Portsmouth CITY COUNCIL

Mitigating Climate Change through the Local Plan

Background Paper

April 2021

Contents

1. Introduction

1.1. The Council has a legal duty to ensure that the new Local Plan includes policies that, taken as a whole, have been designed to secure action on climate change. National policy sets out that the planning system should help to: 'shape places in ways that contribute to radical reductions in greenhouse gas emissions', and that Local Plans should take a proactive approach to mitigating climate change[1].

1.2. The purpose of this paper is to set out an analysis of the current emissions profile of the city in order to inform the development of the new Local Plan. It is intended as a companion piece to the climate change risk in Portsmouth background paper, which look more closely at the need for adapting to climate change that is now unavoidable. Together these two papers are intended to form the evidence base underlying the climate change response within the Local Plan.

1.3. Firstly the paper will highlight the data sources that have been drawn upon to inform this analysis. Following on from this, the paper breaks down the emissions profile of the city in detail, looking at the various contributing sectors to Portsmouth's greenhouse gas emissions. Finally a reflection is presented which considers what the findings of this analysis mean for the development of the Local Plan going forwards, and how setting out several potential approaches to be taken within the Plan

[1] National Planning Policy Framework (2019) paras 148 and 149

2. Methodology and limitations of this analysis

2.1. Quantitatively measuring the city's GHG emissions foot print is a challenge and the information set out in this background paper draws together data from several sources. Principally, the paper presents key findings for the city from the online Setting City Area Targets and Trajectories for Emissions Reduction (SCATTER) tool[2]. This is a comprehensive resource launched in 2018 and developed by the consultancy Anthesis Group in collaboration with Nottingham City Council, BEIS, Greater Manchester Combined Authority and the Tyndall Centre for Climate Research at the University of Manchester. Carbon tends to be the key focus when considering climate change mitigation, however, the tool is unable at present to isolate carbon emissions from the wider range of greenhouse gas emissions the city produces. Thus much of this analysis will be discussing the range of greenhouse gas emissions which SCATTER converts into a carbon dioxide equivalent (CO_2E). Should more detailed information relating to carbon specifically become available in the future this note will be updated to reflect this.

2.2. The report also draws upon official statistics gathered by the Department for Business, Energy and Industrial Strategy (BEIS) [3], which is able to focus purely on carbon dioxide emissions arising as a result of energy consumption. This data records only those emissions that are within a local authority's influence, thus some sources of emissions such as motorways or land use change, are omitted and thus does not provide for a full picture of a city's carbon footprint. As such it is considered useful to discuss the SCATTER data alongside this data to help provide a fuller picture of the emissions profile for the city.

[2] The tool can be accessed here: https://scattercities.com/

[3] BEIS data *UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018* (published 2020): https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2018

3. Breakdown of the city's carbon footprint

3.1. Total emissions across sectors

3.1.1. According to the BEIS government data on carbon dioxide emissions[4], the city's carbon footprint has been reducing year upon year, as with much of the rest of the country. This can in part be attributed to the decarbonising of the national energy grid that is bringing about reductions of emission as a result of energy use irrespective of local actions. Figure 1 demonstrates that per capita emissions have reduced from around 6 tonnes of carbon dioxide per person in 2005, to almost half this value at 3.2 tonnes of carbon dioxide per person in 2018 (the most recent year for which data is available).

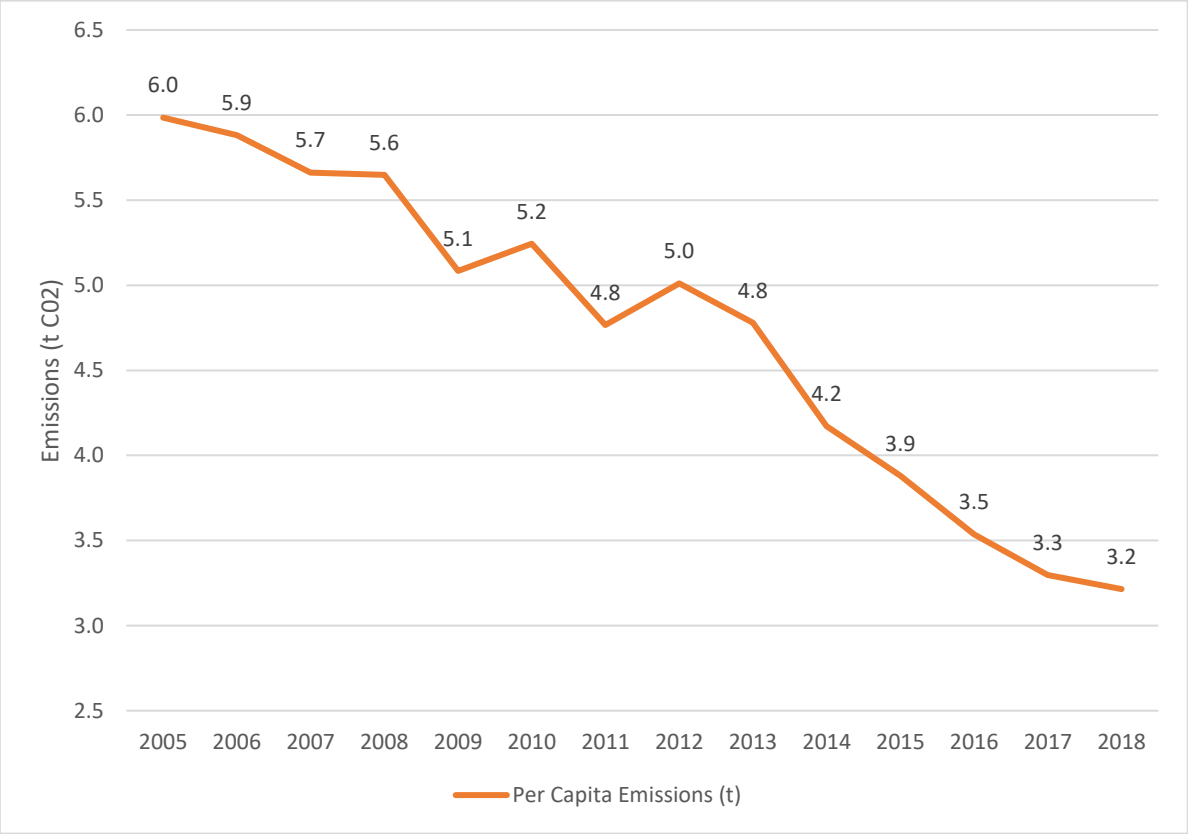

Figure 1: Portsmouth per capita emissions of carbon dioxide between 2005 and 2017 according to BEIS data.

3.1.2. When the profile of carbon dioxide emissions is broken down into respective sectors between 2005 and 2018, it is clear that the largest reductions can be attributed to commercial/industrial and domestic sectors (likely due to the continued decarbonisation of the national energy grid), with the transport sector producing far more conservative reductions in emissions across the same period, as Figure 2 demonstrates.

