

Ideas for London

ARUP





Foreword



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It is extraordinary that only 16 years ago London elected its first Mayor. In this short period, thanks largely to strong mayoral leadership, the city has been transformed into a 21st century leader of the global economy and a benchmark for urban living and urban mobility.

We are now on the cusp of a mayoral transition at a pivotal moment in London's long history. The challenges presented by climate change, global economic instability, and the new demands of our millennial generation seem greater than ever. But these may even be dwarfed by the speed of technological changes that are rapidly leading to new forms of ownership, funding, and communication; changes that will ultimately challenge our current notions of the way we live, work, travel and plan our city.

Within this next mayoral term we may see the first driverless vehicles on London's roads, electric taxis replacing diesel, new forms of high density housing to meet new heights of demand, the opening of Crossrail connecting new swathes of the city and a potential shift away from carbon fuelled lifestyles to address our rising air pollution challenge.

The new Mayor has the opportunity to take the decisions that prepare the city for these monumental changes, essential changes, necessary to maintain London's competitive advantage in the world.

Radical change requires strength of leadership, clarity of vision and pragmatism in delivery. These are the principles that have underpinned Arup's thinking on the steps that could be taken to prepare for London's future. Our ideas are intended to be thought provoking but deliverable, radical but popular and strategic but with dramatic effect.

We hope you enjoy exploring our ideas and debating their merits. We hope the future Mayor will take a strong lead in developing and delivering the best of them.





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Arup and the last Mayor 2008 - 2016

Arup's work in London since Boris Johnson took office on the 4th May 2008.



Focus areas

Reflecting on our work, we have identified five areas that the new Mayor should focus on during their first term in office.

Growth

Growth in London's population and employment is at a record high. We believe it should be welcomed and embraced. It fuels innovation, regeneration and prosperity. Cities with stagnant or declining populations tend to falter. They lose momentum and investment. Growth creates pressure for improved public services, educational standards and infrastructure - to the benefit of the many - not just the few. And we know that historical attempts to restrain London have not worked. They have had the dual effect of damaging the city and not benefiting the rest of the country. With as much as four fifths of London's growth coming from natural population change (more births coupled with Londoners living longer), growth looks locked in for the foreseeable future. At the same time London is fuelling population growth to the rest of the UK. But the population "apple" tends not to fall far from the tree; most of those who leave London move to the South East. As a result the two are becoming increasingly intertwined. After London, the rest of the South East is the second most rapidly growing region in the UK. That's why we've included ideas to improve governance and collaboration between London and its sister authorities - *South of England and London Super Region*.

Competitiveness

Urban areas are judged across a range of criteria by individuals and employers looking to live, work, study and invest. Competitiveness is not just about efficiency and value for money. Our *New Night Life* initiative is all about giving Londoners access to more of a 24 hour economy. The Night Tube will - very soon - help to deliver this. Carefully managed, commercial and cultural activities and events will be able to thrive into the later evening hours. That in turn will boost employment, growth and the attractiveness of entertainment in London and put it in a similar league to other world cities.

Meanwhile in the virtual world, with our *Digital Office for London* idea, we think the Mayor can help to further enhance the quality and attractiveness of London's digital infrastructure and encourage more efficient delivery of public services in the city.

Self-governance

Alongside growth, we are witnessing a transformation in how Britain's public services are organised, delivered and paid for. Whitehall has learned that *one size fits all* policies for transport, housing, education and even health creates delivery risk and is often inefficient. Such an approach cannot hope to meet citizens' rising and different needs and expectations. Londoners and indeed voters across the UK have demonstrated their

enthusiasm for empowering local leaders to spend public resources wisely and be held to account. In a generation we have moved from a policy of winding up local government institutions and nationalising business rates to devolution of powers and taxes. Very soon, Scotland will enjoy more powers than most comparable countries in devolved or federal political systems. With the relatively recent restoration of its city wide government, London needs to continue to be at the forefront of the devolution agenda. It needs further powers and incentives to secure a closer alignment of development, housing, local taxes and infrastructure. That's why we've included two ideas - a *London Infrastructure Fund* and *Transport Investment Zones* in our proposals.

Quality of life

A city that is growing provides its citizens with many benefits. But it generates wealth and prosperity beyond its administrative boundaries. It would be naive to think that growth is without risks and costs. Chronically, an overcrowded and congested London would not be popular with citizens nor city leaders. We have therefore come up with a number of measures designed to provide opportunities to develop and reinvigorate attractive places in our suburban town centres. By integrating walking and cycling into how we measure accessibility for housing developments, the boroughs could provide additional housing more quickly and efficiently. In creating streets for *walking in a green London*, we lighten the city's footprint and ensure Londoners have more healthy daily routines. Up in the sky, *Drones for London (DfL)* could also help ease the squeeze back on the ground. DfL could offer public service providers a cost effective means by which to use drones to maximum public benefit.

Environmental enhancement

Finally, in a world with an ever changing climate, it is crucial to focus on measures that will ensure London is more resilient to extreme weather events. A national park which takes parts of London's Green Belt allows the city government to improve the quality and access to vital green and open space. Previously underutilised land could be released to enhance Londoners' overall quality of life. Our *London Blue Grid* water management idea would provide a long term plan for reducing surface water and flood risk; whilst *Driving down corporate carbon emissions* involves including carbon management in procurement criteria for public sector contracts. Lastly on a slightly more prosaic level, our proposals for an *Electric bus battery switch scheme* could help to reduce roadside emissions and help deliver other environmental goals.

We hope that our ideas will help to stimulate the debate as to how London should grow, develop and meet the needs of its citizens and that you will enjoy reading, debating and discussing them.



Arup in London

In our mission to shape a better world we must shape better cities; we must shape a better London.

Since our creation in London 70 years ago, Arup has embodied the city's spirit and has been at the heart of its development. It is the location of Ove Arup's first project, the penguin pool at London Zoo, and remains our global headquarters and home to over 2,000 staff.

Our aim is to enable London's boroughs, urban communities, infrastructure providers, developers and investors to determine a better future rather than simply react to external pressures placed upon them.

Arup does not presume to know better. We recognise that London faces unique challenges, but with our reach, our depth of knowledge and our unique collaborative approach we aim to combine our experience of what works with local understanding of the issues to create innovative opportunities. Beyond this, we also offer ourselves as brokers of the vital relationships between citizens, city governments and investors.

Our commitment is to be a:

partner to city activists

**trusted advisor to the Mayor, the
Greater London Authority and local boroughs**

confidante to developers and investors

promoter of transformative infrastructure

supporter of local communities, businesses and NGOs



Long term visions

The impact of prevailing growth in London and accommodating additional population and employment will create immense economic, as well as social, challenges and pressures. London will falter if it fails to respond.

Creative, innovative thinking will be required by the Mayor to ensure that the opportunities presented by population growth are seized.

We have compiled three strategic programmes that the Mayor should investigate to safeguard prosperity for London and its eight million plus residents.



