

**Action Today to Protect Tomorrow**  
The Mayor's Climate Change Action Plan  
Executive Summary

**LONDON**  
**CO<sub>2</sub>**  
**N<sub>2</sub>**

**Greater London Authority  
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## Foreword by Ken Livingstone, Mayor of London

It is almost impossible to exaggerate the danger of climate change. I have no doubt that it is the single biggest threat to the future development of human civilisation.

When scientists talk of the threat of catastrophic climate change they don't just mean the inconvenience of extra flooding or the Tube being unbearably hot in summer. If no action is taken to cut carbon emissions we face temperature rises of over five degrees towards the end of this century. It took a temperature *drop* of just five degrees to cause the last ice-age, so the impact of a temperature increase of the same level would be profound. The map of the world would be changed beyond recognition as sea levels rise, and hundreds of millions of people would be displaced by drought, starvation and the increased ferocity of extreme weather events.

Collectively, we have been complacent about global warming for far too long. It is 10 years since the Kyoto Protocol was signed and still global carbon emissions continue to rise. All of us have a responsibility – actions taken at an individual level can have consequences that are unacceptable for society as a whole. Buying a gas-guzzling 4x4 vehicle is an 'individual choice' but it creates carbon emissions that contribute to global warming and harm everyone. It should be no more socially acceptable than to claim the right to dump rubbish in the street.

Global warming has to be tackled at a city, national and international level. Human civilisation has developed so much that our actions affect the functioning of our entire planet.

I hope for the sake of our children and grandchildren that we can still prevent catastrophic climate change, but to do so we have to act with great speed and decisiveness.

The aim of this plan is to deliver decisive action in London with the urgency that is required.

Nicholas Stern's formidable review for the Chancellor on the 'Economics of Climate Change', published in November 2006, demonstrated conclusively that the cost of swift action to reduce carbon emissions will be small (one per cent or less of national income) but that the costs of doing nothing and then trying to clean up the mess later will be much higher. I fully endorse the approach adopted by Stern.



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This action plan shows that many measures that will deliver the quickest carbon emissions reductions in London will also deliver net financial benefits within a fairly short space of time - improving the comfort of London's homes and offices and putting money back into the pockets of Londoners and London businesses. Those longer run measures that will impose higher costs in the short term, will still work out as a good investment compared with the costs of doing nothing and allowing catastrophic climate change to develop.

The simple message is this: to tackle climate change you do not have to reduce your quality of life, but you do have to change the way you live. The present model of huge energy production followed by huge energy waste - in the losses from power stations, from houses, from commercial property, and from transport - is utterly inefficient and is irreparably damaging the planet. There must be a decisive shift to an economy in which energy is conserved, not wasted, and therefore in which far less energy needs to be produced per unit of economic activity.

The fundamental cause of global warming is the profligacy with which we have exploited global energy resources over the past century. A strategy to cut carbon emissions is essentially about cutting out waste and improving efficiency.

This is a problem everyone has both a stake in resolving and genuinely can do something about through their changing their own behaviour. From turning off appliances when they're not being used, to installing renewable energy supplies to their house, if every Londoner decides to play a part in cutting our carbon footprint the cumulative effect will be considerable.

But even such individual action alone won't be enough. The plan sets out a series of measures that I will take as Mayor, including to enable Londoners and businesses to use energy more efficiently; to change fundamentally the way London is supplied with energy; to maintain London as a world-leader in sustainable transport; and to ensure that new development in our growing city is of the highest environmental standards - fit for a very different future.

London businesses and business leaders have been at the forefront of raising awareness of the threat of climate change and business has a major part to play in reducing London's carbon footprint. This plan sets out a series of ways in which I will support and work with them to make London's business sector a beacon of carbon-friendly commerce.

Indeed, by placing ourselves at the forefront of tackling what is likely to be a defining issue of the twenty first century, London has a real opportunity to develop its own economy. I want London to become the world's leading centre for research and financial development on climate change during the next five years.

To achieve this requires, first, clarity that London is determined to tackle climate change; second, the most sophisticated financial institutions to respond to carbon trading and investment technologies; and third, state of the art scientific and technical research facilities to develop the technologies of the future.

A number of cities can offer some of these solutions, but only London can offer all three. I will do my part by ensuring that climate change continues to be the number one priority for my administration.

This action plan demonstrates that London can make deep and meaningful cuts in its emissions through actions by London public authorities, by businesses, and by individual Londoners. For the next ten years we can meet the target reductions that scientists say are necessary.

The difficult truth, however, is that without action at a national and international level we cannot continue to achieve this through to 2025 and beyond.

Most fundamentally, the government has to take rapid action to introduce a comprehensive system of carbon pricing.

Nicholas Stern called climate change 'the greatest ever market failure', and he was completely right. While the price of a product or service continues to ignore its impact on global warming in the form of carbon emissions it will be impossible to persuade businesses and individuals to take the full scale of actions that are necessary to avert catastrophic climate change.

Working with the government to introduce a comprehensive system of carbon pricing in the UK, in Europe, and internationally will be one of my top priorities.

Action at national and international level is often slow and difficult. That is why we have also established the C40 - a forum of the largest cities in the world, in partnership with the Clinton Foundation, to accelerate emissions reductions among cities.

A parallel development to this has started in the United States - whose government has refused to sign the Kyoto Protocol on climate change. The action of the Mayor of Seattle, Greg Nicholls, in pulling together at first a handful of US cities willing to sign up to the Kyoto Protocol's demands has stirred a change in attitude to climate change in the world's most polluting nation, although there is still a long way to go before the US actually starts to cut its emissions. Over 400 cities and states have now joined Seattle.

Every generation faces at least one great challenge. The challenge of the twenty first century is climate change. It is a challenge that absolutely everyone can play a part in tackling and which we must win. I look forward to working with Londoners to achieve this.

**Ken Livingstone**, Mayor of London

# Executive summary

## **The challenge**

Climate change is the biggest threat to the future development of human civilisation and poses a huge challenge for cities like London. The possibility of global climate change catastrophe can only be reduced by the world making deep and immediate cuts in its emissions of greenhouse gases, especially of carbon dioxide. This plan sets out how London will contribute and show leadership in meeting this global challenge.

## **The impact on Londoners and the economy**

The core message of this Climate Change Action Plan is that Londoners do not have to reduce their standard of living for London to play its part in tackling climate change, but we do all have to change the way we live.

We have to move from a high energy-using, wasteful economic model to one that conserves energy and minimises waste. In other words we have to be more efficient.

As our focus is on efficiency, many of the measures advocated in this plan will deliver net financial benefits over a relatively short period of time, as well as cutting emissions. And as the government's comprehensive 'Stern Review' of the economics of climate change demonstrated, it will be far cheaper to invest now to reduce carbon emissions, rather than ignore the problem and face far higher costs in the future.

