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Mitsubishi Electric Guide to The London Plan

Information Guide 51

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Mitsubishi Electric Guide to The London Plan

This is an independent guide produced by Mitsubishi Electric to enhance the knowledge of its customers and provide a view of the key issues facing our industry today.

This guide accompanies a series of seminars, all of which are CPD certified.

Contents

The London Plan

Containing 121 policies set out over 317 pages, the London Plan is a comprehensive vision of London's objectives for its economy, environmental performance, transport and social structure.

London is Europe's biggest city with a total area of 1,572 sq km and a population of 7.56 million. London's population is forecast to exceed 9 million by 2021 and reach almost 10 million by 2031.

To cope with this rapid development and to avoid chaos, London needs an overarching strategic plan of action, hence the development of the London Plan.

The Plan sets out an integrated economic, environmental, transport and social framework for the development of the capital to 2031. Local plans of London boroughs must conform generally with the London Plan.

Essentially, the plan's six objectives are to ensure that London is:

- A city that meets the challenges of economic and population growth to ensure a sustainable, favourable and improving quality of life for all Londoners and helps tackle inequalities
- A globally competitive and successful city
- A diverse, strong and accessible community to which Londoner's feel attached
- A place that delights the senses and takes care of its buildings and streets, producing the best of modern architecture, while also making the most of its built heritage
- A world leader in improving the environment locally and globally and at the forefront of policies to tackle climate change. London should reduce pollution, develop a low carbon economy and consume fewer resources by using them more effectively
- A city where everyone can access jobs, opportunities and facilities with an efficient and effective transport system

The original London Plan was published in February 2004 and was revised and republished in February 2008 and again in July 2011. Minor alterations were made in June 2012 to comply with the National Planning Policy Framework (which sets out the Government's planning policies for England and how these are expected to be applied) and other changes in national policy. In October 2013, the Mayor published another series of 'revised early minor alterations' to the Plan.

The London Plan is an essential part of achieving sustainable development in London. It offers a framework for the development and use of land in London, incorporating improvements to infrastructure, especially transport.

The Plan also sets out proposals for implementation, co-ordination and resourcing of projects. In providing an overarching strategy, the Plan helps to ensure joined-up policy delivery by Greater London Authority (GLA) organisations including Transport for London.

For the construction industry, the Plan is also important because it provides a background on which London boroughs set their detailed local planning policies. Sustainable development is a strong theme in the London Plan, with the aim of mitigating the effects of climate change on the city and its population.

London and Climate Change - being lean, clean and green

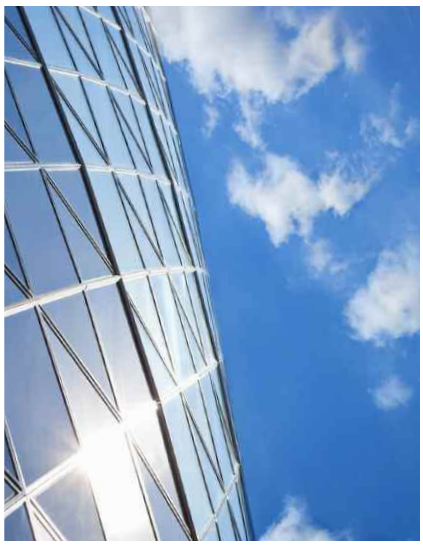
As Europe's largest city, London needs to be very aware of the potential impacts of climate change. Its geographical position makes the UK capital vulnerable to flooding, subsidence, overheating and water shortages. As the Plan states:

> *Climate change will increase the probability and severity of these events through rising sea levels, higher winter rainfall, higher tidal surges, hotter summers and less summer rainfall.*

Figures for London show that the city's inhabitants use 167 litres of water per person per day, which is 14% above the average for England and Wales. Energy demand is also growing year-on-year for both domestic and commercial purposes. However, the July 2013 Supplementary Planning Guidance (SPG) on Sustainable Design and Construction, points out that in terms of carbon emissions London is well ahead of many other parts of the country. High use of public transport in the city and its efficient use of land put London's carbon emissions at 5.9 tonnes per person per year. This is significantly lower than the UK average of 7.1 tonnes.