New Heart for London's Town Centres

1 London's opportunity

Post-war development has been focussed in London's central activity zone. During this period London moved away from its polycentric village origins to a monocentric radial city. Strategically this has enabled London to compete globally and attract people and employers to the city.

As London's population moves towards 9m there is a chronic shortage of affordable housing and there are signs that the cost of employment space is stifling growth.

With London's population predicted to grow to as much as 13 million by 2050. New solutions need to be explored. Revitalising, intensifying and reimagining the city's polycentric origins hold part of the key.

2 The big Idea

We need to move away from viewing London as just the central activity zone. We need to take greater account of London's town centres. They provide the a great opportunity to stimulate growth and develop attractive new places for people to live, work and play.

The role of the town centre has shifted almost entirely from administrative function to serving as a 'living room' for its catchment area, where shopping and leisure, learning and living have become dominant features. Millennials are shaping the world to suit their needs and lifestyles, and their influence is changing how London functions.

In response, we need to create a new vision for outer London; maximising the

socio-economic potential of places such as Croydon and Wembley and tackling underperformance in others. The vision should place residential-fuelled development at its heart. This is not only a direct solution to London's housing problem, but a significant opportunity for a new strategic role for town centres.

Town centres need to be well connected. Good public transport accessibility will be key. This means not just continuing to improve London's inbound radial connectivity, but unlocking potential through improved orbital and intra-centric links; connecting each town centre to the next. High quality public space will be critical. Good quality public realm and open spaces catalyse investment, boosting commercial activity and improving health and wellbeing.

Creating new hearts to new town centres will provide the quality of life London's millennial generation and older residents rightly expect.



3 The Mayor's role

A visionary Mayor establishes a new future for London. This ensures the city continues to reimagine and reinvent itself in response to the challenges and opportunities that it faces.

The Mayor's leadership on planning, regeneration and transport enables him or her to develop a holistic and integrated strategy for London's future including the potential role of London's town centres.

Beyond providing leadership and vision, the Mayor holds the necessary planning, fiscal and delivery tools to realise his or her aspirations. This includes using the London Plan and other strategy documents to set out a clear vision.

The Mayor should be empowered to introduce new fiscal tools to incentivise development and provide targeted funding to support priority projects.

The Mayor can use executive bodies such as Transport for London to deliver new strategic transport infrastructure where it is required.

The Mayor should use delivery powers and mayoral development corporations to fast-track the development process.

South of England and London Super Region

1 London's opportunity

London is intrinsically connected to the counties and districts that surround it and vice versa. Every day around a million individuals travel across the GLA administrative boundary for work. Around 800,000 commute into London from other parts of the country and the remainder – some 200,000 Londoners “reverse” commute to outside of the city.

Because of its close economic ties with the rest of southern England, London's housing, transport and employment pressures are felt well beyond the city's boundaries. As a result we think that there is a need to find ways for more effective closer working around strategic decision-making at a “super-region” level. This would involve more co-ordination between the GLA, counties and some unitary authorities.

2 The big idea

Infrastructure schemes - such as major rail projects and increases in aviation capacity - have regional implications. Determining where major housing growth takes place can have widespread effects. And the cumulative impact of many small decisions by individual authorities can have impacts well beyond local administrative boundaries. By coordinating strategy and communicating plans effectively, London and its neighbours could achieve better outcomes and do so more efficiently.

A strategic entity could be developed at a level where there could be debate and development of policies to secure long

term sustainable development. It could work on integrating policies for the Green Belt, housing delivery, economic development, transport, environment and waste. By bringing local authorities together, such an approach could provide a forum for developing ideas and policies around larger, boundary-crossing projects, such as major rail schemes. Creation of a collaborative “super region” infrastructure plan could help local government develop a more co-ordinated, sustainable approach to economic growth, homes and employment and a higher quality of life for residents.

The grouping could bring together the statutory government bodies in a non-binding forum. This would allow for coordinated planning, cocommissioning and more formal types of cooperation as and when they are needed. Crucially, the group could help to identify the opportunities for working, planning and investing together more efficiently, for the benefit of London and the wider southern region.

Increased collaboration and formalisation of partnerships would help to drive the long term economic growth of not only southern England and London but the UK as a whole. Closer working and collective decision making on matters that affect both London and the wider south would allow authorities to deliver policies to meet the strategic needs of the region. Infrastructure and development plans could be developed and published on a five or ten year basis with annual updates.



3 The Mayor's role

The Mayor is key to unlocking the potential for a South of England and London Super Region.

As population and employment continue to grow, the Mayor will need to work ever more closely with leaders of the counties and unitary authorities in the south of the country to co-ordinate policies and deliver the region's infrastructure requirements.

Ultimately, the Mayor and other leaders in the south could take on more local control and investment in infrastructure that has a strong regional dimension.

A New National Park for London

1 London's opportunity

The Green Belt is one of London's greatest assets...or is it? With confusion and emotion attached to current Green Belt debates, it is time to reevaluate its purpose and reinforce its value as an asset to the city.

We should not focus on the role it has played, we need to start thinking about the role it can now play and the opportunity that it presents in helping solve London's evolving housing crisis.

2 The Big Idea

Picture a green lung surrounding London, connecting into the city and providing recreational space for all. Imagine the improved quality of life, and the value to health and wellbeing that this would bring. There is a perception that the Green Belt already provides this. The reality is arguably quite different. A significant proportion of London's Green Belt falls on poor quality land that remains in private ownership benefitting neither those in London, nor those in neighbouring authorities.

We believe that by making London's Green Belt a National Park we can maximise its contribution to its surrounding areas. In registering the Green Belt as a National Park, we can still control the extent to which development can take place, but critically, we can simultaneously create a new instrument to improve access to invaluable green open space.

Creating a National Park would provide the opportunity to strategically evaluate the Green Belt, and identify appropriate areas of land that can be released.

It would also highlight areas that should be protected, added to and enhanced so as to create a regional and national amenity.

A newly created management body would work with landowners to introduce and maintain rights of way. This would provide improved access, recreational opportunities and connect the Green Belt into the city it surrounds. The management body would ensure that this process could be completed in a way that does not undermine the economic contribution of land in the Green Belt.



3 The Mayor's Role

As London's most senior executive official, the Mayor should lead these discussions. A proposal would require consultation with, and support from London's neighbouring authorities, the UK Government and the UK Association of National Park Authorities.

The proposal would need significant financial backing, and the Mayor will need to show intent in being prepared to use funding to bring forward investment in infrastructure, enhancement and development of the land that is released.

The Mayor would need to work closely with his or her staff and stakeholders to consider the infrastructure required to link released land back into London and to those authorities outside of the park.

Policy ideas for the Mayor of London

What could the next Mayor and London Assembly do to make London a better city for residents, business or visitors?

London's Mayor is elected for a term of four years. We asked our planning teams for policy ideas for the next London Mayor.

