks to encourage the development of low carbon and renewable energy solutions appropriate to the scale and circumstance of the development.

The supporting text to Policy CS16 advises that a Sustainability Statement is required to accompany a planning application. The Sustainability Statement needs to provide detail on the measures proposed to meet the appropriate level of sustainability required by relevant government schemes/guidance and provide a calculation of the predicted annual energy loads and consumption of the development, as well as the predicted CO2 emissions.

Policy CS16 reads as follows:

Development will be sustainable, able to function effectively in a changing climate and address impacts on climate change emissions. Development will be required to:

1. Use a good standard of building fabric, passive design, and landscaping measures to minimise energy demand,
2. Be flexible from the outset to allow adaptation to alternative uses,
3. Deliver a good level of sustainability required by relevant government schemes/guidance,
4. Minimise its contributions and provide resilience to the ongoing and predicted impacts of climate change,
5. Reduce its whole-life CO2 equivalent emissions impact, and
6. Optimise the use of local renewable or low carbon energy in accordance with the following hierarchy:
    i. Connection to an existing, or make provision for future connection, to a committed wider decentralised energy scheme within a specified timeframe,
    ii. Development of a decentralised energy scheme for the whole or significant portion of a development from the outset, including joint schemes with significant adjacent external energy loads,
    iii. Incorporation of other renewable energy solutions,
    iv. Incorporation of other low carbon energy solutions in accordance with current government guidelines.

The following provides a summary of these criteria:

Criteria 1:
This requires the use of a good standard of building fabric, passive design and landscape measures to minimise energy demand. The guidance seeks to lower energy demand through household developments being asked to demonstrate a dwelling fabric energy efficient value 15 percent better than that sought through Building Regulations 2013. This is similar fabric performance equivalent of Code for Sustainable Homes Level 4 - a good standard of building fabric- whilst not adding cost to construct. For non-domestic buildings, the guidance also seeks a 25 percent reduction in the Target Emission Rate. The applicant will also need to demonstrate how a range of passive design measures and landscaping measures have been incorporated into the design to minimise energy demand.

Criteria 2:
This requires a flexible design to allow for adaptation to alternative uses. This will require applicants to consider incorporating measures, such as Lifetime Homes, Smart Homes and Modern Design and the ability of development to be converted to alternative forms of development.

Criteria 3:
This requires a good level of sustainability through the applicant demonstrating best practice project and site management, site water use, site transport, water reuse and recycling, the sustainable use of materials and construction techniques.

Criteria 4:
This seeks to minimise a development's contribution to, and provide resilience from, the ongoing and predicted impacts of climate change. This will be measured by a commitment by the applicant to incorporate measures to mitigate and adapt to climate change, specifically relating to transport, waste and, building water use, the impacts from overheating and flooding and the incorporation of landscaping and ecology in its design.

Criteria 5:
This requires a reduction in whole-life CO2 emissions impact. This can be achieved through demonstrating that the performance gap between design and as-built is minimised and information is given to the occupants to encourage the use of the building in an energy efficient way.

Criteria 6:
This requires developments to optimise the use of local renewable or low carbon energy in accordance with a hierarchy, prioritising decentralised energy schemes (referred to throughout this document as District Heat Networks), followed by other renewable energy solutions and finally other lower carbon energy solutions. Where no District Heat Networks exist, Major applications must evaluate the feasibility of providing a District Heat Network and, where feasible implement such schemes.

The following table summarises the key areas of Policy CS16, and the broad areas that development should address:

Policy CS16		Key areas covered
1	• Good standard of building fabric • Passive design • Landscaping	Fabric energy efficiency standard Passive design techniques Role of landscaping
2	• Alternative uses	Lifetime Homes Building Regulations 2013 M2 & M3 Smart homes and modern design Possible future conversion
3	• Good level of sustainability	Best practice site management Sustainable construction (materials, water and transport) Waste reuse and recycling
4	• Climate change mitigation and adaptation	Mitigation (in occupancy); - Energy - Transport - Water use - Waste and recycling Adaptation; - Overheating - Flooding Landscaping and ecology
5	• Whole life cycle CO2 equivalent emissions	As-built performance gap Occupier engagement
6	• Local renewable or low carbon energy	District Heat Networks Incorporation of renewable energy systems

The Sustainability Statement should provide the necessary detail on the measures proposed to meet an appropriate level of sustainability to comply with all the criteria in Policy CS16.

The onus is on the applicant to demonstrate why certain requirements of policy CS16 are not feasible, either technically or financially, if exemptions from certain provisions are sought.

Part 2: **SUSTAINABILITY STATEMENT REQUIREMENTS**

2.1 Purpose of a Sustainability Statement

The purpose of a Sustainability Statement is to demonstrate that the proposed climate change mitigation and adaptation measures comply with Newcastle City Council's approach to address climate change. It also ensures climate change and sustainability considerations remain an integral part of the development's design, construction and lifetime operation.

Policy CS16 (1) requires developments to demonstrate a "*good standard of building fabric, passive design, and landscaping measures to minimise energy demand*" and Policy CS16 (3) requires a "*good level of sustainability required by relevant government schemes/guidance*".

These requirements therefore require applicants to incorporate measures above the standard form of building fabric, as set out through Building Regulations 2013, to achieve a good level or standard.

Newcastle City Council wish to work with applicants to achieve high standards of sustainable design and construction. For this reason, it is important that principles of sustainable design and construction are considered from the outset of planning a new development, in order that they help shape the proposal.

2.2 Applications requiring a Sustainability Statement?

Whilst Policy CS16 is applicable to all forms of development, the Tyneside Validation Checklist requires Sustainability Statements to be submitted for Major applications.

Major applications are defined as residential developments of 10 or more dwellings or more than 0.5 hectares, or buildings of 1,000 square meters floor space or sites of more than 1 hectare.

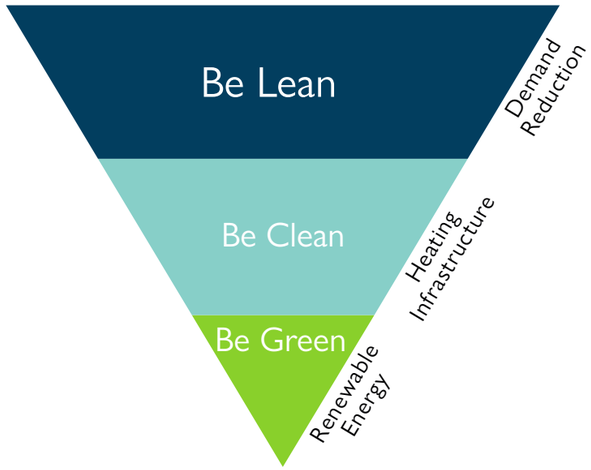
Where an existing building or group of buildings is refurbished and the development qualifies as a Major application, the accompanying Sustainability Statement must demonstrate how the individual elements of the Energy Hierarchy (see Section 2.3) have been implemented and how reductions in regulated CO2 emissions (see Section 3.2 for definition of regulated emissions) have been achieved.

All Sustainability Statements accompanying a Major applications should be prepared in accordance with this guidance document; however, where other supporting documents are being submitted as part of a planning application, it may be appropriate to cross-reference these documents, provided cross-referencing is clear and the documents contain sufficient information to allow an assessment of the application. The issues covered in a Sustainability Statement should cover the topics covered in the guidance and in a format that clearly identifies how each of the Policy CS16 criteria are addressed. The failure to address each of the criteria set out in this guidance could result in an application being assessed as failing to comply with Policy CS16.

All Major outline planning applications should be accompanied by a Sustainability Statement which will guide the design of the development. While less detail will be expected than for a full planning application or a hybrid planning application, applicants should undertake initial feasibility work on each part of the Energy Hierarchy to illustrate how they will minimise CO2 emissions from the development. Applicants should also consider the CO2 targets that are likely to be in place at the time of submission of the reserved matters application to ensure that the scheme can meet any higher planning or regulatory targets.