[4] BEIS data *UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018* (published 2020): https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2018

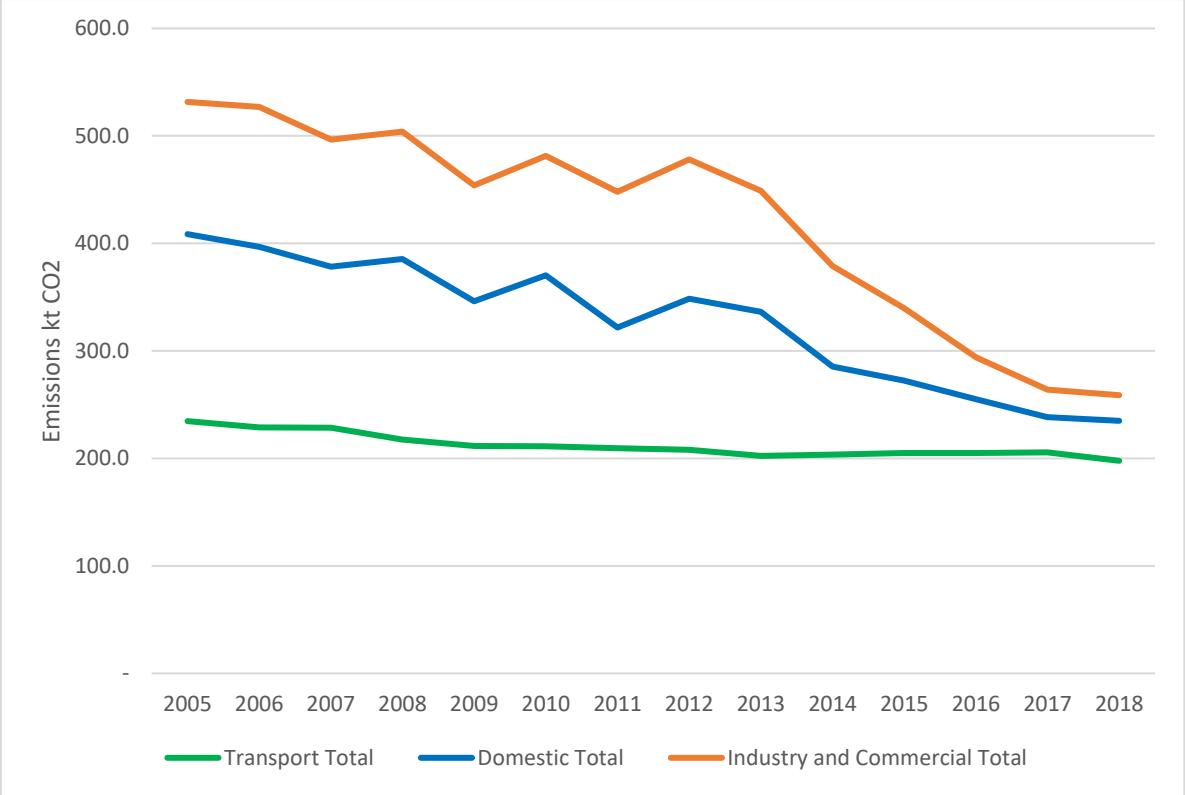

Figure 2: Portsmouth carbon dioxide emissions by sector between 2005 and 2018 according to BEIS data.

3.1.3. This emissions data does not capture the full picture of greenhouse gas emissions in the city however, as noted in section 2. A broader picture of the emissions profile for Portsmouth can be attained from the SCATTER tool, which will now be discussed for the remainder of this paper.

3.1.4. Again it is necessary to highlight, that at present SCATTER does not allow for carbon emissions to be isolated from other greenhouse gas emissions (such as gases CO_2, N_2O and CH4), which also contribute to climate change to varying degrees. As such the figures below cover a wider spectrum of emissions than just carbon dioxide, but have been converted into a CO_2 equivalent. Should improved reporting become available in the future, this note will be updated to reflect this.

3.1.5. The total emissions for the city are predominantly produced by heating and powering existing buildings, which contributes to more than 60% of all greenhouse gas emissions (or just under 682,000 of emissions), followed by emissions by the transport sector which contribute to about a third of emissions (33.3%). The remainder of greenhouse gas emissions come from waste processes, though this is minimal at 1.69% compared to the two sectors already mentioned. A breakdown of the total greenhouse gas emissions profile for Portsmouth is shown in Figure 3.

Sector	Thousand Tonnes of CO_2e
Stationary energy (Buildings)	681.987
Transportation	350.334
Waste	17.707

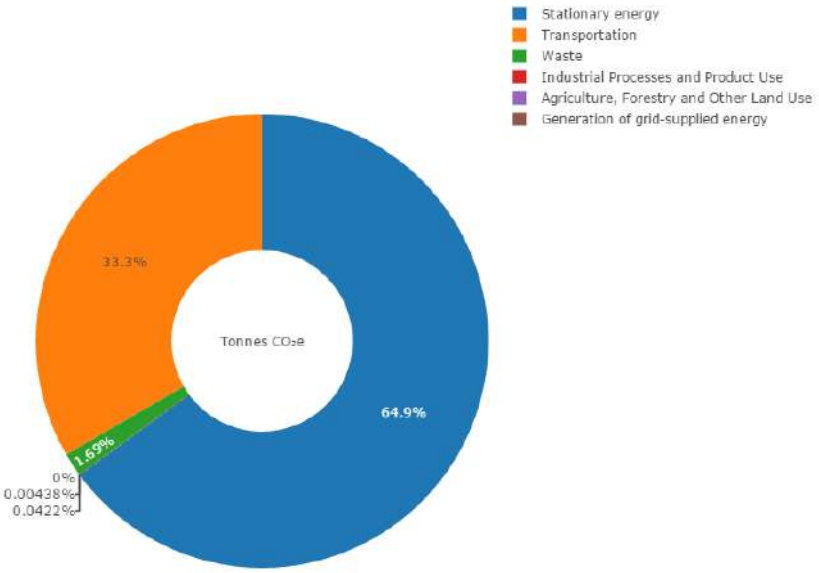

Figure 3 - Breakdown of total greenhouse gas emissions by sector for Portsmouth according to SCATTER.

3.2. Scope 1, 2 and 3 breakdown

3.2.1. The reporting of greenhouse gas emissions is often broken down into categories, or 'scopes'[5]. Conventional greenhouse gas reporting refers to three scopes of emissions:

- Scope 1 emissions - these are direct emissions produced from owned or controlled sources.
- Scope 2 emissions - these are indirect emissions arising from generating purchased electricity, heat, steam and cooling.
- Scope 3 emissions - includes all the other indirect emissions within a value/supply chain such as those arising from purchased goods, business travel, waste disposal, investments and leased assets.

3.2.2. Scope 1 and 2 emissions tend to be the easier sources of greenhouse gas emissions to address, scope 3 emissions could be being generated far from the instigator of those emissions, for example the purchaser of a mobile phone is potentially, indirectly generating emissions on the other side of the planet where their phone has been assembled.

