



Energy Statement

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South East of Wokingham

Revision 00

Date: 26 April 2024

Revision History

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Calculations contained within this report have been produced based on information supplied to Energist by the Client and the Design Team. Any alterations to the technical specification on which this report is based will invalidate its findings.

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This Energy Statement summarises how a development specification can be improved over the minimum standards of Building Regulations to enhance energy performance and reduce regulated carbon emissions from the site.

The Local Planning Authority has requested this document be produced to satisfy a planning condition.

This report should be provided to the Local Planning Authority, along with evidence of SAP / SBEM calculations. The specification summary listed in Sections 6 (for fabric) and 7 (for services) should be used by the Design Team to ensure the final construction project meets the reduction targets as listed in this document.

1. EXECUTIVE SUMMARY

1.1 Purpose of this document

Energist UK has been appointed by the Applicant Nicholas King Homes to create this [Energy Statement](#) for the proposed development at South East of Wokingham in support of the outline planning application.

This document outlines a specification of measures which demonstrates how the Applicant will meet compliance at the proposed development for reducing annual, regulated (in-use) carbon emissions from the buildings in line with:

- i) The [National Planning Policy Framework](#) (2021)

Standardised national guidance to ensure consistency of local planning conditions regarding sustainable design and energy use.
- ii) Building Regulations volume [Approved Document Part L](#) (2021)

Use SAP10 to show full building compliance with the Target Emission Rate, Target Primary Energy Rate, Target Fabric Energy Efficiency, maximum U-Value thresholds, and minimum efficiencies for building services.
- iii) Local planning policy of [Wokingham Borough Council](#),

Go beyond the minimum standards of the Building Regulations targets (above) and ensure the development shows a 19% reduction over the Target Emission Rate, while also showing how the design will utilise renewable technology to offset at least 10% of the annual regulated energy use.

See Section 7 of this document for weblinks to view, in full, the latest versions of these policy documents.

1.2 Summary of results

The Applicant demonstrates commitment to meeting the required energy standard targets at South East of Wokingham by implementing the following improvements over the Baseline specification.

In doing so, the site will:

- [Exceed the minimum standards of Building Regulations Approved Document Part L \(2021\), with an improvement of 83.21% overall.](#)

- This goes beyond the requirements of the Wokingham LOCAL PLANNING AUTHORITY SPD, Policy CP1 of the Core Strategy, Policy NRM11 which set a minimum improvement target of 10%.

This chart visualises the LPA target against the Baseline specification, and shows the improvements made through fabric and LZC improvements.