2.3 The Energy Hierarchy

To demonstrate that the development has been designed to meet elements of Policy CS16 criteria, Sustainability Statements should demonstrate how it has been designed against the "Be Lean, Be Clean, Be Green" Energy Hierarchy as set out below:



	Description	Link to Policy CS16
Be Lean	Use less energy and manage demand during operation through fabric and servicing improvements and the incorporation of flexibility measures.	Policy CS16 (1), (3) and (4)
Be Clean	Exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly by connecting to District Heat Networks.	Policy CS16 (4), (5), (6 i.) (6 ii.), (6 iii.) and (6 iv.)
Be Green	Maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.	Policy CS16 (4), (5), (6 iii.) and (6 iv.)

To meet the requirements of Policy CS16 Sustainability Statements must:

- Report estimated site-wide regulated CO2 emissions and reductions (broken down for the domestic and non-domestic elements of the development), expressed in tonnes of CO2 per annum, after each stage of the Energy Hierarchy
- Demonstrate how the carbon reduction targets beyond Part L 2013 of the Building Regulations for Major applications for domestic and non-domestic developments will be met, namely:
    - Domestic developments should achieve at least a 15% improvement (15% CO2 reduction) on Building Regulations 2013 from energy efficiency
    - Non-domestic developments should achieve at least a 25% improvement (25% CO2 reduction) on Building Regulations 2013 from energy efficiency
- Include information demonstrating that the risk of overheating has been mitigated through an Overheating Strategy Report that accompanies an application which incorporates passive design measures. For residential development this will need to demonstrate compliance with '[Acoustics Ventilation and Overheating - Residential Design Guide (January 2020 Version 1.1)]' produced by Acoustics & Noise Consultants and the Institute of Acoustics, or any subsequent updated document;
- Demonstrate that connection to existing or planned District Heat Networks has been prioritised and provide correspondence to support how this has been incorporated into the developments design;
- Minimise the number of energy centres and provide a single point of connection to the District Heat Network;
- Investigate suitable low carbon and/or renewable heating plant for installation within the energy centre if connection can't be made to an area wide District Heat Network;
- Investigate and commit to maximising the installation of renewable technologies (including the potential for electrical or thermal storage) on site.

The following sections of this guidance sets out in more detail how a Sustainability Statement should demonstrate how these factors have been met through the development's design and how the supporting technical information shall be measured and presented within the statement.

2.4 Securing implementation of proposed measures

The Sustainability Statement must clearly outline the applicant's commitments in terms of CO2 savings and measures proposed to reduce energy demand. Detailed applications will not be determined until the information identified in this guidance, including modelled predicted energy efficiency savings arising from the development, are fully quantified and confirmed to be part of the application's design. Planning conditions and/or Section 106 agreements will then be used to secure the implementation of the measures set out in the Sustainability Statement. For this reason, it should be assumed that there would not normally be a requirement to condition the supply of additional energy efficiency modelling following determination of an application. A planning condition will require compliance with the carbon reductions identified in the submitted Sustainability Statement as a minimum.

2.5 Carbon factors - energy performance modelling

To demonstrate how a design has been adapted to minimise energy demand and its whole-life CO2 emissions target to meet Policy CS16, the Sustainability Statement must include the energy performance assessment of the development against fuel carbon factors utilising Standard Assessment Procedure (SAP) modelling, as defined in:

- **SAP 2012** - SAP 2012 remains relevant to confirm the development's compliance with Building Regulations 2013.
- **SAP 10.0** - SAP 10.0 is no longer considered relevant and is therefore disregarded from the following commentary.
- **SAP 10.1** - SAP 10.1 is now superseded by SAP 10.2 in all respects with the exception of the two unresolved areas set out in SAP 10.2 text in the next bullet point.
- **SAP 10.2** - At the time of preparing this document (November 2021), a near-complete version of SAP 10.2 had been published and will come into use for live assessments (expected in mid-2022). There are two unresolved areas relating to whether a multiplier should be applied to the Target Fabric Energy Efficiency which is subject to the outcome of the Future Buildings Standard consultation and the other is the treatment of District Heat Networks. A further iteration of this guidance will be produced once the final detail of SAP 10.2 is released. Government are currently proposing that in the interim uplift next year most existing networks (i.e already built or where already under construction before June 2022) would be able to pass the interim uplift in CO2 and Primary Energy terms. Government are currently proposing to do this by adjusting the notional building in both domestic and non-domestic Part L Building Regulations to be equal to the actual building as long as the actual is equal to or better in CO2 and Primary Energy terms than a gas CHP based heat network with 33% overall distribution losses. This will be calculated as a gas CHP system with 70% gas CHP (elec. Efficiency 38% and thermal efficiency 42%) and 30% communal gas boiler (efficiency 85%) giving the heat delivered thresholds of CO2/kWh at 0.350 and Primary Energy kWh/kWh of 1.450.

The significant reduction in the carbon intensity of grid-supplied electricity, due to increased integration of renewable energy into the grid and decreasing fossil fuel contribution over recent years, is reflected in SAP 10.1 and SAP 10.2. The impact of adopting SAP 10.1 or SAP 10.2 for calculation of the proposed development's regulated CO2 emissions will likely result in:

- Overall regulated CO2 emissions are reduced;
- Combined Heat and Power (CHP) performs less favourably against a grid-supplied electricity counter-factual
- Electrical sources of heat generation are favoured; and
- Installation of on-site renewable electricity (e.g. solar photovoltaics) have a reduced CO2 reduction or offset effect.

As a result, in reviewing the SAP model energy assessment, consideration of all three carbon factors (namely SAP 2012, SAP 10.1 and SAP 10.2) will need to be undertaken, in particular recognition that SAP 10.1 and SAP 10.2 reflect a more realistic analysis of a development's regulated CO2 emissions.

If the development can feasibly connect to an existing or planned District Heat Network using gas-engine CHP, then the SAP 2012 carbon factor can be applied, provided the District Heat Network operator has developed a strategy to decarbonise the District Heat Network by 2030 and can commit to this within the Sustainability Statement.

The use of the SAP 10.1 and SAP 10.2 emission factors in this context is for demonstrating performance against planning policy targets and is separate to Building Regulation compliance. Applications should therefore separately ensure that compliance with Building Regulations is maintained. Applicants using SAP 10.1 or SAP 10.2 carbon factors should continue to use the current Building Regulations methodology for estimating energy performance against Part L 2013 requirements, but with the outputs manually converted for the SAP 10.1 and SAP 10.2 emission factors and set out in the Sustainability Statement. For the avoidance of doubt, until such time as the statutory instrument is formally released by Government in relation to anticipated Building Regulation changes, the SAP 2012 carbon factors will be used by Building Control to assess applications compliance with Building Regulations.

A table in the form set out below detailing the predicted SAP rating outputs with and without mitigation measures included in the development's design must form part of a Sustainability Statement. This table should be used to record the estimated carbon performance of the development emission factors to allow for a robust assessment of performance against the proposed emission factors and comparison against the unmitigated emission factors. In addition, a summary of the modelling work output (i.e. BRUKL reports) must be provided in an appendix of the Sustainability Statement for each stage of the Energy Hierarchy.

	Fuel Carbon Factor (kgCO2/kWh) From Table 12 (Fuel prices, emissions factors and primary energy factors) of relevant SAP document		
	SAP 2012	**SAP 10.1**	**SAP 10.2**
Natural Gas	0.216	0.210	0.210
Grid Electricity	0.519	0.136	0.136
Bespoke District Heat Network carbon factor	*[To be populated by applicant]*		
Other carbon factors relevant to the development to be added	*[To be populated by applicant]*		

Detailed guidance on how energy efficiency targets should be calculated and presented in a Sustainability Statement are included in Part 4 of this guidance.

Part 3: **ASSESSING CARBON EMISSIONS FROM DEVELOPMENT**

3.1 Establishing CO2 emissions

Savings are to be expressed in tonnes of CO2 per annum, not kg CO2 /m2 per annum or any other metric. For each application, the following table should be completed and presented separately for domestic uses, non-domestic uses and the entire site, to demonstrate compliance with the Energy Hierarchy and the CO2 targets. Using the formulas outlined in the table below and the assessment approach set out in this guidance, the following tables from Appendix 1 should be completed by the applicant for each SAP fuel carbon factors (where applicable): Summary Table Dom 1 and Summary Table Dom 2 for domestic developments; and / or Summary Table Non-dom 1 and Summary Table Non-dom 2 for non-domestic developments; and / or Summary Table Site 1.

