Energy Planning

Monitoring the implementation of London Plan energy policies in 2013

MAYOR OF LONDON

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EXECUTIVE SUMMARY

This document sets out the outcomes secured in 2013 as a result of implementation of the London Plan energy policies (specifically Policy 5.2) through the planning system. It also considers the role of new development in contributing to the delivery of decentralised energy systems in London.

Key Highlights:

This document sets out the outcomes secured in 2013 as a result of implementation of the London Plan energy policies (specifically Policy 5.2) through the planning system:

- Implementation of the energy hierarchy in 2013 resulted in regulated CO_2 emission reductions of 36 per cent more than required by Part L 2010 of the Building Regulations
- Commitment to the provision of CHP plant able to produce 25MW of electricity and a similar amount of heat, equivalent to 16 per cent of the CHP electrical capacity installed in London in 2012
- Significant investment secured at each stage of the energy hierarchy including:
    - *Be Lean* - Investment in energy demand reduction measures resulting in a 9 per cent reduction in CO_2 emissions compared to Part L 2010 through energy efficiency measures alone
    - *Be Clean* - £120 million in heat network infrastructure and associated CHP capacity, supporting the strategic move to decentralised energy networks
    - *Be Green* - £13 million in photovoltaic panels and additional investment in other renewable energy technologies

The Mayor must be consulted on all planning applications that are of strategic importance to London[1]. After an application has been referred by one of London's local authorities the Mayor is required to provide a statement of compliance with the London Plan[2] within six weeks (Stage I). Once the local authority has resolved to determine the application, it is required to refer it back to the Mayor to allow him to decide whether to direct refusal, take over the application for his own determination or allow the local authority's decision to stand (Stage II).

An energy assessment is required for each planning application referable to the Mayor, setting out how the London Plan energy policies will be met within the development. Specifically, applicants are required to set out how the proposals apply the following energy hierarchy:

- Be lean: use less energy
- Be clean: supply energy efficiently
- Be green: use renewable energy

The hierarchy provides the mechanism through which the carbon dioxide (CO_2) emission reduction targets in Policy 5.2 of the London Plan are achieved. It also contributes to the implementation of

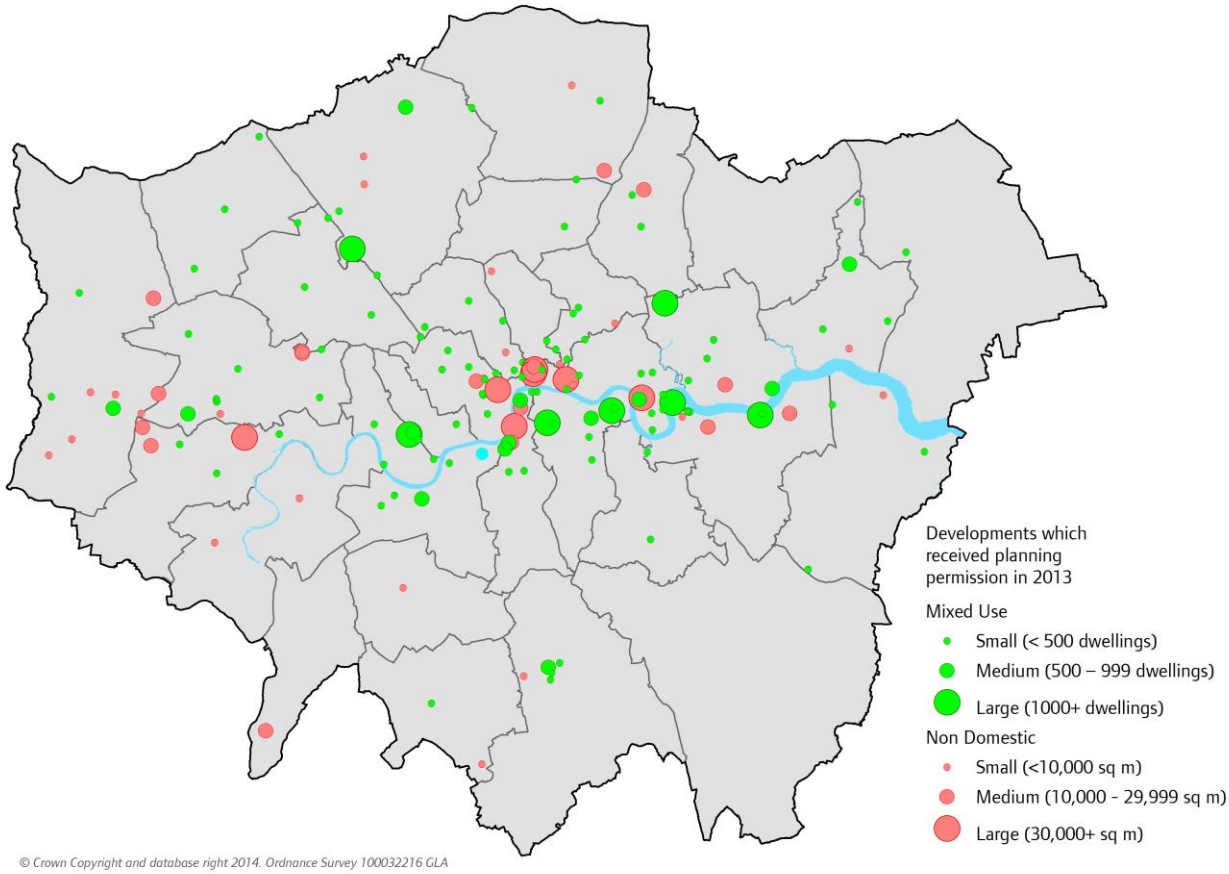
[1] Definitions of strategic applications are set out in the Mayor of London Order 2008 - https://www.london.gov.uk/sites/default/files/archives/Mayor%2520of%2520London%2520Order%25202008.pdf
[2] The London Plan is available here https://www.london.gov.uk/priorities/planning/london-plan

strategic energy policies relating to decentralised networks and ensures opportunities for building occupants to receive efficient, secure and affordable energy.

A specialist team evaluates each energy assessment to ensure that the London Plan energy policies are met and, where necessary, negotiate improvements to strategies. The commitments secured through this process in 2013 are reviewed in this report, which may be of interest to developers and their consultants, planning case officers, policy officers and others with an interest in how London Plan policies are implemented.

172 applications which had been granted provisional permission by the local planning authority were considered by the Mayor at Stage II in 2013[3] and approved. Three other applications, which were refused by the local planning authority, were taken over by the Mayor and two of these were approved in 2013. The combined number is similar to the number of approvals in 2012. As with all planning applications, whether or not these developments are built out or get superseded will depend on many factors, for example if a more economic use for the land is identified, or there is a change in land owner with different objectives. Figure 1 shows the distribution, size and type of developments approved by the Mayor at Stage II in 2013 and hence considered in this report.

Figure 1: Distribution of Stage II applications approved in 2013



[3] 11 other applications were also seen at Stage II having been refused by the local planning authority but were not taken over by the Mayor

Significant energy related outcomes continued to be secured through implementation of the London Plan energy polices in 2013. These included commitments to:

- Investment in demand reduction measures to exceed the requirements of Building Regulations through energy efficiency alone and reduce residential energy bills by circa £580k per annum.
- New heat network infrastructure and associated generation equipment including:
    - circa £17million of investment in combined heat and power (CHP) plant able to produce 25MW of electricity and a similar amount of heat, broadly equivalent to the amount required to supply 50,000 homes. This new capacity represents 16 per cent of the 153MW of CHP electrical capacity installed in London in 2012[4].
    - around £103million of investment in heat network infrastructure for circa 41,000 communally heated dwellings
    - Site heat networks in seven very large[5] mixed use developments, with each one contributing to the development of an area wide network – further detail on these developments is included in Appendix 3.
    - Approximately 60 permanent jobs created in operating and maintaining the heat network infrastructure and associated energy generation equipment.
- Investment in renewable energy equipment, including circa £14 million to provide approximately 71,000m^2 of photovoltaic panels. This equates to approximately 7MW of new electrical capacity, equivalent to the average demand of circa 14,000 homes[6].

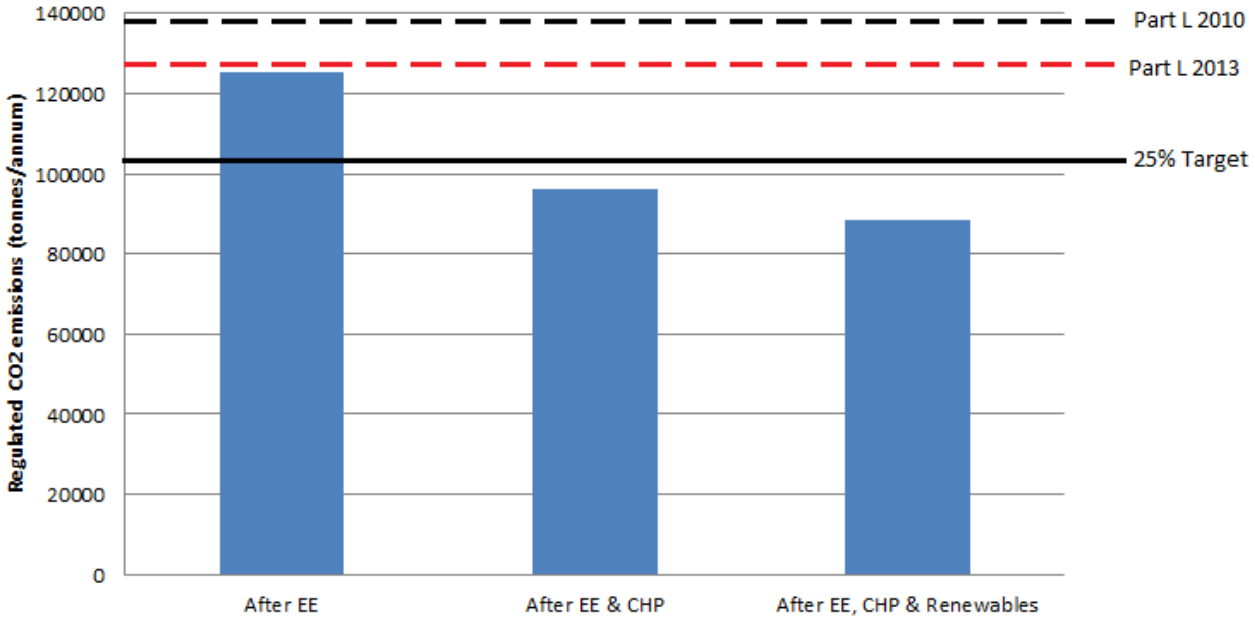
The energy outcomes set out above will reduce fossil fuel use resulting in:

- Regulated[7] CO_2 emission reductions of 36 per cent more than required by Part L 2010 of the Building Regulations. This improvement is greater than the 25 per cent target for new developments set out in Policy 5.2 of the London Plan for the period 2010 to 2013, and represents a circa 30 per cent regulated CO_2 reduction compared to the new 2013 Building Regulations.
- Circa 49,474 tonnes per annum of regulated CO_2 emission reductions, over and above those reductions required to comply with Part L 2010 of the Building Regulations. This is equivalent to retrofitting loft insulation in circa 124,000 existing homes. This compares to combined savings from the RE:NEW and RE:FIT programmes of 29,900 tonnes in 2012.