3.2.3. In respect of Portsmouth's direct greenhouse gas emissions (also referred to as scope 1 emissions). Collectively, the built environment, (made up of residential, commercial, industrial and institutional buildings) are the largest source of emissions, accounting for 50.8% of all scope one emissions. Residential dwellings are the sub-sector that produces the largest

proportion of emissions from the built environment at 30.6% of emissions (likely because this is the dominant land use in the city), as can be seen in Figure 4.

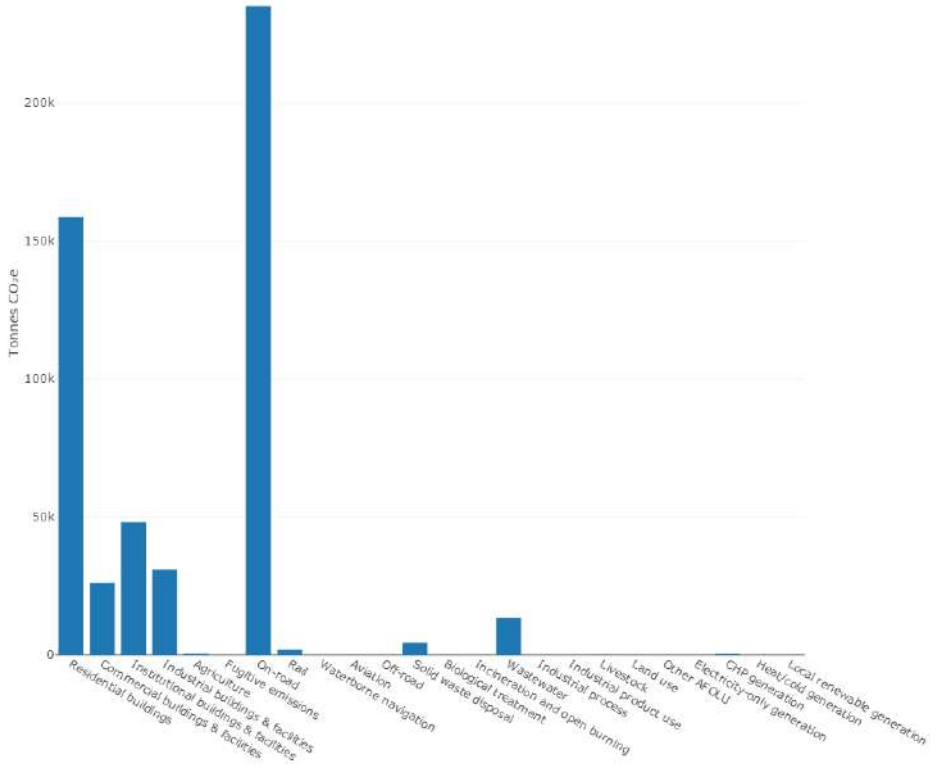

Figure 4: Scope one emissions in Portsmouth broken down by sub-sector according to SCATTER.

3.2.4. The sub-sector of on-road transport however, almost matches the cumulative emissions on all of the sub sectors of the built environment together (45.3% at 235.069k of emissions).

3.2.5. In many buildings, direct emissions tend to be produced as a result of burning of fossil fuels for producing heating as well as meeting cooking needs. Certain fluorinated gases can also leak from air conditioning and refrigeration units[6]. For transportation systems, like cars and trucks on the road, direct emissions are a result of the burning of fossil fuels (e.g. petroleum related products) within internal combustion engines that release gases (mainly carbon dioxide). In respect to waste, direct emissions come from organic waste sent to landfill, as well as the treatment of wastewater which produces gases such as methane and some Nitrous Oxide.

3.2.6. All indirect (or scope two) emissions in the city are being produced by buildings within the city's existing built environment as Figure Five demonstrates. This is to be expected as scope two emissions include those that are produced at power plants burning fossil fuels in order to produce the electricity used to power homes (e.g. for lighting and powering devices), ultimately making buildings habitable.

[6] More information on this topic here: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

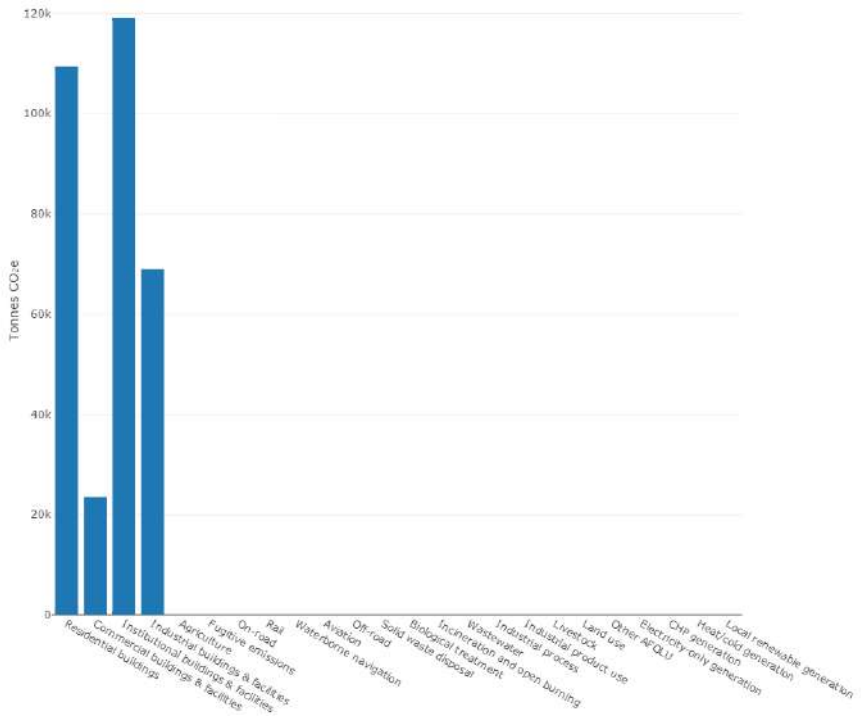

Figure 5: Scope two emissions in Portsmouth broken down by sub-sector according to SCATTER.

3.2.7. All other indirect emissions being produced by the city are those which fall into scope three. These emissions are predominantly apportioned to aviation (113.4k), with smaller amounts again being produced as a result of buildings in the city, as is demonstrated in Figure 6.