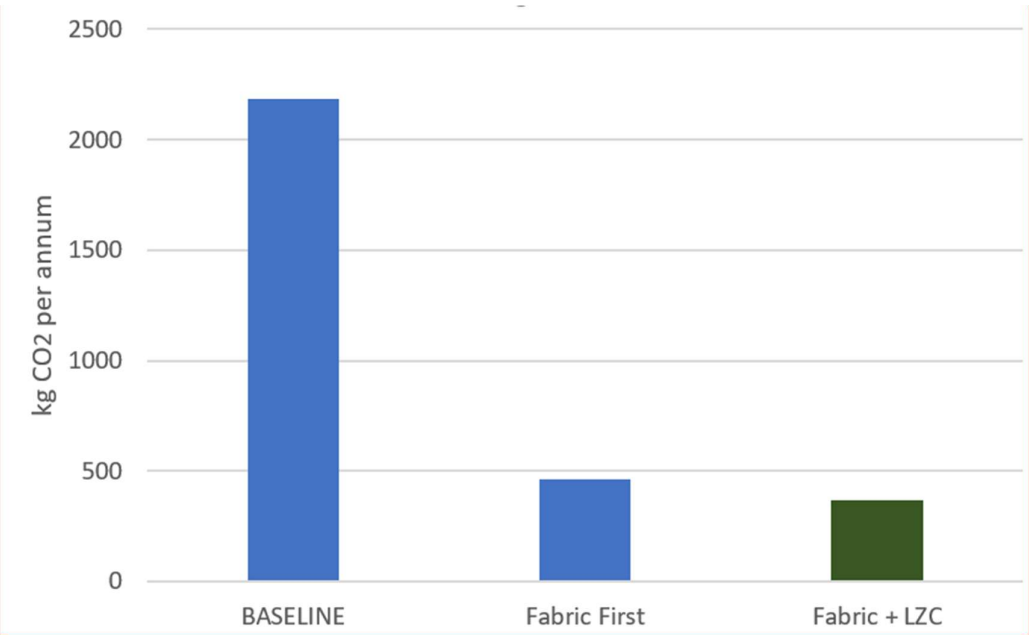


Fig1: Summary of sitewide kgCO₂ at various stages of improvement

Baseline Emissions	2,182.32 kgCO2 per annum
Proposed Emissions	366 kgCO2 per annum
	83.21%

2. METHODOLOGY

2.1 Energy Hierarchy

This Energy Statement lists a number of design improvements which will be incorporated into the development to ensure the previously mentioned requirements are met.

To do this, a process called [The Energy Hierarchy](#) will be followed.

The Energy Hierarchy is a list of enhancement techniques which are prioritised to assist construction projects in creating buildings which require less energy, without compromising comfortable living conditions for the occupants.

In this case, a [three-tier](#) Energy Hierarchy will be used:

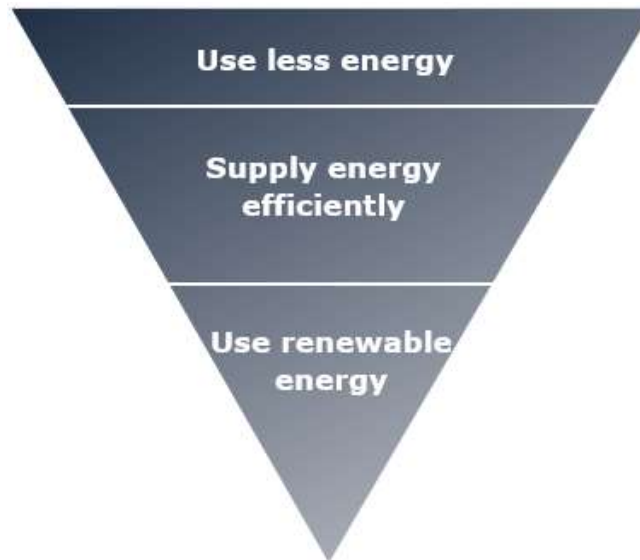


Fig2: *Energy Hierarchy (three-tier)*

Use less energy: Create a construction specification with low levels of heat loss and install building services which operate at a consistently high efficiency.

Supply energy efficiently: Minimise the amount of fossil fuels used in the overall energy mix for the development. Encourage the use of electricity tariffs which fund renewable and low carbon power supplies.

Use renewable energy: Encourage the use of on-site renewable technology and low carbon heating systems.

2.2 Stages of compliance

To meet the requirements outlined in this Energy Statement, the Applicant needs to consider how the proposed energy performance of the Development can be improved compared to a notional baseline:



Fig3: Stages of compliance (three-tier)

Baseline energy demand: Also known as the sitewide Target Emission Rate. This is the minimum standard required to show compliance with Building Regulations Approved Document Part L in England.

Fabric First approach: When considering ways of improving the energy performance of a new building, it is important to begin with the fabric. A building with lower U-values, lower thermal bridging losses and a more airtight design will naturally have a lower heating demand.

Low carbon and renewables: Following a review of the fabric elements, building services can then be reviewed to look for further improvements. This may include the use of low energy heating systems and onsite electricity generation.

2.3 Methods of compliance

Energist has used [SAP10.2](#) methodology and the [Elmhurst DesignSAP](#) to calculate the energy demand for 15 sample dwellings on the development.

This creates a sample dataset which is extrapolated to reflect the true number of dwellings that make up the whole planning application.

This approach generates an acceptably accurate sitewide total to predict the regulated CO₂ emission rates and energy demand from the development without having to invest in completing SAP models for every dwelling at this early stage of the design process.

The Applicant commits to completing SAP analysis on all plots following planning approval and before work commences on site.