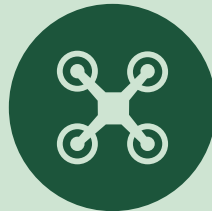
The ideas are designed to be deliverable within the first mayoral term. Click on each idea to find out more.



Active transport to unlock housing density



London Blue Grid



Drones for London



A Digital Office for London



Walking in a green London



Driving down corporate carbon emissions



London Infrastructure Fund



Electric bus battery switch scheme



New night life



Transport Investment Zones



Active transport to unlock housing density

1 London's opportunity

The London Plan limits housing density across London based on Public Transport Accessibility Level (PTAL). By shifting the focus from 'transport accessibility' to 'active transport', the next Mayor of London can improve accessibility across London, enabling a higher density of development and unlocking new housing supply.

2 The big idea

The next Mayor of London can develop a system covering active transport to complement the current PTAL system. Active Transport Accessibility Level (ATAL) considers the quality of walking and cycling infrastructure along routes to transport centres. If areas with a low PTAL were transformed to a high ATAL we estimate housing density could be increased by more than 50%. This would have a positive impact on housing supply.

In addition to enabling additional housing supply, a community built around active transport will enjoy benefits including:

- A strong local economy. People on foot and on bikes often spend more money locally and provide a catalyst for regeneration.
- A socialable community. Social engagement between residents will increase as a consequence of increased time spent in safe, high quality public spaces, creating desirable places to live.
- A healthy community. Active transport leads to better physical health, and the combination of physical activity and

increased social activity will enhance mental health in the community.

- A safe community. Where natural activity and busier streetscapes provide security more akin to central London.

Delivery timeframe

Revisions to the London Plan are already in progress. Arup understands that Transport for London is conducting research into enhancing the PTAL system. These two workstreams can be brought together with a focus on active transport to immediately enable greater housing density subject to active transport accessibility.

Funding

Active transport infrastructure is more cost-efficient than that required for public transport. Active transport infrastructure could be supported and delivered through contributions from the private sector. Investments in walking infrastructure have health and air quality benefits valued at close to twice the cost of construction.

Evidence

Research from the University of Cambridge has suggested that a 20 minute walk each day could be enough to reduce an individual's risk of early death. Just a modest increase in physical activity could have significant health benefits and reduce the strain on public health services.



1.5m
homes will be required in London by 2050

70%
increase in public transport capacity is required by 2050

50%
of London currently has low public transport accessibility

3 The Mayor's role

Work with Transport for London to develop the ATAL tool; it will be essential to ensure that the quality of the infrastructure is sufficient to make it accessible to all.




Develop the London Plan to allow for high density housing in areas with good ATAL.

Commission a pilot on publically owned land to test the concept.

Designate ATAL Opportunity Areas in London and work with developers and house builders to realise the potential of these sites.



London Blue Grid

Like our idea, let us know   

1 London's opportunity

The London Sustainable Drainage Action Plan 2015 arguably identifies solutions that are functional rather than multifunctional, and reactive not proactive.

London and the Mayor have the opportunity to establish one action group to develop a proactive, multi-functional approach to water management which would have enormous environmental, socio-economic and political benefits.

2 The big idea

Building on existing arrangements, establish a GLA initiative to spearhead an integrated multifunctional approach to London's blue infrastructure. This should develop a plan for the proactive implementation of adaptive measures to counteract flooding through:

- 1. Policy and strategy** - Establish the London Blue Grid to strategically manage blue infrastructure.
- 2. Localised management** - Create 'Water Improvement Districts' (WIDs) for each of the seven London drain groupings with detailed project plans, investments, incentives for success and charges for failure.
- 3. London's lost rivers** - Create Trusts for each Thames tributary and hidden tributary, and develop catalyst projects for the initiative.

Through a fully integrated proactive approach, double the size of the London sustainable drainage action plan with a new aim of achieving a 2% reduction in surface water flows into the sewer network

each year for 25 years resulting in a 50% reduction in flows by 2040.

The strategy would generate numerous environmental benefits including a reduced flood risk, improved water quality, improved liveability and increased biodiversity. The social benefits include enhanced recreation opportunities, a greater connection to nature, new public realm, opportunities for play and revitalised neighbourhoods. Economic benefits would be seen through flood resilience, and the potential increase in land and property value.

Delivery timeframe

Similar to the London Sustainable Drainage Action Plan 2015, the strategy should have an initial phase of 25 years with a series of 5-year goals. Quick wins include: provision of strategic guidance through the London Blue Grid; establishment of WIDs and detailed water management plans; delivery of exemplar drainage projects.

Funding

New developments, upgrades to public realm, or river restoration projects should all incorporate sustainable drainage as part of a wider, multi-functional green infrastructure network. There will be opportunities for cost saving through reduced infrastructure connections to mains drainage, grey water recycling and flood resilience.

Evidence

The Copenhagen Cloudburst management plan 2012 demonstrates sustainable rainwater management through the multifunctional use of public space for water attenuation. The plan has a cost of DKK 3.8bn; a flood event in 2011 caused damage worth DKK 6bn.



0

of London's 40 rivers are classified 'good' water quality

By 2031

an additional 600,000 homes will increase pressure on drainage systems

By 2050

there will be a 7.7% chance each year that London's drainage will be overcome through a rainstorm.

3 The Mayor's role

Enable the GLA to spearhead an integrated multifunctional approach to develop London's blue infrastructure with the three main strategies.

Establish a London Blue Grid to promote blue infrastructure and provide strategic guidance on sustainable drainage.

Create and support WIDs for each of the seven drain London groupings and encourage them to develop local, detailed water management plans.

Establish Trusts for each tributary and hidden tributaries within Greater London.



Drones for London

1 London's opportunity

The urban fabric of London is under constant stress. A growing population is demanding more from our public services than ever before. This happens at a time when city budgets are stretched and shrinking. It's time to "call in the drones", leverage London's tech sector, deliver savings to public services, and capture the burgeoning market for smart aerial vehicles.

2 The big idea

Drones for London (DfL), a publically-owned fleet of nimble, recognisable, multipurpose London drones (Unmanned Aerial Vehicles) operating on behalf of London's vital public services.

The Mayor's Drone Launchpad is an innovation hub, drone control, maintenance, and repair centre. The launchpad enables DfL operators to provide numerous cost and time-saving services to public departments.

Based on a common chassis and modular service packs, London drones would be designed for multiple functions and would be flexible to daily operational needs. For instance an advanced search and rescue assistant one day, an air quality measurement device the next.

Benefits to London

The London Drone platform would offer a costed service for frontline services as well as other public or approved public interest bodies. Potential benefits include:

- A wide range of cost savings through offering services to public sector bodies without the funds to cover overheads for such a service themselves.

- New job creation and indirect economic stimulus.
- Technological leadership and innovation for London.
- Improved outcomes for the general public through better quality services.

