

reliance on using natural gas as its main energy source to a more diverse range of low and zero-carbon sources, including renewable energy and secondary heat sources. Decentralised energy and local secondary heat sources will become an increasingly important element of London's energy supply and will help London become more self-sufficient and resilient in relation to its energy needs.

- 9.3.3 Many of London's existing **heat networks** have grown around combined heat and power (CHP) systems. However, the carbon savings from gas engine CHP are now declining as a result of national grid electricity decarbonising, and there is increasing evidence of adverse air quality impacts. Heat networks are still considered to be an effective and low-carbon means of supplying heat in London, and offer opportunities to transition to zero-carbon heat sources faster than individual building approaches. Where there remains a strategic case for low-emission CHP systems to support area-wide heat networks, these will continue to be considered on a case-by-case basis. Existing networks will need to establish decarbonisation plans. These should include the identification of low- and zero-carbon heat sources that may be utilised in the future, in order to be zero-carbon by 2050. The Mayor will consider how boroughs and network operators can be supported to achieve this.
- 9.3.4 Developments should connect to existing heat networks wherever feasible. New and existing networks should incorporate good practice design and specification standards comparable to those set out in the CIBSE/ADE Code of Practice CP1 for the UK or equivalent. They should also register with the Heat Trust or an equivalent scheme. This will support the development of good quality networks whilst helping network operators prepare for regulation and ensuring that customers are offered a reliable, cost-competitive service. Stimulating the delivery of new district heating infrastructure enables the opportunities that district heating can provide for London's energy system to be maximised. The Mayor has identified **Heat Network Priority Areas**, which can be found on the London Heat Map website.<sup>158</sup> These identify where in London the heat density is sufficient for heat networks to provide a competitive solution for supplying heat to buildings and consumers. Data relating to new and expanded networks will be regularly captured and made publicly available. Major development proposals outside Heat Network Priority Areas should select a low-carbon heating system that is appropriate to the heat demand of the development, provides a solution for managing peak demand, as with heat networks, and avoids high energy bills for occupants.

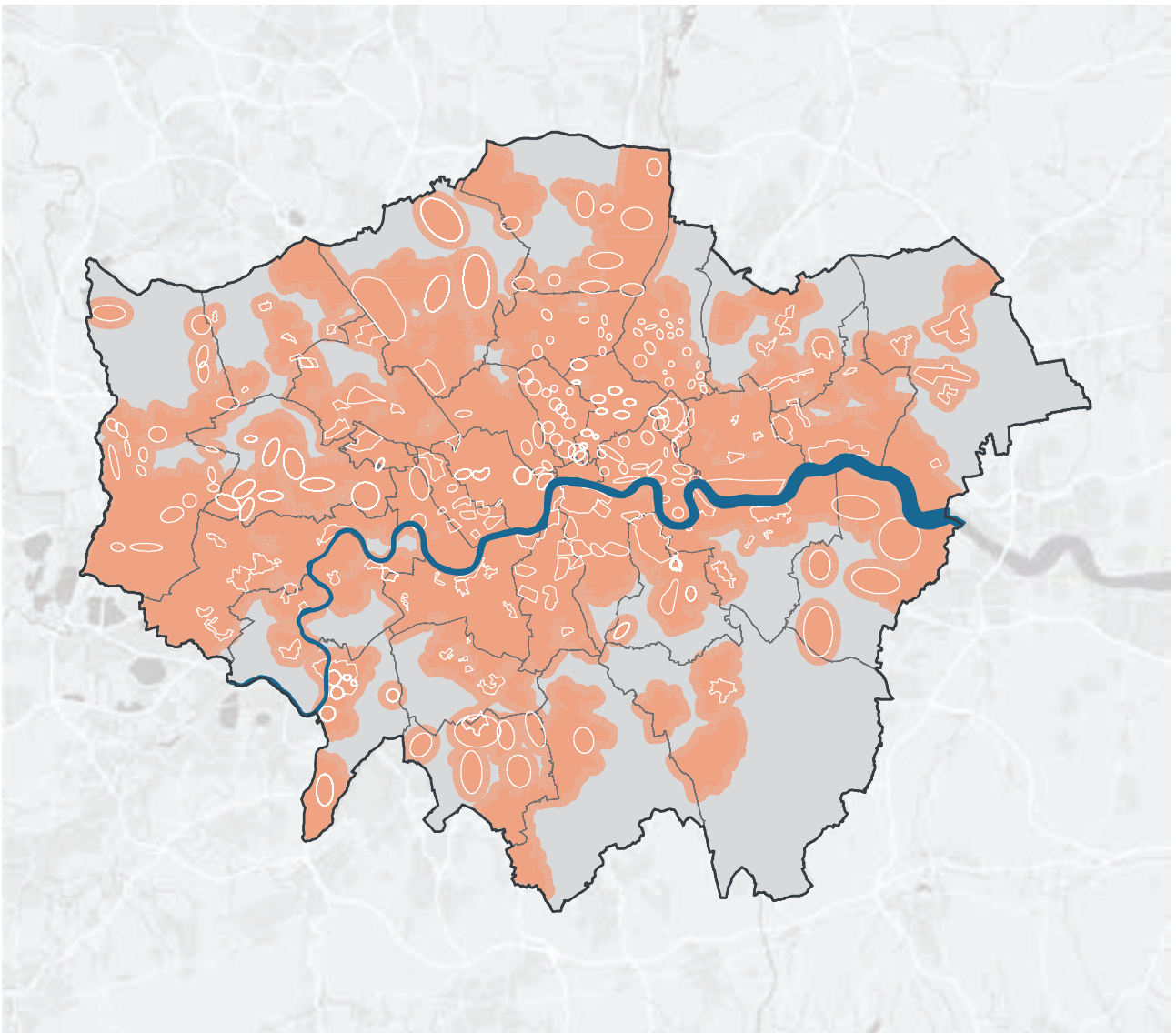
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<sup>158</sup>