Evidence of these SAP and SBEM calculations should accompany this Energy Strategy. This will include SAP BREL documents, SAP Worksheets and Predicted Energy Assessments.

For additional copies of these reports, or to query the inputs used, see Page 2 of this document for methods of contacting the Energist Technical Team.

3. SITE DETAILS

3.1 Description and location

This Energy Statement concerns the development of 850 and 200 homes respectively to the southeast of Wokingham.

The area falls under the jurisdiction of Wokingham Local Authority.

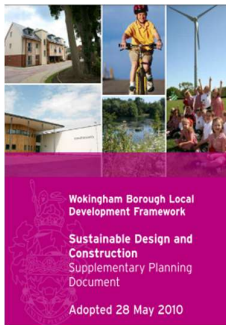
The site is located in a predominantly heavy residential setting.



Image 1: Site location

4. PLANNING REQUIREMENTS

4.1 Local authority conditions



There is a requirement under the Wokingham Council Core Strategy SPD, Policy CP1 of the Core Strategy adopted May 2010 that all new build development will achieve a 19% reduction in CO₂, and 10% of all regulated energy use should come from renewable technologies on site.

An excerpt from the Policy is quoted below:

For further details, visit <https://shorturl.at/fqAS2>

Policy NRM11

In line with the South East Plan policy NRM11, all developments involving 10 or more dwellings or 1,000m² or more gross non-residential floorspace (major developments) will be expected to secure at least 10% of their expected energy demand from decentralised, renewable or low carbon sources.

Non-residential development of 1000m² criteria applies to all proposals outside use class order C3. This means that nursing homes and residential institutions are included.

See the Council's 'Developers Guidance note for the 10% renewable energy requirement of the South East Plan policy NRM11'.

- An Energy Statement should be submitted with a planning application as part of a wider Sustainability Statement or the Design and Access Statement.*
- The Energy Statement should also include detailed information on the selected technology e.g layout plan, floor plans and elevations and visual impact etc.*

On-site renewable energy/ low carbon technologies are encouraged on all sizes and types of development. As stated in 'Sustainability Issue 1', renewable energy technology can be used as part of reaching Code for Sustainable Homes levels and BREEAM standards.

Policy NRM11 (of the South East Plan) requirements are not 'in addition' to any requirements of the Code for Sustainable Homes or BREEAM. Unless this is a requirement of the subsequent MDD DPD.

In some situations, decentralised/ renewable/ low carbon energy generation may not be appropriate. Development can deliver on carbon reduction targets without requiring the use of renewable energy.

5. BASELINE ENERGY DEMAND

5.1 The Notional

The following specification summary has been used to create the [Baseline target](#).

This is a notional specification and does not reflect the true proposals for this development.

The contents of this notional specification are used to calculate the [Target Emission Rate](#) under Approved Document Part L (2021).

Element	Specification (Residential)
Ground floor U-Value	0.13 W/m ² K
External walls U-Value	0.18 W/m ² K
Walls to corridors / core U-Value	0.18 W/m ² K
Party walls Between dwellings	Fully insulated and suitably sealed
Roof U-Value	0.11 W/m ² K
Glazing U-Value g-value	1.20 W/m ² K 0.63 % Maximum 25% glazing ratio
External Doors U-Value	1.00 W/m ² K
Thermal bridging Description	Notional psi-values SAP Appendix R
Air permeability 100% blower door testing	5.0
Ventilation system	System 1 Intermittent extraction fans to all wet rooms
Heating system	Gas boiler 89.5% boiler, feeding radiators

Hot water system	Gas boiler From main heating system
Showers	Unvented system From main heating system
Waste Water Heat Recovery	Applied to all showers 36% recovery efficiency
Lighting	LED 80 lumens per watt
Photovoltaic (PV) panels	South east orientation Array size = 40% of building footprint

5.2 Baseline Results

When the above specification is applied to the sample SAP modelling, the generated results provide the sitewide Baseline, or Notional, target.

All improvements listed in the following section are measured against this Baseline to show how the true specification will perform better, requiring lower energy use and therefore generate a lower amount of carbon emissions annually.