The use of drones for public services is inevitable. London should lead the uptake and reduce the risk of a future where it has less control and has to outsource similar services.

Delivery timeframe

The setting up of an Office for Drones and scoping of operations would take place in year one; platform development and service piloting would be completed in year two. With the right level of support, London Drones could be expected to take to the skies in 2018.

Funding

An initial investment of up to £1m would be needed to cover set-up costs. A phased expansion in operations could see the scheme operating profitably within four years, returning funds to the city and other public services. The department would be self-financing, raising revenues by charging £300 - £2000 per flight depending on the function.

Evidence

Private drones are already performing exciting functions, including notably for entertainment. Their potential for public service is enormous, Delft Technical University in the Netherlands has already demonstrated the utility of "ambulance drones" to react to medical emergencies.



£7m

spent on the Air Support Unit of the Metropolitan Police in 2013

A 2 hour Met Police helicopter flight costs up to

£1,700

By 2024 the global civil aerial drone market is expected to hit

US\$3bn

3 The Mayor's role

Champion the principles and potential of the Launchpad to senior public service decision makers and regulators, raising awareness, acceptance and ensuring future take up. This will guarantee that the full potential of the opportunity is realised.

Endorse the Launchpad's role in the wider economy of London.

The Mayor can also be expected to champion the scheme's benefits nationally and internationally, helping deliver the maximum economic return and promoting London as an international technology leader.



A Digital Office for London

1 London's opportunity

Digital technology provides a major opportunity to support the Greater London Authority (GLA) in responding to many of the diverse challenges that London faces. It can improve the quality and efficiency of public services, create opportunities for employment, and strengthen the relationship between the GLA and London's citizens. The GLA's Smart London Board has already outlined its priorities in a Smart London Plan which provides the foundation for London to become a world class digital city. With London's Smart City market estimated to be worth £8.8bn in 2020, what else could be done to ensure that the city is best placed to take advantage of this major opportunity?

2 The big Idea

Mayoral candidates have announced that they will appoint a Chief Digital Officer (CDO) if they are elected, following other cities such as New York, Boston and Singapore. Arup believes the Mayor could go beyond installing an individual and create a dedicated department, a Digital Office for London. The Office would embed digital technology in the operations and culture of the GLA, supporting departments and public agencies to deliver even better public services for London. It could have three main functions:

- **Digital economy:** Support the development of London's digital economy, working in collaboration with organisations including London & Partners, Tech City UK, investors and "incubators", to help remove barriers to growth, such as digital skill shortages, lack of affordable office space, and connectivity issues.
- **Digital Services:** Drive digital innovation within the GLA and among the boroughs.

Connect data within the GLA and incentivise other organisations to share their data to create a clearer digital picture of London. This is not about data for data's sake – it will be driven by opportunities to improve services for Londoners.

- **Digital responsibility:** Address the social and ethical issues brought about by digital technology in London. Represent Londoners' needs regarding digital literacy, data privacy and security. Support public authorities with the procurement of technology and develop 'digital planning guidelines' to ensure developers provide connectivity and data to support place making.

Delivery timeframe

The Digital Office could be established by the Mayor within months. The work of the Office should be ongoing throughout the Mayoral term and beyond. The GLA's recently published 'Data Strategy' as well as the work of the Smart London Board provide the building blocks for this Office.

Funding

The Government Digital Services team within the Cabinet Office saved the UK government £1.7 billion in 2015. This highlights the scale of savings that could be delivered by a Digital Office in London; savings which can support the financing of the Office.

Evidence

Cities including New York, Boston, San Francisco and Singapore have established offices for digital technology with a Chief Digital Officer or Chief Technology Officer. The Mayor of Rio de Janeiro is setting an example in how digital technology can increase citizen engagement and renew local government legitimacy.



200,000
people are employed
in jobs primarily related
to digital technology
in London

265m
journeys on public
transport have been
made using contactless
payment cards

The Mayor has committed
£730K
to local projects
proposed through a
crowd-funding platform

3 The Mayor's role

The Mayor will need to articulate the opportunities that digital technology can enable for London and describe how the Digital Office will work to pursue these.

He or she will need to define the outcomes that the Office will achieve, allocate a budget and key performance indicators, and appoint a CDO to create and lead the Office.

The CDO will need to act as a spokesperson, champion and coordinator of the GLA's digital activities to drive cultural change, steer the Office's activities, and attract investment. As well as understanding London's infrastructure and economy, the candidate must be digitally fluent, and should understand both public and private sector concerns.



Walking in a green London

1 London's opportunity

The next Mayor of London can improve health, air quality and congestion by focusing on walking – with safe, attractive streets planned for people, reflecting the city's character, stimulating the senses, improving the economy and unlocking areas for housing by increasing active accessibility.

2 The big idea

Creating streets that prioritise people, and an environment that encourages more visitors and more people to walk, improving the health of Londoners, the city's economy and the attractiveness of the city.

Walking is the simplest mode of transport, part of almost every journey, accessible to all and with great benefits. These include benefits to physical and mental health, environmental, housing and economic improvements for Londoners.

Measures could include:

- streetscapes that promote walking
- putting walking first through key pedestrianisation projects
- green infrastructure to improve air quality and create new visually appealing sensory areas
- defined areas of interest as attractive destinations
- planning policies to encourage a range of uses and promote small businesses.

Walking in a green London will contribute to various strategic elements that shape modern and functional cities. The outcomes include:

- **shaping city life:** diversity of uses, improved health, safety and wellbeing
- **resilience:** higher density housing development through systems such as our Active Transport Accessibility Level idea
- **climate ready:** reducing carbon emissions
- **seizing growth opportunities:** improved access to local shopping, strengthened local economies and communities
- **regeneration:** town centre renewal and areas with defined character
- **hosting major events.**

Delivery timeframe

The next Mayor can make an immediate impact through a series of 'quick win' solutions: encouraging the de-cluttering of streets, installing green infrastructure, introducing solar paths in parks, creating programmes that incentivise walking for Londoners and visitors, including Walk London events.

Funding

Proposed £1 a week per Londoner, approximately £450m a year – about three times the investment for cycling – as 21% of trips are done by walking and 2% by bicycle.

Evidence

Excellent examples across the world demonstrate how improvements in walking can support better cities; New York, Barcelona, Copenhagen and Zurich have introduced measures to enhance walking, with corresponding socio-economic benefits for people and reductions in car use.



9,000+
people die annually
from air pollution

2.6m
car trips every day
are shorter than 2km

44%
of adults don't achieve
minimum levels of
physical activity

3 The Mayor's role

A "Walking Mayor" could make London the walking capital of the world. The Mayor could put in place a number of immediate measures to facilitate a better walking environment for Londoners.

Immediate measures that could be employed by the Mayor include street de-cluttering, pedestrianising key streets, creating walking superways to improve public transport connections, and publicising walking connectivity between London's parks.

The Mayor could host a Walk London event involving the closure of streets in different areas of the capital. This event will highlight walking as an alternative approach to mobility in London.