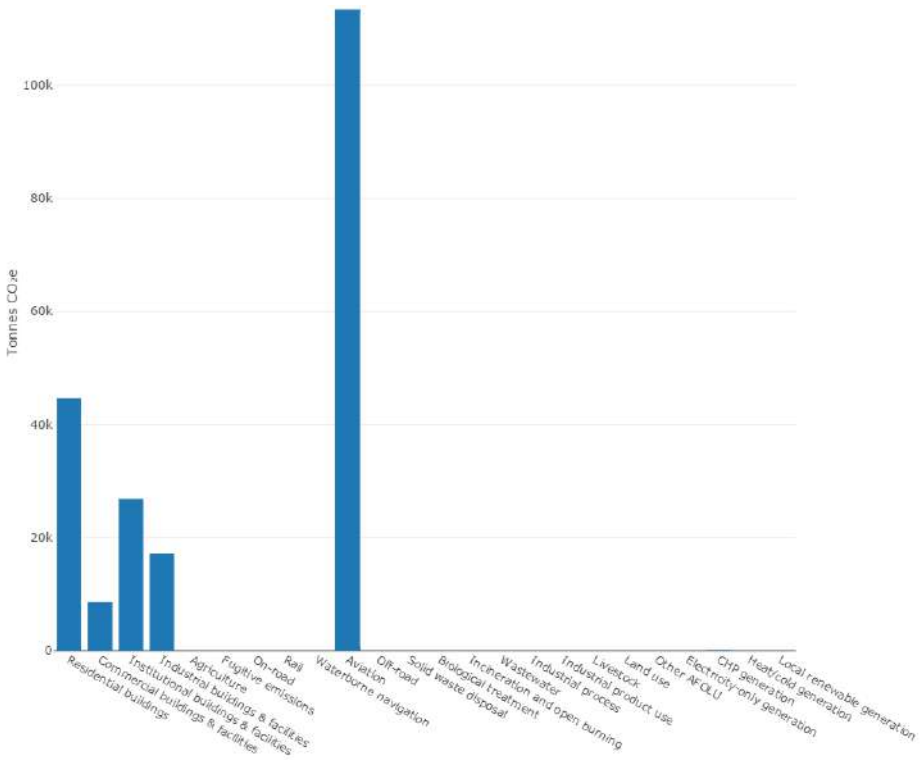

Figure 6: Scope three emissions in Portsmouth broken down by sub-sector according to SCATTER.

3.2.8. Scope three emissions include those indirect emissions that have not been produced as a result of powering and heating (scope 2). These include the emissions resulting from the production of products that are being used in the home, the transportation of products across the world before being purchased, and the use of the products subsequently, these are essentially the emission arising from the 'value chain'. Due to the complexity of the production of scope three emissions, these are still a much more challenging set of emissions for individuals and organisations to understand and quantify, and therefore act to address, in comparison to scope 1 and 2 emissions.

4. Fuel Poverty in Portsmouth

4.1. Energy efficiencies and renewable energy generation can also be justified for other reasons beyond striving for carbon neutrality. Securing these improvements will reduce the energy bills of residents and improve energy security, this is particularly important for Portsmouth where a significant proportion of residents are classified as living in socio-economic deprivation, but also fuel poverty.

4.2. The Council has produced an energy and water strategy to guide efficiencies in new homes in the future[7]. The strategy highlights that 12.1% of households in Portsmouth are affected by fuel poverty, equating to over 11,000 households, and this is higher than the national average of 10.9%[8]. This means that people faced with a 'choice' over adequate heating and lighting in their homes or spending money on other essentials, and the problem disproportionately affects the elderly, families with young children and those living with long-term sickness and disability. It also highlights that there are around 125 more deaths in the city during the coldest four months of the year compared to the average of the rest of the year and that it is thought that 30% of these deaths can be attributed to living in cold homes.

4.3. There are distinct clusters of fuel poverty in the city as demonstrated by Figure 7. The highest prevalence is in Central Southsea which is driven by the concentration of relatively older homes in this area that are less energy efficient and privately owned. There are other clusters in Nelson and Paulsgrove.

[7] Energy and Water strategy: https://www.portsmouth.gov.uk/ext/housing/safety-and-cost-saving-in-the-home/safety-and-cost-saving-in-the-home

[8] Based upon the low income, high costs indicator, 'high' considers a household to be fuel poor if they have required fuel costs that are above average (the national median level), and were they to spend that amount, they would be left with a residual income below the official poverty line.

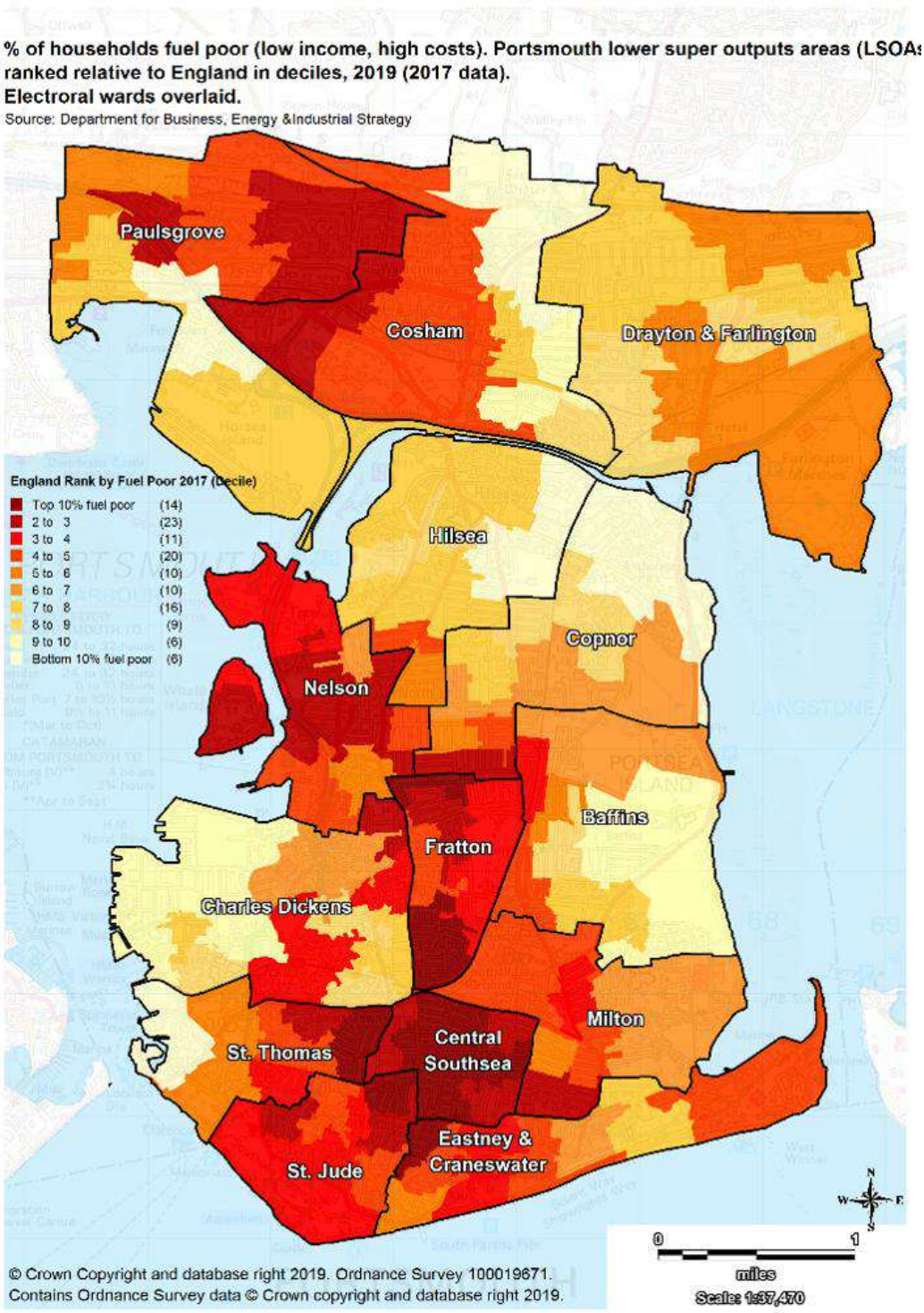

Figure 7: Areas of Portsmouth with the highest proportion of fuel poor households, based on the Low Income, High Costs indicator.

