MANAGING RISKS AND INCREASING RESILIENCE

THE MAYOR'S CLIMATE CHANGE ADAPTATION STRATEGY

OCTOBER 2011

MAYOR OF LONDON

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Greater London Authority
October 2011

Published by
Greater London Authority
City Hall, The Queen's Walk
London SE1 2AA

www.london.gov.uk
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ISBN 978-1-84781-469-2

Cover photo © 2011 BURNS & NICE Ltd,
London

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EXECUTIVE SUMMARY

Key headline messages

- London is already vulnerable to extreme weather, in the form of floods, droughts, heatwaves and very cold weather. Without action, further climate change, London's population growth, and other changes (eg changes to make-up of London's population and land cover) will increase the risk of severe impacts.
- London has already experienced some changes to its climate and we should expect warmer wetter winters and hotter, drier summers in the future. Extreme weather, such as heatwaves and very heavy rainfall is expected to become more frequent and intense. Very cold winters will still occur, though they will become less frequent. Sea levels will rise for centuries.
- Preparing for extreme weather and further climate change is about managing risks and increasing our resilience to them – it is therefore as much about the economy, quality of life and social equality, as about the environment.
- Early action today will not only manage current and future risks, but save Londoners money and create jobs.
- Many of our vulnerabilities to climate impacts stem from London's 'urbanisation'. Restoring greenspaces and building community capacity will increase our resilience and improve our quality of life.
- The Mayor does not have the power or the budgets to adapt London on his own. However through this strategy he can provide a framework for collective action, identifying where he is uniquely placed to act and where other organisations, and even Londoners themselves, can lead or facilitate action.

Key messages by chapter are:

Introduction

There is clear evidence that our climate is already changing. It is widely accepted that without significant and global action to reduce our greenhouse gas emissions, we run the risk of experiencing significant changes to our climate that will dramatically impact on our quality of life and the economy.

'Adaptation' is a process of identifying climate risks and opportunities, assessing the options to manage these risks and opportunities, and implementing the most sustainable actions to sustain and even improve our quality of life. Because the climate will keep changing through the century, and our responses change with it, adaptation should be seen as a 'journey', rather than a 'destination'.

Chapter 1: London's future climate

The UK currently has the most advanced climate projections in the world. They project that the southeast of the UK will experience warmer, wetter winters and hotter, drier summers in the future. Extreme weather, such as heatwaves and very heavy rainfall will become more frequent and intense. Very cold winters will still occur, though they will become less frequent. Sea levels are expected to continue to rise for centuries to come.

Chapter 2: Mapping adaptation

No single authority is individually responsible, or capable, of increasing our resilience to climate risks. To effectively sustain and even increase our resilience, we need the climate to be routinely considered in all significant decisions and more joint working across the public, private and voluntary sectors. This chapter attempts to map where responsibility for adaptation lies and identify where gaps exist in enabling adaptation.

Chapter 3: Flooding

London is vulnerable to flooding from a variety of sources, key of which are flooding from the North Sea (tidal flooding), the freshwater Thames and the tributaries to the Thames (fluvial flooding) and from heavy rainfall (surface water flooding). Flood risk in London is principally managed by a system of flood defences (walls, gates and the Thames Barrier) and drainage networks.

London is currently very well protected against tidal flooding, but has a lower and much more variable standard of protection against fluvial flooding and a relatively low standard of protection against surface water flooding. The probability of all forms of flooding is projected to increase as sea levels rise and heavy rainfall events become more frequent and intense. The cumulative impact of paving over of front and back gardens has increased the pressure on our drainage system, also increasing the likelihood of flooding.

The impact of a major flood in London would be significant because it is heavily urbanised and 15 per cent of the city's surface area lies on the floodplains of London's rivers. Currently 1.25 million people, 481,180 properties, and a substantial proportion of the capital's schools, transport network, and emergency services are at tidal and fluvial flood risk, though most are well protected. More than 800,000 properties lie at risk of surface water flooding. The consequences of flooding will increase as London's population grows and more property and infrastructure is located in areas of flood risk. There are also a large number of flood-vulnerable communities at risk. Advance warning times for fluvial and surface water flooding are short and public awareness of flood risk and capacity to act is low.