Driving down corporate carbon emissions

1 London's opportunity

London's Mayor can only directly influence emissions from the public sector estate and public transport systems in London.

By amending the Greater London Authority (GLA) procurement process for goods and services, the Mayor has a major opportunity to extend his or her influence.

In doing so, the Mayor could influence the carbon strategies of thousands of companies both in London and across the city's supply chain.

2 The big idea

The Mayor should set a GLA policy that all procurements – of goods, services or works – must include scoring criteria on bidders' corporate carbon management plans and corporate carbon emissions performance, at pre-qualification and full tender stages.

In reducing the scores of bidders for non-compliance, firms will be required to ensure a robust carbon plan is put in place if they are to win contracts from the GLA. Through this approach, corporate carbon management planning and performance become explicit business differentiators. This will encourage companies to invest time and resource into reducing their carbon footprint.

The GLA Group spent around £6bn on procured goods and services from over 1300 separate companies and organisations in 2014-15. If GLA procurement accounts for, on average, 10 percent of suppliers' income, £60bn in corporate income is affected directly by the GLA. If each procurement were to involve five competing

businesses, then 6500 businesses would be encompassed in the policy.

Delivery timeframe

A review and investigation into a change in procurement rules can be made relatively quickly. Consultation with public and private sector stakeholders, and reviews against UK and European legislation could probably be concluded within a year. The new rules could be scheduled for introduction during year two.

Funding

A consultation and feasibility study would require investment from the Mayor but could be completed for under £100,000. Over the longer term, the measure would be included within the standard GLA procurement processes resulting in no additional operational cost.

Evidence

Procurement criteria have been used to drive behavioural change in companies in relation to health & safety, financial probity, ethical behaviour, equalities and the environment. Standards and guidance on sustainable procurement exist (such as WRAP guidance or ISO 20400); these focus on the products and services. Sustainability indices also exist and have long been used by the public and private sector to promote corporate social responsibility.



£6bn+
spent in procured goods and services by the GLA in 2014-2015

Over 1300
suppliers involved in 2014-15

GLA procurement of goods and services involved companies with an estimated **£60bn+** in total turnover

3 The Mayor's role

The Mayor has the authority to help adjust London's procurement protocols to include corporate carbon performance.

The new Mayor could immediately commission a consultation led by the GLA's Head of Legal and Procurement to investigate legislative options.

The consultation for the process can be sponsored by the Mayor and involve a Deputy Mayor for Environment and Energy. The consultation would proactively involve engagement with representatives from the private sector.

As a champion of the idea, the Mayor can use his profile to promote the idea and highlight the social, economic and environmental benefits.



London Infrastructure Fund

1 London's opportunity

London's competitiveness relies heavily on the quality and quantity of its infrastructure provision. Historical underinvestment has left London at a disadvantage when compared to many OECD rivals.

In order for London to retain its competitive advantage and meet its quality of life objectives, major and sustained investment in infrastructure is required.

2 The big idea

The recent London Infrastructure Plan has identified significant funding gaps between infrastructure required to 2050 and public sector funds available. At the same time, London is growing at an unprecedented pace, and there is no long term funding vehicle to meet the city's long term needs.

Our proposal is for a ring-fenced London Infrastructure Fund, which raises funding in part from increases in business rate revenue, "windfall" gains from public sector land disposal and further devolved taxes (such as stamp duty or motoring). These could be aligned with pension and life insurance funds to invest in London's long term infrastructure requirements. The fund would provide both capital and revenue funding to support the planning, and design stages of projects as well.

Recognising that London is 'one economy', the London Infrastructure Fund will share the costs and benefits of London's growth. This Fund could carry on the council tax levy which helped fund the Olympic Games and is due to expire in 2016. A 1% addition to council tax, could be used to fund

infrastructure projects which benefit London as a whole— whether that is unlocking new housing sites, supporting walking and cycling infrastructure, or providing new green spaces.

Delivery timeframe

The fund could be set up with initial pump-priming from the public sector, and be operational within a 1-3 year timeframe.

Prior to full business rate retention, the fund could operate within the partial rates retention system and use the interim period to scale up operations and prioritise projects. The fund should be ready to run at full funding from 2020.

Funding

We estimate that the scale of capacity required could initially be delivered with a team of 5 to 10 staff and grow with ramp-up of the Fund.

Evidence

The business rates levy which supported the funding of Crossrail and the Council Tax levy which helped fund the Olympic games demonstrates the efficiency and effectiveness of pooling these funds to either fund directly or finance borrowing for projects that provide London-wide benefits. There is likely to be strong demand for investment to fund infrastructure from private institutions. For example, in the United States, the municipal bond market is worth an estimated \$3.7 trillion.



By 2050 the population of London could exceed

13m

The cost of London's infrastructure until 2050 could exceed

£1.3 trillion

80%

of required infrastructure spend is projected to be in housing and transport

3 The Mayor's role

The Mayor will play a central role in making the political and strategic case for the Infrastructure Fund both to central government and to the wider public.

The Mayor should look to set up a team within the GLA to provide initial capacity and capability to scope out the fund's activities, arrange strategic partnerships and lead on fund development. Central government support will be essential to ensuring the success of this project.



Electric bus battery switch scheme



1 London's opportunity

Electric buses provide an “off-the-shelf” solution to combat the growing concern in London over vehicle emissions and air pollution levels. London’s first electric bus arrived in 2013. In 2015 there were 51 electric buses operating across the network. Battery taxis are on their way.

Yet London is facing challenges to meet growing energy demand. Currently 40% of the city’s substations are under stress, and demand for energy across the capital could increase by 20% before 2050.

As London continues to invest in electric vehicles, could an integrated and innovative approach to electric buses provide environmental benefits whilst delivering increased resilience to the national grid?

2 The big idea

Global investment in research and development has secured rapid advancement in electric buses and the batteries that power them. This has resulted in increased confidence in electric buses and de-risking of battery weight, size and range. Concerns over charge time remain.

Could London work with existing suppliers to design buses that allow their batteries to be switched out quickly and smoothly without disrupting operations? This could take place at optimum points on the network and could ensure that operations are not penalised by the time it takes to charge bus batteries.

At each switch location, those batteries not in operational use could perform

“grid balancing” activities via infrastructure that connects them to the national power network. This could provide increased capacity to the wider system helping to ease the shocks and stresses brought about by high and variable demands on the grid.

As London’s fleet of electric buses expands, so does the scale of this opportunity. Battery switching can help to tackle environmental challenges whilst helping to ensure security of supply.

Delivery timeframe

A 5-year roll out period would include a 1 to 2 year pilot programme. This could be situated on routes where benefits to the national grid and Londoners would be maximised. Following a successful pilot, the scheme could then be extended across London in line with a roll out of electric buses.

