

Melksham Road, Holt

Bellway Homes Ltd (South West)

Energy and Sustainability Statement

AES Sustainability Consultants Ltd

May 2026



	Author	Date	E-mail address
Produced By:	Jennifer Bantin	19/05/2026	Jennifer.Bantin@aessc.co.uk
Reviewed By:	James Alexander	19/05/2026	James.Alexander@aessc.co.uk

Revision	Author	Date	Comment
Rev0	Jennifer Bantin	19/05/2026	Initial Issue
Rev1	Jennifer Bantin	19/05/2026	Heating change

This statement has been commissioned by Bellway Homes Ltd (South West) to detail the proposed approach to energy and CO₂ reduction to be employed in the development of the site known as Melksham Road, Holt. It should be noted that the details presented, including the proposed specifications, are subject to change as the detailed design progresses, whilst ensuring that the overall commitments will be achieved.

Contents

1.	Introduction	4
2.	Planning Policy	5
3.	Overheating Risk and Passive Design	8
4.	Energy and CO ₂ Reduction Strategy	9
5.	Low Carbon and Renewable Energy Systems	13
7.	Resource Efficiency	20
8.	Electric Vehicle Charging	21
9.	Water Efficiency	22
10.	Conclusions	23

List of figures & tables

Figure 1. Site Development Plan	4
Table 1. CO ₂ Emissions improvements from successive Part L editions	9
Figure 2. The Energy Hierarchy	9
Table 2. Benefits of the Fabric First approach	10
Table 3. Proposed construction specification – Residential Main Elements	11
Table 4. Individual Biomass Heating feasibility appraisal	14
Table 5. Solar Thermal systems feasibility appraisal	14
Table 6. Solar Photovoltaic systems feasibility appraisal	15
Table 7. Air Source Heat Pump systems feasibility appraisal	15
Table 8. Ground Source Heat Pump systems feasibility appraisal	16
Table 9. Hot Water Heat Pump Feasibility Appraisal	16
Table 10. Sample dwelling as-designed CO ₂ emissions after renewables (Part L 2021)	18
Table 11. Site-wide CO ₂ emission reductions achieved	19
Figure 3. Residential Parking Standards (inc. EV charging provision)	21
Figure 4. Example of communal EV charging post arrangement	21
Table 12. Typical Water Demand Calculation	22

1. Introduction

Preface

- 1.1. This statement has been written by AES Sustainability Consultants on behalf of Bellway Homes Ltd (South West); this statement has been prepared in support of the planning application for the development known as Melksham Road, Holt.

Development Description

- 1.2. The development site is located to the north east of Holt and falls within the jurisdiction of Wiltshire Council.
- 1.3. The development consists of 88 dwellings and will comprise of a mix of 1, 2, 3 and 4 bed homes. The scheme will deliver a mix of Privately owned homes, Shared Ownership homes, Affordable Social Rented homes and homes specifically for first homes.
- 1.4. The proposed site development plan is shown in figure 1.

Purpose and Scope of the Statement

- 1.5. This statement has been prepared to address relevant national and local policies relating to the sustainable design and construction of dwellings, including relevant policies within the Wiltshire Core Strategy. This statement also shows how this development aims to achieve higher standards listed in Wiltshire Core Strategy, using this document as guidance.
- 1.6. This statement demonstrates that the development will be designed and constructed to meet current building regulations with the possibility of a portion of the site falling under the Future Homes Standard, providing a 75-80% CO₂ reduction compared with 2013 regulatory standards.
- 1.7. Sustainable construction considerations are additionally addressed, including overheating risk and climate resilience, sustainable and responsible materials usage, water consumption of the dwellings and Electric Vehicle Charging (EVC).



Figure 1. Site Development Plan

2. Planning Policy

Wiltshire Core Strategy

- 2.1. Local policies relating to the sustainable design and construction of buildings is contained within the Wiltshire Core Strategy adopted in January 2015. The following extracts from this document are relevant to the energy strategy:

Core Policy 41: Sustainable construction and low-carbon energy

Climate change adaptation

New development, building conversions, refurbishments and extensions will be encouraged to incorporate design measures to reduce energy demand. Development will be well insulated and designed to take advantage of natural light and heat from the sun and use natural air movement for ventilation, whilst maximising cooling in the summer.

Sustainable construction

New homes (excluding extensions and conversions) will be required to achieve at least Level 4 (in full) of the Code for Sustainable Homes.

Conversions of property to residential use will not be permitted unless BREEAM's Homes "Very Good" standards are achieved.

All non-residential development will be required to achieve the relevant BREEAM "Very Good" standards, rising to the relevant BREEAM "Excellent" standards from 2019.

Existing buildings

Retrofitting measures to improve the energy performance of existing buildings will be encouraged in accordance with the following hierarchy:

- i. Reduce energy consumption through energy efficiency measures.
- ii. Use renewable or low-carbon energy from a local/district source.
- iii. Use building-integrated renewable or low-carbon technologies.

Core Policy 41: Sustainable construction and low-carbon energy Continued

Opportunities should be sought to facilitate carbon reduction through retrofitting at whole street or neighbourhood scales to reduce individual costs, improve viability and support coordinated programmes for improvement.

Renewable and low-carbon energy

All proposals for major development will be required to submit a Sustainable Energy Strategy alongside the planning application outlining the low-carbon strategy for the proposal.

In all cases, including those listed above, proposals relating to historic buildings, listed buildings and buildings within conservation areas and world heritage sites should ensure that appropriate sensitive approaches and materials are used. Safeguarding of the significance of heritage assets should be in accordance with appropriate national policy and established best practice.

In all cases the impact of these requirements on the viability of development will be taken into consideration.

Core Policy 43: Providing affordable homes

Provision

On sites of five or more dwellings, affordable housing provision of at least 30% (net) will be provided within the 30% affordable housing zone and at least 40% (net) will be provided on sites within the 40% affordable housing zone. Only in exceptional circumstances, where it can be proven that on-site delivery is not possible, will a commuted sum be considered.