The regulated CO_2 emissions after each stage of the energy hierarchy are shown in Figure 2 below. The emissions are reduced well below Part L 2010 of the Building Regulations requirements through energy efficiency (EE) measures. The largest reduction is then achieved through CHP, before a further reduction through use of renewable energy technologies.

[4] Combined Heat and Power in Scotland, Wales, Northern Ireland and the regions of England in 2012
[5] Including more than 1000 dwellings
[6] UK installed PV capacity in 2012 was 1706MW- Digest of UK Energy Statistics 2012
[7] These figures exclude the impact of unregulated emissions, e.g. catering, small power, etc.

Figure 2: Regulated CO_2 emissions after each stage of the energy hierarchy



Less than 10 per cent of developments for which CO_2 reduction data was provided did not meet the carbon dioxide reduction target set out in Policy 5.2 on-site – these were often developments where CHP was not suitable due to the nature of the development. In these circumstances, the London Plan requires the developer to agree a cash in lieu contribution with the local borough to account for the shortfall in CO_2 emission reductions (see Policy 5.2E). Reflecting that this circumstance only applied to a small number of developments in 2013, this shortfall equated to an approximate value of just £0.4million. It should be noted that only certain London boroughs[8] have mechanisms in place for collecting contributions from developers.

Table 1 below compares the figures for 2010, 2011, 2012 and 2013. The number of applications was broadly similar to that occurring in 2012. However, the total number of dwellings in applications was down 22 per cent compared to the previous year, as the quantum of development receiving planning permission stabilised after a sharp rise in 2012.

Although the percentage CO_2 savings were the same as 2012, overall CO_2 savings were 10,343 tonnes per annum lower. This was primarily due to a reduction in the number of dwellings in planning applications received, meaning the overall regulated CO_2 emissions were lower than in 2012. The number of dwellings committing to connect to heat networks was also down, again due to a lower total number of dwellings receiving planning permission.

[8] E.g. Islington, Lewisham, City of London, Kensington and Chelsea

Table 1: Comparison of 2010, 2011, 2012 and 2013 figures

	2010	2011	2012	2013
Stage II applications	112	118	171	**174**
Number of dwellings in development	28,181	32,051	55,879	**43,178**
Estimated domestic floor area[9] (million m^2)	2.0	2.2	3.9	**3.0**
Non-domestic floor area (million m^2)	2.2	1.5	2.3	**2.3**
Regulated CO_2 emission reductions compared to Part L 2010 Building Regulations (per cent)	33	33	36	**36**
Regulated CO_2 emissions reductions compared to Part L 2010 Building Regulations (tonnes per annum)	35,598	41,136	59,817	**49,474**
Dwellings connected to heat networks	27,000	31,000	53,000	**41,097**
Proposed CHP electrical capacity (MW)	28	17	29	**25**
PV Panels (m^2)	22,500	49,000	87,000	**71,354**

[9] Assumes that the average dwelling receiving planning approval has an internal area of 70m^2

INTRODUCTION

The construction of new buildings and homes is a key contributor to stimulating economic recovery. The buildings constructed today will be occupied for many years to come and help to make London a low-carbon, resource efficient city of the future. It is essential that they provide Londoners with comfortable environments within which to live and work, which are affordable and have minimal impact on the environment.

Hence, the London Plan[10] requires new buildings to achieve high levels of energy efficiency and developers to provide the infrastructure to supply the remaining energy efficiently. The energy hierarchy, upon which the energy policies in the London Plan are based, adheres to the following order:

1. use less energy (be lean)
2. supply energy efficiently (be clean)
3. use renewable energy (be green)

As well as encouraging the efficient use of energy, the policies facilitate other benefits including increased security of supply and affordable energy. In particular, Policy 5.5 outlines how the Mayor expects 25 per cent of the heat and power used in London to be generated through the use of localised decentralised energy systems by 2025, and prioritises the development of heat networks at the development and area wide levels accordingly. The delivery of decentralised energy in London is supported through the planning process by requiring the implementation of site wide heat networks where appropriate in new developments which are the subject of strategic scale planning applications.

Increased investment in energy efficiency measures, infrastructure and low and zero carbon technologies is also stimulated through the policies, thereby contributing to increased associated employment.

Policy 5.2 sets CO_2 emission reduction targets for new buildings. In the medium term, these are aligned to fit with the government's plans for zero carbon homes from 2016 and zero carbon non-domestic buildings from 2019. However, in the intervening period the policy requires new buildings to achieve additional CO_2 reductions over and above those required by Building Regulations. Between 2010 and 2013, the London Plan target of 25 per cent reductions in CO_2 emissions above Part L 2010 of the Building Regulations applied to applications. The target increased to 40 per cent better than Part L 2010 of the Building Regulations for applications received[11] on or after 1st October 2013.

An energy assessment is required for each planning application referable to the Mayor. In preparing the energy assessment, applicants are required to follow the Greater London Authority (GLA) guidance on preparing energy assessments[12]. Each energy assessment is then evaluated on a case by case basis by a dedicated energy planning team to ensure compliance with London Plan policies and ensure each development (where appropriate) contributes to the long term plans for decentralised

[10] The London Plan is available here https://www.london.gov.uk/priorities/planning/london-plan
[11] At Stage I
[12] http://www.london.gov.uk/priorities/planning/strategic-planning-applications/preplanning-application-meeting-service/energy-planning-gla-guidance-on-preparing-energy-assessments

energy in London. The evaluation recognises the particular circumstances of individual developments and the constraints that apply in each case. Further information on the costs to the GLA of providing the team to implement the policies are provided in Appendix 4.

The regulated CO_2 emission reductions and infrastructure commitments secured through the planning process from applications determined in 2013 have been evaluated. This report presents the results of the evaluation; whether or not these developments are constructed or get superseded by new planning applications will depend on the specific circumstances relating to each development, for example if a more economic use for the land is identified, or there is a change in land owner with different objectives

Strategic scale applications determined in 2013

The Mayor is responsible for London's planning at a strategic level. The 32 London boroughs and the City of London are the local planning authorities for their areas. The London Legacy Development Corporation is the local planning authority for parts of east London.

The Greater London Authority Acts 1999 and 2007 require the boroughs to consult the Mayor of London on planning applications that are of potential strategic importance to London, as defined by the government and set out in The Town and Country Planning (Mayor of London) Order 2008.

The Mayor is required to provide a statement of compliance with the London Plan within six weeks of receiving an application from the local planning authority (this statement is commonly referred to as a Stage I report). Once the planning authority has resolved to determine the application, it is required to refer it back to the Mayor to allow him to decide whether to direct refusal, take over the application for his own determination or allow the planning authority's decision to stand. The Mayor's decision (commonly known as Stage II) will take the form of an officer's report to the Mayor and a letter from the Mayor.

172 applications which had been granted provisional permission by the local planning authority were considered by the Mayor at Stage II in 2013[13] and approved. Three other applications, which were refused by the local planning authority, were taken over by the Mayor and 2 of these were approved in 2013. The combined number is similar to the number of approvals in 2012. Table 2 illustrates a breakdown of applications by development type.

[13] 11 other applications were also seen at Stage II having been refused by the local planning authority but were not taken over by the Mayor

Table 2: Breakdown by category of applications at Stage II in 2013

Type of development	Number of developments	Number of dwellings	Non-domestic floor area (millions m2)
Mixed use[14] and domestic	116	43,178	1.4
Non-domestic	58	0	0.9
Total	**174**	**43,178**	**2.3**

Energy policies in the London Plan

In Policy 5.1 the Mayor states his intention to seek to achieve an overall reduction in London's carbon dioxide emissions of 60 per cent (below 1990 levels) by 2025. It is expected that the GLA Group, London boroughs and other organisations will contribute to meeting this strategic reduction target, and the GLA will monitor progress towards its achievement.

The modelling which informed the 60 per cent CO_2 reduction by 2025 target assumed all new homes will need to be zero carbon from 2016, and non-domestic buildings from 2019, to achieve building regulation compliance. Therefore, the contribution of the new build policies to the CO_2 reduction target was assumed to arise from buildings obtaining planning approval and building regulations compliance prior to the introduction of the zero carbon requirements. While the relatively short duration of this period[15] means the contribution of new build to the overall CO_2 reduction target is envisaged to be relatively modest compared to the existing building stock, it has an important role to play in demonstrating best practice in building design and catalysing new, area wide decentralised energy schemes.

Policy 5.2A requires that developments should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following hierarchy:

1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy

Policy 5.2B sets targets for carbon dioxide reductions in buildings. These targets are expressed as minimum improvements over the Target Emissions Rate (TER) outlined in the national Building Regulations. Applications received at Stage I before 1 October 2013 were required to achieve a 25 per cent reduction in regulated CO_2 emissions compared to a Part L 2010 of the Building Regulations compliant development.

