Wokingham Borough Council

Climate change policy direction topic paper: an energy-based approach

Wokingham Borough Local Plan Update: Proposed Submission Plan (Regulation 19)

September 2024

Contents

List of tables

List of figures

1. Introduction

1.1. The purpose of this topic paper is to provide background to explain the policies relating to climate change within the Local Plan Update (LPU): Proposed Submission Plan (September 2024), providing context and justification for the direction recommended.

1.2. It sets out the relevant legislative and scientific context at the global, national and local level before providing justification for each policy in the Climate and Energy chapter of the Proposed Submission Plan.

2. Background

2.1. The Climate Change Act 2008 and Secondary Legislation published in 2019 require the UK to stop contributing to global GHG emissions by 2050.

2.2. To drive a proportionate local response to this national goal, Wokingham Borough Council (hereafter denoted as WBC) has committed to achieve a carbon neutral borough by 2030. WBC has also declared a Climate Emergency and prepared a Climate Emergency Action Plan (CEAP) which guides the Council's actions in response to climate emergency. The CEAP actions are tailored to achieving the goal of carbon neutrality by 2030, with a commitment thereafter to achieve net zero.

2.3. As of 2022[1], buildings remain the UK's second highest-emitting sector, accounting for 20% of total emissions[2] and 26% of UK energy consumption.[3] This is despite lower energy consumption in 2022 due to it being the UK's hottest year on record.[4]

2.4. The distinction between carbon neutral and net zero is a key definition for the purpose of this paper. Net zero refers to scenarios where anthropogenic emissions (those resulting from human activity) of a defined scope are balanced by the anthropogenic emissions that are removed over a specific period. When relating to the development and operation of the built environment, net zero typically refers to

[1] Statistics to 2024 are expected in March 2025

[2] https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2022

[3] Department for Energy Security and Net Zero. 2023. Review of *Energy Consumption in the UK (ECUK) 1970 to 2022*. London: UK Government. https://assets.publishing.service.gov.uk/media/651422e03d371800146d0c9e/Energy_Consumption_in_the_UK_2023.pdf

[4] Department for Energy Security and Net Zero. 2023. Review of *Energy Consumption in the UK (ECUK) 1970 to 2022*. London: UK Government. https://assets.publishing.service.gov.uk/media/651422e03d371800146d0c9e/Energy_Consumption_in_the_UK_2023.pdf.

scenarios where efforts to reduce the emissions resulting from construction or operation of a building have been made, and any residual emissions balanced, for example, through on-site renewable energy generation.

2.5. The UK Green Building Council (UKGBC) provides the two following definitions of net zero as it relates to development, one for net zero carbon construction and another for net zero carbon building operation.

> "Net zero carbon – construction (1.1): "*When the amount of carbon emissions associated with a building's product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy."*
>
> "Net zero carbon – operational energy (1.2): "*When the amount of carbon emissions associated with the building's operational energy on an annual basis is zero or negative. A net zero carbon building is highly energy efficient and powered from on-site and/or off-site renewable energy sources, with any remaining carbon balance offset*."[5]

2.6. Carbon neutrality is a similar concept but places less emphasis on the abatement of up-front emissions. It is focussed on offsetting, rather than reducing emissions.

2.7. As such, net zero is the preferred target for the LPU since it reduces risk (from failed offset schemes for example) and prioritises development which seeks to reduce the emissions it generates. This will include energy efficiency measures, which lead to more climate resilient buildings.

2.8. These commitments must be reflected in the LPU with measures for the mitigation of and adaptation to climate emergency forming a central part of the LPU proposals.

[5] UK Green Building Council. 2019. Review of Net Zero Carbon Buildings: A Framework Definition. London: UK Green Building Council. https://ukgbc.org/wp-content/uploads/2019/04/Net-Zero-Carbon-Buildings-A-framework-definition.pdf.

3. Climate Context

Global and national

3.1. 2023 was the hottest year on record globally.[6] Along with higher temperatures, global heating causes wide-ranging impacts including desertification, melting of icecaps and glaciers, rising sea levels, degradation of wetlands, and ocean acidification.

3.2. Global weather systems are destabilised by the impacts of a warming climate, as a result, extreme weather events including flooding, drought, heatwaves and wildfires are becoming more common.

3.3. The impacts of global heating are exacerbated by and combined with the effects of human activity (deforestation, wetland draining, nitrate pollution and overfishing for example) to result in a biodiversity crisis, where habitat loss end ecosystem disruption is driving the rapid and global loss of species.

3.4. The UK is more frequently experiencing weather events which would have been uncommon anomalies even four decades ago. 2022 was the UK's hottest year to date, with many regions experiencing heat waves, drought and water restrictions. Immediately following this, the period from September 2022 to March 2024 was the wettest on record for England. In 2023 the UK experienced 11 named storms, an exceptional rainfall event and a heatwave.[7]

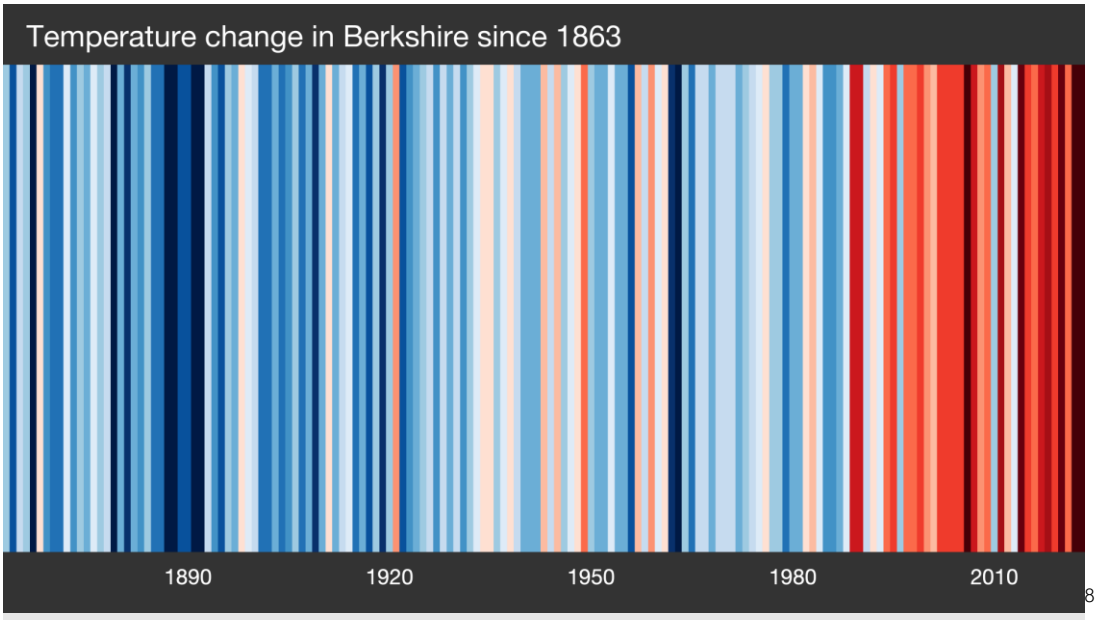
Local

3.5. Wokingham lies in Berkshire in the Southeast of England. This region, along with East Anglia, is characterised by generally warmer and drier weather than most other UK regions. This means that as the UK climate heats, some of the highest summer temperatures will be felt in the Southeast region. At the same time, UK winters are consistently milder and wetter, characterised by fewer cold snaps and more frequent heavy rain.

3.6. A Berkshire version of the 'warming stripes chart' was created by Professor Ed Hawkins at the University of Reading. This illustrates the increase in local temperatures between 1863 and 2023 relative to the 1961-2010 average.

[6] University of East Anglia. 2024. Review of *2023: The Warmest Year on Record Globally*. Uea.ac.uk. January 12, 2024. https://www.uea.ac.uk/about/news/article/2023-the-warmest-year-on-record-globally.

[7] https://www.metoffice.gov.uk/weather/learn-about/past-uk-weather-events#y2023



[8]

Figure 1: Warming strip chart for Berkshire detailing average temperature increase over time

3.7 The following graph illustrates local climatic conditions over the period 1863-2024. It was created by meteorologist Dr Roger Brugge at the University of Reading, and shows annual temperatures relative to the baseline of average temperatures for the 30 year period between 1991 and 2020 for the East Berkshire area.[9] When a year was colder than the average for 1991-2020, it is shown in blue; when the year was hotter than the average for 1991-2020, it is shown in red, with the deviation shown in degrees Celsius. A 30-year running mean is shown, illustrating a dramatic period of heating between the 1990s and the present.

[8] https://showyourstripes.info/c/europe/unitedkingdom/berkshire

[9] "*This series has been determined using reported monthly-mean temperatures from many of the weather stations that have been open in the Reading-Bracknell-Wokingham-Maidenhead area at some point in time since 1863. The weather stations currently used are those for Maidenhead West, Crowthorne 2, Wokingham and the University of Reading. Monthly data for all these stations can be found in the monthly Bulletin of the Climatological Observers Link*." Brugge, Dr Roger. 2024. "East Berkshire Temperature Series." Reading.ac.uk. 2024. https://www.met.reading.ac.uk/~brugge/east_berks_temp/eastberks.html.

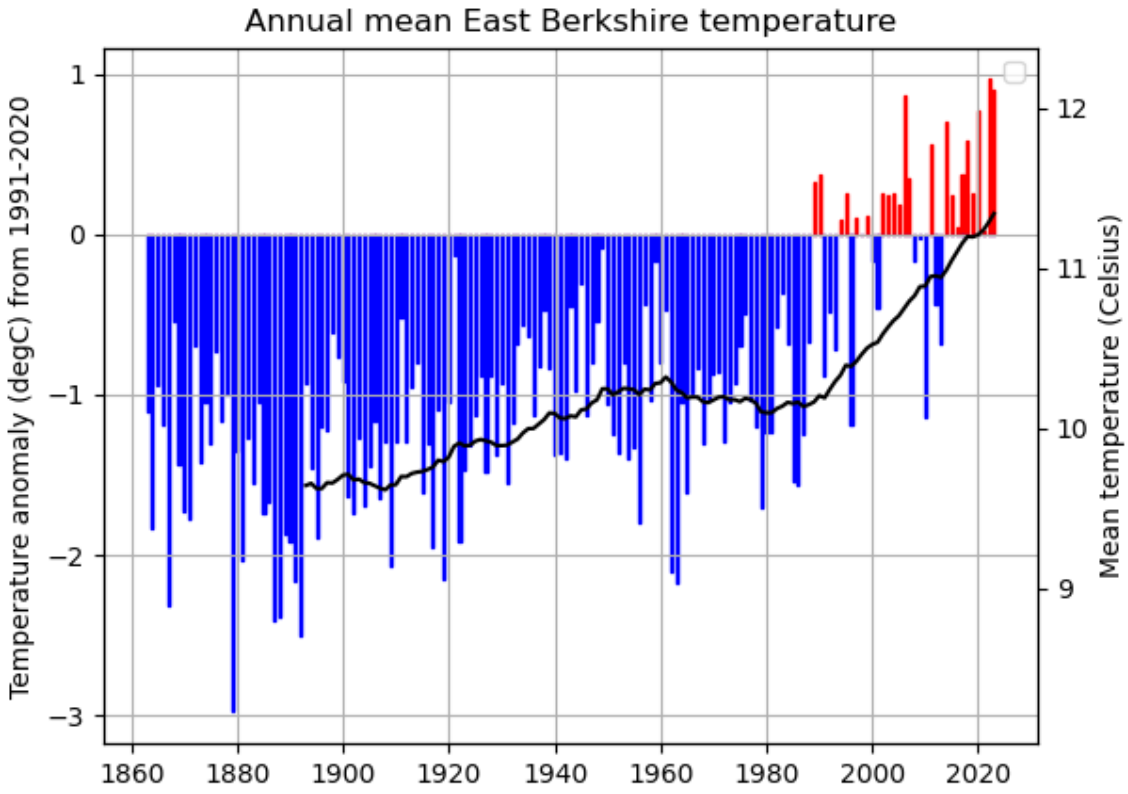


Figure 2 Annual mean east Berkshire temperature

3.8 Dr Brugge has also published statistics on local instances of heat waves using data from Reading[10]. Evidence shows that *"each year in the 8-year period 2016-2023 experienced a heatwave; previously heatwaves had never occurred in more than two consecutive years, namely 1975-1976 and in 1989-1990."*[11]

[10] "*In Reading and the surrounding area, the official definition of a heatwave is a spell of three days or more, each of which has a maximum temperature of 28 °C or above*." Brugge, Dr Roger. 2024b. "Heatwaves in Reading." Reading.ac.uk. University of Reading. August 10, 2024. https://metdata.reading.ac.uk/mobiledata/foyer_display/heatwaves/heatwaves.html.

[11] Brugge, Dr Roger. 2024b. "Heatwaves in Reading." Reading.ac.uk. University of Reading. August 10, 2024. https://metdata.reading.ac.uk/mobiledata/foyer_display/heatwaves/heatwaves.html.

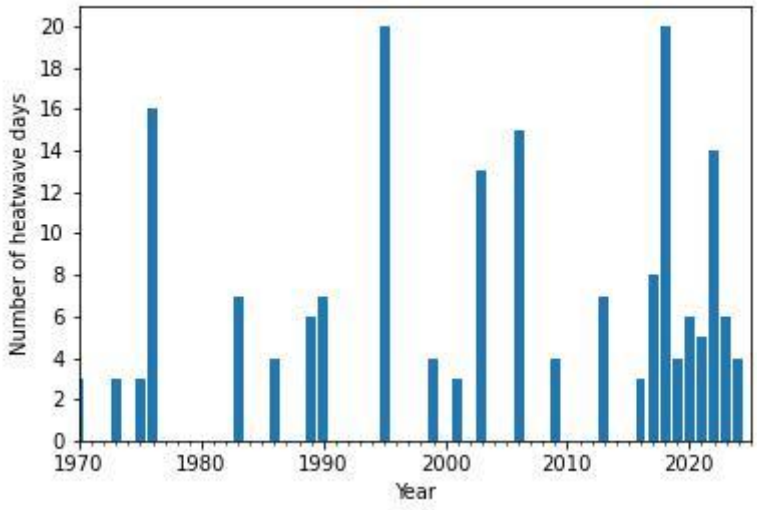


Figure 3 Local heatwave occurrence from 1970 onwards

3.9 This trend of increasing frequency aligns with reporting published by the Met Office which predicts that "*By the 2040s, heatwaves as severe as 2003 could occur every other year.*" [12]

3.10 The increasing frequency of heatwaves means that heat stress, high indoor temperatures and drought are risks which Borough residents face increasingly often. Secondary impacts of these conditions include flash flooding and topsoil erosion. These factors place people, property, services, agriculture, businesses and ecosystems at risk.

3.11 Climate hazards present a greater risk to vulnerable populations, notably elderly people and those facing deprivation. This is caused by increased physical vulnerability and lack of access to climate resilient spaces. A 2022 paper published in the journal Social Science & Medicine, found that vulnerable populations were more likely to experience health inequalities related to weather events.[13]

3.12 The UK Health Security Agency (UKHSA) publishes monitoring data on excess mortality during hot weather – this is intended to record the number of people who died from heat-related causes and would otherwise not have died on that particular day. The relationship between excess mortality and hot weather is illustrated by this UKHSA graph for 2023:

[12] Christidis, N., Jones, G. & Stott, P. 2015. "Dramatically increasing chance of extremely hot summers since the 2003 European heatwave." *Nature Clim Change* **5**, 46–50. https://doi.org/10.1038/nclimate2468

[13] Rizmie, Dheeya, Laure de Preux, Marisa Miraldo, and Rifat Atun. 2022. "Impact of Extreme Temperatures on Emergency Hospital Admissions by Age and Socio-Economic Deprivation in England." *Social Science & Medicine* 308 (308): 115193. https://doi.org/10.1016/j.socscimed.2022.115193.

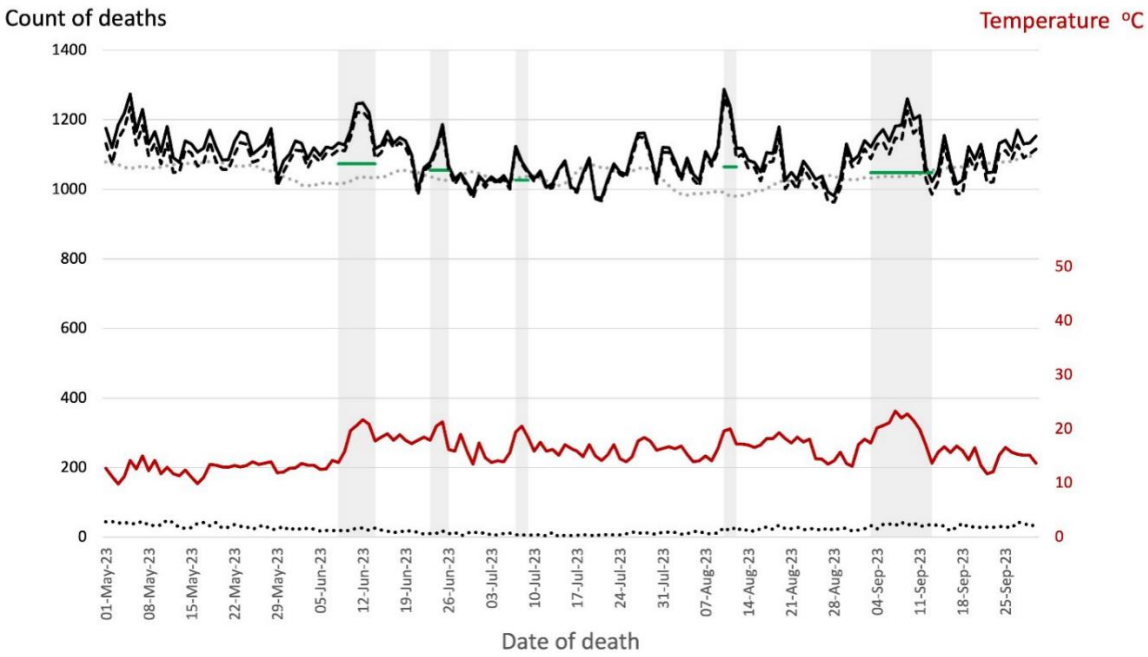


Figure 4 Relationship between excess mortality and hot weather

> *"Shaded areas on Figure 1 highlight periods that meet UKHSA criteria for estimating heat-associated mortality and were analysed by age, gender and region. All other aspects of Figure 1 are: 1. daily all-cause deaths adjusted for registration delay (solid black line); 2. daily all-cause deaths adjusted for registration delay and with COVID-19 deaths removed (dashed black line); 3. pre-pandemic 5-year mean daily deaths baseline (grey dotted line); 4. plus or minus 2-week baseline (solid green line); 5. COVID-19 deaths (dotted black line); 6. mean central England temperature (solid red line)"*[14]

3.13 In 2022, Arup provided a Climate Change Evidence Base to WBC to assist in the drafting of appropriate climate emergency focussed policies in the LPU. This document outlined current and future climate hazards in Wokingham.

3.14 It referred to research published by Imperial College London which found that during heatwaves, a single degree of temperature above average temperature correlated to a 10% increase in risk of death from cardiovascular or respiratory disease in the Southeast region when compared with other regions.[15]

[14] UK Health Security Agency. 2024. "Research and Analysis Heat Mortality Monitoring Report: 2023 Updated 22 July 2024." *Gov.uk*. https://www.gov.uk/government/publications/heat-mortality-monitoring-reports/heat-mortality-monitoring-report-2023.

[15] Bennett, James E., Marta Blangiardo, Daniela Fecht, Paul Elliott, and Majid Ezzati. 2014. "Vulnerability to the Mortality Effects of Warm Temperature in the Districts of England and Wales." *Nature Climate Change* 4 (4): 269–73. https://doi.org/10.1038/nclimate2123.

"*This demonstrates a particular population vulnerability, that may be attributed to an older population and needs to be considered in the update of planning requirements to ensure that resilience is sufficiently considered in developments*."[16]

3.15 The document also refers to the risk to infrastructure and services, noting that heat waves have had significant impacts on the rail network in Wokingham and surrounding areas with high temperatures leading to track buckling and service cancellations.[17]

3.16 Representative Concentration Pathways are projections adopted by the IPCC of global heating based on scenarios where varying levels of atmospheric greenhouse gas (GHG) concentrations are achieved. The four primary scenarios known as RCP2.6, RCP4.5, RCP6.0 and RCP8.5 relate to the outcomes of different levels of mitigation through GHG emissions reductions where RCP2.6 is a very stringent pathway which would require CO2 emissions to be zero by 2100 and, in turn, it is likely to maintain the global temperature rise below 2ºC by 2100.

3.17 Met Office's UK Climate Projections consider that with a global 2ºC temperature rise by 2100, the Southeast will experience the greatest heating, reaching a 3 to 4ºC increase relative to 1981-2000 summer averages. This could mean summer temperatures of 41ºC are reached in Wokingham by 2100. If global temperatures have risen beyond 2ºC by 2100, this will be reflected in Wokingham as further increases.

3.18 Rainfall in the UK as a whole is continuing to increase, with 2023 seeing rainfall equivalent to a 16% increase over the 1961-1990 average.

3.19 In the Southeast, rainfall has not significantly increased, however rainfall patterns are changing, with drier springs and summers leading to wetter and milder winters. Summer drought contributes to increased risk of subsequent groundwater flooding when hot weather is followed by spells of heavy rain falling on hard-baked ground which is less which is less able to absorb water, causing increased runoff.

3.20 As global heating continues to affect weather patterns, the Southeast of England is likely to see more rain in winter. The Met Office predicts that for the Wokingham area, this would be characterised by heavier and longer spells of rain.[18]

3.21 Much of the Wokingham lies in the catchment of the river Thames, with several rivers and watercourses draining towards the Thames throughout the borough. The

[16] Ove Arup and Partners Ltd. 2022. "Wokingham Borough Council Local Plan Update Climate Change Evidence Base, Final Report." London: ARUP.

[17] Ove Arup and Partners Ltd. 2022. "Wokingham Borough Council Local Plan Update Climate Change Evidence Base, Final Report." London: ARUP.p.16

[18] Met Office and BBC, 2021. "What will climate change look like near me?" [Online] Available at: https://www.bbc.co.uk/news/resources/idt-d6338d9f-8789-4bc2-b6d7-3691c0e7d138

Arup report noted instances of flooding in the Borough, the risk of which is managed through the 2020 WBC Strategic Flood Risk Assessment.

3.22 Further information about future climate projections for Wokingham can be found in the Wokingham Borough Council Local Plan Update Climate Change Evidence Base, Final Report produced by ARUP.

3.23 It is clear from the evidence presented that the impacts of global heating are already being felt in Wokingham. The degree to which GHG emissions can be reduced and how quickly this happens will decide whether global heating reaches 2°C or higher by 2100 relative to the 1990 baseline.

3.24 Higher heating will mean an increase in the risks for Wokingham and the region described above.

3.25 It is therefore vital that WBC uses its local development framework to effectively mitigate and adapt to the climate emergency, safeguarding residents, businesses, infrastructure, services and the natural environment. WBC recognises the need to follow the scientific evidence and act now, to contribute to the UK having a chance to avoid the most serious impacts of global heating.

4. WBC position on climate emergency

4.1 Climate Emergency declarations are statements made by governments and other bodies to acknowledge the climate crisis and set out commitments to actions mitigating and adapting to the crisis. These actions are often focussed around reducing GHG emissions.

4.2 Darebin, in Melbourne, Australia, became the first Council to declare a Climate Emergency in 2016. It was intended to allow for official recognition of the severity of risks caused by climate crisis and the need for urgent action to be planned, in the same way that governments and local government bodies respond to other kinds of emergency, for example the COVID19 pandemic.

4.3 Following Darebin's declaration, other authorities globally began to declare Climate Emergencies, at first in the USA and then the UK. In April 2019, the Welsh Government declared a Climate Emergency, with the motion being passed by the Senedd on May 1st of that year. Also, on May 1st, 2019, MPs approved a motion to declare an environment and climate emergency in UK Parliament.

4.4 Local authorities across the UK followed, and in July 2019, Wokingham Borough Council Members unanimously declared a Climate Emergency. WBC's Climate Emergency declaration commits to do as much as possible to become carbon neutral by 2030 and is governed by the WBC Climate Emergency Action Plan (CEAP).

4.5 The CEAP is a strategic document which sets out actions the Council will take to reduce the GHG emissions it directly controls or influences, while tackling the impacts of the climate crisis in Wokingham.

4.6 The CEAP defines ten key priorities for climate action by the Council:

- Reduce carbon dioxide emissions from transport.
- Generate more renewable energy in the borough.
- Reduce carbon dioxide emissions from domestic and business property.
- Increase the levels of carbon sequestration in the borough through greening the environment.
- Engage with young people and support sustainable schools.
- Reduce waste sent to landfill.
- Utilise planning policies to minimise emissions from new developments
- Achieve sustainable procurement practices throughout the Council
- Encourage behaviour change.
- WBC to lead the way on carbon neutrality, by improving its own operations.

4.7 A progress report is produced every year by WBC's Climate Emergency team tracking progress against the actions in the CEAP and identifying any areas of challenge.

4.8 Progress is overseen by a Climate Emergency Overview and Scrutiny Committee which meets six times a year and includes representatives from major Council parties. Community members may submit questions to the committee.

4.9 Many of the key priorities of the CEAP can be influenced by the LPU:

Table 1 CEAP Priorities and overview of contribution of LPU policies

CEAP Key priority	Relevance to planning	LPU policy reference
1. Reduce carbon dioxide emissions from transport.	Sustainable modes of travel can be prioritised and encouraged through strategic planning and planning policies.	CE5;[19] C1, C3
2. Generate more renewable energy in the borough.	Allocation of land for renewable energy generation, as well as generation associated with new development, can be prioritised through strategic planning and planning policies.	CE1; CE7; CE8

[19] transport emissions from construction

3. Reduce carbon dioxide emissions from domestic and business property.	Emissions from the operation and construction of new buildings can be influenced by planning policies.	CE1; CE2; CE3; CE6;
4. Increase the levels of carbon sequestration in the borough through greening the environment.	Prioritisation of habitat restoration and the delivery and stewardship of environmentally valuable green spaces can be influenced by planning policies.	NE2, NE4, NE5
5. Engage with young people and support sustainable schools.	Sustainable new school buildings can be delivered through implementation of appropriate planning policies.	CE1; CE2
6. Reduce waste sent to landfill.	Recycling provision for new development and construction waste can both be addressed through planning policies.	CE4; CE5
7. Utilise planning policies to minimise emissions from new developments	Self explanatory.	CE1; CE2; CE3; CE4; CE5
8. Achieve sustainable procurement practices throughout the Council	Not applicable to planning.	N/A
9. Encourage behaviour change	Implementation of planning policies driving sustainable development will support the development industry to move towards a climate resilient future characterised by responsible practices.	CE1; CE2; CE3; CE4; CE5; CE6
10. WBC to lead the way on carbon neutrality, by improving its own operations.	While the way WBC manages its operations is an internal governance matter, WBC can seek to lead the way with its own developments by exceeding the	CE1; CE2; CE3; CE4; CE5; CE6; CE7; CE8

	requirements it sets in planning policy for sustainable development.	

4.10 WBC published its 4th Progress Report on the CEAP in September 2023, including snapshots of the Borough's current and potential future emissions profiles under different scenarios:

Figure 5 WBC 2020 Emissions (Figure 1 of CEAP)

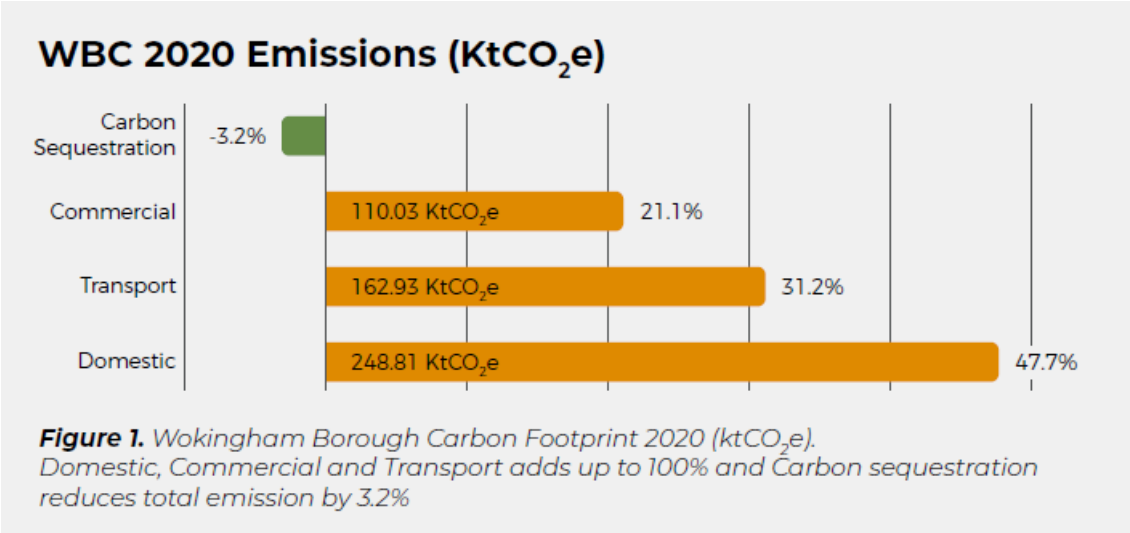


Figure 1. *Wokingham Borough Carbon Footprint 2020 ($ktCO_2e$). Domestic, Commercial and Transport adds up to 100% and Carbon sequestration reduces total emission by 3.2%*

Figure 6 WBC Emissions Trajectories (Figure 2 of CEAP)

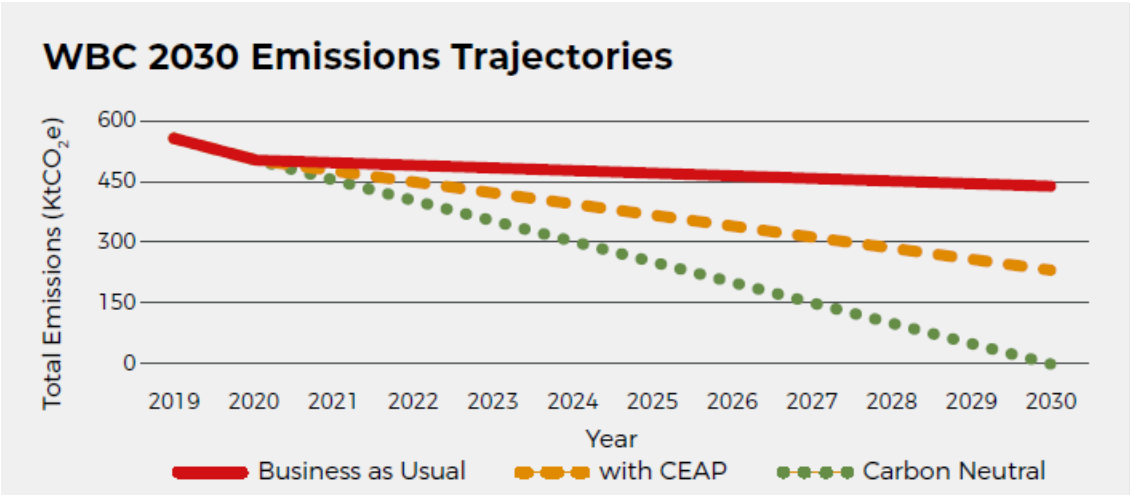


Figure 2. *Wokingham Borough Emissions Trajectories for 2030 ($ktCO_2e$) The 3 lines represent 3 potential scenarios for emissions based on the extent of actions taken by the council and wider borough. A 'business as usual' line showing minimal intervention, a 'with CEAP' line to show the impacts of the actions in this plan, and a 'carbon neutral' line to show the extent of actions needed to achieve this by 2030*

4.11 The second chart shows that from a starting point of 505 KtCO2e[20] in 2020, emissions should be around the 300 KtCO2e mark in 2024 to be on track for the target of carbon neutrality in 2030. This target is very ambitious and requires extensive work across all areas of Council activity.

4.12 The actions of the CEAP are projected to save 206.7 $ktCO_2e$, meaning a shortfall of 232 $ktCO_2e$ remains to be addressed.

4.13 The Fourth Progress Report states that "*This* [shortfall] *clearly demonstrate the scale of the issue and outlines the importance of delivering the CEAP actions, alongside the need for wider government support, as without statutory powers and funding, the major actions required to reach the* "Carbon Neutral*" line are not currently achievable*."[21]

4.14 In addition to the CEAP, WBC maintains a Council Plan and Community Vision.

4.15 The Council Plan is intended to outline the specific actions WBC will take over the plan period. It is complemented by the Community Vision which reflects the collective aspirations of the residents and stakeholders of Wokingham Borough. Each document has specific Focus Areas.

4.16 With one Council Plan expiring in 2024, WBC consulted on its new Council Plan for 2025-2030 July and August 2024.

4.17 The Council Plan sets out WBC's priorities for delivery in the plan period and forms a strategic framework for its activities during this time.

4.18 The Focus Areas of the Council Plan are:

- Economic Growth: Initiatives to support local businesses, attract investment, and create job opportunities
- Housing: Plans to build new homes, including affordable housing, and manage development sustainably
- Infrastructure: Projects to improve transportation, digital connectivity, and public utilities
- Environment: Measures to enhance green spaces, reduce carbon emissions, and promote sustainability
- Health and Wellbeing: Programs to improve public health services, mental health support, and recreational facilities

[20] Carbon dioxide equivalent is the amount of carbon dioxide (CO2) that would be emitted to cause the same global warming impact as the total emitted mixture of Greenhouse Gases

[21] Wokingham Borough Council. 2023. "Wokingham Borough Council Climate Emergency Action Plan: Fourth Progress Report, September 2023." p.6

- Education and Skills: Investments in schools, lifelong learning opportunities, and skills training

4.19 While the Focus Areas of Housing and Environment most directly relate to the need for robust climate-focussed policies in the LPU, promoting sustainable development will also benefit other areas including local Economic Growth through the creation of green jobs; Infrastructure through prioritisation of public transport routes serving new development, and green utilities such as electric vehicle charging hubs; Health and Wellbeing through improvements in active travel opportunities, healthy buildings and public green spaces and Education and Skills through driving demand for training in disciplines related to sustainable development.

4.20 The Community Vision is intended to look 10-20 years ahead and is co-created with the local community. The Focus Areas of the Community Vision are:

- Quality of Life: Enhancing the overall well-being of residents through improved community services, social cohesion, and cultural activities
- Sustainability: A strong emphasis on creating a sustainable environment, including initiatives for green energy, waste reduction, and biodiversity conservation
- Inclusive Growth: Ensuring that economic and social benefits are accessible to all, addressing inequalities, and fostering a diverse and inclusive community
- Opportunities: Providing fair opportunities and ensuring people have access to the things they want and need
- Resilience: Building community resilience to respond to challenges such as climate change, economic fluctuations, and health crises, ensuring the borough is safe and friendly
- Future Generations: Prioritising the needs and aspirations of future generations through forward-thinking policies and investments

4.21 The Focus Area of Sustainability directly relates to the need for a climate-resilient LDF, however all other Focus Areas of the Vision relate to sustainability and climate emergency response to some extent: Quality of Life requires safe, healthy, climate resilient neighbourhoods; Inclusive Growth should include addressing the inequalities created or worsened by the climate crisis including health inequalities which can be addressed through provision of resilient homes; Opportunities explicitly includes the need to build community resilience to the challenge of climate change and Future Generations wellbeing will be directly affected by the extent to which climate change mitigation and adaptation can be embedded now and in the years to come.

5. Legislative and policy context

Relevant legislation

5.1 The Climate Change Act 2008 (CCA 2008) governs the UK's strategy for mitigating its contribution to, and adapting to the risks caused by, climate change. Under the CCA, reductions in GHG emissions are required and climate hazards must be identified and adapted to.

5.2 The CCA 2008, as amended by the Climate Change Act 2008 (2050 Target Amendment) Order 2019, sets out that the UK must reduce GHG emissions by 100% of 1990 levels by 2050 – this is the UK's net zero target.

5.3 The CCA 2008 contains a 'carbon budget' mechanism to allow for tracking of progress towards intermediate milestones on the journey to net zero. Each carbon budget is set a minimum of 12 years before the period which it relates to. Once the budget is set, Government must introduce policies sufficient to deliver the level of emissions reduction required for the budget to be met.

5.4 The Climate Change Committee (CCC) advises on what the budgets should be and publishes an annual report to government on whether adequate action is being taken for the UK to be on track towards its 2050 target of net zero emissions.

5.5 In addition to the carbon budgets, the CCA 2008 requires Government to publish a Climate Change Risk Assessment every five years. This covers current and future risks and opportunities associated with climate change.

5.6 Adaptation and mitigation actions in line with the CCA 2008 are broadly divided between the Department for Energy Security and Net Zero (DESNZ) and the Department for Environment and Rural Affairs (Defra). DESNZ leads on national policy relating to reducing emissions from energy generation through decarbonisation of the national grid and a transition away from fossil fuels. Defra manages the UK's National Adaptation Programme which contains actions in response to the risks and opportunities identified in the Climate Change Risk Assessment.

5.7 Increasingly, most strategic national policies include some form of response to the climate emergency, so these departments do not hold sole responsibility for the UK's compliance with the CCA 2008.

5.8 The Conference of the Parties COP is the decision making and compliance monitoring body of the United Nations Convention on Climate Change. Established in 1995, it typically meets annually to review progress and evidence of the climate change mitigation and adaptation efforts by the Party States. Decisions and treaties arising from COP are intended to secure the implementation of the Convention as agreed and can be binding under international law.

5.9 The 21st COP meeting (COP21) held in Paris in 2015 led to the adoption of a treaty by the 196 member Parties which requires that the global average temperature should rise to no more than 2ºC above pre-industrial levels and that all efforts should be pursued to limit the increase to 1.5ºC:

"…in recent years, world leaders have stressed the need to limit global warming to 1.5°C by the end of this century.

That's because the UN's Intergovernmental Panel on Climate Change indicates that crossing the 1.5°C threshold risks unleashing far more severe climate change impacts, including more frequent and severe droughts, heatwaves and rainfall.

To limit global warming to 1.5°C, greenhouse gas emissions must peak before 2025 at the latest and decline 43% by 2030."[22]

5.10 This treaty is known as the Paris Climate Change Agreement, or Paris Agreement.

5.11 The 28th meeting, COP28, was held in 2023 in the United Arab Emirates. It marked the first "global stocktake" on the Paris Agreement – a checkpoint where Parties must demonstrate what progress has been made to date under the terms of the Agreement. COP28 found that the Convention is not on track to limit the temperature increase to 1.5ºC and there is very little time to address this before the opportunity is lost:

"*The world has avoided a potential 4°C increase to a range of 2.1-2.8°C if all current climate action plans are implemented. There is a possibility to get to a temperature increase that is below 2°C as 87% of the global economy is now covered by targets associated with achieving climate neutrality.*"[23]

5.12 The stocktake also highlighted the scale of the mitigation gap – the discrepancy in the trajectory needed to limit the global temperature rise to 1.5ºC compared with the current trajectory factoring in all climate action plans. This gap is reflected at a local level in Wokingham by the 232 $ktCO_2e$ shortfall in emissions reductions not addressed by the WBC CEAP but required to allow the Borough to reach its target of carbon neutrality by 2030.

5.13 COP28 provided benchmarks and guidance for positive steps Parties must take to retain the possibility of limiting average global temperature increase to 1.5ºC. It drew attention to the global energy transition away from fossil fuels, with targets to triple renewable energy generation and double energy efficiency by 2030.

5.14 It found that adaptation efforts should be more ambitious, better co-ordinated and universal in scope, since the climate emergency impacts all sectors and populations.

[22] United Nations: Climate Change. 2015. "The Paris Agreement." United Nations Climate Change. United Nations. 2015. https://unfccc.int/process-and-meetings/the-paris-agreement.

[23] UNFCCC. 2024. "COP 28: What Was Achieved and What Happens Next?" Unfccc.int. 2024. https://unfccc.int/cop28/5-key-takeaways.

5.15 Credibility and robustness of pledges made at COP have been subject to criticism, for example where the involvement of fossil fuel lobbies has been permitted.

5.16 As a Party to the Convention, the UK participates in COP and is bound by its Treaties including the Paris Agreement. It has agreed to a Nationally Determined Contribution (NDC) of a 68% reduction in emissions relative to the baseline of 1990 levels by 2030.

5.17 The UK's Net Zero 2050 target is intended to drive the level of reduction necessary to meet the NDC while providing scope for bringing the residual 32% of emissions down to net zero over the two decades following the 2030 NDC target.

5.18 The Climate Change Committee (CCC) is an independent body scrutinising and reporting on climate action in the UK, established under the CCA 2008. As noted above, it assists in the setting of 'carbon budgets' and provides reporting to parliament on progress made under the terms of the CCA 2008 and international commitments such as the Paris Agreement.

5.19 In the CCC's 2024 Progress Report, it was found that while the UK has met its three carbon budgets to date, it is significantly off-track to meet its NDC to the Paris Agreement, with current targets only sufficient to secure a 59% reduction against 1990 levels by 2030, rather than the 68% required, and there are insufficient plans in place to secure the 2030 target:

> "*only a third of the emissions reductions required to achieve the 2030 target are currently covered by credible plans. Action is needed across all sectors of the economy, with low-carbon technologies becoming the norm*".[24]

5.20 Local actions have a major role to play in driving a proportionate response to national and international agreements on climate action. This includes local authority climate emergency strategies such as the CEAP and policies such as those contained in the LPU and, where relevant, neighbourhood plans. If urgent action is not taken at a local level, the UK will not be able to honour its commitments on emissions reduction.

5.21 The CCC monitors progress against key indicators in all sectors. In view of the mitigation gap identified in its July 2024 progress report to Parliament, the Committee provided a list of urgent actions required to start to bring the UK back on track. Many of these actions have a direct or indirect link to development planning and domestic energy use. The progress report highlighted that "*Much of the progress to date has come from phasing out coal-generated electricity, with the last coal-fired power station closing later this year. We now need to rapidly reduce oil and gas use as well*".[25]

[24] UK Committee on Climate Change. 2024. "Progress in Reducing Emissions 2024 Report to Parliament." *Theccc.org.uk*. London: CCC. p.8

[25] UK Committee on Climate Change. 2024. "Progress in Reducing Emissions 2024 Report to Parliament." Theccc.org.uk. London: CCC. p.8

5.22 The priority actions set out by the CCC for the second half of 2024 onwards include the following actions with a direct or indirect link to planning policy and development:

Table 2 CCC priority action and links to planning and/or development

CCC Priority Action 2024	Link to planning and/or development
Make electricity cheaper.	As electricity costs reduce, the cost of running low and zero carbon technologies such as air source heat pumps will be lower than the cost of using oil or gas to heat buildings, providing a clear incentive for the transition away from fossil fuels.
Reverse recent policy rollbacks.	The CCC calls for the removal of the exemption of 20% of households from the 2035 fossil-fuel boiler installation phase-out, and to address the gap left by removing obligations on landlords to improve the energy efficiency of rented homes. These actions can be quickly implemented by reinstating the previously instated policies (including the no-new gas boilers policy) and will contribute to both the need to triple renewable energy generation and double energy efficiency as identified by the UN Convention. "*Electric heating should be the default in all new buildings and should become the norm for all buildings over time…"*[26] It is important that LPAs can require fossil-free new development across the board however currently, legacy applications which may have received outline approval some years ago are coming forward with schemes based on fossil-fuel space heating and poor energy efficiency. This should be addressed.
Remove planning barriers for heat pumps, electric vehicle charge points and onshore wind.	Barriers to onshore wind have been lifted since publication of the progress report. More can still be done to incentivise and streamline the adoption of heat pumps and electric vehicles, including the removal of the restriction under permitted development rights that heat pumps are installed at least one metre away from a property boundary.
Introduce a comprehensive programme for	Currently this work is done by each authority according to their resources and priorities, and while some support is available, no coherent

[26] UK Committee on Climate Change. 2024. "Progress in Reducing Emissions 2024 Report to Parliament." Theccc.org.uk. London: CCC. p.83

decarbonisation of public sector buildings	national programme exists to ensure delivery of decarbonised public assets by a certain date. The progress report also highlights the opportunity for the Government to identify which large scale public buildings can "*act as anchor loads for low-carbon heat networks*".[27]
Ramp up tree planting and peatland restoration.	Efforts towards these actions are currently not of the scale required to sufficiently contribute to emissions abatements in line with the UK's targets of 30,000 ha new woodland creation per year by 2025 and 32,000 ha peatland restoration per year by 2026. A national delivery programme with targets for each local authority would support this action.
Publish a strategy to support skills	A skills gap exists in both development and planning, where the necessary expertise to deliver a decarbonised built environment must be improved. LPAs can influence the closing of this gap by setting appropriate standards for sustainable development and thereby encouraging developers to upskill and adapt, while prioritising local skills and training in disciplines relating to decarbonisation of the built environment, such as retrofit PAS2035 assessor training, and other green skills.
Strengthen NAP3.[28]	By strengthening the national approach to adaptation, the Government should place greater emphasis on climate emergency adaptation at a local level to drive a more consistent and appropriately scaled response in communities across the UK. This will include actions in climate emergency strategies and local development frameworks among other instruments.

Other relevant national trends

5.23 Grid decarbonisation refers to the process by which an increasing proportion of electricity supplied in the UK is delivered by renewable energy generation.

[27] Ibid. p.84

[28] NAP3 is the UK Governments National Adaptation Plan. It accepts that the impacts of climate emergency are already apparent and will increase in severity before they abate, meaning that adapting our homes, infrastructure, emergency response planning and ways of living is essential for the safety and wellbeing of people, ecology, businesses, services and built assets.

5.24 In 2023, the CCC published a report examining the opportunities and challenges of achieving a decarbonised supply for the UK by 2035, per the Government's 2021 commitment to bring forward its former target of a decarbonised supply by 2025 by 15 years.

5.25 The CCC highlighted the co-benefits of decarbonised electricity, including improved energy security of a system based around the UK's renewable resources such as wind and solar power. It also stressed that renewables are the cheapest form of electricity generation, even when considering the cost of managing the variability of outputs.[29]

5.26 The 2023 report stressed that a decarbonised supply by 2035 will not be possible without increased pace of delivery and deployment of infrastructure. This includes generation infrastructure such as solar farms, alongside energy storage infrastructure and upgrades to the carrying capacity of the grid. Work on these areas is underway but must be accelerated to avoid missing the 2035 target.

5.27 For local authorities, this means working with network operators and distributors to plan for new connections and generation opportunities. Local authorities can also work to implement renewable energy generation across their estates, while incentivising the delivery of new renewable energy in stand-alone and development linked installations through local planning policies and schemes for residents such as the Solar Together group buying scheme which operates in Wokingham.[30]

5.28 Wokingham's CEAP includes the following actions relating to decarbonisation of energy supply:

Table 3 CEAP priority areas relating to planning, associated actions and carbon savings

Priority Area	**Action**	**Carbon savings (tCO_2e)**
2 - Renewable energy generation	2.1 Increase the generation of renewable energy through investment in solar farms to generate 49,000 MWh by 2030.[31]	10,342

[29] Dooks, Tom. 2023. "A Reliable, Secure and Decarbonised Power System by 2035 Is Possible – but Not at This Pace of Delivery." Climate Change Committee. March 9, 2023. https://www.theccc.org.uk/2023/03/09/a-reliable-secure-and-decarbonised-power-system-by-2035-is-possible-but-not-at-this-pace-of-delivery/#:~:text=Decarbonised%20electricity%20by%202035%20will.

[30] Wokingham Borough Council. 2023a. "News: Invest in Solar Panels through Group-Buying Scheme." Wokingham. 2023. https://www.wokingham.gov.uk/news/2023/invest-solar-panels-through-group-buying-scheme.

[31] To include connection of at least one purpose-built solar farm. The currently approved scheme at Barkham has a capacity of 29MWp, while work to plan a second site is underway.

	2.2 Support the generation of renewable energy in the Borough to generate the equivalent of approx.1550 kWh per household.	16,078
3 – Retrofitting domestic and commercial buildings	3.2 Improve energy performance of Council Housing stock.[32]	3229
	3.3 All local schools to be retrofitted by 2029.[33]	4400
7 - New development	7.4 Support low carbon and renewable energy generation.	Neutral (mitigates impacts of future development).

5.29 Development plans have a role to play in delivering decarbonised energy supply. Through planning policies, local authorities can allocate land for renewable energy generation and provide a framework for applications for this type of development. They can also incentivise the provision of on-site renewable energy with new buildings.

National policy

5.30 The National Planning Policy Framework (NPPF) contains planning policies for England and advises on how these are expected to be applied. The current version of the NPPF was revised in December 2023, with further proposed reforms published under consultation in July 2024. The NPPF is supported by a suite of guidance documents on subjects relating to plan making and the application of planning policy.