The GLA has committed to a number of targets on sustainable development and these include reducing carbon and other emissions from transport and buildings. Even though London is performing well in this area, the concern over the potential impacts of climate change on the city is a driving factor in continuing on a path of reduction.

Another key objective is to improve the energy efficiency of London's homes and non-dwellings. The aim is to achieve a 60% reduction in London's CO_2 by 2025 (against 1990 levels) and to deliver 25% of the city's energy requirements from decentralised sources by 2025.



The Plan takes into account these serious issues in its approach to planning applications, and all London boroughs are expected to do the same in their DPDs (Development Plan Documents).

There is a strict energy hierarchy that is applied to assessment of applications:

1. Does the proposal use less energy by adopting sustainable design and construction measures?
2. Does the proposal use an efficient energy supply, with particular emphasis on decentralised energy generation?
3. Does the proposal use renewable energy?

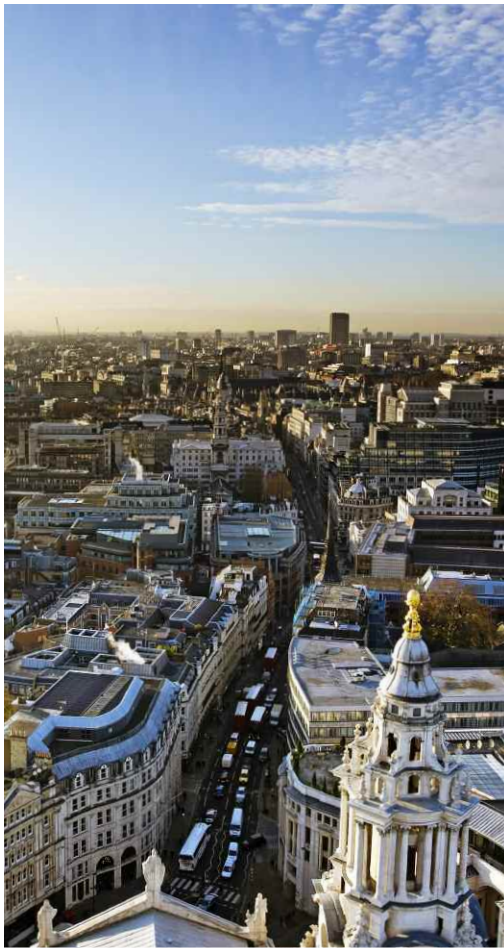
The Mayor has characterised these three points by saying that building projects must, **"be lean, be clean and be green"**.

There is also an understanding that the Mayor and the boroughs will support and promote 'the most effective adaptation to climate change'. This includes use of measures that minimise overheating and the contribution to the heat island effect found in cities. Buildings must minimise solar gain and water use, while also ensuring that they help to reduce flood risk through sustainable urban drainage.

In the most recent edition of the London Plan, there is a requirement for each major development proposal to submit an in-depth energy assessment. This must include details on how CO_2 reduction targets are going to be met on the development. Recently issued Supplementary Planning Guidance states that from October 2013 new developments must show a 40% improvement on CO_2 emissions (compared with Part L 2010). From 2019 non-domestic buildings will have to be zero carbon.

While setting targets for new buildings, it is also important to bear in mind that existing buildings are a major contributor to London's energy use and carbon emissions, and will continue to be so for many years to come. As part of the London Plan, the RE:FIT scheme is aimed at retrofitting London's current public sector building stock. The aim is for 40% of public sector buildings in London to be retrofitted by 2025, representing 11 million m^2. The aim is to achieve carbon savings of 2.5 million tonnes per annum.

A similar scheme, known as RE:NEW has been set up to help improve the energy efficiency of London's homes. This scheme aims to maximise the benefits of Government funding schemes such as the Green Deal and Energy Company Obligation (ECO), which will fund energy saving investments for householders, including insulation, heating and technologies such as photovoltaics.



New Approaches to Heating and Energy Generation

The wide-ranging objectives of the London Plan mean that there is no single solution for the challenges of its existing and new building stock. However, the Mayor of London is supporting development and use of innovative approaches and technologies. Chapter Five (section 5.4) of the Plan names a number of renewable energy technologies that may be considered for new projects, including photovoltaics, solar hot water and heat pumps.

Two strategies that are considered particularly useful to London are decentralised energy generation and the use of secondary heat sources.

According to the Decentralised Energy Capacity Study (2011), by 2030 almost a quarter of London's heat and power could be generated locally. Heat would be distributed by 'heat networks'.

Finding long term sources of heat will become more challenging, so turning to secondary sources is an important proposal. These secondary sources include waste heat from industrial and commercial activities, as well as heat that exists naturally in the air, ground and water.

An example of secondary heat use was seen in headlines in November 2013 when it was announced that heat captured from the London Underground tunnels and electrical substations would be used to warm homes. The scheme will run through Islington's Bunhill heat and power network which was opened in November 2012 and already supplies more than 700 homes in the north London borough. The expansion will add 500 more homes to that network.

The potential of heat pumps

Heat pumps are an important element in the use of secondary heat. Engineering consultants Buro Happold conducted a survey for the GLA on the use of waste heat, and identified both opportunities and challenges.

In its report for the GLA (London's Zero Carbon Energy Resource - Secondary Heat, July 2013) Buro Happold points out that waste heat sources are not uniform in temperature and are generally not of a high enough temperature to deliver directly to homes. For example, the report points out that waste heat from sewers is available at 14ºC to 22ºC. The same is true when sourcing heat from the air, ground or water. Temperatures need to be upgraded before they can be useful. With this in mind, the report highlights the usefulness of heat pumps in this role. The Buro Happold report estimates that the city's heat demand could be met by this combination of technologies.

Heat pump technology is now well proven, and already around 25,000* homes are benefiting from it. Heat pumps today can comfortably deliver heat at useful temperatures of around 55ºC.

Even allowing for heating needs that cannot be met from secondary sources (such as cooking), the Secondary Heat report estimates that the Mayor's 25% goal could be reached without the need for significant retrofitting. The report does point out some hurdles in achieving this goal including commercial issues to balance resources available, and the supply of a peak heating source for very cold weather.

The overall vision is that London in 2050 would be moving away from reliance on fossil fuels, and using secondary heat sources in the centre of the city, and at its edges using heat pump technology to extract heat from the ground, water and air.

Heat pumps are a potentially important technology that could help London reach its renewable and sustainable goals. They are available in a range of capacities to suit a variety of project requirements and the London Plan's goal of reaching the 55ºC and above temperature range is ideally suited to heat pump technology.

The Secondary Heat report covers the use of heat pumps very specifically because of their ability to make use of the three main potential sources of delivered heat: air source; water treatment works and ground source.

Since heat pumps do require electricity input, Buro Happold points out that decarbonising the grid would be an important step to making this technology less of a carbon burden. Also, the relative cost of using heat pumps is affected by changes in electricity prices. As with all renewable technologies, the first step is to ensure that buildings require less heat through better design, construction and maintenance. Similarly, investments in existing building stock should concentrate first on improving their overall energy performance, before considering renewable technologies.

The movement of heat between buildings through a low temperature heat loop also opens up opportunities for cooling and heating with good levels of efficiency. This movement of heat means that heat is not lost but re-used. Even higher temperature waste heat or loops can interact with these low temperature loops through heat exchangers or nodes. Heat pumps are a vital part of realising this change away from higher temperatures, where heat loss from pipework could cause problems within buildings.

*figures from the Heat Pump Association

Heat Pump Technology in London - Kingston Heights uses River Thames for heating

A new eco-friendly housing development in London is getting the energy for its heating and hot water directly from the Thames in a pioneering community heating scheme that could be replicated in many of our major towns and cities.

Edward Davey, the Secretary of State for Energy and Climate Change, formally switched on the innovative, renewable heat pump-based heating system. The £70 million mixed-use development has been created by NHP Leisure Developments on the site of a former power station right in the heart of Kingston upon Thames, and 200 metres from the banks of the river. The development includes 56 homes called Kingston Heights for national affordable housing provider Affinity Sutton, plus 81 luxury private apartments known as River Walk provided by Redrow London.

The 137 apartments, built by specialist contractor and developer, United House, will all benefit from the cutting edge Ecodan heat pump system that harvests naturally stored energy from the River Thames. The community heating scheme takes renewable heat from the sun, stored in the river water and boosts it to the temperature required for the underfloor heating and hot water needed by residents. “At two metres below the surface the water never falls below 7°C, even in winter, so we can be certain that it can provide enough energy to heat the apartments,” explains Mike Spenser-Morris, managing director of NHP Leisure Developments and the visionary behind the scheme.

> “If we had fitted gas boilers, then the site would be dumping around 500 additional tonnes of carbon into the atmosphere each year. In addition, because of this systems exceptional energy efficiency, the equivalent heating cost for a couple living in a one bedroom apartment would be 18% more.”

The system can draw up to 13 million litres of water each day - the equivalent of five Olympic-sized swimming pools. The river water passes through a state-of-the-art, two-stage filtration process that ensures no marine life can enter the system. Inside a specially built plant room adjacent to the river, the water passes through high efficiency heat exchangers and, once the low grade heat has been harvested, the water is immediately fed back into the river, untreated in any way.

The heat exchangers transfer this low grade heat from the river water to an internal 'closed' loop water system and this is then carried 200 metres to a plant room in the apartment building, where Mitsubishi Electric's renewable Ecodan heat pump technology boosts the low grade heat to the temperature required for the apartments' heating and hot water. Towards the end of 2014, the construction of a new 142-bedroom hotel, with meeting, banqueting and conference facilities, will also be completed at the site, which will increase the efficiency of the heating scheme further still.

The Doubletree by Hilton hotel will derive all its heating and hot water, as well as its cooling, from the open water heat pump installation. Heat recovered from cooling the individual hotel rooms will be reclaimed and returned to the community system to support the heating and hot water demand for the whole site.

Mike Spenser-Morris believes the scheme paves the way for other developments taking place near an open body of water, to benefit from this highly energy efficient system, doing away with the need for traditional combustion boilers, with their attendant carbon emissions. "This open water heat pump system will be capable of producing over two megawatts of thermal energy for this development and will provide it 24/7, 365 days a year regardless of the weather or air temperature, even in the depths of winter," he explains. "Almost every major city in this country is close to a river, lake, reservoir, canal or the sea.

"Every litre of water naturally stores, with the greatest efficiency, the valuable energy the sun delivers to earth each day," adds Spenser-Morris. "There will be thousands of homes and businesses that can benefit from this most energy-efficient technology and in the process prevent thousands, even millions of tons of harmful carbon being released into the atmosphere from now on".

Edward Davey, Secretary of State for Energy and Climate Change and MP for Kingston and Surbiton, officially switched on the development's innovative heating system in October 2013. "Kingston Heights is a great example of how sustainable solutions can help power entire communities. I want to see a community energy revolution where projects like this are the norm, not the exception," he said.

"This project will not only transform the waterfront area in Kingston, but also means residents' bills will be lower than if they used gas. The Thames is a great natural asset to Kingston and London as a whole. By capturing the heat permanently stored in the river to provide heat and hot water to the whole development the project shows the enormous potential of renewable energy."

Secretary of State, Edward Davey, MP, visited the specially-built plant room adjacent to the river, which extracts heat from the river water without harming wildlife.

To receive a CPD seminar on The London Plan you can call your Mitsubishi Electric Regional sales office to arrange an in-house presentation of this information.

If you would like to receive invitations to future CPD events, please email **livingenvironmentalsystems@meuk.mee.com**

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