[14] All these developments have a residential and commercial component
[15] 5 years for dwellings and 8 years for non-domestic buildings

The Mayor applied the 40 per cent target to Stage I applications received on or after the 1 October 2013. As this report only examines applications considered by the Mayor at Stage II, an application would have to have been received at Stage I on or after 1 October 2013 and considered at Stage II before the 31 December 2013 to have had the 40 per cent target applied and be included in this report. Examination of the data identified only 1 development which fell into this category. This number is expected to be much higher in 2014.

Major development proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emissions reduction outlined above are to be met within the framework of the energy hierarchy.

As a minimum, energy assessments are expected to include the following details:

- calculation of the carbon dioxide emissions covered by the building regulations at each stage of the energy hierarchy
- proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services
- proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)
- proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies.

Where it is clearly demonstrated that the specific targets cannot be fully achieved on-site, any shortfall may be provided off-site or through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.

There are also specific policies (5.3, 5.6 and 5.7) relating to the individual elements of the energy hierarchy.

APPLICATION OF THE ENERGY HIERARCHY

Step 1: Energy efficiency in new developments

Policy 5.3 of the London Plan states that development proposals should demonstrate that sustainable standards are integral to the proposal and ensure that they are considered at the beginning of the design process. Standards include measures to maximise CO_2 emissions reductions across the site, including the building and services.

New developments are required to incorporate passive and active energy efficiency measures in order to minimise the demand for energy. In addition to enhancing the design of the building, developments are required to include active measures such as energy efficient lighting, heat recovery systems and advanced controls.

Energy efficiency is the first element of the energy hierarchy and developers are required to commit to improving energy efficiency before CHP and renewable energy systems. This approach of encouraging the highest levels of energy efficiency to reduce demand is reinforced by requiring developments to reduce regulated CO_2 emissions below those of a Building Regulations compliant development through energy efficiency alone.

The reduction in regulated CO_2 emissions from energy efficiency alone compared to a Part L 2010 of the Building Regulations compliant development increased further to 9 per cent in 2013. This compares to reductions from energy efficiency of 1 per cent and 5 per cent in 2011 and 2012 respectively and suggests that developers and their consultants are enhancing their understanding of the scope for increased energy efficiency measures, and are increasingly willingly to commit to greater CO_2 reductions through this first element of the energy hierarchy.

The potential for further CO_2 reductions through energy efficiency

Work commissioned by the GLA in 2013 suggests that additional savings may be achievable by further improving the fabric and design of new buildings, although the extent of the improvements are subject to practical and cost constraints, e.g. design restrictions relating to orientation. In particular, the research highlighted that reducing the percentage of the façade which is glazed demonstrated significant benefits. External walls are better thermal insulators than windows and so reducing the area of glazing reduced the CO_2 emissions. Furthermore, external walls are cheaper than windows, reducing the capital cost as well. The results showed that moving from a nearly fully glazed facade to the baseline design option (glazing area approximately 20 per cent of the floor area), provides a 3-13 per cent reduction in CO_2 emissions. In operation, additional savings are also possible through the incorporation of technologies such as smart meter technologies and behavioural change. These savings are primarily reflected in reductions in unregulated emissions and hence not captured within the savings in this report which deals solely with regulated CO_2 emissions.

Step 2: New developments supporting the plans for district heating in London

Policy 5.5 states that the Mayor expects 25 per cent of the heat and power used in London to be generated through the use of localised decentralised energy systems by 2025. In order to achieve this target the Mayor prioritises the development of heating networks. Although the bulk of carbon savings from this work are anticipated to come from converting the energy supply of existing building stock, the implementation of the 'Be Clean' element of the energy hierarchy in Policy 5.2 plays an

important role both in providing an opportunity, through large new developments, for new heat networks to be established and in ensuring new developments are ready to connect to decentralised networks as and when they become available.

Energy Masterplans
The development of heat networks relies on the identification of areas with the right mix of heat demands, connecting buildings and a motivated project owner. The Energy Masterplanning (EMP) process has been developed by the GLA's Decentralised Energy Project Delivery Unit (DEPDU) to identify opportunities for new networks in London, and to set out a long-term vision for heat network development.

The Masterplan sets out initial proposals for pipe routes and plant locations, as well as the economic and environmental impacts of their implementation.

Energy masterplans outline existing, planned and proposed developments that may be of potential interest for future interconnection. The masterplans should therefore play a key role when considering a development's network design; such as placement of energy centres and the capacity of pipes to interconnect with other heat loads. Once the information is assembled into the map, different network combinations of demand connected to potential energy centres can be evaluated using techno-economic modelling techniques which provide indicative sizing of the network and financial viability.

In 2012 and 2013 a number of new energy masterplans were published on the London Heat Map web site (www.londonheatmap.org.uk). These include:

- Royal Docks and Canning Town Energy Infrastructure Report
- Upper Lee Valley Decentralised Energy Network: Waltham Forest Satellite Schemes
- London Borough of Redbridge Decentralised Energy Masterplanning Study
- London Borough of Brent Wembley Regeneration Area Energy Masterplan
- Royal Borough of Kingston upon Thames Energy Master Plan
- Decentralised Energy Masterplan for Westminster
- London Riverside Opportunity Area Energy Masterplan.

Energy masterplans are often followed by feasibility studies which consider in detail the technical and economic opportunities and constraints to establishing heat networks serving part or all of the area covered by a masterplan. Should a network be considered feasible, a business plan for implementation is required and, ultimately, an authority (or other organisation) must proceed with a procurement exercise to deliver the network.

Area Wide Heat Networks
The implementation of large heat networks provides the flexibility to switch fuel and heat generation technologies, thereby allowing heat supplies to be decarbonised by moving away from fossil fuels. Nowhere is this more clearly illustrated than in Gothenburg, Sweden where 90 per cent of all apartment blocks in the City are heated by a heat network. Before 1980 over 90 per cent of the heat

was provided by fossil fuel but now the majority of heat comes form waste heat sources (refuse incineration and refineries and other industry) with another 15 per cent from renewables[16].

Table 3 provides summary information for examples of area wide heat networks that have been developed and are operational. It also includes a selection of networks which are planned in the near future. An indication of the scale of the networks is given by the number of homes currently planned to be connected into the network. In some cases there may be the potential for further expansion of thse networks, however the viability of this for each network depends on a range of factors including the diameter of the pipework leaving the energy centre and throughout the primary network[17], the temperature difference achieved between the flow and return pipework, and the physical space within the energy centre(s) to accommodate additional heat generation equipment.

Table 3: Examples of existing and planned area wide heat networks

Network	Status	Homes connected (N.B. may be additional non-domestic space)	Brief description
SELCHP (Lewisham and Southwark)	Operational	~2500	An existing energy from waste (EfW) plant is the primary heat source for this network. The network became operational in November 2013 and supplies heat to five existing housing estates. There is scope for expansion to serve other buildings, including new developments, in the surrounding area.
Olympic Park (straddles 4 boroughs)	Operational	3000[18]	The heat network and energy centres, which use gas fired CHP as the lead heat source, were constructed to serve the buildings in the London 2012 Olympic Village. It has already expanded to serve buildings outside the park and has the potential for significant expansion in the years ahead e.g. bays are located within the energy centres for additional heat generation plant.
Bunhill (Islington)	Operational	~850 (Phase 1)	The first phase of the Bunhill network connects three housing estates and two leisure centres via a 1km network. It is served by an energy centre containing gas fired CHP and became operational in late 2012. The second

[16] Göteborg Energi's district energy system: Application for Global District Energy Climate Awards 2009
[17] and the related mass flow rate of the water contained therein
[18] Located in the fomer athletes' village

			phase will use a low temperature network, supplied by sources of waste heat, to supply additional new and existing buildings.
Euston Road (Camden)	Planned	339 (+ 75,000m^2 non-domestic associated with the biomedical research facility)	In the Euston Road area, a cluster of four communally heated estates have been identified which are in close proximity to a new major biomedical research facility due to be completed in 2015/16 which obtained planning permission in 2011. The demand of the estates and research facility has been assessed on behalf of the Decentralised Energy for London programme and provides an excellent opportunity for a network. Following prepatory work and approval by the London Borough of Camden Cabinet, a procurement exercise for the development of this network was initiated in the spring of 2014.
White City (Hammersmith & Fulham)	Planned	5000	An energy study for the White City opportunity area found that the area is a suitable location for a decentralised energy scheme. A strategic framework and master plan for the development of a network has been developed.
Vauxhall Nine Elms Battersea (Lambeth and Wandsworth)	Planned	16,000	The VNEB opportunity area planning framework sets out an energy master plan for the area which includes the development of a low carbon district heating network serving developments in the heart of Nine Elms, Battersea Power Station and the New Covent Garden Market initially, with the potential to expand. The findings of a feasibility study are being developed with a view to commercialising the opportunity and bringing the scheme to market. The feasibility identifies that the annual heat supply to the network could reach 100,000MWh by 2025, with over a quarter of this related to the Battersea Power Station development alone.

New Developments

New developments have an important role to play in bringing area wide networks, such as those described above, to fruition. They can provide a contribution in one of two ways:

1. The largest new developments have the potential to be the catalyst of area wide heat networks serving existing buildings in the vicinity, as well as new buildings
2. Smaller new developments are often important heat loads to support the delivery of area wide networks consisting of multiple existing and new buildings.