The provision of affordable housing may vary on a site-by-site basis taking into account evidence of local need, mix of affordable housing proposed and, where appropriate, the viability of the development. All affordable housing will be subject to an appropriate legal agreement with the council. This level of provision should be delivered with nil public subsidy, unless otherwise agreed by the council.

Tenure

Tenure will be negotiated on a site-by-site basis to reflect the nature of the development and local needs as set out in Core Policy 45 (Meeting Wiltshire's housing needs).

On site distribution and standards

Affordable housing units will be dispersed throughout a development and designed to a high quality, so as to be indistinguishable from other development. In determining the level of integration that can be achieved, consideration will be given to the practicalities of management and maintenance associated with the proposal whilst still ensuring affordability, particularly in developments of flats.

National Planning Policy Framework

- 2.2. In February 2025, the Government published the updated National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England and how these are expected to be applied.
- 2.3. The planning process has been identified as a system to support the transition to a low carbon future in response to climate change by assisting in the reduction of greenhouse gas emissions and supporting renewable and low carbon energy.
- 2.4. Paragraph 164 sets out what is expected from new developments when considering strategies to mitigate and adapt to climate change:

164. New development should be planned for in ways that:

Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaption measures, including through the planning of green infrastructure; and

Can help to reduce greenhouse gas emissions, such as through its location, orientation, and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

Current National Policy Standards

- 2.5. Government policy in relation to the energy performance of buildings has been evolving over the past decade, following government commitments to reduce the emission of greenhouse gases – particularly CO₂. This obligation was enshrined in the Climate Change Act 2008, which commits the UK to achieving a mandatory 80% reduction in the UK's CO₂ emissions by 2050, compared with 1990 levels.
- 2.6. In 2016, the UK government ratified the Paris Agreement, which provides a framework for governments to pursue the target of limiting global warming below 2°C.
- 2.7. In June 2019, the Government announced it had set a new net zero greenhouse gas emission target for the UK by 2050, compared with the previous target of at least 80% reduction from 1990 levels.

- 2.8. The built environment has a key role to play in delivering these international commitments, as it accounts for approximately a third of overall CO₂ emissions. These commitments have been translated into national policies within the built environment driven by, amongst other mechanisms, the EU Energy Performance of Buildings Directive and the 2012 Energy Efficiency Directive.
- 2.9. Following the introduction of the 2021 edition of Building Regulations Part L, the successive updates now require regulated CO₂ emissions levels from new-build domestic buildings to be approximately 50% lower than 2006 levels. Similarly, non-domestic buildings have also seen significant updates with a 27% reduction in CO₂ emissions over Part L2A 2013 Building Regulations now being required.
- 2.10. The Government proposes that the Building Regulations are the appropriate mechanism to drive future standards with respect to energy consumption, with local authorities able to apply the optional requirements of the national technical standards with respect to water consumption and space.

Building Regulations Standards

- 2.11. The government introduced the latest revision in Building Regulations, known as Part L 2021 in December 2021, coming into effect for buildings where construction is commenced after 15th June 2023. The current standards require a 31% reduction in CO₂ emissions compared with the previous Building Regulations standard, alongside improvements to fabric standards and a focus on primary energy usage as a new compliance metric.

Future Homes Standard (FHS)

- 2.12. The next step change in Part L energy standards, Building Regulations Part L1 2026, a.k.a. the Future Homes Standard (FHS), has now been published for public access. Sites for which planning permission is granted from March 2027 onwards will now fall under FHS; for sites already begun before this date, there will be a 'grace period' until March 2028 to complete dwellings – any dwelling completing after this date will also be required to meet FHS.
- 2.13. Amongst the upcoming targets and requirements now outlined under these Regulations, the installation of fossil-fuel heating (such as gas boilers) will be barred from new dwellings. It will also be mandatory for a large Solar Photovoltaic array to be present on each dwelling, generally amounting to area coverage approximately equivalent to 40% of the main ground floor area (m²).

- 2.14. These new policies have yet to come into effect, but sites should be designed to meet these requirements as they are currently understood. Any site that expects some dwellings to complete construction after FHS has come into effect should therefore demonstrate that they will be compliant with these policies.
- 2.15. Further analysis of these new regulations is ongoing by AES and the community in general; it is confirmed that any and all further adjustments that may be required under FHS will be implemented for this site going forward, when required.

Proposed Strategy

- 2.16. This statement is intended to establish the proposed approach to sustainable construction and a reduction in CO₂ emissions to be delivered at the development, in order to meet Building Regulations Part L, and in line with the National and Local policy framework goals of including appropriate measures to mitigate and adapt to climate change through design solutions.
- 2.17. It is possible that some plots on this site may complete after March 2028, these plots will need to comply with FHS. The SAP calculations used in this report comply with the previous Part L requirements, the final design stage SAP calculations will adopt the requirements of the regulatory standards at the relevant time of construction of the dwellings.
- 2.18. This will include following the energy hierarchy approach to low energy design, with consideration given to building design, passive solar design and energy efficient site-layouts as a first principle.
- 2.19. The buildings will be constructed following a fabric first approach, which prioritises improvements to the thermal envelope of the building, including insulation standards, thermal bridging and air leakage.
- 2.20. Low carbon and renewable energy systems will be installed to meet the requirements of regulatory standards and policies. A range of additional sustainable design measures have also been considered.
- 2.21. The following sections of this statement set out the sustainable design considerations which will be applied in order to deliver low energy, comfortable and affordable development.
- 2.22. The development will be required to meet the local authorities enhanced Part G requirement of 110l/p/d.