Funding

Electric buses are clean, quiet and relatively straightforward to maintain. Based on whole life cost, electric buses are now demonstrating value versus other options. By providing additional capacity, and delivering energy back into the national grid, a not insignificant financial return could be generated if this benefit can be captured.

Evidence

The annual revenue for all utility scale battery application is expected to increase to US\$18bn in 2023. The price of batteries has decreased by 75% in the last 10 years and is projected to continue decreasing quickly. This favours multiple batteries per bus.

540,000t
CO2 are produced annually by London buses

It costs
70%
less to fuel electric buses than diesel buses

40%
of London's electrical substations are currently under stress

3 The Mayor's role

Electric buses currently represent less than 0.01% of London’s 9,000 strong fleet, the Mayor can continue to support investment in electric buses on London’s streets.

As a champion for the battery switch scheme, the Mayor could work with TfL to develop the procurement structures and charging infrastructure to support the programme.

The Mayor can use TfL’s bus contracting framework to secure the introduction of electric vehicles in a way that is financially sustainable and that manages technical risks and challenges appropriately. This approach has already been used to deploy hybrid buses onto London’s roads.



New Night Life

1 London's opportunity

It is no secret, London is running out of space. Spiralling rents threaten to drive entrepreneurs out of the city, small businesses risk being priced out of their workspace, and independent retailers are often making way for national chains.

London risks losing the edge that makes it an attractive and unique destination. With the launch of the Night Tube, the mayor has a transformational opportunity to support the night economy and secure an invaluable platform upon which London's creative entertainment sectors can thrive.

2 The big idea

The Mayor needs an integrated night time strategy to use the Tube network as a city wide asset to drive a new night time economy across the capital. This would promote local economies and innovation - places that are well used during daytime and early evening, but underutilised at night, become accessible. This can provide more low cost space to entrepreneurs and businesses, fostering innovation and creativity.

It would also create vibrant community places - night markets, sports, exhibitions, performances, pop up restaurants could be possible with localised programmes based around the extensive and catalytic network of existing stations.

A night market on Oxford Street would pilot and demonstrate the opportunity. The benefits of initially using Oxford Street include:

Connectivity – with the introduction of the Night Tube on the Central, Jubilee, Northern,

Piccadilly and Victoria Lines, it will be one of the best connected places in London.

Proximity to the West End – London's theatres, a large majority of which reside in the West End and a short walk from Oxford Street, brought in over £600m in tickets sales in 2015.

Iconic location – an established retail location, a popular retail destination with high value tenants during the day, but the street space is underutilised at night.

Delivery timeframe

In the new Mayor's first term, a programme of night time activities could be planned on Oxford Street to tie in with the Night Tube. A localised programme of events can then be rolled out around the Night Tube's extensive network of stations in the Mayor's second year.

Funding

For markets and events, funding could be provided through fees which are typically levied by councils to recoup management costs. If any additional capital funding is required, NNL projects could be crowd-funded through a continuation of the Mayor's Civic Crowdfunding Programme. Business Improvement Districts could also support NNL projects in their areas.

Evidence

The Lumiere light festival attracted tens of thousands. Business owners said trade was up over 10%, and footfall over 25% on the same time last year. New night time activities are becoming increasingly popular globally including night food and shopping markets (Melbourne), White Night festival (Paris) and Museum nights (Amsterdam).



Like our idea, let us know



The Night Tube is expected to boost London's economy by **£360m**

Night bus usage in London has risen by **170%** since the year 2000

Night time economy accounts for **8%** of UK employment (Night Time Industries Association)

3 The Mayor's role

Promote a night time strategy using the city wide asset of the night tube network as a catalyst.

Work with TfL, property owners and companies to identify places that are well used in the daytime and early evening hours but that are underutilised at night.

Encourage new uses and programmes to utilise the space around stations creating more low cost space to foster innovation and position London as a leading creative city.

Create a position of a 'Night Mayor' to manage the transformation and also be a public figure to promote the new night time economy.





Transport Investment Zones

1 London's opportunity

Fiscal constraints coupled with a chronic UK housing shortage have created a more challenging and complex policy landscape for financing infrastructure in London.

Government investment in infrastructure including railways and stations is under pressure to demonstrate value for money. There is a focus on benefits such as unlocking land for housing, providing for employment growth and boosting productivity.

Heightened demand for housing within a time of constrained public funds creates an opportunity to realise the government's housing growth ambitions and/or generate financial resources to supplement public investment in infrastructure.

2 The big idea

We believe that fiscal and planning incentives can be realigned and operated together to achieve specific aims within special zones around railway stations.

Crossrail has led to significant localised upsurges in market investment and rental values. These have occurred ahead of construction and completion of station works.

Transport Investment Zones could be designed specifically to take early advantage of this effect. Within a defined impact zone around a station, a dedicated team can provide support for planning authorities and developers to accelerate planning and benefit contributions. Special planning measures could be introduced to maximise expected benefits, and a Hong Kong style

land value capture mechanism could be designed.

Delivery timeframe

Delivery of a Transport Investment Zone requires coordination between the Mayor, boroughs and Government. The next Mayor could establish the first Transport Investment Zone in his or her first term as a pilot.

Funding

Establishing a pilot TIZ will require public resources and staff to manage the process. The potential public benefits from value capture and additional development would far outweigh the management costs.

Evidence

Business Rate Supplements (Crossrail 1), Roof Tax (Milton Keynes), s.106 (Jubilee Line Extension) and TIF (Northern Line Extension) all capture value increases driven by transport investment.



Like our idea, let us know



London's population is growing by more than

100,000
each year

House prices have risen by as much as

73%
along the Crossrail route in a two year period, five years before completion

1.5m
homes will be required in London by 2050

3 The Mayor's role

The Mayor should develop a London model that would allow for the land value uplift beyond station boundaries to be captured. This could be used to finance improvements.

It is critical to be for the primary purpose of Transport Investment Zones to be clear. For instance is it to deliver housing? Or to generate funding for further infrastructure improvement?

Resources are needed from the Mayor in partnership with boroughs and the private sector, to achieve focus on delivering housing and infrastructure outcomes.

The Mayor's model should aim to address opportunities and constraints with respect to governance, accountability, replicable, and crucially "bankability" from an investment perspective.



Arup and the last Mayor 2008 - 2016

Since Boris Johnson took office on the 4th May 2008, Arup has been at the heart of many of the city's most prominent projects in the built environment.

- Arup has worked on 3,754 individual projects in London since 4th May 2008.
- We have been able to call upon 2,693 staff in our global head office in London to support our projects here.
- We have used global expertise from our 92 global offices across 40 countries to support our London projects.