5. Considerations for the new Local Plan

5.1. Addressing Portsmouth's climate mitigation responsibilities

5.1.1. The UK government has recently legislated an amendment to the target set out in the Climate Change Act 2008, committing the UK to achieving a 100% reduction in greenhouse gas emissions compared to the 1990 baseline[9]. Locally, the Council has also joined a number of other local authorities in declaring a climate emergency and made the commitment of achieving a more rigorous target of net zero carbon emissions by 2030.

5.1.2. Whilst the city has clearly made advances in reducing emissions as is evidenced by the BEIS data of Figures 1 and 2, there is still progress to be made and actions to promote reduced carbon emissions will need to be continued. This analysis shows that a significant proportion of Portsmouth's greenhouse gas emissions are produced by the built environment, and residential development in particular. In order to support the national and local objectives set out above it will be important for the Local Plan to incorporate policies which pave the way towards achieving low carbon and carbon neutral development, though it should be recognised that this will be a challenging endeavour.

5.1.3. A variety of planning policy areas can help to address mitigation of climate change and secure reductions in greenhouse gas emissions. Policies relating to housing density which will look to encourage higher density development in the most sustainable locations, encouraging active and sustainable transport options, and green infrastructure will all play an important role in the Local Plan's climate change response.

5.1.4. Two policies areas that will more specifically be addressing reducing carbon emissions, are those relating to sustainable construction and also the energy use within new development, particularly new homes.

5.2. Sustainable Design and Construction in new development

5.2.1. One means by which development schemes could demonstrate their overall sustainability credentials is through certification against an independently assessed sustainability standard. A variety of such standards have been developed over time and are in use nationally including BREEAM, Homes Quality Mark (HQM), Passivhaus and Construction Logistics and Community Safety (CLOCS).

5.2.2. These standards usually work by utilising a framework of sustainability topics against which development schemes can be assessed. Schemes like BREEAM and HQM award an overall score based upon the number of credits secured against particular topics, from water use, to energy efficiency, materials used and health and wellbeing. They are a means of considering the sustainability of the entirety of the development and the various facets of a design, rather than taking particular features in isolation. The nationally applied nature of these standards also means that developers are afforded a level of consistency and certainty of approach in terms of what is expected of them to achieve certain scores.

[9] The legislation can be found here: http://www.legislation.gov.uk/ukpga/2008/27/section/1

5.2.3. Portsmouth has been requiring new non-domestic development featuring an increase in floor space of over 500m2 to achieve at least BREEAM Excellent unless otherwise agreed with the Council since 2013. Additionally, the Council also requires residential conversions of one unit or more to achieve either Ecohomes or BREEAM Domestic Refurbishment 'Very Good'. Prior to the ministerial review into housing standards in 2015, the Council also required domestic development to achieve certification in line with the Code for Sustainable Homes standard, though its ability to require new homes to certify against this scheme was revoked as part of the ministerial review.

5.2.4. Whilst data on the performance of the existing policy to date is unfortunately limited, there is a record of schemes that have achieved certification against BREEAM on BRE's GreenBookLive website[10], and it offers a snapshot of sustainability credentials of some larger development in the city in recent years. According to that resource and at the time of writing, there were 8 developments that had achieved a final stage BREEAM certification of 'Excellent' with a further 18 scoring 'Very Good', (this was across a variety of assessment categories such as Multi-Residential, refurbishment etc.). Of those schemes achieving Excellent, these included, the Ben Ainslie Racing & Americas Cup Team Base & HQ; the Unite Chaucer House - Student Accommodation; as well as the Portland Future Technology Centre[11]. One development, the University of Portsmouth Sports Centre, has achieved an interim assessment of 'Outstanding'. It should be noted that the Council is currently lacking data on the number of schemes that did not achieve at least a Pass score, but that would have been required to do so through policy, as such the above data can only offer a snapshot of some more positive sustainable design successes that have happened in the city, but should not be taken as a comprehensive summary of performance of the policy, which cannot be deduced from this information alone. The Council will be working to improve its data recording in this matter as part of the development of the new Local Plan.

5.2.5. The new draft sustainable construction policy will continue to require applicants to pursue certification in a sustainability scheme appropriate to the type of development, such as Homes Quality Mark or BREEAM. It will also set out other measures that will contribute to reducing carbon emissions, as well as adapting to climate change. The policy approach relating to energy use in new buildings will be discussed next.

5.3. Lower carbon and carbon neutral development

5.3.1. Reducing energy use in residential development through achieving lower carbon and carbon neutral homes will be an important means of delivering development fit for a zero carbon future. Whilst the government at the time ultimately pulled its support of zero carbon homes policy in 2015, the industry spent several years preparing for the requirement to deliver zero carbon homes from 2016 onwards and there has been considerable research and analysis created during the years approaching 2016 which highlights this is an achievable standard[12]. It is considered that carbon neutral homes is still a realistic requirement for the new local plan for major developments of more than ten dwellings as a minimum.

[10] GreenBookLive website: https://www.greenbooklive.com/index.jsp
[11] University of Portsmouth - Future Technology Centre website: https://www.port.ac.uk/about-us/our-facilities/teaching-and-learning-spaces/future-technology-centre
[12] Much of this research is still held on the Zero Carbon Hub website: http://www.zerocarbonhub.org/

5.3.2. The Council envisages that lower carbon and carbon neutral development will be designed by incorporating a range of measures which are in accordance with principles of the energy hierarchy as detailed in Figure 8.

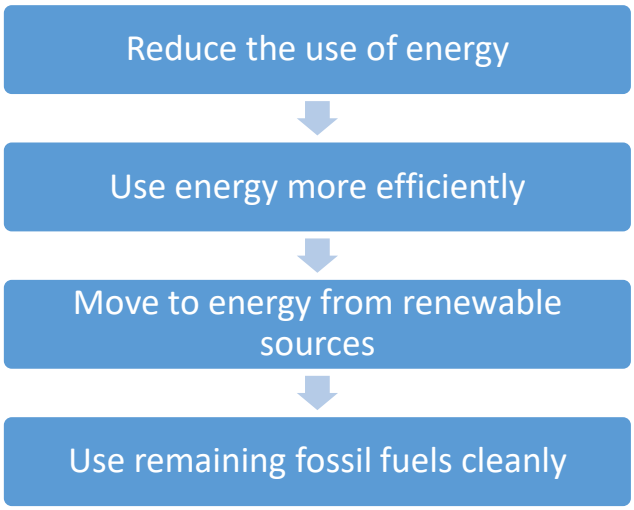

Figure 8: The energy hierarchy

5.3.3. The expectation is that new development is designed by keeping to the highest levels of the hierarchy as possible, firstly ensuring that the use of energy in the development is reduced as much as it can be, before ensuring that what energy is used is done so efficiently. What energy is then used should come from renewable sources before any remaining energy is sourced as cleanly and efficiently as possible from fossil fuels, such as through combined cooling, heat and power (CCHP) technologies.