Response

The Mayor believes that London should be resilient to all but the most extreme floods and should have robust emergency plans to respond to, and recover from, flooding. The Mayor will work with partners to reduce and manage current and future flood risk in London by:

- improving the understanding of flood risk in London and how climate change will alter the risks, to identify areas at greatest current and future risk
- supporting collaborative working to enable a coherent cost-effective approach
- reducing flood risk to the most critical assets and vulnerable communities, to target the greatest effort on London's most vulnerable assets
- raising public awareness of flooding and individual and community capacity to cope and recover from a flood, to improve London's resilience to flood events.

Chapter 4: Drought

The likelihood of a drought having a significant impact on London is currently low, as in most years there is sufficient water to meet demand. However, this 'security of supply' is only met by withdrawing more water from the environment than can be sustained. In the future, less summer rainfall, greater demand for water and greater restrictions on the volume of water we can remove from the environment will threaten our security of supply.

Without action, London will experience an increasing frequency of drought management measures (such as restrictions on water use, for example hosepipe and non-essential uses bans). Frequent and prolonged droughts would affect water-dependent businesses, London's green spaces and biodiversity – particularly wetlands and watercourses. Reducing our water use could improve our drought resilience, safeguard

our environment and save Londoners money through reduced utility bills.

Response

The Mayor believes that London should have a secure supply of water that is affordable and safeguards the environment. The Mayor will work with partners to improve the sustainability of London's water supply and demand balance and make London more robust to drought by:

- promoting an integrated package of measures to enable and sustain a long-term improvement in water efficiency
- lobbying government to integrate water efficiency into housing retrofitting programmes
- promoting capturing and using rainwater for non-consumptive purposes
- improving our response to drought.

In response to the 2006 drought, Londoners' water use fell by ten litres per person per day, but has now increased back to its original level. This shows we can, and have, made significant water savings, but that without ongoing support and incentives, consumption increases. The Mayor will work with partners to deliver a 'six point plan' of integrated actions:

a Improve the water efficiency of existing buildings
b Ensure all new development is super water efficient
c Raise Londoners awareness of the financial benefits of increased water efficiency
d Increase the number of homes with a water meter
e Change the way Londoners pay for their water
f Continue to tackle leakage.

As part of its strategy to reduce CO2 emissions by 80 per cent by 2050, government has made a commitment to offer an energy efficiency retrofit to every home in the UK by 2030. The Mayor believes that improving the water efficiency of London's 3.2 million homes is essential to balancing supply and demand for water in the long-term and meeting our carbon reduction targets. As such, water efficiency improvements should to be integrated into energy efficiency retrofitting programmes to ensure cost effective delivery and increased public awareness.

The Mayor is keen to promote capturing and using rainwater for non-consumptive purposes (such as flushing toilets). This approach, known as 'rainwater harvesting' can be a 'win-win-win' solution, though reducing the use of treated mains water for uses that do no require highly-treated water, reducing flood risk and reducing the volume of rain-diluted sewage at sewage treatment works.

Chapter 5: Overheating

Overheating is a term used in this strategy to describe when temperatures are hot enough to affect Londoners' health and comfort, or affect the capital's infrastructure. As we have already experienced two major heatwaves in the last decade (2003 and 2006), overheating is a real and present risk to London. Without action, the risk of overheating is expected to increase in the future as average summers get hotter, heatwaves increase in intensity and frequency and as London grows. In addition, urban landscapes can amplify summer night-time temperatures, maintaining high temperatures in the city at night, an effect known as the urban heat island effect.

Londoners are more resilient to rising temperatures than the rest of the UK, but once temperatures exceed 24.7ºC, Londoners seem to be more vulnerable, with a higher rate of deaths and ill effects. The reasons for this vulnerability are that London is located in the warmest part of the UK and therefore our thermally poor homes are more likely to overheat. Poor air

quality also thought to compound the impact of high temperatures. High temperatures also affect the transport network, electricity supply and water use.

The Mayor will work with partners to reduce and manage the impact of hot weather on Londoners through:

- mapping overheating risk to prioritise actions to target the worst affected areas and most vulnerable people
- managing rising temperatures by increasing the amount of green space and vegetation in the city
- reducing the risk of overheating and the need for mechanical cooling in new and existing development and infrastructure
- ensuring London has a robust heatwave plan.