Leadenhall Building

The Tottenham Physical Development Framework

London 2012 Olympic Games

London Infrastructure Plan 2050

Programme Delivery Dashboard for Croydon Council

Thames Tideway Tunnel

Decentralised Energy for London

King's Cross Station

Crown Estate Ecology Masterplan

Crossrail

Guys Hospital Tower Refurbishment

London Power Tunnels



Leadenhall Building

Engineering an icon of London's contemporary skyline

At **224m** provides the highest offices in the city of London

46 storeys tall

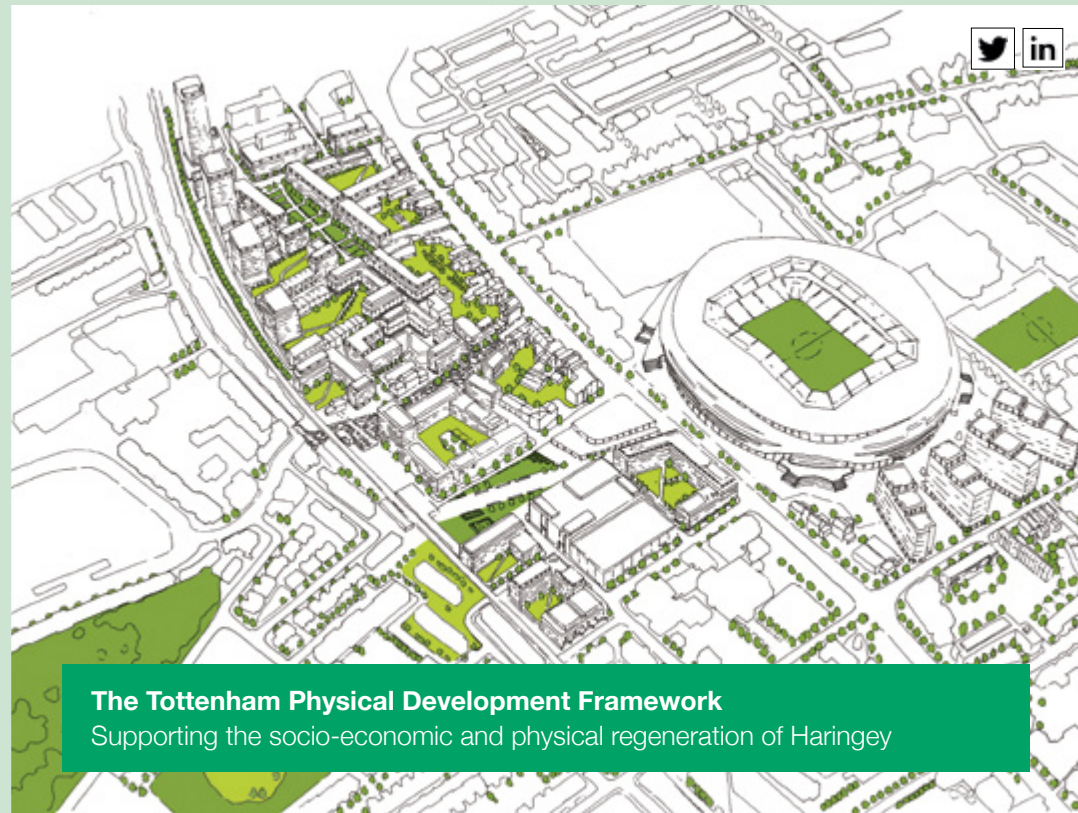
85% of the building was assembled offsite

Located in the heart of the City of London, the 46-storey Leadenhall Building is an unashamedly ambitious exercise in architectural engineering.

It features an innovative external steel-braced megaframe which wraps around the internal tapering shape – an asymmetric profile which presented complex challenges for our structural engineers.

With 85% assembled off site, this project has achieved unprecedented levels of pre-fabrication for a high rise structure in the UK.

Arup provided structural and building services engineering, vertical transportation, acoustics, lighting and security design services for this landmark building, now popularly known to Londoners as 'The Cheese grater'.



The Tottenham Physical Development Framework

Supporting the socio-economic and physical regeneration of Haringey

The £430m new stadium for Tottenham Hotspur a catalyst for developments

10,000 new homes created by the framework

3,700 Tottenham residents were included in consultation

Arup was appointed by Haringey Council and the Mayor of London to prepare the Tottenham Investment Framework and Regeneration Strategy following the London riots of 2011.

Using the proximity of the new Spurs stadium to stimulate wider benefits, the ambition is to drive growth and attract investment. Our planners were required to balance the demands and diversification of housing, increasing dwelling numbers and mix without losing Tottenham's socially driven housing character.

Working with a diverse local consortium, we listened closely to community aspirations. This will boost visibility and bring back a sense of pride to local neighbourhoods.



London 2012 Olympic Games

Securing a sustainable legacy for east London

1,500

Arup staff worked together to deliver a fully integrated, holistic approach to design

The Olympic Park covers an area totally **500 acres**

The Olympic Park is the largest urban park to be built in Europe for **150 years**

Arup played a central role in delivering infrastructure and venues for the London 2012 Olympic and Paralympic Games, as well as transforming the south park site for development.

From 2005, we provided engineering design, consultancy and economic advice in and around the Olympic Park site and continue to work with key stakeholders to secure a sustainable legacy for London.

Highlights for the firm include the design of first class sporting venues: the Aquatics Centre, Eton Manor and the Handball Arena, as well as the Athletes Village and the engineering of the ArcelorMittal Orbit, Britain's biggest structural artwork.



London Infrastructure Plan 2050

Preparing London for growth to 2050

By 2050 the population of London could exceed **13m**

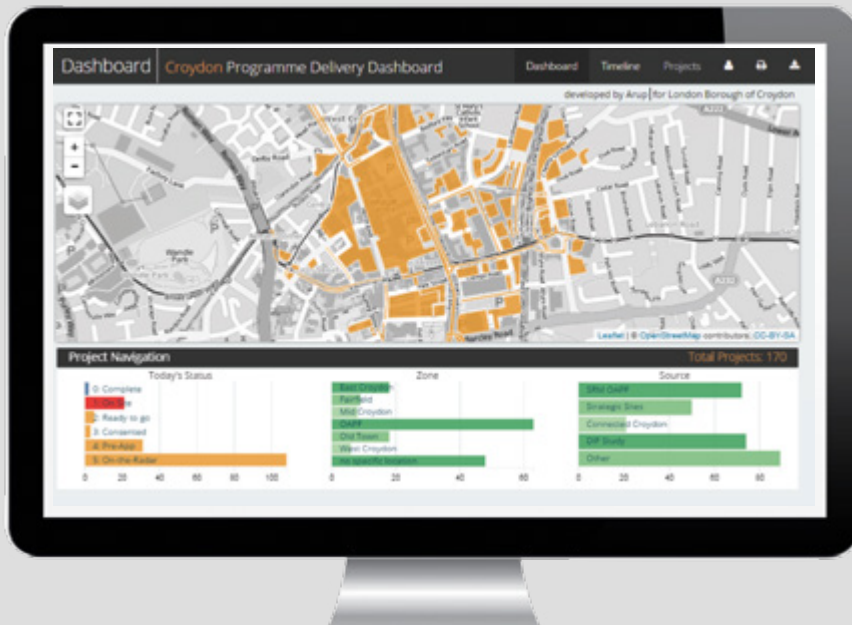
The cost of London's infrastructure needs to 2050 exceeds **£1.3 trillion**

Arup identified that housing and transport represents **80%** of the investment

London is growing at its fastest rate in modern history. As a core enabler of growth, optimal and increased investment in infrastructure is critical.