	Carbon dioxide emissions (tonnes CO2 equivalent per annum)	**% change**
Regulated Emissions		
Baseline: Part L 2013 of the Building Regulations Compliant Development	A	
Be Lean – after Demand Reduction measures	B	
Be Clean – after Heating Infrastructure measures	C	
Be Green – after Renewable Energy measures	D	
Savings Calculations		
Be Lean – savings from Demand Reduction measures	A - B	(A - B) / A* 100
Be Clean – savings from Heating Infrastructure measures	B - C	(B - C) / A* 100
Be Green – savings from Renewable Energy measures	C - D	(C - D) / A* 100
Cumulative on-site savings	A - D = E	(A - D) / A* 100

3.2 Regulated and unregulated emissions definition

A building's energy consumption varies considerably according to the building's function. Its total operational energy usage comprises regulated and unregulated energy.

BREEAM defines regulated and unregulated energy as follows:

- Regulated energy is building energy consumption resulting from the specification of controlled, fixed building services and fittings, including space heating and cooling, hot water, ventilation, fans, pumps and lighting. Such energy uses are inherent in the design of a building. Designers may not be able to predict how the services and fittings will be used but they can design them to be as energy efficient as possible.
- Unregulated energy is building energy consumption resulting from a system or process that is not 'controlled', ie energy consumption from systems in the building on which the Building Regulations do not impose a requirement. For example, this may include energy consumption

from systems integral to the building and its operation, e.g. IT equipment, lifts, escalators, refrigeration systems, external lighting, ducted-fume cupboards, servers, printers, photocopiers, laptops, cooking, audio-visual equipment and other appliances.

The calculations of emissions set out in the Sustainability Statement shall be based on regulated emissions.

3.3 Calculating regulated CO2 emissions for a Part L 2013 of the Building Regulations Compliant Development

The Sustainability Statement must first establish the regulated CO2 emissions assuming the development complied with Part L 2013 of the Building Regulations using Building Regulations approved compliance software (see references to SAP and SBEM in Section 3.4 below).

When determining this baseline, it should be assumed that any heating and hot water supply would be provided by gas boilers and that any active cooling would be provided by electrically powered equipment. If a communal low temperature heat network is being proposed, this should be included when determining CO2 emissions to ensure a consistent baseline (i.e. the energy supply for a large apartment block would be provided by communal gas boilers not individual ones in each dwelling).

For each non-domestic building the Target Emissions Rate (TER) should be multiplied by its floor area to provide the related regulated CO2 emissions. For each representative dwelling type, the related TER is multiplied by the cumulative floor area for that dwelling type to establish the related CO2 emissions . The CO2 emissions for each non-domestic building and dwelling type are then summed to give the total regulated emissions for the development.

3.4 Calculating regulated CO2 emissions at each stage of the Energy Hierarchy

Regulated emissions must establish:

- **Domestic (dwellings)**: a Dwelling CO2 Emissions Rate (DER) calculated through the Part L 2013 of the Building Regulations methodology SAP 2012. This is multiplied by the cumulative floor area for the particular dwelling type in question to give the related CO2 emissions. In terms of the extent of modelling work required, the applicant must provide information for a representative sample of domestic properties.
- **Non-domestic**: a Building CO2 Emissions Rate (BER) calculated through the Part L 2013 of the Building Regulations methodology based on the National Calculation Methodology (NCM) and implemented through Simplified Building Energy Model (SBEM) v5.2d or later or equivalent software. For each building, the related BER is multiplied by its floor area to give the related CO2 emissions.

The CO2 emissions for each non-domestic building should be summed together to give total non-domestic regulated emissions. Similarly, the CO2 emissions of all dwellings must then be summed to give the total regulated emissions for the domestic element of the development. These figures should be expressed in tonnes of CO2 per annum.

3.5 Summary tables for Sustainability Statement outputs

Appendix 1 contains summary tables setting out how the outputs form the Sustainability Statement shall be presented, based on the detailed approach set out in Part 4.

Part 4: APPLYING THE ‘BE LEAN’, ‘BE CLEAN’, ‘BE GREEN’ APPROACH

4.1 'Be Lean' – Demand Reduction

Energy efficiency targets

All Major applications are expected to achieve the following energy efficiency targets:

- Domestic developments should achieve at least a 15% improvement (15% CO2 reduction) on Building Regulations 2013 from energy efficiency
- Non-domestic developments should achieve at least a 25% improvement (25% CO2 reduction) on Building Regulations 2013 from energy efficiency.

Sustainability Statements must set out the demand reduction measures which will be put in place to achieve these energy efficiency targets.

Demand reduction measures

Measures typically include both architectural and building fabric measures (passive design) and energy efficient services (active design). Demand reduction features should be introduced at the earliest design stage of a development.

For domestic (residential) developments, the total Part L Fabric Energy Efficiency Standard (FEES) for the development as a whole should be provided, which is based on the maximum energy demand for the dwelling.

Passive design measures, including optimising orientation and site layout, natural ventilation and lighting, thermal mass and solar shading, should be set out in the Design and Access Statement and cross-referenced in the Sustainability Statement.

Active design measures, including high efficiency lighting, efficient mechanical ventilation with heat recovery and wastewater heat recovery, must also be investigated and set out in the Sustainability Statement.

The applicant must provide details in the Sustainability Statement of the demand reduction measures specific to the development, for example enhanced U-value numbers (W/m2K), air tightness improvement, efficient services and lighting. Information should also be provided on the development's approach to limiting thermal bridges. Where a particular energy efficiency standard is to be met, this must be clearly stated. The glazing percentage of the buildings, expressed as the glazed area (from the inside looking out) divided by the façade area (multiplied by 100), should be clearly stated within the Sustainability Statement.

The applicant must clearly identify the extent to which Part L 2013 of the Building Regulations is exceeded through the use of these demand reduction measures alone, i.e. the percentage improvement of the BER/DER over the Target CO2 Emissions Rate (TER) expressed as a minimum energy performance requirement for a new dwelling / building expressed in terms of kg CO2 per m2, before the inclusion of a District Heat Network connection and use of on-site renewables.

The appendix of the Sustainability Statement must include a summary output sheet from the modelling work (i.e. a print out, such as a full BRUKL report) only taking into account energy efficiency measures, i.e. excluding the proposed heating system and renewable energy. The 'Be Lean' case should assume that the heating is provided by gas boilers and that any active cooling would be provided by electrically powered equipment.

If the final heating proposal is to be low carbon or renewable energy, gas boilers must still be assumed for the purposes of the 'Be Lean' element of the hierarchy. The distribution loss factor to be applied at the 'Be Lean' stage is the SAP default (1.05).

For applications that have a high domestic hot water demand, the potential for wastewater heat recovery should be considered. Applicants proposing wastewater heat recovery for domestic units should include the system in the SAP calculations. Applicants proposing wastewater heat recovery for non-domestic units are not currently able to account for this using the Building Regulations methodology; they can however provide documentary evidence confirming the percentage of the hot water demand that this technology offsets. For both domestic and non-domestic proposals, evidence should be provided, including manufacturer datasheets or correspondence, to demonstrate that the performance claimed is achievable.

For applications that include residential units, a clear explanation of the different dwelling types modelled should be provided. For each dwelling type the full DER worksheet, including the effect of energy efficiency measures alone (i.e. excluding any contribution from the proposed heating system and renewable energy), should be provided, together with the full TER worksheet. It is essential that the worksheets containing the DER and TER and the modelling inputs are provided to enable the savings from energy efficiency to be validated (i.e. SAP worksheets or Part L compliance checklists alone are not sufficient as they do not include all the relevant information).

For domestic (residential) developments, the total Part L Fabric Energy Efficiency Standard (FEES) for the development as a whole should be provided. The table below (Summary Table Dom 3 in Appendix 1) should be completed.