## **London's contribution to climate change**

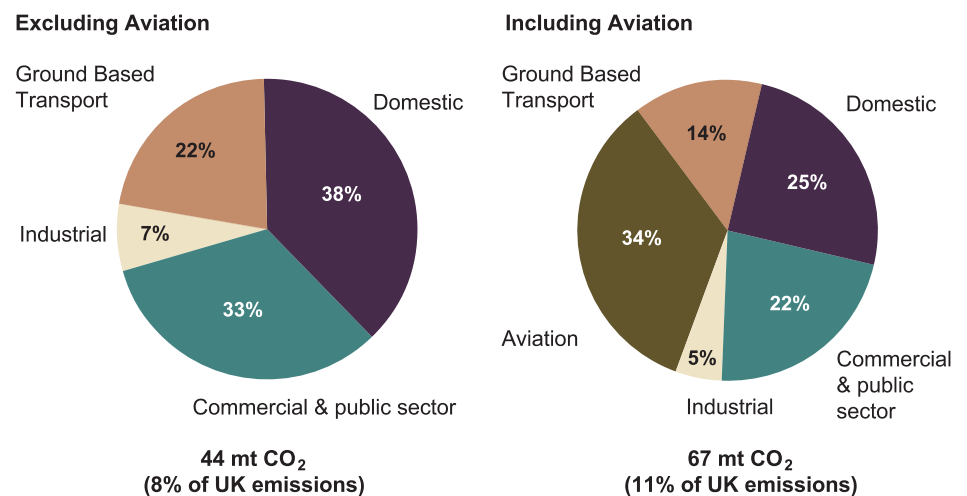
The United Kingdom is the world's eighth largest emitter of carbon dioxide. London is responsible for eight per cent of these emissions, producing 44 million tonnes of CO<sub>2</sub> each year. Unless we take action, emissions are set to increase substantially. Given London's forecast economic and population growth, London's emissions are projected to increase by 15 per cent to 51 million tonnes by 2025.

These figures exclude emissions from aviation, which are not part of CO<sub>2</sub> reductions obligated under the Kyoto Protocol and are not routinely included in the UK government's assessment of emissions.

With aviation currently accounting for only 2-3 per cent of global CO<sub>2</sub> emissions, this may seem quite reasonable. However, London's role as an international aviation hub means that aviation emissions account for 34 per cent of its total carbon footprint. Evidence further suggests that emissions from aircraft, because of the altitude at which they are emitted, can have twice the impact of ground-based emissions. Continued dramatic growth in flight numbers is also predicted, which implies that as the century progresses the contribution of aviation to climate change is likely to become very significant.

As such, the Mayor believes it important to consider aviation in his Climate Change Action Plan and it is the subject of a whole chapter of this document (Chapter 4.6). However, as aviation emissions can only be tackled through national and international action they have not been included in the core figures in other chapters.

Figure i 2006 carbon dioxide emissions from London



*Note* 2006 figures are based on latest available LECI data (for 2003) projected to 2006 based on projections for each sector

*Source* London Energy and CO<sub>2</sub> Emissions Inventory; DEFRA

### London's record so far

London has a good record in addressing climate change compared with most cities. Over the past six years we have become the only major city in the world to achieve a shift away from private car usage to public transport, cycling and walking - stabilising our emissions from road traffic, while everywhere else they are rising. In part, this has been driven by the pioneering move to charge vehicles entering central London, which has cut carbon emissions by 16 per cent within this zone.



The regulations set out in the Mayor's current London Plan ensure that new developments in London now achieve higher environmental standards than elsewhere in Britain; for example, 10 per cent of energy needs must come from on-site renewable power wherever feasible.

The Mayor has also established the London Climate Change Agency to help move London towards more efficient, lower-emission forms of energy supply. And in 2005 the Mayor established the C40 Large Cities Climate Leadership Group, which is now working to accelerate emissions reductions in many of the world's largest cities.

But even these positive steps are not enough. That is why the Mayor has produced this action plan.

### **The targets**

Tackling climate change clearly requires global action. The Mayor supports the broad view that this should be achieved through a process of 'contraction and convergence' - with the largest industrialised nations that have caused climate change required to significantly reduce their emissions, while newly developing nations are permitted to increase emissions up to a point where emissions converge and stabilise at a level which avoids catastrophic climate change<sup>1</sup>.

Once carbon emission levels have stabilised at a safe level, the world needs to operate on the basis of 'carbon democracy'; that is, that the world agrees a maximum level of global emissions and every individual is entitled to emit an equal proportion of carbon emissions within that.

The science of global warming is still developing, but the growing scientific consensus is that stabilising atmospheric CO<sub>2</sub> concentrations at 450 parts per million (ppm) is required to avoid catastrophic climate change. Current levels are around 380ppm - up from levels of 280ppm maintained for most of human history prior to the industrial revolution.

Stabilising global carbon emissions at 450ppm on a contraction and convergence basis means that London has to limit the total amount of carbon dioxide we produce between now and 2025 to about 600 million tonnes<sup>2</sup>. Meeting this CO<sub>2</sub> budget will require ongoing reductions of 4 per cent per annum. This implies a target of stabilising London and the UK's emissions at 60 per cent below 1990 levels by 2025. This compares to the existing UK government aspiration of a 60 per cent reduction from 2000 levels by 2050. This plan adopts these targets and prioritises actions across all sectors to achieve them.

**London has to limit total carbon dioxide between now and 2025 to 600 million tonnes**

### **Achieving the targets**

There is no technical barrier to achieving these targets. However, the difficult truth is that in preparing this action plan we have been unable to present any realistic scenario in which we can achieve the 2025 target set out above, without a small number of key national regulatory and policy changes.

The problem is that existing taxation and regulation policies do not ensure that the costs of carbon emissions are taken into account in setting the price of most products and services. As a result, there are insufficient financial incentives for businesses and individuals to take the kinds of action necessary to cut carbon emissions on the scale that is necessary.

An absolute priority for the Mayor, therefore, is to work with national government to introduce a comprehensive system of carbon pricing. Such a system will catalyse further technological development and commercialisation, and indeed creates opportunities for London to host carbon-trading markets, invest in green funds, and research, develop and finance new zero and low-carbon technologies.

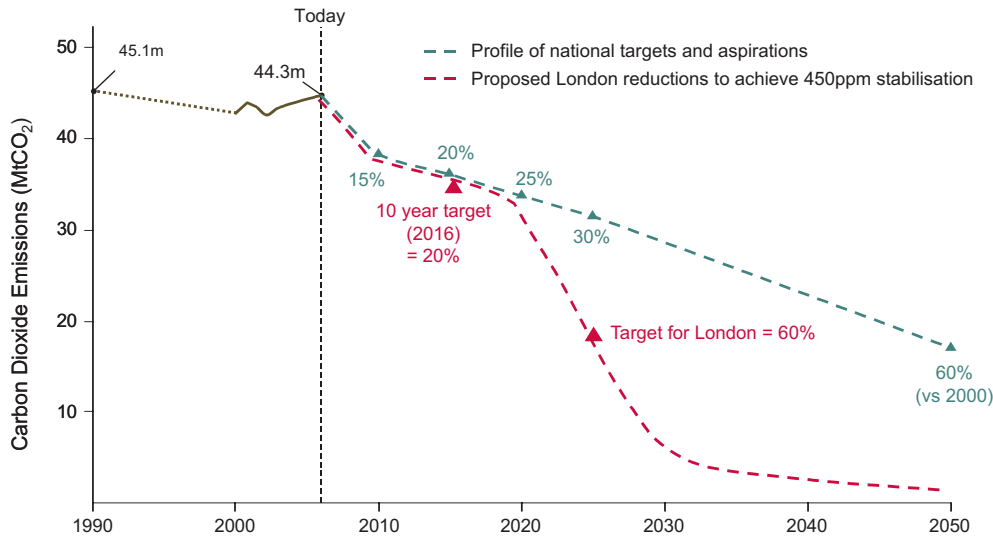
Regardless of what emissions stabilisation target is adopted for 2025, the scale of reduction we need over the next ten years is about the same. To put it another way, whatever the ultimate goal we have to implement immediately measures that are already cost-effective and will deliver major emissions reductions.