London Heat Map, <https://www.london.gov.uk/what-we-do/environment/energy/london-heat-map>



- 9.3.5 Where developments are proposed within Heat Network Priority Areas but are beyond existing heat networks, the heating system should be designed to **facilitate cost-effective future connection**. This may include, for example, allocating space in plant rooms for heat exchangers and thermal stores, safeguarding suitable routes for pipework from the site boundary and making provision for connections to the future network at the site boundary. The Mayor is taking a more direct role in the delivery of district-level heat networks so that more new and existing communally-heated developments will be able to connect into them, and has developed a comprehensive decentralised energy support package. Further details are available in the London Environment Strategy.
- 9.3.6 The Mayor also supports the development of **low-temperature networks** for both new and existing systems as this allows cost-effective use of low-grade waste heat. It is expected that network supply temperatures will drop from the traditional 90°C-95°C to 70°C and less depending on system design and the temperature of available heat sources. Further guidance on designing and operating heat networks will be set out in the updated London Heat Network Manual.
- 9.3.7 **Low-emission CHP** in this policy refers to those technologies which inherently emit very low levels of NO<sub>x</sub>. It is not expected that gas engine CHP will fit this category with the technology that is currently available. Further details on circumstances in which it will be appropriate to use low-emission CHP and what additional emissions monitoring will be required will be provided in further guidance. This guidance will be regularly updated to ensure that it reflects changes in technology.