5.31 Paragraph 8 of the NPPF acknowledges that climate change adaptation and mitigation is one of the key pillars of sustainable development.

5.32 Chapter 14 of the NPPF is titled "Meeting the challenge of climate change, flooding and coastal change". It covers paragraphs 157-179 of the Framework, which addresses the ways in which local planning authorities are expected to act on climate change through their development plans. Of these, paragraphs 157-164 directly relate to policies CE1-CE8 of the LPU.

5.33 NPPF paragraph 157 states that:

> "*The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in*

[32] Based on EPC grade improvements which in most cases will include photovoltaic panel or air-source heat pump installation.

[33] This action refers to retrofitting school buildings with renewable energy generation technology.

greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure." [34]

5.34 The following paragraphs go on to set the principles that new development should be planned for in ways that limit its vulnerability to the impacts of climate change while reducing emissions arising from development "*such as through its location, orientation and design."* (Paragraph 159).

5.35 Plans should provide strategies for securing supply and use of low carbon heat, consider suitable areas for generation infrastructure and seek opportunities for development to use decentralised low carbon energy supplies, including through supporting community energy initiatives. (Paragraphs 160-161).

5.36 The Framework requires that local planning authorities expect new development to comply with local policies on decentralised energy unless this can be demonstrated not to be possible, and "*take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption*." (Paragraph 162).

5.37 Paragraph 163 explains that there must be a presumption in favour of the need for low-carbon energy and that applicants should not be required to demonstrate this.

5.38 Paragraph 164 states that significant weight in the planning process should be given to the need to support energy efficiency and low-carbon heating improvements to existing buildings where permitted development rights for the same do not apply.

5.39 A suite of guidance published alongside the NPPF covers subjects relating to the topics encountered in plan-making. This is collectively known as the Planning Practice Guidance (PPG). PPG section titled 'Climate change' stresses the duty for plan makers to embed climate emergency response in the planning process, as mandated by Section 19(1A) of the Planning and Compulsory Purchase Act 2004 which requires local planning authorities to include "*policies designed to secure that the development and use of land in the local planning authority's area contribute to the mitigation of, and adaptation to, climate change*"[35] in Local Plans. This legal duty forms part of the appraisal of local plans.

5.40 The PPG goes on to provide examples of how climate change mitigation via emissions reductions, and adaptation to the impacts of climate change can be respectively provided for in planning policies:

[34] Ministry of Housing, Communities and Local Government. 2023. "National Planning Policy Framework, Paragraph 157." December 2023.

[35] Ministry of Housing, Communities and Local Government. 2014. "Guidance: Climate Change." GOV.UK. https://www.gov.uk/guidance/climate-change#statutory-duty-on-Climate-Change. Paragraph: 002 Reference ID: 6-002-20140306

"Examples of mitigating climate change by reducing emissions:

- *Reducing the need to travel and providing for sustainable transport*
- *Providing opportunities for renewable and low carbon energy technologies*
- *Providing opportunities for decentralised energy and heating*
- *Promoting low carbon design approaches to reduce energy consumption in buildings, such as passive solar design*

Examples of adapting to a changing climate:

- *Considering future climate risks when allocating development sites to ensure risks are understood over the development's lifetime*
- *Considering the impact of and promoting design responses to flood risk and coastal change for the lifetime of the development*
- *Considering availability of water and water infrastructure for the lifetime of the development and design responses to promote water efficiency and protect water quality*
- *Promoting adaptation approaches in design policies for developments and the public realm."*[36]

5.41 The above principles have been embedded in WBC's LPU policies relating to climate emergency response, see section 6 below.

Building regulations

5.42 The Building Regulations are secondary legislation in England and Wales which govern the standards to which new buildings must be constructed as a minimum. The Building Regulations are made up from Approved Documents, which cover specific aspects of construction.

5.43 Of primary relevance to sustainable development are Conservation of Fuel and Power: Approved Document L which is broken down into Volume 1: Dwellings and Volume 2: Buildings other than dwellings.

5.44 Approved document L sets minimum performance standards for building elements in terms of their thermal performance. These are measured in terms of element 'U-values' – a metric showing the degree of thermal transmittance permitted by the element in question. Lower U-values relate to better insulating building components.

5.45 Compliance with approved document L is determined through use of standardised assessments, one for homes and one for all other buildings. The procedure for

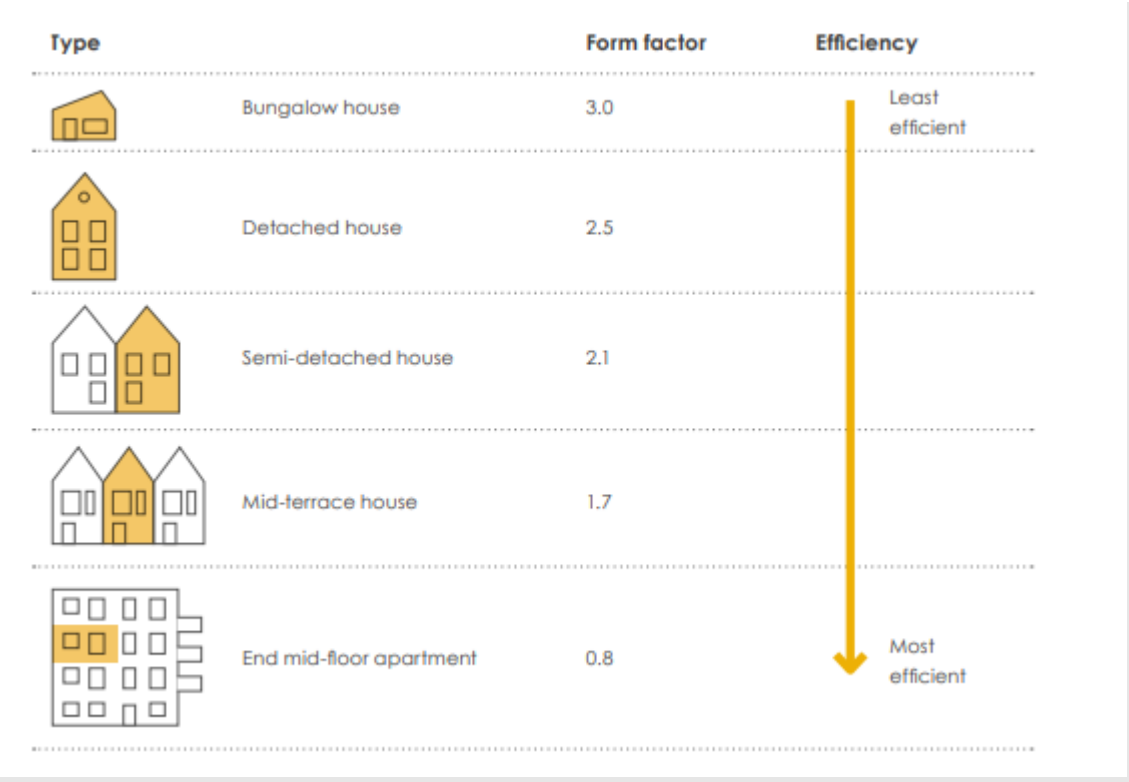
[36] Ministry of Housing, Communities and Local Government. 2014. "Guidance: Climate Change." GOV.UK. https://www.gov.uk/guidance/climate-change#statutory-duty-on-Climate-Change. Paragraph: 003 Reference ID: 6-003-20140612

assessing homes is known as the Standard Assessment Procedure or SAP. The basic function of the SAP is to generate a benchmark for energy performance and operational carbon emissions for a proposed building. From this, it generates a maximum permissible level of regulated energy consumption and carbon emissions which the modelled building must not exceed.

5.46 The SAP uses a 'notional building' model, whereby a building with the same orientation and geometrical form as the proposed building is generated using a specification from reference values that cover glazing area, heating system, thermal performance of building elements and so on. This is used to determine the Target Emission Rate (TER) and Target Fabric Energy Efficiency (TFEE).

5.47 One problem with this approach is that orientation and geometry play a significant role in determining a building's thermal performance and therefore how much energy is required to run it. For example, a building with a simple form will lose much less heat through its external envelope than one with a complex shape and large surface area to volume ratio, as illustrated in the figure below.

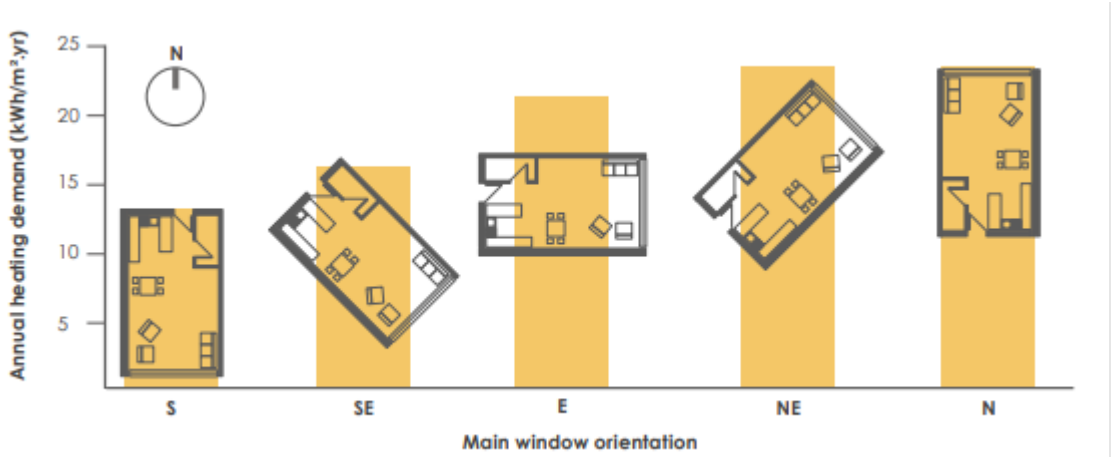
Figure 7 Types of homes and their form factor



37

5.48 Similarly, orientation has a significant impact on energy demand:

[37] Low Energy Transformation Initiative. 2021. "LETI Climate Emergency Design Guide How New Buildings Can Meet UK Climate Change Targets." LETI. https://www.leti.uk/cedg.



[38]

Figure 8 Why orientation is important

5.49 Another problem with the SAP methodology is that it allows poor thermal performance of the building to be compensated for to some extent by the provision of renewable energy generation equipment. This means that in some cases, U-values poorer than those of the notional building (which are minimum standards for compliance and do not approach best practice) can be acceptable in SAP terms.

5.50 This creates an issue of quality, health and climate resilience, where buildings are allowed to be constructed with relatively poor thermal performance because they have solar panels for example. Such buildings are not 'net zero ready' – their thermal performance means that they would require retrofitting to reduce their demand for operational energy to this level. They also do not adequately protect inhabitants from the impacts of the changing climate by prioritising passive regulation of internal temperatures.

5.51 Below, the difference between best practice performance values for building elements and the limiting values set by Approved Document L can be seen:

Table 4 Comparison of performance values required by Part L1A 2021 and best practice (residential)

Building element	Unit	Part L 2021 limiting value	Best practice value
External wall	W/m2. K	0.26	0.12
Party wall	W/m2. K	0.20	0.10
Roof	W/m2. K	0.16	0.10
Floor	W/m2. K	0.18	0.10
Vertical windows	W/m2. K	1.60	0.80
Rooflights	W/m2. K	2.20	1.00

[38] Ibid.

Doors	W/m2. K	1.60	1.00
Air permeability	m3/h.m3 @ 50 Pa	8.0	<1.0
G value of glass	absolute	none	0.4 – 0.3

Table 5 Comparison of performance values required by Part L2A 2021 and best practice (non-residential)

Building element	Unit	Part L 2021 limiting value	Best practice value
External wall	W/m2.K	0.26	0.12
Roof (pitched)	W/m2.K	0.16	0.10
Roof (flat)	W/m2.K	0.18	0.10
Floor	W/m2.K	0.18	0.10
Vertical windows	W/m2.K	1.60	0.80
Rooflights	W/m2.K	2.20	1.00
Doors	W/m2.K	1.60	0.80
Vehicle doors	W/m2.K	1.30	0.80
Air permeability	m3/h.m3 @ 50 Pa	8.0	<1.0
G value of glass	absolute	none	0.4 – 0.3

5.52 Some local planning authorities have maintained requirements for a percentage increase in carbon emissions reduction against the TER generated from notional buildings via the SAP. WBC's 2014 Managing Development Delivery Plan takes this TER-tracking approach in its Policy CC05, requiring a 10% improvement.

5.53 In addition to the issues detailed above, this mechanism is not robust, as it requires a percentage improvement against a fictional, un-built building, which cannot be accurately measured.

5.54 The Planning and Energy Act 2008 (PEA 2008). The PEA 2008 allows that local planning authorities set standards for energy efficiency in new developments in their planning policies which exceed the minimum standards set in the Building Regulations.[39] This power is reflected in the PPG[40].

[39] HM Government. 2008. "Planning and Energy Act 2008." November 13, 2008. https://www.legislation.gov.uk/ukpga/2008/21/section/1.

[40] Ministry of Housing, Communities and Local Government. 2014. "Guidance: Climate Change." GOV.UK. https://www.gov.uk/guidance/climate-change#statutory-duty-on-Climate-Change Paragraph: 012 Reference ID: 6-012-20190315

Future national standards

5.55 The Future Homes Standard (FHS) and Future Buildings Standard (FBS) are improved standards intending to be introduced to cover new residential and non residential buildings respectively. The Future Homes and Buildings Standards are packages of changes to the UK Building Regulations in response to a 2020 Government consultation. These Standards are expected to come into full effect from 2025, with interim measures currently in effect since June 2022.

5.56 Primarily, the Standards aim to reduce the regulated operational emissions arising from new buildings by introducing more stringent requirements for fabric performance and requiring low-carbon heating. Under the Standard, new homes will need to be either connected to a heat-network which uses decarbonised heat sources or directly use heat pumps. New fossil fuel heating systems will not be permitted. With these measures, the Government aims to create new housing stock which is "net zero ready", meaning buildings which will not require retrofit (i.e. the removal of fossil fuel heating systems) to become net-zero carbon in operation as the National Grid decarbonises, however this assertion has been challenged since the level of fabric efficiency achieved under the two proposed options for the Standard under consultation would arguably not be sufficient to remove the need for future upgrades.[41]

5.57 Along with electrification, the Standards recognise that to sustainably and affordably deliver climate resilient housing, buildings must operate efficiently. It therefore introduces an improved set of minimum values for thermal performance in both residential and non-residential buildings. It is estimated that regulated emissions from new homes built under the FHS will emit 75-80% less carbon dioxide than homes constructed to the pre-2021 Building Regulations minimum performance standards.

5.58 The FHS and FBS consultation included a proposal to remove the power to set higher energy standards than the Building Regulations in local plans. This was proposal was rejected following consultation with Local Authorities, however a Written Ministerial Statement published in December 2023 (WMS 2023) has again attempted to restrict the ability of local authorities to set energy standards in response to evidence.

5.59 The WMS 2023 states:

> *"Any planning policies that propose local energy efficiency standards for buildings that go beyond current or planned buildings regulation should be rejected at examination if they do not have a well-reasoned and robustly costed rationale that ensures:*

[41] Knight, Lewis. "Planning to Fail? The Future Homes Standard and New Local Energy Efficiency Rules Risk Blocking the Path to Net Zero." *Bioregional*, 19 Dec. 2023, www.bioregional.com/news-and-opinion/future-homes-standards-2023.

• That development remains viable, and the impact on housing supply and affordability is considered in accordance with the National Planning Policy Framework.
• The additional requirement is expressed as a percentage uplift of a dwelling's Target Emissions Rate (TER) calculated using a specified version of the Standard Assessment Procedure (SAP)."

5.60 In response to the WMS 2023, WBC's Net Zero Policy – Technical Evidence Base (discussed further below) as well as the Local Plan and Community Infrastructure Levy Viability Study[42] demonstrate that setting best practice energy efficiency standards are both technically feasible and financially viable.

5.61 The WMS 2023 was legally challenged in early 2024, with WBC submitting a witness statement to explain the devastating impact the restriction would have on the Authority's ability to meet its own and national climate targets, and to adopt policies in response to evidence as required by paragraph 31 of the NPPF.[43] The witness statement also explained the impact on resourcing for authorities needing to draw up a new policy approach, as well as the detrimental impact on residents who will not be provided with an appropriate standard of climate resilient housing.[44] This challenge was unsuccessful with two out of the three grounds dismissed.[45]

5.62 The FHS and FBS proposals faced criticism of its priority on decarbonisation over energy efficiency.[46] There are many reasons why both decarbonisation and energy efficiency must be prioritised to create climate resilient buildings, for example, a decarbonised heat source does not necessarily safeguard dwellers against fuel poverty, whereas an energy efficient home with decarbonised heating will reduce spending on heating and power while also minimising emissions. Reducing energy demand from new buildings helps to safeguard energy security and retain pressure on grid upgrades at a manageable level.

---

[42] Wokingham Borough Council: Local Plan and Community Infrastructure Levy Viability Study: https://www.wokingham.gov.uk/sites/wokingham/files/2024-09/Wokingham%20Local%20Plan%20Viability%20Study%20Final%20-%20Main%20report.pdf

[43] HM Government. *National Planning Policy Framework*. 19 Dec. 2023, www.gov.uk/guidance/national-planning-policy-framework/3-plan making#:~:text=Preparing%20and%20reviewing%20plans&text=The%20preparation%20and%20review%20of,into%20account%20relevant%20market%20signals.

[44] Witness Statement of Wokingham Borough Council. *BETWEEN: THE KING on the Application of RIGHTS: COMMUNITY: ACTION LTD (Claimant) and the SECRETARY of STATE for LEVELING UP, HOUSING and COMMUNITIES (Defendant)*. 12 May 2024.

[45] Judgement. *BETWEEN: THE KING on the Application of RIGHTS: COMMUNITY: ACTION LTD (Claimant) and the SECRETARY of STATE for LEVELING UP, HOUSING and COMMUNITIES (Defendant)*. 2 July 2024, www.bailii.org/ew/cases/EWHC/Admin/2024/1693.pdf.

[46] East of England Local Government Association. "East of England Response to the Future Homes Standard Consultation and Written Ministerial Statement on "Planning – Local Energy Efficiency Standards Update."" Received by Lee Rowley MP, 1 Mar. 2024.

6. Creating a local plan for a climate resilient Borough

Draft Plan 2020

6.1. A suite of policies was contained within the Draft Plan 2020 and subject to consultation. Those policies were based on best practice at the time of drafting. In September 2022, as referred to elsewhere, WBC published the Local Plan Update Climate Change Evidence Base produced by ARUP, which included a review of Draft Plan (2020) policies and identified a series of recommendations for where these could go further, drawing on more recent best practice and evidence since their drafting.

6.2. In the subsequent years since this evidence was produced, best practice has further moved on. The LPU Proposed Submission Plan includes ambitious policies that have been further evidenced and strengthened. A key change is the move from a carbon reduction approach to one that focuses on overall energy demand, in particular heating requirements. This approach is supported by the Wokingham Borough Council Net Zero Policy – Technical Evidence Base (2024) document[47], produced by Currie & Brown, Etude and Introba. This piece of evidence, as well as the sections above, discuss the benefits of this approach but notably this has the significant benefits of reflecting the energy hierarchy which starts with reducing energy demand.

6.3. The Net Zero Policy – Technical Evidence Base (2024) demonstrates that the requirements of policy are technically achievable and also that there would only be an increase in development costs of between 6.0%-7.7% (relative to Part L, 2021) and only 1.8% - 2.8% (relative to Future Homes Standard Option 1, the most stringent of the consultation standards) as a result of a policy requirement for all new homes to be net zero. More detail is provided below.

6.4. The following sections set out broadly what the Proposed Submission policies aim to achieve with reference to evidence reviewed, provide an overview of the Net Zero Policy – Technical Evidence Base and then considers each of the policies contained within the 'Climate Change and Energy' chapter of the Proposed Submission Plan in turn.

Proposed Submission Plan approach

6.5. As required by paragraph 31 of the NPPF, WBC sought evidence to determine the appropriate policy approach considering local and national climate hazards and commitments on carbon reduction.

[47] Available at: https://www.wokingham.gov.uk/sites/wokingham/files/2024-09/Wokingham%20-%20Net%20Zero%20Evidence%20Base%20Final%20Report.pdf

6.6. Industry sources were reviewed including the LETI Climate Emergency Design Guide 2021, UKGBC Net Zero Carbon Buildings: A Framework Definition 2019, and the Net Zero Carbon Toolkit (2021) published by West Oxfordshire District Council, Cotswold District Council and Forest of Dean District Council and prepared by the Passivhaus Trust, Levitt Bernstein, Etude and Elementa alongside our Climate Change Evidence Base and case studies of other recently adopted and proposed local planning policies.

6.7. This work informed the policy direction for climate emergency response in the LPU. In summary, the Proposed Submission Plan is intended to directly control regulated emissions arising from development operation, by setting targets for space heating demand that exceed the requirements of the building regulations and requiring that residual energy demand after demand reduction measures have been used are met through on-site renewables. It is also intended to influence unregulated emissions by a) setting respective caps on total energy demand (as metred) for residential and non-residential development and b) requiring in-use energy use monitoring and reporting for major development.

6.8. Unregulated emissions will also be indirectly influenced by policies encouraging standalone and development-linked renewable energy generation which can contribute to decarbonisation of the national grid. While no target for embodied emissions is proposed, it is our intention to require major development to carry out whole-life carbon assessment – these assessments require an approach to reducing embodied emissions to be demonstrated. The reason for this is to introduce the process for developers now, so that when we review the plan in a few years, the introduction of measures to restrict rate of GWP/m2 will be less of an onerous addition to projects where the monitoring and reporting process is already required. Consumption emissions will be influenced by the spatial strategy which will require sustainable patterns of development that encourage low-carbon modes of travel. They will also be addressed through specific development management policies relating to the relevant issues including transport, active travel, water use and waste.

6.9. Finally, consumption emissions will be influenced by wording to encourage the use of voluntary sustainability frameworks such as BREEAM which require action against all categories of development impact.

Net zero policy – technical evidence base

6.10. As referred to above, WBC commissioned Currie & Brown, Etude and Introba to develop an evidence base in order to understand the technical and cost implications of delivering net zero buildings.

6.11. The Net Zero Policy – Technical Evidence Base report summarises best practice as regards net zero development and discusses the limitations of current building regulations to delivering local, regional and national climate goals.

6.12. The report then sets out the technical and financial evidence to support the recommended Net Zero policy requirements, focussed on residential development. It does this based on three residential typologies which are typical of developments that come forward in the borough: detached house, semi-detached house and a low-rise block of flats. Predictive energy modelling using Passive House Planning Package (PHPP) was carried out to understand whether the typologies could technically achieve both the space heating demand standards and energy use intensity standards (discussed in more detail under polices CE3 and CE2 below) that WBC intended to introduce through policy. Predictive energy modelling was used over Part L compliance modelling as it provides a more accurate indication of a building's energy use and thus drives better design and construction decisions.

6.13. The report found that for all dwellings modelled achieve a space heating demand of less than 20 kWh/m2/year, demonstrating that the proposed Net Zero policy requirement is technically feasible. The low-rise block of flats in particular achieves a space heating demand of less than 10 kWh/m2/year due to their more efficient form factor. It also found that all dwellings achieve an energy use intensity of no more than 35 kWh/m2/year, demonstrating that element of the proposed Net Zero policy requirement is also technically feasible. As regards the requirement for developments to generate on-site renewable energy, the report found that all dwellings with the modelled form factor achieve an energy balance on site i.e. generation exceeds consumption.

6.14. In addition, sensitivity analysis has also been undertaken on the three typologies to understand the impact of changes in form factor, orientation and glazing ratios. This analysis shows that the recommended policy requirements are achievable for each dwelling type in all but a few individual cases, even with higher glazing ratios (windows having higher U-value than walls and therefore more heat is lost) worse form factor, and north facing elevations i.e. sub-optimal designs. The analysis therefore demonstrates that there is flexibility for schemes to achieve the technical standards.

6.15. The final aspect of the report is a capital cost analysis of the building typologies and specifications modelled that comply with the recommended net zero policy. The likely capital cost uplift from the current Part L 2021 Building Regulations baseline using a South England Q3 2024 cost base has been estimated, in addition to cost uplifts against the Future Homes Standard Options 1 and 2 scenarios. The cost analysis showed uplift ranges of 6.0% to 7.7% (£111 – £149/m2) against the current Part L 2021 Building Regulations; 1.7% to 2.8% (£33 – £55/m2) against the FHS Option 1; and 3.8% to 6.8% (£73 – £123/m2) against the FHS Option 2 scenario. The 7.7% uplift over Part L arises from one of the low-rise flat forms tested, with all other dwellings having an uplift between 6 and 6.9%. Low rise flats form a modest proportion of housing delivery in the borough. The outputs of this study have informed the whole plan viability evidence, which has found that cumulative policy requirements (including 7.5% cost uplift for achieving net zero) are generally viable.

6.16. As noted above, the WMS 2023 has reaffirmed the position that national policy does not expect plan-makers to set local energy efficiency standards for buildings that go beyond current or planned buildings regulations. To proceed, any proposal must be well-reasoned and have a robustly costed rationale that ensures development remains viable and the additional requirement is expressed as a percentage uplift to a dwellings Target Emission Rate (TER) using a specified version of the Standard Assessment Procedure (SAP). The Net Zero Policy – Technical Evidence Base report provides a well-reasoned and robustly costed rationale for the pursuit of the proposed net zero policies.

6.17. In addition, policies incorporate clauses to ensure development proposals which cannot reasonably be expected to meet the standards are not impeded. The proposed approach has been found sound through a number of local plan examinations elsewhere and subsequently adopted.

Proposed policies with justification and policy precedents

6.18. The LPU contains eight policies relating to the climate emergency response. These are labelled "CE" and are contained in a discreet chapter of the plan titled Climate Change and Energy. Below the basis for, and intended application of, each of the Climate Change and Energy policies is examined.

LPU Policy CE1: Design Principles for Efficient Buildings

6.19. The aim of this policy is to ensure that all new buildings in the borough are designed with energy performance and whole-life greenhouse gas emissions in mind at all stages of the design process from the outset.

6.20. It asks that applications demonstrate consideration has been given to the following design principles, in order: building orientation, the geometrical form of the building, the fabric of the building in terms of a) thermal performance and b) embodied emissions, heating source and renewable energy.

6.21. These are universal principles which can and should be considered for every new building.[48] The policy specifies the order in which the principles should be applied so that the beneficial effects are maximised in a cost-effective way. For example, creating a scheme to cover the operational energy demand of a building from on-site renewables will be more arduous and expensive if the building is inefficient in its form and orientation, with an excessive demand for energy.

[48] With the exception of heat supply and thermal performance for unheated buildings where thermal comfort is not necessary. It should be noted that unheated spaces which require stable temperatures (for instance for the storage of goods) will benefit from good thermal performance.

6.22. In buildings, orientation refers to the orientation of the building's plan, its footprints and facades, and its glazing. Orientation with respect to the cardinal directions is an important consideration, as it affects solar gain – the amount of warmth and light which are provided to the interior of the building by the sun – but orientation with respect to features of the site including topography, trees and neighbouring buildings are also key.

6.23. The impact that building orientation has on energy demand is significant, meaning it should be considered at the earliest design stage, allowing the rest of the design to proceed from the starting point of a rational orientation.

6.24. Figure 8 in section 5 above, produced by LETI for their Climate Emergency Design Guide, clearly illustrates the need to consider orientation for energy efficiency. It shows relative annual heating demand for the same room oriented South, Southeast, East, Northeast and North respectively. The lowest annual demand is around 13 kWh per square metre for a South facing room, while the North facing version has a heating demand almost twice as high.

6.25. It should be noted Policy CE1 requires that solar gain in buildings must be optimised rather than maximised, showing due consideration to the impact of orientation. While the diagram above shows how a South facing room has a much lower heating load than one facing in the opposite direction, too much solar gain causes overheating, something which will be an increasing issue for the built environment in Wokingham as the Southeast of England sees warmer temperatures. To mitigate this risk, overheating can be avoided through proper design and placement of windows, avoiding very large areas of glass and over-glazing on East and West oriented facades where low-angle sunlight can cause overheating in the evening and morning.

6.26. The geometrical form of a building also has a significant impact on how much operational energy it will require. In general, buildings with simple forms and smaller surface area to volume ratios will require less energy to heat and light. Heat loss form factor (HLFF) (sometimes called "form factor") refers to the ratio of external surface area (i.e. the parts of the building exposed to outdoor conditions) to the internal, heated floor area. The greater the ratio, the less efficient the building and the greater the energy demand. Detached dwellings will have a high form factor, whereas apartment blocks will have a much lower form factor and thus will tend to be more energy efficient.

6.27. The most energy efficient buildings will be compact and have an HLFF of 1.5 or less. This is due to a reduction in heat loss through thermal bridges – areas of the building's fabric where junctions between elements are not as well insulated as the surrounding material, creating a conduit whereby internal warmth can be lost to the outside environment. Buildings with very complex roof forms perform especially badly in terms of thermal bridging.

6.28. Thermal bridging is a key issue behind what is known as the "performance gap" where buildings perform more poorly (often significantly so) in practice once constructed, than they were modelled to perform during design. A significant contributor to the gap is the fact that junctions between building elements are often modelled as being constructed perfectly, however on site, irregularities in materials, last minute specification changes and human error in installation, can all cause materials and building elements to perform more poorly than expected.

6.29. Every junction (between two adjacent roof planes for example) is an opportunity for flaws in detailing and construction to contribute to a reduction in fabric performance, therefore, buildings with fewer such junctions will usually perform more closely to their modelled outcomes.

6.30. Buildings with simple forms tend to require less energy to heat and light due to simple, rational floor plans that do not have unnecessary space which would increase operational energy demand.

6.31. They are also more materially efficient to construct, meaning that the embodied greenhouse gas emissions and whole-life carbon associated with them is lower than for buildings with more complex forms.

6.32. Fabric performance refers primarily to how well insulated a building is. Many things affect this – the materials used to construct the building, how they are combined and detailed, how the building handles moisture and so on. These factors combined determine how well the building fabric performs.

6.33. The building regulations set minimum standards for the fabric performance of key building elements. These values as they apply to homes are summarised below:

Table 6 Fabric performance comparison of building regulations and best practice

Measure	**2022 UK Building regulations (interim)**	**Best practice (homes)[49]**
Air tightness	8.0 $m^3/h.m^3$ @ 50 Pa	0.6 $m^3/h.m^3$ @ 50 Pa

[49] Best practice will vary between building typologies and constraints. The best practice values shown are rules of thumb, consistent with fabric performance levels needed to create a low energy home. They are consistent with the values needed to achieve Passivhaus certification (and therefore a space heating demand of 15kWh/m^2/year) see, Passivhaus Trust. *How to Build a Passivhaus: Rules of Thumb*. Apr. 2015., the Passivhaus Trust.

U-value windows	1.60 W/m^2.K	0.80 W/m^2.K (triple glazing)
U-value walls	0.26 W/m^2.K	0.15 W/m^2.K
U-value floor	0.18 W/m^2.K	0.10 W/m^2.K
U-value roof	0.16 W/m^2.K	0.12 W/m^2.K

6.34. The above table indicates values for thermal performance of various building elements as limited by the Building Regulations and as best practice. The metric used for thermal performance in the building regulations is the U-value, which measures the rate of transfer of thermal energy, or 'thermal transmittance' from one side of a material or composite element to the other under certain conditions.

6.35. Heat supply refers to the source of heat used for the building. Fossil fuel supplies such as oil, gas and coal will not be permitted for new homes. They will instead use zero carbon or zero carbon ready solutions such as electric heating powered through on-site renewables like solar panels, or heat pumps, which take a small amount of electricity to run and will become zero carbon as the national grid decarbonises.

6.36. The move away from fossil fuel heating is crucial to meet local and national commitments for emissions reduction, while safeguarding residents from the need for costly and invasive retrofit in the future. This measure will also improve air quality and ensure dwellers have access to affordable, low and zero carbon heating as the cost of renewable energy falls.

6.37. It should be noted that adoption of the full Future Homes and Buildings Standards is expected in 2025. The 2023 consultation publication on the standards explained that fossil fuel heat sources will not comply with the Standards, since a key objective of the Standards is to deliver "*new homes and non-domestic buildings that are 'zero-carbon ready', meaning that because they use electric or other renewable energy sources, no work will be necessary to allow them to achieve zero carbon emissions*

when the electricity grid is fully decarbonised. This means gas boilers, including hybrid and hydrogen-ready boilers, will not meet the proposed standards."[50]

6.38. Renewable energy. As shown above, once steps have been taken to rationalise a design and minimise its demand for energy, generation of renewable energy on site can be considered. With an optimised building of relatively low energy demand, it will be less meet the regulated portion of annual demand through on-site renewable energy (see Policies CE2 and CE3).

6.39. Maximising the number of buildings generating their own zero-carbon energy on-site is vital to ensure local and national decarbonisation commitments can be met. On site renewables provide other benefits to dwellers and building operators as they contribute to energy security and affordability.

6.40. To comply with part e) of Policy CE1, evidence that the feasibility of renewable energy generation has been evaluated and an appropriate effort to include on-site renewable energy generation should be provided.

6.41. The above steps a) – e) set out in Policy CE1 relate to the Energy Hierarchy (Be Lean, Be Clean, Be Green, Be seen). Be lean refers to reducing energy demand through designing a building's fabric and orientation to maximise daylighting and passive heating and cooling, as well as managing demand during operation. Be clean involves utilising available local energy sources such as connecting to a local district heat network. Be green relates to the maximisation of on-site renewable energy generation and storage. Finally, be seen requires energy performance to be monitored, verified and reported.

6.42. The approach proposed in policy CE1 is consistent with that taken elsewhere and found sound by Planning Inspectors, in particular the example of Policy S6 of the Central Lincolnshire Local Plan adopted April 2023. Policy SEC1 1) of the Cornwall Climate Emergency Development Plan Document adopted February 2023 similarly embeds the energy hierarchy in the design of developments.

LPU Policy CE3: Environmental standards for Residential Development

6.43. Given the discussion of residential considerations under Policy CE1 above, Policy CE3 is discussed next as this sets requirements for residential development.

6.44. The review of policies and best practice showed that WBC's extant policy on carbon emissions reduction in new buildings (Policy CC05 of the WBC MDD Local Plan 2014)

[50] Department for Levelling Up, Housing & Communities. "The Future Homes and Buildings Standards: 2023 Consultation." *GOV.UK*, DLUHC, 4 Mar. 2024, www.gov.uk/government/consultations/the-future-homes-and-buildings-standards-2023-consultation/the-future-homes-and-buildings-standards-2023-consultation.

was no longer fit for purpose. MDD Policy CC05 states that "*Planning permission will only be granted for proposals that deliver a minimum 10% reduction in carbon emissions through renewable energy or low carbon technology where the development is for: a) Schemes of more than 10 dwellings (gross), or b) Non-residential proposals of more than 1,000 sq m gross floorspace.*"[51]

6.45. Further policy DH9 of the Draft Plan (2020) required minor residential developments to achieve at least 19% improvement over Building Regulations Part L (2013) or satisfy any higher subsequent standard. DH9 sought to require major developments to achieve carbon neutral homes, but this was not adequately defined.

6.46. The problem with CC05 and the approach of DH9 to minor developments is that it requires / would have required a reduction in emissions relative to the baseline of the Target Emissions Rate (TER) as set by the Building Regulations. The TER is not a set rate of emissions, it is generated by considering a "notional building" of the same floor area and form as the proposed building.[52] In the case of DH9, the 19% improvement has already been exceeded by the introduction of updated building regs.

6.47. This means that if a building has not gone through the steps set out in LPU Policy CE1 and has, for example an inefficient form which causes its modelled energy demand to be relatively high, the TER generated from the notional building with the same inefficient form will also be higher than it would be had the building been designed with the energy hierarchy in mind, following the step as set out in Policy CE1.

6.48. Rather than using a policy which relates to the TER, the evidence and industry sources reviewed in support of the creation of the LPU recommend a simpler approach using absolute targets for energy use intensity and space heating demand.

6.49. Energy Use Intensity (EUI) measures how much energy a building consumes in a year, per square meter of floor area. LETI emphasise that EUI is an appropriate metric for building performance because it "*is solely dependent on how the building performs in-use; rather than carbon emissions, which also reflect the carbon intensity of the grid*"[53] and can be used to compare buildings of a similar type to benchmark performance.

[51] MDD available at: https://www.wokingham.gov.uk/planning-policy/adopted-development-plan/local-plans

[52] BREEAM define the notional building as "*A hypothetical building of the same size, shape, orientation and shading as the actual building, with the same activities, zoning and system types and exposed to the same weather data, but with pre-defined specified properties for the building fabric, fittings and services.*" BREEAM UK. *BREEAM New Construction UK Non-Domestic Buildings, Technical Manual SD5078 BREEAM UK New Construction 2018 3.0*. London, BRE, 2018. p.150.

[53] Low Energy Transformation Initiative. LETI Climate Emergency Design Guide How New Buildings Can Meet UK Climate Change Targets. LETI, 2021. p.24

6.50. EUI is simple to model at design stage and can easily be monitored from energy bills once the building is being used. This is because EUI takes regulated and unregulated energy into account.[54]

6.51. Space heating demand measures how much energy is required annually to heat a building, divided by the building's floor area. SHD relates directly to the thermal performance of the building fabric.

6.52. Space heating makes up 63% of annual energy demand in existing homes, followed by hot water (17%) and appliances (13%).[55]

6.53. This does not need to be the case – energy efficient homes which are designed with thermal performance in mind can have a very different distribution of energy demand as illustrated by this diagram from the LETI Climate Emergency Design Guide:

Figure 9 Residential energy breakdown

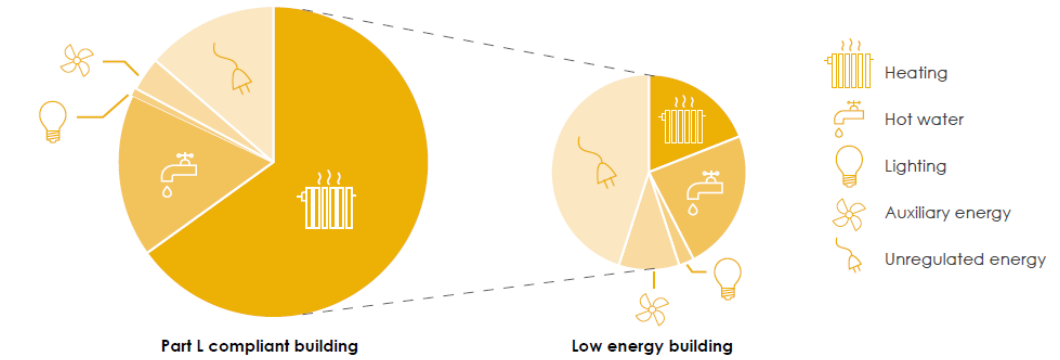


Figure 1.7 - Residential energy breakdown

6.54. By setting target ranges and caps for EUI and SHD, an appropriate level of building performance can be secured.[56]

6.55. Part 1. a) of Policy CE3 of the WBC LPU requires that new homes generate enough renewable energy on-site to cover their regulated energy demand annually. This includes only the "fixed" loads regulated through the Building Regulations – heating, cooling, lighting. It does not include appliances. As we can see from the above diagram, this requirement will be significantly easier for a building designed to reduce its energy demand to meet space heating demand compared to one which targets Building Regulations compliance.

[54] With the exception of electric vehicle charging which is not considered to be a building-related demand.

[55] Committee on Climate Change. *UK Housing: Fit for the Future?* CCC, Feb. 2019. P.59

[56] It should also be noted that space heating and cooling demand are proposed for inclusion within the Home Energy Model (HEM) which is scheduled to be released alongside the Future Homes and Buildings Standards and will replace the current methods of calculating building performance for the Building Regulations (SAP).

6.56. To assist planning applicants in achieving this requirement, part 1. b) of Policy CE3 sets out the energy use targets which new homes are expected to meet: a site average space heating demand of around 15-20kWh/m^2/year and a site average total energy demand of 35 kWh/m^2/year.

6.57. These targets and limiting values are informed by sources across built environment sustainability. These include:

- The LETI Climate Emergency Design Guide which advocates for space heating demand of 15 kWh/m^2/year and energy use intensity of 35 kWh/m^2/year for all new housing, to achieve a "net zero trajectory";[57]
- Currie & Brown and Aecom's report for the CCC on the costs and benefits of performance standards for new buildings which identified that absolute performance standards offer a greater degree of reliability than reliance on notional buildings models;[58]
- The RIBA 2030 Climate Challenge which advocates for homes to be built with total energy demand of 35 kWh/m^2/year or lower by 2030;[59]
- UK GBC's Net Zero Whole Life Carbon Roadmap which advocates for the Future Homes and Buildings Standards to adopt absolute targets for energy use and space heating demand with the following standards recommended for implementation in 2025 *"Energy Usage Intensity (EUI) target (kWh/m2/yr) compliance approach in place of notional building methodology … (35-40 kWh/m2/year for new homes); Thermal Energy (Space Heating) Demand limits (15 kWh/m2/year for new homes); Low carbon heating for all new buildings (no fossil fuel combustion*)." [60]
- This is also reflected in UK GBC's 2019 report for the CCC, UK Housing: Fit for the future?[61]

6.58. Flexibility is offered to protect the viability of development and recognise that meeting the targets will be more challenging in some situations. Developments may exceed the total energy demand of 35 kwh/m2/year where unavoidable, provided that no single dwelling has a total energy demand exceeding 60 kWh/m2/year regardless of the amount of on-site renewable energy generation.

[57] Low Energy Transformation Initiative. *LETI Climate Emergency Design Guide How New Buildings Can Meet UK Climate Change Targets*. LETI, 2021.pp.22-26

[58] Currie & Brown , and Aecom. *A Report for the Committee on Climate Change the Costs and Benefits of Tighter Standards for New Buildings*. 2019. p.26

[59] Royal Institute of British Architects. *RIBA 2030 Climate Challenge - Version 2*. 2021. p.6

[60] UK Green Building Council. *Net Zero Whole Life Carbon Roadmap Summary for Policy-Makers*. Nov. 2021. p.3

[61] Committee on Climate Change, and UK Green Building Council. *UK Housing: Fit for the Future?* CCC, Feb. 2019. p.63

6.59. In exceptional circumstances where the above criteria cannot be met, exceptional basis clauses are included in part 4 of the policy.

6.60. Exceptional basis clause 1 allows that where there is a technical or policy reason for the requirement not being met, evidence must show why the requirement cannot feasibly be met and to what extent the development could approach the requirements for energy use. Where this clause is used, if the proposed development consists of ten or more new homes, there are three options for mitigation of the additional environmental impact of the development open to the applicant. These are i. to enter into a legal agreement for the provision of offsite renewable energy generation of capacity at least equal to the additional energy demand incurred by the development over and above the policy compliant threshold; ii. To enter into a legal agreement to contribute to the council's carbon offset fund which will be used for carbon reduction projects in the Borough; or iii. To connect the new homes to a decentralised and decarbonised energy network or combined heat and power system.

6.61. Exceptional basis clause 2 allows that instead of providing individual models and reports confirming compliance with policy requirements on energy demand, applicants may wish to use a recognised accreditation or certification scheme. This can bring additional benefits as many such schemes cover aspects of sustainable development beyond energy efficiency and emissions. It can also speed up the decision-making process. Schemes suggested in the clause include Passivhaus (Plus or Premium level will ensure both requirements for renewable energy generation and limitation of energy demand are met, Classic level will be acceptable if supplemented with evidence on the renewable energy generation requirement), and BRE's Home Quality Mark. Other recognised independent accreditation schemes will also be considered where they are consistent with the requirements of Policy CE3.

6.62. Exceptional basis clause 3 acknowledges that proposals on previously developed land may in some cases struggle to meet the requirements of Policy CE3 for financial viability reasons. In such cases, evidence is required to show why this is the case and to what extent the policy requirements can be approached.

6.63. The flexibility built into Policy CE3 allows for development viability to be protected while ensuring a high standard of sustainable, energy efficient, low carbon development.

6.64. The approach to setting energy performance requirements, as well as flexibility through exceptional basis clauses, is consistent with that taken elsewhere and found sound by Planning Inspectors, for example in the cases of Policy S7 of the Central Lincolnshire Local Plan adopted April 2023, Policy SCR6 of the Bath & North East Somerset Local Plan (Core Strategy and Placemaking Plan) Partial Update adopted January 2023 and Policy SEC1 2b of the Cornwall Climate Emergency Development Plan Document adopted February 2023.

6.65. Part 2 of Policy CE3 requires the submission of models of the energy efficiency of new homes at design and "as built" stages with the latter being submitted prior to first occupation of the development. This ensures that Policy CE3 can be monitored against and assists applicants in identifying any issues with their approach through modelling from the design stage.

6.66. The policy requires that a methodology which gives a true impression of a building's energy demand in use is used. This means the model should include unregulated loads.

6.67. Part 3 of Policy CE3 requires that monitoring is undertaken to track the building's use of energy once it is occupied. This is vital to guard against the energy performance gap mentioned earlier in this paper, whereby dwellers can sometimes find themselves with higher energy bills than expected due to mistakes in construction. Monitoring performance will allow for corrective action to be taken in such cases.

6.68. Part 5 of Policy CE3 covers water consumption. It requires that all new homes meet the Building Regulations higher water efficiency standard of 105 litres or less per person per day (excluding allowance of up to five litres for external water consumption) which is equal to the current WBC requirement in Policy CC04 of the extant MDD Local Plan. Policy CE3 of the LPU specifies that proposals which make reductions beyond this level are encouraged.

6.69. This requirement recognises that water stress is an issue in Wokingham and new development must mitigate its impact as far as possible by reducing water consumption. The average existing home in the UK uses around 350 litres of water per day, with each person using on average 143 litres of water per day.[62] UK Building Regulations specify that new homes should allow for no more than 125 litres of water per person per day with an optional more stringent standard of 110 litres (including 5 litres for outdoor use) per person per day which can be set as a planning requirement where appropriate.

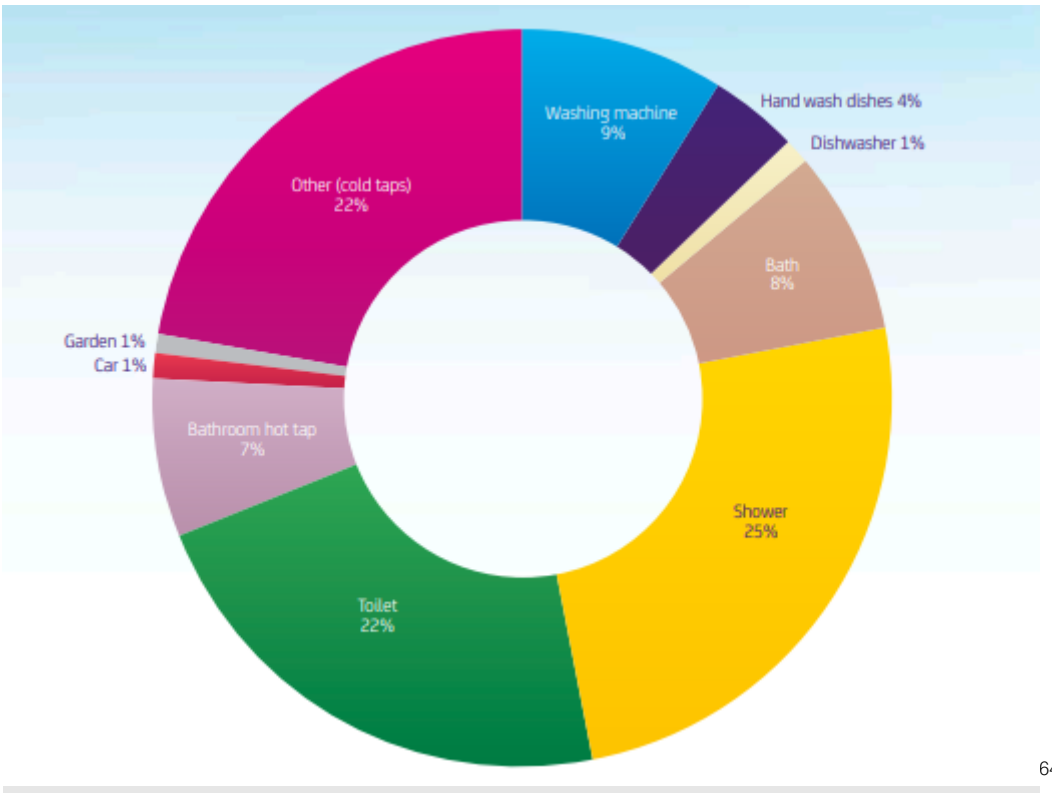
6.70. WBC's Climate Change Evidence base authored by ARUP identified that "*The WBC Water Cycle Study Phase 1 Scoping Study (2019) states that Wokingham is classified alongside many local authorities in southern England as an area of serious water stress. There is a risk of shortages in public water supply for example water needed for agriculture, energy generation, household demands and industry in the future."*[63] For this reason, it is reasonable and appropriate that the higher standard for water efficiency in new homes is set by Policy CE3.