Hence, establishing site heat networks on new developments has a number of strategic benefits including:

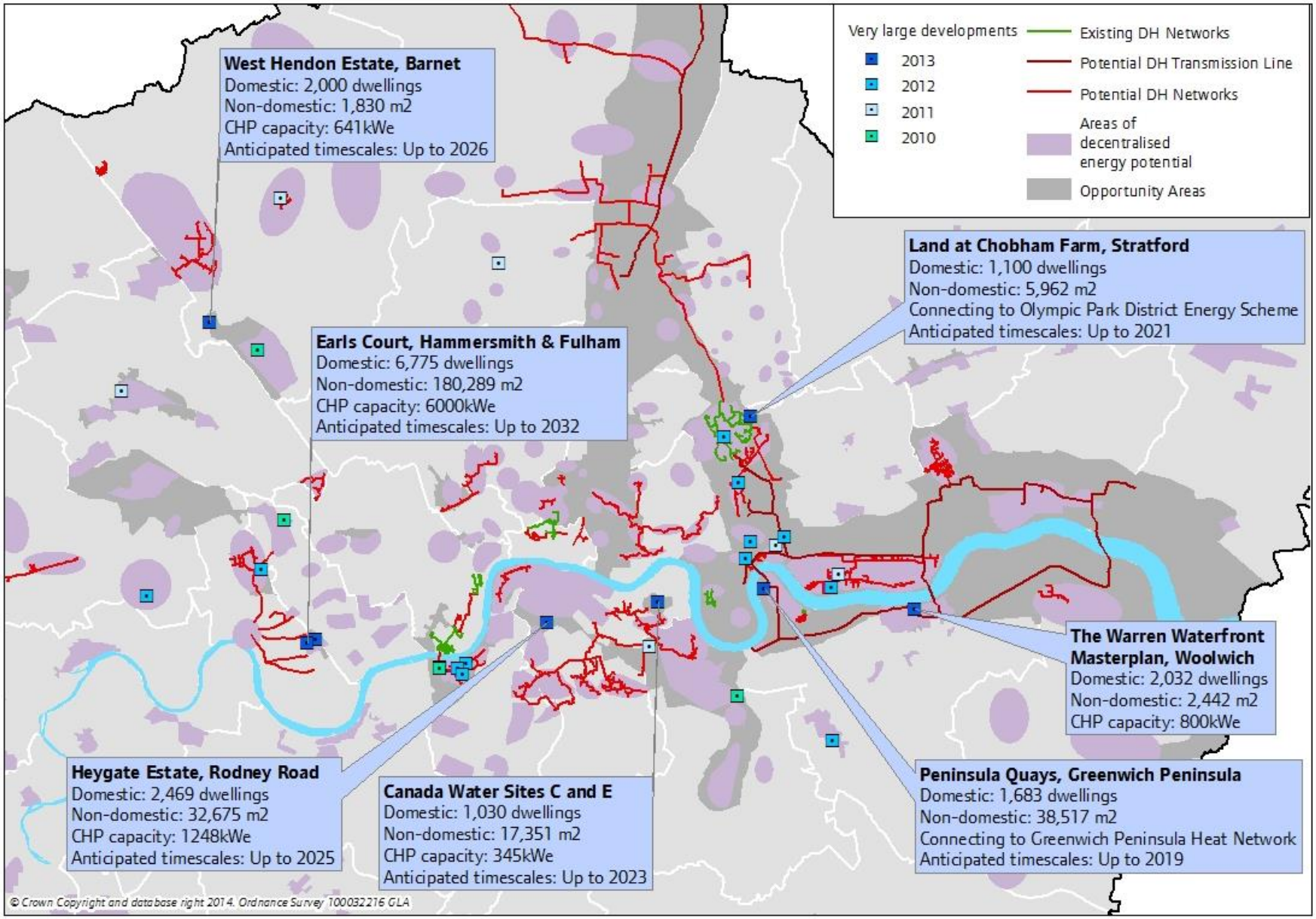
- Avoiding locking in a dwelling's heat supply to a specific fossil fuel source (as is the case with individual gas boilers)
- Enabling satellite new developments and existing buildings to be linked in an area wide network
- Enabling heat supply to be decarbonised by switching an area wide network's heat source(s) to energy efficient technologies and low carbon fuels in the future.

Very large new developments

As illustrated in Figure 3 below, a number of very large mixed use developments, each incorporating over 1,000 dwellings, obtained planning approval in 2013[19]. Given their scale, these developments often form a key part of the plans set out in Opportunity Area Planning Frameworks (OAPFs). Similarly, the energy infrastructure (e.g. site heat network) planned for these developments can be a key element in realising the plans for area wide district heating networks. Due to the scale of these developments they are inevitably multi-phase and often envisaged to take over a decade to complete. Appendix 3 provides two more in-depth case studies for the Earls Court development and Greenwich Peninsula area, outlining how the energy infrastructure links to the plans for the wider area.

[19] The Battersea Power Station site was also the subject of a Section 73 of the Town and Country Planning Act 1990 application in 2013 but is not covered in this report as it was accounted for in the 2010 monitoring report.

Figure 3: Very large new developments approved at Stage II in 2013



Ensuring smaller developments in dense areas are future proofed

The majority of residential units receiving planning approval from the Mayor in 2013 were located in developments of less than 1,000 homes. In those developments the average number of units was circa 250.

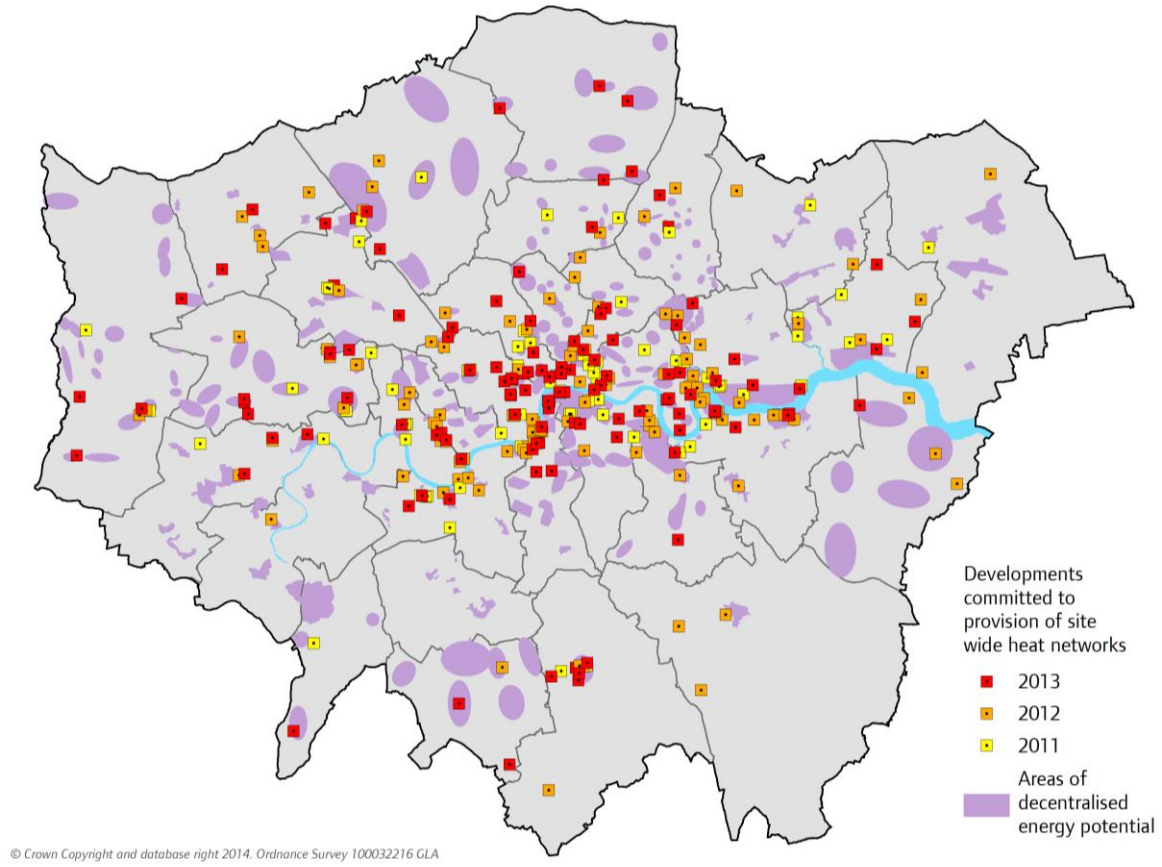
While these developments were generally not of a scale where they would be the catalyst for an area wide network, it was important to secure commitment to them being future proofed to enable them to play their part in London's district heating plans. Hence, where a development was located in an area that could be served by an area wide network in the future, the development was expected to include a site heat network to allow future connection. If the developer was able to clearly demonstrate with whole life costing (using reasonable assumptions) that a site heat network was not financially viable and would result in uneconomic costs for occupiers, the development was not required to adopt a site heat network. For example, developments with individual houses fell in to this category[20].

This approach resulted in commitments to 24,008 residential units being supplied by a heat network. Including the 17,089 dwellings connecting to heat networks in the very large developments, overall this resulted in commitments to 41,097 dwellings (95 per cent of the total dwellings receiving approval) connecting to heat networks. Individual houses in developments were not usually communally heated due to the higher heat distribution losses typically occurring in the distribution system for these types of dwelling which are located a greater distance apart.

Figure 4 illustrates the distribution of the developments which commited to the provision of site wide heat networks in 2011, 2012 and 2013, mapped against identified areas of decentralised energy potential[21]. This illustrates the concentrations of site wide heat networks in these areas, predominantly in the inner London boroughs, but also in specific identified areas further out (e.g. Croydon town centre).

[20] 1760 of the 2080 dwellings (5 per cent of total dwellings) not connecting to site heat networks were individual houses.
[21] Data on areas of decentralised energy potential sourced from the London Heat Map - www.londonheatmap.org.uk/

Figure 4: Distribution of developments committed to providing site heat networks



Combined heat and power (CHP) capacity serving new developments

Just under two-thirds of strategic developments met a proportion of their energy requirements through CHP. This resulted in commitments to circa 25MW of CHP electrical capacity as part of proposals submitted in 2013, broadly equivalent to the electricity required to supply 50,000 homes and equivalent to 16 per cent of the CHP electrical capacity installed in London. This compares to commitments to 29MW and 17MW of CHP electrical capacity in 2012 and 2011 respectively.

As shown in Table 5 below, the vast majority of the capacity was found in the two larger installation tranches; 100kW$_e$ to 999kW$_e$ and 1MW$_e$ and above. However, the average installation size varies significantly in the two tranches with the average capacity in the second tranche nearly ten times higher than that of the first. The largest single CHP installation proposed was for the second permanent energy centre in the Earls Court development.

At the 'less than 100kW$_e$' scale, the Mayor does not request consideration of CHP installations for residential only developments due primarily to the complexities of managing CHP electricity sales in these circumstances. However, developers often propose these to meet other requirements such as compliance with conditions.

Table 5: Size distribution of CHP installations secured through planning in 2013

	Total electrical capacity (MW_e)[22]	Average size of installation (MW_e)
Less than 100kWe	1.9	0.05
100kWe to 999kWe	11.7	0.27
1MWe and above	10.9	2.19
Total	**24.5**	**-**

Step 3: Renewable energy in new developments

Policy 5.7 of the London Plan requires that, after considering the first two elements of the energy hierarchy, major development proposals should provide CO_2 emissions reductions through the use of onsite renewable energy generation, where feasible.

The proportion of developments exceeding the targets in Policy 5.2 of the London Plan in 2013 through the first two elements of the energy hierarchy and not proposing renewable energy systems doubled compared to 2012. Overall, 32 developments exceeded the targets in Policy 5.2 of the London Plan through the first two elements of the hierarchy and hence did not propose on-site renewable energy systems. This trend may reverse with the raising of the London Plan target to 40 per cent beyond Part L 2010 of the Building Regulations for applications received at Stage I on or after the 1 October 2013.

As can be seen in Table 6 below, photovoltaic panels was the most popular renewable energy technology adpted by developers in 2013. This mirrors the preceding years and reflects the complementary nature of the technology with CHP (where electricity production is not usually a limiting factor), which is adopted in many developments. Other renewable technologies, such as heat pumps and solar thermal, are sometimes proposed but there are far fewer of these installations as base load heat is provided by CHP and the technologies would tend to compete for the same heat load. The number of biomass installations remains low, primarily due to concerns regarding the impact on local air quality.

[22] 21 developments incorporating CHP did not provide an estimate of the electrical capacity. These developments are estimated to incorporate an additional 3MW of electrical capacity.

Table 6: Number of installations of different types of renewable energy systems

	2011	2012	2013
PV	60	107	123
Biomass boilers	14	7	8
Heat pumps	19	21	27
Solar thermal	10	6	12

REDUCTIONS IN REGULATED CO_2 EMISSIONS ACHIEVED IN 2013

Overall regulated CO_2 reductions

Policy 5.2 of the London Plan sets targets for regulated CO_2 emissions reductions over and above those required by Part L 2010 of the Building Regulations. Developments were required to achieve a 25 per cent regulated CO_2 emissions reduction in 2013 compared to a Part L 2010 compliant development. The target increased to 40 per cent better than Part L 2010 of the Building Regulations for applications received by the Mayor at Stage I on or after 1 October 2013 in line with London Plan policy; however this new target only applied to one development covered by this report.

Table 7 (below) provides the emissions after each stage of the energy hierarchy for new developments that were referred to the GLA and obtaining planning approval in 2013. The application of the London Plan energy policies in these new developments resulted in cumulative regulated CO_2 emission reductions of 49,474 tonnes per annum relative to the Part L 2010 of the Building Regulations Target Emissions Rate (TER). This compares to combined savings from the RE:NEW and RE:FIT programmes of 29,900 tonnes in 2012, and is equivalent to retrofitting loft insulation in circa 124,000 existing homes[23].

Regulated CO2 emission data at each stage of the energy hierarchy was not provided for twenty-two applications (13 per cent of all applications considered at Stage II). Of these:

- four applications related to refurbishment and/or change of use of existing buildings
- two applications related to temporary facilities.

Additionally, there were four applications relating solely to an energy centre. In these circumstances, CO_2 savings were allocated to the developments served by the energy centre, rather than the centre itself. One of these, the Beddington Energy Recovery Facility, will generate electricity for export to the national grid with the capability to export heat to district heating networks should they be developed in the vicinity. Another application, located at the Sustainable Industries Park in Dagenham, was for a biogas production facility which will inject the gas into the gas grid.

Other applications where CO_2 emission data was not provided fell into a range of categories e.g. very small developments, small extensions to existing buildings, etc.

The reductions in regulated CO_2 emissions equate to an overall percentage saving of approximately 36 per cent beyond the requirements of Part L 2010 of the Building Regulations; significantly higher than the 25 per cent target in Policy 5.2 and approaching the new 40 per cent target which will apply to many Stage II applications in 2014. The ability of developments to meet this new target through increasing carbon dioxide reductions on-site will vary depending on the type and characteristics of the development. However, the achievement of overall savings of 36 per cent in 2013 gives a positive indication that future overall carbon savings will meet this new target.

Similarly to previous years, the largest contribution was due to CHP and amounted to 29,168 tonnes of CO_2 per annum - well over half of the overall reduction. The first element of the energy hierarchy, energy efficiency, achieved a reduction of 9 per cent. Renewable energy, the final element of the

[23] Assumes average saving per dwelling of 0.4 tonnes of CO_2 per annum from OFGEM CERT spreadsheet

hierarchy, was responsible for the smallest reduction of the three elements – this is largely due to the difficulties of installing on-site renewable energy in a high density, urban environment.

Table 7: CO_2 emission reductions from application of the energy hierarchy

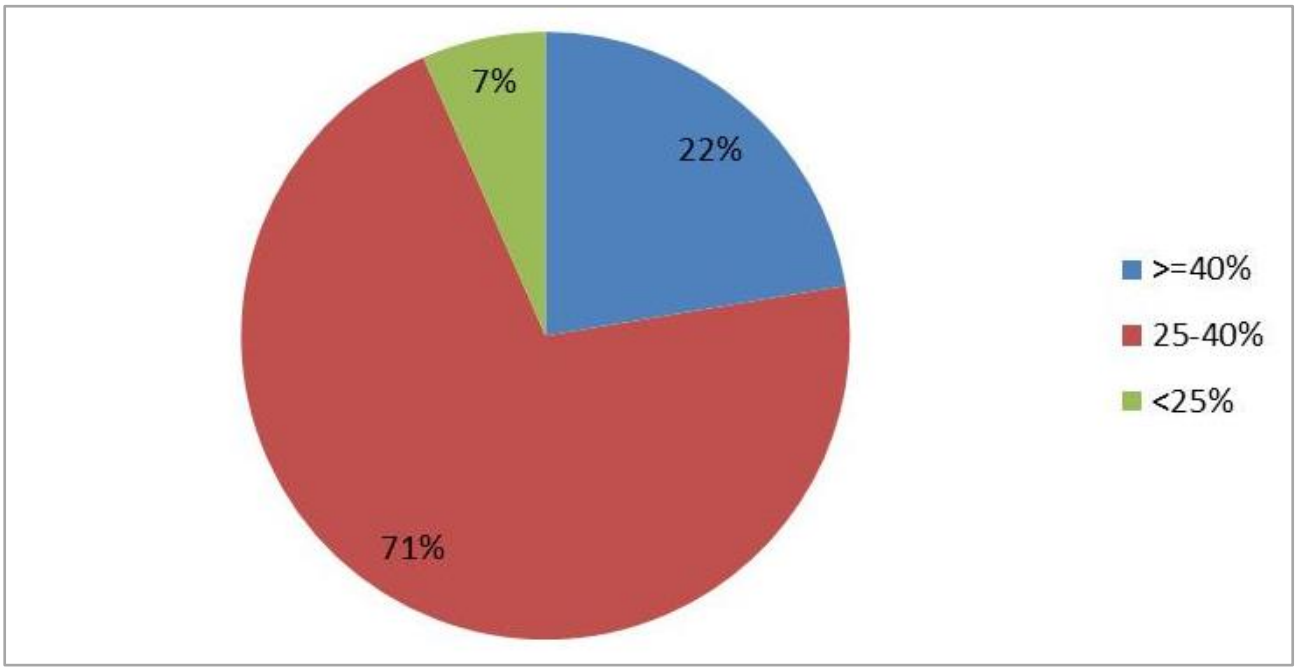
	Regulated CO_2 emissions	**Cumulative regulated[24] CO_2 emissions reductions relative to Part L 2010 Building Regulations**	
	(tCO_2/year)	**(tCO_2/year)**	**(per cent)**
Baseline	138,035	-	-
After energy efficiency	125,422	12,613	9
After energy efficiency & CHP	96,254	41,781	30
After energy efficiency, CHP & renewables	88,561	49,474	36

Proportion of developments meeting the target

Over 90 per cent of developments for which CO_2 reduction figures were provided met or exceeded the 25 per cent target in Policy 5.2 of the London Plan. As shown in Figure 5 below, 22 per cent of developments achieved CO_2 reductions greater than or equal to 40 per cent – the new London Plan target. Less than 10 per cent of all developments failed to achieve the target through on-site carbon reduction measures. Developments falling into this category are also discussed further below.

[24] Excluding unregulated energy

Figure 5: Proportion of developments achieving particular ranges of percentage savings



The cumulative shortfall in CO_2 reductions

Due to site specific constraints, developments do not always meet the target in Policy 5.2 of the London Plan using on-site measures. In these circumstances, a cash in lieu contribution may be made by the developer to the local borough to account for the shortfall in CO_2 emission reductions. The GLA supplementary planning guidance (SPG) for Sustainable Design and Construction contains guidance to ensure a consistent approach to carbon dioxide off-setting and collection of cash in lieu contributions is adopted.

The total shortfall from developments not meeting the target equated to approximately 216 tonnes of regulated CO_2 emissions per annum in 2013. This represents a significant reduction from 2012 when the shortfall amounted to 3,592 tonnes per annum, and may be due to developers making a concerted effort to achieve further CO_2 reductions on-site rather than making a cash in lieu contribution related to the shortfall, on the grounds that the benefit of investment should be retained by the building occupants. As the shortfall was relatively small it only equated to circa £389,000 assuming an indicative CO_2 price of £60 per tonne and a 30 year lifetime.

For illustrative purposes only, calculating the shortfall against the new 40 per cent target, it would have equated to 9,647 tonnes of regulated CO_2 emissions per annum. This corresponds to a value of circa £17million, based on the 30 year lifetime and £60 per tonne CO_2 price[25].

Comparing CO_2 reductions to the new building regulations

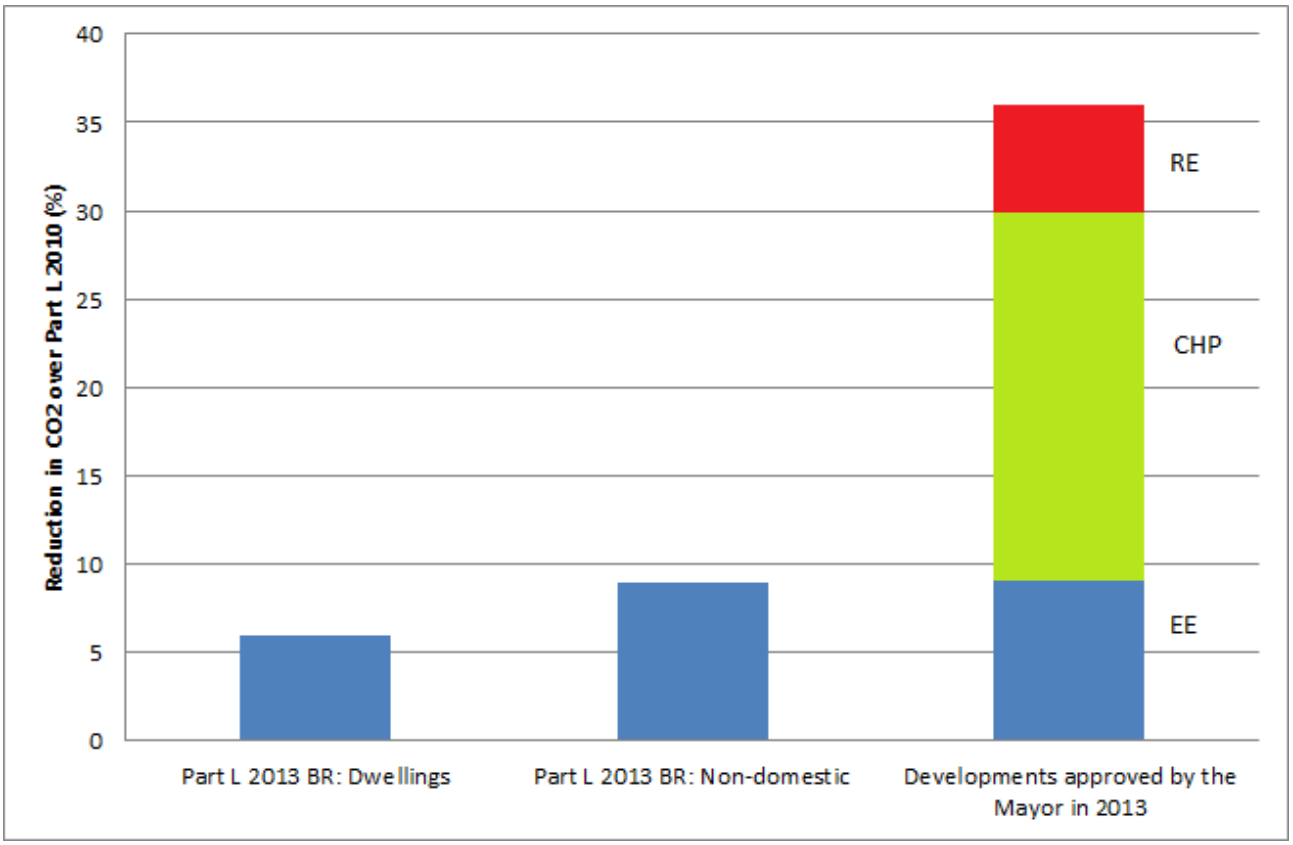
Part L 2013 of the Building Regulations comes into effect on the 6 April 2014. Part L 2013 will require an overall 6 per cent reduction in CO_2 emissions for new residential buildings and an overall 9 per cent

[25] £60 per tonne of CO_2 was the central price assumption used in government's consultation on Allowable Solutions

reduction in CO_2 emissions for new non-domestic buildings compared to Part L 2010 of the Building Regulations.

Figure 6 shows the CO_2 reductions required by the new Part L 2013 of the Building Regulations over and above Part L 2010. These reductions can be achieved through a combination of energy efficiency, CHP and renewable energy technologies. The figure also shows the CO_2 reduction through the combined impact of the three elements of the energy hierarchy for developments receiving planning approval in 2013. As can be seen, the CO_2 reductions from those developments achieving planning in 2013 far exceed those reductions required by the new building regulations. Indeed, the reductions secured through energy efficiency alone exceed the requirements of Part L 2013.

Figure 6: CO_2 reductions secured through the London Plan compared to those required by Part L 2013 of the Building Regulations



INVESTMENT DUE TO LONDON PLAN ENERGY POLICIES

Substantial investment in infrastructure and technologies will be required to meet the commitments obtained through implementation of London Plan energy polices in 2013. Overall, this is expected to total more than £184 million.

Energy efficiency measures alone will result in CO_2 emissions being reduced 9 per cent below a Part L 2010 of the Building Regulations compliant development. Implementing these energy efficiency measures is estimated to stimulate additional investment in new dwellings and non-domestic buildings, resulting in annual energy cost savings for dwelling occupants of £580k per annum[26], with additional energy costs savings for non-domestic building occupants.

Assuming an installed capital cost of £700 per kilowatt of electrical capacity, the 25MW of CHP electrical capacity committed to in 2013 is estimated to require investment of circa £17million[27].

The site heat network infrastructure into which CHP will supply heat energy will also require significant investment. It is estimated that an outlay of £103million[28] will be required to fund the heat network infrastructure for the 41,097 dwellings with communal heating. The non-domestic buildings will require additional further investment for the associated heat network infrastructure.

A workforce will be required to operate and maintain the heat network infrastructure and associated energy generation equipment serving the new developments. It is estimated that the developer commitments obtained in 2013 will result in approximately 60 permanent jobs[29], the majority of them being in energy services companies (ESCOs).

Investment in renewable energy systems was also proposed to help achieve the CO_2 reduction commitments. Using an installed capital cost estimate of £2,000 per kilowatt, providing circa 7MW of photovoltaic panel electrical capacity will require an investment of approximately £13 million. This investment is envisaged to result in combined feed-in-tariff (FiT) revenue and electricity savings of circa £0.9million per annum. Further investment will happen in other renewable energy technologies, e.g. heat pumps, solar thermal panels and biomass boilers.

[26] Based on SAP modelling measures to reduce the demand for heat.
[27] i.e. 700 x 25 x 1000 = 17,500,000
[28] Assumes a heat distribution cost of £2500 per flat for district heating, taken from Table 51 of Code for Sustainable Homes: A cost review (CLG March 2010)
[29] Assumes 0.5 jobs per mixed use/residential development for maintaining a site network

CONCLUSION

The continued implementation of the London Plan energy policies in 2013 has resulted in the following commitments being secured:

- Regulated CO_2 emission reductions of 36 per cent against a baseline in which developments complied with Part L 2010 of the Building Regulations.
- Significant investment at each stage of the energy hierarchy including:
    - Investment in energy demand reduction measures to reduce residential energy bills by circa £580k per annum
    - £120 million in heat network infrastructure and associated CHP capacity
    - £13 million in photovoltaic panels and additional investment in other renewable energy technologies.
- Approximately 60 permanent jobs in operating and maintaining heat network infrastructure and associated energy supply plant.

APPENDIX 1

Bibliography

Supplementary Planning Guidance (SPG) on Sustainable Design and Construction, Mayor of London, April 2014

District Heating Manual for London, Mayor of London supported by Intelligent Energy Europe, February 2013[30]

London's Zero Carbon Energy Resource – secondary heat, Mayor of London, July 2013

Homes for London: The London Housing Strategy – Draft for consultation, Mayor of London, November 2013

[30] Available at: www.londonheatmap.org.uk

APPENDIX 2

Glossary

Building Emissions Rate (BER) or Dwelling Emission Rate (DER) is the actual building/dwelling CO_2 emission rate. In order to comply with Part L of the Building Regulations, the BER/DER must be less than the TER (see below).

Combined Heat and Power (CHP) is defined as the simultaneous generation of heat and power in a single process. The power output is usually electricity, but may include mechanical power. Heat outputs include hot water for space heating or domestic hot water production.

CHP Electrical Capacity is the maximum power generation capacity of CHP.

Communal heating is a general term for a shared heating system where heat is supplied to multiple dwellings and/or non-domestic buildings using pipes containing hot water.

kilowatt (kW) – One thousand watts. A watt is a measure of power.

Megawatt (MW) – One million watts. A watt is a measure of power.

Part L of the Building Regulations – Approved documents L1A and L2A of the Building Regulations relate to the conservation of fuel and power in new dwellings and new buildings other than dwellings respectively.

Regulated CO_2 emissions – The CO_2 emissions arising from energy used by fixed building services, as defined in Approved Document Part L of the Building Regulations. These include fixed systems for lighting, heating, hot water, air conditioning and mechanical ventilation.

Simplified Building Energy Model (SBEM) is a computer program that provides an analysis of a building's energy consumption. The purpose of the software is to produce consistent and reliable evaluations of energy use in non-domestic buildings for Building Regulations compliance.

Site heat network – a set of flow and return pipes circulating hot water to the apartment blocks (and apartments contained therein) and non-domestic buildings on a development.

Standard Assessment Procedure (SAP) is a methodology for assessing and comparing the energy and environmental performance of dwellings. Its purpose is to provide accurate and reliable assessments of a dwelling's energy performance that are needed to underpin building regulations and other policy initiatives.

Target CO_2 Emission Rate (TER) is the minimum energy performance requirement for a new dwelling/building. It is expressed in terms of the mass of CO_2 emitted per year per square metre of the total useful floor area of the building (kg/m^2/year).