	Target Fabric Energy Efficiency (MWh/year)	Design Fabric Energy Efficiency (MWh/year)	Improvement (%)
Development total			

Costs to occupants

Applicants will be expected to consider the estimated costs to occupants of the Sustainability Statement and outline how they are committed to protecting the consumer from high prices. In line with the Energy Hierarchy, applicants should prioritise energy demand reduction. Energy efficiency measures should therefore be the primary factor of consideration before proceeding with a selection of the energy system.

When estimating the costs to occupants, applicants should consider all of the following parameters:

- Fuel used (including taxes, Climate Change Levies, etc.)
- Incentives (if applicable)
- Electricity sales (if applicable)
- Plant replacement
- Overheads
- Maintenance

Overheating

It is important to identify potential overheating risk in developments early on in the design process and then incorporate suitable passive measures within the building envelope and services design to mitigate overheating and reduce cooling demand. For residential developments this will need to demonstrate compliance with 'Acoustics Ventilation and Overheating – Residential Design Guide (January 2020 Version 1.1)' produced by Acoustics & Noise Consultants and the Institute of Acoustics, or any subsequent updated document.

Measures that are proposed to reduce the demand for cooling should be set out under the following categories:

1. Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure. It is also expected that external shading will form part of Major applications.

2. Minimise internal heat generation through energy efficient design: For example, heat distribution infrastructure within buildings should be designed to minimise pipe lengths, particularly lateral pipework in corridors of apartment blocks, and adopting pipe configurations which minimise heat loss e.g. twin pipes.
3. Manage the heat within the building through exposed internal thermal mass and high ceilings: Increasing the amount of exposed thermal mass can help to absorb excess heat within the building. Efficient thermal mass should be coupled with night time purge ventilation.
4. Provide passive ventilation: For example, through the use of openable windows, shallow floorplates, dual aspect units or designing in the 'stack effect' where possible.
5. Provide mechanical ventilation: Mechanical ventilation can be used to make use of 'free cooling' where the outside air temperature is below that in the building during summer months. This will require a by-pass on the heat recovery system for summer mode operation.
6. Provide active cooling systems: The increased use of air conditioning systems is generally not supported, as these have significant energy requirements and, under conventional operation, expel hot air, thereby adding to the urban heat island effect. However, once passive measures have been prioritised if there is still a need for active cooling systems, such as air conditioning systems, these should be designed in a very efficient way and should aim to reuse the waste heat they produce.

Overheating modelling for both domestic and non-domestic developments should be conducted using the following design weather file: DSY1 (Design Summer Year) for the 2020s, high emissions, 50% percentile scenario.

All Major applications are required to undertake a detailed analysis of the risk of overheating. The overheating analysis should include:

- Dynamic overheating analysis software used
- Site location
- Site orientation
- Weather file used
- Internal gains
- Occupancy profiles
- Thermal elements performance (U-values and glazing g-values)
- Shading features (i.e. blinds, overhangs etc.)
- Thermal mass details
- Ventilation strategy
- Model images indicating the sample units modelled
- Units' internal layout

'Active cooling' should not be specified in developments where it has been demonstrated that the passive or other measures proposed have successfully addressed the risk of overheating; to avoid unnecessarily increasing a development's energy demand and CO2 emissions. In addition, it is not expected that 'active cooling' will be proposed for any domestic (residential) developments.

For non-domestic buildings, the BRUKL output reports contain an 'HVAC Systems Performance' table comparing the cooling demand of the actual and notional buildings for different building elements. The aim should be to reduce the actual cooling demand below that of the notional for each of the non-domestic spaces in the development where an active cooling load exists.

The cooling analysis results shall be presented in the following table (Summary Table Non-dom 3 in Appendix 1):

	Area weighted average non-domestic cooling demand (MJ/m2)	Total area weighted non-domestic cooling demand (MJ/year)
Actual		
Notional		

If an active cooling strategy is required, it should be set out in the Sustainability Statement and include details of the active cooling plant being proposed, including efficiencies, and the ability to take advantage of free cooling and/or renewable cooling sources. Where appropriate, the cooling strategy should investigate the opportunities to improve cooling efficiencies to reduce CO2 emissions through the use of locally available energy sources such as ground cooling, river water cooling (etc.) and efficient technologies such as heat pumps that can be used to provide cooling.

4.2 'Be Clean' – Heating Infrastructure

Once demand for energy has been minimised, the applicant must demonstrate how the development's energy systems will exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly to reduce CO2 emissions.

District Heat Networks

District Heat Networks are an important part of a sustainable and flexible energy system of which each building is a part, and which enables a more circular approach to energy use by storing, using and reusing energy sources. This supports a more effective and efficient use of energy by reducing primary energy demand and minimising the amount of energy that is ultimately wasted within the system.

District Heat Networks offer an efficient and competitive solution for heating buildings in urban areas with high heat density and provide the added benefit of enabling the use of secondary energy or waste heat sources. This allows useful, lower quality energy to be used and re-used within the system to meet lower quality energy demands, such as space heating and hot water, saving high quality energy sources and capacity to meet high quality energy demand. The inherent thermal storage capacity of District Heat Networks helps to manage demand, supports balancing and the flexibility of the electricity network and the integration of increasing volumes of renewable energy into the grid mix. By providing a system-level alternative to building-level solutions, District Heat Networks help manage demand through their inherent storage provision whilst protecting existing capacity in the local electricity network to accommodate additional development and the integration of increasing volumes of renewable energy into the grid mix.

District Heat Networks also provide long-term flexibility to achieve decarbonisation. Existing carbon intensive heat sources and production technologies can be substituted at a later time with new, lower carbon and innovative technologies to support the decarbonisation of the District Heat Network. This in turn is a simpler process for decarbonising heat supply to multiple consumers in one area, removing the need to retrofit individual buildings.

Other benefits of District Heat Networks include:

- The larger energy centres forming part of District Heat Network allow for more effective abatement and dispersal of emissions compared to having many small individual systems in an area. These District Heat Networks then provide the opportunity for buildings close to the

District Heat Network to replace their existing individual gas boilers with a heat interface unit (HIU) and a connection to the District Heat Network;

- The size of District Heat Networks allows them to realise significant economies of scale, which means that they can minimise operational costs and keep heat costs fair and affordable to help alleviate fuel poverty for residents;
- Fuel diversity and multiple heat sources reduces exposure to fluctuations in commodity prices, and the District Heat Network provides wider energy system benefits, such as balancing and flexibility, to the national grid as it helps to manage the District Heat Network ;
- The reduction of a District Heat Network peak demand, through the increased diversity of its heat load and the use of its thermal storage capacity, leads to less carbon intensive sources being used to generate energy; and
- There are reduced maintenance costs involved in maintaining a single system compared to many individual systems.

Connection to an existing or committed District Heat Network will need to be in compliance with technical specifications that are available for any relevant scheme. Payment of associated costs or contributions will also be required at that time. Where no District Heat Network exists, Major applications must evaluate the feasibility of providing a District Heat Network and, where feasible, implement such schemes.

Where no District Heat Network exists and the deployment of an area-wide District Heat Network proves not to be feasible, Major applications should prioritise adoption of a communal low temperature heat network. A communal low temperature heat network is one that has a single point of connection served by a single energy centre for the entire site which connects all buildings. Communal low temperature heat networks future proof the development for easy connection to an area wide District Heat Network in the future.

The onus is on the applicant to demonstrate why certain requirements of this policy are not feasible, either technically or financially, if exemptions from certain provisions are sought.

Where connection to an existing or future proposed District Heat Network is feasible, when measured against a renewable energy counterfactual (such as Air Source Heat Pumps), connection will be secured through a Section 106 legal agreement. The agreement will need to secure wayleave access to install all associated pipework and ancillary equipment with connection via a plate heat exchanger in the proposed building(s) plant room and subsequent use of the District Heat Network for all of the development's heating loads to agreed timescales. Should a District Heat Network become available after first occupation, the building(s) shall be designed to allow ready access and installations for future connection and supply of all of the development's heating loads to agreed timescales.