**Figure 9.3 - Heat Network Priority Areas****Heat Network Priority Areas**

- Heat Network Priority Areas
- Local Authority Heat Network Studies

Source: GLA  
Environment

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- 9.3.8 Increasing the amount of **renewable and secondary energy** is supported and development proposals should identify opportunities to maximise both secondary heat sources and renewable energy production on-site. This includes the use of solar photovoltaics, heat pumps and solar thermal, both on buildings and at a larger scale on appropriate sites. There is also potential for wind and hydropower-based renewable energy in some locations within London. Innovative low- and zero-carbon technologies will also be supported.
- 9.3.9 **Electricity** is essential for the functioning of any modern city. Demand is expected to rise in London in response to a growing population and economy, the increased take up of electric vehicles, and the switch to electric heating systems (such as through heat pumps). It is of concern that the electricity network and substations are at or near to capacity in a number of areas, especially in central London. The Mayor will work with the electricity and heat industry, boroughs and developers to ensure that appropriate infrastructure is in place and integrated within a wider smart energy system designed to meet London's needs.
- 9.3.10 Demand for **natural gas** in London has been decreasing over the last few years, with a 25 per cent reduction since 2000.<sup>159</sup> This trend is expected to continue due to improved efficiency and a move away from individual gas boilers. Alongside the continuing programme of replacing old metal gas mains (predominantly with plastic piping), local infrastructure improvements may be required to supply energy centres, associated with heat networks, that will support growth in Opportunity Areas and there may also be a requirement for the provision of new pressure reduction stations. These requirements should be identified in energy masterplans.
- 9.3.11 Cadent Gas and SGN operate London's gas distribution network. Both companies are implementing significant **gasholder de-commissioning programmes**, replacing them with smaller gas pressure reduction stations. The Mayor will work with key stakeholders including the Health and Safety Executive to achieve the release of the resulting brownfield sites for redevelopment including energy infrastructure where appropriate.
- 9.3.12 Land will be required for energy supply infrastructure including **energy centres**. These centres can capture and store energy as well as generate it. The ability to efficiently store energy as well as to generate it can reduce overall energy consumption, reduce peak demand and integrate greater levels of renewable energy into the energy system.

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<sup>159</sup>Based on data from London Energy and Greenhouse Gas Inventory (LEGGI) <https://data.london.gov.uk/dataset/leggi>

## Policy SI 4 Managing heat risk

- A Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.
- B Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:
- 1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
  - 2) minimise internal heat generation through energy efficient design
  - 3) manage the heat within the building through exposed internal thermal mass and high ceilings
  - 4) provide passive ventilation
  - 5) provide mechanical ventilation
  - 6) provide active cooling systems.

9.4.1 Climate change means London is already experiencing higher than historic average temperatures and more severe hot weather events. This, combined with a growing population, urbanisation and the urban heat island effect, means that **London must manage heat risk** in new developments, using the cooling hierarchy set out above. Whilst the cooling hierarchy applies to major developments, the principles can also be applied to minor development.

9.4.2 In managing heat risk, new developments in London face two challenges – the need to ensure London does not overheat (the urban heat island effect) and the need to ensure that individual buildings do not overheat. **The urban heat island effect** is caused by the extensive built up area absorbing and retaining heat during the day and night leading to parts of London being several degrees warmer than the surrounding area. This can become problematic on the hottest days of the year as daytime temperatures can reach well over 30°C and not drop below 18°C at night. These circumstances can lead many people to feel too hot or not be able to sleep, but for those with certain health conditions, and ‘at risk’ groups such as some young or elderly Londoners, the effects can be serious



and worsen health conditions. Green infrastructure can provide some mitigation of this effect by shading roof surfaces and through evapotranspiration. Development proposals should incorporate green infrastructure in line with [Policy G1 Green infrastructure](#) and [Policy G5 Urban greening](#).

- 9.4.3 Many aspects of building design can lead to increases in overheating risk, including high proportions of glazing and an increase in the air tightness of buildings. Single-aspect dwellings are more difficult to ventilate naturally and are more likely to overheat, and should normally be avoided in line with [Policy D6 Housing quality and standards](#). There are a number of low-energy measures that can **mitigate overheating risk**. These include solar shading, building orientation and solar-controlled glazing. Occupant behaviour will also have an impact on overheating risk. The Mayor's London Environment Strategy sets out further detail on actions being taken to address this.
- 9.4.4 Passive ventilation should be prioritised, taking into account external noise and air quality in determining the most appropriate solution. The increased use of **air conditioning systems** is not desirable as these have significant energy requirements and, under conventional operation, expel hot air, thereby adding to the urban heat island effect. If active cooling systems, such as air conditioning systems, are unavoidable, these should be designed to reuse the waste heat they produce. Future district heating networks are expected to be supplied with heat from waste heat sources such as building cooling systems.
- 9.4.5 The Chartered Institution of Building Services Engineers (CIBSE) has produced **guidance on assessing and mitigating overheating risk in new developments**, which can also be applied to refurbishment projects. TM 59 should be used for domestic developments and TM 52 should be used for non-domestic developments. In addition, TM 49 guidance and datasets should also be used to ensure that all new development is designed for the climate it will experience over its design life. Further information will be provided in guidance on how these documents and datasets should be used.