3. Overheating Risk and Passive Design

- 3.1. Dwellings constructed today may be operating in a substantially different climate over the coming decades, and therefore should be designed to ensure that they are able to adapt and reduce the risk of overheating with potentially higher summer temperatures and longer hot spells.
- 3.2. Key design decisions can affect the potential risk of overheating:
- Poor consideration of orientation of large glazed facades
 - High density development contributing to urban heat island effects
 - High glazing ratios contributing to excessive unwanted solar gain
 - Inadequate ventilation strategies
 - Very high levels of thermal insulation without considering heat build-up
- 3.3. Other factors which additionally contribute to heat build-up within homes and should be addressed where possible include:
- High levels of occupation
 - Appliance use contributing to internal temperature fluctuations.

Cooling hierarchy

- 3.4. In common with sustainable heating strategies, it is possible to apply a sustainable 'cooling hierarchy' which sets out the priorities to ensure overheating risk is minimised:
- Minimise internal heat gain
 - Manage heat through internal thermal mass and design of spaces
 - Passive ventilation strategies
 - Mechanical ventilation systems
 - Active cooling systems

Approved Document O

- 3.5. In order to more robustly address overheating risk, the Government has introduced a new Approved Document, 'Part O', into the Building Regulations.
- 3.6. This document requires a more in-depth assessment of the risk of overheating, considering site location, dwelling orientation, glazing proportions and openable window areas for natural ventilation.

- 3.7. This assessment will be undertaken at the start of detailed design and any mitigation measures that may be required will be built in.

Addressing overheating risk

- 3.8. The development is proposed to use traditional masonry construction, which has a relatively high thermal mass, compared with timber or steel construction. A construction with a high thermal mass can help to reduce overheating risk as it absorbs heat during the day and slowly releases it during cooler nighttime hours, effectively smoothing out temperature fluctuations within the property.
- 3.9. Within the development layout, orientation and massing has been considered to maximise useful passive solar gain. Glazing will be specified with a solar transmittance value (g-value) to strike the balance between useful solar gain in the winter and unwanted solar gain in the summer.
- 3.10. Where possible dwellings will be able to benefit from cross-ventilation to effectively purge warm air from the properties during periods of hot weather. Window opening areas will be considered and guided by the Part O assessment, with increased opening areas being designed in as required.
- 3.11. Window sizes have been optimised to maximise daylight and solar gain, but ensure overheating has been mitigated. TM59 dynamic overheating assessments shall be run on all designed house types to ensure no overheating occurs.

4. Energy and CO₂ Reduction Strategy

- 4.1. As one of the key areas of ongoing impact of any development, the energy demand of the buildings to be constructed is a key consideration in the overall sustainability strategy.
- 4.2. As set out within the policy review section of this statement, it is considered that Building Regulations form the minimum requirement for new dwellings in terms of energy performance.
- 4.3. As shown in Table 1, the CO₂ standards contained within Part L were increased in 2010 and 2013, reducing the TER by approximately 25% and a further 6% (9% for non-residential) respectively.
- 4.4. Part L 2021 has been mandatory from June 2023, which constitutes a much larger step change of a 31% reduction for domestic buildings and a 27% reduction in emissions for non-domestic buildings.

Table 1. CO₂ Emissions improvements from successive Part L editions

Building Regulations	CO ₂ emissions improvements over preceding regulations
L1A 2006	-
L1A 2010	25%
L1A 2013	6%
L1 2021	31%

Energy Reduction Strategy – Fabric first

- 4.5. The proposed construction specification and sustainable design principles to be applied to the development will ensure that each dwelling meets and exceeds the fabric energy efficiency requirements of Part L1 2021.
- 4.6. It is proposed that the energy demand reduction strategy for the development incorporates further improvements beyond a Part L compliant specification and initially concentrates finance and efforts on reducing energy demand as the first stage of the Energy Hierarchy.

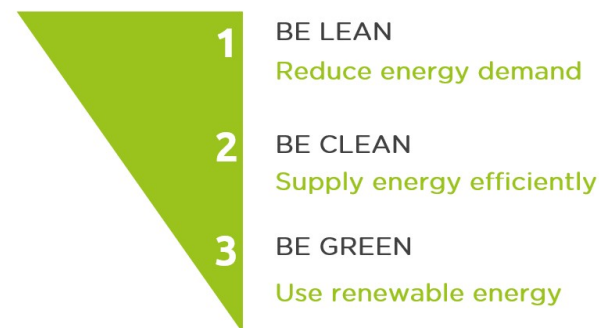


Figure 2. The Energy Hierarchy

Be Lean – reduce energy demand

- 4.7. The design of a development - from the masterplan to individual building design - will assist in reducing energy demand and peak load in a variety of ways, with a focus on minimising heating, cooling and lighting loads. Key considerations include:
 - Building orientation – maximise passive solar gain and daylight
 - Building placement – control overshadowing and wind sheltering
 - Landscaping – control daylight, glare and mitigate heat island effects
 - Building design – minimise energy demand through fabric specification

Be Clean – supply energy efficiently

4.8. The design and specification of building services to utilise energy efficiently is the next stage of the hierarchy, considering:

- High efficiency heating and cooling systems
- Ventilation systems (with heat recovery where applicable)
- Low energy lighting
- High efficiency appliances and ancillary equipment

Be Green – use low carbon / renewable energy

4.9. Low carbon and renewable energy systems form the final stage of the energy hierarchy and can be used to directly supply energy to buildings or offset energy carbon emissions arising from unavoidable demand. This may be in the form of:

- Low carbon fuel sources – e.g., biomass
- Heat pump technologies
- Building scale renewable energy systems
- Small-scale heat networks
- Development-scale heat networks

4.10. As this hierarchy demonstrates, designing out energy use is weighted more highly than the generation of low-carbon or renewable energy to offset unnecessary demand. Applied to the development, this approach is referred to as ‘fabric first’ and concentrates finance and efforts on improving U-values, reducing thermal bridging, improving airtightness, and installing energy efficient ventilation and heating services.