Applicants proposing to use low-emission Combined Heat and Power (CHP) plants will be required to provide sufficient information to justify its use, ensure that the carbon and air quality impact is minimised, for example through the selection of a lower emission unit and use of abatement technology, and undertake emissions testing to demonstrate that the installed system meets emission limits prior to first use.

The Policy CS16 heating hierarchy

The adoption of a communal low temperature heat network for the Development is to be prioritised and should select a heat source in accordance with the following heating hierarchy as set out in Policy CS16 (6):

i. Connection to an existing, or make provision for future connection, to a committed wider decentralised energy scheme within a specified timeframe,
ii. Development of a decentralised energy scheme for the whole or significant portion of a development from the outset, including joint schemes with significant adjacent external energy loads,
iii. Incorporation of other renewable energy solutions,
iv. Incorporation of other low carbon energy solutions in accordance with current government guidelines

The onus is on the applicant to demonstrate why certain requirements of the policy are not feasible, either technically or financially, and therefore why the development cannot adopt an approach based on the highest level(s) of the heating hierarchy. If exemptions from certain provisions are sought, a robust rationale from the applicant is required and it shall take into account all aspects of Policy CS16 and this guidance document.

Further information on the above heating hierarchy is set out below:

i.) Connection to an existing, or make provision for future connection, to a committed wider decentralised energy scheme within a specified timeframe; and

ii.) Development of a decentralised energy scheme for the whole or significant portion of a development from the outset, including joint schemes with significant adjacent external energy loads.

Developments proposing to connect to a District Heat Network may continue to use SAP 2012 emission factors, provided the District Heat Network operator has submitted its decarbonisation strategy showing a credible decarbonisation plan for the system by 2030.

Existing District Heat Networks

Where a District Heat Network exists in the vicinity of the proposed development, the applicant must prioritise connection and provide evidence of active two-way correspondence with the District Heat Network operator. This must include confirmation from the District Heat Network operator of whether the District Heat Network has the capacity to serve the new development or if they are willing to expand the capacity, together with supporting estimates of installation cost and proposed timescales for connection.

The carbon factor associated with the heat supplied by a District Heat Network should be obtained from the District Heat Network operator and be provided in the Sustainability Statement. This should be accompanied by the assumptions used to derive the carbon factor including estimated heat losses. For each heat source, the proportion of heat provided by the source, the generation plant efficiencies and the type of fuel used should all be provided.

Planned District Heat Networks

If there are no existing District Heat Networks to supply the system, the applicant must investigate whether a District Heat Network is being planned for the area.

Where connection is proposed to a planned District Heat Network, the applicant should provide the information on correspondence with the expected District Heat Network operator (or developer) and the carbon factor associated with the heat supplied by the District Heat Network. If no information on the District Heat Network performance is available applicants should make reasonable assumptions on what the anticipated end use will be. Where a District Heat Network is planned, developments must demonstrate that they are designed to connect to the District Heat Network, in line with the proposed District Heat Network's design specification.

Where a development is within an area that could be supplied by a District Heat Network, but the applicant is contending that providing a communal low temperature heat network to allow future connection will result in uneconomic costs to end users, the applicant must provide a whole life cycle cost (LCC) analysis comparing the communal and individual systems.

Although LCC results will vary on a case by case basis, modelling usually shows that LCC of well-

designed heat networks and individual boilers are broadly similar for high-density developments. Where the LCC of the communal heat network is broadly similar to that of individual gas boilers the network will not be considered uneconomic. Where it can be demonstrated and evidenced that the LCC of the communal heat network is significantly higher than that of individual gas boilers and it can be shown to make the scheme unviable, the communal heat network may be deemed uneconomic.

Undertaking a Life-Cycle Costing (LCC)

This section provides information on how life-cycle costing (LCC) must be approached where the applicant claims that adopting communal low temperature heat network to facilitate a District Heat Network connection will result in uneconomic costs to end users. It provides broad guidance on how the LCC must be approached – individual assumptions will be subject to scrutiny.

The LCC analysis should be conducted over a 30-year period, with the communal low temperature heat network assumed to have a lifespan of at least this duration. The residual value of the communal low temperature heat network and, where applicable, the alternative individual boilers at the end of the analysis period should be taken into account.

The discount rate should reflect the sources of finance that will be used to implement the system, e.g. for social housing funded by government grant a 3.5% discount rate should be assumed in line with HM Treasury Green Book guidance.

The analysis must take into account:

- Initial installed capital cost - for the heat network this would typically be expected to be around £5,500 per apartment. This excludes the costs of internals downstream of the Heat Interface Unit (HIU) which should be assumed to be the same as those for an individual boiler. Cost estimates should be obtained from established district heating installation companies.
- Replacement costs – an individual boiler will typically be replaced twice during the lifetime of a heat network.
- Annual fuel costs – due to bulk purchasing communal boilers will have a lower unit gas cost than individual gas boilers.
- Annual operation and maintenance costs.
- Annual meter reading and billing administration costs – for heat networks this would not be expected to be greater than £80 per dwelling per annum.

In determining the annual fuel costs for the heat network option reasonable assumptions must be made regarding the heat loss and efficiency of the communal boilers. Best practice design should be assumed for the heat network e.g. low temperatures, twin pipes, etc. The case specific heat loss should be estimated for the particular development.

Supplying heat beyond the site boundary

Applicants should investigate opportunities for expanding their communal low temperature heat network to supply heat to local developments and buildings outside the boundaries of their site, particularly if this has the potential to facilitate the development of an area-wide District Heat Network. Applicants could look in particular for opportunities to connect to existing local buildings and developments to help reduce their CO2 emissions and this could help the development if it can't meet its CO2 reduction targets on-site to meet them off-site.

Very large mixed-use developments can often be the catalyst for establishing an area-wide District Heat Network to serve a much larger area. These opportunities for expanding the District Heat Network into the adjacent area to supply heat should be fully explored. Sufficient allowance should be made in sizing the energy centre and communal low temperature heat network infrastructure to allow for expansion of the communal low temperature heat network to serve a wider area in the future.

iii.) Incorporation of other renewable energy solutions

The third step of the heating hierarchy encourages the exploitation of local energy opportunities to maximise the use of locally available renewable energy sources whilst minimising primary energy demand and CO2 emissions. Secondary heat sources should be used before renewable energy sources but can also be used in conjunction with them to minimise the carbon intensity of the heat network.

Secondary heat includes environmental sources: air, water and ground; and waste sources: such as heat from the sewerage system, sewage treatment plants, the Metro network, data centres and chiller systems, among others. The applicant should investigate waste heat sources of heat on or adjacent to the site. This waste heat, especially if it is low-grade heat, can be re-used to meet demand for low quality energy such as space heating and hot water. Many secondary heat sources will be low-grade heat, i.e. below 30^{o}C, and depending on the flow temperature of the heat network that it is being put into, it may need elevating using a heat pump either at source, before going into the network, or at the point of use.

These low-carbon heat sources can be used for both site-wide networks and as multiple heat sources for area-wide District Heat Networks, supporting development of new low carbon District Heat Networks and the decarbonisation of existing District Heat Networks that have gas-engine CHP as their primary heat source.

iv.) Incorporation of other low carbon energy solutions in accordance with current government guidelines

Low emission Combined Heat and Power (CHP)

To date, gas-engine CHP has been the primary technology for facilitating the development of District Heat Networks due to its high efficiency and better carbon performance compared to electrical systems utilising grid electricity. However, the rapid decarbonisation of the electricity grid means that technologies generating onsite electricity (such as gas-engine CHP) will not achieve the carbon savings they have to date. There are also growing air quality concerns associated with combustion-based systems; with the number of smaller sites using gas-engine CHP now of particular concern.

In general, larger sites are considered more appropriate in terms of operational regime and available heat load to enable an effective operation of CHP systems, providing that any related emissions are properly abated.

To address air quality concerns and to continue to facilitate District Heat Networks, only low-emission CHP is suitable and only where it is facilitating an area-wide District Heat Network. New gas-engine CHP is strongly discouraged as a suitable heating solution for new development in Newcastle.