## Policy SI 5 Water infrastructure

- A In order to minimise the use of mains water, water supplies and resources should be protected and conserved in a sustainable manner.
- B Development Plans should promote improvements to water supply infrastructure to contribute to security of supply. This should be done in a timely, efficient and sustainable manner taking energy consumption into account.
- C Development proposals should:
- 1) through the use of Planning Conditions minimise the use of mains water in line with the Optional Requirement of the Building Regulations (residential development), achieving mains water consumption of 105 litres or less per head per day (excluding allowance of up to five litres for external water consumption)
  - 2) achieve at least the BREEAM excellent standard for the 'Wat 01' water category<sup>160</sup> or equivalent (commercial development)
  - 3) incorporate measures such as smart metering, water saving and recycling measures, including retrofitting, to help to achieve lower water consumption rates and to maximise future-proofing.
- D In terms of water quality, Development Plans should:
- 1) promote the protection and improvement of the water environment in line with the Thames River Basin Management Plan, and should take account of Catchment Plans
  - 2) support wastewater treatment infrastructure investment to accommodate London's growth and climate change impacts. Such infrastructure should be constructed in a timely and sustainable manner taking account of new, smart technologies, intensification opportunities on existing sites, and energy implications. Boroughs should work with Thames Water in relation to local wastewater infrastructure requirements.
- E Development proposals should:
- 1) seek to improve the water environment and ensure that adequate wastewater infrastructure capacity is provided

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Achieve at least a 12.5% improvement over defined baseline performance standard

- 2) take action to minimise the potential for misconnections between foul and surface water networks.

F Development Plans and proposals for strategically or locally defined growth locations with particular flood risk constraints or where there is insufficient water infrastructure capacity should be informed by Integrated Water Management Strategies at an early stage.

- 9.5.1 Londoners consume on average 149 litres of water per person per day – around 8 litres above the national average. All water companies that serve London are located in areas classified as seriously water-stressed. London is at risk of drought after two dry winters. During 2006 and 2012 **water use restrictions** affecting London were imposed. These restrictions were limited to sprinkler, hosepipe and non-essential user bans. A severe drought – with rota cuts, standpipes, reduced mains pressure or adding non-potable water to the mains supply – would have major implications for Londoners’ health and wellbeing, the environment and London’s economy. The Mayor will work with the water industry to prevent this level of water restriction being required for London in future.
- 9.5.2 An important aspect of avoiding the most severe water restrictions is to ensure that leakage is reduced and **water used as efficiently as possible**. The Optional Requirement set out in Part G of the Building Regulations should be applied across London.<sup>161</sup> A fittings-based approach should be used to determine the water consumption of a development. This approach is transparent and compatible with developers’ procurement and the emerging Water Label,<sup>162</sup> which Government and the water companies serving London are supporting.
- 9.5.3 Even with increased water efficiency and reduced leakage, water companies are forecasting an increasing demand for water. Without additional sources of supply, the increased demand will increase the risk of requiring water restrictions during drought periods. **Security of supply** should be ensured. Demand forecasts need to continue to be monitored and based on the consistent use of demographic data across spatial and infrastructure planning regimes.

<sup>161</sup> Planning Practice Guidance: Paragraph 014 of ‘Housing: optional technical standards’, DCLG, 27 March 2015. Where there is a clear local need, local planning authorities can set out Local Plan policies requiring new dwellings to meet the tighter Building Regulations’ Optional Requirement of 110 litres per person per day.

<sup>162</sup> <http://www.europeanwaterlabel.eu/thelabel.asp>