6.71. The Energy Saving Trust conducted a comprehensive study of domestic water use in the UK in 2013. It found that water used in homes is typically distributed as follows.

[62] Energy Saving Trust. *At Home with Water*. July 2013. p.13

[63] Ove Arup and Partners. *Wokingham Borough Council: Local Plan Update Climate Change Evidence Base*. 12 July 2021. p.98

Figure 10 Typical distribution of water usage in homes



64

6.72. Using fittings such as taps, toilets and dishwashers which are adapted to function with lower water consumption makes a significant difference to overall household consumption. The table below illustrates typical and best practice consumption rates for common fittings.

Table 7 Typical water consumption vs best practice consumption from common household fittings

Fitting type	Typical consumption	Best practice consumption
WC	5 - 9 L	< 4 L
Shower	13 L / minute	6 L / minute
Handwash basin taps	8 L / minute	2 L / minute
Sink taps	10 L / minute	4 L / minute
Dishwasher	1.25 L / place setting	< 0.7 L / place setting
Washing machine	14 L / kg	6 L / kg

6.73. As shown in the above table, low-flow fittings can often achieve a reduction in consumption of 50% or more when compared with their non-low-flow counterparts.

64 Energy Saving Trust. At Home with Water. July 2013. p.13

By specifying such items in new homes, applicants will be able to meet the requirements of Policy CE3.

6.74. Part 5. b) requires that greywater recycling and/or rainwater harvesting are used wherever practicable. This responds to the evidence that water stress is and will continue to be a serious concern in Wokingham and any steps that are taken to reduce consumption and use water sustainably will be recognised as beneficial in the planning process.

6.75. For the same reason, Part 5. c) of Policy CE3 encourages the use of water recycling and smart water meters to further reduce consumption and allow for issues (such as leaks) to be swiftly identified and addressed.

6.76. Part 5. d) of Policy CE3 requires that wherever possible, external hard landscaping must be permeable. This measure will reduce the risk of flash flooding and assist with rainwater attenuation by providing opportunities for rainwater to dissipate that reduce stress on drainage networks.

6.77. Part 5. e) of Policy CE3 encourages the use of green roofs and walls to further contribute to sustainable rainwater attenuation and provide co-benefits such as summer cooling and ecological value.

6.78. Part 5. f) of Policy CE3 encourages the installation of water butts with capacity at least 100L where new homes have gardens. This measure will provide an opportunity for rainwater to be harvested (for example for garden use), reducing the burden of water supply from the development.

6.79. These measures to ensure new development is designed and built to prioritise water efficiency have been set after reviewing evidence and benchmarking against policies adopted by other UK local authorities.

6.80. In *UK Housing: Fit for the future?,* the CCC described England's Southeast region as being particularly vulnerable to water stress, with a projected deficit in supply leading to water shortages along with possible increase in water bills and measures to restrict use.[65]

6.81. Reducing the demand for water also reduces the greenhouse gas emissions associated with supplying water including those arising from pumping and water treatment.[66]

[65] Committee on Climate Change, and UK Green Building Council. *UK Housing: Fit for the Future?* CCC, Feb. 2019. p.77

[66] Wood Environment and Energy Solutions , et al. on behalf of the Committe on Climate Change *Updating an Assessment of the Costs and Benefits of Low-Regret Climate Change Adaptation Options in the Residential Buildings Sector*. Feb. 2019. p.13

6.82. In the report Updating an assessment of the costs and benefits of low-regret climate change adaptation options in the residential buildings sector for Wood et al on behalf of the CCC, limiting water use to 110L per person per day was found to be a low-regret measure for new build homes.

6.83. Inclusion of policies requiring residential development to achieve the more stringent optional standard of 110 litres per person per day is established common practice in adopted plans. This includes for example Policy H5: Standards for new housing of the Reading Borough Local Plan adopted November 2019; Policy INF4: Water Resources of the South Oxfordshire Local Plan adopted December 2020; and Policy LP 55 Sustainable construction of the Bracknell Forest Local Plan, adopted March 2024, to name a few local examples.

LPU Policy CE2: Environmental standards for Non-Residential Development

6.84. Policy CE2 follows the same principles as Policy CE3 shown above.

6.85. Part 1. a) of the policy requires on-site renewable energy generation to at least equal the regulated energy demand of the development annually.

6.86. To aid with the above, part 1. b) requires a site average space heating demand of around 15 - 20kWh/m2/year and a site average total energy demand of around 70kWh/m2/year with no individual unit requiring more than 90kWh/m2/year in regulated energy to operate.

6.87. Parts 2 and 3 of Policy CE2 match the requirements of Policy CE3, requiring accurately modelled energy performance estimates at the design stage and for the development 'as built', using appropriate methodologies, along with a deliverable commitment to on-going performance monitoring after the development is occupied. These requirements are necessary to ensure that new non-residential buildings perform to the standard shown in their planning application, reducing the risk of an energy performance gap and ensuring that benefits described in application materials are passed on to future building users.

6.88. As with Policy CE3, exceptional basis clauses are provided in part 4 of Policy CE2 as detailed below.

6.89. Exceptional basis clause 1 allows that where there is a technical or policy reason for the requirement not being met, evidence must show why the requirement cannot feasibly be met and to what extent the development could approach the requirements for energy use. Where this clause is used, if the proposed development consists of 1000m^2 of non-residential floor area, there are three options for mitigation of the additional environmental impact of the development open to the applicant. These are i. to enter into a legal agreement for the provision of offsite renewable energy generation of capacity at least equal to the additional

energy demand incurred by the development over and above the policy compliant threshold; ii. To enter into a legal agreement to contribute to the council's carbon offset fund which will be used for carbon reduction projects in the Borough; or iii. To show that the development will be connected to a decentralised and decarbonised energy network or combined heat and power system.

6.90. Exceptional basis clause 2 allows that instead of providing individual models and reports confirming compliance with policy requirements on energy demand, applicants may wish to use a recognised accreditation or certification scheme. This can bring additional benefits as many such schemes cover aspects of sustainable development beyond energy efficiency and emissions. It can also speed up the decision-making process. Schemes suggested in the clause include BREEAM (Outstanding or Excellent certification levels) and Passivhaus (Plus or Premium level will ensure both requirements for renewable energy generation and limitation of energy demand are met, Classic level will be acceptable if supplemented with evidence on the renewable energy generation requirement). Other recognised independent accreditation schemes will also be considered where they are consistent with the requirements of Policy CE2.

6.91. Exceptional basis clause 3 acknowledges that proposals on previously developed land may in some cases struggle to meet the requirements of Policy CE2 for financial viability reasons. In such cases, evidence is required to show why this is the case and to what extent the policy requirements can be approached.

6.92. The flexibility built into Policy CE2 allows for development viability to be protected while ensuring a high standard of sustainable, energy efficient, low carbon development.

6.93. As with residential developments, the approach to setting energy performance requirements, as well as flexibility through exceptional basis clauses, is consistent with that taken elsewhere and found sound by Planning Inspectors, including Policy S8 of the Central Lincolnshire Local Plan adopted April 2023.

6.94. Part 5 of Policy CE2 covers water standards, requiring the incorporation of greywater recycling and rainwater harvesting wherever possible and the installation of measures including smart water meters and low-flow fixtures. Part 5. c) of Policy CE2 requires external hard surfacing to be permeable unless there is a demonstrable reason why this is not possible, and part d) asks that developers consider the potential to incorporate green roofs and/or walls in their schemes.

6.95. As discussed above, sustainable management of water, and minimisation of mains water consumption, is a critical issue in Wokingham. The need to reduce the burden of water demand from new development applies to non-residential and residential developments alike, and these will share many common approaches such as the installation of low-flow taps and toilets. Due to their wider variety of uses, non-residential buildings will have varying water use profiles and it is important that

these are understood at the design and planning application stage, so that appropriate mitigation strategies can be identified.

6.96. The water efficiency measures proposed in Policy CE2 follow the same logic as those relating to residential development in Policy CE3. In addition to contributing to sustainable development and climate resilient places, the sustainable water use requirements in Policy CE2 are expected to provide benefits to businesses and organisations which could include reduced water bills. Smart water metering will provide a clearer picture of businesses consumption profile, allowing them to make efficiencies where possible and quickly respond to any issues such as leaks. Businesses responding to a study for Water Resources East identified difficulty submitting readings as a key barrier to improving their efficient use of water.[67]

6.97. As with residential development, there are plenty of examples of adopted plans requiring water efficiency measures from non residential development proposals which act as precedent for the requirements of CE3. The London Plan (adopted March 2021) Policy SI 5: Water infrastructure requires commercial development proposals to achieve BREEAM excellent standard for the 'Wat 01' water category, or equivalent. Policies S12: Water Efficiency and Sustainable Water Management and S21: Flood Risk and Water Resources of the Central Lincolnshire Local Plan (2024) require development proposals to give similar consideration to incorporating green roofs/walks and other rainwater harvesting techniques. Policy SEC1 5) of the Cornwall Climate Emergency Development Plan Document adopted February 2023 also includes requirement for proposals of 1,000m2 or more to incorporate water reuse and recycling and rainwater harvesting measures.

LPU Policy CE4: Supporting a Circular Economy

6.98. A linear economy is based on extracting materials, creating products, and then disposing of them as waste after use. The linear model is focussed on the product, with waste being generated throughout the production process. This model is prevalent in most areas of economic consumption from clothing to technology, but also influences the built environment, when buildings are constructed with high wastage, poor capacity for adaptation, maintenance or retrofit and as a result, have shorter service lives, resulting in demolition and redevelopment.

6.99. Linear economies contribute to climate crisis by depleting primary resources and generating large amounts of material wastage, pollutant byproducts and greenhouse gas emissions.

6.100. By contrast, circular economies prioritise minimisation of waste. A circular economy approach to consumer products would include sustainable manufacturing processes

[67] Water Resources East, and Blue Marble. *Promoting Water Efficiency among Non-Household Customers*. 12 Aug. 2022.

such as using waste materials, robust, repairable products with long service lives, which can be recycled at the end of their useful life. The minimisation of waste is key to this model.

6.101. When applied to the built environment, circular economies can include models for the repurposing of existing buildings wherever possible, construction of new buildings using low-impact, local and renewable materials, keeping in mind the need to facilitate future maintenance, adaptation and retrofit in the design.

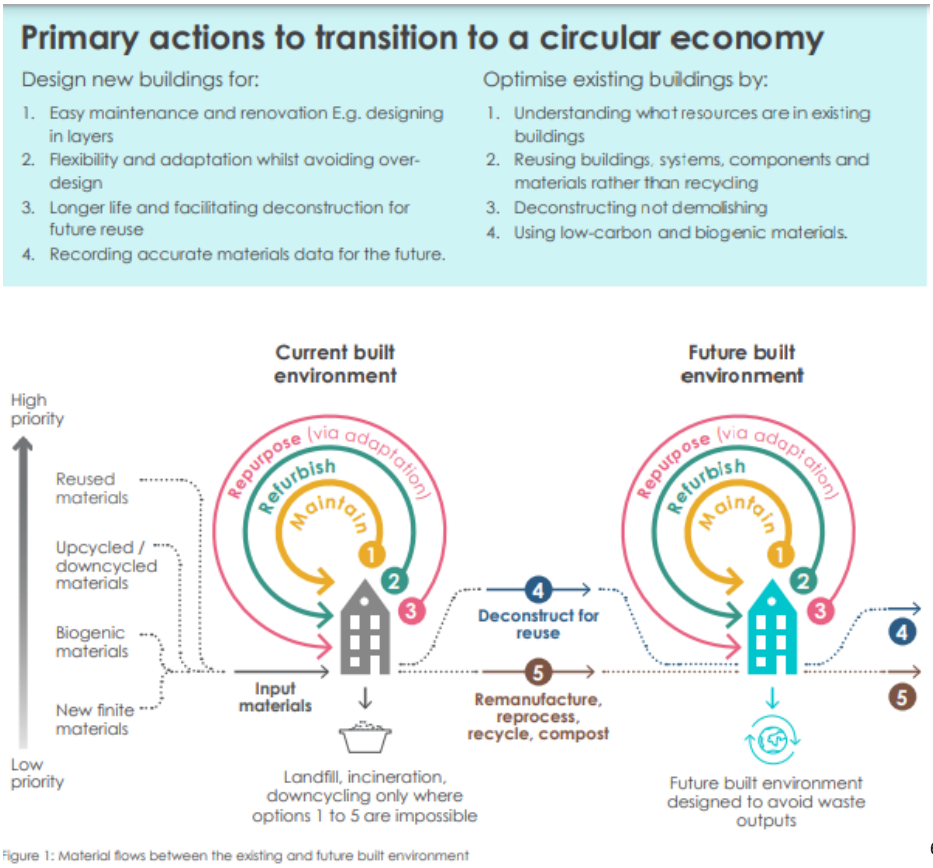
6.102. In their Climate Change Evidence base for Wokingham Borough Council, Arup define circularity in the built environment as follows: "*The circular economy model aims to decouple economic growth from resource consumption. In a circular economy, renewable materials are used where possible, energy is provided from renewable sources, natural systems are preserved and enhanced, and waste and negative impacts are designed out. Materials, products and components are managed in repetitive loops, maintaining them at their highest useful purpose as long as feasible, which minimises resource waste."*[68]

Figure 11 Principles of a circular economy

6.103. The below diagram from LETI illustrates material flows between existing and future buildings under a circular economy model.

[68] Ove Arup and Partners Ltd. *Wokingham Borough Council Local Plan Update Climate Change Evidence Base, Final Report*. ARUP, 21 July 2022. p.115

Figure 12 Material flows between existing and future built environment



6.104. Arup's evidence base for the WBC LPU recommends the adoption of planning policy to encourage circular economy models of development and redevelopment.

6.105. In response, Policy CE4 states that proposals which demonstrate circular economy principles will be supported. It requires that development proposals of ten or more homes or 1000m2 non-residential floor area submit a circular economy strategy as part of their Energy and Sustainability Statement, to show how principles of circularity have informed the design of the scheme.

6.106. The approach proposed in policy CE4 is consistent with that taken elsewhere and found sound by Planning Inspectors, including Policy S10: Supporting a Circular Economy of the Central Lincolnshire Local Plan adopted April 2023; Policy SEC1 6) of the Cornwall Climate Emergency Development Plan Document adopted February 2023; and policy S17 of The London Plan (March 2021) which requires major developments to evidence that they are embedding circular economy principles into

[69] Low Energy Transformation Initiative. *Circular Economy for the Built Environment: A Summary*. LETI, Apr. 2022.

schemes, and further requiring referable schemes to submit a Circular Economy statement.

LPU Policy CE5: Embodied Carbon

6.107. Embodied carbon refers to CO2e emissions associated with a building's construction and deconstruction. It includes emissions from extraction, manufacture and transport of materials and building products, as well as work on site. Embodied carbon and operational carbon (the emissions relating to running a building) together, make up whole life carbon.

6.108. Embodied carbon is not currently covered by the Building Regulations, however UKGBC estimate that around 20% of total GHG emissions arising from the built environment are embodied emissions, meaning they are generated by extraction, transport and manufacture processes that happen before a building is first occupied.[70] In the UKGBC's guidance briefing Embodied Carbon: Developing A Client Brief, the need to address embodied impacts in order to meet the UK's commitments is explained:

> "*In the UK, the Low Carbon Routemap and the 2015 Routemap Progress Report highlight that the sector needs to find a further 39% reduction in carbon emissions from the 1990 baseline in order to meet the Government's target to reduce carbon emissions in the built environment by 50% by 2025. Longer term, deeper reductions will be needed to reach the UK's Climate Change Act target of 80% reduction by 2050 from a 1990 baseline. Consideration of embodied carbon within the built environment at the initial design and construction stages, especially by the construction and property sectors, is necessary to achieve the required GHG reductions.*"[71]

6.109. Developers should seek to identify carbon hotspots, or areas projected to cause a significant amount of embodied emissions, in their designs from an early stage. These hotspots can be addressed through subsequent design iterations, leading to a reduced rate of emissions per development area. This rate can be further reduced by using materials, products and processes with lower embodied emissions, for example, use of cement replacement in concrete elements and choosing systems with longer service lives. These steps lead to improvements in supply chains and a reduced need to rely on offsetting the residual emissions.