4.11. This approach has been widely supported by industry and government for some time, particularly in the residential sector, with the Zero Carbon Hub¹ and the Energy Savings Trust² having both stressed the importance of prioritising energy demand as a key factor in delivering resilient, low energy buildings.

4.12. The benefits to prospective homeowners of following the Fabric First approach are summarised in Table 2.

Table 2. Benefits of the Fabric First approach

	Fabric energy efficiency measures	Bolt-on renewable energy technologies
Energy/CO ₂ /fuel bill savings applied to all dwellings	✓	✗
Savings built-in for life of dwelling	✓	✗
Highly cost-effective	✓	✗
Increases thermal comfort	✓	✗
Potential to promote energy conservation	✓	✓
Minimal ongoing maintenance / replacement costs	✓	✗
Significant disruption to retrofit post occupation	✓	✗

Building Regulations Standards – Fabric Energy Efficiency

4.13. In addition to the CO₂ reduction targets, the importance of energy demand reduction was further supported by the introduction of a minimum fabric standard into Part L1A 2013, based on energy use for heating and cooling a dwelling. This is referred to as the ‘Target Fabric Energy Efficiency’ (TFEE), expressed in kWh/m²/year.

4.14. This standard enables the decoupling of energy use from CO₂ emissions and serves as an acknowledgement of the importance of reducing demand, rather than simply offsetting CO₂ emissions through low carbon or renewable energy technologies.

4.15. The TFEE is calculated based on the specific dwelling being assessed with reference values for the fabric elements contained within Approved Document L1. These reference values are described as ‘statutory guidance’ as opposed to mandatory requirements, allowing full flexibility in design approach and balances between different aspects of dwelling energy performance to be struck so that the ultimate goal of achieving the TFEE is met. The proposed approach and indicative construction specifications are set out in the following sections of this Strategy.

¹ Zero Carbon Hub, Zero Carbon Strategies for tomorrow's new homes, Feb 2013

² Energy Savings Trust, Fabric first: Focus on fabric and services improvements to increase energy performance in new homes, 2010

Proposed Fabric Specification

- 4.16. To ensure that the energy demand of the development is reduced, the buildings will be designed to minimise heat loss through the fabric wherever possible. Table 3 details the proposed fabric specification for the major building elements via the right-hand column, with the first column in this table setting out the current Part L1 2021 limiting fabric parameters to demonstrate the improvements which will be sought.

Table 3. Proposed construction specification – Residential Main Elements

	Part L1 2021 Limiting Fabric Parameters	Proposed Specification Part L1 2021
House External wall u-value	0.26 W/m ² K	0.22 - 0.24 W/m ² K
Party wall u-value	0.20 W/m ² K	0.00 W/m ² K
Plane roof u-value	0.16 W/m ² K	0.09 W/m ² K
Ground floor u-value	0.18 W/m ² K	≤ 0.12 W/m ² K
Windows u-value	1.6 W/m ² K	1.30 W/m ² K
Doors u-value	1.6 W/m ² K	1.00 – 1.30 W/m ² K
Air Permeability	8.00 m ³ /h.m ² at 50 Pa	5.00 m ³ /h.m ² at 50 Pa

Thermal Bridging

- 4.17. The significance of thermal bridging as a potentially major source of fabric heat losses is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the thermal bridging will not achieve the desired energy and CO₂ reduction targets.
- 4.18. The specification should seek to minimise unnecessary bridging of the insulation layers, with avoidable heat loss therefore being reduced wherever possible. Accurate calculation of these heat losses forms an integral part of the SAP calculations undertaken to establish energy demand of the dwellings, and as such thermal modelling will be undertaken to assess the performance of all main building junctions.

Air Leakage

- 4.19. After conductive heat losses through building elements are reduced, convective losses through draughts are the next major source of energy wastage. The proposal adopts a best-practice airtightness standard of 4.0 – 5.0 m³/h.m² at 50Pa for the units. With pressure testing of all units to be undertaken on completion to confirm that the design figure has been met.

Passive Design Measures and Overheating Risk Mitigation

- 4.20. Glazing will be specified with a solar transmittance value (g-value) to strike the balance between useful solar gain in the winter and unwanted solar gain in the summer.
- 4.21. Due to these measures to reduce internal heat gain, natural ventilation provided through window openings and the opportunity for cross ventilation will allow sufficient air exchange rates to purge any heat build-up. Active cooling systems are therefore not proposed.
- 4.22. By following these principles, the development will be designed to build in resilience to a potentially changing climate over the lifetime of the buildings and minimise overheating risk, which can be exacerbated by the drive to build better insulated, more airtight homes if not considered within the design and construction process.

Provisions for Energy-Efficient Operation of the Dwelling

- 4.23. Energy consumption can be reduced by passive design features that ensure that the building systems and equipment are utilising energy in the most efficient manner possible. Improving energy efficiency is principally addressed through the buildings themselves through various measures such as:
- Specifying glazing with solar transmittance value (g-value) to strike a balance between useful solar gain in winter and unwanted solar gain in summer
 - Fully insulating all primary pipework
 - Minimising the overshadowing from adjacent dwellings and vegetation to maximise solar gains where possible
 - Installing energy efficient lighting
- 4.24. However, the occupant also has a more active part in reducing energy by ensuring efficient operation of the dwelling.
- 4.25. The occupants will be provided with all necessary literature and guidance relating to the energy efficient operation of fixed building services.

- 4.26. Currently it is assumed that all houses will be provided with highly efficient Gas boilers, fully insulated primary pipework, and multi-zone zone controls to avoid unnecessary heating of spaces when not required. The apartments will be provided with direct electric heating and Hot Water Heat Pumps.

Eliminate the Performance Gap

- 4.27. The reasons why buildings do not perform in accordance with design are increasingly understood. Part L1 2021 introduces a BREL report and photographic evidence requirement which will ensure that key areas of the build affecting thermal performance of each home must be inspected, photographed and reviewed. This process will help to ensure that any issues on a site can be identified prior to completion and handover and rectification works undertaken in a timely manner.

5. Low Carbon and Renewable Energy Systems

- 5.1. A range of technologies have been assessed for potential incorporation into the scheme with the intent of delivering compliance with the carbon reduction targets contained within Part L 2021.

Combined Heat and Power (CHP) and District Energy Networks

- 5.2. A CHP unit is capable of generating heat and electricity from a single fuel source. The electricity generated by the CHP unit is used to displace electricity that would otherwise be supplied from the national grid, with the heat generated as effectively a by-product utilised for space and water heating.
- 5.3. The economic and technical viability of a CHP system is largely reliant on a consistent demand for heat throughout the day to ensure that it operates for over 5000 hours per year. Heat demand from mainly residential schemes is not conducive to efficient system operation, with a defined heating season and intermittent daily profile, with peaks in the morning and the evening. For this reason, the use of a CHP system is considered unfeasible for this development.
- 5.4. There are currently no heat networks which extend near the proposed development. High network heat losses associated with distribution to individual houses, as opposed to large high-rise apartment blocks and commercial developments mean that a new heat network to serve the area is not considered viable or an environmentally preferred option. Due to these reasons, the provision for future connection to a district heating system is also not proposed.

Wind Power

- 5.5. Locating wind turbines adjacent to areas with buildings presents a number of potential obstacles to deployment. These include the area of land onsite required for effective operation, installation and maintenance access, environmental impact from noise and vibration, visual impact on landscape amenity and potential turbulence caused by adjacent obstacles, including the significant amount of woodland on and around the development.
- 5.6. A preliminary examination of the BERR wind speed database indicates that average wind speeds at 10m above ground level are around 4.5 m/s³. Wind turbines at this site are

therefore unlikely to generate sufficient quantities of electrical energy to be cost effective⁴. For these reasons wind power is not considered feasible.

Building Scale Systems

- 5.7. The remaining renewable or low carbon energy systems considered potentially feasible are at a building scale. These are as follows;
- Individual biomass heating
 - Solar thermal
 - Solar photo-voltaic (PV)
 - Air Source Heat Pumps (ASHPs)
 - Ground Source Heat Pump (GSHPs)
- 5.8. The advantages and disadvantages of these technologies are evaluated in Tables 4-9.

³ NOABL Wind Map (<http://www.rensmart.com/Weather/BERR>)

⁴ CIBSE TM38:2020. Renewable energy sources for buildings.

Table 4. Individual Biomass Heating feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Potential to significantly reduce CO₂ emissions as the majority of space and water heating will be supplied by a renewable fuel - Decreased dependence on fossil fuel supply	- A local fuel supply is required to avoid increased transport emissions - Fuel delivery, management and security of supply are critical - Space is required to store fuel, a thermal store and plant - A maintenance regime would be required even though modern systems are relatively low maintenance - Building users or a management company must be able to ensure fuel is supplied to the boiler as required. - Local environmental impacts potentially include increased NO_x and particulate emissions
Estimated costs and benefits	
Cost £2,000 upwards for a wood-pellet boiler, not including cost of fuel	
Conclusions	
Biomass heating is considered technically feasible in large dwellings provided sufficient space can be accommodated for fuel supply, delivery and management. Air quality concerns in addition to increased transport emissions for fuel delivery mean that it is not a preferred technology for the development.	

Table 5. Solar Thermal systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Mature and reliable technology offsetting the fuel required for heating water - Solar thermal systems require relatively low maintenance - Typically, ~50% of hot water demand in dwellings can be met annually	- Installation is restricted to favourable orientations on an individual building basis - The benefit of installation is limited to the water heating demand of the building - Safe access must be considered for maintenance and service checks - Buildings need to be able to accommodate a large solar hot water cylinder - Distribution losses can be high if long runs of hot water pipes are required - Visual impact may be a concern in special landscape designations (e.g. AONB)
Estimated costs and benefits	
- Cost £5,000 – 8,000 for standard installation - Ongoing offset of heating fuel, minimal maintenance requirements	
Conclusions	
Solar thermal systems are considered technically feasible on all buildings with suitable roof orientations, however the contribution to carbon reduction is expected to be low and therefore it is not a preferred technology.	

Table 6. Solar Photovoltaic systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- The technology offsets grid supplied electricity used for lighting, pumps and fans, appliances and equipment - Mature and well proven technology that is relatively easily integrated into building fabric - Adaptable to future system expansion - Solar resource is not limited by energy loads of the dwelling as any excess generation can be transferred to the national grid - PV systems generally require very little maintenance - Service and maintenance requirement minimal, and 2-3 storey buildings should not require significant additional safety measures (fall protection systems etc) for roof access	- Poor design and installation can lead to lower-than-expected yields (e.g. from shaded locations) - Installation is restricted to favourable orientations - Safe access must be considered for maintenance and service checks - Visual impact may be a concern in special landscape designations (e.g. AONB) or conservation areas - Reflected light may be a concern in some locations
Estimated costs and benefits	
- Cost £1,300 upwards (1kWp+) and scalable - Ongoing offset of electricity fuel costs, minimal maintenance requirements	
Conclusions	
PV panels are considered technically feasible for all buildings with suitable roof orientations. The relatively low cost, high carbon saving potential and limited additional impacts mean that PV is considered a feasible option for this development.	

Table 7. Air Source Heat Pump systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Heat pumps are relatively mature technology providing heat using the reverse vapor compression refrigeration cycle - Heat pumps are a highly efficient way of providing heat using electricity, with manufacturers reporting efficiencies from 250% - Can be of increased benefit where cooling is also required, therefore particularly relevant to commercial buildings	- It is critical that heat pump systems are designed and installed correctly to ensure efficient operation can be achieved. - Users must be educated in how heat pump systems should be operated for optimal efficiency - Air source heat pump plant should be integrated into the building design to mitigate concerns regarding the visual impact of bolt-on technology - Noise in operation may be an issue particularly when operating at high output, requires good system design
Estimated costs and benefits	
- Cost circa £2,000 - Running cost linked to COP of heat pump, however likely to be higher than mains gas	
Conclusions	
Air source heat pumps are technically feasible for the buildings in this scheme. Detailed design can ensure that these systems are integrated carefully to avoid any adverse noise or visual amenity impacts.	

Table 8. Ground Source Heat Pump systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Heat pumps are relatively mature technology providing heat using the reverse vapor compression refrigeration cycle - Heat pumps are a highly efficient way of providing heat using electricity, with manufacturers reporting efficiencies from 320% - Can be of increased benefit where cooling is also required, therefore particularly relevant to commercial buildings	- Low temperature heating circuits (underfloor heating) would be required to maximise the efficiency of heat pumps - A hot water cylinder would also be required for both space and water heating - It is critical that heat pump systems are designed and installed correctly to ensure efficient operation can be achieved - Ground source heat pumps either require significant land to incorporate a horizontal looped system or significant expense to drill a bore hole for a vertical looped system
Estimated costs and benefits	
- Cost circa £10,000+ - Estimated simple payback at circa 18 years (systems only) - Running cost linked to COP of heat pump, however likely to be higher than mains gas - Additional costs to upgrade electricity infrastructure currently unknown	
Conclusions	
Ground source heat pumps are considered technically feasible for buildings in this scheme. However, the cost and difficulty associated with vertical boreholes at this site means that they are not considered a preferred low carbon technology at this stage.	

Table 9. Hot Water Heat Pump Feasibility Appraisal

Potential Advantages	Risks & Disadvantages
- Hot water demand met through grid electricity with low effective emissions factor - Heat pump element increases efficiency over immersion heater, circa 200%+ - No external heat exchanger requirement, only intake and exhaust duct runs - Low noise levels - Compact solution in same footprint as hot water cylinder	- Maximum length of duct runs means that cylinder positioning needs to be considered within the dwelling - Less appropriate for larger dwellings with higher hot water demands due to potentially slower recharge rate - Some noise, however likely to be easily suppressed with appropriate cylinder location - Space heating must be met through separate system
Conclusions	
Hot water heat pumps are considered feasible for dwellings with relatively low number of wetrooms and appropriate cylinder location to allow for duct runs to building façade. Hot water heat pumps are considered a preferred low-carbon technology at this stage.	

Summary

5.9. Following this feasibility assessment, it is considered that there are a range of technically feasible low carbon or renewable energy systems, however a number of these may be discounted on the grounds of increased running costs for residents or other adverse effects:

- Biomass heating systems would require significant storage space for fuel as well as regular deliveries at different times to all dwellings. Local NO_x and particulate pollution is also an increasing concern, and therefore they are not considered appropriate for this development.
- Ground source heat pump systems may be technically feasible, however the ground conditions are unknown, and the capital cost is likely to be prohibitive.
- Solar Photovoltaic systems would be required in order to show overall Building Regulation compliance where Gas boilers are installed.
- Air source heat pumps may be technically feasible for the houses, however the requirements for siting the outdoor unit mean that they are not considered feasible for the apartments.

5.10. There are three main technologies with significant potential for the development:

- Solar photovoltaics
- Hot Water Heat Pumps
- Air Source Heat Pumps

5.11. It is currently proposed that the houses will incorporate Gas Boilers supplemented with solar photovoltaic panels and apartments direct electric with hot water heat pumps. Individual plots may be supplemented by PV panels where necessary, this will be determined at Design Stage.

Future Homes Standard

5.12. Due to the timescale of development The Future Homes Standard (FHS) needs to be considered when assessing the potential specification. These new policies have yet to come into effect, but any site that expects some dwellings to complete construction after FHS has come into effect should therefore demonstrate that they will be compliant with these policies. Sites for which planning permission is granted from March 2027 onwards

will now fall under FHS; for sites already begun before this date, there will be a 'grace period' until March 2028 to complete dwellings – any dwelling completing after this date will also be required to meet FHS.

6. Total CO₂ reductions

- 6.1. Through following the strategy described, the dwellings will reduce energy demand and consequent CO₂ emissions beyond a Part L 2021 compliant level of performance through the dwelling fabric, gas boilers and PV systems.
- 6.2. To establish a suitable baseline position a sample of dwellings drawn from the Bellway House Type range have been assessed. This exercise will establish baseline CO₂ emissions for the scheme under current regulations.
- 6.3. Using SAP10.2 software, a sample range of dwellings have been assessed under Part L 2021 to build a representative site model and establish the predicted CO₂ emissions of the development, with the proposed fabric and renewable energy strategy applied to provide an overview of the typical as-designed CO₂ emissions. The results of these calculations are shown in Table 10.

Table 10. Sample dwelling as-designed CO₂ emissions after renewables (Part L 2021)

House Type	Part L 2021 Target CO ₂ Emissions	As-Designed CO ₂ Emissions	Reduction %
Cooper	12.73	12.44	2.28
Turner	11.9	11.59	2.61
Quilter	12.69	12.42	2.13
Mason	10.89	10.51	3.49
Shipwright	11.28	10.87	3.63
Scrivener	11.1	10.73	3.33
Milliner	10.76	10.62	1.3
Goldsmith	9.62	9.47	1.56
Weaver	9.41	9.26	1.59
Watchmaker	9.3	9.28	0.22
SBI-GF	11.77	5.48	53.44
SBI-FF	12.69	5.93	53.27
Baker	12.00	11.36	5.33
3BW	10.89	10.51	3.49
Tillman	10.72	10.35	3.45
Cartographer	10.93	10.48	4.12

- 6.4. Table 11 demonstrates the site-wide savings over and above the Part L 2021 compliant baseline that will be delivered.

Table 11. Site-wide CO₂ emission reductions achieved

	CO ₂ Emissions (kgCO ₂ /yr)	
Part L 2021 compliant baseline	93,423	
As designed calculated emissions	86,827	
Savings	6,596	7.10%

- 6.5. All dwellings will be recalculated again at the construction drawing stage to make sure policies and Building Regulations are met.
- 6.6. Design stage SAP calculations will be produced on a plot-by-plot basis under the relevant Part L standard and calculation methodology to accurately represent the final CO₂ emissions of the development.

7. Resource Efficiency

- 7.1. This section sets out details of additional resource efficiency and sustainable design principles to be applied at the development.

Materials

- 7.2. The impacts of construction materials range from the depletion of natural resources to the greenhouse gas emissions and water use associated with their manufacture and installation.
- 7.3. Within the development choices will be made in order to reduce the consumption of primary resources and using materials with fewer negative impacts on the environment, including but not limited to the following;
- Use fewer resources and less energy through designing buildings more efficiently.
 - Specify and select materials and products that strike a responsible balance between social, economic and environmental factors.
 - Incorporate recycled content, use resource-efficient products and give due consideration to end-of-life uses.
 - Influence, specify and source increasing amounts of materials which can be reused and consider future deconstruction and recovery.

Embodied Carbon

- 7.4. As the operational energy use of buildings is reduced through design and specification as described, the embodied carbon in the building materials and process becomes a much greater proportion of the overall impact of a development.
- 7.5. There is currently no legislation governing embodied carbon; however this may come into effect through the proposed 'Part Z' of the building regulations in coming years. Best practice standards are being adopted through LETI and RIBA and will be considered when setting any targets for the development, with an aim to significantly improve on current practice.

- 7.6. Typical measures which may be implemented to reduce embodied carbon may include:

- Selection of materials with high natural content
- Selection of low embodied carbon option for all materials
- Recycled plastics in windows, pipework and cavity closers
- Recycled content in gypsum plasterboard
- Use of recycled (crushed) aggregate as hardcore
- Recycle elevation treatments where feasible i.e., roof tiles, bricks, architectural features.

Construction Waste

- 7.7. The development will additionally be designed to monitor and manage construction site waste effectively and appropriately. Target benchmarks for resource efficiency will be set in accordance with best practice – e.g., 5m³ of waste per 100m² / tonnes waste per m².
- 7.8. Wherever possible materials will be diverted from landfill through re-use on site, reclamation for re-use, returned to the supplier where a 'take-back' scheme is in place or recovered and recycled using an approved waste management contractor.

8. Electric Vehicle Charging

- 8.1. It is recognized that there is a need to ensure that the development is adaptable to accommodate a future shift in personal transportation to electric vehicles, to promote sustainable transport and to minimise air pollution. As Electric Vehicle (EV) ownership increases, developers have an increasing responsibility to provide EV charging points for occupants.
- 8.2. The development will therefore provide EVC infrastructure to all dwellings.
- 8.3. The 'Overarching Design Code' document prepared by David Lock Associates (as revised May 2022) provides a summary of the requirements for electric vehicle charging as taken from the Suffolk Parking Guidance SPG (2019):

Residential Car Parking															
Residential parking standards as set out in The Suffolk Guidance for Parking 2019:															
MANDATORY	<table> <tr> <td>All residential units</td><td>Electric Vehicle charging point</td></tr> <tr> <td>1-bedroom unit</td><td>1 space per dwelling</td></tr> <tr> <td>2-bedroom unit</td><td>1.5 spaces per dwelling (1 allocated and 1 shared between 2 units for flexible use); or 2 spaces per dwelling when provided within curtilage (or, where sharing a space between 2 dwellings is not practical).</td></tr> <tr> <td>3-bedroom unit</td><td>2 spaces per dwelling</td></tr> <tr> <td>4+ bedroom unit</td><td>3 spaces per dwelling</td></tr> <tr> <td>Visitor/ unallocated</td><td>0.25 spaces per dwelling</td></tr> <tr> <td>Disabled</td><td>N/A if parking is in curtilage of dwelling, otherwise as visitor/unallocated</td></tr> </table>	All residential units	Electric Vehicle charging point	1-bedroom unit	1 space per dwelling	2-bedroom unit	1.5 spaces per dwelling (1 allocated and 1 shared between 2 units for flexible use); or 2 spaces per dwelling when provided within curtilage (or, where sharing a space between 2 dwellings is not practical).	3-bedroom unit	2 spaces per dwelling	4+ bedroom unit	3 spaces per dwelling	Visitor/ unallocated	0.25 spaces per dwelling	Disabled	N/A if parking is in curtilage of dwelling, otherwise as visitor/unallocated
All residential units	Electric Vehicle charging point														
1-bedroom unit	1 space per dwelling														
2-bedroom unit	1.5 spaces per dwelling (1 allocated and 1 shared between 2 units for flexible use); or 2 spaces per dwelling when provided within curtilage (or, where sharing a space between 2 dwellings is not practical).														
3-bedroom unit	2 spaces per dwelling														
4+ bedroom unit	3 spaces per dwelling														
Visitor/ unallocated	0.25 spaces per dwelling														
Disabled	N/A if parking is in curtilage of dwelling, otherwise as visitor/unallocated														
GUIDANCE	- All residential parking should be provided within the overall plots or on the adjacent highways, directly in front of the plot it is allocated to. - Houses are to be provided with garages and/or allocated parking bays. - Visitor parking should be provided on-street within lay-bys or within communal parking areas. Precise details of these will be submitted as part of reserved matters applications. - All dwellings with on plot parking will have a charging point on the side of the home. - All dwellings with off-plot allocated parking will have one charging point, type to be determined at RMA stage. 50% of unallocated parking within private areas (ie. Private drives and communal parking courts) will have the infrastructure / ducting (passive charging).														

Figure 3. Residential Parking Standards (inc. EV charging provision)

- 8.4. In accordance with these requirements, Bellway commits to the provision of:

- On plot parking – EV charging point provided to side of house
- Off plot allocated parking – EV charging via charging column, one point per dwelling served
- Communal unallocated parking – 50% of unallocated spaces will be provided with ducting to enable the future provision of EV charging points

- 8.5. This provision is additionally in line with the standards introduced via the new Approved Document S.

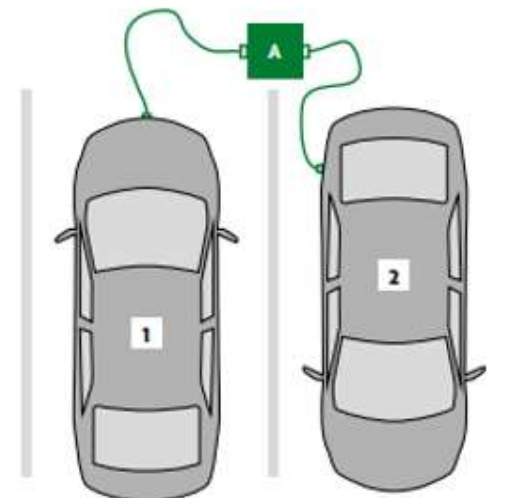


Figure 4. Example of communal EV charging post arrangement

- 8.6. Further technical details of the charger along with locations will be provided at the appropriate time as preparation for the development progresses.

9. Water Efficiency

- 9.1. The UK Climate Change Risk Assessment 2017 identified risks of shortages in water supply as a future climate change impact. Therefore, the efficient use of water is an important factor when considering future resilience to climate change.
- 9.2. As well as aiming to minimise water usage through the materials used, water consumption of the end user will be considered in line with current national policy, which encourages a requirement of 125/l/p/d. Building Regulations 2021 Part G require water efficiency measures for all new residential units:

Water Efficiency

G2. Reasonable provision must be made by the installation of fittings and fixed appliances that use water efficiently for the prevention of undue consumption of water.

Water Efficiency of New Residential units

36. (1) The potential consumption of wholesome water by persons occupying a new residential unit must not exceed the requirement in paragraph (2)

(2) The requirement referred to in paragraph (1) is either –

(a) 125 litres per person per day; or

(b) in a case to which paragraph (3) applies, the optional requirement of 110 litres per person per day,

As measured in either case in accordance with a methodology approved by the Secretary of State.

- 9.3. Water efficiency measures are met under Part G if: The estimated consumption of wholesome water resulting from the design of cold and hot water systems is not greater than the standard set by the Secretary of State of 125/litres/person/day, or the optional standard of 110 litres/person/day.
- 9.4. Appendix A of Part G provides a water efficiency calculation methodology. This assesses the whole house potable water consumption in new residential units. The calculation methodology is to be used to assess compliance against the water performance targets

in Regulation 36 to ensure that all new residential units meet the water efficiency requirement.

- 9.5. Water efficiency measures including the use of efficient dual flush WCs, low flow showers and taps and appropriately sized baths will be encouraged with the aim to limit the use of water during the operation of the development.
- 9.6. Table 12 shows a typical water demand calculation and shows how the development could achieve the required 110 litres/occupier/day.

Table 12. Typical Water Demand Calculation

Installation Type	Unit of measure	Capacity/ flow rate	Litres/occupier/ day
WC (dual flush)	Full flush (l)	6	8.76
	Part flush (l)	4	11.84
Taps (excluding kitchen taps)	flow rate (l/min)	4	7.90
Bath	Capacity to overflow (l)	181	19.91
Shower	Flow rate (l/min)	8	34.96
Kitchen sink taps	Flow rate (l/min)	6	13.00
Washing Machine	Litres/kg dry load	6.8	14.28
Dishwasher	Litres/place setting	1.04	3.74
Calculated Use			114.4
Normalisation Factor			0.91
Total Internal Consumption (L)			104.1
External Use			5.0
Building Regulations 17.K			109.1

10. Conclusions

- 10.1. This Energy Statement has been prepared by AES Sustainability Consultants on behalf of Bellway Homes Ltd (South West) to detail the proposed approach to energy and CO2 reduction to be employed for development at Melksham Road, Holt, Wiltshire.
- 10.2. A review of National and Local policy including the NPPF and relevant recent Government statements has established that the Building Regulations are considered the appropriate method for setting standards relating to energy use and CO2 emissions, considering building design and site-layout to further reduce energy consumption.
- 10.3. The development will be designed to meet national standards with respect to Building Regulations Part L 2021 requirements as a minimum and deliver more additional carbon and energy reductions in line with local adopted policy.
- 10.4. The statement is intended to demonstrate that, following a fabric first approach to demand reduction, in combination with renewable sources of energy in the form of the photovoltaic arrays, the proposed residential development will deliver a level of energy performance above national Part L 2021 targets.
- 10.5. This strategy focuses on a 'Fabric First' approach which prioritises improvements to the fabric of the dwellings to avoid unnecessary energy demand and consequent CO2 production.
- 10.6. Indicative SAP calculations show site-wide annual savings of circa 6,596kgCO2/yr or 7.10% over a Part L 2021 baseline.,
- 10.7. From March 24th 2027, building control submissions will need to comply with the new Future Homes Standard (FHS) requirements, developments submitted prior to this date will continue to be assessed under the current Part L2021. Any dwellings that have not been started by March 24th 2028 will need to be redesigned to meet the new FHS standards.
- 10.8. Water efficiency measures including the use of efficient dual flush WCs, low flow showers and taps and appropriately sized baths will be encouraged with the aim to limit the use of water during the operation of the development to limit water use. Each new residential unit will minimise water usage to at least 110 litres/person/day in line with the current national minimum standards.