Baseline Emissions	2,182 kgCO ₂ per annum
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6. FABRIC FIRST APPROACH

6.1 What Is Fabric First

The first step to improving the energy performance of a building design is to look at the [specification of the fabric](#).

A highly insulated building with minimum air leakage will have a far lower heating demand, requiring less energy to run. This has the added benefit of lower fuel bills and a lower carbon footprint.

This meets the [first principle of The Energy Hierarchy](#) – to use less energy.

There are also several key advantages to adopting a [Fabric First](#) approach:

- It does not require behavioural changes from the occupants
- There are no additional maintenance costs
- There is nothing mechanical that can break down or require replacing

There are several elements of a building specification which can be considered for Fabric First improvements:

- U-Values of the ground floor, external walls, roofs and other heat loss elements
- U-Values of windows, external doors and rooflights
- Thermal bridging: The design of junctions to minimise heat loss
- Air permeability targets
- Reducing the number of open flues and vents.

6.2 Proposed Fabric

The Applicant will integrate the following design measures to reduce energy demand using the Fabric First approach.

Although some individual elements in the proposed specification are higher than those shown on the Baseline, overall, these changes amount to a reduction in energy demand.

Element	Fabric First Specification
Ground floor U-Value	0.13 W/m ² K
External walls U-Value	0.14 W/m ² K
Walls to corridors / core U-Value	0.18 W/m ² K
Party walls Between dwellings	Fully insulated and suitably sealed
Roof U-Value	0.12 W/m ² K
Glazing U-Value g-value	1.40 W/m ² K 0.63 % Maximum 25% glazing ratio
External Doors U-Value	1.30 W/m ² K
Thermal bridging Description	Independently Calculated Psi values
Air permeability 100% blower door testing	5.0

6.3 Proposed Results

The Developer has adopted the following measures to ensure a [suitable improvement in energy performance](#) over the Baseline:

- Energy efficient building fabric and insulation to all heat loss floors, walls and roofs.
- High efficiency double glazed windows throughout.
- Quality of build will be confirmed by achieving good air tightness results throughout.

Baseline Emissions	2,540 kgCO2 per annum
Fabric First Emissions	463.84 kgCO2 per annum
	81.74%

7. LZC APPROACH

7.1 What Is LZC

Low and Zero Carbon devices (LZC) can be used to improve the energy performance of a building.

Six LZC technologies are typically considered, although the suitability of each option needs to be assessed on an individual basis.

If a system is considered viable for this development, this can be used to further improve the energy performance on top of the fabric changes, which means an even greater reduction in carbon emissions against the Baseline.

Using LZC meets the second and third principles of The Energy Hierarchy – to supply energy efficiently and to use renewable energy.

There are also several key advantages to using LZC technology:

- Onsite generation of electricity means less reliance on the National Grid
- Enhancements to a boiler heating system will lead to a lower demand on fossil fuels such as gas and oil
- Using heat pumps will futureproof the development in readiness for zero carbon energy supplies.

There are several elements of a building specification which can be considered for Low and Zero Carbon improvements:

- Heating and hot water systems
- Heating controls and supplementary heat recovery aids
- Onsite renewable installations

7.2 Viability options – Wind turbines



The ability to generate electricity via a turbine or similar device which harnesses natural wind energy.

This could be considered as an onsite solution to reducing carbon emissions (the turbine is included within the development), or offsite (investing financially in a nearby wind farm).

Advantages

- Turbines generate clean electricity.
- The UK Government is aiming to generate the majority of the nation's electricity supply through wind turbines.
- Spare electricity can be exported to the National Grid, or fed into a battery store on site to assist with charging electric vehicles.

Disadvantages

- Currently, UK planning policy makes it extremely difficult to install wind turbines on land. The priority of the Government is to encourage offshore turbines only.
- There is a high installation cost associated with wind turbines, as well as annual maintenance costs.
- Turbines work best in windier locations, free from surrounding obstructions. Efficiency is greatly reduced when installed in unideal positions.

Development feasibility

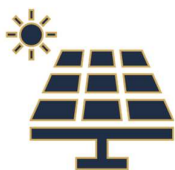
Economical: With limited Government support to install turbines on land, this option is not considered to be economically viable.