6.110. The Climate Change Committee's December 2020 report Policies for the Sixth Carbon Budget and Net Zero recognises that the national policy landscape will need to change to include mandatory regulation of embodied carbon in the built environment over the next carbon budget period:

[70] UK Green Building Council *Net Zero Whole Life Carbon Roadmap Summary for Policy-Makers*, 2021. p.44
[71] UK Green Building Council. *Embodied Carbon: Developing a Client Brief*. Mar. 2017. p.5

"*To improve resource efficiency and incentivise material substitution within construction the Government should:*
• Work with industry to agree a standard for the 'whole-life' carbon footprint of buildings and infrastructure.
• Introduce mandatory disclosure of whole-life carbon in buildings and infrastructure to facilitate benchmarking as soon as possible.
• Following this, introduce a mandatory minimum whole-life carbon standard for both buildings and infrastructure which strengthens over time, with differentiated targets by function and usage. For homes, this standard should be included within the Future Homes Standard."[72]

6.111. As noted above, embodied emissions are not controlled by the building regulations as operational emissions are, and therefore setting limits on rates of embodied emissions is currently not best practice in planning policy, however as the need to account for embodied emissions is recognised, planning policy requiring calculation of embodied emissions rates is being adopted, most notably in the 2021 London Plan, which requires that all developments referrable to the Mayor submit a Whole Life Carbon Assessment or WLCA (which takes into account the proportions of operational and embodied emissions generated by a development) alongside their Sustainability and Energy Statement. Such requirements strengthen both the development industry and development management in local planning as they introduce the concept of embodied emissions and anticipate future controls on rates of embodied emissions.

6.112. The addition of a requirement for WLCA in the LPU was recommended by ARUP in their WBC LPU Climate Change Evidence Base which states that WBC should "*Recognise that operational emissions are only some of the emissions generated through new development...*[and] *require major development applications to submit an assessment of emissions across the entire life cycle of a building ("whole life cycle assessment"), demonstrating steps taken for their reduction."* [73]

6.113. In response to this evidence, policy CE5 requires that sustainability statements should show how mitigation of embodied carbon has influenced the design. This could be, for example, by showing that of several proposed roof-forms, the most materially efficient was chosen, or that the design team committed to specify low-carbon insulants.

6.114. Policy CE5 also requires that large developments consisting of 50 or more homes or 5000 m^2 of non-residential floor area must submit whole life-cycle carbon assessments in support of their planning applications.

6.115. Part 3 of policy CE5 requires that any proposed demolition is adequately justified by evidence that the existing building/s could not be retained in whole or part.

[72] Committee on Climate Change. *Policies for the Sixth Carbon Budget and Net Zero*. Dec. 2020. p.108
[73] Ove Arup and Partners Ltd. *Wokingham Borough Council Local Plan Update Climate Change Evidence Base, Final Report*. ARUP, 21 July 2022. p.5

6.116. These requirements are designed to ensure that embodied carbon is not ignored during the design of new buildings, and that the largest developments in the Borough adequately account for their impact in terms of whole life carbon.

6.117. In addition to the London Plan mentioned above, the approach proposed in policy CE5 is consistent with that taken elsewhere and found sound by Planning Inspectors, including Policy S11: Embodied Carbon of the Central Lincolnshire Local Plan adopted April 2023. Policy SCR8: Embodied Carbon of the Bath & North East Somerset Local Plan (Core Strategy and Placemaking Plan) Partial Update adopted January 2023 similarly requires large scale developments or 50 dwellings or 5,000m2 non residential floorspace to submit an Embodied Carbon Assessment.

LPU Policy CE6: Reducing Energy Consumption in Existing Buildings

6.118. In circumstances where existing buildings are the subject of planning applications, there are opportunities for planning policy to improve the sustainability of these buildings.

6.119. Due to the wide variety of constraints and project scopes which apply to existing buildings, no absolute requirements are proposed for energy efficiency or space heating demand as in new buildings.

6.120. Instead, policy CE6 provides support in principle for proposals which result in improvements in a building's performance and/or emissions. Weight is attributed in proportion to the extent of the improvement.

6.121. Policy CE6 specifically states that retrofitting of energy efficiency measures and appropriate renewable energy generation technologies will be supported in historic buildings unless unacceptable harm to the significance of a heritage asset would occur.

6.122. Policy CE6 also notes that proposals for a change of use should be viewed as an opportunity to improve energy efficiency.

6.123. Policy CE6 responds to the need to consider that most buildings which will be in use at the end of the plan period in 2040 already exist in 2024, with the majority of these having been constructed under less ambitious governance on sustainable development than exists today. As such, retrofitting existing buildings is one of the most impactful steps we can take to ensure local and national commitments on emissions reduction are complied with.

6.124. UK GBC highlighted the importance of addressing the performance of existing housing in particular in its 2021 Retrofit Playbook:

> *"Addressing the energy efficiency of the UK's housing stock in particular will be a vital to achieving the most cost-effective pathway to net zero, with homes*

accounting for approximately 77% of buildings' heating emissions footprint. With 80-85% of today's homes likely still standing in 2050 – and the UK's housing current stock still one of the most inefficient in Europe – greater policy and financial action to drive energy efficiency is essential."[74]

6.125. The proposed approach in relation to existing buildings is again consistent with recently adopted plans, which includes Policy S13: Reducing Energy Consumptions in Existing Buildings of the Central Lincolnshire Local Plan adopted April 2023. CP1: Retrofitting existing buildings of the Bath & North East Somerset Local Plan (Core Strategy and Placemaking Plan) Partial Update adopted January 2023; and Policy SEC1 3 of the Cornwall Climate Emergency Development Plan Document adopted February 2023.

LPU Policy CE7: Low Carbon and Renewable Energy Generation

6.126. Policy CE7 recognises that, in order to meet the challenge of decarbonising energy in the UK, standalone renewable energy generation infrastructure is needed. The policy sets a positive strategy for energy to be achieved from these sources and is intended to ensure that these installations are sustainably located and do not unacceptably harm their locations, as well as ensuring provisions are made for the lifetime of such infrastructure.

6.127. Part 1 of Policy CE7 states that renewable energy infrastructure will be supported unless there are unacceptable impacts arising from its installation, such as on residential amenity or biodiversity.

6.128. Part 1 c) makes explicit that the requirement for 10% net gain in biodiversity applies to such developments and must be achieved through the development actions.

6.129. The policy also provides specific support for any community-led energy scheme which meets the policy requirements.

6.130. Part 2 of Policy CE7 requires a strategy for the sustainable deconstruction and remediation of such installations and sites at the end of their service life.

6.131. It is necessary to include provision for installations such as solar farms or other low and zero carbon infrastructure in local planning policy, to ensure that installations in the Borough are supported and can be delivered with maximisation of co-benefits such as biodiversity net gain while mitigating any potential harms.

[74] ---. *Retrofit Policy Playbook: Driving Retrofit of Existing Homes - a Resource for Local and Combined Authorities*. UK GBC, 2021.p.11 referring to House of Commons Business, Energy and Industrial Strategy Committee. *Energy Efficiency: Building towards Net Zero Twenty-First Report of Session 2017-19 Report, Together with Formal Minutes Relating to the Report by Authority of the House of Commons*. UK Government, 2019. p.5

6.132. The benefits of increasing the amount of renewable energy generation in the Borough are local, national and global. Locally, such infrastructure can contribute to building opportunities for green employment and skills, while helping to move the Borough towards its local carbon reduction targets and safeguard future energy in Wokingham. In turn, renewable energy infrastructure contributes to the ongoing decarbonisation of the national grid (where connected). Where installed for community use, it reduces pressure on the grid. The decarbonisation of energy in the UK contributes to national carbon reduction efforts.

6.133. The Arup Climate Change Evidence Base (2022) supporting the plan includes an assessment of future renewable energy capacity in the borough. Whilst the plan does not formally allocate land for renewable energy, this simply reflects that limited areas of land for this use have been promoted and those that have are not demonstrably deliverable. The approach instead introduces a principle in favour of such uses, except where harm is unacceptable.

6.134. This policy approach is a common one in adopted plans, including Policy S14: Renewable Energy of the Central Lincolnshire Plan; Policy LP 56: Renewable and low carbon energy of the Bracknell Forest Local Plan, adopted March 2024; and Policy RE1 – Renewable and Low Carbon Energy part 1 of the Cornwall Climate Emergency DPD.

LPU Policy CE8: Protecting Renewable Energy Infrastructure

6.135. Policy CE8 recognises that in some instances, development proposals can conflict with the viability of existing renewable energy generation installations.

6.136. It requires that no development proposal should significantly harm such infrastructure, either through harming the technical performance of an existing or approved site, or by reducing the potential for future installations to succeed.

6.137. This policy aims to safeguard the benefits of renewable energy in the Borough and will contribute to assessments of sustainable location of proposed development sites. In so doing, it is consistent with the approach found sound in Policy S15: Protecting Renewable Energy Infrastructure of the Central Lincolnshire Local Plan.

Strategic approach to development

6.138. The spatial strategy contained within the Proposed Submission Plan is predicated on the majority of development needs being delivered through large scale developments, known as Strategic Development Locations (SDLs).

6.139. Large scale developments are often the best solution to meeting development needs in a way that responds to the challenges of climate change. They offer an

opportunity to design in sustainability from the outset including measures to lessen the need to travel by private car – through direct provision of local facilities such as schools, shops, health centres – so reducing their carbon footprint and impact on the environment and air quality. They also provide the critical mass to support new or expanded public transport corridors to provide future residents with choice in how they undertake longer journeys, as well as planning for accessible green space, drainage management, biodiversity enhancements and renewable energy.

6.140. The Proposed Submission Plan identifies three SDLs, two of which are carried forward from the existing plan (Arborfield Garrison and South Wokingham) and expanded, and the other representing a new garden village: the Loddon Valley Garden Village.

6.141. The Arborfield Garrison and South Wokingham SDLs include a policy requirement (SS11 and SS12 respectively) requiring development, as part of the key place shaping principles, to: "*Achieve climate resilient neighbourhoods through the application of adaptation and mitigation methods, including embedding passive design principles and energy demand reduction measures in the sustainable design and construction of buildings and homes*;"

6.142. The Loddon Valley Garden Village policy (SS13) contains a range of place making principles aimed at delivering sustainable development. Key requirements are set out below:

> *"3. The siting, layout, and form of development, including landscaping should:…*
>
> *c) Be designed around a series of walkable neighbourhoods, each providing a range of accessible services and facilities. Where important local facilities are necessarily located beyond the neighbourhood, these should be linked by accessible and attractive routes which support and encourage active travel. The promotion of community facilities for shared use, such as outdoor and indoor sports and leisure provision will be strongly encouraged;*
>
> *d) Establish a comprehensive and integrated network of high-quality and attractive active travel routes, greenways and bus services within the garden village and to destinations in the wider area;…*
>
> *g) Locate district and local centres where they are accessible to the planned housing, and are of an appropriate scale to meet the day-to-day needs with a range of retail (including food store of around 2,500m2), leisure, cultural, community, health and service facilities;*
>
> *h) Locate higher development densities around the district and local centres, transport nodes, and along public transport routes subject to site specific sensitivities such as landscape, character and heritage;"*

6.143. Part 11 of SS13 deals specifically with sustainable design and construction and states:

> *"11. Development proposals should devise and implement a comprehensive energy and sustainability strategy that:*
>
> *a) Applies passive design principles to ensure that form, orientation, building typologies, development densities and green and blue infrastructure are appropriately used to reduce energy demand and deliver climate resilient neighbourhoods;*
> *b) Implements the energy hierarchy at all scales and demonstrates a fabric first approach;*
> *c) Ensures that the total operational energy demand at completion of the Loddon Valley Garden Village is met from renewable or low-carbon sources on site, prioritising opportunities for heat networks, community energy initiatives or other solutions which take advantage of the scale of the development;*
> *d) Provides measures to reduce the whole-life impacts by creating adaptable, durable buildings and employing construction methods and materials which minimise embodied emissions; and*
> *e) Provide measures to reduce water consumption."*

6.144. Loddon Valley Garden Village is also unique in that it includes an existing science park, film studio complex, British Museum archive building, with further employment floorspace planned. Whilst acknowledged that most future residents of the development will work elsewhere, the nature of the proposals presents a unique opportunity to maximise future residents working near where they live.

7. Concluding remarks

7.1. This topic paper sets out the rationale for the proposed climate change policies as contained in the Wokingham Borough Local Plan Update - Proposed Submission Plan. It brings together numerous sources of evidence which demonstrate why there is a pressing need for local planning policy to address climate change and also explains why the proposed approach has been taken, with reference to existing precedents.

Appendix A: Glossary of terms

Term	Definition
Carbon budgets	A carbon budget places a legally binding restriction on the total amount of greenhouse gases the UK can emit over a 5-year period.
Carbon neutral	means the GHG emissions caused by human activity in a defined area and scope are no greater than the amount of GHG removed from the atmosphere in the same area, including offsetting of residual emissions.
Circular economy	An industrial system that is restorative or regenerative by intention and design. It replaces the linear economy and its 'end of life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals and aims for the elimination of waste through the design of materials, products, systems that can be repaired and reused.
CO2e	The amount of carbon dioxide (CO2) that would be emitted to cause the same global warming impact as the total emitted mixture of Greenhouse Gases
Embodied carbon	The carbon emissions associated with the extraction and processing of materials and the energy and water consumption used by the factory in producing products and constructing the building. It also includes the 'in-use' stage (maintenance, replacement, and emissions associated with refrigerant leakage) and 'end of life' stage (demolition, disassembly, and disposal of any parts of product or building) and any transportation relating to the above.
Energy based approach	An approach that focusses on overall energy demand rather than a carbon reduction approach.
Energy hierarchy	Where the below steps are followed in order: A. **Reduce the need for energy** – site layout and orientation of buildings can reduce the energy demand of buildings by capitalising on passive solar gain which utilises the energy from the sun to heat and provide light while avoiding unwanted thermal gains by effective use of solar shading; B. **Use energy efficiently** – there are many measures available to ensure that buildings use energy efficiently. These include thermally efficient building elements, high levels of airtightness and insulation, and energy efficient appliances (light fittings etc); C. **Supply energy efficiently** – by using existing supplies more efficiently, including taking opportunities to connect to any available local heat / cooling and/or power networks, greenhouse gas emissions can be significantly reduced (also termed low carbon sources) e.g. Combined Heat and Power (CHP) networks; D. **Use renewable energy** – by incorporating technologies that obtain energy from flows that occur naturally and repeatedly in the environment, such as from the wind (wind turbines),

	the fall of water (hydroelectric), from the sun (photovoltaics), from the thermal energy in the ground (ground source heat) and from latent thermal energy in air and water (air source and water source heat respectively); E. **Monitor performance** – in order to ensure transparency around true building performance it is important that performance is monitored, verified and reported. As a minimum this should include recording energy example are strongly encouraged.
GHG emissions	Natural and anthropogenic gases that absorb and emit radiation within the spectrum that causes warming.
Net zero	For the purpose of the LPU, a scenario in which the quantity of anthropogenic greenhouse gas emissions arising from the development's operational energy use on an annual basis is zero or negative, and where whole-life emissions are reduced through sustainable design measures.
Operational carbon	The carbon dioxide and equivalent global warming potential (GWP) of other gases associated with the in-use operation of the building. This usually includes carbon emissions associated with heating, hot water, cooling, ventilation, and lighting systems, as well as those associated with cooking, equipment, and lifts (i.e. both regulated and unregulated energy uses).
Passive design	The use of layout, fabric and form to reduce or remove mechanical cooling, heating, ventilation and lighting demand.
Regulated emissions	Energy consumed by a building, associated with fixed installations for heating, hot water, cooling, ventilation, and lighting systems.
Representative Concentration Pathways (RCP) and UKRCP	An RCP is a greenhouse gas concentration trajectory. The IPCC uses four different 21st century pathways as input to a range of climate model simulations to project their consequences for the climate system.
Scope 1,2 and 3 emissions	Categories of emissions related to activity type. Scope 1 emissions are the direct emissions arising from the use of fuels, scope 2 emissions are indirect from the generation of purchased electricity, and scope 3 emissions are further indirect emissions that are produced outside the boundary of an area for the purpose of providing services to that area
Unregulated emissions	Energy consumed by a building that is outside of the scope of Building Regulations, e.g. energy associated with equipment such as fridges, washing machines, TVs, computers, lifts, and cooking.
Whole life carbon	This includes embodied carbon, as defined above, and operational carbon. The purpose of using WLC is to move towards a building or a product that generates the lowest carbon emissions over its whole life (sometimes referred as 'cradle-to-grave').