New developments will continue to be expected to connect to existing District Heat Networks that are already utilising gas-engine CHP or that have had planning approval on this basis, provided the network operator has submitted a decarbonisation strategy for the network by 2030. Decarbonisation strategies will include CHP being replaced with a lower carbon alternative, such as a large centralised heat pump as the CHP nears the end of its lifetime. The decarbonisation strategies should include:

- A commitment to investigate all available options for decarbonising the network and timings for doing so, e.g. waste heat sources in the area, replacement of gas-engine CHP with other technologies such as heat pumps.
- Evidence of existing (or planned) studies that have been undertaken and timescales for implementing the decarbonisation plans, including investigation of funding for further work from the Green Heat Network Fund or other suitable funding.
- A detailed plan demonstrating that the process is being monitored in order to ensure its

implementation as well as a commitment to keep Newcastle City Council updated on progress.

Where CHP is applicable, detailed information should be provided in the Sustainability Statement including the size of the engine proposed (kWe/kWth), the provision of any thermal store and suitable monthly demand profiles for heating, cooling and electrical loads, cost benefit analysis, CO2 reduction benefits, etc. The plant efficiencies used when modelling CO2 savings should be the gross values rather than the net values often provided by manufacturers. The size of the CHP must be optimised based on the thermal load profile before renewable energy systems are considered for the site. CO2 savings from the CHP must be expressed as a percentage reduction on the regulated emissions of the Part L 2013 compliant development.

Use of ultra-low NOx gas boilers

A heating strategy led by ultra-low NOx gas boilers should only be considered when it has been clearly demonstrated that all of the above options (i, ii, iii and iv) have been fully investigated and ruled out with sufficient evidence provided to Newcastle City Council. Ultra-low NOx gas boilers are also acceptable in cases where they represent interim heating solutions until a site is able to connect to an existing or new District Heat Network.

Facilitating a heat network connection

The communal low temperature heat network should allow for a single point of connection to an area wide network and, prior to this, be supplied from a single energy centre where all energy generating equipment is located. A single energy centre will facilitate the simplest connection (whether immediately, or at a later date) to an area wide District Heat Network as well as reduce maintenance and operating costs. Therefore, the Sustainability Statement must demonstrate that enough space has been allocated for a sufficiently large energy centre that will allow for its connection to an area-wide District Heat Network. This must be clearly shown on the plan drawings of the development and the floor area in m2 should be confirmed in writing. A floor plan showing the layout of the plant in the energy centre should also be provided to demonstrate sufficient space has been allowed for the specified equipment and, where applicable, additional equipment to be installed in the future.

Applicants are required to calculate the design heat loss of their proposed system and include them within the energy calculations. These should be based on the pipe length of the total network (both buried and block pipework), design temperatures (including any design Summer time temperature reduction) and the level of insulation proposed. Full details should be provided in the Sustainability Statement.

It is important that options for reducing the distribution losses are incorporated at planning stage as they will be largely dependent on the building design, for instance optimising circulation spaces to reduce the lateral pipe length. Therefore, the heat loss calculation must be based on the length of distribution pipes rather than a percentage estimate.

In order to further reduce distribution losses, the use of variable flow control systems to lower flow rates and lower return temperatures at part-load must be investigated and included within the heat loss calculation. At the design stage, it is recommended that careful attention is paid to ensure systems operate with low return temperatures, in line with the CIBSE Heat Networks: Code of Practice for the UK.

Disrict Heat Network solutions usually benefit from the inclusion of thermal storage. This provides useful balancing for low-carbon technologies, the opportunity to use surplus and low-cost, low-carbon electricity at times of low demand and also helps in the case of heat from renewable and secondary heat sources that may be intermittent.

Developments that will be implemented in phases should seek to create one energy centre large enough for the entire site. A simple schematic of the communal low temperature heat network showing all apartments and non-domestic buildings/uses connected into it, as well as the location of the energy centre(s), must be provided as part of the Sustainability Statement. Where the applicant can provide evidence that a single energy centre is not feasible for the site they must still seek to minimise the number of energy centres and explain how the network will evolve across the development's phasing programme, including indicative timescales and its future connection to an area-wide District Heat Network. Schematics should be provided showing how the schem will evolve and ultimately where and how it will connect to the area wide network.

Applicants should explain how their District Heat Network will decarbonise over time to achieve Net Zero and the timeline for achieving this, which should be achieved by 2030.

Designing heat network infrastructure

New and existing District Heat Networks should incorporate good practice design and specification standards. Poorly designed communal low temperature heat network infrastructure within a building, e.g. a residential tower block, can contribute towards internal overheating problems, especially in communal areas, and high service charges. To avoid this, applicants should work with their chosen District Heat Network operator from pre-design stage.

The CIBSE Heat Networks Code of Practice has been developed to improve the quality of feasibility studies, design, construction, commissioning and operation of District Heat Networks in the UK by setting minimum requirements and identifying best practice options. Network losses should be investigated at the earliest opportunity as they have significant implications on the efficiency of the District Heat Network (both cost and CO2) and the thermal comfort of occupants.

The Code of Practice includes recommendations on designing to minimise pipe lengths (particularly lateral pipework in corridors of apartment blocks), using low temperature systems and adopting pipe configurations selected to minimise heat loss e.g. twin pipes. The level of pipework insulation is also identified in the Code of Practice as a key issue and designers are expected to target levels of insulation significantly better than Building Regulations and British Standard requirements in order to stay within the heat loss levels identified in the Code of Practice.

All applications proposing communal low temperature heating system shall be conditioned to register and comply with the Heat Trust for added customer protection. The Heat Trust was established in November 2015 from collaboration between industry, consumers and government with the aim to establish a common standard in the quality and level of protection given by heat supply contracts. The Trust is also intended to offer District Heat Network customers an independent process for settling disputes. The Heat Trust mark is a sign that the heat supplier has agreed to abide by the standards set out in the scheme and it is expected that District Heat Network operators sign up to the scheme.

Reporting

The applicant shall provide the information detailed in the table below on fuel consumption from each energy source in their Sustainability Statement:

Energy Source	Total fuel consumption (domestic) (MWh/year)	Total fuel consumption (non-domestic) (MWh/year)
Grid electricity		
Gas boilers (communal / individual)		
Gas CHP		
Connection to existing District Heat Network		
Other gas use (e.g. cookers)		

4.3 'Be Green' – Renewable Energy

Sustainability Statements should explain how the opportunities for producing, storing and using renewable energy on-site will be maximised. Detailed site-specific analysis should be provided for all renewable energy technologies and provide a logic for why each is considered feasible or unfeasible. The renewable energy technologies to be assessed shall include (list not necessarily exhaustive):

- Heat pumps including Air Source Heat Pumps (ASHP), Ground Source Heat Pumps (GSHP), Water Source Heat Pumps (WSHP) and waste heat recovery
- Solar Photovoltaics (PV)
- Solar thermal system (flat plate or evacuated tube collectors)
- Wind turbines
- Biomass (logs / wood chips, wood pellets, straw)
- Biofuel
- 'Smart' strategies and control systems

Newcastle City Council expects all Major applications to maximise on-site renewable energy generation. This is regardless of whether the 15% or 25% on-site CO2 reduction target for domestic and non-domestic developments respectively has already been reached through earlier stages of the Energy Hierarchy. In particular, solar PV should be maximised on roof spaces to boost self-generation and self-consumption of renewable energy on site to reduce the costs of regulated and unregulated energy use in the building, particularly reducing the operational costs of an electric-based heating system.

Information required on renewable energy generation:

- An assessment of what is achievable and compatible with the measures already implemented in step 1(Be Lean) and step 2 (Be Clean) of the Energy Hierarchy should be provided.
- Applicants should provide calculations to demonstrate that their chosen renewable system or systems will reduce CO2 emissions. The percentage CO2 reduction from renewable energy should be expressed relative to the Part L 2013 regulated energy baseline–- see table in Section 3.1 of this guidance document.
- High efficiency systems (e.g. state of the art solar PV modules) and innovative technologies should be considered in the interest of maximising on-site CO2 reductions.
- If a number of renewable energy technologies are proposed, it will be important to demonstrate how they will work in tandem and, where applicable, how they will be integrated into a District Heat Betwork (for heat generating technologies) and, again where applicable, also how they will integrate with a cooling system/strategy.