5.3.4. Development of the new Local Plan policy for low carbon and carbon neutral development has taken inspiration from the approach for zero carbon homes as was previously set out by the Zero Carbon Hub, this was a non-profit organisation set up in 2008 to support the delivery of the government's zero carbon homes policy at the time. The approach to zero carbon buildings takes three steps in the design of new buildings as is set out in Figure 9 below.

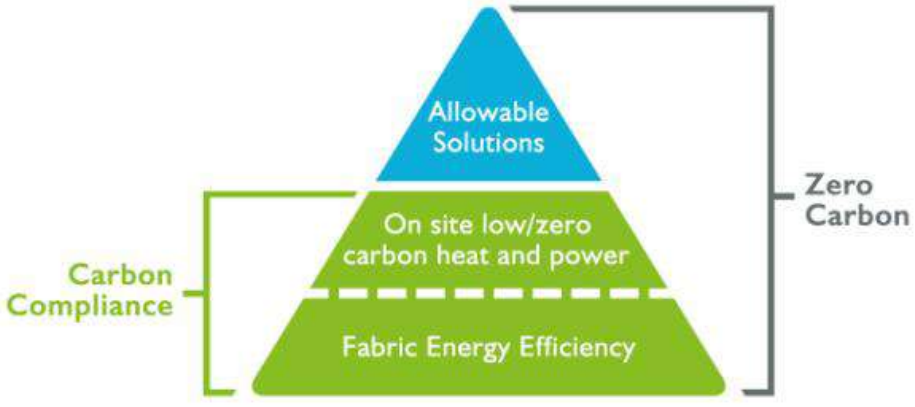

Figure 9: Zero carbon homes policy breakdown according to zero carbon hub[13] and demonstrating the place of carbon offsetting (allowable solutions) within this approach

[13] More information can be found here: http://www.zerocarbonhub.org/zero-carbon-policy/zero-carbon-policy

5.3.5. Each of the steps detailed in Figure 9 will be explained in greater detail in the following section, but to summarise, initially the expectation will be for the most energy efficient fabric design in the building, which will enable occupants to reduce their energy usage and therefore their carbon footprint by using less energy to heat their homes, and helping to achieve the upper most tier of the energy hierarchy. Then, it will be expected that carbon emissions are further reduced on the development through incorporation of onsite renewable energy generating technologies and use of sustainable heating technologies. Finally it is expected that any remaining, unmitigated carbon emissions being produced by the development are offset (an allowable solution), through the one of payment of a financial contribution into the Council's carbon offset fund.

Fabric efficient building design

5.3.6. One of the most effective means of reducing a building's carbon footprint is through improving its energy efficiency which will reduce the energy usage of the occupant from the outset. This needs to be considered at the design and construction stage ideally, as retrofitting development to improve fabric efficiency at a later date can be very difficult and costly to achieve.

5.3.7. Fabric efficiencies are important not only for supporting the carbon saving of a building in the long term (reducing need for retrofitting further down the line), but also in reducing the bills of occupants (something that is important for Portsmouth where a considerable amount are living in fuel poverty), as such the council considers this an important means of achieving multiple sustainability objectives.

5.3.8. The 2008 Planning and Energy Act empowered local authorities to require development in their areas to comply with energy efficiency standards that exceed the energy requirements of the Building Regulations, (specifically set out in part L1A). Whilst Government has set out its intention to review Building Regulations and also restrict local authorities' abilities to set standards above them, this has yet to be finalised.

5.3.9. The Council will expect new build development to achieve a **19% improvement in energy efficiency over the 2013 Target Emission Rate** (equivalent to meeting the energy requirements of level 4 of the withdrawn Code for Sustainable Homes). Indeed this standard has already been required of new development in Portsmouth for the last few years, since the 2015 ministerial statement[14], and has been secured via planning condition. This approach has not been considered a constraint to new development.

[14] Written statement to Parliament Planning update (March 2015): https://www.gov.uk/government/speeches/planning-update-march-2015

Assessing compliance on energy efficiency

The Standard Assessment Procedure (SAP) is the Government's national calculation methodology for assessing the energy performance of dwellings and is used to facilitate policies including Building Regulations and for the production of Energy Performance Certificates. It also allows for the calculation of a development's carbon emissions. The SAP methodology has been updated semi-regularly over the years with new updates provided in 1998, 2001, 2005, 2009 and most recently 2012. The SAP allows for the calculation of a Dwelling Emissions Rate (DER)) based upon the specifications of the proposed development and comparison against a Target Emissions Rate (TER) which is essentially the minimum acceptable standard, based upon a notional building that is similar in shape and size to the proposed dwelling. As the TER is the minimum acceptable standard it should not be exceeded by the DER.

A similar approach is used for assessing non-residential buildings via Building Regulations through the Simplified Building Energy Model (SBEM) calculation (rather than SAP). This includes a slightly different methodology to address the differences in these types of buildings.

The government has proposed updates to SAP and SBEM as part of its consultations on Future Homes Standard and Future Buildings Standard and these are discussed more in

5.3.10. Any specified target for energy efficiency improvement above Building Regulations should only be considered as a minimum. Developers will be encouraged to pursue higher standards of fabric efficiencies wherever practical and should also consider incorporating general principles of Passivhaus standard, and measures of passive design to maximise building efficiency such as through exploiting natural processes for daylight, ventilation and winter sunlight.

Renewable energy/sustainable heat and cooling

5.3.11. Once energy efficient fabric has been designed into the development, remaining carbon emissions that are being generated from energy use within the development can be offset further by supplying energy sourced from renewable energy technologies. This is a good means of shifting energy use away from the national grid, which continues to have (an admittedly shrinking) embedded carbon footprint, to cleaner sources, such as power generated from sunlight through solar panels.

5.3.12. Due to the highly constrained nature of the city, with its significant levels of urban development, ecological designations and heritage protections, there are very limited opportunities for large scale renewable energy installations such as solar photovoltaic panel arrays and on shore wind farms, particularly on Portsea Island. The principle technologies for renewable energy generation in Portsmouth are therefore most likely to be those that can utilise traditionally redundant spaces above within the city, such as on roof tops using building mounted solar PV.

5.3.13. The Council considers that for the purposes of the Local Plan policy, a requirement of a **20% reduction in carbon emissions through onsite renewable energy generation** is an appropriate requirement. This is most likely going to be in the form of solar pv technologies, but could be achieved through other means if practical. This target is based upon calculations of average solar panel capacity on buildings in the city (set out in appendix A). The Council's calculations indicate that a 20% reduction in emissions via solar panels is a quite comfortable target for the average building in the city (both domestic and non-domestic).