Technical: It is technically possible to install a wind turbine in this location.

Practical: Installing a wind turbine is not considered practical. It is not an ideal location to benefit from high efficiencies. The surrounding residents are likely to raise concerns should a turbine be proposed.

Overall: This option is not considered viable.

7.3 Viability options – Photovoltaic panels



The ability to generate electricity through harnessing natural solar energy.

Photovoltaic (PV) panels can be located on buildings to feed into the supply directly, or larger solar farms can be positioned on unused land to produce energy to feed local communities.

Advantages

- PV panels generate clean electricity.
- This is a commonly used technology. National planning policies suggest local authorities should only object to their use on heritage grounds.
- Spare electricity can be exported to the National Grid, or fed into a battery store on site to assist with charging electric vehicles.

Disadvantages

- Efficiency drops up significantly if positioned in a shaded location.
- Less appropriate on high-rise buildings, as roof area is limited.
- Efficiency is reduced when positioned on east or north roofs.

Development feasibility

Economical: Although there is limited Government support, the installation costs of PV panels are more viable than other LZC options.

Technical: It is technically possible to install PV panels in this location.

Practical: There are no practical reasons why PV panels cannot be installed in this location.

Overall: This option is viable.

7.4 Viability options – Solar thermal panels



Using energy from the sun to pre-heat the water supply being fed into the building.

Solar thermal panels are usually located on a south facing roof close to the building's water storage cylinder.

Advantages

- Solar thermal panels provide free hot water, reducing reliance on the heating system.
- National planning policies suggest local authorities should only object to their use on heritage grounds.
- Especially beneficial for buildings with a high water use, such as sports clubs and gyms.

Disadvantages

- Efficiency drops up significantly if positioned in a shaded location.
- Less appropriate on high-rise buildings, as roof area is limited.
- Unlike PV panels, solar thermal relies on solar rays, meaning they are far less efficient on cloudy days.

Development feasibility

Economical: This system should be viable to install from a financial point of view, however PV panels are expected to be cheaper and more effective.

Technical: It is technically possible to install solar thermal panels in this location.

Practical: There are no practical reasons why solar thermal panels cannot be installed in this location.

Overall: This option is viable.

7.5 Viability options – Heat pumps



Compressing latent heat in the atmosphere with a refrigerant gas to warm water in a closed circuit.

Heat pumps are able to capture heat from the air, ground or nearby watercourses and use this energy to provide heating and hot water.

Advantages

- The UK Government considers heat pumps to be an essential technology for reducing the energy demand of our buildings and cutting our reliance on fossil fuels for heating our homes.
- On average, modern systems will generate 3 – 4 kilowatts of heat for every kilowatt of electricity used.
- Heat pumps can provide heating via underfloor systems, radiators or air conditioning vents. Some systems also provide cooling and ventilation.

Disadvantages

- Behaviour of occupants needs to adapt, as using a heat pump as if it were a boiler will significantly reduce efficiency and performance.
- Heat pumps require an external fan or underground coils, as well as an internal unit about the size of a full height fridge freezer.
- Heat pumps are better suited to well insulated buildings with low levels of heat loss.

Development feasibility

Economical: The cost of installing heat pumps should be considered an economically viable option.

Technical: It is technically possible to install heat pumps in this location.

Practical: There are no practical reasons why solar thermal panels cannot be installed in this location.

Overall: This option is viable.

7.6 Viability options – Biomass boilers



A boiler system which burns plant based materials such as wood pellets, crops or food waste instead of fossil fuels.

Biomass boilers come in a wide range of sizes, and can provide heating and hot water to a single dwelling, or as part of a heat network.

Advantages

- Inside the dwelling, the heating system and controls are identical to a conventional gas or oil boiler.
- Biomass is a low carbon fuel source when sourced in the UK. Sites with woodland can use their own supply of biomass.
- No fossil fuels are used.

Disadvantages

- A reliable supply of biomass is required, and the fuel to feed the system must be kept on site.
- Some urban areas do not allow biomass boilers due to concerns over air quality.
- Installation costs of biomass boilers are generally much higher than a conventional gas or oil boiler.