APPENDIX 3

The Plans for Heat Network infrastructure in the Earls Court Development

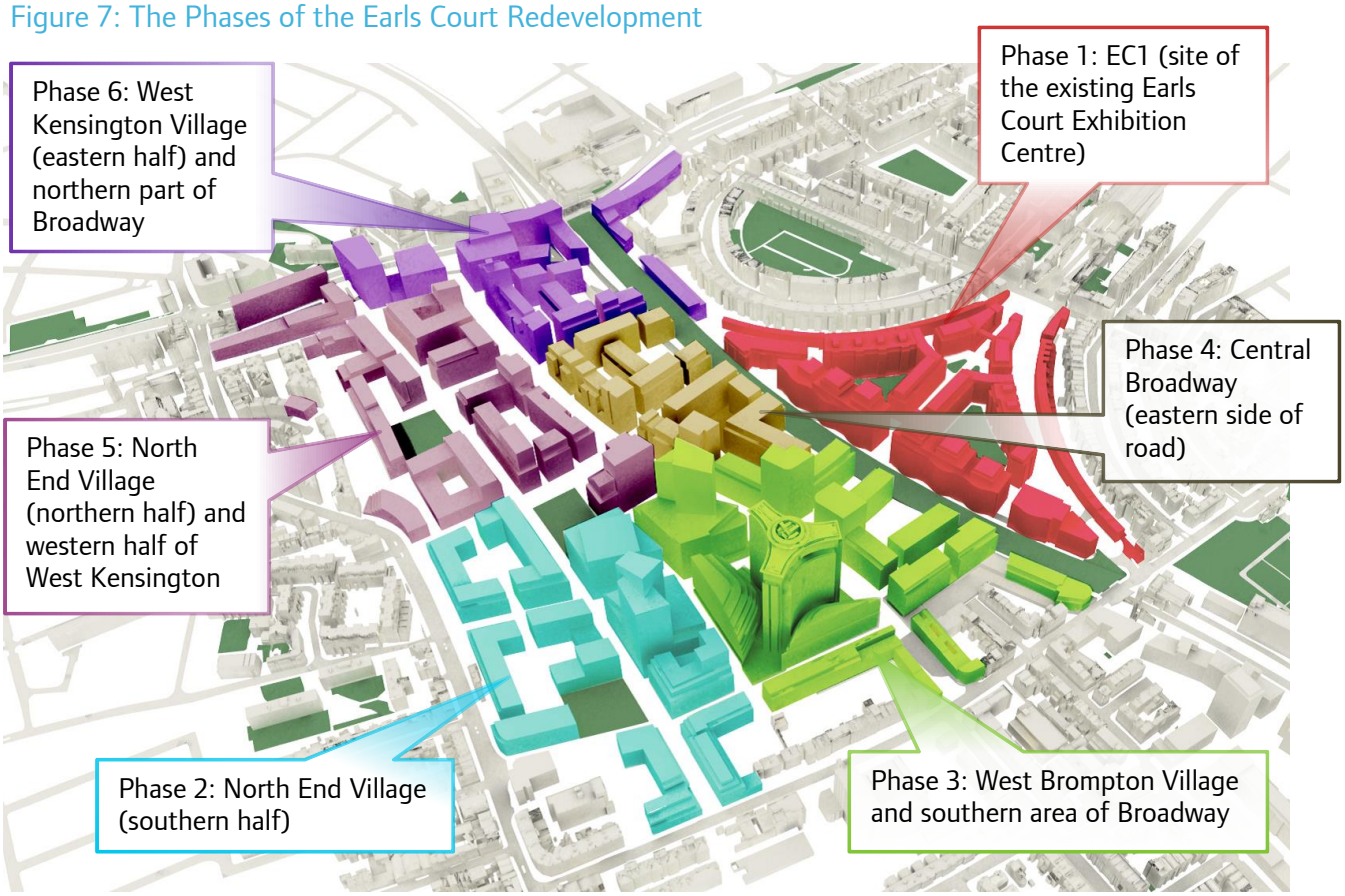
Context

The London Plan identifies Earls Court and West Kensington as an Opportunity Area spanning the London Borough of Hammersmith and Fulham and the Royal Borough of Kensington and Chelsea. The Earls Court and West Kensington Opportunity Area Joint Supplementary Planning Document (SPD)[31] provides a guide to development in the Opportunity Area. The SPD is supported by the Earl's Court and West Kensington Opportunity Area Energy Strategy (November 2011) which includes the outcomes of a Decentralised Energy Feasibility Study which identified potential for a heat network in the Opportunity Area to serve the area beyond it.

Development Details

In November 2013 approval was given to the Earls Court and West Kensington planning applications which include up to 6,775 dwellings and significant amounts of non-domestic space. The proposed substantial mixed use development comprises buildings to accommodate offices, retail, hotel and serviced apartments, leisure uses, a private hospital, education, health, community and culture uses. As shown in Figure 7 below[32], the masterplan for the development is split into 6 main phases:

Figure 7: The Phases of the Earls Court Redevelopment



[31] http://www.lbhf.gov.uk/Images/Earl's%20Court%20and%20West%20Kensington%20Joint%20Supplementary%20Planning%20Document_tcm21-170130.pdf

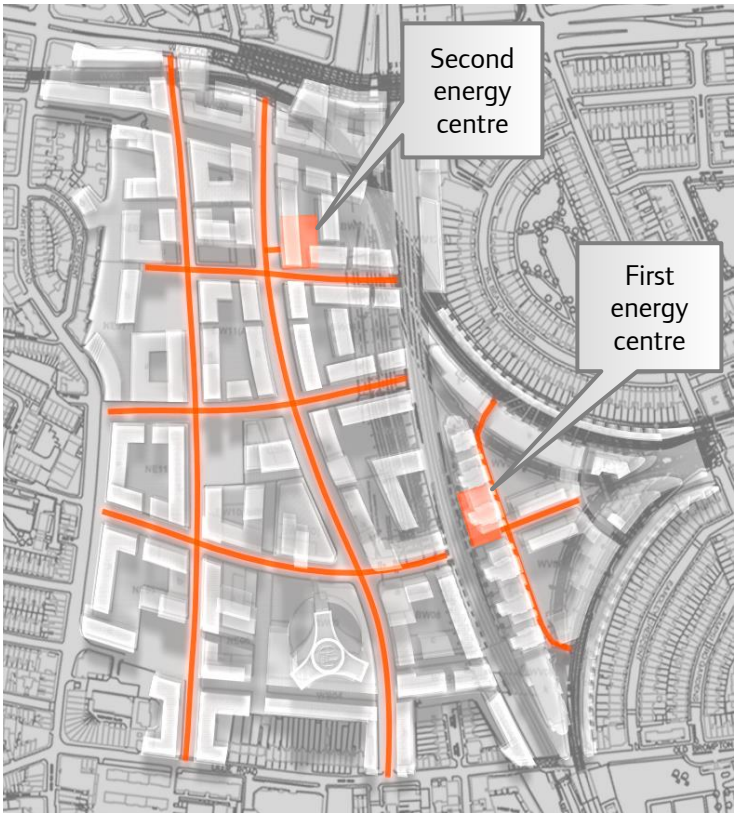
[32] reproduced from the LBHF Design and Access Statement (24.06.11)

Proposed Energy Strategy

The developers have sought to ensure provision is made for heat network infrastructure and central energy provision from the earliest consideration of the masterplan. Due to its significant size the development will evolve in phases with two permanent energy centres proposed to eventually serve the development's heat network infrastructure.

The first energy centre to commence operation is proposed to be located in the east of the development within the Royal Borough of Kensington and Chelsea. The indicative location of this energy centre is shown in Figure 8 to the right of the railway line bisecting the site. The energy centre proposed will have a floor area of 1,200m^2 and accommodate 1.2MW$_{th}$ of gas fired CHP capacity, thermal storage and gas fired top-up/back-up boiler plant, together with an electrical switch room and ancillary plant (pumps, pressurisation units, etc.). This first permanent energy centre is due to begin operation after phases 1.2 and 1.3 have become operational. In the interim, 5 temporary containerised systems will be used to maintain heat supplies to the communal heating of the plots in the initial phases.

Figure 8: Main district heating network routes and energy centre locations



The larger, second permanent energy centre is proposed to be located in the London Borough of Hammersmith and Fulham, in the north of the development. This larger energy centre (3000m^2) is envisaged to accommodate 4.8MW$_{th}$ of gas fired CHP, four times the capacity of the first permanent energy, along with thermal storage and top-up/back-up boilers. The second energy centre is proposed to come online after phases 2.1, 2.2, 2.4, 3.1, 3.2 and 3.3 have been completed. In the intervening period 13 containerised boiler systems will be used to maintain heating supplies to the blocks within these phases.

Future Potential

This very large mixed use development has the potential to be the catalyst for a network serving the wider geographic area. As such, within the energy assessment, provision has been made within the development's heat network infrastructure to potentially supply certain buildings outside of the Earls Court development itself. For example, the first permanent energy centre has been sized to accommodate heat generation plant capable of serving the Lillie Square development – an approved application for 808 residential units in 8 residential blocks to the south of the Earls Court

Development site. This energy centre also includes space which could be used to accommodate alternative fuel supplies and energy sources in the future.