Arup was enlisted to work with the GLA to provide an assessment of the costs associated with London's long-term infrastructure requirements, and to provide recommendations on how this infrastructure development could be funded.

Arup highlighted funding sources and provided recommendations ranging from efficiency savings to maximising revenues from increased fiscal devolution. This enabled the GLA to deliver their London Infrastructure Plan 2050. Strategically London is now ahead of the game. The city is prepared for growth.



Programme Delivery Dashboard for Croydon Council

Powering Croydon's transformation as a place to live, learn, work and visit

More than
160
construction projects
will transform Croydon
in the next five years

Plans include
3000
new homes

2m sqft
of new retail and
leisure facilities will
be created

Croydon Council is embarking on an Olympic-scale programme of development, with one major difference: it's not on a blank canvas of land. In just five years, more than 160 construction projects will transform Croydon as a place to live, learn, work and visit, providing a completely new town centre.

Arup responded to Croydon's challenge of planning how to deliver the programme while keeping Croydon moving with a tailor-made, web-based dashboard that defines the programme, engages and reassures stakeholders and provides a strategic roadmap. It promises to radically transform how regeneration schemes are planned and delivered in the future.



Thames Tideway Tunnel

The first substantial upgrade of London's sewer system since 1865

The tunnel will support
London's population
for the next
100 years

Completion is
scheduled for
2022

The west section
of the 25km tunnel
is valued at
£416m

The Thames Tideway Tunnel will ensure that London's sewer system is fit to support its projected population for at least the next 100 years, and will tackle the issue of untreated sewage discharges that currently enter the River Thames on a regular basis.

The new tunnel will be the biggest infrastructure project ever undertaken by the UK water industry. Mobilisation work for the 'West' section begun in September last year with completion scheduled for 2022.

Arup and Atkins have been appointed by BMB in a joint venture as part of the team charged with delivering the West section of the Thames Tideway Tunnel.





Decentralised Energy for London

Low carbon energy to power a sustainable future for London

€3.3m
programme for
decentralised energy

90%
funded by
the European
Investment Bank

Legacy pipeline of
opportunities for
Decentralised energy
now in excess of
£200m

This €3.3m programme, 90% of which was funded by the European Investment Bank supports the Mayor of London's commitment to deliver 25% of London's energy supply through decentralised energy by 2025.

Arup was appointed by the Mayor of London in 2011 to provide technical, financial and commercial assistance to London Boroughs to develop and bring decentralised energy (DE) projects to market.

By July 2015, our work has delivered ten projects to the market with a combined value of £93m. The programme's legacy pipeline of opportunities for further DE projects is now worth in excess of £200m.



King's Cross Station

Redefining, reshaping and creating value in a rejuvenated King's Cross

40m
passengers use King's
Cross each year

£400m
redevelopment was
completed and the
station concourse
opened in 2012

Arup's work opened
up the front of the
station as the original
architect intended in
1852

The sympathetic redevelopment of King's Cross station has turned an unloved, historic rail terminus into a dynamic transport hub and a destination in its own right.

The £400m restoration and redevelopment was announced in 2005. From the earliest stages, Arup was at the heart of the design process for this ambitious project.

The core challenge for the project team was threading the requirements of a modern mainline station seamlessly into the historic Grade I-listed structure, whilst keeping one of the busiest stations in London running safely and smoothly. The redevelopment's sweeping new space opened in 2012 and now provides a fitting gateway to London.





Crown Estate Ecology Masterplan

Designing a green spine at the heart of central London

The masterplan will ensure a significant area of green space in the corridor every **100m**

1,500m² of green space will be created by the end of 2016

10,000m² of green space will be created by 2025

Arup is working with The Crown Estate to establish a green corridor across its London portfolio. The masterplan prepares an innovative guide to the installation of valuable green infrastructure throughout The Crown Estate's London portfolio.

Benefits will include enhanced biodiversity, improved air quality, reduced heat island effect, increased storm water retention and a more visually attractive environment.

The Crown Estate and Arup are now looking to create a partnership with other Estate-holders to extend the approach across London's West End. This ensures that The Crown Estate takes a long term approach to integrating green infrastructure in new and existing developments.



Crossrail

Increasing rail capacity as a key enabler of London's growth

Up to 24tph (trains per hour) will travel in each direction through the central underground section

42km of bored tunnels have been constructed under the centre of London

Crossrail due to open in **2018**

Crossrail is Europe's biggest underground civil engineering project. The project, which connects Reading and Heathrow in the west to Shenfield and Abbeywood in the east will increase central London's rail capacity by 10%.

Arup with Atkins in a joint venture won the largest design package for the project, which included the detailed design for the twin bored tunnels, and Tottenham Court Road Crossrail station.

Arup has had significant design input into six of the ten new stations and has provided the project with numerous specialist services such as acoustic and fire engineering, archaeology, and sustainability consultancy.





Guy's Hospital Tower Refurbishment

Breathing life back into the world's tallest hospital building

The £40m
refurbishment was
completed in 2 years

The 148m
high building is the
tallest hospital building
in the world

Work involved
installing
5000m²
of glazing units

Guy's and St Thomas' NHS Foundation Trust selected Arup in 2008 as a one-stop multidisciplinary team, together with sub-consultants Penoyre & Prasad architects, to deliver its vision for rejuvenating Guy's Tower.

Arup's Project Management group assembled a team of experienced consultants and designers from across the firm, providing the extensive range of services required to deliver the project, including focused access to specialist technical expertise when it was required.

This refurbishment programme was successfully delivered while the building continued to function as one of the UK's busiest hospitals.



London Power Tunnels

Securing London's access to renewable energy generation

Involves
32km
of tunnels stretching
across London

The power tunnels are
dug at a depth of up to
60m

The tunnels will house
two cables, the largest
180km
in length

The £1bn London Power Tunnels ensure National Grid will be able to provide the power infrastructure to enable growth in London as well as securing access to future renewable energy generation.

A total of 32km of tunnels are being constructed deep below the road network. The project represents the single biggest upgrade of transmission systems since the 1960s.

Arup has been involved in the project since 2009 and has provided Programme and Project Management throughout. This is as well as a number of specialist services including but not limited to procurement support, health and safety support, information management.

About Arup

ARUP

Arup is the creative force at the heart of many of the world's most prominent projects in the built environment and across industry. We offer a broad range of professional services that combine to make a real difference to our clients and the communities in which we work.

We are truly global. In 92 offices across 40 countries our 12,000 planners, designers, engineers and consultants deliver innovative projects across the world with creativity and passion.

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