Heat pumps

Heat pumps should always be categorised under this third and final element of the Energy Hierarchy (not the first element, "Be Lean") unless they are serving District Heat Networks. In that case, they should be categorised under 'Be Clean'.

Where heat pumps are proposed, a high specification of energy efficiency will be expected to ensure the system operates efficiently and to reduce peak electricity demand. This applies to any type of heat pump proposals including air source heat pumps (ASHPs), ground source heat pumps (GSHPs), water source heat pumps (WSHPs) or hybrid and ambient loop types of systems.

The Sustainability Statement should state the refrigerant to be used in the heat pumps, and wherever possible a refrigerant that has a negligible global warming potential should be proposed to minimise the environmental consequences of refrigerant leaks. There are various factors that influence the efficiency of a heat pump system and these include the building use (domestic or non-domestic), the source temperature, the output (flow) temperature, the distribution losses and the energy required for running the pumps. Where standard manufacturer details are used, without considering the proposed system requirements, the reported CO2 emission saving is likely to be optimistic and incorrect. As such, a set of specification requirements, outlined below, should be provided for the entire heating system rather than the technology itself, allowing for the consideration of other factors that could compromise optimal operation.

The following information will be required as part of the applicant's submission:

- Details of the Seasonal Coefficient of Performance (SCOP), the Seasonal Performance Factor (SFP) and Seasonal Energy Efficiency Ratio (SEER), which should be used in the energy modelling. This should be based on a dynamic calculation of the system boundaries over the course of a year i.e. incorporating variations in source temperatures and the design sink temperatures (for space heat and hot water). Details of the assumptions should be included in the Sustainability Statement, including manufacturer datasheets showing performance under test conditions for the specific source and sink temperatures of the proposed development and assumptions for hours spent under changing source temperatures.
- Clarification as to how the heat pump will operate alongside any other heating/cooling technologies being specified for the development (i.e. how will the heat pump system operate alongside communal low temperature heat networks, and/or Combined Heat and Power (CHP) plant, solar thermal, etc. if they are also being proposed by the applicant)
- Whether any additional technology is required for top up, for instance during peak loads. This should be incorporated into the energy modelling assumptions and explanation of how this has been done should be provided.
- The approach to generating domestic hot water. To optimise the system's operation it will be expected that thermal store will be integrated in the majority of applications; the operation of the system should be provided.
- A calculation of the CO2 savings that are expected to be realised through the use of this technology.
- An estimate of the expected heating costs to occupants, demonstrating that the costs have been minimised through energy efficient design.
- An estimate of the heating and/or cooling energy the heat pump would provide to the development and the electricity the heat pump would require for this purpose. Particularly for GSHP systems this estimation should be supported by the following information:
    - For closed loop systems, an indication of the land area available that would be required to install the required number of boreholes. Where possible, the ground conditions of the specific site should be taken into account for the calculations.
    - For open loop systems (including aquifer thermal storage systems), the flow rate of water that is available on-site should be stated. It should be used to estimate the amount of heating/cooling the system could provide.
- Applicants will need to provide a diagram of the proposed location of the heat pumps and the associated condenser units. Where condenser units are installed internally there should be adequate access to air flow.
- Specifically for ASHPs, evidence that the heat pump complies with the minimum performance standards as set out in the Enhanced Capital Allowances (ECA) product criteria for the relevant ASHP technology as well as evidence that the heat pump complies with other relevant issues as outlined in the Microgeneration Certification Scheme Heat Pump Product Certification Requirements document at: http://www.microgenerationcertification.org.
- Specifically for GSHPs, confirmation that the site geology is suitable for the installation of the GSHP and also evidence of the likelihood of a permit being granted by the Environment Agency, where required.
- Confirmation that end-users will be supplied with regular information to control and operate the system e.g. at point of occupancy and maintenance visits.

Solar photovoltaic (PV) panels

The following information is required where solar photovoltaic (solar PV) panels are proposed:

- Drawings showing the amount of roof that is available within the development and that could be used to install solar PV modules with suitable orientation and lack of shading. The shading

analysis should include an assessment of the height of existing buildings and any permissions granted for buildings near the application site.
- An estimate of the total solar PV system output (kWp).
- Quantification of the amount of roof area that could be used to install solar PV modules.
- An estimate of the electricity that the solar PV modules will generate including the assumptions for the calculations.
- A calculation of the CO2 savings that may be realised through the use of this technology.

Solar thermal system

The following information is required where solar thermal is proposed:
- Clarification of how the solar thermal collectors will operate alongside the heating system being proposed by the applicant.
- Drawings showing the amount of roof that is available within the development and that could be used to install solar thermal collectors with suitable orientation and lack of shading.
- Quantification of the amount of roof area that could be used to install solar collectors.
- An estimate of the heating requirements that the solar thermal collectors may provide including the assumptions for the calculations.
- A calculation of the CO2 savings that may be realised through the use of this technology.

Wind turbines

The following information is required where wind energy is proposed:
- Estimation of the wind resource on-site at turbine height. The use of the UK Wind Speed (NOABL) is required as a minimum, however supplemental wind resource information can be used to further refine the wind resource estimate.
- Drawings showing the wind turbine location and height in relation to the surrounding structures and including the predominant wind directions.
- An estimate of the renewable electricity that the wind turbine(s) may generate calculated using the estimated wind resource and the wind turbine characteristics i.e. manufacturers' warranted power curve if available.
- A calculation of the CO2 savings that may be realised through the use of this technology.

Biomass

Like CHP, biomass can have significant impacts on local air quality. Applicants proposing to use biomass and biofuel systems will be required to provide sufficient information to justify its use, ensure that the CO2 and air quality impact is minimised, for example through the selection of a lower emission unit and use of abatement technology, and undertake emissions testing to demonstrate that the installed system meets emission limits prior to occupation. In addition to NOx emissions, biomass can also emit particulate matter both from the combustion and from delivery and storage of the fuel.

Biofuel

The following information is required where a biofuel system is proposed:
- Details of the manufacturer's warranty for the use of the proposed liquid biofuel in the CHP unit chosen.
- Confirmation of the blend and standard of biofuel to be used (typically B100 BS EN 14214).
- Details of potential supplier(s) of the biofuel to be used and written confirmation that they can supply the required quantities.
- Information relating to the maintenance regime of the CHP as a consequence of biofuel use.
- Review air quality implications of biofuel with Newcastle City Council's air quality officers.
- Information relating to the sustainability and carbon intensity of the biofuel in line with the Government's Renewable Transport Fuel Obligation (RTFO) CO2 and sustainability methodology for biofuels.
- Details of how the fuel will be stored on site.

- The running costs of a CHP utilising biofuel will typically be higher than a conventional CHP engine using natural gas. Confirmation that this increased running cost has been acknowledged and that it will not affect the proposed operation of the CHP is required.