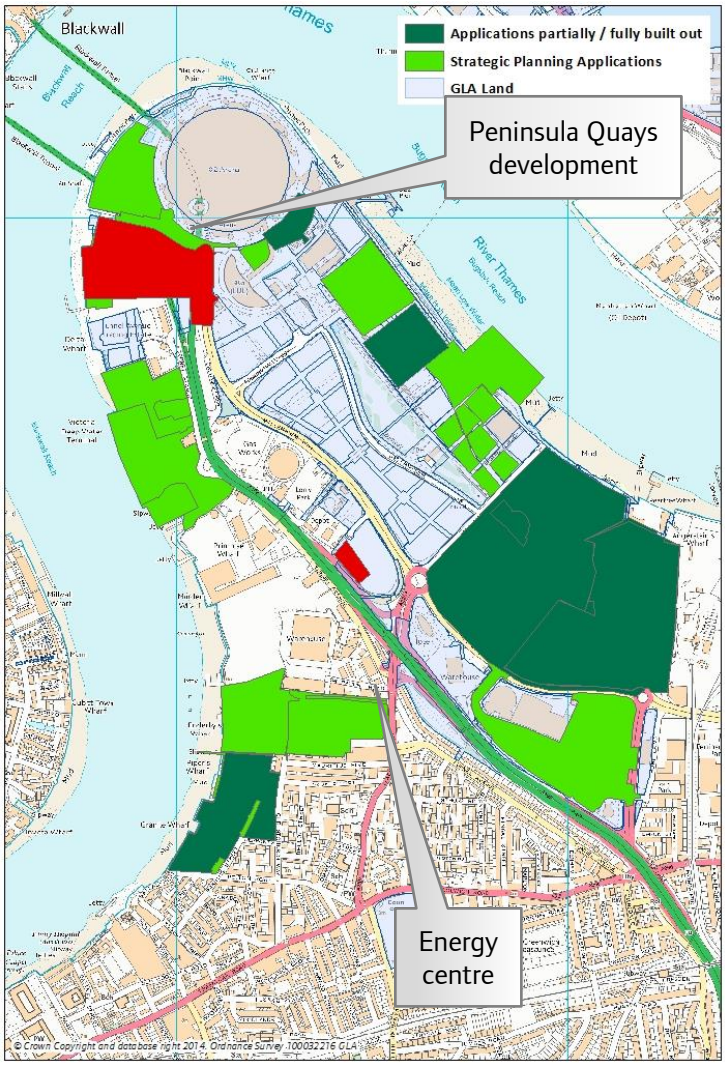
Peninsula Quays, Greenwich Peninsula (Greenwich)

Context

Greenwich Peninsula plays two key strategic roles, as an internationally significant leisure attraction and as a major contributor to meeting London's need for additional housing. The main focus of commercial development is at the north of the peninsula around the O2 Centre and the Jubilee Line station. The Peninsula will incorporate around 10,000 homes[33], spread across multiple plots.

The Greenwich Peninsula development represents one of the largest and most prominent regeneration projects in the UK. Over the next 15 to 20 years the Peninsula will be transformed into a new 15 million ft² (1.4 million m²) master planned community with a unique blend of residential, entertainment, business, retail and community uses. Figure 9 illustrates some of the current and potential future development planned for the Peninsula.

Figure 9: Greenwich Peninsula development context



When complete, Greenwich Peninsula will be a thriving urban community for 25,000 residents, creating 24,000 long-term employment opportunities and hosting thousands of visitors to the entertainment district within the O2 complex and other attractions. The regeneration will create a vibrant new district for London which is inclusive, sustainable and enjoyable, and a model for future urban communities. Developments such as Peninsula Quays (discussed below) are at the heart of this regeneration.

The sustainability vision for the Greenwich Peninsula development is to offer an affordable and attractive low carbon energy solution to developers and residents complying not only with the known legislation requirements over the next few years, but additionally having the flexibility to adopt other high efficiency heat supply technologies and switch to low or zero carbon fuel sources.

[33] http://www.london.gov.uk/priorities/housing-land/land-assets/greenwich-peninsula

Strategic Energy Planning

The heat energy solution for Greenwich Peninsula will consist of a single permanent energy centre (shown in Red on Figure 10) housing high efficiency gas-fired CHP units with a combined electrical capacity of 6.3MW$_e$, as well as gas-fired boilers to provide back-up and meet peak energy demand. Thermal storage, in the form of large insulated water tanks, will be included to enable optimised plant operation and increased overall efficiencies.

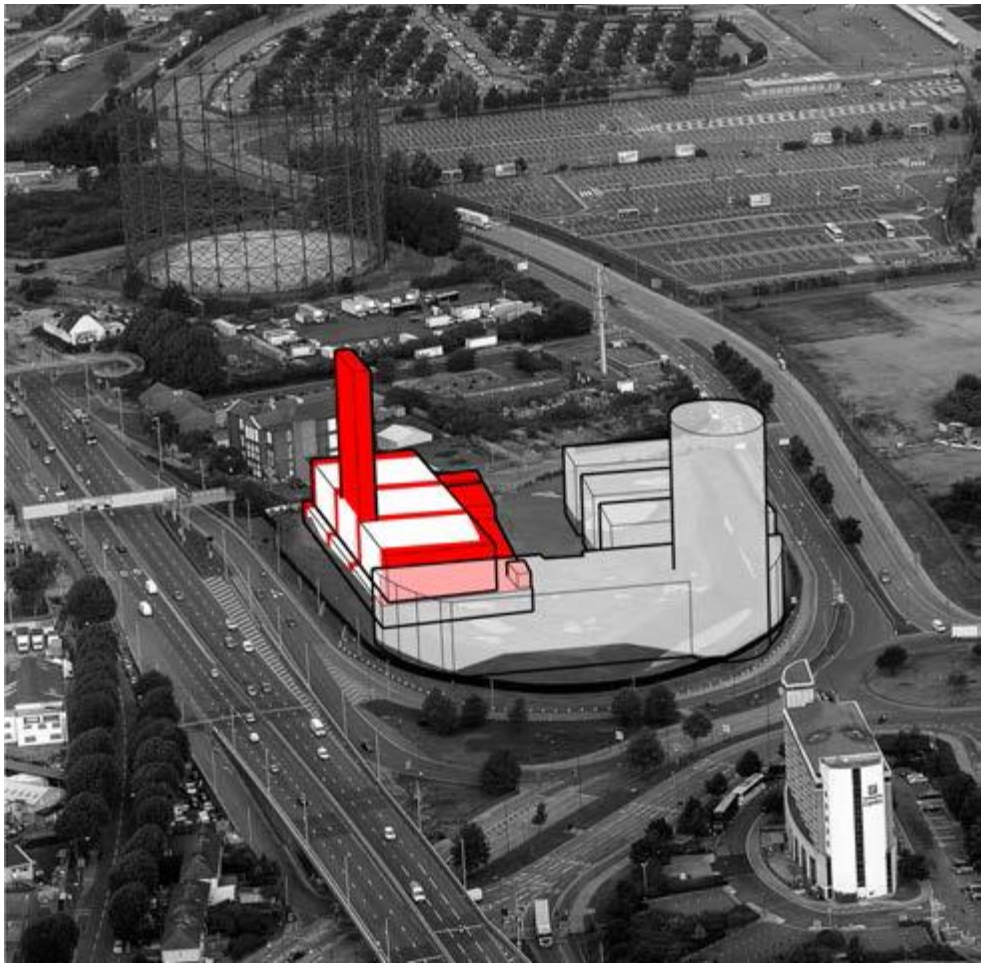
Figure 10: Greenwich Peninsula Heat Network

The energy centre will be connected to all development plots on the eastern part of the Peninsula via a pre-insulated area-wide heat network (illustrated in Figure 10). The development plots will each interface with the heat network via individual heat sub-stations located within each plot / building. Each sub-station will connect to a plot level site heat network distributing heat energy around each building, and up to individual Heat Interface Units (HIUs) within each residential property.

Approval was given in October 2013 for the energy centre building which will supply the Peninsula's area wide heat network. The approved proposal is for a 12m high, 2,600m^2 floor area building incorporating a 49m high flue stack, as shown in Figure 11 below. Within the confines of the building, space is provided for three CHP units, seven gas boilers and four thermal stores to help smooth heat demand profiles enabling CHP to supply a large proportion of the heat.

An Energy Services Company (ESCo) will be responsible for managing and maintaining the network. They will supply affordable, secure energy to customers connected to the network. Minimum standards of service will be provided to the ESCO's heat supply customers, for example, a guaranteed response times should a fault occur with the heat supply.

Figure 11: Proposed Energy Centre



Peninsula Quays

When planning permission for the individual plots is sought, each plot level energy strategy is checked to ensure it supports the strategic energy plans for the Peninsula. For example, in July 2013 approval was given for outline planning permission for the Peninsula Quays mixed use development of 1,683 residential units (spread over 8 building envelopes) and up to 38,517m^2 of non-domestic space. A site heat network is planned for the development to connect to the area wide network when this becomes operational.

APPENDIX 4

Cost to the GLA

A team evaluate the energy assessments produced by developers to ensure they meet the energy policies in the London Plan and this process results in the CO_2 saving commitments described in this 2013 monitoring report. Where the proposed energy assessments do not meet the policies, changes to the proposals are requested to bring them into compliance. The role is primarily that of a gate keeper ensuring that only those proposals meeting the policy requirements obtain approval through the planning system.

The team is led by a GLA energy officer with support provided by external specialist consultants. The team regularly interacts with the planning case officers assigned to individual applications. The annual combined costs of the core team are approximately £200,000.

Cumulative CO_2 savings of 1,484,220 tonnes will be achieved as a result of the implementation of the London Plan energy policies in 2013. This assumes the annual CO_2 savings secured through planning continue for a period of 30 years reflecting the lifetime of the building services.

This represents a cost per tonne of CO_2 saved of £0.14 when considering purely the officer and consultancy costs to the GLA. The cost per tonne of CO_2 saved will be higher in practice as some of the savings will not materialise, for example where the development does not get built out or is superseded by a new planning application in a later year. However, even if the majority of the developments did not proceed, the cost to the GLA is still significantly less than £1 per tonne of CO_2 saved.

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Hindi
यदि आप इस दस्तावेज की प्रति अपनी भाषा में चाहते हैं, तो कृपया निम्नलिखित नंबर पर फोन करें अथवा नीचे दिये गये पते पर संपर्क करें

Vietnamese
Nếu bạn muốn có văn bản tài liệu này bằng ngôn ngữ của mình, hãy liên hệ theo số điện thoại hoặc địa chỉ dưới đây.

Bengali
আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি (কপি) চান, তা হলে নীচের ফোন্ নম্বরে বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Greek
Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος εγγράφου στη δική σας γλώσσα, παρακαλείστε να επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυδρομικά στην παρακάτω διεύθυνση.

Urdu
اگر آپ اِس دستاویز کی نقل اپنی زبان میں چاھتے ھیں، تو براہ کرم نیچے دئے گئے نمبر پر فون کریں یا دیئے گئے پتے پر رابطہ کریں

Turkish
Bu belgenin kendi dilinizde hazırlanmış bir nüshasını edinmek için, lütfen aşağıdaki telefon numarasını arayınız veya adrese başvurunuz.

Arabic
إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى الاتصال برقم الهاتف أو مراسلة العنوان أدناه

Punjabi
ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

Gujarati
જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં જોઇતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.