Chapter 6: Health

The impact of climate change on the health of Londoners is a complex issue as the benefits or threats to health may be direct (for example, heatstroke), or indirect (for example, a hospital having to be closed due to flooding). On balance, for the early decades of this century, the changing climate is expected to present more health benefits than challenges, such as a predicted reduction in hospitalisation and cold-related deaths. It is also expected that without targeted action, existing health inequalities will increase, particularly for vulnerable populations. Managing these impacts is the responsibility of a wide range of agencies, both within the health sector and beyond.

To date, the health sector has largely focused on actions to reduce carbon emissions. It is critical that the health and social care services are resilient to extreme weather. The health sector is an emergency service and therefore needs to be capable during emergencies.

The Mayor will work with the health and social care sector to provide climate information, assist with assessing climate risks and opportunities to the sector and developing best practice demonstration projects.

Chapter 7: London's environment

London is the greenest big city in the world and the quality and abundance of its greenspaces provides the opportunity for Londoners and visitors to have access to wildlife in an urban setting. London's greenspaces also perform a range of functions, known as 'ecosystem services', such as reducing flood risk by absorbing rainwater, and cooling the city through shading and evaporation. These ecosystem services are essential to the wellbeing of Londoners and London's resilience to climate change.

The Mayor plans to increase London's resilience to climate impacts through using ecosystem services to complement London's 'grey' infrastructure (floodwalls, drains and sewers). The Mayor will work with partners to deliver a major Londonwide 'urban greening' campaign, increasing the quality, quantity, function and connectivity of London's greenspaces, targeting projects where they are most needed and where they will have greatest impact.

Chapter 8: Economy

All cities are vulnerable to climate change because of the concentration of people and development in a relatively small area, and their reliance on importing people, food, water, energy and products for them to thrive. London's position as one of the world's foremost cities also exposes it to the impact of climate change beyond its boundaries – both nationally and internationally.

London's ability to remain a leading world city in an increasingly competitive and globalised

economy over the next 20 years depends on a number of factors. In particular, London must continue to attract and retain internationally competitive firms in the finance and business sectors. This chapter focuses on four key areas where the Mayor believes London's economy and business community needs to adapt for a changing climate:

- Ensuring that London is perceived as a safe and secure place to do business
- Identifying the segments of the financial services sector most exposed to climate change
- Enabling London to become the world exemplar in tackling climate change
- Enabling London's businesses to become more climate resilient.

The Mayor will work with London's business-to-business organisations and Business Improvement Districts to help businesses identify and respond to the risks and opportunities presented by climate change and extreme weather.

Chapter 9: Infrastructure

A city is a system of systems. The resilience of the city is therefore not just dependent on how resilient its systems (transport, utilities etc) are individually, but also the resilience between these systems. This chapter looks at London's transport, energy and waste infrastructure.

London's transport network is the lifeblood that supports the city. The diversity of London's transport modes (Underground, bus, train, taxi etc) provides greater resilience to climate impacts as it is very unlikely that all modes would be affected by an extreme weather event. However some modes are more vulnerable than others. The Underground is the most vulnerable to flooding and overheating as water will naturally flow to the lowest point and cooling the deep level Underground lines is very challenging. Buses on the other hand are very flexible as their routes can be easily changed and the buses themselves are relatively easy to retrofit or replace.

Transport for London has undertaken a climate risk assessment across all its modes using the UKCP09 climate projections and is confident that it has the mechanisms to manage an extreme weather event and replace operational critical assets as required.

The energy system is vulnerable to both direct climates impacts and changes in demand for energy. It is expected that winter heating demand will decrease through the century and summer cooling increase. This will provide challenges as currently most heating is gas powered and almost all cooling electrically generated.

More than a third of the energy industry processes – generation and distribution – are sensitive to climate variability, especially temperature, rainfall, wind, sea levels and soil moisture. The energy generation and distribution companies need to ensure that their systems are climate resilient and that they can meet changes in seasonal energy demand.

Climate change will affect waste management through potential changes in the types and volume of waste produced and direct impacts on the waste management process (from collection through to treatment and final disposal). New facilities will need to be flexible to changes in waste production and be resilient to climate impacts.

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Chinese
如果需要您母語版本的此文件，
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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 જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.