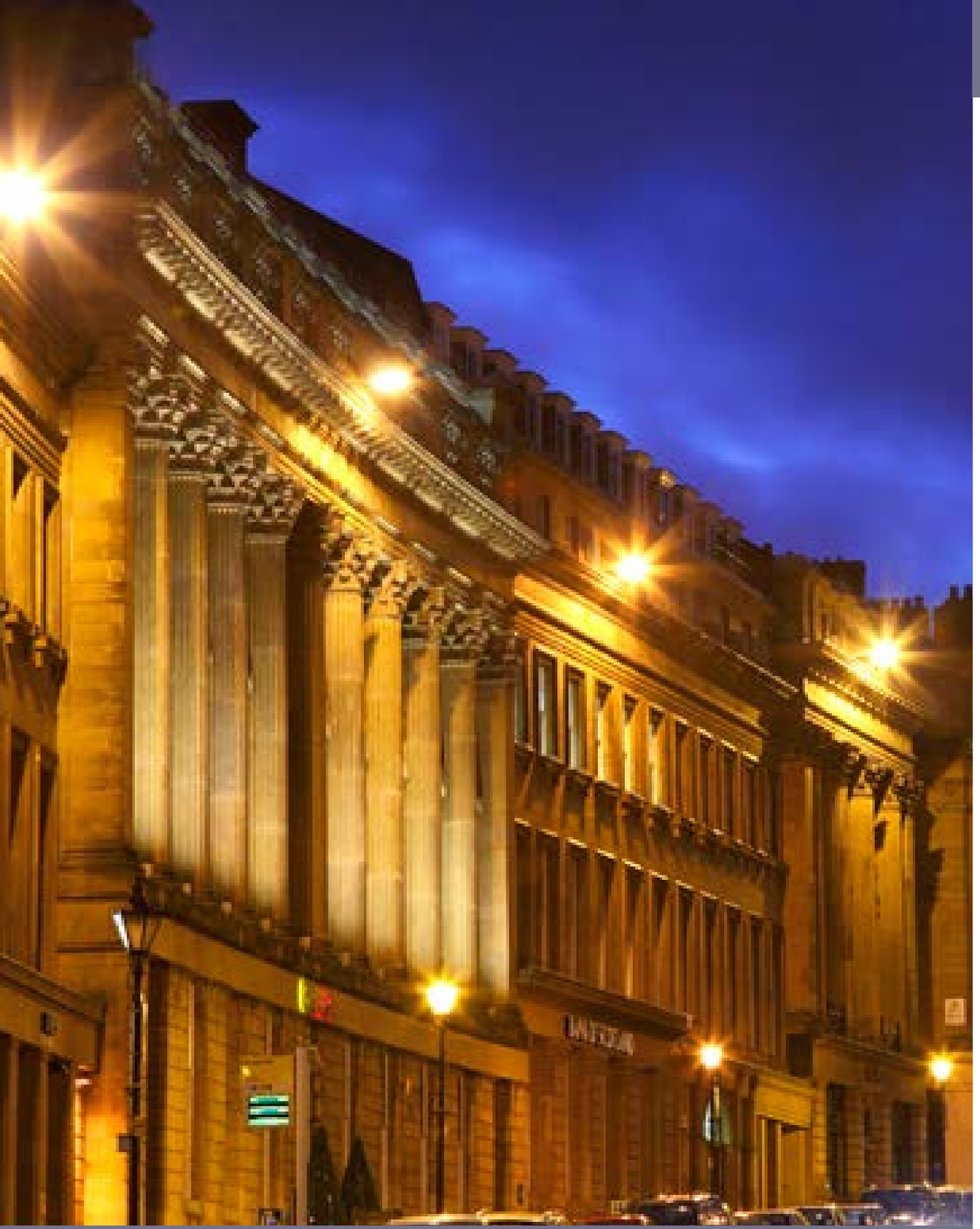
As with solid biofuels, combustion of liquid biofuels can lead to additional NOx and particulate emissions and the same considerations apply to combustion emissions. Although biofuels are unlikely to emit particulates from storage, some fuels may have the potential to emit volatile organic compounds and expert advice should be sought.

'Smart' strategies and control systems

Applicants are encouraged to consider and include a summary in the Sustainability Statement of optimisation opportunities to incorporate renewable energy technologies and integrate renewable technology with other components of the system including energy storage, Electric Vehicle (EV) charging, control systems, energy management systems, white goods (if installed), Demand Side Response, secure remote access to data which occupants and building owners can access, secure remote communication of consumption data between the meter and the supplier, etc.

Performance monitoring of renewable energy systems

For all proposed renewable energy systems, a confirmation that the performance and output of the system will be monitored, in line with relevant guidance documents and industry best-practice is required.



APPENDICES

Appendix 1 – Sustainability Statement summary tables

Domestic buildings

Summary Table Dom 1 – CO2 emissions after each stage of the Energy Hierarchy for domestic buildings (regulated and unregulated emissions by SAP carbon factor):

	CO2 emissions for domestic buildings (Tonnes CO2 per annum)					
	SAP 2012		SAP 10.1		SAP 10.2	
	Regulated CO2 emissions	Unregulated CO2 emissions	Regulated CO2 emissions	Unregulated CO2 emissions	Regulated CO2 emissions	Unregulated CO2 emissions
Baseline: Part L 2013 of the Building Regulations Compliant Development						
After 'Be Lean' (Demand Reduction) measures						
After 'Be Clean' (Heating Infrastructure) measures						
After 'Be Green' (Renewable Energy) measures						

Summary Table Dom 2 – Regulated CO2 emission savings (compared to the Baseline) after each stage of the Energy Hierarchy for domestic buildings:

	Regulated CO2 emission savings for domestic buildings (compared to the Baseline)					
	SAP 2012		SAP 10.1		SAP 10.2	
	Tonnes of regulated CO2 emissions per annum saved	% saving	Tonnes of regulated CO2 emissions per annum saved	% saving	Tonnes of regulated CO2 emissions per annum saved	% saving
After 'Be Lean' (Demand Reduction) measures						
After 'Be Clean' (Heating Infrastructure) measures						
After 'Be Green' (Renewable Energy) measures						
Cumulative on site savings						

Summary Table Dom 3 – Fabric Energy Efficiency for domestic buildings

	Target Fabric Energy Efficiency (MWh/year)	Design Fabric Energy Efficiency (MWh/year)	Improvement (%)
Development total			

Domestic buildings

Summary Table Non-dom 1 – CO2 emissions after each stage of the Energy Hierarchy for non-domestic buildings (regulated and unregulated emissions by SAP carbon factor):

	CO2 emissions for domestic buildings (Tonnes CO2 per annum)					
	SAP 2012		SAP 10.1		SAP 10.2	
	Regulated CO2 emissions	Unregulated CO2 emissions	Regulated CO2 emissions	Unregulated CO2 emissions	Regulated CO2 emissions	Unregulated CO2 emissions
Baseline: Part L 2013 of the Building Regulations Compliant Development						
After 'Be Lean' (Demand Reduction) measures						
After 'Be Clean' (Heating Infrastructure) measures						
After 'Be Green' (Renewable Energy) measures						

Summary Table Non-dom 2 – Regulated CO2 emission savings (compared to the Baseline) after each stage of the Energy Hierarchy for non-domestic buildings:

	Regulated CO2 emission savings for domestic buildings (compared to the Baseline)					
	SAP 2012		SAP 10.1		SAP 10.2	
	Tonnes of regulated CO2 emissions per annum saved	% saving	Tonnes of regulated CO2 emissions per annum saved	% saving	Tonnes of regulated CO2 emissions per annum saved	% saving
After 'Be Lean' (Demand Reduction) measures						
After 'Be Clean' (Heating Infrastructure) measures						
After 'Be Green' (Renewable Energy) measures						
Cumulative on site savings						

Summary Table Non-dom 3 – Non-domestic building cooling demand

	Area weighted average non-domestic cooling demand (MJ/m2)	Total area weighted non-domestic cooling demand (MJ/year)
Actual		
Notional		

Site wide (where Major applications incorporate both domestic and non-domestic buildings)

Summary Table Site 1 – Site wide regulated CO2 emission savings (compared to the Baseline) after each stage of the Energy Hierarchy

	Site wide regulated CO2 emissions (Tonnes CO2 per annum)								
	SAP 2012			SAP 10.1			SAP 10.2		
	Total regulated CO2 emissions across both domestic and non-domestic buildings on site	Tonnes of regulated CO2 emissions per annum saved	% saving	Total regulated CO2 emissions across both domestic and non-domestic buildings on site	Tonnes of regulated CO2 emissions per annum saved	% saving	Total regulated CO2 emissions across both domestic and non-domestic buildings on site	Tonnes of regulated CO2 emissions per annum saved	% saving
Baseline: Part L 2013 of the Building Regulations Compliant Development									
After 'Be Lean' (Demand Reduction) measures									
After 'Be Clean' (Heating Infrastructure) measures									
After 'Be Green' (Renewable Energy) measures									