5.3.14. So as to encourage a fabric first approach, the 20% reduction will be required subsequent to the 19% improvement in fabric efficiencies that is highlighted above. This will equate to a 39% improvement in emissions when fabric efficiencies and renewable energy generation are taken together. This will apply to major development only.

5.3.15. In respect of sustainable heat and cooling, the means by which homes and the water used in those homes are heated in particular are the major source of carbon emissions from these buildings. In order to address the carbon footprint of these buildings, it is commonly accepted that there needs to be a move away from the burning of natural gas in traditional gas boilers and towards lower carbon heating technologies both in new buildings and existing ones. Indeed the *Clean Growth Strategy* (2018)[15] and recent consultation on the *Future Homes Standard* (2019)[16] set out the government's intention of pursuing phasing out the installation of high carbon forms of fossil fuel heating and increasing uptake of low carbon heating.

5.3.16. New development should therefore demonstrate how it has selected the most sustainable heating and cooling systems, and in this context to be truly sustainable and future proofed, this will mean low carbon systems wherever possible. Low carbon heating is likely to focus on heat pumps, (e.g. air, and ground sourced), although this is still a developing market. These systems work like refrigerators in reverse, drawing heat from outside into the property and generally deliver heat to a property much more efficiently than direct electric heating. Other means of low carbon heating may be from combined heat and power technologies (these technologies offer an opportunity to secure greater levels of efficiency from energy generating systems as traditionally wasted heat is piped away from the generator to be used in a building's heating systems), as well as communal and district heat networks.

5.3.17. In relation to heat network development in the city, the Council has previously commissioned an energy mapping exercise by the consultancy Atkins which looked at opportunities for district heat network development in Portsmouth (2015). The project looked at individual buildings in the city and conducted demand mapping and building suitability exercises to determine opportunity areas for heat network development in the future. The findings of the report were that there were potentially three distinct areas in the city which could feasibly accommodate heat networks in the future, though there would need to be further work conducted to explore each. One zone is located on the mainland, around the IBM offices, QA Hospital and Lakeside Buildings and the second zone is located to the north east of Portsea Island around the Mountbatten Centre; the News Centre and the City Deal sites at Tipner. The report was able to conclude with more certainty that a third location around the city centre,

[15] Clean Growth Strategy: https://www.gov.uk/government/publications/clean-growth-strategy
[16] More information available here: https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings

which could link up PCC buildings, University of Portsmouth and Naval base buildings was a more feasible location for heat network development. A fourth location around the industrial estates near the railway triangle on the mainland was investigated but ultimately discounted due to insufficient buildings and anchor loads to support a network.

5.3.18. In respect to heat network systems, where fossil fuels are necessary to generate the primary heat in these systems, the advantage of these technologies is that they can be designed to allow for future retrofitting as cleaner/renewable sources of heat become available, and with a reduced impact upon the dwellings relying on them (as opposed to replacing many individual boilers for example). Heat network systems may therefore one option that helps to future proof and enable the shift towards a zero carbon future.

Carbon off-setting

5.3.19. It may be unviable for developers to deliver fully carbon neutral development through fabric efficiencies and renewable and low carbon energy and heating alone, for the time being at least. This has been backed up by research by several studies conducted for other authorities around the country which are referenced in this section, though this may change in the future with advances in technology. In the interim therefore, it is considered that one means of helping to secure carbon neutral development through the new Local Plan could be through an offsetting mechanism whereby a one off payment is provided to cover the remaining, unmitigated carbon being produced by a development. This figure would be calculated based upon a price per tonne of residual carbon being emitted, and multiplied across the number of years remaining until the grid is expected to be fully decarbonised (currently expected to 2035). Though thirty years is generally an accepted life expectancy for most renewable energy technologies[17].

5.3.20. Carbon off-setting is not a new approach and increasingly local authorities around the country are implementing such schemes though their Local Plans in order to achieve further reductions in greenhouse gas emissions. The term is often used interchangeably with the term 'allowable solutions' (as per Figure 9).

5.3.21. There are several considerations in devising the per tonne of carbon price to be set for unmitigated carbon emissions. Carbon off-setting should only be explored once all carbon reductions through the above approaches have been undertaken. It is important to ensure that the price is not so high that it makes development within Portsmouth unviable, equally however the price should not be set so low that the option is more attractive than including measures for directly reducing carbon emissions. The Local Plan will be subject to a viability assessment as the plan progresses that will test the impacts of its various composite policies including carbon offsetting.

5.3.22. One means of determining an offset price per tonne of carbon is by determining what the cost would be to deliver carbon offsetting projects within the local authority area and working backwards. However, work undertaken by the consultancy AECOM for the Greater London

[17] Next steps to zero carbon homes: allowable solutions. Consultation. DCLG. 2013: https://www.gov.uk/government/consultations/next-steps-to-zero-carbon-homes-allowable-solutions

Authority (GLA)[18] to study carbon offsetting pricing highlighted the difficulty of setting a robust carbon offset price that was based upon the cost of intended offsetting projects, due to the variation in types of projects and savings that such offsetting funds could potentially deliver. Instead they recommended an approach that is based upon nationally recognised pricing mechanisms, such as those set out in the HM Treasury Green Book.

5.3.23. Evidence pulled together from several sources in a separate study by the Centre for Sustainable Energy (2019)[19] for the West of England Local Authorities suggested that the pricing previously recommended by the Zero Carbon Hub and used by authorities such as GLA in their Local Plan (£60 per tonne of carbon) was too low for a couple of reasons. Firstly, it did not appear to be generating enough revenue to provide for a 1:1 offsetting of one tonne of carbon elsewhere in carbon offset projects. Secondly, they noted that it also seemed to be acting as an incentive for avoiding delivering mitigation on site.

5.3.24. Based upon the work by AECOM highlighted earlier, the new London Plan sets out a nationally recognised carbon offset price using the national non-traded carbon figure (£95). The Centre for Sustainable Energy Study highlighted that this higher £95 per tonne figure proposed by London, could be a more fitting figure for providing equivalent offsetting elsewhere. They note that whilst the costs of carbon offsetting projects will vary considerably and that even £95 per tonne would not meet all of them, fully funding some projects and only part funding others, it would allow for the cross-subsidising of a range of measures to meet carbon reduction objectives overall. This cost would also reflect the most up-to-date carbon price, based on nationally recognised pricing mechanisms. Though the figure might need to be reviewed as the energy grid decarbonises and the price of offsetting through onsite renewables like PV increases.

5.3.25. The cost for carbon offsetting for the Portsmouth Local Plan is therefore could be £95 per tonne of unmitigated carbon dioxide equivalent emissions (CO^2e) per year, calculated for multiplied by the agreed off-setting period. The cost of off-setting would be monitored through the plan period, and subject to review after a five year period.

5.3.26. Research by the Centre for Sustainable Energy noted that collecting of the carbon offset via the Community Infrastructure Levy (CIL) would not be appropriate due to CIL being based upon a fixed charge per sq m^2. Which means that CIL cannot account for the varying performance of developments in terms of carbon emissions. It is considered that S106 obligations would be the more appropriate method of collection.