Development feasibility

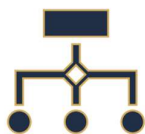
Economical: The cost of installing a biomass boiler and storage in this location is prohibitive.

Technical: It would be technically possible to install a biomass boiler, however site layout changes will be required to accommodate the fuel store.

Practical: Biomass is not considered practical. The storage of fuel on site will require a redesign of the site layout. The local authority is unlikely to approve a solid fuel heating system on grounds of impacting local air quality.

Overall: This option is not considered viable.

7.7 Viability options – Combined heat and power



A Combined Heat and Power (CHP) system works in a similar way to a generator, but on a much larger scale.

A gas fired turbine generates electricity for the building. The bi-product is used to supply heating and hot water.

Advantages

- The CHP unit generates free heat while producing onsite electricity.
- A single CHP plant can be used to provide heat to hundreds of dwellings.
- Excess electricity can be exported to the National Grid, or stored in batteries to assist with electric vehicle charging.

Disadvantages

- CHP systems are powered by gas which is a fossil fuel. This is not in line with the UK Government's futureproofing policy for net zero.
- The system works at its most efficient on a larger scale. Single dwelling CHP boilers are available, but do not show efficiency gains compared to a conventional boiler.
- CHP is unable to provide 100% of the heating demand all of the time, so a back up system, usually a gas boiler, will also need to be installed.

Development feasibility

Economical: Installing a district CHP system for this development is not believed to be financially viable.

Technical: It would not be viable to install this type of system without making significant design changes to accommodate the plant room and pipework.

Practical: CHP is not considered practical. The size of the development does not lean itself towards using CHP, and the Local Authority are unlikely to approve this installation of a fossil fuel led heat network.

Overall: This option is not considered viable.

7.8 Viability options – Waste water heat recovery



Waste water heat recovery systems (WWHRS) reduce demand on the hot water supply by capturing wasted energy from baths and showers.

A specially designed pipe transfers heat from the draining water to pre-heat the cold water entering the supply.

Advantages

- The system is reasonably cheap and does not require maintenance or energy to operate.
- No behavioural changes are required from the occupier. In most cases, the building owner will not know WWHRS has been installed.
- WWHRS reduces demand on the hot water supply, cutting the building's reliance on fossil fuels.

Disadvantages

- WWHRS works best when the pipework is fitted vertically below the shower. Horizontal installations are not as efficient.
- Is not recommended for use with some power showers, as the incoming water temperature can increase quicker than the shower thermostat can adjust.
- Energy savings by using WWHRS are low, and will need to be combined with other options.

Development feasibility

Economical: Installing WWHRS is considered economically viable.

Technical: It is technically feasible to install WWHRS on most house types, but consideration should be given to its appropriateness in bungalows.

Practical: There are no practical reasons why WWHRS cannot be installed in this location.

Overall: This option is viable.

7.9 Viability options – Batteries and storage



Homes which are able to generate more electricity than they need at that time, can store excess power for later use instead of instantly exporting power to the National Grid.

Common methods are battery banks, or immersion diverters which heat the dwelling's hot water cylinder.

Advantages

- Less reliance on buying in power from the National Grid.
- Occupants can benefit from free hot water with an immersion diverter.
- Battery banks can be used during power-cuts.

Disadvantages

- A method of generating electricity is required (PV / turbine)
- Benefit depends on the building occupant using saved energy at the best time of day.
- Immersion diverters not viable for combi cylinders or homes with low hot water demand.

Development feasibility

Economical: The cost of installing batteries or immersion diverters is considered to be a viable option.

Technical: It is technically viable to install a battery bank in the garage. It is not viable to use immersion diverters as the dwelling does not include a large hot water cylinder.

Practical: It is practical to consider the installation of a battery bank, as this will work alongside the PV array to further reduce reliance on the National Grid.

Overall: This option is viable.

7.10 Proposed LZC approach

The Applicant will integrate the following additional design measures to reduce energy demand using low and zero carbon technologies.

Element	Viability
Wind turbines	No
Photovoltaic panels	Yes 2 kWp, south facing
Solar thermal panels	No
Heat pumps	Yes Air source heat pumps to be used on all plots
Biomass boilers	No
Combined Heat & Power	No
Waste Water Heat Recovery	YES
Energy Storage	No

7.11 Proposed Results

The Developer has adopted the following measures to ensure a suitable improvement in energy performance over the Baseline:

- Photovoltaic panels
- Air source heat pumps
- Waste water heat recovery

Fabric First Emissions	463.84 kgCO2 per annum
Fabric & LZC Emissions	366.51 kgCO2 per annum
Improvement using LZC:	20.98%

Baseline Emissions	2182.32 kgCO2 per annum
Fabric & LZC Emissions	366.51 kgCO2 per annum
Overall improvement:	83.21%

8. CONCLUSIONS

8.1 Final results

The Applicant demonstrates commitment to meeting the required energy standard targets at South East of Wokingham by implementing the following improvements over the Baseline specification.

In doing so, the site will:

- Exceed the minimum standards of Building Regulations Approved Document Part L (2021), with an improvement of 83.21% overall.
- This goes beyond the requirements of the Wokingham LOCAL PLANNING AUTHORITY SPD, Policy CP1 of the Core Strategy, Policy NRM11 which set a minimum improvement target of 10%.

This chart visualises the LPA target against the Baseline specification, and shows the improvements made through fabric and LZC improvements.

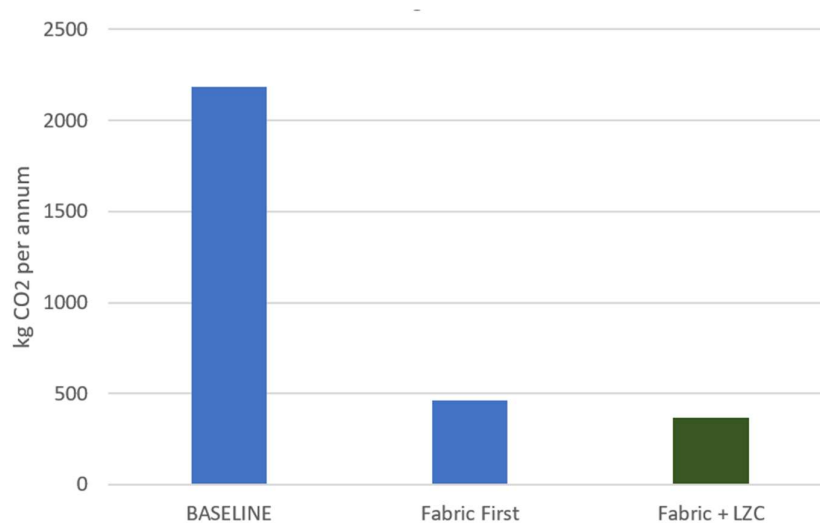


Fig4: Summary of sitewide kgCO₂ at various stages of improvement

Baseline Emissions	2182.320 kgCO2 per annum
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Fabric First Emissions	463.84 kgCO2 per annum
Improvement (Fabric only)	23.6%
Fabric & LZC Emissions	322.51 kgCO2 per annum
Improvement (LZC only)	20.98%
Improvement (Combined)	83.21%

9. PLANNING POLICY LINKS

9.1 The Climate Change Act (2021 amendments)

This legal documents establishes a framework for the United Kingdom to become net zero carbon by 2050.

Climate Change Act (2008) – 80% reduction by 2050
With 2021 amendments – 100% reduction by 2050

9.2 Approved Document AD-L (2021 amendments)

This Building Regulation targets the Conservation of Fuel and Power on all new construction projects in England.

Latest versions of AD-L

9.3 National Planning Policy Framework (2021 amendments)

This document offers guidance to Local Planning Authorities to assist in developing Local Plans to support the transition to a low carbon future.

Latest version of the NPPE

9.4 Local Authority Policy

Wokingham Council Core Strategy SPD, Policy CP1 of the Core Strategy adopted May 2010. This Energy Statement has been produced based on the guidance written in this local policy document.

<https://shorturl.at/fqAS2>