Ten years is also about the longest timeframe over which we can make realistic assumptions about future legislative or technological change.

This plan, therefore, focuses on what can be achieved over the next 10 years, but in the context of the types of changes that will be needed by 2025 and beyond.

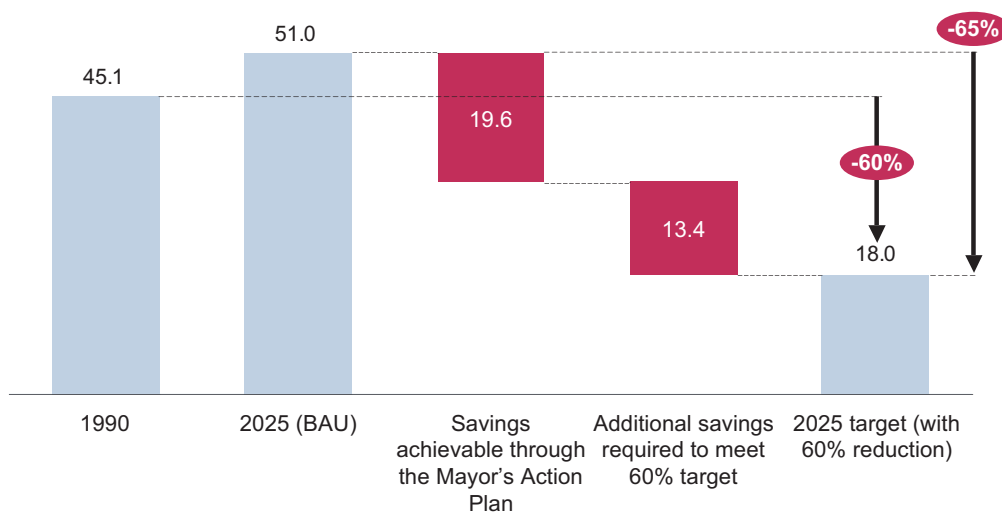
The graph below illustrates the core scenarios that this plan has considered. It shows that with the actions set out in this plan London can hit its 2016 10-year milestone, but without much more rigorous national and international action - including introducing widespread carbon pricing - we will divert from this path and by 2025 London's emissions level will have stabilised at just 30 per cent below 1990 levels, twice as high as that required. As a result, London will not make its full contribution to stabilising atmospheric CO<sub>2</sub> concentrations at 450ppm.

Figure ii Potential London CO<sub>2</sub> trajectories (excluding aviation)



By 2025, annual CO<sub>2</sub> savings of 19.6 million tonnes compared to business as usual are achievable through actions set out in this plan. Action will be necessary at a national and European level to save the further 13.4 million tonnes needed each year to constrain London’s total carbon dioxide emissions to 600 million tonnes between now and 2025.

Figure iii London’s 2025 CO<sub>2</sub> reduction target (excluding aviation)  
Million tonnes of CO<sub>2</sub>



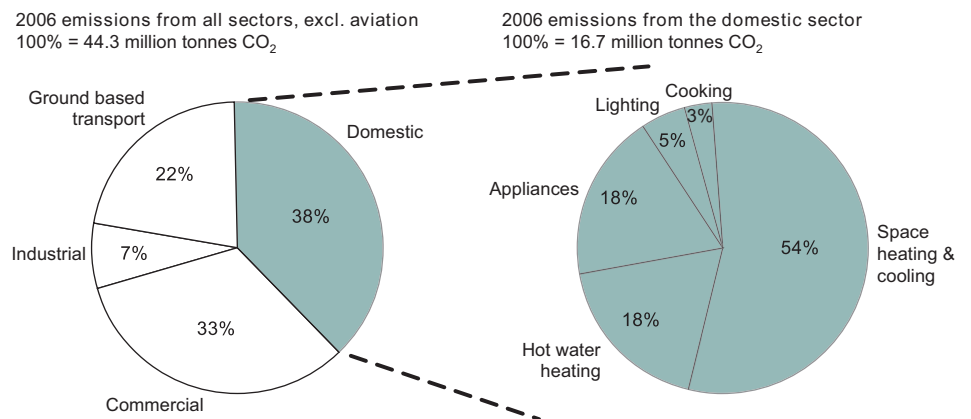
Source London Energy and CO<sub>2</sub> Emissions Inventory; GLA

The sections below summarise how these reductions can be achieved, sector by sector.

### Emissions from existing homes

Energy use in existing homes is the largest single source of CO<sub>2</sub> emissions in London, at nearly 40 per cent of the total. This plan sets out how annual domestic CO<sub>2</sub> emissions can be reduced by 7.7 million tonnes by 2025.

Figure iv 2006 CO<sub>2</sub> emissions from London's domestic sector



*Note* Cooling in the domestic sector represents a small component, currently less than one per cent

*Source* London Energy and CO<sub>2</sub> Emissions Inventory; DEFRA

**If every lightbulb in every London home was energy efficient, London could save 575,000 tonnes of CO<sub>2</sub> and £139 million per year**

Roughly half of this reduction can be delivered if just two thirds of Londoners make simple behavioural changes and put some basic energy efficiency measures in place. To give but a few examples, if every light bulb in every London home was energy efficient, it could save 575,000 tonnes of CO<sub>2</sub> and £139 million per year; if all appliances in homes were energy-efficient, this could translate into savings of £150 million off electricity bills and 620,000 tonnes of CO<sub>2</sub> every year. Reductions will also need to come from changes to the carbon-intensity of energy supplied to Londoners' homes.

Critically, because the basis of this plan is to cut waste and improve the efficiency with which energy is supplied and used, measures to reduce carbon dioxide emissions in this sector will result in significant energy bill savings: Londoners could save up to £1 billion per year by 2025, or approximately £300 per year per average household. This will particularly benefit those on lower incomes for whom expenditure on heat and power consumes a large portion of disposable income. Obviously, if fossil fuel energy prices continue to rise, these savings would be even greater.

The key new initiative to deliver carbon dioxide savings from the domestic sector will be the **Mayor's Green Homes Programme**. Around £7 million

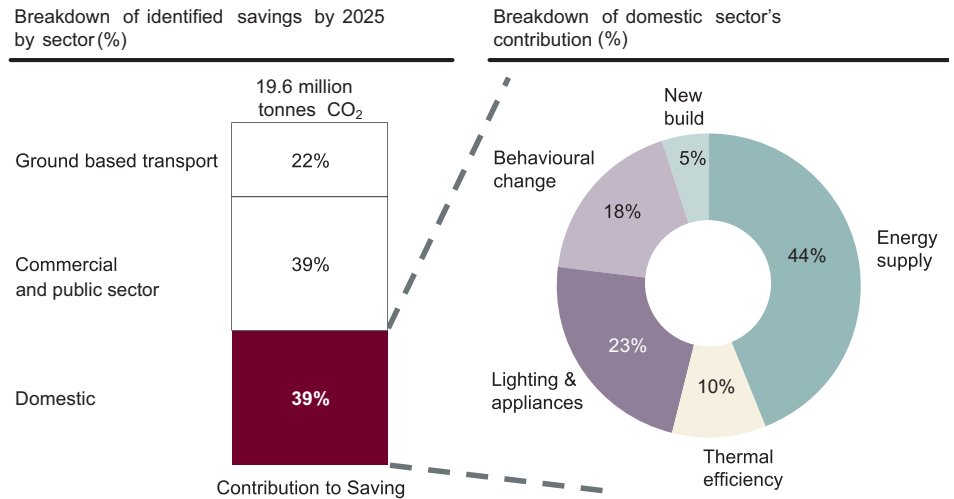
will be set aside in the 07/08 budget to initiate this scheme. But significant additional resources will also be leveraged in from national public and private sector energy programmes and through new partnerships with other organisations. This will include close collaboration with industry to develop the supply chain.

The Green Homes Programme will include:

- A London-wide offer to homeowners of **heavily subsidised** (and free to those on benefits) **loft and cavity wall insulation**
- A major marketing campaign to **increase awareness** about what actions Londoners can take to cut their emissions and reduce their energy bills
- A new **one-stop-shop advice and referral service**, available to all Londoners, on implementing energy savings measures and installing micro-renewables, which will be accessible by web and by phone. This pioneering service will be delivered in partnership with the Energy Savings Trust
- A pilot Green Homes **“concierge service”**, providing bespoke energy audits and project management of installation of energy efficiency improvements, micro-renewables and water conservation measures for the able-to-pay sector
- A programme of improving the energy-efficiency of London’s **social housing stock**
- Identifying skills gaps in the sustainable energy industry and developing **training** (in collaboration with the relevant industry bodies) to improve the skills required to install and service energy saving and micro-renewable products and systems.

**Implementing the Mayor’s home energy efficiency programme would save the average London household £300 per year**

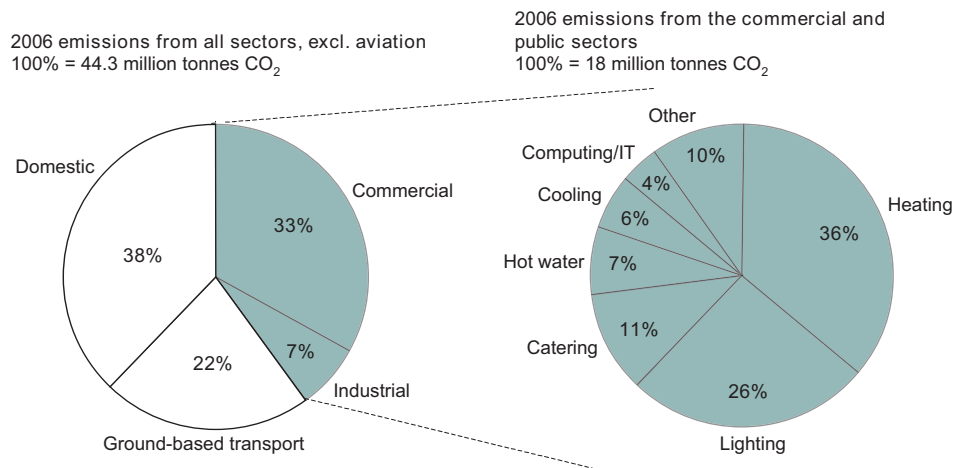
Figure v Domestic sector's contribution to CO<sub>2</sub> savings by 2025



**Emissions from existing commercial and public sector activity**

Emissions from the commercial and public sector are 15 million tonnes of CO<sub>2</sub> annually (18 million when industry is included)<sup>3</sup>. They come primarily from electricity usage, including for lighting and computing, although as the climate continues to warm, energy used for cooling buildings could become increasingly significant. Substantial savings can be achieved through simple actions like turning off appliances at night and avoiding inefficient heating and cooling of buildings. These carbon savings will also result in significantly lower energy bills, and will boost London's economy and create new jobs by creating demand for services such as energy-saving building refurbishment.

Figure vi 2006 CO<sub>2</sub> emissions from London's commercial and public sectors



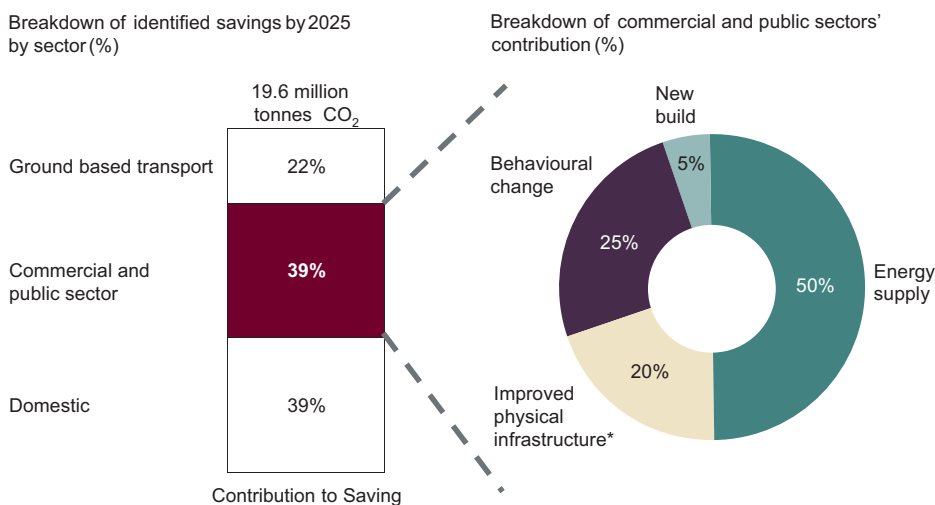
Source London Energy and CO<sub>2</sub> Emissions Inventory; DEFRA

The Mayor will work with the private sector and other public bodies to deliver carbon dioxide savings from existing commercial and public sector activity through a **Green Organisations Programme**. This programme could deliver a reduction of 7.6 million tonnes of CO<sub>2</sub> from annual sector emissions and, when combined with improvements in new build contributes to an overall reduction in CO<sub>2</sub> of roughly 40 per cent in this sector. The programme will focus on the following key areas:

**If all of London’s businesses and public sector organisations introduced simple behavioural changes, CO<sub>2</sub> emissions could be reduced by over three million tonnes per year**

- **Better Buildings Partnership:** working with and incentivising commercial landlords to upgrade their buildings, particularly during routine refurbishments.
- **Green Organisations Badging Scheme:** working with tenants (both private and public sector organisations) to reduce emissions through staff behavioural changes and improved building operations. This will include providing information and support to deliver these changes, working together with existing initiatives, as well as a clear set of targets and associated green ‘badging’ levels.
- **Lobbying:** Both the Better Buildings Partnership and the Green Organisations Badging Scheme will be supported by a lobbying campaign focusing on key barriers to the uptake of energy savings and clean energy. The Mayor will work closely with London’s businesses and public sector organisations to develop and deliver this programme, in order to build on and benefit from initiatives that are already in train.

Figure vii Commercial and public sectors’ contribution to CO<sub>2</sub> savings by 2025



*Notes* Includes simple energy ‘audits’ as well as staff measures; improvements to physical infrastructure includes either to building fabric or other operating efficiencies such as installing motion sensor lighting

**Dense, urban environments can be the most sustainable way to accommodate large populations**

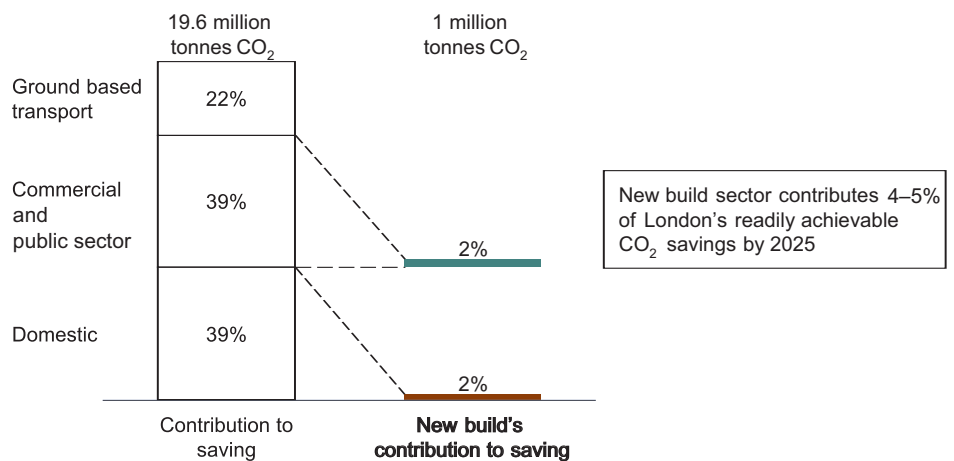
**Emissions from new build and development**

Ensuring that new buildings are designed and constructed to high standards of energy efficiency and renewable energy use is essential if London is to stabilise its carbon emissions at the necessary levels over the medium to long-term. As a significant amount of new construction is expected to take place in London over the next two decades, we have a perfect opportunity to set a new standard in zero and low carbon development, green building design and sustainable land use planning. Dense, urban environments can be the most sustainable way to accommodate large populations, as demonstrated by London’s already-low per capita CO<sub>2</sub> emissions (the lowest of any UK region at 25 per cent below the national average)<sup>4</sup>.

Roughly one million tonnes of CO<sub>2</sub> per annum can be saved in 2025 through better enforcement of current regulations and the introduction of higher standards for domestic and commercial new build. The major challenge will be to ensure concerted action by all organisations involved (including boroughs, developers and the construction industry) and full implementation of the improved standards.

**Figure viii New build sector’s contribution to CO<sub>2</sub> savings by 2025**

Breakdown of identified savings by 2025 by sector (%)



The Mayor’s priorities to deliver savings from new build and development are:

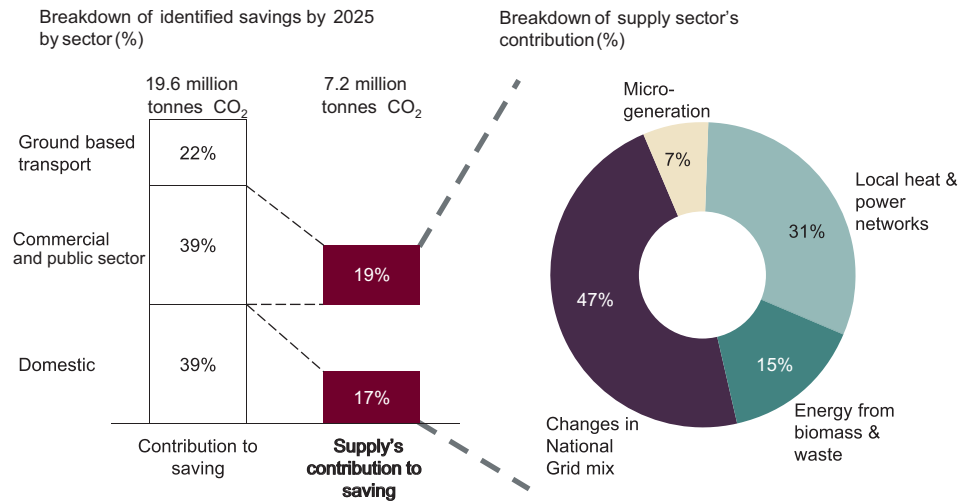
- **To revise the London Plan requirements for new developments.** The draft Further Alterations to the London Plan issued by the Mayor require new developments to prioritise the use of decentralised energy supply, most importantly by connecting to combined cooling heat and power (CCHP) networks



- **Further emphasis on energy efficiency through the Mayor's planning role.** Recent experience within the Greater London Authority has demonstrated what a substantial difference a small number of additional dedicated and knowledgeable resources can make. New energy-focused resources will therefore be added to both the Mayor's Planning Decisions Unit and Environment team
- **A greater focus on energy efficiency at borough level.** To increase sustainable energy and planning skills in the London boroughs and other key stakeholders through a comprehensive outreach programme. This programme will provide training and support for the boroughs, a publicly accessible energy portal and close collaboration with developers to establish the true cost/benefit of compliance with new regulations in London
- **Showing by doing: individual developments and new housing powers.** The Mayor will model exemplary energy-efficiency standards both through individual developments in which the London Development Agency (LDA) is involved, and for all new affordable homes. The Mayor's new Housing Strategy will make energy efficiency a key priority, including achieving the government's recently announced target of 100 per cent new homes as zero-carbon by 2016. All LDA developments will also be developed to the highest standards, building upon experiences such as the Gallions Park zero carbon development.

### Energy supply

The single biggest barrier to reducing London's carbon emissions is the way in which energy supplied to homes and offices is produced and distributed. Centralised electricity generation, whether through coal, oil, gas or nuclear power stations, is inherently inefficient - wasting two thirds or more of its original energy input in the form of expelled heat. Further losses occur in the process of distributing electricity from rural power stations to the towns and cities where it is mostly consumed.

Figure ix Supply sector's contribution to CO<sub>2</sub> savings by 2025

The Mayor's top priority for reducing carbon emissions is to move as much of London as possible away from reliance on the national grid and on to local, lower-carbon energy supply (decentralised energy, including combined cooling heat and power (CCHP), energy from waste, and on-site renewable energy - such as solar panels). This approach is often termed 'decentralised energy'.

The Mayor's goal is to enable a quarter of London's energy supply to be moved off the grid and on to local, decentralised systems by 2025, with the majority of London's energy being supplied in this way by 2050. This plan sets out how London could achieve carbon savings of 7.2m tonnes by 2025, through improved energy supply (note: savings from energy supply are already included in the figures given for emissions reductions from the domestic and commercial sectors).

The Mayor will also encourage the government to enable far more rapid investment in the huge opportunities that Britain, as an island nation, possesses for large scale renewable energy generation.

London's push for a decentralised, sustainable energy supply will include:

- **Dramatically increasing the rollout of combined cooling heat and power energy supply.** The main source of carbon reductions from decentralised energy will come from the combined generation of heat and power locally (CCHP). Through the direct investment of the London Development Agency and the requirements of the draft Further Alterations to the Mayor's London Plan, supplying energy through CCHP will become the norm in major new developments in

London. However, the bulk of CCHP's potential will need to be realised through supplying London's existing building stock. A major vehicle for this will be the Mayor's Climate Change Agency and its joint venture with EDF Energy, the London Energy Services Company.

- **Rapidly developing and delivering mechanisms to produce energy from waste (without incineration).** Energy from waste through new non-incineration technologies (such as anaerobic digestion, mechanical biological treatment, pyrolysis and gasification) offers a carbon-savings potential nearly as large as that of Combined Cooling Heat and Power. If all the London waste that currently goes to landfill were utilised, it could generate enough electricity for up to two million homes, and heat for up to 625,000 homes. However this technology still needs to be explored and commercialised. The creation of a single waste authority for London would have provided a major boost to this work. In its absence, the Mayor will work with boroughs and industry to facilitate and accelerate the potential of energy from waste including pilots and showcasing technologies at several large sites.
- **Promoting the uptake of on-site renewable energy in London.** Small and medium-scale renewable energy generation will be promoted through the revised London Plan standards, the Green Homes and Green Organisations Programmes, and through the Mayoral group's own installations.
- **Pursuing large-scale renewable power generation in London.** There are limited, but significant, opportunities for large-scale renewable power generation in London - for example, land-based wind turbines could supply power to up to 47,000 households. Much greater opportunities for wind power exist in the Thames Estuary, at least enough to supply a million homes, and the Mayor will strongly back projects such as the London Array. We will also investigate the potential for using tidal and wave power from the Thames.
- **Making the case for a greatly accelerated programme of investment in renewable energy in the UK.** The UK has huge untapped potential for renewable energy. In fact, some estimates suggest that renewables could provide nearly 100 per cent of the UK's electricity with offshore wind providing up to 60 per cent of the total. This would be one of the measures with the most significant carbon-reducing impact for London. We will therefore push for simple planning and regulatory changes that incentivise much greater contribution from renewables to the national grid.
- **Supporting carbon sequestration.** While burying carbon emissions underground is not a long-term solution, the Mayor recognises that it is being investigated around the world and will offer significant emissions reductions once commercially viable. We will push for rapid uptake of carbon sequestration to further reduce national grid emissions while the UK achieves a transition to a renewable energy based economy. In the

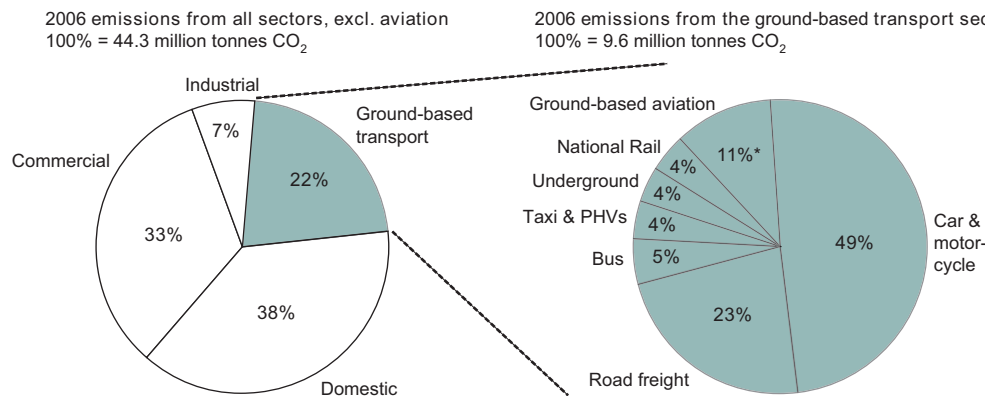
**The London waste that currently goes to landfill could generate enough electricity for up to two million homes, and heat up to 625,000 homes**

meantime, all new power stations should use the latest technologies to minimise CO<sub>2</sub> emissions and implement heat capture and distribution.

**Emissions from ground based transport**

London is unusual compared with many large cities around the world in that its emissions from transport (excluding aviation) are relatively small - about 22 per cent of the total. Unlike other sectors, transport emissions in London have stayed flat since 1990 despite the rapid growth of London’s population and economy. This is thanks to high long-term levels of public transport use and, since 2000, unprecedented investment in the public transport network, alongside the implementation of policies like the congestion charge to combat congestion and manage traffic.

Figure x 2006 CO<sub>2</sub> emissions from the ground based transport sector



*Note* Emissions from aircraft whilst taxiing and during the take-off and landing cycle (i.e., below 1,000m in altitude)

*Source* Mayor’s Energy Strategy and TfL analysis

If implemented, the measures in this plan would deliver carbon savings of 4.3m tonnes by 2025.

The top priority now is to reduce emissions from car and freight traffic, since these represent nearly three quarters of emissions in this sector. This includes:

- **Changing the way Londoners travel.** A major programme of continued investment in public transport, walking and cycling to provide attractive alternatives to car travel (as outlined in Transport for London’s *Transport 2025* work). It also includes promoting alternatives to the car through marketing, information and other travel demand management policies. London-wide, this can deliver nearly a million tonnes of CO<sub>2</sub> savings per annum.

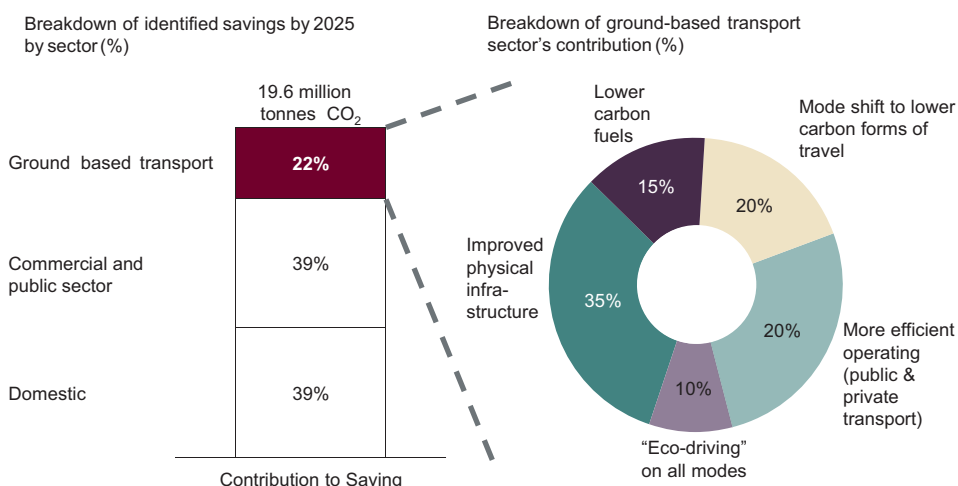
**CO<sub>2</sub> emissions from road transport would fall by as much as 30 per cent if people simply bought the most fuel efficient car in each class**

For an average Londoner, switching from driving to work to taking the bus will save 0.6 tonnes of carbon per year; taking up cycling instead would increase these savings to 1.1 tonnes.

- **Operating vehicles more efficiently.** Simply driving more sensibly can reduce fuel use by 5-10 per cent. The Mayor will promote eco-driving (for example, smoother acceleration/braking and proper vehicle maintenance) by all car, freight, taxi and public transport drivers.
- **Promoting low-carbon vehicles and fuels.** The biggest opportunity for emissions reductions in this sector is from uptake of lower-carbon vehicles and fuels, which alone could cut transport emissions by up to 4-5 million tonnes. CO<sub>2</sub> emissions from road transport would fall by as much as 30 per cent if people simply bought the most fuel efficient car in each class
- **Carbon pricing for transport.** More widespread carbon pricing will be essential to incentivise demand for low-carbon vehicles and fuels, and to drive innovation in further developing these technologies. Comprehensive carbon pricing requires regulatory changes at international, national and regional levels. Having led the world with the Central London Congestion Charge, the Mayor now wants London to become the first major city in the world to charge cars to enter its central business area on the basis of their carbon emission levels. Under this proposal, the highest polluting vehicles will be charged £25 a day, while zero-emission vehicles will travel free.

The Mayor will also pursue an ambitious programme of energy-saving measures across public transport. This includes regenerative braking on the Tube - which allows energy generated in braking to be reused to drive the train, and the conversion of London’s entire 8,000-bus fleet to diesel-electric hybrid vehicles.

Figure xi Ground based transport sector’s contribution to CO<sub>2</sub> savings by 2025



### Aviation

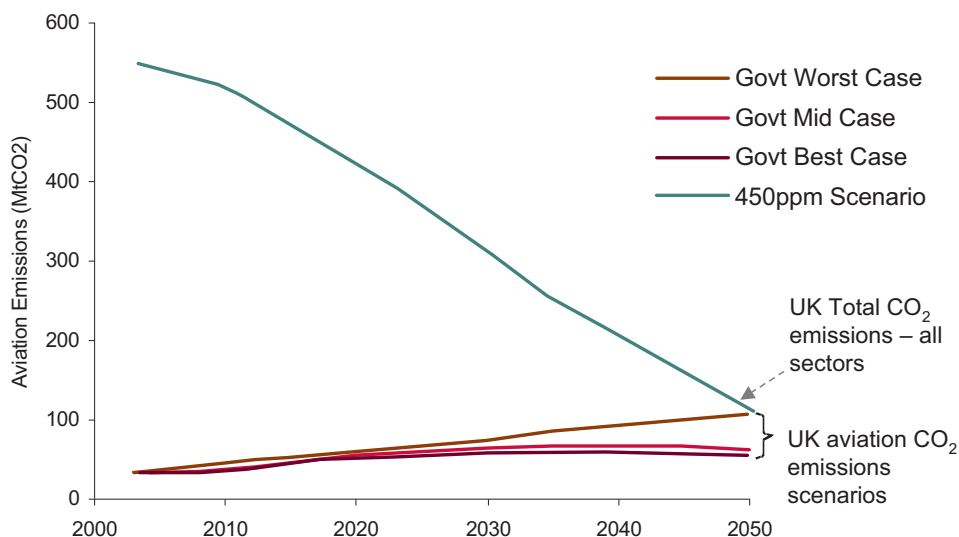
Aviation is one of the most environmentally damaging modes of transport. Per passenger kilometre, air travel is the most CO<sub>2</sub>-intensive form of travel, and trips by air tend to cover the largest distances. This impact on the climate is exacerbated by the release of CO<sub>2</sub> and other greenhouse gases high in the atmosphere, where the negative effect of these emissions is more than doubled.

Air travel is also one of the key elements of today's global economy, so curbing aviation emissions presents a global challenge. London is a major UK and international air travel hub, with London's airports handling 30 per cent of passengers entering or departing the UK<sup>5</sup>. London's role in the world economy and its "world city" status depend on maintaining these links with the rest of the world.

Aviation emissions today account for approximately seven per cent of total UK CO<sub>2</sub> emissions. However, forecasts suggest that historic growth rates of 6-7 per cent per annum will continue and possibly increase if the market and regulatory environments remain as they are. This historic and projected growth is driven largely by dramatic growth in leisure trips, which have accounted for over 85 per cent of air travel growth in the UK. The majority of these trips are accounted for by a small percentage of the population, with 10 per cent of people (mostly better off) accounting for fully half of all flights.

As a result of this growth, UK government projections predict a 50-200 per cent increase in CO<sub>2</sub> emissions from aviation in the UK by 2050. This means aviation would account for most of the UK's overall CO<sub>2</sub> budget if the UK is to achieve stabilisation targets being advocated by the Mayor.

Figure xii Overall UK emissions targets compared to government aviation forecasts



Source Tyndall Centre for Climate Change, Royal Commission

In principle aviation fits within the same simple framework that applies to all carbon emissions. In practice, however, the industry poses certain specific issues that must be dealt with and is therefore considered in a separate chapter.

The fundamental principle is that overall carbon emissions must be capped at a level preventing climate change. From this point of view what is important is the overall quantity of emissions not their source. It may be indeed the case, for example, that within an acceptable overall carbon cap in the future society will take more stringent measures to prevent heat escaping from buildings (which produces no benefit) in order to permit more travel (which does have benefits).

However at present two interrelated problems exist. First, the true price of carbon emissions is not built into the price of air travel - meaning each air trip in fact does damage that is not financed. This can only be dealt with by including aviation within a comprehensive system of carbon pricing. Secondly, while this is introduced, the build up of air travel is so rapid that it threatens to overwhelm the benefits derived from limiting emissions in other areas. This means that until a comprehensive system of carbon pricing is introduced physical controls and/or financial disincentives will have to be used to prevent unacceptable damage being done by rising emissions from aviation.

For aviation, unlike most other sectors considered in this report, there are real technological, as well as political and regulatory barriers, to reducing carbon emissions in the short to medium term. That is why much of the public debate has centred on reducing demand for flying.

While the majority of options to reduce the growing impact of aviation are beyond the direct influence of the Mayor, he will act where he can to reduce emissions. These steps will include:

**By not being subject to the same fuel duty as motorists the UK aviation industry avoids annual costs of almost £8bn**

- **Seeking to influence EU and international aviation policy** including the earliest possible inclusion of aviation in the EU emissions trading scheme (ETS) and levying duty on aviation fuel. We estimate that if the 12.5 million tonnes of fuel consumed by the UK aviation industry were subject to the same duty as motorists pay for petrol, almost £8bn could be raised annually to invest in fighting climate change.
- **Working with the aviation industry** to implement efficiencies that can deliver a step-change reduction in emissions, and where necessary lobbying the European Union for research and development funding. There is much that airlines can do - and are slowly beginning to do - to cut carbon emissions while aircraft are still on the ground and by changing approach paths, amongst other measures.
- **Challenging the need for further runway expansion at UK airports.** While it will be of continued importance for London to have excellent international links, existing runway capacity should be used for business flights and a reasonable volume of leisure flights. Given that the majority of growth has been and will be in additional leisure flights for those who already fly a lot, avoiding runway capacity growth will only affect these incremental, discretionary flights.
- **Educating Londoners and advocating alternatives to air travel** as part of overall communications on climate change and working with the government to develop price-competitive, high-speed rail services.
- **Leading by example** ensuring that all agencies under Mayoral control avoid flights wherever possible and offset their emissions when air travel is the only option.



### The Mayoral group

The Mayoral group itself (comprised of City Hall, the London Development Agency, Police and Fire services, Transport for London and Visit London) currently produces around 0.2m tonnes of CO<sub>2</sub> per year. While this is only 0.5 per cent of London's total emissions, the Mayoral group is committed to aggressively tackling CO<sub>2</sub> emissions from its own operations, including the carbon impact of its 75,400 staff, 8,300 vehicles and one million square metres of facilities. In addition, we will seek to demonstrate best practice through flagship projects and catalysing further technological and market developments.

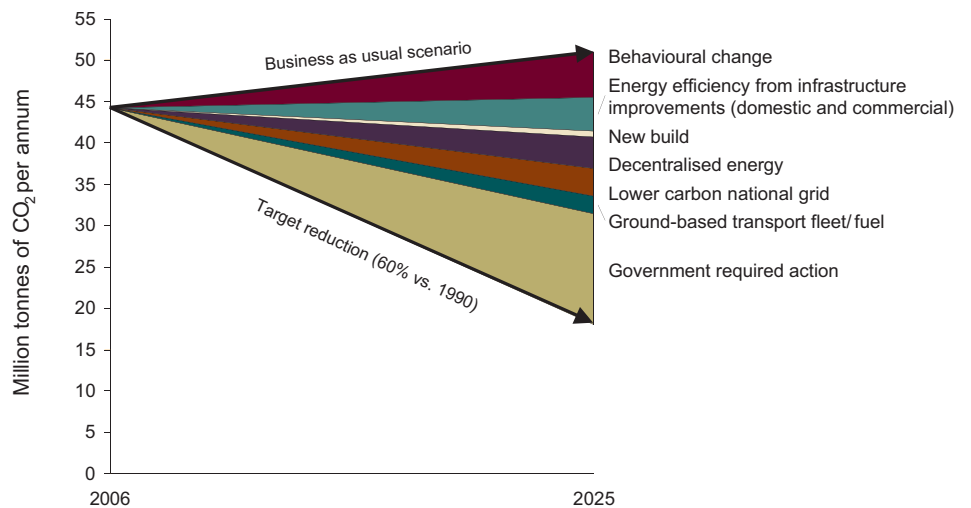
The Mayor's key priorities for action to reduce emissions from the Mayoral Group and demonstrate best practice are:

- **Improving the energy efficiency of our buildings.** This includes installing energy efficient lighting and appliances, and designing new buildings with carbon reduction as the number one priority.
- **Maximising use of decentralised energy** through the installation of combined cooling heat and power (CCHP), micro-wind, photovoltaic (PV) and solar thermal heating at all appropriate GLA group sites.
- **Promoting staff energy-savings behaviour** at home and at work by running ongoing staff campaigns. Savings from changing behaviour in the workplace can be doubled if those changes are mirrored at home.
- **Minimising emissions from travel**, including procuring the lowest-carbon fleet options wherever possible for both operational and support vehicles, reducing non-operational air travel to a minimum and off-setting essential travel.
- **Following high green procurement standards** for contracting all goods and services, and so stimulating market demand for zero and low carbon technologies, products and services. This measure should also help bring the price of the goods down as supply increases.

**Meeting the targets**

If we achieve the measures set out in this action plan, London will realise a 20 per cent reduction in its emissions by 2016, and so meet the ten-year milestone. However, without further national and international action - most importantly, the introduction of comprehensive carbon pricing - London would only achieve a 30 per cent reduction in 2025 in the best possible case, which is just half the target reduction of 60 per cent. The chart above shows the breakdown of how this would be achieved.

Figure xiii 2025 scenario without required government action



Source London Energy and CO<sub>2</sub> Emissions Inventory; GLA

Without concerted action by national government to implement tax and regulatory policies that strongly support CO<sub>2</sub> reductions, London’s emissions in 2025 are projected to be 31.4 million tonnes, or 13.4 million tonnes greater than the objective of 18.0 million tonnes.

Unfortunately, when it comes to tackling climate change, quite good is not good enough. It is imperative that we do find ways to meet these targets. Achieving regulatory and fiscal change at a national level will, therefore, be a priority for the Mayor. By demonstrating leadership in London, the Mayor will encourage the government to take the steps necessary to ensure that London and the UK play a leading role in averting catastrophic climate change.

A small number of actions at a national level will be especially significant to delivering substantial carbon emissions reductions in London. The Mayor will therefore particularly be seeking three things from government:

- The rapid introduction of comprehensive carbon pricing across all sectors, including aviation. This is crucial to create incentives for widespread take-up of carbon reduction measures and to drive development of new technologies.
- Regulatory change to incentivise widespread rollout of decentralised energy. This includes simplification of the process for connecting CCHP to the grid, including fair payment for electricity sold into the grid.
- Changes to enable significant reductions in the carbon intensity of the national grid. This includes removing existing planning hurdles to and creating regulatory incentives for large-scale renewables investment, as well as rapid uptake of carbon sequestration while the UK transitions to a more renewable energy based energy supply.

### **Conclusions**

There is no doubt that stabilising London's emissions at 60 per cent below 1990 levels by 2025 and limiting total CO<sub>2</sub> emissions between now and then to 600 million tonnes is extremely challenging. But it can be done, using existing technologies, and will bring real financial and other benefits to householders, businesses and London's economy in general.

This action plan demonstrates that over the next ten years we can put London firmly on the path towards that goal - as long as every part of London's society is willing to play their part.

In the longer term, a new approach will be required at a national and international level, including faster development of low carbon technologies, so that we stabilise emissions at a safe rate.

The Mayor's goal is for London to demonstrate over the next years that a low carbon future is possible and that, indeed, it is the basis for maintaining a great, forward looking and successful world city.

The time for rhetoric on climate change is over. Now the delivery must begin.

The Mayor will report annually on London's carbon emissions and on progress against the targets set out in this action plan.



## References

- 1 This approach has been adopted by the 1992 UN Framework Convention on climate change, which recognises the “common but differentiated responsibilities” of developed and developing nations, and in the Kyoto protocol, where developed country signatories have taken on emissions ceilings under the current phase.
- 2 UK carbon budget estimated by Tyndall Centre extrapolated to London over the period to 2025. Climate change literature quantifies emissions in both tonnes of carbon dioxide and tonnes of carbon (the later referring to just the elemental carbon component in a molecule carbon dioxide). 600 MtCO<sub>2</sub> is equivalent to 165 mega tonnes of carbon. Throughout, this plan quantifies emissions in terms of carbon dioxide.
- 3 “Commercial and public sector” refers to all commercial, public (including government offices, schools, hospitals), non-governmental and industrial organisations.
- 4 Defra, November 2006.
- 5 “London’s airports” refers to Heathrow and London City. Gatwick, Stansted and Luton are not included as they are located outside the GLA boundary.





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Nếu bạn muốn có văn bản tiếng Việt  
của bản này, vui lòng gọi số điện thoại, hay  
đến địa chỉ nêu ở dưới đây hoặc liên hệ qua  
email nêu ở đây.

### Greek

Αν θέλετε να ανακτήσετε αυτήν την έκδοση  
στα ελληνικά του βιβλίου του, τηλεφωνήστε, επισκεφθείτε το  
επίσημο ιστολόγιο ή επικοινωνήστε με τον υπεύθυνο για τη  
παραγωγή αυτής της έκδοσης στα ελληνικά.

### Turkish

Bu belgeyi kendi dilinize  
kavramanız için aşağıdaki  
bilgilere veya telefon numarasına  
ulaşabilirsiniz.

### Punjabi

ਜੇ ਤੁਸੀਂ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਜਾਰੀ ਸ਼ਾਇਰੀ ਦੀ  
ਕਿਸ ਵਰਜੀ ਵੀ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਕਾਲ ਕਰੋ ਜਾਂ ਹੇਠ  
ਲਿਖੇ ਪਤੇ 'ਤੇ ਸੰਪਰਕ ਕਰੋ:

### Hindi

यदि आप इस दस्तावेज़ की हिंदी शायरी  
प्राप्त में चाहते हैं, तो कृपया निम्नलिखित  
नंबर पर फोन करे या हमारे पते पर हमें  
पते पर काल करें।

### Bengali

আমনি যদি বাংলায় সাধারণ এই  
সংস্করণটি চাইতে  
হইলে, তাহা হইলে নিচের নম্বর  
বা ঠিকানাতে ফোন করা  
সম্পন্ন।

### Urdu

اگر آپ اسے دستاویز کی  
چاہتی ہیں، تو براہ کرم  
یہ نمبر پر فون کریں یا  
یہ پتے پر رابطہ کریں۔

### Arabic

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باللغة العربية، أو معرفة العنوان  
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### Gujarati

જો તમે આ દસ્તાવેજની  
ગુજરાતી શાયરી  
ચાહો છો, ત્યાં  
કોન નંબર પર  
ફોન કરો અથવા  
નીચેના સંપર્ક  
સાથે।

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