5.3.27. The intention of the carbon offset fund that is established through these offsetting payments will be to enable the city council to implement projects that retrofit the existing building stock which are continuing to contribute to the carbon emissions that were detailed in section 3 of this paper.

[18] London Carbon Offset Price report (2017), prepared for Greater London Authority by AECOM: https://www.london.gov.uk/sites/default/files/london_carbon_offset_price_-_aecom_.pdf

[19] West of England Carbon Reduction Requirement Study - Carbon offsetting in the West of England (2019), prepared for West of England Authorities by the Centre for Sustainable Energy: https://www.cse.org.uk/downloads/reports-and-publications/policy/planning/west-of-england-carbon-reduction-requirement-study-carbon-offsetting-april-2019.pdf

6. Future changes

6.1. At the time of writing this paper, the country is going through a period of flux in various aspects of national politics, national policy and the energy landscape. The draft Local Plan policy is being composed with a view to potential changes in the future and enough flexibility to accommodate them.

6.2. Over the summer of 2020, the government published its white paper 'Planning for the Future'[20]. Amongst wide ranging reforms to the planning system, the paper proposes to set development management policies (such as those relating to energy) at a national level, which would potentially impact on what policy can be set through the Local Plan.

6.3. Outside of planning, a review of national Building Regulations has also been ongoing. The Regulation 25b amendment came into force for all new buildings requiring them to be 'nearly zero carbon' from 2021 onwards. However, this change to the Regulations will be supported by further updates to the technical standards within the Building Regulations assessment process itself in order to ensure that new development meets this higher specification. The government has been consulting on these updates as part of its Future Homes Standard consultation[21] (which was run in 2020) and Future Buildings Standard consultation[22]. Each of these consultations has proposed various reforms to the technical requirements within Building Regulations in order to ensure that the development of new buildings is net zero ready, as well as to update other approaches such as ventilation, the performance gap and overheating. The changes include enforcing a higher standard of energy efficiency and carbon reduction across all new buildings.

6.4. The outcome of the Future Homes Standard consultation was published at the start of 2021 and sets out the government's proposed approach towards implementing its Future Homes Standard in 2025, which will result in new homes being producing at least 75% lower CO2 emissions than those built to current Building Regulations standards, as well as being 'zero carbon ready'. In the meantime, the Government has confirmed its intention to carry out an interim uplift to Building Regulations that would result in homes producing 31% less CO2 emissions compared to current standards. The results of the Future Buildings Standard consultation, which deals with standards in other non-residential buildings, is expected in the later in the year once the consultation closes in April. It is likely that as Building Regulations become more stringent the quality of new buildings over the coming years, that the need for a bespoke Local Plan policy addressing matters such as fabric efficiency and renewable energy will be reduced, however the Council has prepared a draft policy which sets out its intent to address these issues in the meantime (and should the updates to Building Regulations be delayed). This paper, and the draft policy for the Local Plan will be reviewed over the coming year and may be modified in response to the changes happening nationally ready for the next Local Plan consultation.

[20] Planning for the Future consultation website: https://www.gov.uk/government/consultations/planning-for-the-future

[21] Future Homes Standard consultation website: https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings

[22] Future Buildings Standard consultation website: https://www.gov.uk/government/consultations/the-future-buildings-standard

6.5. As part of the consultations, the government has indicated that it is looking to publish an update to SAP 2012 to reflect the changing energy landscape (e.g. the decarbonising energy grid). The updated SAP is referred to as SAP 10 and will bring several changes that could impact how carbon emissions in new development are calculated. For non-residential buildings, the government is currently consulting on amendments to the Simplified Building Energy Model (SBEM) in order to achieve the same objectives.

6.6. Beyond policy changes, the cost of achieving carbon neutrality can generally be expected to fall in the coming years because the costs of technologies like renewables continues to reduce. Indeed there are suggestions that the costs of renewable energy technologies could be expected to decline by around a third over the next ten years.

6.7. As well as renewables becoming cheaper, the electricity we take from the national grid (which comes from a range of sources that have changed considerably over the years) is continually decarbonising irrespective of local measures. This is because of not only a move towards a greater sourcing of power from renewable energy, but also a shift away from coal to natural gas, and these changes have led to an ongoing reduction in carbon intensity of electricity meaning that one of the major sources of emissions in residential development, electricity, is steadily becoming cleaner.

6.8. There are various implications of the above changes in the energy landscape for achieving carbon neutrality in new development. For example, electrically heated homes will steadily reduce in their carbon footprint as the indirect emissions of the power they source their heating from decarbonises nationally. Even homes that remain gas powered will see reductions in their carbon footprint because the power used to light the home or power appliances is also decarbonising (whilst the impact of cleaner gas technologies such as hydrogen are also not yet known). Equally, carbon savings secured through renewable energy generation like solar panels will decrease as the more carbon intensive energy from the national grid that they are intended to replace becomes lower carbon. This could mean that other carbon offsetting measures, such as more sustainable heating sources like air source heat pumps in the place of more carbon intense heating like gas boilers, becomes more important in demonstrating carbon neutrality.

6.9. Changes in the national energy landscape mean that there may be changes in the options available to developers to improve the sustainability of their proposals. However there are more substantial and quick acting developments in national policy that are likely to impact the emissions of new buildings, such as the changes in nationally prescribed modelling procedures such as the methods by which energy performance is measured.

Appendix A - Calculations underpinning average renewable energy capacity in the city

DOMESTIC	
Number of panels that can fit on roof	24
System size	7.29375
Solar Power Generation (kWh/year)	7293.75
If covered 100% of domestic load (kWh/year) (Remaining is exported to the grid).	3325
Carbon Emissions Saved (kgCO2/year) from property only	922
Potential percentage of CO2 saved (%)	**30%**

NON-DOMESTIC	
Number of panels that can fit on roof	256
System size	76.70625
Solar Power Generation (kWh/year)	76706.25
If covered 100% of non-domestic load (kWh/year) (Remaining is exported to the grid).	78,783
Carbon Emissions Saved (kgCO2/year) from property only	21847
Potential percentage of CO2 saved (%)	**62%**

Average Carbon Emissions per year for Domestic Properties (kg/CO2/year)*	3066
Average Carbon Emissions per year for Non-Domestic Properties (kg/CO2/year)**	35120
Average Domestic Roof Space for Solar (m2)***	38.9
Average Non-Domestic Roof Space for Solar (m2)***	409.1
Solar Panel Area (m2)	1.6
Solar Panel Power (kW)	0.3
Solar Power generation (kWh/kWp/year)****	1000
Carbon Factor of Electricity (as of 2019) (kgCO2e/kWh)	0.2773
Average Domestic Electricity Usage (kWh/year) *****	3325
Average Non-Domestic Electricity Usage (kWh/year) *****	78783

* Data taken from Ofgem - Calculated using electricity and gas figures
** Data taken from Non-Domestic EPCs in Portsmouth from 2016
*** Data from Southampton University
**** Approximation taken from Solar PV system designs on current PCC projects
***** Taken from BEIS -https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics