EAST LONDON GREEN ENTERPRISE DISTRICT

Draft Final Report, 8 February 2010

East
Architecture, landscape
urban design

49–59 Old Street
London EC1V 9HX
www.east.uk.com
T 020 7490 3190
F 020 7490 3290
E mail@east.uk.com

with

GVA Grimley
Locum Consulting
Buro Happold Engineers
Chora Architecture and Urbanism
Sergison Bates Architects
Dow Jones Architects
Polimekanos Graphic Design

EAST LONDON GREEN ENTERPRISE DISTRICT

Draft Final Report, 8 February 2010

Executive summary

Introduction and Vision

The East London Green Enterprise District (the District) is the first defined and planned area of its type in Europe and is a key tool in addressing the UK's carbon reduction levels. The District will be a highly attractive location for green/low carbon sector enterprises and will develop into an internationally recognisable cluster of these enterprises leading the way toward a sustainable low-carbon future for the UK and the world.

The core aim of the GED is enable East London to reduce London's carbon footprint whilst delivering high quality jobs and communities. (Keep first two paragraphs up to Land ownership, under new heading

Why East London?

The East London Green Enterprise District Area's extent has been chosen as it contains a large amount of publicly owned sites, large parts of which are designated for industrial land use. There are a number of key schemes existing and emerging in the area already, which support Green Enterprise District principles, such as the Olympics, ExCel, the London Thames Gateway Heat Network and the Sustainable Industries Park.

Low Carbon Economy Context

Of the UK's growing low carbon sectors the sub sectors particularly relevant to East London are: Automotive, especially high efficiency internal combustion engines and manufacturing of hybrid and electric vehicles; Building Technologies, especially domestic boilers related to retrofitting, and Micro CHP; Recycling and Reuse; alternative fuels; and components for wind power.

Employment and Land Use

Depending on the share of the London's LCEGS sector grows the Green Enterprise district will capture The Green Enterprise District will generate between 2,900 and 6,442 jobs. Land requirements are between 24 and 52 hectares, and careful monitoring is required to ensure sufficient land supply.

Proposals and Recommendations

Governance

The key proposal is to establish an 18 – 24 month task force, drawing from existing partners.

Dynamic Masterplan

The dynamic masterplan sets out projects across nine project groups:

A Dymnamic Masterplan is a temporal plan describing an overall delivery strategy for the District. It relates projects to each other chronologically.

Prototype project groups

Energies and Utilities Network

Low Carbon energy production and distribution across the whole Green Enterprise District

Transport and Infrastructure Network

Transportation and distribution of people and goods

Ecology Network

Creation and Improvements of accessible and inaccessible public and private green spaces for increased amenity and biodiversity and food production

Environmental Manufacturing

Material recycling and reclamation, and manufacturing of low carbon and environmental goods, and their smart distribution

Exemplar Mixed Use Communities

Mixed use residential, commercial and industrial communities based on smart grids, plug and play sites including local waste treatment and other low carbon energy production facilities

Retrofitting Communities

Upgrading of residential, commercial, industrial and municipal buildings to reduce energy consumption and other environmental impacts, and achieve spatial and visual benefits, including training and supply chains

Governance

Recommendations regarding management, communication, marketing and branding of the Green Enterprise District.

Green Expo

Short and long term exhibitions of low carbon technologies and buildings, including an International Building and Technology Exhibition

Clean Tech

High tech low carbon manufacturing and infrastructure

Pilot Projects

This study identifies seven pilot projects as proposed next steps, these have been identified because jointly they build on emerging initiatives we consider in need of support or because they represent a current lack of focus. Specific sites across the District have been looked at in more detail.

The pilot projects are:

1 Energy Infrastructure

Achieving a reduction of 80% carbon emissions in the District.

2 Waste to Energy

Self sufficiency for commercial and industrial waste in the District, and self sufficiency for municipal waste for the LBTH.

3 Riverfront Address

Recommendations to enhance the role of the river in the operation and experience of the District

4 Industrial Retrofit

Retrofitting Industrial buildings to provide carbon emission reduction as well as spatial and visual benefits

5 Local Food Network

Increasing local food production to achieve social cohesions, skills training, education, environmental and health benefits as well as carbon emission reductions

6 Airport City International Building and Technology Exhibition

Offsetting the predicted increase in City Airport's passengers and carbon emissions through the transformation of the Royal Docks

7 Olympic Legacy Holding Strategy

Recommendations for green interim uses after the games and before the legacy

Introduction to the East London Green Enterprise District

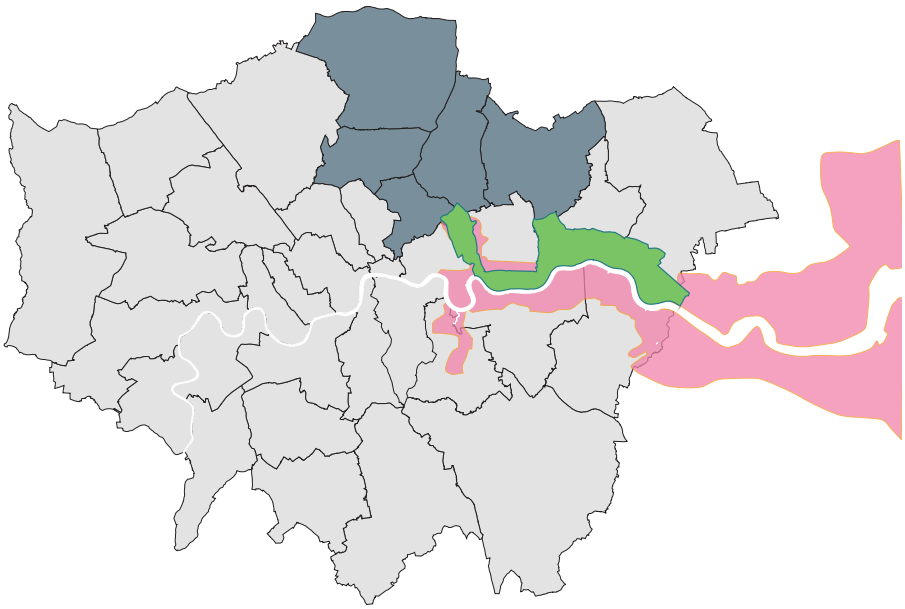
The East London Green Enterprise District (the District) is the first defined and planned area of its type in Europe and is a key tool in addressing the UK's carbon reduction levels. The District will be a highly attractive location for green/low carbon sector enterprises and will develop into an internationally recognisable cluster of these enterprises leading the way toward a sustainable low-carbon future for the UK and the world. Enterprise is the District refers to business, industry and Research and Development that contributes to the low carbon economy development and the principles of the District. Enterprises already operating within the District will be encouraged to adopt green principles to their practices/operations while actual low-carbon sector businesses will be the priority audience of the new business.

As well as attracting new enterprises, the District will transform into a physical low carbon environment which in turn will be drive demand and be an attractor to investors and visitors to the area and will further define the character of the area. Energy generation systems, distribution networks, waste management and transport systems will all be considered in terms of creating a sustainable low carbon district. It is anticipated that as in, Kalundborg Eco Industrial Park in Denmark, a symbiotic industrial ecology will develop between these enterprises further enhancing and validating the character of the district.

As well as businesses, the District will host research and demonstration centres, exemplar housing and mixed use schemes, renewable energy generation systems and an exceptional quality of public realm, that encourages rich biodiversity, natural systems of water management and is inviting to users to dwell and enjoy the area. Together the enterprises/economic and physical character of the place will define the District.

For the District to be sustainable, the three principles of sustainability need to be addressed: economic, environmental and social. To this aim therefore, while the District will represent significant economic investment, the sustainable environmental aspect of the district will be inherent in the physical arrangement and treatment of buildings, spaces, transport and energy networks plus encouragement of biodiversity and natural water management systems. The success of the District also relies heavily on the engagement of existing as well as new communities within the area. The recognisable benefits of the new Green Enterprise District aspect of their local area is critical.

The East London Green Enterprise District will be an international exemplar of a planned approach to creating an economically and socially viable low-carbon environment and destination to live, work and play



East London is a key growth area within London and is well connected to Europe and beyond via the Thames

The area identified for the District incorporates land across six London boroughs (LB's Hackney, Waltham Forest, Tower Hamlets, Newham, Barking and Dagenham and Havering) and includes most of the London Thames Gateway area north of the Thames. While recognising ambitions, objectives and development strategies within each borough, the District encourages a unified approach to achieving the District's objectives across borough boundaries. This objective is approached by building on existing use patterns and strengths across the area, and where necessary, new policy, guidelines, recommendations intend to be introduced to enable achievement of the District objectives.

As well as responding to the objectives of the boroughs in which it sits, the success of the District will be largely determined by a clearly defined and successful role within London, the Greater South East and the global market. This role is to be defined by acknowledging existing use patterns across London and understanding the market potential for East London.

The District will be a centre for the low carbon industry attracting business in this sector while demonstrating best practice in a low carbon environment and relationship between operators.

East London has one of London's largest and densest collections of industrial land in one area. Recent erosion of industrial land across the Capital increases the significance and value of the land here and makes a strong case for the retention of all industrial land in East London while strengthening the industrial sector here.

The core aim of the East London Green Enterprise District is to enable London and the UK to reduce it's carbon footprint whilst delivering high quality jobs and communities

East London Green Enterprise District with borough boundaries

DEFINITION OF THE EAST LONDON GREEN ENTERPRISE DISTRICT

The East London Green Enterprise District will be:

- a place that will showcase the principles and practice of sustainable development in the most rapidly changing area of one the world's leading cities
- London's first area with a focus on attracting and fostering green enterprise
- a place for innovative projects that demonstrate ways of de-carbonising cities and reducing other environmental impacts
- a location of choice for both businesses involved in developing and supplying low carbon technologies as well as businesses that actively integrate the principles of low carbon enterprise
- a place that will give priority to investment in low carbon growth sectors, for example renewable energy and waste to energy schemes
- a place that actively supports low carbon activity through the provision of relevant utilities, transport, business, property, financial and fiscal infrastructure
- a place that educates businesses and people about the importance and relevance of green enterprise, a low-carbon economy and contributing to a more sustainable approach to living and working in cities
- recognisable by a brand/hallmark; The proposed hallmark will operate on a sliding scale from (1-3 green dots) and will consider issues such as CO2 emissions, waste and water management of both the premises and the product or service on offer.

Overall, an East London Green Enterprise District characterised in this way would be an internationally recognised growth pole in East London, which will make a substantive contribution to London's economy and be recognised as being at the leading edge of fostering and supporting green enterprise in a highly sustainable green environment.

A green enterprise is one that:

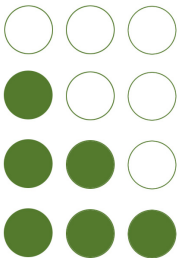
- is committed to and applies principles of sustainability to its operations
- puts sustainable principles at the heart of its culture and business ethos
- makes a recognisable and valuable contribution to the low-carbon economy of the District and a sustainable economy in East London
- where possible, makes a contribution to the education of business and people, in the District and beyond, on the benefits of a low carbon economy
- exemplifies the brand of the District.

East London is one of London's key industrial areas and as such the District's low carbon objectives will not preclude any industries/businesses from locating here, all businesses are welcome though low-carbon economy businesses are prioritised and all operators are expected to adopt green principles to their operation, reflecting the District's objectives.

As the creation of the District concerns existing and new enterprise it is obvious that different measures toward achieving the District's vision will apply to the new and the existing operators. Those already operating will be encouraged to adopt high levels of environmental performance and engage where possible in local supply chains while receiving support where possible to enable this. New enterprises, especially those developing new sites, will generally have a larger scope to achieve excellent environmental performance within their buildings and on their sites. While there will be fluctuation and variety within the District's enterprises it is imperative that both new and existing are encouraged to embrace the District's objectives to create a comprehensive low carbon environment in East London.

To realise this vision we propose the following objectives:

- achieve a policy consensus amongst key stakeholders about the purpose and offer of the District
- define and agree a definition of green enterprise as a hallmark for desired forms of business and organisation to operate in the area
- identify generic and specific locations in East London that together will constitute the District
- to define the physical and organisational infrastructure that will link and strengthen the individual project components of the District so that the whole is greater than the sum of the parts
- develop a rolling programme of "on brand" major and supporting projects that exemplify and bring alive the vision of the District
- establish a framework for the progressive development of the District that locates the major projects and their supporting infrastructure
- secure planning policy support for the development of the District through amendments to the LDFs/SPG for the constituent London Boroughs and dialogue with other relevant public bodies, such as the Environment Agency, HCA, TfL etc
- create a task force to promote, lead and manage the District
- develop a District brand to secure domestic and inward public and private investment and to promote the benefits of the area to a wider public.



The inclusion of the Green Enterprise District hallmark in enterprise and business identity demonstrates commitment to the District's low carbon principles and extends the message beyond the District's boundaries

THERE IS A LOT GOING ON ALREADY

This area already hosts an array of businesses, programmes and initiatives that accord with the District's objectives. The Green Enterprise District initiatives builds on these, offers investment opportunities and brings new projects into the current mix.

- Olympics;
  Planned to be the most sustainable Olympics ever the Games are a major driving force for the Green Enterprise District.

- ExCel Exhibition Centre
  Demonstrating good green credentials, this well established international exhibition centre is ideal for hosting and attracting low carbon related events

- London Thames Gateway Heat Network;
  The largest project of its type ever undertaken in the UK, the Heat Network should deliver 120,000 homes and buildings with hot water and a potential CO_2 emissions saving of 100,000 tonnes

- Closed Loop
  Located in the Sustainable Industries Park in Dagenham, Closed Loop epitomises the District's aspirations for industrial ecology and a waste free production cycle

- Sustainable Industries Park
  A modern industrial park incorporating various aspects of sustainable practice and offering substantial new employment opportunities and a dramatically improved appearance.

- Barking Riverside
  Exemplar housing development for approximately 26,000 new residents; the scheme includes schools, health facilities, food production areas, sustainable transport links and renewed access to the river edge

- Ford
  The single largest employer within the District, Ford also offer opportunity for HEV and efficient engine development in line with low-carbon vehicle development

- Institute for Sustainability
  The IFS is pioneering several retrofitting programmes, leading retrofitting skills training programmes and researching carbon emissions from vehicles with a view to their reduction

- London Thames Gateway
  The largest regeneration project currently being undertaken in Europe, it offers the opportunity to facilitate many of the District's objectives

- University of East London
  Located to the east of the District the university runs several research and development programmes into sustainable development

- Tate and Lyle
  A long-standing employer in the area, Tate and Lyle are contributing to the emerging district heating systems with their excess heat

- Renewable Energy Generators
  Existing wind turbines near Ford are being complemented by two new ones in the Olympics as well as 2 CCHP plants

- Rainham Marshes
  The SSSI fluvial floodplain is an international visitor attractor owing to its bird population and ancient marsh landscape

- Public transport extensions
  Proposals for an extension of the Docklands Light Railway and the new East London Transit service through the area will increase public access to the area

Historic uses and patterns

Along with current and emerging activities, the area's history is well suited to the District's needs.

The District area covers (48 km2) area of East London along the north bank of the Thames incorporating a vast collection of significant developments, infrastructural and natural features and uses. This area has a well established urban framework and a lengthy industrial and employment history. Existing and historic transport infrastructure have defined the location of economic activity. East London's residential communities have developed around these. Historically determined by the prevailing direction of the wind, and flow of the Thames, it has also been the default destination for much of London's waste.

Though the nature of industry, manufacture and waste management has evolved greatly since these patterns were established, the associated scale of land attributed to these industries lends itself well to the reinvigoration of the industrial sector in this area. The proximity of much of the area to the Thames, once a thriving transport and freight amenity, is an equally relevant historic and current incentive for the location of industry here.

The rebranding of this area as a Green Enterprise District builds on these long established rich and complex series of places and communities here and is intended to read as an overlay to these uses and patterns.

The investment in the area as a result of projects such as the 2012 Olympics (to the west of the District area), Stratford City, the Sustainable Industrial Park and London Riverside (central) are all powerful catalysts and major opportunities to act as a springboard for the District.

Current activities

The current developments within the area also lend themselves toward increased development. The investment in the area as a result of projects such as the 2012 Olympics (to the west of the District area), Stratford City, the Sustainable Industrial Park and London Riverside (central) are all powerful catalysts and major opportunities to act as a springboard for the District. Between and sometimes linking these are new residential communities, emerging development proposals and planned infrastructure upgrades and extensions. The Olympics in particular presents the unique opportunity of a global audience for those enterprises established in time to benefit from them. The Olympic Legacy too presents an unrivalled local opportunity for enterprise to engage with.

Current activities in East London are influencing the long established uses

Land ownership and land use

The area hosts a collection of public land holdings that could be used by the public sector to help deliver the District ambitions. Industrial land use is dominant, prefect for the reinvigoration of the industrial sector here.

While industrial land use is already a strong characteristic of the area, its significance in this regard is likely to be heightened by the gradual erosion of industrial land use designation across London. East London is one of the few remaining strongholds of industry and should be encouraged to build on this quality as highlighted earlier this kind of land is fundamental to green business.

Location and proximity

While historic patterns of use and land plots make the area conducive to industry, the proximity of the area to London's financial centre, Canary Wharf, is a strong attractor as well as the presence of London's City Airport within the area and its iconic dockside environment, strengthening the relationship of the District with the European market and beyond.

The river also offers a freight connection with other parts of the UK, Europe and beyond.

Journey time from City Airport to Canary Wharf is approx 15 minutes

Journey time from City Airport to Rainham marshes is approx 35 minutes

Industrial land use designation and strategic employment sites and land in public body ownership within the District

POLICY OBJECTIVES FOR THE DISTRICT

The Lower Lea Valley

This section revues this context and suggests initial directions for economic development and inward investment across the District. The potential location of Green Enterprise growth sectors highlighted at the beginning of this work is addressed.

This review is organised by the Opportunity Areas identified by the London Plan. These reflect broad functional development areas rather than municipal boundaries. This is a useful way to delineate the drivers, assets and character of key current and proposed employment locations across the District.

Policy objectives, key development projects, transport assets, public sector land ownership and suggestions for the most relevant District related economic sectors for each Opportunity Area are considered.

Current Policy Objectives

The Lower Lea Valley has been identified as an Opportunity Area in the London Plan because of the area's significant potential for renewal and regeneration within the East London Sub – Region. It is one of the largest regeneration opportunities in Europe and the largest remaining regeneration opportunity in inner London.

The Lower Lea Valley covers areas on both sides of the River Lea and stretches from the Hackney marshes in the north to the River Thames in the South. The OA covers areas in four London Borough's, Tower Hamlets, Hackney, Waltham Forest and Newham. However the majority of the OA land is located in the LB of Newham. It is situated just 3 miles from Central London.

The major development and regeneration projects in this OA include Stratford City, the Olympic Park, and Canning Town and Custom House regeneration. These significant physical developments provide the opportunity for social, physical and economic regeneration. The current London Plan target is for 32,000 homes and 50,000 new jobs by 2026.

The Opportunity Area Planning Framework for the Lower Lea Valley provides strategic guidance on key regeneration locations, the future land use structure, open space and transport recommendations. The aim of regeneration of the Lower Lea Valley is to transform the area into a vibrant, high quality, sustainable mixed use city district that is fully integrated into the urban fabric of London. It is anticipated that the regeneration will benefit existing residents.

The London Borough of Newham covers the largest part of this Opportunity Area. Its Core Strategy sees Newham pursuing:

Becoming a major business location.

Major land use change from industrial and employment, unlocking vast amounts of development land.

New residential developments incorporating improved local facilities for education, health, leisure and recreation and good quality transport services.
Successful regeneration of the area will provide new and improved employment and business opportunities.

New communities integrated into existing neighbourhoods in order to enhance the living and working experience of those already residing in the area.

Development Context

The Lower Lea Valley is a large and complex area with a wide variety of activities. This area has a long history as a manufacturing, warehousing, utility and service area which has left a number of significant issues to be addressed.

This area offers a wide array of residential communities, local industrial and service centres, high streets and town centres. The Lower Lea Valley also contains vacant sites, contamination issues and areas fragmented by multiple waterways, roads, railways and overhead pylons.

Key Current Proposals

1 The 2012 Olympic Park, located in the Lower Lea Valley OA, includes the development of the Velopark, Eton Manor, Arena 3, the Olympic Stadium and the Aquatics Centre. This will be an international destination with global visibility in 2012.

2 The Media and Press Centre will accommodate all of the media needs during the Games and is intended to be an office based development focused on media related sectors after. This is a large scale office development than will be able to accommodate a range of businesses in the future.

3 The Athletes Village is due to provide up to 2,800 new homes in time for the 2012 Olympic and Paralympic Games. Following the Games a further 1,500 residential units will be added to the scheme and the project will become a mixed tenure community.

4 Stratford City is the largest retail led, mixed use urban regeneration project ever undertaken in the UK. The site covers 180 acres and will provide a new metropolitan centre for East London. The development was granted planning permission in 2004. It is adjacent to the Olympic Park Site. The development will provide 175,000 sq m of shopping, leisure and entertainment space, the majority

of which will be provided by the Westfield Stratford Centre. The scheme will also provide 465,000 sq m of office space, 120,000 sq m of hotel and conference space and 460,000 sq m of residential space (providing 5,000 new homes), all of which is to be supported by 32 acres of open spaces. Plans also include a 900 pupil secondary school, a primary school, a primary healthcare centre and an NHS walk – in centre.

5 Bromley by Bow - Development will include a mix of uses including retail, offices, community and civic provisions, the further integration of the creative industry at Three Mills into the wider community and the creation of public and green space along the water. Potential improvements to the A12 corridor would increase its strategic location to the wider area.

6 Hackney Wick – The redevelopment of this area provides the opportunity to improve the capacity and accessibility of the station, improve retail facilities, provide new mixed use and residential development, improve public access to the waterside. The area will be an access point for the Games and will therefore the station will benefit from access and capacity improvements prior to 2012.

7 West Ham – occupies a pivotal location in the centre of the LLV, linking east, west, north and south with excellent underground and C2C rail connections to the major centres of Stratford, Canary Wharf, the City and Greenwich Peninsula. These existing connections and future accessibility proposals provide the area with the potential to be a vibrant mixed use centre.

8 Lea Valley Park extension – the LLV park currently extends from Hertfordshire 20 miles South following the course of the River Lea to the Hackney Marshes. The extension of the park is key to the Olympics masterplan. The aim is to create a 'green spine' on the waterways of the LLV connecting the Olympic Park to the Thames.

9 Canning Town and Custom House -
Canning Town is a key gateway to the Lower Lea Valley. The area is highly accessible by both road and public transport. The A13 provides a strategic road link to central London. In terms of public transport Canning Town station is the rail/bus inter-connecting station, with the Jubilee Line Underground service and DLR, which offers fast links to the Royal Docks, City Airport, Canary Wharf, the City and West End. Canning Town is likely to become the second largest centre in the Lower Lea Valley. The recently updated masterplan for the area proposes that the area has the potential to provide 10,000 new homes and 50,000 sq m of retail and commercial space. Developers have recently been appointed to begin delivery of the masterplan proposals.

Key current proposals within the Lea Valley Opportunity Area

Industrial Land Change

The most prominent change of use is from industrial land. The OAPF for the area suggests that the Lower Lea Valley has the potential to release up to 173 ha of industrial land from 2005 to 2016 for other uses. This will be tested and validated by Boroughs as they prepare their local planning documents.

Despite this scale of change, it will still be important for industrial accommodation to remain in this area as it is one of the few key remaining 'inner' industrial locations in London. Because of their importance some remaining industrial areas are identified as Strategic Employment Locations, they are mainly located in the centre of the Valley where industry is the predominant land use. Outside of this area there are five existing clusters of specialised industrial activity including Three Mills/ Sugar House Lane, Hackney Wick, Fish Island and the new Spitalfields Market. Outside of these protected areas the aim is to encourage mixed use and higher density redevelopment. A conscious effort has been made to relocate businesses displaced by the Games and other major developments, notably to Beckton to the east, which is also within the Green Enterprise District. In order to facilitate the new employment roles that are expected the area will also provide improved education facilities. Birkbeck University has planned for a purpose built, stand alone Stratford campus. UEL is also expanding the offer from its Stratford Campus.

The partners of the Olympic Legacy vision have also committed to work with local authorities and other agencies to develop and deliver the Stratford Jobs and Business strategy and the Olympics Local Employment and Training Framework, which will provide a programme of employment support services, a range of training initiatives and programmes of education support.

Transport Assets

The Lower Lea Valley is well served by good public transport links. Major investments have extended the Jubilee Line through the area to Stratford to connect with the Central Line and main line rail services. Access will soon to be improved by planned improvements including two Crossrail Stations, four new DLR stations, improved services on underground lines and improvements to the A13 at Canning Town and high speed links to St. Pancras.

Stratford is currently well connected, and further improvements are planned for the area. These include a new Crossrail Station (scheduled to open in 2017), new DLR stations, improvements to the underground services and an improved bus service. The two major transport hubs, Stratford Regional Station and Stratford International Station will be connected by the Westfield development. The new Javelin line and the Kent Fastlink will also service the area.

Accessibility will be improved in the Canning Town area with the Crossrail Station at Custom House and the planned A13 improvements that will reduce road traffic congestion and improve pedestrian movement in the area. Access is also provided by the A12.

However moving about the area at a local level is more restricted due to the barriers created by major roads, waterways and railway lines. On a local scale there are plans to make the area more easily accessible by improving cycle and pedestrian routes with new connections to cross the physical barriers present in the area.

Land Ownership

The Lower Lea Valley OA incorporates a significant amount of brownfield sites (73 sites totalling 429ha). Of these sites 17 (111 ha) are publicly owned. The LDA owns 5 sites covering 36 ha. The Olympic Delivery Authority is a significant current land owner.

The Lower Lea Valley OA incorporates a significant amount of brownfield sites (73 sites totalling 429ha). Of these sites 17 (111 ha) are publicly owned. The LDA owns 5 sites covering 36 ha. The Olympic Delivery Authority is a significant current land owner.

The Royal Docks and Beckton Waterfront

Current Policy Objectives

The Royal Docks and Beckton Waterfront has been identified as an Opportunity Area in the London Plan. It is one of the major opportunities to achieve significant renewal and regeneration within the East London Sub – Region. It is also one of the principal areas within the London Borough of Newham capable of contributing to future economic and housing growth.

The current London Plan target is for 14,000 homes in this area up to 2026 and 5,500 new jobs over the same period. The Draft London Plan (October 2009) sets housing outputs at 11, 000 new homes for the OA and employment outputs at 6, 000 until 2031.

The Opportunity Area covers a key strategic location between the Lower Lea Valley and Barking Riverside to the east. The area forms the lower half of Newham's 'Arc of Opportunity', a large scale regeneration project covering 140 ha of brownfield land.

The London Borough of Newham has outlined its vision for future land use in the area in the emerging Core Strategy (currently at the Issues and Options stage). The vision for the area from 2007 to 2020 includes:

Becoming a major business location;

Major land use change from industrial and employment, unlocking vast amounts of development land;

New residential developments incorporating improved local facilities for education, health, leisure and recreation and good quality transport services;

Successful regeneration of the area will provide new and improved employment and business opportunities;

Finally, to regenerate the area successfully, it is vital that new communities are integrated into existing neighbourhoods in order to enhance the living and working experience of those who already residing in the area.

Development Context

This area has a long history as a major centre of industry. The Royal Docks, the largest enclosed docks in the world, became London's principal docks during the first half of the twentieth century, serving hundreds of cargo and passenger ships at a time. Beckton was the location of Europe's largest gas works and Britain's largest sewage works. Residential communities grew up around the docks as a result of the employment available. The decline of the Docks and other industry in the area has left large plots of land vacant or underused. The docks present a unique iconic character that should be built upon.

The land north of Royal Victoria dock at the west of the Opportunity Area is currently occupied by the Excel Centre, a major exhibition and conference centre. There are also nearby and recent vintage residential and hotel developments.

Silvertown Quays occupies land to the south across Victoria Dock. The historic quays are at present either used for storage or vacant. There is some housing development to the west.

To the South West of this is the Thameside West area. This is currently used for manufacturing, storage and small businesses. This area also has a number of wharves. The Thames waterfront is dominated by the Tate and Lyle Sugar Factory in this area.

The north east sector of the docks is defined by the Royal Albert Dock. This is home to the University of East London and the Royals Business Park, which hosts a single office building occupied by public sector tenants.
South across the Albert Dock is London City Airport. Just to the South of the airport there is also the long standing Silvertown residential community. This is neighboured by the Thameside industrial estate to the south.

A number of new higher density residential developments have also emerged across this area: at the west, along the Thames and also at the East. Gallion's Reach is a higher density residential development at the eastern end of the Docks.

This is neighboured by office developments to the east and data storage, distribution and manufacturing to the north on Armada Way and at the London Industrial Park to the north in Beckton. The Beckton area in the North East of the OA is currently occupied by utilities, logistics, industry and an edge of town retail development.

Historically busy dockside; cranes and tracks are still in tact for much of the dock edge

Key Current Proposals

1 The Royal Docks area is one of the most dynamic development environments in London. There are significant plans to regenerate existing communities, as well as to redevelop previous dock related sites.

2 Proximity to the central city, Canary Wharf, Stratford, London City Airport and extension of the DLR and future delivery of Crossrail are seen as major drivers of change. Both the public and private sectors have been active in defining that change.

3 The Canning Town and Custom House Regeneration Project aims to significantly improve the Canning Town neighbourhood through housing regeneration and a new town centre. Custom House is in the Royal Docks OA and is the planned location for a Crossrail Station.

4 Landmark Site Mixed Use Zone – this area, located at the western end of the Royal Docks already hosts the Royals Water Sport Centre. It is proposed that this site is developed for residential and employment use. Proposals include a permanent water sports facility.

5 The EXCEL Centre – the venue is currently undergoing a £165 m expansion.

6 Peruvian Wharf – Planning permission has been achieved on half of the site for a 150 bedroom hotel and 900,000 sq ft of commercial space. A safe guarded wharf has been retained on site.

7 Minoco Wharf - A mixed use development is planned for this area comprising of residential, retail, commercial and community facilities, as well as a marina lined with shops and restaurants.

8 The Silvertown Quays Project – This project was proposed to include 5,000 new homes, office, retail and visitor facilities.

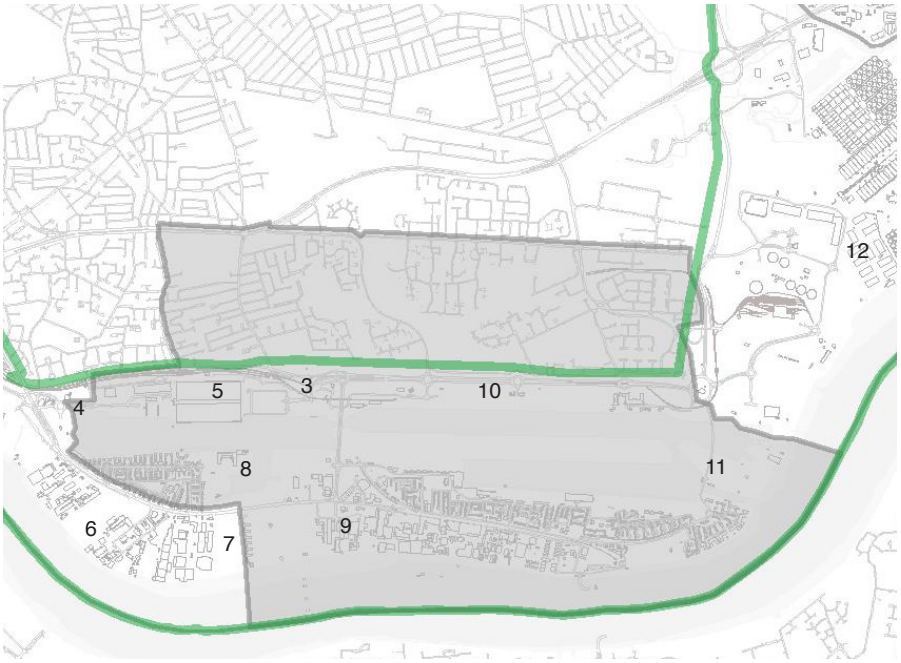
9 Barrier Park East – The development of 750 homes received outline planning permission in June 2009.

10 Royals Business Park - Original concepts included the development of the 50 acre site providing 148,000 sq m of office and 9,000 sq m of retail and leisure facilities. Building 1000, comprising of 23,500 sq m of office, has been completed and is occupied by Newham Council and Swatch.

11 Royal Albert Basin – It is intended that completion of this development will result in the creation of 100 jobs and 2,000 homes.

12 Beckton Riverside Olympic Location – this 20 acre development site located at the eastern end of the OA is intended to provide 460,000 sq ft of industrial units for businesses relocated from the 2012 Olympic Park site.

13 The LDA is planning to locate an area wide district heating network within the Royal Albert Basin. The 1,000 sq ft centre will supply low carbon heat for new mixed developments. It will also form part of the London Thames Gateway Heat Network.



Key current proposals within the Royal Docks and Beckton Opportunity Area

Transport Assets

The Royal Docks area is served by highway access from the A13 and connections to the Blackwall Tunnel going south and access to the North Circular via Barking.

Public transport services include a Jubilee Line stop at Canning Town, which links to a network of Docklands Light Rail stations that serve the south area of the docks and also north of the docks and east to Beckton.

The introduction of the East London Transit will connect Ilford to Dagenham Dock via Barking Town Centre and Gallions Reach. The planned Crossrail development will improve the connectivity of the area from

Central London. This will provide greater access to employment opportunities for residents and better services for businesses. Stations are planned at Canning Town and Custom House.

There are some constraints on public transport accessibility, particularly in locations that fall between DLR stations.

Land Ownership

The Royal Docks and Beckton Waterfront includes large tracts of previously industrial land. There are now a number of large vacant parcels that were previously in industrial use. The London Development Agency owns a number of these including 16 sites, covering 148 hectares. The LDA also has significant land interests in Beckton associated with the London Industrial Park. Thames Water is also a major land owner through the ownership of facilities in Beckton. Land ownership at the Royal Docks OA is held across a number of private and public interests. Approximately 260ha has been identified as brownfield across the area, and therefore available for regeneration. Approximately 205 hectares are in some form of public ownership.

The Royal Docks and Beckton Waterfront includes large tracts of previously industrial land. There are now a number of large vacant parcels that were previously in industrial use. The London Development Agency owns a number of these including 16 sites, covering 148 hectares. The LDA also has significant land interests in Beckton associated with the London Industrial Park. Thames Water is also a major land owner through the ownership of facilities in Beckton. Land ownership at the Royal Docks OA is held across a number of private and public interests. Approximately 260ha has been identified as brownfield across the area, and therefore available for regeneration. Approximately 205 hectares are in some form of public ownership.

Barges moored alongside Tate & Lyle tell the story of how well used the Thames was for freight and how popular attractor this was for industry

Current Policy Context

Much of the eastern part of the District is within the London Boroughs of Barking and Dagenham and of Havering. There is also significant overlap with the London Riverside Opportunity area identified by the London Plan. The District also includes Barking Town Centre, which is the focus of considerable regeneration activity.

London Riverside has been identified as an Opportunity Area in the London Plan because of the area's significant potential for renewal and regeneration within the East London Sub – Region.

The current London Plan target for the London Riverside Opportunity Area is for 14,000 new jobs up to 2026. This is matched by a housing target of 20,000 homes up to 2026. This is proposed to be increased 25,000 new homes in Draft Replacement London Plan. There is a significant opportunity to integrate the objectives of the Green Enterprise District in the delivery of these targets. The OA objectives outlined in the London Plan are reflected in the LB Barking and Dagenham submission Core Strategy (June 2009). An Opportunity Area Planning Framework is currently being considered. An AAP for Barking Town Centre is currently at the pre – submission stage.

The key areas identified for regeneration in the Barking and Dagenham Core Strategy are:

Barking Town Centre - a significant number of new homes will be built as well as new shops and community facilities, including a new business centre

Barking Riverside – this exemplar project is the largest brownfield regeneration site in the Borough. There are plans for 10,800 new homes, 3 new schools, healthcare facilities, shopping areas, parks, river access with new cycle and path ways, and transport connections demonstrating deliverables when developing at this scale.

South Dagenham – a family, housing led, mixed urban community.

Development Context

The area has a long history as a centre for manufacturing, distribution and waste recycling. London Riverside is an area containing some of London's largest vacant sites, important industrial areas and some of the capitals last wild spaces. There is a unique mix of land uses in the area, for example large residential areas are near to manufacturing plants, while some of the capital's largest wildlife and natural areas are also nearby.

Historically, this section of the Green Enterprise District was dominated by the Ford Dagenham production facility. This large scale plant was one of the largest employers in East London. The area includes a wide range of manufacturing, distribution, outdoor storage, waste processing and recycling operations. Facilities ranged from highly-organised, large-scale, high-visibility production to small, poorly regulated and low visibility industrial sites and units.

Consolidation on the manufacturing sector has left large vacant parcels, particularly around the A13. New investment has occurred at the Sustainable Industrial Park. Some larger material storage and distribution and recycling operations have reinvested in cleaner and more efficient processing. There has also been reinvestment in some of the smaller multi-tenant facilities in the area, including at Easter Park.

Key Development Projects

1 Barking Riverside is a large scale residentially led mixed use development proposal. There are plans for 10,800 new homes, 3 new schools, healthcare facilities, shopping areas, parks, river access with new cycle and path ways, and transport connections. The project is being delivered through joint venture arrangements involving the Homes and Communities Agency. The first phase of this development is due to start on site in early 2010. Delivery of this scheme has the potential to change on the ground conditions, as well as the image, identity and perceptions of the section of the Green Enterprise District.

2 The London Sustainable Industrial Park is emerging as a significant new employment development and image and identity changer for the sub-regional industrial property market. This is intended to be an exemplar model of community resource providing employment, education, training, recreation and environmental improvement

Ford has been a stronghold in the area since 1931

opportunities; that unites world class research on maximising resource use efficiency, recovery and recycling initiatives, with business clusters seeking environmental improvement and economic gains through: sharing information; exchanging waste products, and coordinating operations and procurement activities.

3 The Sustainable Industrial Park aims to build upon existing recycling and aggregate operations, the area's engineering and the role of the Centre of Engineering & Manufacturing Excellence (CEME). Key components include: an Environmental Technology Resource Centre for London (ETRCL); attracting SMEs with a 'green' focus; a Local Community Resource involving local people, schools, colleges and universities in education and training, and promoting 'green chains' between businesses on site, moving towards the ideal of a closed loop system where waste products from one business become resource inputs for another. A number of new buildings have been supported by local infrastructure development and the attracting of businesses in key sectors.

4 The Dagenham Dock development has so far provided 1,400 new jobs and 70,000 sq m of employment space. February 2006 saw the opening of Voltaic, an award winning distribution/ warehouse building developed by Gazeley with a suite of 12 of the latest ecological initiatives including solar photo-voltaic's and a ground source heat pump.

Transport Assets

London Riverside has good road links to central London and the M25. The A13 is the main East – West route. However most of the land south of the A13 is only accessible by car or bus.

Access to the London Riverside area of the GED is provided by the A13, with access to the M25 to the east, and onwards to the rest of the UK motorway network. The A13 also connects to west to the A414 north circular and into central London. Much of east and central London can be reached in 45 minutes.

Some highway improvements have been made to the A13 Goresbrook Interchange, improving the previously poor access to the Sustainable Industrial Park site at South Dagenham Dock. Further infrastructure improvements are in the pipeline.

The planned Creekmouth Loop Road upgrade will link River Road and Creek Road, alleviating the pressure on River Road and permitting greater traffic separation between industrial and residential areas.

There are fourteen 'safe-guarded' cargo handling wharves in Barking and Dagenham, handling the largest volume of cargo in Greater London.

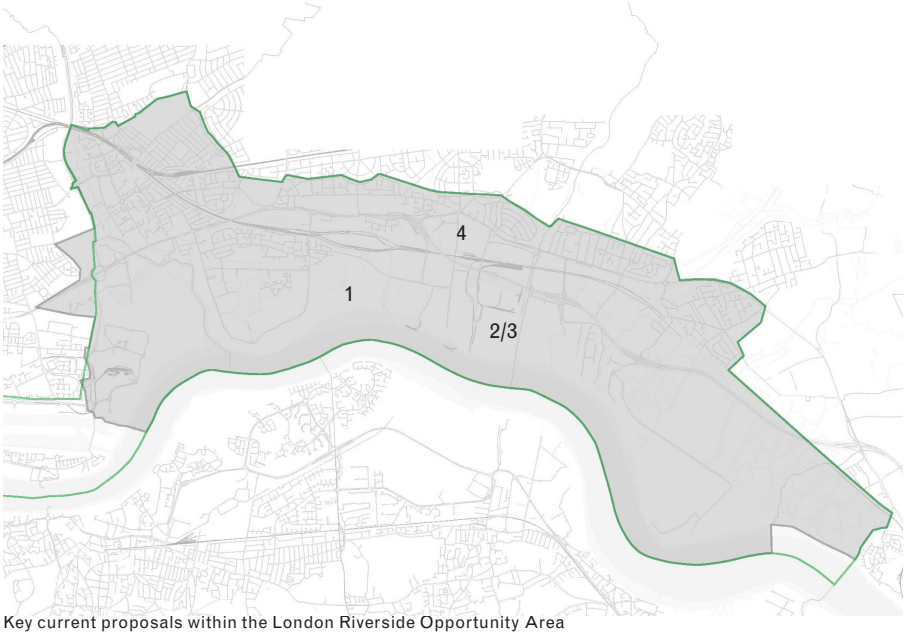
Public transport access is provided by the District Line to Barking Town Centre. Rails services link Barking and Romford. Bus services are provided throughout the local residential communities.

Public transport improvements include the introduction of East London Transit, providing a fast and frequent bus service connecting Ilford to Dagenham Docks via Barking Town Centre and Gallions Reach. Phase 1, connecting Ilford to Dagenham via Barking Riverside is expected to be operational by 2010. Phase 2, the Gallions Reach stretch, is expected to be operational by 2012.

The planned extension of the Docklands Light Railway and the Thames Gateway Bridge would have improved accessibility to, from and around the area. However both of these projects have suspended indefinitely.

Land Ownership and Development Opportunities

There are now a number of larger, regularly shaped vacant parcels previously in industrial use. The LDA owns a number of these; including 14 sites, covering 80 hectares. The HCA has ownership interests through a joint venture at Barking Riverside. The London Thames Gateway Development Corporation also has ownerships at Dagenham. This array of public ownerships presents the opportunity for a significant public sector influence on the type and approach to development in this area. A total of 23 sites at 94 ha are publicly owned.



Key current proposals within the London Riverside Opportunity Area

There are now a number of larger, regularly shaped vacant parcels previously in industrial use. The LDA owns a number of these; including 14 sites, covering 80 hectares. The HCA has ownership interests through a joint venture at Barking Riverside. The London Thames Gateway Development Corporation also has ownerships at Dagenham. This array of public ownerships presents the opportunity for a significant public sector influence on the type and approach to development in this area. A total of 23 sites at 94 ha are publicly owned.

SPATIAL CHARACTERS

The pattern and nature of uses as explained earlier is evident from the figure ground image below. Residential areas are characterised by close-knit smaller footprints while large industrial plants such as Ford leave large bold prints on the plan. The marshes and land-bound water bodies are clear too by the absence of development in these areas.

Lack of pressure on land use compared with inner London has led to the evolution of this pattern.

The variation within these spatial characters lends itself well to the multiple objectives of the District including a robust green infrastructure.

Densely built and populated Barking Town Centre

Generous expanse of Rainham marshes, a dramatic contrast to residential and industrial areas of the District

Waterside spatial characters

Despite the rich variety of space across the District, the river is common to the whole site. The relationship of the river with the land varies from the riverside itself, merging into smaller creeks and canals, engineered docks and the marshes. This is a positive relationship and should be built upon.

Despite the strong presence of water throughout the area, public access to the river's edge itself and the creeks around Dagenham is restricted for much of the area. Industries located against the waterside and site boundary fences prohibit easy movement along here, despite the fact that much of the river trade ceased years ago and very few of the businesses make use of the river.

Here we explore the resulting spatial qualities of the presence of water across the area and how this may inform uses and spatial qualities within the area.

Industry located against the river edge prohibits pedestrian access although much of the industry no longer uses the piers and other riverside infrastructure

1 Lower Lea Valley - 'Islands'

This area is characterized by a tight net of infrastructure – roads, railway tracks, and the river Lea, splitting the area into a large number of distinct parcels, which can spatially be considered islands. Each island has its own distinctive edges, which vary, determining the character of the island.

This character suggests that islands are identified for development by single users, or types of use, to enhance the legibility of the distinct island characters.

3 Beckton - 'Green Doiley'

Built forms such as the Beckton sewage works plant are simple bold shapes that, in plan, appear as dense precise cut-outs from the ground plane. Except for along the riverside there is little relationship of this area with the river.

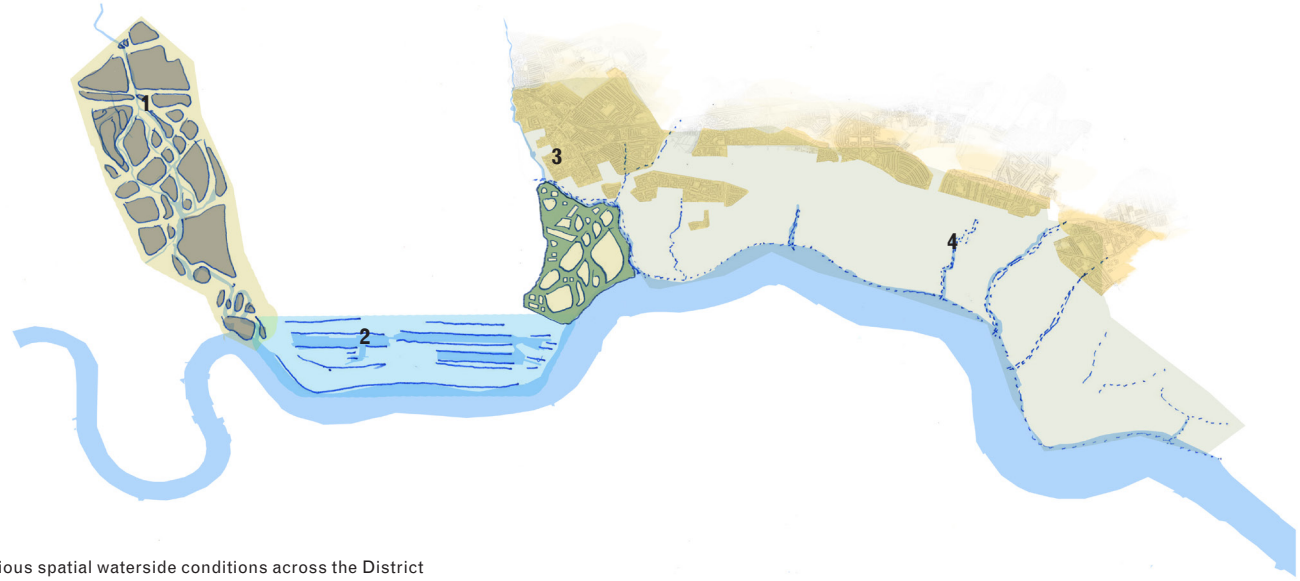
Uses here don't encourage public access to this area,

4 Riverside - 'Marshes'

This area is the largest, and it has retained its character of flat marshland, with large industrial uses such as Ford along the river. Housing has historically been restricted to the raised levels above the railway lines and the A13.

Rainham marshes are a significant and unique resource for recreation and wildlife and will be enhanced by additional visitor facilities.

The distinctive flatness of the area is a quality that could be built on with large, low level buildings.



Various spatial waterside conditions across the District

2 Docks - 'Terraces'

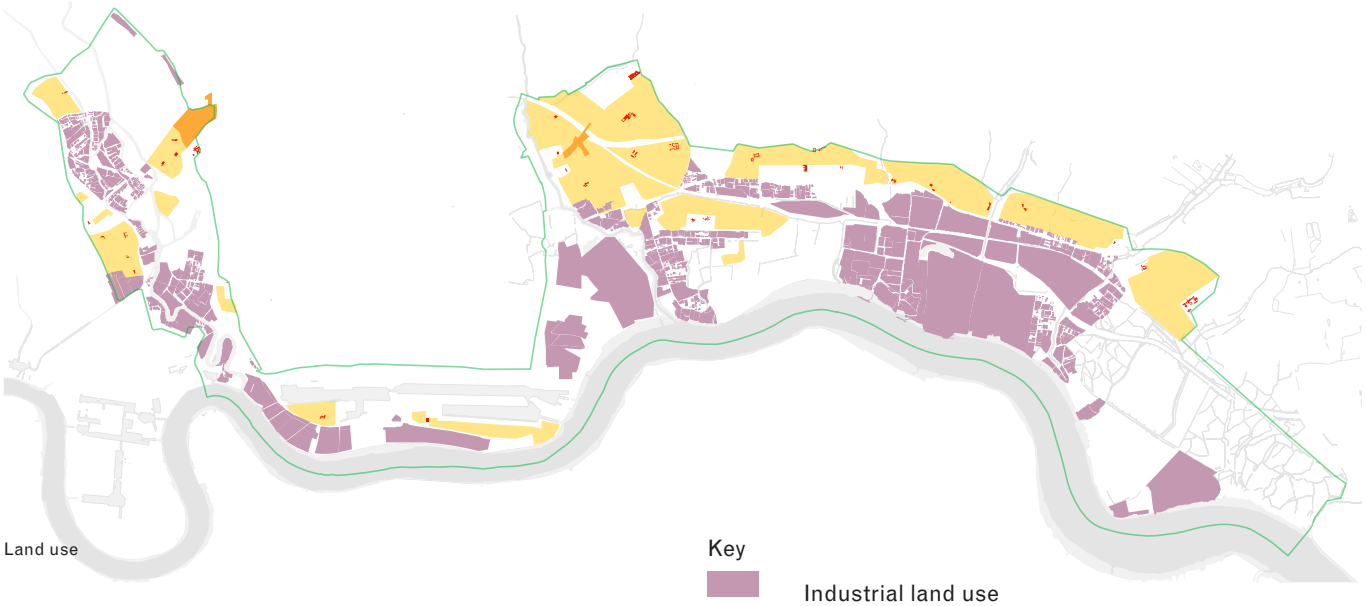
In the docks around 25% of the area is water – and it divides the area into strips or terraces, all running parallel to the River Thames. Major roads and other transport infrastructure also runs east-west, mimicking the flight paths of City Airport traffic.

For this condition we suggest high density, multi-use linear plots, arranged in terraces, placed between roads and water, similar to the Tate & Lyle configuration.

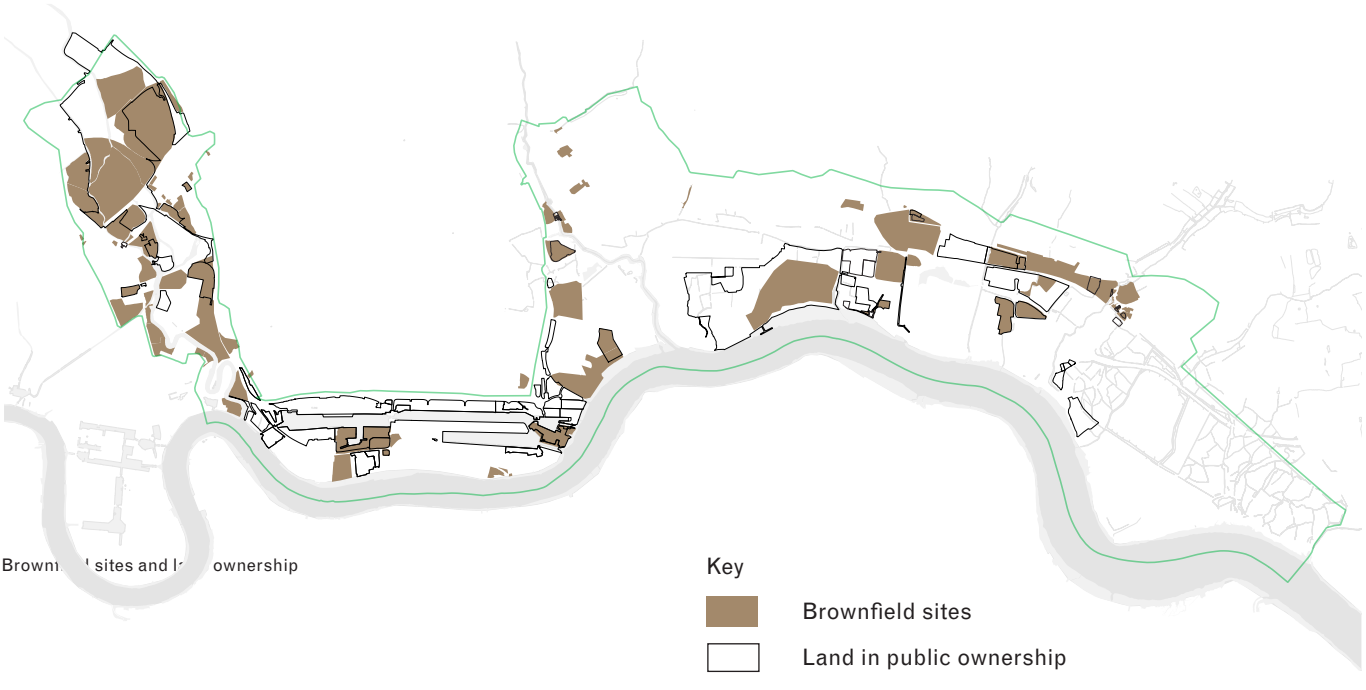
Land use and ownership

Industry hugs the river edge while town centres and residential areas are pushed further north. New industry and employment opportunities will seek to employ local people and establish strong relationships between these uses and their users.

The amount of brownfield land and that within public ownership in the District suggests significant development potential.



Land use

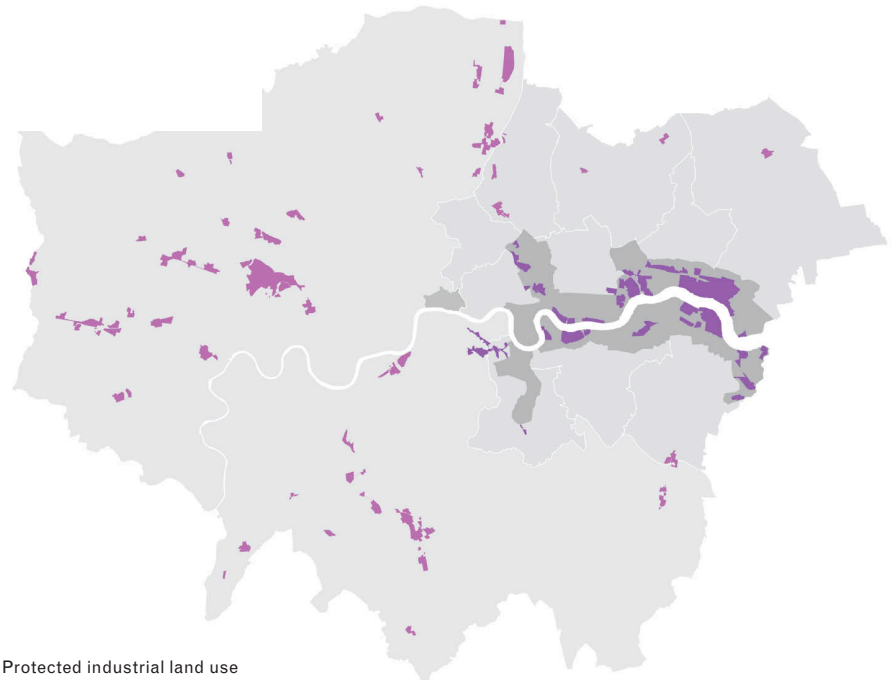


Brownfield sites and land ownership

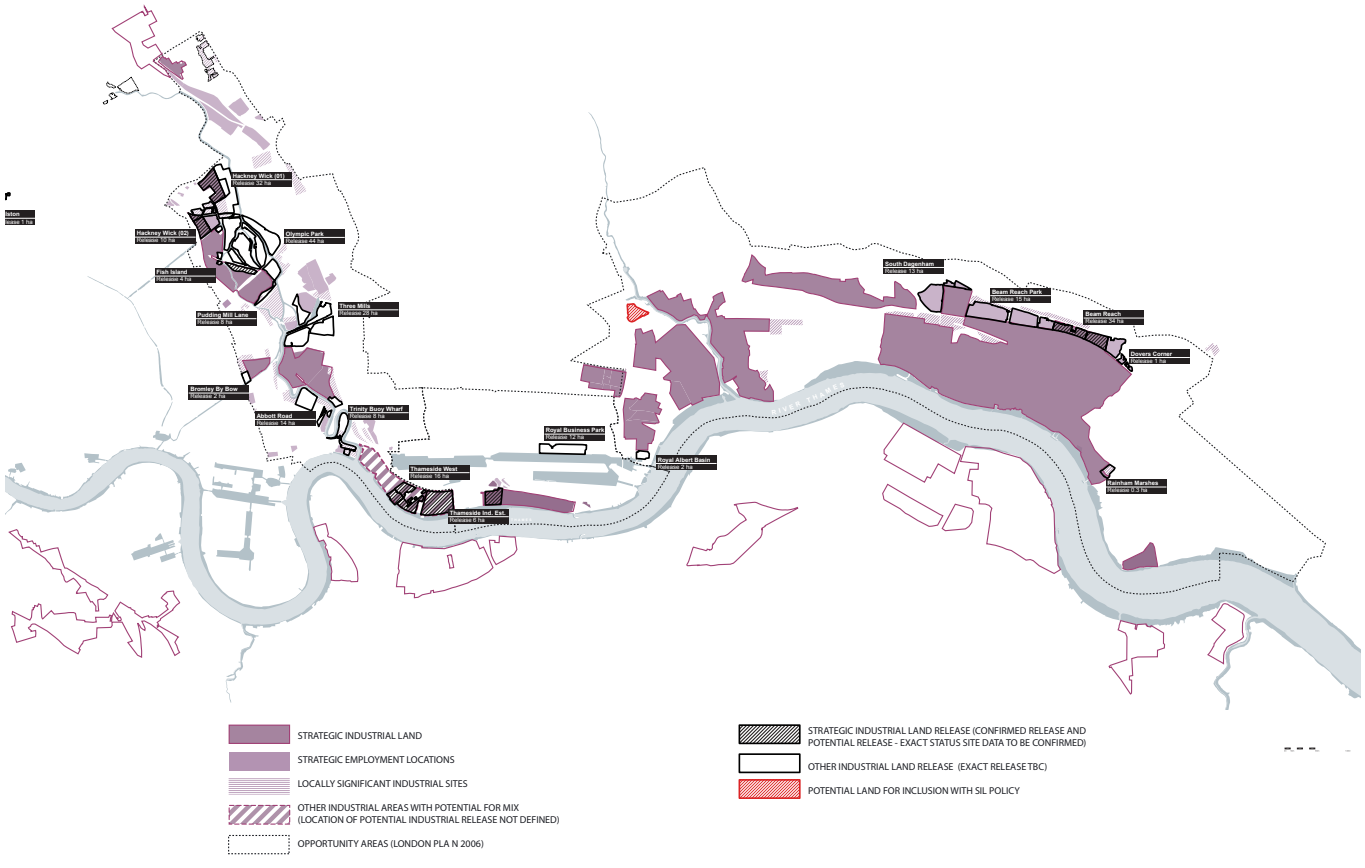
Strategic industrial land uses

While the status of some potential release of land is unconfirmed, much of the land shown on the plan at the bottom of the pages is confirmed to some extent.

The Green Enterprise District holds the single largest concentration of protected industrial land use in London



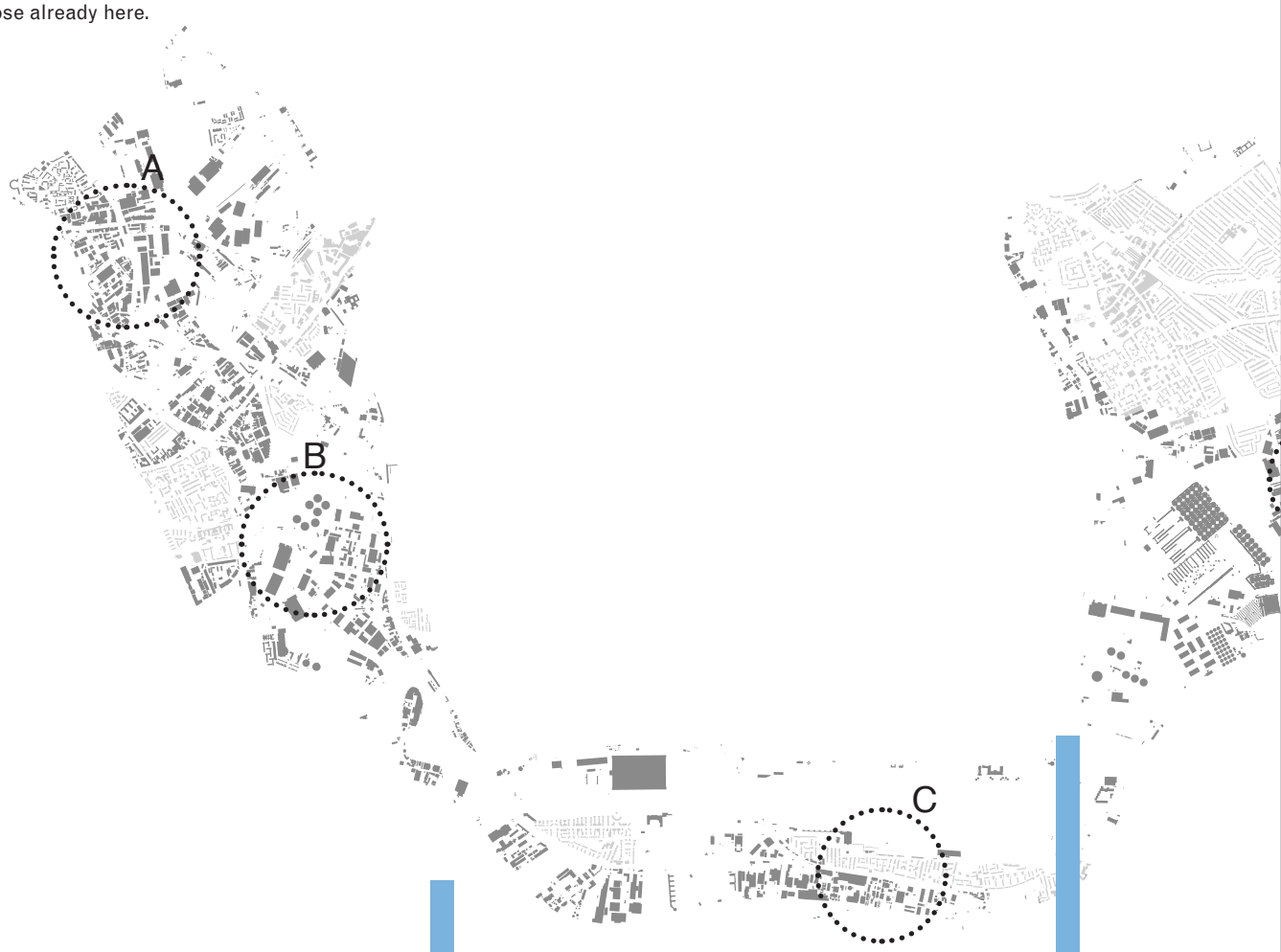
Protected industrial land use



Uses - existing operators

The graphs below represent 200 businesses (per graph cluster) across 7 different areas of the District to give a sense of the types of businesses currently operating within the area, and their dispersion.

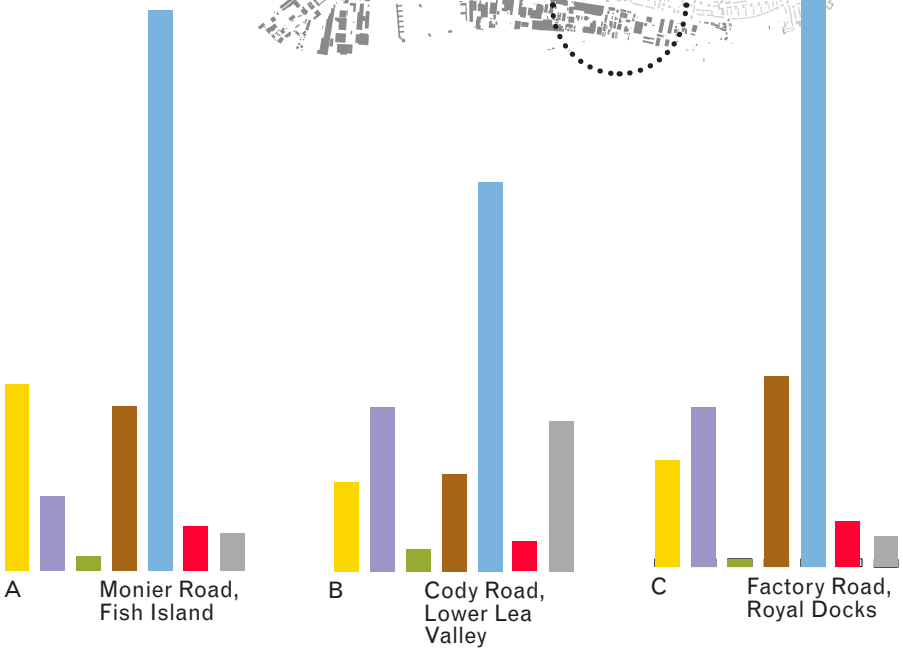
This starts to provide clues about where to locate new businesses to establish a synergy with those already here.



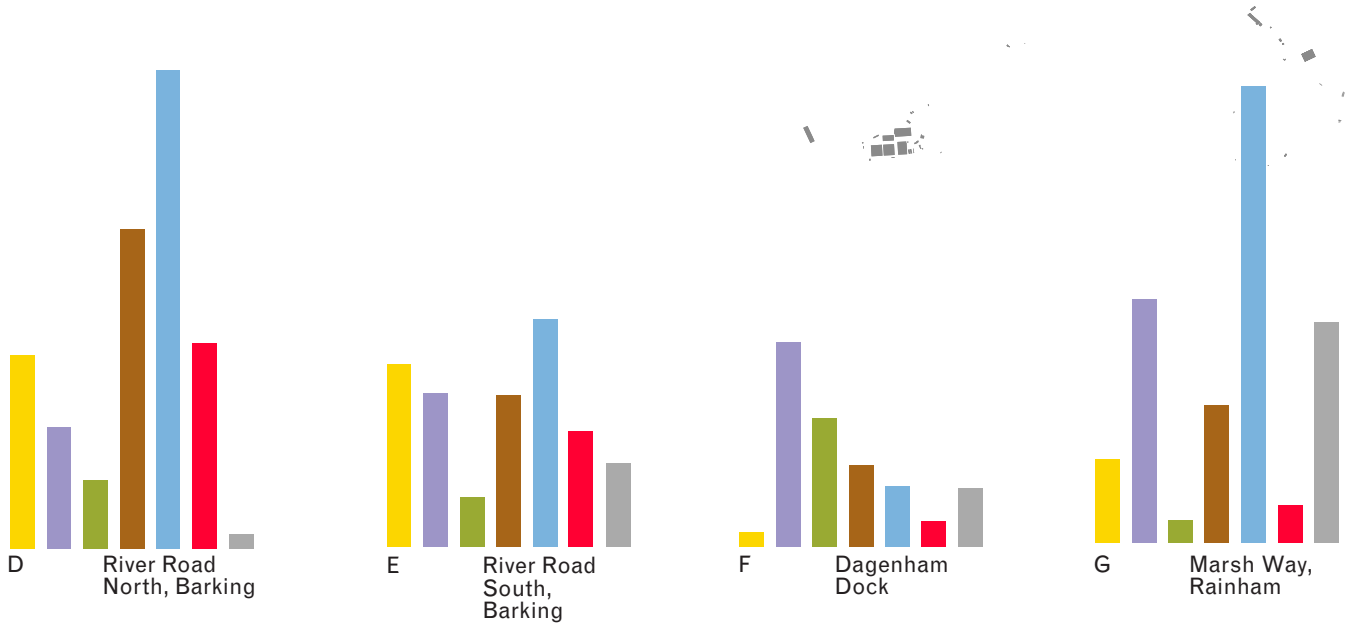
Key

- Food - retail, wholesale, manufacturing services
- Distribution and storage services
- Waste and recycling
- Construction related
- General services or retail
- Car related - manufacturing and servicing
- Industrial - manufacturing and servicing

Height of bar represents proportion of units out of 200

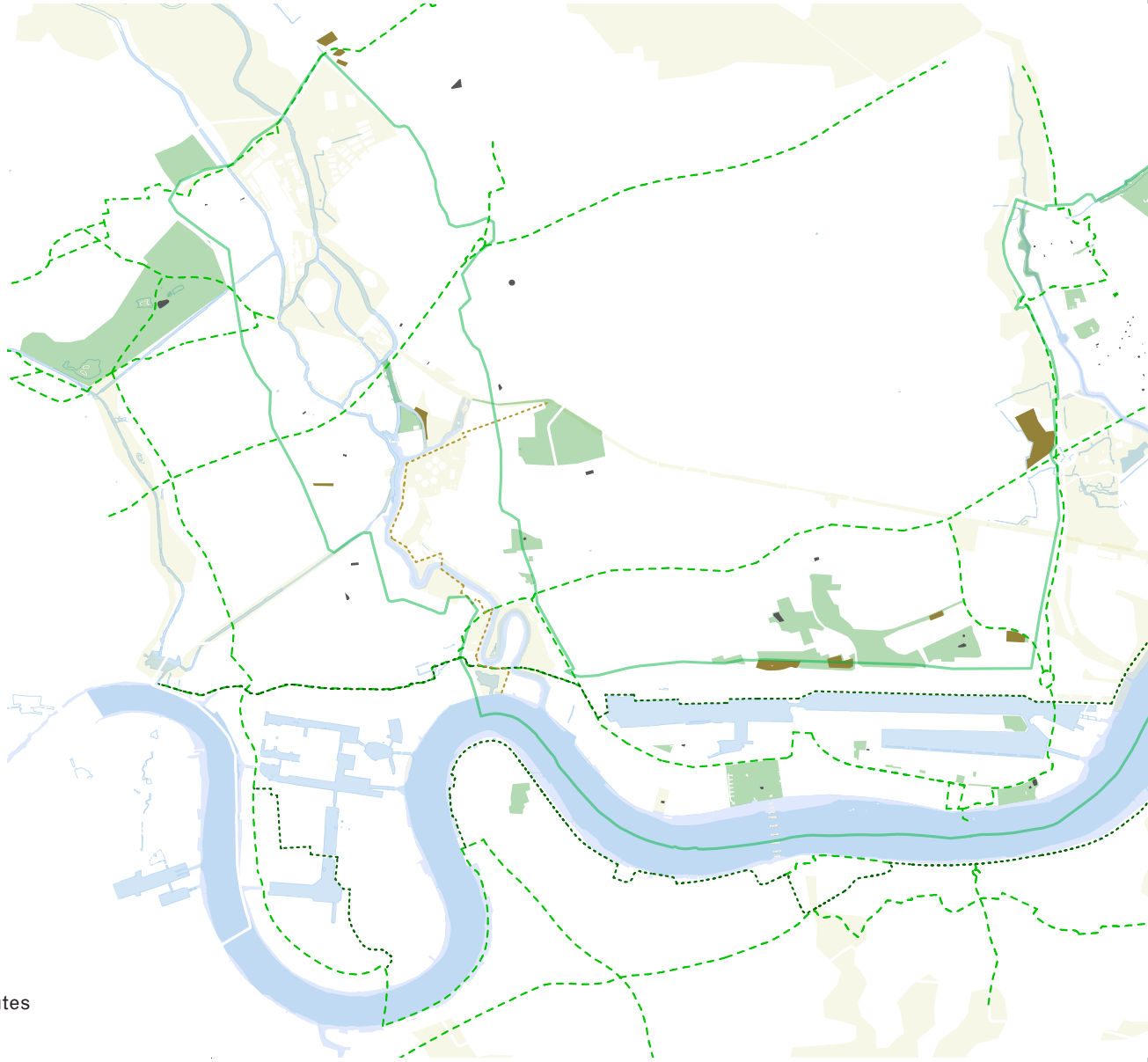


Synergy between existing and new enterprises should be encouraged, building on the strengths and patterns here already



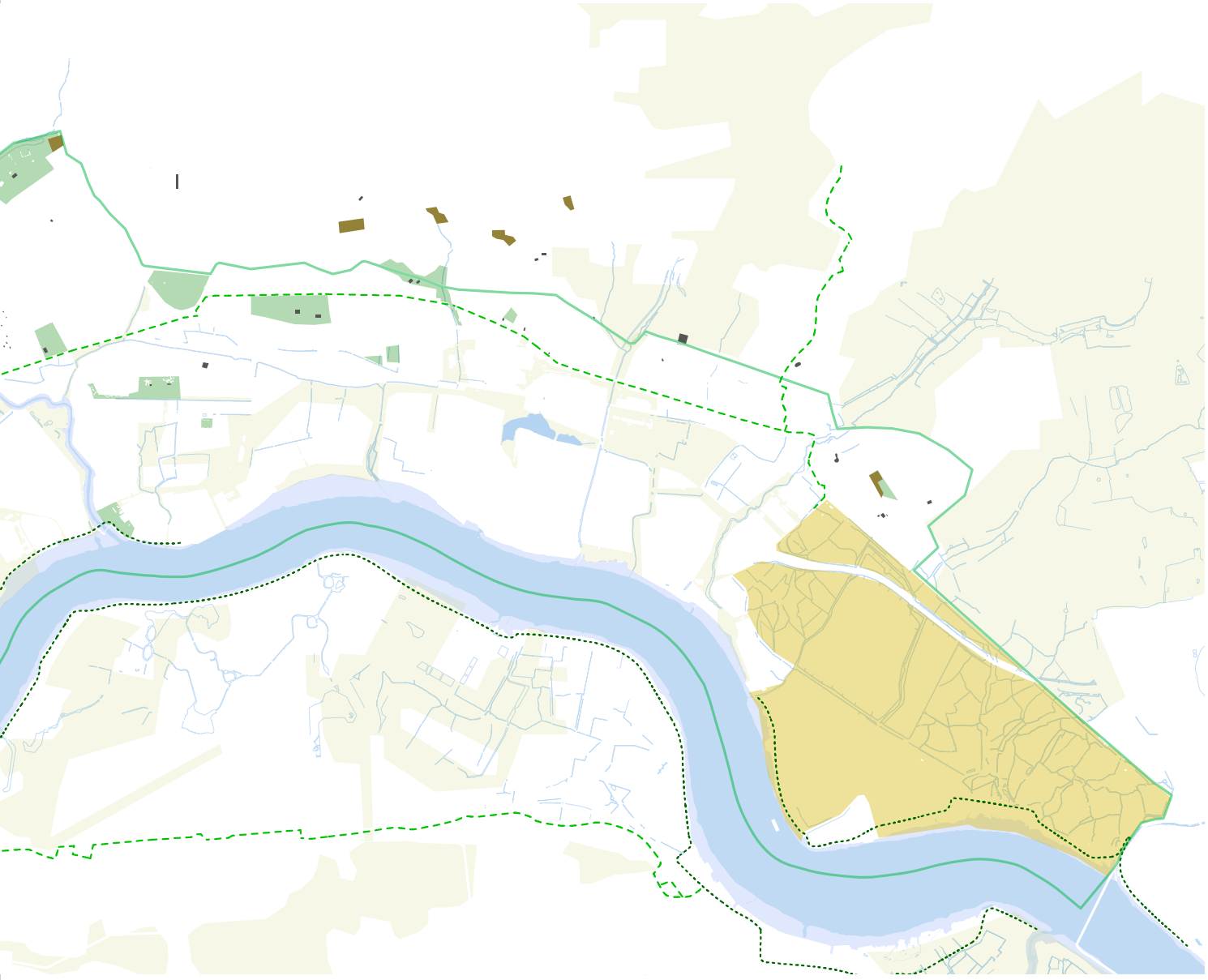
Uses - open space

The East London Green Grid extends across the eastern side of the District. Other open space, rich in quality and variety extends across the area, contributing to a dense green network across the whole area. These spaces together contribute to a robust green infrastructure, enhancement of which is proposed via a landscape strategy.



Key

- Fatwalk
- Cycle routes
- Sustrans
- Arboretum
- Parks
- Playgrounds
- Allotments
- East London Green Grid
- Marshes



INFRASTRUCTURE OVERVIEW

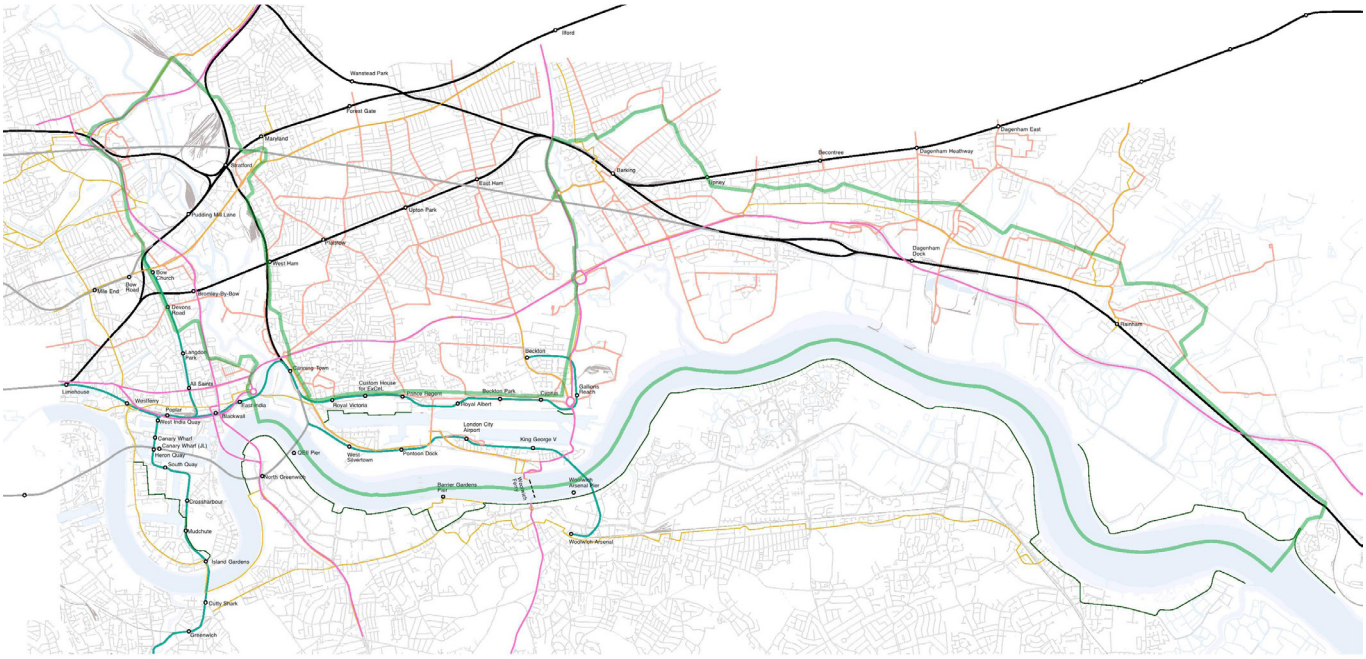
This section offers an overview of the current infrastructure across the District area including:

- transport,
- energy,
- water treatment,
- gas,
- high voltage electricity,
- district heating network,
- waste,
- water and flood management

Transport

The varying conditions (topographic and land use) across the District area gives rise to a rich diversity of infrastructural components including pylon corridors, sewage works, and the array of new infrastructure associated with the Olympics development. Public transport is currently fairly well addressed as evidenced by the PTAL ratings though this is pre-dominantly in an east-west direction with poor north-south links.

Cycling and pedestrian routes are currently generally poorly provided for though Sustrans are pursuing several new routes in the area.

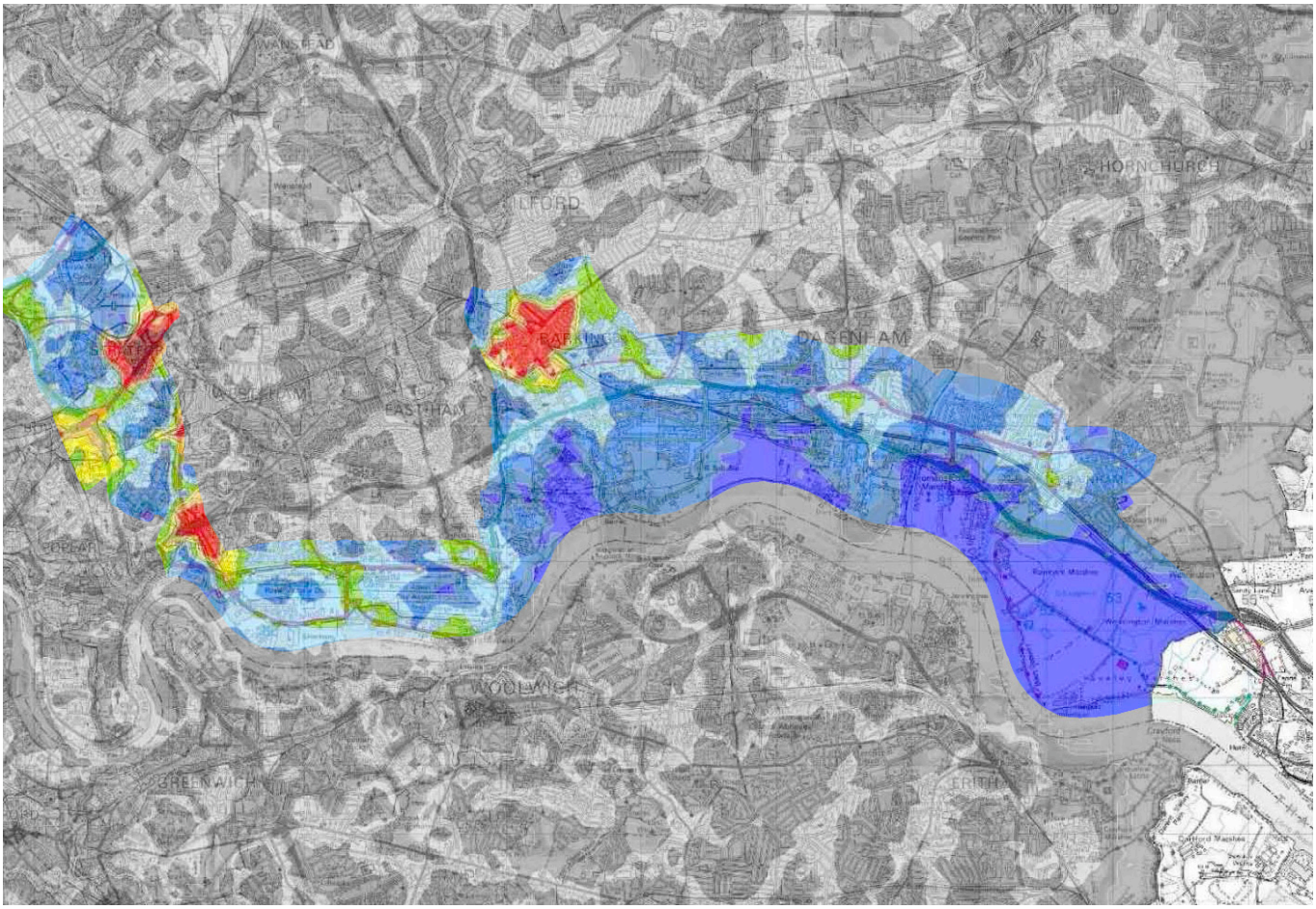


Existing transport network

Key

- Rail line / station
- Underground rail line
- DLR line
- Bus routes
- Main roads
- LCN cycle routes
- Sustrans routes

PTAL figures vary widely across the area

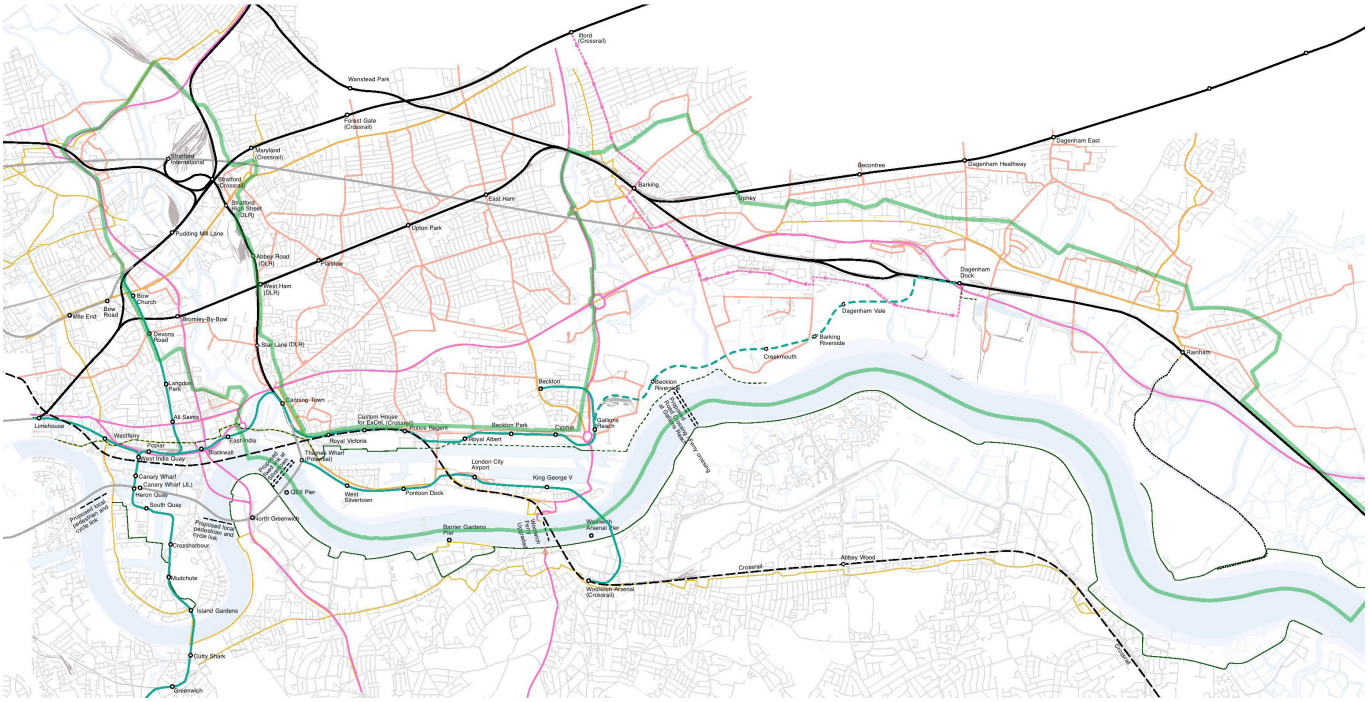


PTAL 2010

Key

- 0 (poorest accessibility)
- 1a
- 1b
- 2
- 3
- 4
- 5
- 6a
- 6b (best accessibility)

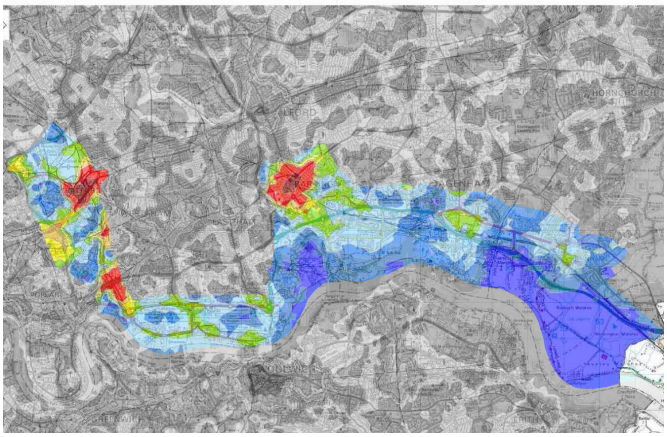
DLR, ELT and Crossrail are major public transport infrastructure projects proposed for the District



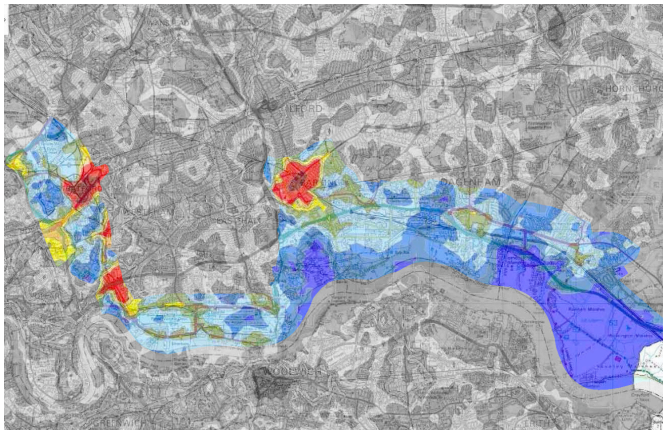
Existing transport network with proposals for extensions etc

Key

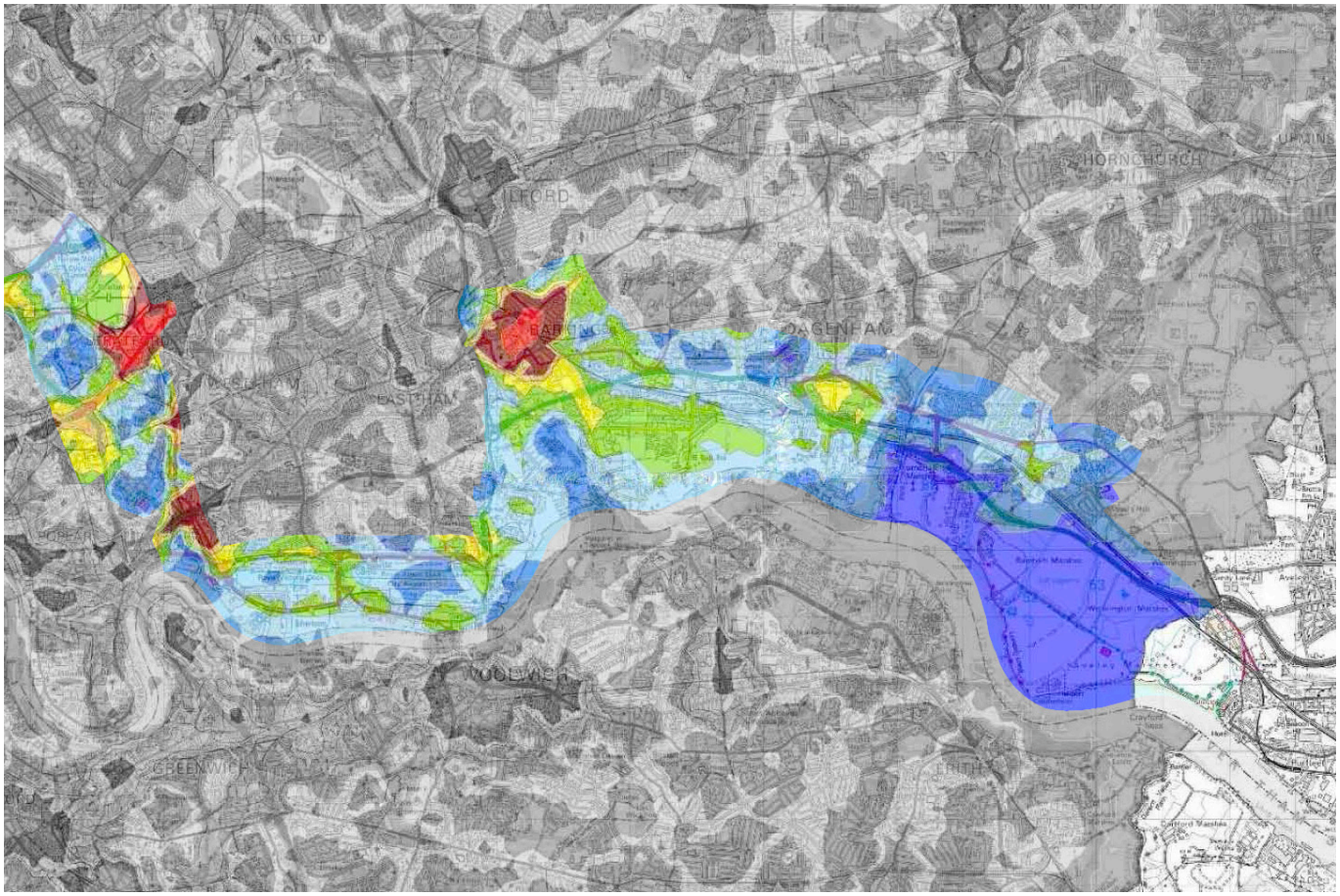
- Rail line / station
- Underground rail line
- DLR line
- Bus routes
- Main roads
- LCN cycle routes
- Sustrans routes
- Proposed DLR extension
- Proposed rail extension
- Proposed East London transit
- Proposed tram at Rainham marshes
- Proposed Sustrans route



Projected PTAL ratings for 2011



Projected PTAL ratings for 2016



Projected PTAL ratings across the area once extensions to services and upgrades have been undertaken

Far greater accessibility into the middle of the District is achieved when the DLR extension to Dagenham is implemented

High Voltage Electricity Supply

`

As would be expected for a formerly major industrial corridor, there is significant existing high voltage electrical infrastructure within the area.

Generation

Barking Power Station is an existing generating station, located at Dagenham Creek. This currently generates 1,000MW of electricity. There is a current plan to extend the generating station capacity to near 1,500MW, and also a second plan to capture waste heat from the station to feed into a district wide heating scheme. The output from the generating station currently connects into the National Grid 275kV transmission network at Barking primary substation.

Transmission

There are a number of 275kV overhead lines connecting to the Barking primary substation from West Thurrock and Northfleet West primary substations to the east. The overhead lines follow the mainline rail corridor. The connections from multiple substations ensure suitable resiliency into the area is maintained. Overhead lines then continue west from Barking main substation to connect to West Ham, Olympic Park and Redbridge primary substations. All of the overhead lines mentioned are operated and maintained by National Grid.

Distribution

It is likely that the majority of connections into the new system will be made from the distribution network. This is a separate network from the transmission network, operates at lower voltages than the transmission network, and is operated by EdF Energy.
Gas supply

The primary gas supply into the development area is to serve Barking generating station, and is provided at high pressure (greater than 7 bar). The Barking Power Station extension environmental statement confirms that there is enough spare capacity in the high pressure main to cater for the 500MW extension.

Wastewater

There are small water treatment works to the east of Barking Power Station, at the mouth of the River Lea, and Beckton sewage works.

Energy

There are already many plans for taking radical action in the generation and distraction of energy – both electrical power and heat – in the District. The development of large new sites will provide good opportunities for greater efficiency and lower carbon emissions in general, and helping provide sites and premises in the area with very high performance levels.

Planning / policy

Energy policy in relation to town planning within London is well defined through the London Plan. This sets a requirement for carbon reduction beyond the minimum standard, and includes clear targets for use of renewable energy, and the hierarchy of energy systems. Additionally new national standard for buildings are being rolled out over the ten years from
2009-2019, which will eventually require all buildings to be 'zero carbon'.

The study area includes a number of London's most strategic initiatives relating to energy.

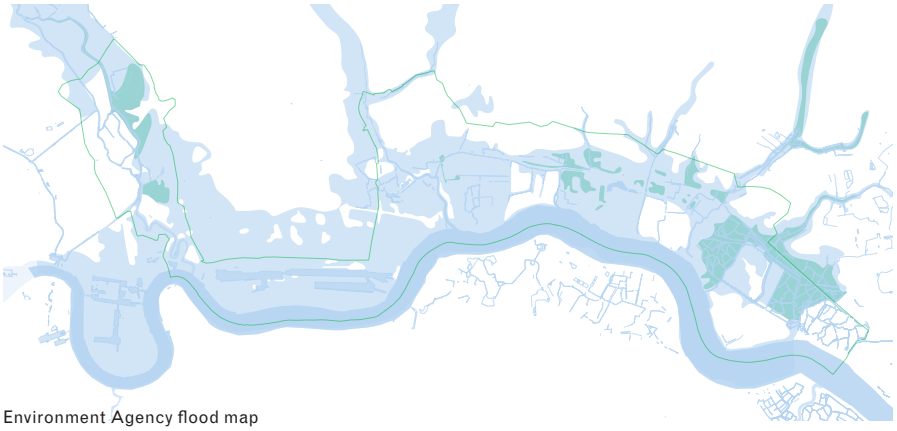
Key projects are listed below:

Project	Location	Description	Opportunity
London Thames Gateway Heat Network	Barking, expanding to entire study area	Large scale, low carbon, heat network. Supplying otherwise wasted heat from Barking Power station and other sources 150,000 homes capacity	Provides a heat market – connection opportunities to export waste heat Supply – buildings/development can tap into low-carbon heat / renewable heat See http://www.ltgheat.net/heat-network/
Cyclamax Energy from waste plant	Sustainable Industries Park	Large scale advanced waste to energy plant. 15MW electrical output, treating 100,000 tonnes of waste	Could provide low carbon power, and heat via the LTGHN. Links to waste processing industries
4no. Large scale wind turbines	Sustainable Industries Park	Large scale wind turbines planned near to the river in industrial area	Source of renewable electricity Iconic structures
Olympic Park Energy Networks	Olympic Park	Low carbon heat and cooling networks fuelled by CHP and biomass	Supply – buildings/development can tap into low carbon heat / renewable heat
Thames Water plant	Beckton	Low carbon CHP plant planned for desalination facility. Uses biogas to power existing plant	Opportunity to supply low carbon heat and power. Could be combined with food waste to produce more biogas
Frog Island EfW	Rainham	Advanced conversion energy from waste plant	Possible source of heat for LTGHN Low carbon power exporter

Strategic energy related projects currently being undertaken within the District

Water and flood management

Most of the District is within a Environmental Agency defined flood plane, defences and mitigation against flooding will always be required.



Environment Agency flood map

Current flood management devices

Current flood defences will reach their design life by 2070

Key utilities across the District

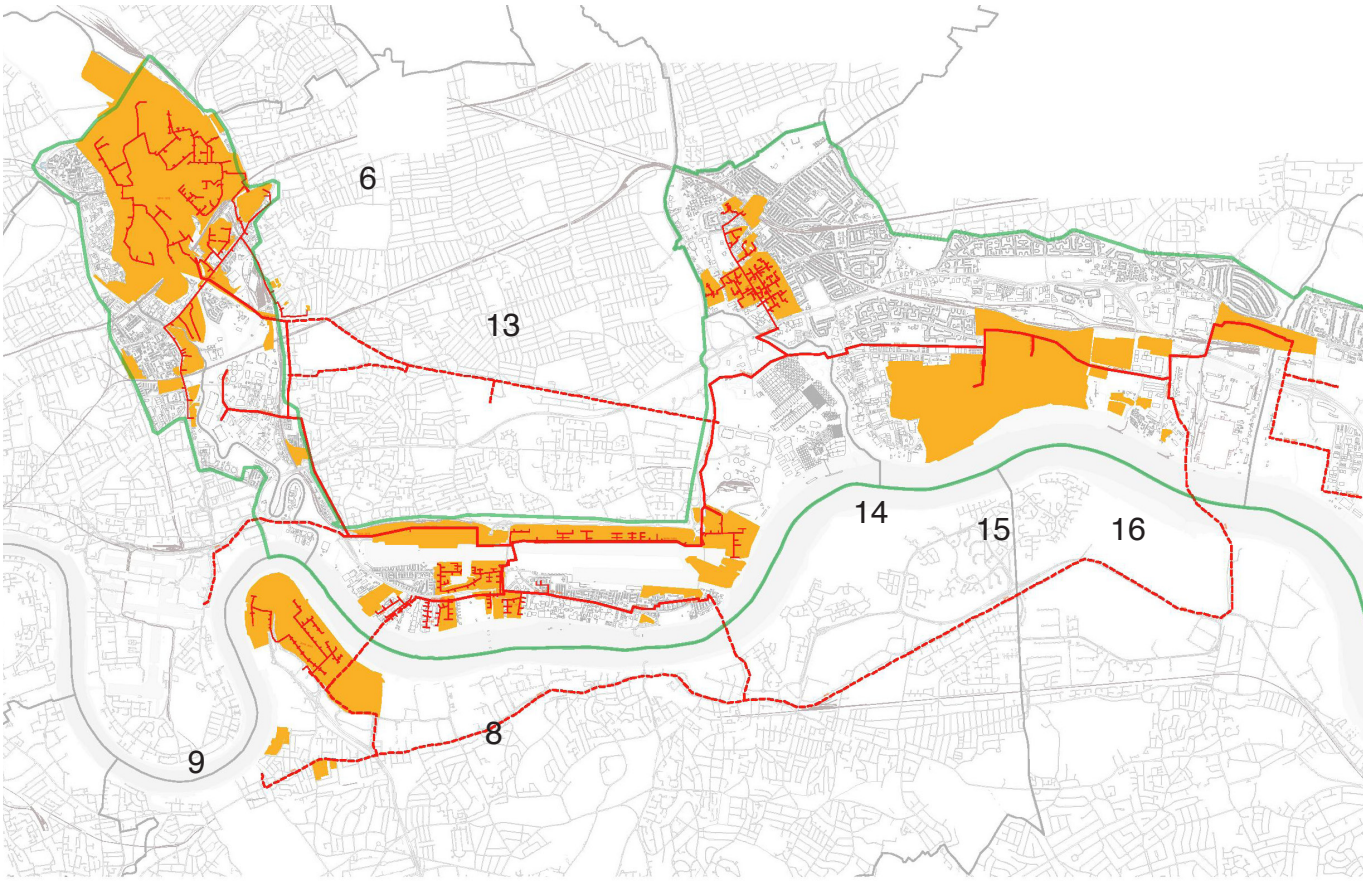
The London Thames Gateway Heat Network

The London Thames Gateway Heat Network is a hot water transmission network that will connect diverse sources of affordable low/zero carbon heat to existing and new developments helping to create sustainable communities.

The first source of heat will be the surplus heat from Barking Power Station, normally rejected in the production of electricity. However, a number of new advanced conversion from waste technologies are planned and they will be able to connect. Heat from the power station will be captured and the hot water distributed via pipes to properties where the heat will be used for domestic hot water and central heating, replacing conventional boilers.

Ultimately, up to 120,000 homes and properties could have their heat requirements met by the 23km network, saving almost 100,000 tonnes of CO2 output each year. The first customers could be supplied by late 2010 or early 2011. It is not expected that the whole transmission line will be built in one go. It is more likely that the first phase will make the initial connection with the power station and then take the pipes through the sustainable industries part to Barking Town Centre, with other parts of the network in the west and Royal Docks being built simultaneously if the demand exists.

Ultimately, up to 120,000 homes and properties could have their heat requirements met by the 23km network, saving almost 100,000 tonnes of CO2 output each year



London Heat Network projects. Notes on the numbered projects in the East London GED are shown opposite

Notes on the London Thames Gateway Heat Network

6 Olympic Park - Stratford

The Combined Cooling Heat and Power scheme being built to serve the Olympic Park and Stratford City Development zones could act as a catalyst for a wider district heating scheme in the Olympic Fringe zones of Stratford Town Centre & High Street, Hackney Wick and Bromley by Bow. These areas are due to be significantly developed over the next 10 years, including building around 10,000 new homes.

As the current proposed scheme will not be able to meet all of the requirements of the Fringe developments, additional energy centres will be needed. The LDA Decentralised Energy Delivery team is working with LB Newham, LB Tower Hamlets and the LTGDC to help deliver the wider scheme. There have been discussions with the Stratford City developers, the Olympic legacy planners and borough planners.
The scheme could have significant legacy benefits. It would make the most of the low carbon assets on the Olympic Park & Stratford City sites and could offer low cost CO2 savings, particularly to deprived areas such as the Carpenters Estate, where capital savings could be used to fund other improvements.

8 Royal Albert Basin

The Royal Albert Basin project is in the development stage. The scheme will supply a total of 1,800 homes, some of which are already under construction. Originally planned to use a private wire but with the new 'local distribution licence' the 700kW natural gas CHP will be connected to the electricity grid. In addition to the CHP, a 1MW(th) woodchip biomass boiler will supply some of the heating requirements. This project has worked as a pilot for the LDA. The procurement of the system may be delayed until the end of 2009 due to the current economic outlook.

9 Royal Docks

This project aims to install a district heating network to serve new demand created by the redevelopment of brown field sites for residential accommodation. A concept design for the local distribution network will be completed by the end of this year. The Royal Docks will be connected to the London Thames Gateway Heat Network, with the biomass plant at a local industrial partner supplying low carbon electricity and low carbon heat. The LDA could spend £10 million to fund the district heating pipe work needed for this project (subject to approval).

13 Barking Town Centre

Barking Town Centre Energy Action Area (EAA) is one of the heat supply distribution connections that will join onto the London Thames Gateway Heat Network. An initial technological feasibility study was conducted in March 2007, funded by LB Barking and
Dagenham. Work is currently underway to progress the initial district heating system design and to establish the short term heat demand. LB Barking and Dagenham is a member of the
Barking Power Station Steering Group.

14 Barking Riverside

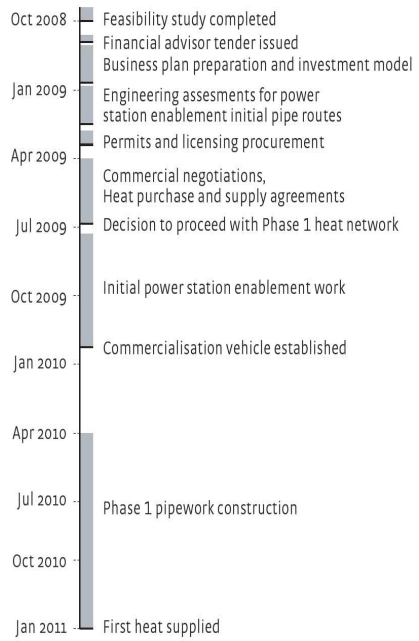
A tender to find a single Multi-Utility Service Company (MUSCO) is about to be issued. This company will supply all the services to the site including heat and hot water. One utility supplier will connect with a smart IT service that will have added value for residents. The end result of such measures will also mean that the site will emit 57% less carbon emissions compared with current building regulations.

15 Dagenham Dock SIP

The Sustainable Industry Park (SIP) at Dagenham Dock is being developed by the LDA, and will see a number of environmentally focused industries locating to this area. The Thames
Gateway Heat Network can provide a low carbon heat source for their facilities, which in turn would give a diversity of heat loads for the network as a whole.

16 Barking Power Station

Barking Power Station is a 1,000 MWe Combined Cycle Gas Turbine power station near Dagenham Dock. As with all power stations, it produces a large quantity of low grade surplus heat as a waste product, a waste product of electrical generation. The Barking Power Station scheme aims to capture this surplus heat and use it to supply heat and hot water to up to 120,000 homes in the region, saving up to 100,000 tonnes of CO2 emissions each year.
There is the further potential to take heat from Barking power station and use it to provide low carbon, affordable heat to new developments planned in other parts of the Thames Gateway. These developments include the new sustainable industry park at Dagenham Dock and Barking Riverside, where 10,000 new homes are planned.



Projected time line for implementation of the London Heat Network

Waste and materials management

East London has long been the location of many waste handling industries and a strategic assessment of these will help develop the most effective synergies between waste management and treatment and the use of waste as a resource for energy generation, fertilisers and recycled materials for manufacture.

East London Waste Authorities (ELWA) collectively generate about 3 million tonnes of waste per year and this is expected to increase to 3.5 million tonnes by 2020. The above tonnage includes municipal, commercial and industrial, construction, excavation and demolition, and hazardous wastes arisings.

To minimise waste arisings, maximise value recovery from generated waste and maximise diversion of waste from landfills (possibly zero waste to landfills) are national and local government priorities on waste management.

The ability to meet these targets has its own challenges:

Recycling and composting require improvement to collection systems and investment in new technologies with efficient sorting and processing techniques to maximise value from collected materials

Recovery needs investment in proven and emerging waste treatment technologies and security of markets for process outputs including Solid Recovered Fuel (SRF), digestate (from Anaerobic Digestion), electricity, heat and process water

Other challenges include capital investment, availability of sites, streamlining of planning processes and public acceptability

Many waste management facilities need to be perceived as resource management initiatives as they are likely to need to live 'check by jowl' with residential and other commercial developments

However, opportunities are immense:

Reduction in green house gas emissions

Creation of new jobs

Less strain on primary resources

Generation and utilisation of energy from waste thereby increasing energy security

Low carbon economy and society

Ability to implement and trial innovative solutions for waste management and thereby become a pioneer in this field

The underlying aim, and guiding principle of all current waste policies is to aspire to creating minimum waste and sending no waste to landfill. This entails replacing a linear approach to using the earth's resources.

Current consented recycling and treatment capacities:

- MRF and composting - 1m tonnes
- Residual waste treatment - 0.64M tonnes

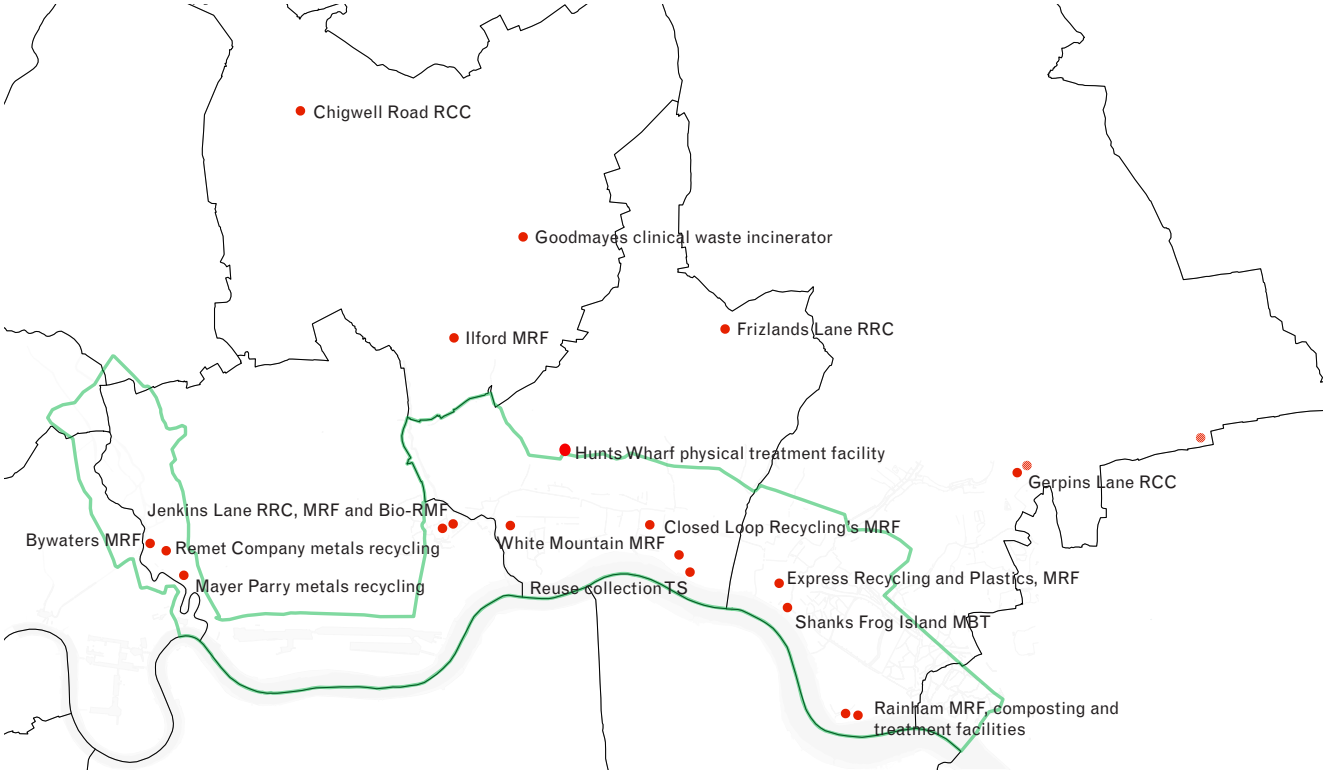
2031 waste targets

- 0% waste to landfill
- 80% waste recycled and composted
- 20% waste to energy

Facility name	Borough	Facility type	Annual Permitted Tonnage
RECYCLING			
Gerpins Lane Reuse & Recycling Centre	Havering	A13 - Household Waste Amenity Site	115,500
Jenkins Lane Waste Management Facility	Newham	A13 - Household Waste Amenity Site	110,000
Chigwell Road Reuse & Recycling Centre	Redbridge	A13 - Household Waste Amenity Site	28,600
Frizlands Lane Reuse & Recycling Centre	Barking & Dagenham	A13 - Household Waste Amenity Site	80,000
Bywaters	Newham	A15 - Material Recycling Treatment Facility	500,000
Ilford Recycling Centre	Redbridge	A15 - Material Recycling Treatment Facility	7,500
Rainham Recycling & Reclamation Centre	Newham	A15 - Material Recycling Treatment Facility	50,000
Express Recycling & Plastics Limited	Newham	A15 - Material Recycling Treatment Facility	30,000
White Mountain Roadstone Ltd	Barking & Dagenham	A15 - Material Recycling Treatment Facility	12,000
Rainham Waste Recycling & Reclamation Centre	Havering	A15 - Material Recycling Treatment Facility	131,000
Jenkins Lane MRF	Newham	A15 - Material Recycling Treatment Facility	50,000
Frog Island MRF	Havering	A15 - Material Recycling Treatment Facility	70,000
Closed Loop Recycling	Barking & Dagenham	A15 - Material Recycling Treatment Facility	25,000
Reuse Collections Limited	Barking & Dagenham	A14 – Transfer Station taking Non-Biodegradable Wastes	260,000
Jewometals (UK) Ltd	Barking & Dagenham	A20 – Metal Recycling (mixed MRSs)	24,000
The Remet Company Ltd	Newham	A20 – Metal Recycling (mixed MRSs)	41,600
Mayer Parry Recycling Ltd (EMR)	Newham	A20 – Metal Recycling (mixed MRSs)	150,000
COMPOSTING			
Rainham Waste Recycling & Reclamation Centre	Havering	A22 - Composting Facility (invessel)	49,000
Rainham Waste Recycling & Reclamation Centre	Havering	A22 - Composting Facility (windrow/wood processing)	153,000
RECOVERY			
Rainham Waste Recycling & Reclamation Centre	Havering	A16 - Physical Treatment Facility (lamp processing)	24,000
Hunts Wharf	Barking & Dagenham	A16 - Physical Treatment Facility	150,000
Clinical Waste Ltd (Goodmayes Hospital)	Redbridge Havering	A18 – Incinerator (Clinical Waste)	7,000
Novera Gasification (Frog Island) *potential		A17 - Physico-Chemical Treatment Facility (gasification)	90,000
Frog Island Bio-MRF	Havering	A23 - Biological Treatment Facility	180,000
Jenkins Lane Bio-MRF	Newham	A23 - Biological Treatment Facility	192,000

* Please note that the Rainham Waste Recycling and Reclamation Centre Facilities are only safeguarded until 2018 when their existing planning permissions expire

Existing key waste and recycling facilities within the District



Locations of existing waste management facilities within GED

	MSW					C&I			C,E&D
	Recycling	Composting	Recycling + Composting	Other recovery	Total recovery[1]	Recycling	Composting	Recycling & Composting	Recycling & Reuse
2010	27%	13%	**40%**	13%	**53%**	38%	18%	**56%**	-
2015	30%	15%	**45%**	22%	**67%**	43%	21%	**64%**	-
2020	33.5%	16.5%	**50%**	25%	**75%**	47%	23%	**70%**	**95%**

Note [1] 'Recovery' means to obtain value from waste through one of the following means:

- Recycling
- Composting
- Other forms of material recovery (such as anaerobic digestion)
- Energy recovery (combustion with direct or indirect use of the energy produced, manufacture of refuse derived fuel, gasification, pyrolisis, or other technologies)

Source: Waste Strategy 2000 for England and Wales, DETR May 2000.

ELWA targets for waste recycling, composting and recovery

EXISTING DESTINATIONS AND ATTRACTORS

The scale of the study area means that the District will encompass a diverse range of land uses, natural and cultural assets, character and experiences. Inevitably this area could not be described as a coherent visitor destination with a unifying sense of place, much less a destination that is currently perceived as 'green'.
From a practical perspective much of the area is inaccessible or unwelcoming to the public due to historic and current industrial activities. Basic infrastructure and services for visitors are widely lacking and the socio-economic profile of the local population, which includes significant disadvantaged communities, reflects the wider challenges for East London as a whole.

Nonetheless there are existing attractors within the area that are potentially relevant to the District and major developments planned and underway that could be complementary to its aims and objectives.

A Dynamic Situation

Regeneration initiatives will continue to shape this area of East London across the short to medium term. Looking across the study area, a number of functional concentrations are emerging:

Arts/creative industries -

Three Mills and Trinity Buoy Wharf in the Lower Lea Valley, The Malthouse and Broadway Theatre in Barking

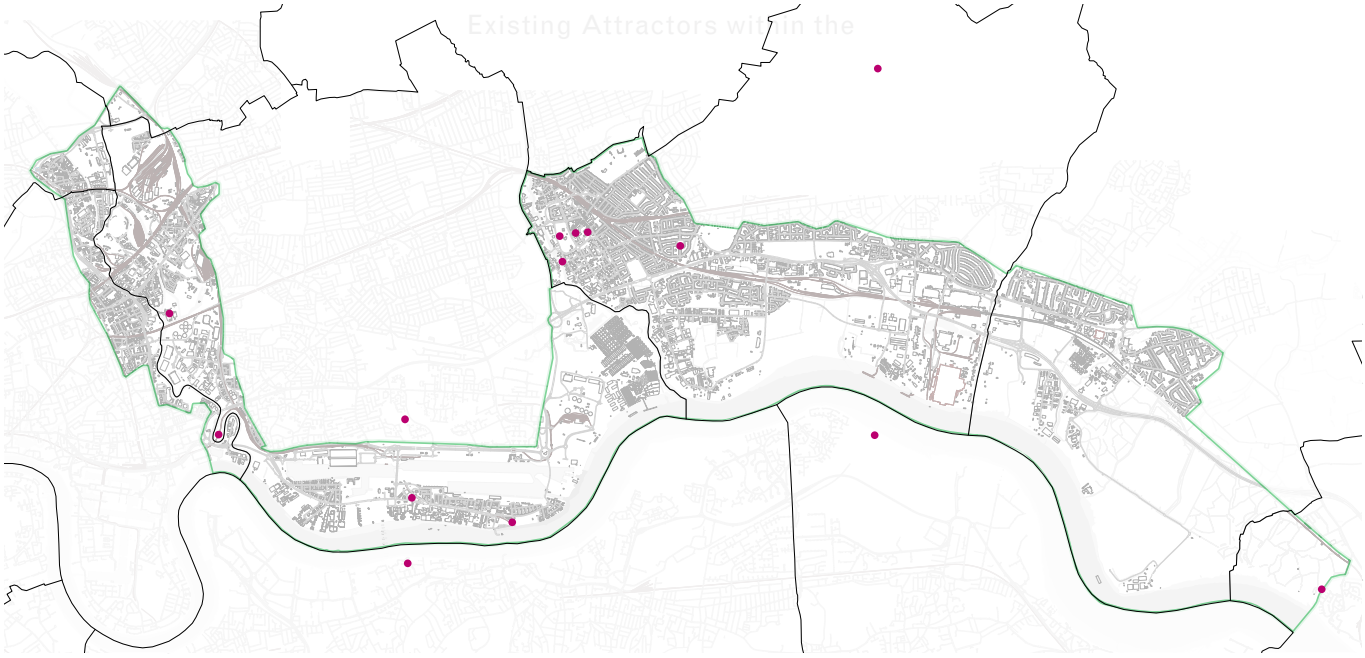
Public open spaces and nature –

Rainham Marshes (an internationally important destination for bird watching), the Thames Barrier Park, the proposed Cross River Park and smaller green spaces such as the Bow Creek Ecology Park
Mixed use development around the Royal Docks – EXCEL, London City Airport, University of East London, London Regatta Centre and the planned regeneration of Canning Town

New residential communities –

especially the massive Barking Riverside scheme.

In addition, although it lies outside the immediate study area, the Olympic Park will become a major hub for sports and recreation in London following the 2012 Games.



Existing attractors within and closeby the District

The list below gives a flavour of the existing cultural and leisure assets. It is not intended to be a comprehensive list and it includes some examples from just outside the boundaries of the study area.

Visual & Performing Arts

- The Malthouse, Barking (Studio 3 Arts and Arc Theatre)
- Broadway Theatre, Barking
- Brick Lane Music Hall, North Woolwich
- The Gallery, Barking Learning Centre
- Three Mills Studio, Bow
- Queen's Theatre, Hornchurch
- Fairkytes Arts Centre, Hornchurch

Museums & Heritage

- North Woolwich Old Station Museum
- Eastbury Manor House, Barking
- Barking Abbey
- Valence House Museum, Dagenham (closed for refurbishment)
- Crossness Engines (south of Thames)
- Rainham Hall

Visitor Centres

- Thames Barrier Information & Learning Centre (south of Thames)
- Newham City Farm
- Bow Creek Ecology Park
- RSPB Visitor Centre, Purfleet

In addition to the facilities noted above, a whole range of local leisure centres and sports facilities, cinemas, libraries, parks, allotments and markets can be found in the area. Larger scale culture, leisure and retail provision is located primarily in nearby Stratford (e.g. Stratford Circus, Theatre Royal, Stratford City development underway).

Key Issues and Opportunities for the District

The baseline assessment suggests a number of opportunities that might be explored further:

- Provide a public face for the District through exhibitions and events at existing venues and/or a new interpretative centre
- Partner with UEL to engage local audiences and a wider public through formal and informal learning
- Promote public spaces that are sustainable in their design and use and that will contribute to the quality of life of local residents and employees
- Help to embed green principles in the large new housing developments planned within the area
- Explore how the District could work with local attractions for mutual benefit e.g. joint marketing, events, access to specialist support relating to sustainable operations and facilities management
- Begin dialogue with the organisers of London cultural events with a wider footprint (e.g. London International Festival of Theatre, London Festival of Architecture) that could also be relevant to the District

Despite 2 large attractors in the near proximity, O2 Arena and ExCel, much of the District is difficult to visit and is currently not conventionally attractive. However, quick wins can be achieved by partnering with organisations of London cultural events with a wider footprint (e.g. London International Festival of Theatre, London Festival of Architecture) that could also be relevant to the District

CURRENT AND EMERGING GED RELATED PROJECTS/SCHEMES

There are many initiatives and programmes already active in the area. Here we list those of which we are aware that have a direct relevance to the objectives of the District.

1 District Heat Network

2 Sustainable Industries Park

3 Fish Island developments

4 Super Wharf Industrial development

5 Visitor attraction at the Royal Docks (Aquarium)

6 Thames Side West

7 Silvertown Quays

8 Royals Business Park

9 Abbey Green Park enhancements

10 Reactivated wharves

11 CCHP Olympic Park

12 Skills Training Centre

13 CHP at Barking Power Station

14 Barking Riverside Exemplar housing

15	Beam Reach 6 Industrial Park	22	DLR extension	29	Stratford City Development
16	Beam Reach 5 Industrial Park	23	Beckton Sewage Works Extension	30	East London Transit
17	Rainham Marshes Wildspace including tram and visitors centre	24	South Dagenham Development	31	Thames Gateway bridge (currently on hold)
18	Rainham River Walk & Three Crowns Cafe	25	Royal Albert Basin	32	Silvertown Crossing
19	Cross River Park (currently on hold)	26	ExCel Building extension		
20	Green Way Extension	27	Canning Town and Custom House Development		
21	Lea Valley Parks (+ Fatwalk)	28	Crossrail extension		

LOW CARBON ECONOMY CONTEXT

The future East London Low Carbon Economy

This chapter identifies the economic sectors that can drive the East London Green Enterprise District.

The UK economy will see significant growth in low carbon economic sectors. Many of these have specific relevance to the East London Green Enterprise District. They are either in place today, or offer products that have a strong demand in London and South East regional markets. There is the potential to build on national growth and a strong regional employment presence.

The UK can support a number of low carbon regions. Each will specialise. Coastal regions will embrace the possibilities of wave and wind energy based on access to the sea and a history maritime technology and construction. Fibre glass yacht hulls lead to turbine blades, and oil rig structures lead to seabed turbine footings. The East London Green Enterprise District can build on a history of manufacturing, material processing and logistics. It is also sits within a global city and one of the most dynamic economic region's in the world.

East London has distinct characteristics that set it apart from other low carbon economy or green enterprise regions. The first factor is one of scale. This market area is home to millions of residents, households, businesses and buildings. This region is growing, and fast. London and the South is the focus of ongoing internal migration within the UK and the EU. Major home building objectives have been set. The East London Green Enterprise District can be a major centre for London's transition to a low carbon future, and secure economic change and growth that benefits local businesses, employees and residents. The River Thames can play a key role – distinguishing East London from other locations pursuing the same sectors.

The primary focus will be on growing low carbon economic sectors. Mainstream sectors can be supported in transitioning to new ones. At the same time, best practices in business and production processes and facilities will be encouraged across the board. Adoption of the Carbon Trust Standard across all businesses will be encouraged.

The UK's Low Carbon Economy is Growing

The UK's "green economy" is expected to grow strongly over the next decade – driven by necessity, regulation and consumer preference. New products, processes and technologies mean that new sectors are being continually updated. Growth in the Low Carbon Goods and Environmental Services Sector provides a proxy guide for the pace of change.

The UK's Low Carbon Environmental and Goods Services (LCEGS) sector is an increasingly significant part of the UK's economy. According to the UK Department of Business, Enterprise and Regulatory Reform's 2009 Low Carbon and Environmental Goods and Services: An Industry Analysis, the total market value of the UK's LCEGS sector was £106.5 billion in 2007/08. The overall growth forecast for the UK LCEGS sector is 4.7% for 2009/10. This is expected to increase to 6.10% by 2014.

There are three broad sub-sectors, referred to as 'Level 1' sectors:

- The Environmental sector (£22.3bn in 2007/08)
- Renewable Energy Sector (£31.1bn in 2007/08)
- Emerging Low Carbon activities (£53.4bn in 2007/08)

(Source: Innovas, 2009)

These sectors aggregate a diverse collection of economic activity. Some are longstanding economic sectors, which are now considered to contribute to a broad environmental quality agenda. Mainstream civil engineering and waste management operations fall within this group. These are likely to continue playing a major role in the economy. Others represent emerging strategies and technologies such as alternative fuels, wind and biomass.

The East London Green Enterprise District can build on its traditional role in these sectors and focus on those sectors it has strength in or can offer a home to based on its existing location and assets.

The Low Carbon Environmental Goods and Services Sector is Growing

The 2009 Low Carbon and Environmental Goods and Services: An Industry Analysis also provides a forecast of cumulative growth across the UK's LCEGS Level 2 sectors to 2016. Those identified as having the highest projected rates of growth (more than 20%) by 2014/15 included:

- Wind
- Alternative Fuels
- Building Technologies
- Alternative Fuels for Vehicles
- Photovoltaics
- Biomass
- Recovery and Recycling
- Waste Management
- Water and Waste Water Treatment

There are Specific High Market Value Sectors to Tap into

A large scale initiative such as the East London Green Enterprise District will seek representation from across a range of low carbon sectors. It also makes sense to focus initially on growing those sub-sectors that are already present in the area on one hand, and the larger UK sub-sectors that can also be steered to East London. The following sectors have the national scale and market value (more than £4bn per year) to be relevant to the East London Green Enterprise District:

The Environment Sector

- Waste Management
- Recovery and Recycling

Renewable Energy Sector

- Biomass
- Wind
- Photovoltaic

Emerging Low Carbon

- Alternative Fuel Vehicles
- Alternative Fuels
- Building Technologies

London and the South East Capture a High Share of Low Carbon Jobs

Almost 900,000 individuals were employed in the UK's LCEGS sectors in 2007/08. London had close to 156,000 of these jobs. The wider South East had more than 113,000 jobs in the sectors. London and the South are already playing a strong role. There is a strong existing employment base to build from and a competitive regional position.

East London offers Strong Locations for Low Carbon Jobs

The East London Green Infrastructure District has historically focused on manufacturing, distribution and logistics and utilities. In recent years there has been significant employment change. Large scale manufacturing has consolidated. Smaller scale business that had been in the Lower Lea Valley has been lost to international competition, while technology has automated production at larger facilities – such as the Ford Motor Company. Distribution has changed fundamentally with the relocation of the Docks in Newham, but the advent of highway linked distribution warehouses in Barking and Dagenham. The local gas works found across the area have been replaced by electricity generating stations and national grid distribution. Water and sewer works are still significant in Beckton. The area has also historically played a strong role in moving, processing and recycling a range of domestic and commercial waste.

Despite these changes, a range of manufacturing, distribution and utilities jobs can still be found throughout the Green Enterprise District. There are more than a dozen potential Green economic and employment locations in the study area. These range from: the compact, smaller scale business locations of the Lower Lea Valley and Canning Town; to the larger scale sites of the defunct Royal Docks; a series of wharfs that handle fuel and aggregates, newer speculative industrial parks as at Gallion's Reach and Dagenham Dock; mixed industrial areas a Creekmouth and Creekway and large single facilities such as the Ford Dagenham plant. These locations have a variety of current uses and attributes which are strongly aligned with low carbon and green enterprise sectors. More detailed analysis of these employment locations is provided later.

Key Employment Sectors can Drive the Green Enterprise District

The East London Green Enterprise District will support key sectors that have an existing UK presence, the potential for future growth and relate well to the economy and infrastructure of East London. The emphasis will be on those that genuinely move the economy to lower use of carbon fuels. That will mean embracing the manufacture of new products, the recycling of used products and materials or the direct generation and distribution of cleaner and more efficient energy. East London can also be a major service centre for retro-fitting the Capital's building stock. This set of sectors is not exclusive. Others will come, while those identified here will have multiple sub-sectors and niches.

East London is a Long Term Home of the Automotive Sector

Cars, vans, lorries and buses have traditionally been high users of carbon fuels. Under regulatory pressure and consumer preference, this sector is changing. The East London Green Enterprise District will encourage and support the automotive sector where it seeks to make significant changes in the use of fossil fuels. This may mean significant advances in internal combustion engines, hybrid motors and electric vehicles.

East London can be a Base for High Efficiency Internal Combustion Engines

East London has a strong historical association with the automotive sector, particularly through the Ford Dagenham facility. Ford has operated at the Dagenham site since 1931. The 2003 opening of the Dagenham Diesel Centre helped the site's position as a leading engine producer. It has the capacity to produce over one million engines for Ford and other manufacturers including Jaguar and Volvo. There are still some local supplier networks in place. Critically, there is also a relevant local labour force for this sector.

BERR reports that automotive manufacturing remains an important part of UK industry and makes a significant contribution to the national economy, as illustrated by the following points:

- In 2005, the gross value added of the motor vehicles industry contributed £9bn to the UK economy and represented 6% of total value added in the UK manufacturing sector.
- The production of vehicles and engines is a major contributor to the UK automotive industry, accounting for nearly 50% of gross valued added in 2005.
- Engine production is one of the strongest elements of the UK's automotive manufacturing industry. The UK produces close to three million engines a year, or 25-30% of total European output, and remains an important manufacturer on the international stage.
- Whilst the number of cars produced has declined slightly in recent years (by 8% between 1999 and 2004), the production of automotive engines has increased significantly (by 29% between 1999 and 2004).

Source: BERR.

It has been estimated by EFF that Ford Motor Company has approximately a quarter of its global engine production located in the UK and in 2006 announced a £1bn investment in low-carbon technology over six years in the UK.

The size, diversity and expertise of the UK engine industry means that business opportunities exist for UK manufacturers and developers in the pursuit of more efficient and less polluting internal combustion engines. Opportunities for market leadership and advancing the green agenda include:

- Combustion technology: improving the efficiency of the combustion process
- Transmission technology: improving the efficiency of transmission
- Engine downsizing: improving the power-to-weight ratio of an engine and enabling greater power output for a given size

Taken together, these measures can have a significant impact on fossil fuel consumption of engines.

The automotive industry is the subject of ongoing and intense competition for the location of major manufacturing facilities. These locations will also pull supply chains with them. Component manufacture is also subject to intense cost and price drivers. It is likely that the draw of southern and eastern Europe cost profiles will continue to be a major factor in investment decision making in this sector.

However, East London can offer a response, either in terms of a superior environment, competitive cost base or both through the Green Enterprise District. This is also an opportunity to build on the specific local investment and skills in the manufacture of engines.

> The scale of building retro-fitting required in the largest city in the UK provides a firm basis for growing this enterprise and employment sector

Appropriate land supply is available in the East London Green Enterprise District as a result of previous waves of automotive and manufacturing sector reorganisation. As with other manufacturing sectors, contemporary industrial park environments would also be appropriate. The fundamentals of high quality built environments, good transport access to regional highways and access to sites for skilled labour will again apply.

There are strong links between this sector and local employment and skills training programmes, particularly through the Centre for Engineering Manufacturing and Excellence.

Manufacturing of Hybrid and Electric Vehicles (HEV) can evolve in East London

The most significant opportunities for UK industry in the HEV sector are to develop and manufacture:

Hybrid powertrains: The integration of mechanical and electrical components into a single 'hybrid' powertrain is a key area in development of HEVs. UK industry has significant expertise in a range of technologies key to hybrid powertrains, such as control systems and electric drivetrains and niche electric vehicles (forklift trucks, short range delivery vehicles, golf equipment). The linked alternative fuels for vehicles sector also has a total UK market value of over £12.6 billion (2007/8) and is ranked fourth in terms of cumulative growth of Level 2 LCEGS industries to the year 2014/15. (BERR)

A number of UK based operations are active in this market, including: Ma (Innovation); Wrightbus; Zytec Group Ltd; Lotus Engineering; Ricardo; AFS Trinity; Optare Group; Smith Electric Vehicles; Modec. This sector would have the same locational requirements and relevance to East London as the internal combustion engine sector.

The UK Low Carbon Industrial Strategy is providing funding of up to £10 million for the accelerated deployment of electric vehicle charging infrastructure in the UK and the establishment of a cross-Whitehall Office for Low Emission Vehicles (OLEV) that will drive policy delivery. This will support infrastructure in a number of UK cities and will build on the previously announced £20 million to tackle barriers in electric vehicle charging infrastructure through the 'Plugged in Places' electric vehicle infrastructure framework. It will also complement the £230 million already announced to reduce the price to consumers of electric and plug-in hybrid cars from 2011.

East London can be a Home for Building Technology

The London Region has a Growing Building Retrofit Programme

Building retrofitting is driven by the desire to make the existing building stock more energy efficient, reducing demand and therefore reducing carbon emissions. A major roll out of retrofitting of residential stock, public buildings such as schools and hospitals and public and private office stock is anticipated. Pilot programmes are being applied across London through the LDA's Building Energy Efficiency Programme and Housing Energy Efficiency Programme.

The scale of building retro-fitting required in the largest city in the UK provides a firm basis for growing this enterprise and employment sector. There is the potential for the East London Green Enterprise District to serve as a hub for Central London, North East London and the Essex and Hertfordshire market areas. Storage of materials, assembly of kits, coordination and dispatch and training of technicians and installers can all occur in East London.

Primary retro-fitting components include:

- Inspection and specification;
- Insulation;
- Window and door replacement;
- Heating and hot water systems;
- Heating and lighting controls and monitoring.

The scale of roll out may require large scale and coordinated delivery addressing typical and repetitive building types. Models for roll out, potentially involving national construction firms, government departments and high visibility retailers are being explored.

The East London Green Enterprise District could be home to a series of retro-fitting hubs. Larger scale facilities could store a wide range of materials, assemble building specific kits and act as employment hub and dispatch centre for installation personnel. These could also act as administrative and design hubs. Separate facilities may be required for residential, public and office buildings – with specialist materials and staff. Such locations could also be skills and training hubs, with direct links to employment.

The East London Green Enterprise District offers a range of industrial sites close to immediate markets, highway connections to wider markets and a local labour force with a traditional role in the construction industry. Links to employment and skills training are provided by construction related programmes at the University of East London and Havering College. Continued evolution of training programmes to respond to new building technologies and the retrofitting will be required.

Domestic Boilers are Needed for Retro-fit and New Homes

A key component of retrofitting is installing energy efficient heating systems. These will also be a required component of new residential properties. There is significant and ongoing market demand for gas boilers across London and the South East market areas as a result. This can justify a business location decision.

The UK is the largest gas boiler market in Europe, accounting for almost a quarter of annual sales across the continent – i.e. approximately 1.5m out of 6.5m units. The UK is also a major designer and

Waste processes will be more extensive, complex, higher value and require higher skills

manufacturer of boilers. A number of household names of both UK and foreign ownership have substantial manufacturing facilities in the UK. These include Baxi Group (includes Potterton, Baxi and Main brands), Worcester Bosch, Vaillant (includes Glow-worm brand) and Keston. Growth in this sector is an opportunity to attract investment in production facilities to the UK.
The primary opportunity for the sector is driven my new building regulations and also recently announced subsidies for the replacement of domestic boilers. Building regulations which became effective in 2005 require all new installations to be high-efficiency condensing boilers. "Between 2002 and 2007, condensing boiler sales rose from 11% to 95% of total gas boiler sales. Despite the rapid growth in sales, condensing boilers still only represent approximately 20% of the total national stock of boilers." (EEF/Deloitte 2008) Based on current trends this will only change gradually as new stock becomes a larger part of the total stock, and older stock is replaced based on consumer preference. The UK Treasury announced as part of the 2009 Pre Budget Report that it will offer householders and landlords a rebate of £400 towards the cost of replacing G Rated domestic boilers with the highest rated replacements.

There is existing boiler manufacturing locations currently in the UK. Future expansion may present the opportunity to capture this expansion locally within the District through inward investment activities. There may be an opportunity for the District to act as the manufacturing, or installation, maintenance and servicing hub for a wider market area including suburban Essex and Hertfordshire. There is also the potential to explore the role of the District as a supply and servicing hub for boiler installation and replacement in London. This can build off the engineering and construction skill base of the local population, and the ability to access a significant catchment within an hour's travel time.

Supply, repair and maintenance facilities can be accommodated in modern small workshop, larger shed or industrial park environments. The fundamentals of high quality built environments, good transport access to regional highways and access to sites for skilled labour will apply.

Ongoing gas fitter training programmes are offered by utility companies and FE Colleges. Growth in this sector may require additional training provision.

Adding Micro Combined Heat and Power (CHP) to Building Technology

Micro CHP applies small scale co-generation, the simultaneous generation of electricity and heat, to homes and small businesses. The SBGI (Society of British Gas Industries) carried out an assessment of the potential UK market for Micro CHP in 2006. The central finding was that, with appropriate policy support, micro CHP systems could capture approximately a third of the boiler replacement market by 2015. Existing companies with UK operations include the Baxi Group and WhisperGen.

As with other domestic and commercial development scale installation, there is an opportunity for the District to act as a manufacturing, installation, maintenance and servicing hub for a wider hinterland including north east London and suburban Essex and Hertfordshire. There is also the potential to explore the role of the District as a supply and servicing hub for London. This can build off the engineering and construction skill base of the local population, and the ability to access a significant catchment within an hour's travel time.

Supply, repair and maintenance facilities can be accommodated in modern small workshop or industrial park environments. The fundamentals of high quality built environments, good transport access to regional highways and access to sites for skilled labour will apply. Specific local training programmes will be required if larger scale roll out is to be achieved.

Stronger Recycling and Re-use is an Opportunity

The UK's waste management, recovery and recycling sector will grow rapidly. Limits to landfill mean more intensive management of the waste stream, re-use of materials and commodities and constraints on landfill capacity. London will continue to generate waste at a large scale. It currently generates an estimated 4 million tonnes of municipal waste per year. The current cost of collection and processing is £600 million per year. This is a real economic opportunity for East London, particularly given its river access, collection of wharves and ability to handle large volumes of material.

The GLA has set out a vision for how London will address waste through "London's Wasted Resource", the January 2010 Mayor's Draft Municipal Waste Management Strategy. This strategy calls for both reducing the waste generated and harvesting the paper, metal, plastics and organic material that is. Materials can be recycled into manufacturing streams or used for clean energy generation. Reducing landfill will reduce greenhouse gas emissions from organic material. It is estimated that this could save 1.5 million tonnes of emissions by avoiding those created by manufacturing new materials, and in generating energy from coal or gas. Significant savings on landfill taxes will also be made – taxes that have made recycling more economically viable in comparison.

The strategy has a series of key policy objectives. The first is to raise awareness of the value of reducing, reusing and recycling municipal waste in order to generate greater performance in these areas. The Mayor will also set a greenhouse gas standard that municipal waste management activities and technologies will need to meet, supporting those that reduce the amount of municipal waste produced and capture the greatest number and quality of materials for re-use, recycling and composting. The Mayor also aims to achieve 45 percent waste recycling or composting by 2015, 50 per cent by 2020 and 60 percent by 2031. In addition to new infrastructure at household and small business source, this will also require large scale processing facilities across London. The Mayor also wants to catalyse waste infrastructure, particularly low carbon technologies across London. The London Waste and Recycling Board has committed £74 million to support reuse, recycling, composting and energy infrastructure in London from 2009 to 2012. Additional public and private funding is also sought.

This overall approach will require more intensive material processing to separate materials that can be recycled or used for other purpose in order to minimise materials going to land fill. Waste processes will be more extensive, complex, higher value and require higher skills. This overall approach will generate new employment and business opportunities.

The East London Green Enterprise District has a significant opportunity to play a leading role in London's transition to this new approach – building on a history of waste processing and recycling, and its leading role in establishing new recycling technologies and businesses. Opportunities exist for the transportation, processing, storage, distribution and remanufacture of materials and products from the waste stream.

There is an opportunity to build on the specific local investment and skills in the manufacture of engines

Existing recycling businesses in the East London Green Enterprise District include: Edwards Waste Paper; Hunts Waste Recycling, Keeble Recycling; KH Waste Management; Shanks, UK Waste Management and Van Dalen. These have grown based on the stream of material coming from central and inner London businesses and communities, the availability of land and transport infrastructure including wharves, rail and highways.

Dagenham Dock is also home to the new Closed Loop London (CLL) facility, which and will transform the recycling of polyethylene terephthalate (PET) in the UK, turning millions of water, soft drinks and cosmetics bottles back into new food packaging each year. This is intended to divert 35,000 tonnes of packaging, which might otherwise be exported for recycling or sent to landfill, into new packaging material by sorting, granulating and super cleaning the recycled plastic bottles to produce a high quality raw material that has been tested extensively and is widely used in food applications in both the US and Europe.

The East London Green Enterprise District can play a significant role as a hub for this new paradigm in processing London's waste materials for recycling and re-use. A new paradigm for the operations, appearance, image, identity and impact on neighbours can also be applied. While traditionally considered to be bad outdoor neighbour uses, processing now increasingly occurs inside new industrial sheds. Local perceptions and concerns will need to be addressed by ensuring that new and expanded facilities are matched by high quality local infrastructure, industrial place-making and public realm and code enforcement. An example of this approach is provided at the Sustainable Industrial Park at Dagenham Dock.

This is a sector which will grow and change. A specific industry skills audit is recommended as a basis for establishing sector specific skills training programmes.

More Energy can be made from Alternative Fuels in East London

The Alternative fuel sector encompasses a range of materials and technologies. A range of materials can now be be burned to generate heat and, or, power. These include materials such as: biomass, woodchips, commercial cooking oil, biodiesel, ethanol and domestic waste. Alternative fuels can provide energy to residential, commercial and civic buildings, as well as powering vehicles.

Drivers of this sector include increasing regulation of carbon emitting fuels and the potential of higher prices for coal, oil and natural gas. There is also a strong desire to diversify the energy supply, with less reliance on a small number of larger providers.

There are a number of small and emerging market operators that can build, install, maintain and operate alternative fuel power stations. Facilities can be modular, taking a small land footprint initially and expanding as demand increases. Facilities can be co-located with users, or contribute to a wider heat or electricity network.

This is an emerging sector that offers potential employment for installers and operators. Facilities could be installed at a number of locations across the Green Enterprise District. Facilities could also be combined on a combined heat and power park – providing multiple and back-up sources of power.

The scale and modular flexibility of this technology means that it can be located across the entire District supplying nearby business locations or residential neighbourhoods. There are opportunities in industrial locations in the Lower Lea Valley, the Thameside Industrial Park, Creekmouth or Dagenham Dock.

Manufacturing Components for Wind Power

The UK is particularly well placed for offshore wind power given its coastline, shallow waters and high average wind speeds. It has also been anticipated by EFF in its Delivering the Low-Carbon Economy – Business Opportunities for UK Manufacturers (EEF/Deloitte, 2008) report that the UK's experience of developing North Sea oil and gas assets provides a base of engineering skills and capabilities which can be applied to offshore wind. This significant resource, rapidly growing market and transferable capabilities translate into a number of potential business opportunities for the UK such as wind generation turbine production; systems and components for next generation turbines; and associated products and services, including maintenance repair.

Companies present in the UK and engaged in this sector include Siemens, Vectus, RWE npower renewables and Evoco. While the offshore wind sector is maturing, the opportunities for the East London Green Enterprise District may challenged by competition from coastal communities closer to power generating areas. While offshore wind generation is a growth market, it is likely that coastal locations will see the greatest economic benefit from this. Lowestoft and Clacton are actively pursuing onshore maintenance facilities associated with their nearby offshore wind farm neighbours. However, gearing and other supply chain components may be relevant to an automotive and commercial motors manufacturing base – with its emphasis on precision moving parts.

The wider opportunity to explore for the District is its role as a hub for wind power manufacturing and servicing. While the blade and stand are the most visible elements, turbines include a complex assembly of high specification, engineered components, gearing and moving parts. These represent high value added and high skill manufacturing potential. The supply chain relationship of the manufacturing base of the District area to these opportunities will need to be established.

There may be some opportunity to engage in the installation of wind turbines within the District itself, potentially in south east Dagenham and at the north of Hackney/ Stratford zone. While contributing to local energy generation, installation alone will not generate a significant amount of long term manufacturing employment. However, operations and maintenance may offer local employment. Such energy sources can also be linked into wider networks for alternative fuels.

There could also be a further opportunity for the District to act as the maintenance and servicing hub for onshore facilities in the in the Essex, East Hertfordshire and Cambridgeshire and Suffolk hinterlands if the policy and political path to their installation can be cleared. There is also the potential to explore the role of the District as a supply and servicing hub for site and building scale wind generation activities in London.

It is possible that manufacturing and servicing can be linked locally, either through shared land uses, or direct business to business supply chains. Either could be accommodated in modern industrial park environments. The fundamentals of high quality built environments, good transport access to regional highways and access to sites for skilled labour will apply.

Potential Low Carbon Job Growth in the East London Green Enterprise District

UK Rates of Growth can be Applied to London's Low Carbon Sectors

As of 2007/08, there were approximately 881,300 people with jobs in the UK's Low Carbon and Environmental Goods and Services Sector. It has been projected that by 2014/15 this will have increased to 1,274.300 (Innovas, 2009). This is an increase of 393,000 or 45% across this period. Projected annual growth rates are 4.6 to 6.1 % per year.

London has a significantly higher LCEGS employment rate and sector value than other UK regions, and is also home to some of its fastest growing sectors. This combination provides a strong basis for optimism that London will see significant employment growth in these sectors. Policy can also play a driving role – with support for building retrofitting and waste management and recycling coming from LDA initiatives and the Draft Municipal Waste Management Strategy.

While specific employment forecasts for the London region have not been established, it is possible to apply UK growth figures for Level 1 sectors as a proxy for annual London growth to the base three Level 1 LCEGS employment totals for 2007/08.

Sector	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2014/15
Environmental	33,303	34,132	35,095	36,147	37,243	38,386	39,580
Renewable	54,869	58,288	62,420	67,170	72,383	78,115	84,435
Emerging Low Carbon	75,063	78,621	82,819	87,523	92,547	97,905	103,643
Total	**163,235**	**171,041**	**180,334**	**190,840**	**202,173**	**214,406**	**227,658**

UK growth rates applied to London LCEGS Level 1 sector employment

This analysis suggests a potential increase in London LCEGS employment from 163,235 to 227,658, an increase of 64,423 or almost 40%.

The East London Green Enterprise District may require between 24 and 52 hectares of employment land across three boroughs

London's Growth can be Apportioned to the East London Green Enterprise District

GLA Economics provides employment projections on a Borough by Borough basis. A significant majority of the Green Enterprise District is focused on the London Borough's of Newham, Barking and Dagenham and Havering. For 2014 employment in LB Newham is projected to reach 85,000 jobs, in LB Barking and Dagenham to reach 51,000 jobs while LB Havering will have 88,000 jobs. These there Boroughs are projected to have 224,000 jobs in total by 2014. This represents 4.5% of the total 4,890,000 jobs in London projected for 2014.

If these three target Boroughs gained a share of London's LCEGS sector job growth at a rate reflecting their current 4.5% share of all jobs, this would generate more than 2,900 jobs. The specialisation and focus of the East London Green Enterprise District could also lead to higher rates of capture for London's growth in these sectors by the three target Boroughs. Capturing 7.5% of London's growth in these sectors would generate 4,832 jobs, while capturing 10% would generate 6,442 jobs.

There will be some overlap between these scenarios and the assumed growth in GLA Economics employment forecasts, on one hand, and Borough generated forecasts behind their Employment Land Reviews. However, these scenarios do provide some parameters for land, infrastructure and skills training requirements.

In the case of land requirements, if general industrial land employment densities and plot ratios are applied, the East London Green Enterprise District may require between 24 and 52 hectares of employment land across a three borough area to accommodate a wide range of employment and utility related sectors. If the balance of growth is towards material processing and distribution, job densities may be lower, and land requirements higher.

London LCEGS Growth	ELGED Capture Rate	ELGED LCEGS Emp Growth	Emp Density SQM per Job	Floorspace	Plot Ratio	HA
64,423	4.6%	2,951	32	94,434	0.4	24
64,423	7.5%	4,832	32	154,615	0.4	39
64,423	10.0%	6,442	32	206,154	0.4	52

Potential ELGED LCEGS Employment Capture Rates: Scenarios

Careful monitoring will be required to ensure a sufficient supply of land allocated for these employment uses

Again, these requirements may be embedded in underlying forecasts for employment growth. However, given the pace at which the sector is growing, and the impact of policies such as London's Draft Municipal Waste Strategy, careful monitoring will be required to ensure a sufficient supply of land allocated for these employment uses.

RECOMMENDATIONS AND PROPOSALS

Layers of proposals

This section explores the different levels of intervention we are proposing to steer the successful evolution of East London into a Green Enterprise District.

The diagram alongside represents these various layers. These include systems and networks that extend across the whole area and discreet projects that are implemented on specific sites. Although illustrated here to show multiple layers, this is not a linear process, and aspects of each of the layers will be delivered as the conditions required allow eg a pilot project may be delivered in Summer 2010 because all conditions are ripe for it while the Governance structure may not be in place till late 2010. (The intention is for these projects and permutations of them to proliferate across the wider area over time).

Each of the discreet pilot projects sets out to achieve a specific objective while informing the wider District narrative.

They are explained in terms of their relationship to each other, to existing activities in the area, the objectives of the East London Green Enterprise District and their relationship to employment opportunities.

The pilot projects are:

1 Energy Infrastructure Network

2 Waste to Energy

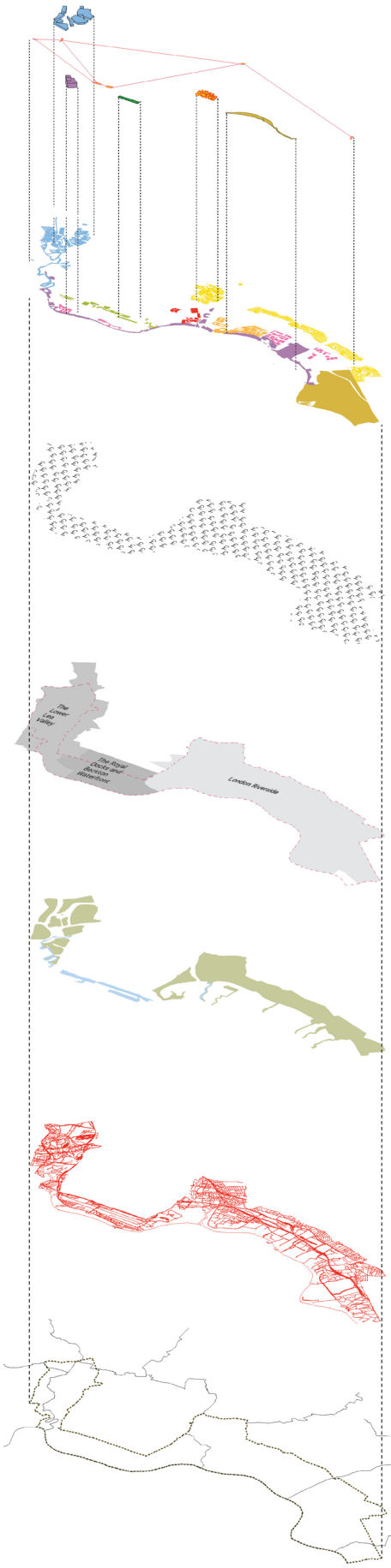
3 Riverfront Economy

4 Industrial retrofitting

5 Local food Network

6 City Airport / Expo

7 Olympic Legacy Holding Strategy



G **Pilot projects;**

discreet projects proposed for piloting the GED objectives

F **Dynamic Masterplan;**

including all emerging proposals

E **Incentives:**

attracting enterprise into the District

D **Opportunity Area objectives:**

distinct objectives of the 3 OA's within the GED are acknowledged and developed

C **Landscape networks;**

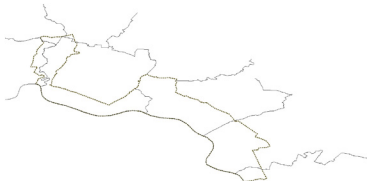
these projects establish a robust green infrastructure across and create a recognisable character for the area

B **Infrastructural projects:**

upgrades and new systems where necessary/appropriate to facilitate low-carbon activity and support other emerging projects

A **Governance structure for the GED**

A EAST LONDON GREEN ENTERPRISE DISTRICT GOVERNANCE



The Proposed Start-Up Delivery Structure – the District Task Force

There are multiple bodies and agencies with a direct and active interest in the East London Green Enterprise District. There are also a number of major public funding commitments in place. At the same time, there is a very active business community with existing and future investments. In line with the GED's broad recognition that East London has an existing context, any governance arrangements must reflect existing structures. At the same time, this is an opportunity to establish a time limited intervention that can orient existing partners and stakeholders to the direction of the Green Enterprise District.

The key proposal is to establish an 18 to 24 month Task Force. This would draw from existing partners and bring a clear focus to initiating the East London Green Enterprise District. A private sector champion would chair the effort on a part time basis. Key stakeholders would serve as a sounding board.

Existing Partners will be Involved

There are a number of partners and stakeholders active in the East London Green Enterprise District. This includes:

- Greater London Authority
- London Development Agency
- Transport for London
- London Borough of Newham
- London Borough of Barking and Dagenham
- London Borough of Havering
- Government Office for London
- Homes and Communities Agency
- London Thames Gateway Development Corporation
- Olympic Delivery Authority
- Olympic Legacy Development Company
- Think London
- University of East London
- Institute for Sustainability
- Centre for Engineering and Manufacturing Excellence
- London Chamber of Commerce
- Small Business Federation

The Task Force Model

It is proposed that a Task Force model be established to initiate delivery of East London Green Enterprise District. The Task Force approach relies on secondment from key existing partners and stakeholders, to create a highly focused and mission specific organisation to deliver clear objectives within a limited timeframe. Best practices can be drawn from the time limited Inner City Task Force model that achieved well regarded focused results in the late 1980's and early 1990's. These brought together leadership, management and expertise from across central government departments to achieve change urban neighbourhoods.

The Task Force will Establish and Advance the GED

The Task Force will have a number of objectives to deliver over its lifetime. This could include objectives from among the following:

Advancing the East London Green Enterprise District Concept

- Advancing the early stage priority and demonstration pilot projects across business, utility, transport and open space domains identified by the Spatial Plan, Economic Plan and Delivery Strategy
- Advance business planning, coordination and alignment among the local partners that will fund and deliver projects
- Promoting the Green Enterprise District concept among Borough officers, councillors and cabinet members
- Developing detailed locational understanding of requirements of target Green economic and employment sectors
- Raising public sector funding for projects from CLG Growth Area Funding, Department of Business Innovation and Skills, the Department for Transport and OfGEN

Supporting East London's Existing Green Enterprises

- Coordinating forums for existing businesses on their requirements for reinvestment in new processes and technologies – building on the work of Think London and helping them reach Carbon Trust Standards
- Providing technical assistance to existing businesses on diversification into green sectors allied to their core business
- Advance understanding of planning, business and procurement requirements of existing businesses
- Hosting an East London Green Business Forum to promote business to business trade within the Green Enterprise District and to promote East London green businesses and services to UK government purchasing departments and to London's corporate procurement community.

Inward Investment and Visibility Raising

- Organising an East London asset based marketing brand and package for inward investment
- Promoting the East London area to green enterprises, as a place to locate, through virtual and viral marketing
- Organising special events and exhibitions demonstrating new technologies or processes relating to low carbon energy generation, waste to energy, recycling, retrofitting and advanced manufacturing
- Coordinating sites visits with existing inward investment agencies and local authorities to promote particular locations that are relevant to the green enterprise sectors concerned

- Hosting an international conference on Green Enterprise sectoral clusters and locational clusters

Implementing Green Enterprise Demand Drivers

- Evolve and promote a range of incentives that would support existing businesses in East London and serve as incentives for inward investment by external business interests. This may require advocacy at HM Treasury and with Central Government Departments and London tiers of government.

Using Seconded Resources as Core Team

It is proposed the East London Green Enterprise District Task Force be created from personnel seconded from among a selection of the existing partners above. This will allow existing partner staff to become immersed in the Green Enterprise District concept and then take it forward on behalf of their home organisations upon their return. A shared experience will establish a collegiate approach across partner organisations. Personnel may come from economic development, regeneration or planning disciplines. Other expert staff may also be drawn from green industry and academia on a short term basis. This may include industry specific, environmental and utility or civil engineering experts. Eight to ten full time equivalent staff may be required.

A shared experience will establish a collegiate approach across partner organisations

The Task Force will work in parallel with existing partners and provide a shared resource for the coordinated action success will be dependent on. This time limited organisation will deliberately not replace any existing structures. The flexibility of this approach means that it could be established in 2010.

A core leadership team will be required. A single Task Force Facilitator will be required to lead day to day operations and coordinate closely with existing partners. The Facilitator will also serve as secretariat to the Leadership and Oversight Group.

Project Managers will be required to:

- Implement early stage projects proposed by this study;
- Implement demand drivers identified below;
- Advise existing green sector businesses and support transition of practices among others;
- Advocate on behalf of green sector businesses in aligning the regulatory environment to support growth;
- Advance skills and training programmes for green industry sectors;
- Coordinate alternative energy and transport infrastructure projects; and
- Promote the Green Enterprise District as an investment opportunity.

This Task Force could be hosted outside of existing government facilities. It could potentially be hosted by the University of East London or the Centre for Engineering and Manufacturing Excellence. It could also be centrally located in a more accessible and visible existing residential community – such as at Barking Town Centre. Further exploration of a potential facility as an early stage project for the East London Green Enterprise District is also presented as part of this report.

Recruiting a High Profile Private Sector Champion

It is recommended that a high profile private sector leader be identified as the champion for the East London Green Enterprise District. The ideal candidate has private sector name recognition, is drawn from an economic sector related to the green economy and has strong links to London generally or East London in particular. The ability to work across public and private sectors and lead a board or steering group will be required. This leader will promote the East London Green Enterprise District through general and specialise media, represent it to the existing business community and also in marketing and inward investment activity. Oversight, steering and mentoring of the Task Force team will also be provided. It is expected that this role will require a day a week commitment for the first three month start up phase.

A wider Steering Group is also recommended. This would be drawn from a selection of the existing partners and also balanced by industry representatives from low carbon economy growth sectors. Including a selection of existing partners will also help embed the Green Enterprise District concept among existing partners. The role of the Steering Group will be to act as a sounding board for Task Force activities, provide advice on advancing initial projects, troubleshoot organisational or bureaucratic barriers to delivery and assist in securing resources.

A specific objective for the Task Force will be to identify long term delivery arrangements beyond the life of the Task Force.

A Single, Visible Location

The Task Force will operate from a highly accessible location within the Green Enterprise District. It will also operate from existing facilities. Potential locations include at the Excel Centre, Building 1000 at the Royals Business Park, at London City Airport. The Think London office at Canada Water has also been suggested as a location. Facilities will include staff offices and meeting rooms. Larger meeting spaces can be rented for larger events as required.

Next Steps

Establishing a new organisation, even if time limited and with short term objectives, will require sensitive integration with existing organisations. A number of the objectives set out above have some overlap with the missions of existing organisations. This allows for rapid transfer and refocus of roles and skills, but also requires careful coordination.

Detailed terms of reference for the Task Force and staff secondment and other resource commitments will now need to be defined.

Detailed terms of reference for the Task Force and staff secondment and other resource commitments will now need to be defined.

B INFRASTRUCTURE

Overview

The following ideas are proposed for the future development of the District, based on the previous review of infrastructure in the area. Further precision to the proposals can only be added following detailed studies, engineering assessment and detail design.

Land and Contamination

- Set up one or more demonstration Soils Hospitals (to replace the current one at the Olympic site)
- Set up exemplar remediation sites where suitable technologies are appropriate.

Water management and flood risk

- Propose establishing new "water meadows" and public realm sites as part of flood management to create some new green open areas in the District
- Set up a demonstration reed bed treatment plant
- Except where access to the river is needed (e.g. wharves) provide terracing and collaborate with the EA to move some of London's flood defences away from the river to create set back and form ecological areas.
- Build a "zero-water" demonstration building that will aim to use no mains potable water.

Utilities

- Develop the District as the UK's first "Smart City" comprising one or more "Smart Grids". This would require the involvement of major electronics companies such as IBM.

Energy

- The local heat network would be developed through the engagement of a number of suppliers and users.
- CHP and associated energy networks would be introduced.
- A "Carbon Information Centre" would be set up to serve the needs of people wanting to upgrade existing buildings as well as general education of the public.

Transport

- There are many opportunities for upgrading / extending / rerouting existing transport (tubes, DLR, Crossrail). These would happen when clear demonstration could be provided of future demand.
- Set up consolidation (or logistics) centres for local distribution of goods to businesses.
- Better uses of the river, wharves and docks will be encouraged. Enhancement of the river Bus would be recommended (and maybe faster river transport such as 30 knot catamarans).
- A monorail or elevated railway could be located in the District, maybe along the Thames for part of its route. This would help give identify to the area.
- Individual transport pods could run on elevated structures like the demonstration project at Heathrow.

Waste

- A storage / treatment area is recommended for materials awaiting reclamation and recycling
- Small industries can be established making use of reclaimed materials (e.g. plastics, wood)
- Aspiration that no waste leaves the District
- There are good opportunities for establishing Energy from waste projects

Opportunities for land remediation

Land remediation will need to be undertaken for most of the brownfield sites in the ELGED. The nature of this process will depend on the nature of the soil beneath the site, the nature of any contamination found, as well as the nature of the development, the budget and the time available. In general this work will be undertaken as each site is developed by the developer / owner.

Considering the whole of the ELGED area, the following particular opportunities should be considered and perhaps, where appropriate, made a condition of development of each site.

2.2 Contaminated Land: Applications in Real Environments (CL:AIRE)

It is recommended that developers of all major ELGED brownfield sites consider collaboration with CL:AIRE to set up a series of exemplar remediation sites. This could include one or a number of soil hospitals, as well as exemplars of "sustainable" remediation technologies, such as bioremediation. These would need to be undertaken in association with other waste recycling facilities to enable beneficial re-use of reclaimed/ recycled aggregates, manufactured top soils, green waste sent to compost etc.

Other initiatives could include taking currently vacant land and remediating it to allow for short/medium term beneficial re-use prior to permanent redevelopment. Such uses could include for example;

- simple capping of contamination by hard-standing for use as skate parks or other recreational features;
- cover (of less contaminated sites) by suitable thickness of sub soils/ top soil for community gardens etc
- cover by suitable thickness of sub soils/ top soil for public open space ("Green Parks").

CL:AIRE
Contaminated Land: Applications in Real Environments (CL:AIRE) is an independent not-for-profit organisation established in 1999 to stimulate the regeneration of contaminated land in the UK by raising awareness of, and confidence in, practical and sustainable remediation technologies. It is one of the leading organisations within contaminated land, fulfilling a need for objective, scientifically robust appraisals of remediation technologies and effective methods for monitoring and investigating sites.

CL:AIRE Project Partnership

CL:AIRE encourages technology demonstration and research projects to raise industry's awareness of, and confidence in, technologies that have been applied on real sites.

From these projects, CL:AIRE can provide all those with an interest in contaminated land with documented, high-quality, and scientifically-robust demonstration reports that appraise available remediation technologies.

CL:AIRE's aim is to build a portfolio of these technology demonstration and research projects using different technology providers demonstrating under different conditions to show successes as much as lessons learnt, so that a thorough understanding of the application of a technology can be achieved.

To do this, we actively seek the participation of site owners, consultants, developers, remediation companies and technology providers to become project partners. We accept a variety of projects which are evaluated on their technical merits by our Technology and Research Group against a transparent set of criteria. http://www.claire.co.uk

2.3 Establishing London Soil Hospitals

During the development of the Olympic site a "Soil Hospital" has been set up (see photos below).

A Soil Hospital can provide a fast and cost-effective way of dealing with contaminated sites. The soils are immediately removed from site and taken to the Soil Hospital where they are treated, using a number of processes. Once treated the soil can be transferred back to the original site or used to restore other sites.

Soils hospitals have the following benefits:

- Not subject to landfill tax
- Off-site treatment
- Immediate removal of contamination from the development site, thus facilitating development
- Soils can be reused
- Variety of transportation methods, road, rail or water
- Reduction in the use of virgin materials

The Olympic Soil Hospital will cease to operate prior to 2012. It is proposed that one or more sites be found in the ELGED area to set up new soil hospitals that could be used for all developments in the ELGED area, and further afield if appropriate.

Soil hospital at 2012 Olympic site

2.4 Exemplar Remediation Sites

It is recommended that a number of demonstration / exemplar remediation sites are set up in the District and should be undertaken in collaboration with CL:AIRE.

These should utilise new/innovative remediation techniques including:

- Stabilisation
- Monitored natural attenuation
- Bioremediation
- Soil washing
- Air sparging / soil vapour extraction/ dual phase extraction techniques
- Permeable reactive barriers

The initial stage would be to undertake a more detailed study of sites in the Ditrict area to identify the conditions that are necessary for successful remediation (e.g. soil type, nature of contamination).

Fig.2.3 Photo and cross section of pilot-scale test bioremediation site showing groundwater flow between injection and extraction wells (yellow arrows) and the bioactive zone (blue-gray zone).

3 Water Management and Flood Risk

3.1 Overview

Potable water, removal and treatment of foul water and managing flood risk all can have a high carbon footprint associated with it. Water supply and the risk of flooding are increasingly going to become a major problem in London with water soon becoming 'blue gold'.

Water is already become the source of discontent between nations and between different regions of the UK with unequal access to potable water.

Already a desalination plant is currently proposed near Beckton Sewage Treatment Plant to provide potable water. This is highly energy intensive process. Steps need to be taken to manage future water supply and flood risk in a sustainable low carbon intensive fashion. The London Thames Gateway area can act as a pilot area to showcase a 'zero water waste' philosophy by close integration of water, the environment, landscaping, transport and the economy and using the following opportunities:

- River Thames Flood Defences & Banks of the Thames
- Integrated Landscaping & Storm Water Drainage
- Rainham Marshes
- London's Victorian Sewers
- Demonstration Reed Bed Treatment Plant
- Smart Water Use

3.2 River Thames Flood Defences & Banks of Thames

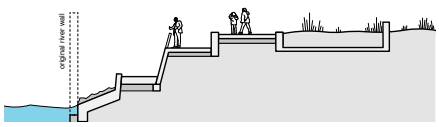
The River Thames provides enormous opportunities for the Thames Gateway area in terms of people and commercial transport, tourism, river frontage development and biodiversity; however, it also brings with it risks of flooding. All development along the Thames Gateway area should be protected from flooding to a sufficiently high standard by flood defences. Currently most flood defences are in the form of river walls.

Opportunity

Flood defences are essential for flood management but they can be adapted into features that serve as new public amenities as well as areas that encourage biodiversity.

There is an opportunity to replace some of the river walls with river terraces that will encourage biodiversity and create an aesthetically pleasing river frontage that is inline with the Environment Agencies biodiversity aspirations. River terraces aren't always compatible with other river frontage uses such as wharfs and docks and therefore could be located in transition zones.

This treatment is recommended for any section of the banks of the Thames, except where access to the water is needed, for example wharves, river transport, boat mooring, etc.



The Environment Agency favours the use of terraces to enhance the banks of the River Thames to provide new habitats, new public amenity space and provide space for the river.

3.3 Integrated Landscaping & Storm Water Drainage

When sites in the District area are redeveloped, a hierarchical approach should be adopted for dealing with storm water:

1) Recycle and reuse
2) Discharge storm water as quickly as possible to the tidal River Thames by gravity
3) As a last resort connect to public sewer

In the event of being tide locked with the River Thames or connecting into a public sewer, the storm water will need to be attenuated. These attenuation options should be integrated with the landscape proposals.

Opportunity

Opportunities for integrating landscaping and flood management are: Water meadows, swales, ponds, green roofs, walking/cycling paths, permeable pavements etc.

It is critical to make space for flooded water in the form of overland flow paths to direct flooded water away from buildings and critical infrastructure. Flow paths are required for flooded water cause from pluvial flooding, fluvial flooding and

flooding in the event of a River Thames flood defence breach. Trim trails and walking / cycle paths could be introduced that serve to route flooded water to water meadows or ponds.

Water meadows make space for water in extreme flood events but for the majority of the time would serve as public open space, e.g. new parks, new school playing fields, new green corridors.

Environment Agency favours the use of swales for the management of storm water that also enhance the public open space.

3.4 Rainham Marshes

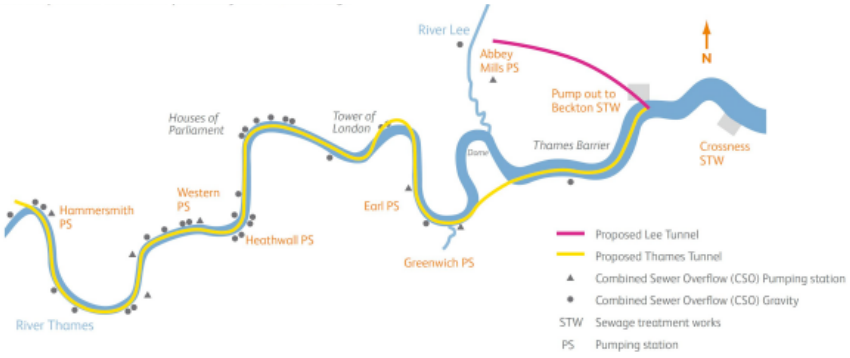
Rainham Marshes was classified as an SSSI in 1986 and has been identified by Natural England in their East London Green Grid Strategy (ELGG) as an area to manage effectively through their agri-environment schemes.

Rainham Marshes is part of what will be, by 2015: 'Wildspace - for a World City'. Wildspace will be a model of sustainable development within the Thames Gateway knitting together the land between Rainham and Purfleet to create a single unit celebrating the wildlife and diversity of the Thames Marshes and providing extensive new access alongside the Thames. This project will make a significant contribution to the social and economic regeneration of London Riverside and secure a healthy natural environment, that is accessible to people and more resilient to climate change. Natural England is part of the project steering group and is funding a project officer who will have a coordinating role.

3.5 London's Victorian sewers

The Victorian sewers were designed as combined surface water and foul water systems. When the capacity of London's Victorian sewers is exceeded during periods of heavy rainfall, the excess storm water overflows into the tidal River Thames through combined sewer overflows (CSOs). Today the overflows are happening much more frequently - on average more than once a week. These CSO discharges pollute the Thames and stress aquatic wildlife by decreasing oxygen in the water. The result is unsightly 'litter' on and around the river environment and increase levels of bacteria and viruses posing health risks to wildlife and people.

Thames Water are proposing to build two separate tunnels - the Lee Tunnel and the Thames Tunnel - to substantially reduce the level of untreated sewage overflowing from London's Victorian sewers into the River Thames and its tributary the River Lee by controlling, storing and diverting CSO discharges for treatment at Beckton Sewage Treatment Works (STW) and hence bring long-term benefits for the environment and people using the River Thames. The project will benefit the Thames Gateway area by providing a cleaner River Thames and reducing pressure on the drainage system thus helping to allow for future development.



Likely routes of the Lee Tunnel and Thames Tunnel. The Thames Tunnel route is indicative only and subject to site selection processes and further preliminary and detailed design.

3.6 Demonstration Reed Bed Treatment Plant

Treating foul water in traditional treatment plants is a fairly carbon intense process. Reed beds on the other hand provide a much more 'green' option but have the disadvantage of requiring a large amount of space. Integrating reed beds with the landscaping proposals would allow for foul water treatment and biodiversity opportunities.

Opportunity

A demonstration reed bed area could be set aside to treat a portion of the foul water generated from the Thames Gateway area. Its location needs to be near (a few 100 metres) and downhill from the source of the foul water to be treated, and needs to have a convenient and short discharge into a river, unless a closed loop system is proposed. Rainham Marshes is not recommended because it is so far from buildings and there is very little fall (so motors would have to be used to pump foul water).

For use linked to residential development, about 400 square metres of reed bed would be needed for 100 people (about 4m2 / person). For commercial use, no estimate can be given without detailed knowledge of the activities in the development.

A reed bed can provide valuable new habitats.

3.7 Smart Water Use

Government policy on the construction of residential buildings has identified water as a resource that will become more scarce in the coming decade, especially in the South East and East of England. The Code for Sustainable Homes (and GLA policy) already requires residential buildings to reduce water consumption in new buildings by about 30%, down to 105 litres per person per day. By 2013-2015 new homes are likely to have to meet CSH 5* or 6* ratings that will require water consumption to be reduced by a further 20%. A few targets are now already in place for reduced water consumption for new non-residential buildings, and it is likely that targets for existing buildings, both residential and non-residential will be in place within 5-10 years.

It is recommended that an exemplar building be constructed in the District area that will demonstrate water efficiency aiming, if possible, to be a "zero water building" that uses no mains potable water. This initiative could help with the first and most important step in achieving reduction in water use which is to educate and raise awareness of the need to reduce water use dramatically.

Opportunity

All new and existing developments could be fitted / retrofitted with visible water meters to enhance public awareness of water use.

A showcase 'Zero Water' development could be provided to demonstrate water efficiency measures for industrial, commercial and residential applications that could be adopted by developers in the area, as well as educate current property owners in order to encourage them to retrofit their developments. Below is a list of possible measures that could be showcased:

- Low flow appliances (e.g. low-flow showers, dual-flush WCs, proximity sensor taps etc)
- Rainwater harvesting systems to recycle water for irrigation, toilet flushing, cooling towers et
- Sustainable urban drainage systems integrated within the landscaping. E.g. permeable pavements, swales, ponds etc.
- Grey and black water recycling for irrigation, industrial processes, toilet flushing
- Green roofs.

In addition to a showcase building, mixed-use development of commercial, residential and industrial buildings could provide many opportunities for transfer of benefits arising from their different uses. For example, grey water from residential areas could be recycled for use in industrial processes.

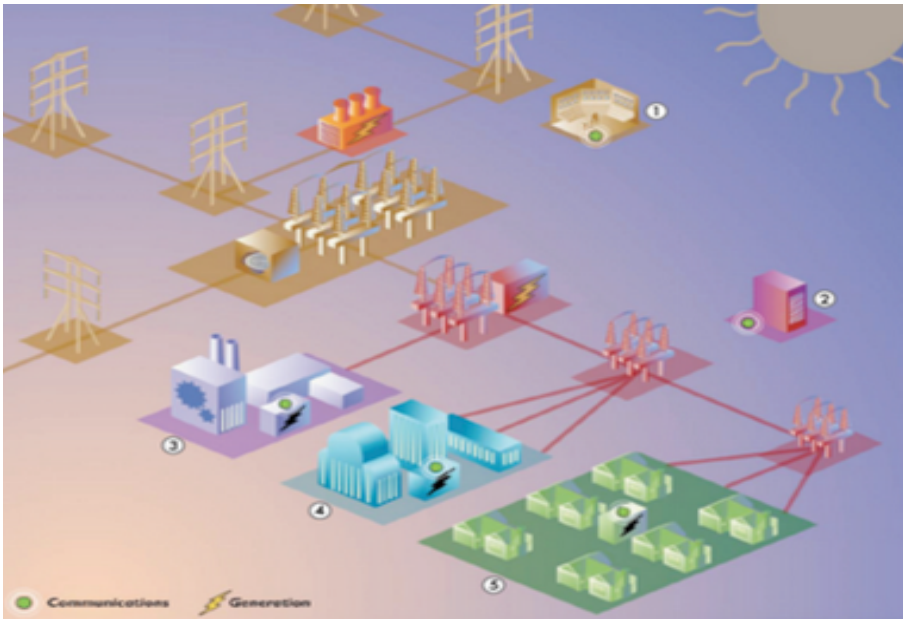
In addition to a showcase building, mixed-use development of commercial, residential and industrial buildings could provide many opportunities for transfer of benefits arising from their different uses. For example, grey water from residential areas could be recycled for use in industrial processes.

4 Utilities

4.1 Smart Grids

It is recommended that the District be used for the UK's first demonstration Smart Grid / Smart City project.

The term Smart Grid may be best understood as the overlaying of a unified communications and control system on the existing power delivery infrastructure to provide the right information to the right entity (e.g. end-use devices, Transmission and Distribution, system controls, customers, etc.) at the right time to take the right action. It is a system that optimizes power supply and delivery, minimizes losses, is self-healing, and enables next-generation energy efficiency and demand response applications.



The basic idea of a Smart Grid. "Just join up the dots: (1) Weather, (2) Power generation and distribution, (3) Industrial use, (4) Business and commercial use, (5) Residential use."

A Smart Grid entails an open standard for communications with devices – both T&D and end use devices – advanced metering infrastructure (AMI), two-way communications between a utility and its customers, and smart interconnections to distributed energy resources.

A Smart Grid will also facilitate the market adoption and interconnection of plug-in hybrid electric vehicles (PHEVs), hybrid electric vehicles that can be plugged into electrical outlets for recharging.

A Smart Grid is a critical element for Dynamic Energy Management, the synergistic effect of a Smart Grid with smart energy-efficient end-use devices, advanced whole building control systems, and smart distributed energy resources to yield energy savings and peak demand reductions greater than what could otherwise be realized. A Smart Grid would potentially link all of these elements together and provide constant communications between a utility and its customers to optimize energy efficiency and mitigate emissions.

4.1.1 Features of Smart Grids

The typical benefits of a Smart Grid are as follows:

- Engage consumers in active participation of the operation of the grid: The real time, two-way communication inherent in a smart grid will enable consumers to be compensated for their efforts to reduce energy consumption and sell energy back to the grid.
- Self healing structure: Using real-time information, the network can anticipate, detect and respond to system problems, and automatically avoid or mitigate outages or power quality issues;
- Enable higher penetration of intermittent generation sources: The smart grid will enable power networks to operate with larger amounts of intermittent renewable energy sources (i.e. wind and solar) as storage technologies will enable suppliers and consumers to compensate for intermittency

Planned implementations provide a wide

range of features to perform required functions:

- Load adjustment: The total load connected to the network varies significantly over time, responding to real consumer events (such as a very hot day or particular TV program). A smart grid may warn individual users that load will be reduced temporarily or continuously.

A number of utilities have programs like this. The key purpose of this is to reduce standby generation and allow users to reduce their bills.

- Demand response support: Demand response allows generators to interact with loads in real time to flatten spikes.
- Greater resilience to loading
- Price signalling to consumers

4.1.2 Smart Grid Technologies

Most smart grid technology is already being utilised in other industries, such as manufacturing and telecommunications, but are being brought together and adapted here for use in the electrical grid.

- Integrated communications: This will allow for real time control, information and data exchange, asset utilisation and security.

Specific areas include substation automation, demand response, distribution automation, energy management systems. These should be combined with general communications networks for data, voice, and video;

- Smart meters: Smart meters will provide a two-way communication path from the extending from the generating plant and network operator to the end-user and other smart grid enabled devices;
- Advanced components: This includes storage technology such as flywheels, power electronics, superconductors and diagnostic components and intelligent appliances.

Within the electrical power system, a smart grid infrastructure serving a small portion of a distribution network is called a microgrid. It has the same features as a smart grid, i.e. multiple decentralised generating sources, energy storage and loads controllable via a smart metering structure.

The key purpose of a microgrid is to maintain autonomy should it need to be disconnected from the general distribution network. They can then maintain power supply to local customers. Microgrids generally have a total installed capacity between a few hundred kW and a few hundred MW.

Using the scale parameters mentioned above determines two possibilities:

- Site wide

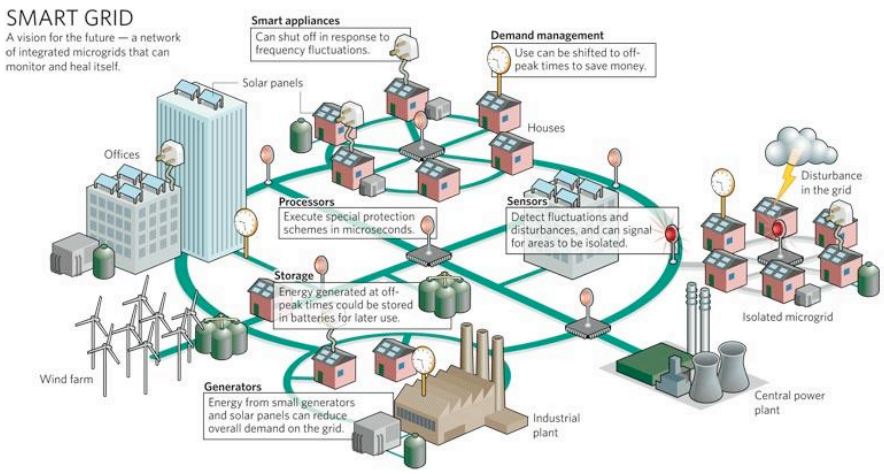
The microgrid would spread throughout the entire GED development area, The site wide option would incorporate the wind turbines on the Fords estate plus additional turbines planned along the river, the landfill capture projects at Rainham marsh, a number of large CHP projects plus a multitude of smaller decentralised energy projects.

- Localised

A smaller microgrid comprising of a renewable power cluster at Beckton and all development areas associated around this area, including the Royal Docks. This would include the airport, Excel centre and riverside developments. The smaller scheme would incorporate CHP and waste to energy projects proposed within the Beckton power cluster as well as other power generating schemes along the wharf.

The key issue in either case is that the networks need to be managed as independent entities. This will mean the establishment of a control centre that will ensure grid stability, scheduling of generators and load management. This presents an opportunity to pioneer smart grid management as well as provide a stimulus for development of technologies such as energy storage.

There are a number of obvious



A Smart Grid links all generators and users of energy to maxims the efficiency of its use. http://vtsenvirogroup.files.wordpress.com/2009/05/smartgrid_454570a-6.jpg

Australian demonstration project
Smart Grid, Smart City will employ a mix of innovative technologies and demonstrate the potential of smart grids to monitor electricity supply, manage peak demand and help customers make informed choices about their energy use.

In order to become the European Union's first "intelligent city," Amsterdam is enlisting the help of Accenture to create a smart electricity grid for businesses to hook up to, add smart meters and energy displays to homes, and take other steps to reduce the city's overall energy use.'

challenges. Firstly there is the technical challenge of evolving the distribution network architecture to be more like the transmission network, i.e. to be more able to accept the injection of power in any location, and to move away from radial structure to more of a mesh network. This evolution shall be accompanied by an appropriate upgrade of protection schemes, along with the introduction of new soft (ICT) and hard (power electronics) technologies for a more flexible system control.
Secondly, there are regulatory and ownership issues. The distribution network operator (EdF Energy) may need considerable coercion or incentive to either disconnect this part of its network or to co-operate and be involved with its development. However, EdF are in the process of selling their network assets. This may be an opportunity to attach conditions to the sale in terms of future development activities permitted on the network, or even to split the current network boundaries and utilise an independent distribution network operator to establish a network to cover the proposed pilot project area.

4.2 Smart City Infrastructure

The Smart City requires a ubiquitous ultra-high speed network infrastructure, fixed and wireless, that allows people, business and government to connect with each other and the systems that manage the infrastructure and services of the city. The network provides valuable real-time data about the urban environment to Smart City applications and service providers. Importantly, this information is context sensitive, location sensitive, personal and secure.

This information can enable a myriad number of services:

- Utilities - facilities management, climate control, meter monitoring, energy generation and storage management, leak detection and network management
- Environment - data collection and monitoring.

The Smart City infrastructure can therefore change the way the city is managed, improving delivery of public services and enhancing the lives of citizens. It can make a city a more attractive place to do business, not only by providing the infrastructure and services required by businesses but also by making a city a more attractive and prestigious place to live and work.

4.2.1 Smart City Delivery

Companies such as Cisco, Microsoft, IBM and Siemens have already demonstrated how technology could be used to orchestrate the reduction in energy use, by modifying heating, lighting and power both in individual domestic and commercial spaces, and in the wider environment. Commercial and domestic voice, data and video services would be distributed via a fibre optic 'Access' network, in conjunction with the smart metering communications network. The system should provide unified communications capabilities including web collaboration, presence-enabled call handling, directory services, instant messaging, and audio/video conferencing. The ability to access a broad range of services via the telecommunications system will be as important to domestic occupants of the site as to business users particularly in the areas of fixed – mobile convergence.

Converged onto the same distribution network alongside the telecommunications networks will be a series of other networks designed to provide remote, centralised control of the cities many and varied 'intelligent' management systems. Where appropriate these services will be delivered via ubiquitous wireless networks.
The system would provide unified communications capabilities including web collaboration, presence-enabled call handling, directory services, instant messaging, and audio/video conferencing. The ability to access a broad range of services via the telecommunications system will be as important to domestic occupants of the site as to business users particularly in the areas of fixed – mobile convergence.

4.2.2 Smart Grid / Smart City Project Proposals

There are now several American and Australian cities planning to "roll out" smart grid technology soon.
Australian demonstration project
Smart Grid, Smart City will employ a mix of innovative technologies and demonstrate the potential of smart grids to monitor electricity supply, manage peak demand and help customers make informed choices about their energy use.

The project will provide a comprehensive dataset about the potential benefits of smart grid appliances, network improvements and technological efficiencies whilst offering details on the effects of greater knowledge about energy consumption on consumer behaviour. It is anticipated that interim data and results will be made available publicly over the course of the project to disseminate lessons to other electricity networks that are developing smart grids and to assist industry with the development of smart grid technologies

Smart Grid, Smart City will also demonstrate the capacity of a smart grid to integrate electricity from renewable and distributed energy sources, such as wind and solar generation, more effectively into the existing electricity network. The data may also explore the capacity of smart grids to enable better integration of distributed generation, distributed storage and plug-in electric vehicles, to allow better dispatch of energy to support the grid.

The Smart Grid, Smart City demonstration project will deploy a live, integrated, smart grid of commercial size and scope in a community within a single electricity distributor's network. The location of Smart Grid, Smart City should provide a reasonable representation of the wider grid to produce credible results that can inform broader industry-led adoption of smart grids in Australia. For this reason, a model demonstration area would include urban, suburban, and rural areas and contain diverse network, geographic, climate and customer characteristics.

It is also anticipated that a range of smart grid technologies and applications will be demonstrated. The Smart Grid, Smart City project is expected to include demonstrations of customer applications; active voltage support and power factor correction; distributed storage; fault detection, isolation and restoration; electric vehicle support; substation and feeder monitoring; wide-area management and distributed generation.
http://www.environment.gov.au/smartgrid/

In Europe the first city with such plans is Amsterdam.

'Amsterdam, June 2009

In order to become the European Union's first "intelligent city," Amsterdam is enlisting the help of Accenture to create a smart electricity grid for businesses to hook up to, add smart meters and energy displays to homes, and take other steps to reduce the city's overall energy use.'
Amsterdam's Smart City program is focused on creating sustainable and economically viable projects that will

reduce the city's carbon emissions and help it meet the E.U.'s emissions and energy reduction goals for 2020.

The Smart City program will include smart electric grid, smart meters, smart building technologies like feedback displays and electric vehicles to reduce energy use throughout commercial properties, residential areas, public buildings and transportation.

The first projects, starting this month, include hooking up commercial vessels and river cruisers to the electric grid while they're docked; creating a smart building at Accenture's Amsterdam office at the ITO Tower by using intelligent technology to collect, monitor and analyze utility data; implementing smart meters and energy feedback displays in homes to help residents manage energy use; and creating a "climate street" along Utrechtsestraat, a popular shopping and restaurant street, that will utilize sustainable waste collection, tram stops, and street and store lighting, with meters and feedback tools allowing store owners and municipal authorities the ability to better manage energy consumption.

The island of Malta has aspirations to become the world's first "Smart Country". Malta: The first smart grid country
The country's electricity and water systems are inexorably intertwined. It depends entirely on foreign fuel oil for the production of all of its electricity and for more than half of its water supply, which filters through an energy-intensive desalination process.

The new smart grid, integrating both water and power systems, will be able to identify water leaks and electricity losses in the grid, allowing the utilities to more intelligently plan their investments in the network and reduce inefficiency. 250,000 interactive meters will monitor electricity usage in real time, set variable rates, and reward customers who consume less energy and water.

By addressing the issues of water and power as a system, the government can provide citizens with better information to make smarter decisions about how and when they use power—and the country can begin the task of replacing carbon-intensive fuel oil with renewable energy for the future.
http://www.ibm.com/smarterplanet/us/en/smart_grid/examples/index.html

4.3 Smart Grid Project Funding

There are a number of funding alternatives available at present. The first of these is the Smart Grid Capital Grant Program run by DECC. This is a £6million fund that is technology oriented.

http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/network/smart_grid/grants/grants.aspx
OFGEM also have funding available under their Low Carbon Network Fund, a scheme that has ring-fenced £500 million to run smart grid pilot projects.

http://www.ofgem.gov.uk/MEDIA/PRESSREL/Documents1/DP5%20final%20-%20030809.pdf

A reduction of around 80% in the emissions of carbon dioxide in the District could be achieved by 2050 through a combination of means

Infrastructure

Details of these proposals are contained in a separate document describing the Low-Carbon Energy Infrastructure Project. Below is a summary of the recommendations.

The aims and means correspond closely to those set out in the recent State of the Nation report from the Institution of Civil Engineers "Low Carbon Infrastructure (ICE, December 2009). They include both the further development of existing initiatives as well as proposals for new initiatives.

5.1 Recommendations

A reduction of around 80% in the emissions of carbon dioxide in the District could be achieved by 2050 through a combination of means:

- Implementing national, regional and local government policies;
- Changes to the fuel mix used to generate electrical power;
- Provision of a local energy infrastructure.

This will be undertaken at three levels or scales:

- ELGED wide / beyond site boundaries – efficient energy distribution
- Large sites – efficient energy generation
- Building scale – individual properties or small groups of buildings

The following particular initiatives proposed for ELGED would contribute to realising this considerable reduction in carbon missions:

- Upgrade of the electrical network to smart-grid-technology and deployment of smart meters;
- Build-out of the London Thames Gateway Heat Network (LTGHN) and connection of new low-carbon sources of energy generation
- Plug-and-play sites for energy generation plant;
- Installation of large-scale low-carbon energy generation

6 Transport

systems including large-scale wind power, biomass-fuelled CHP, energy-from-waste schemes and solar farms;

- Upgrade and retrofit of existing residential and commercial buildings to reduce energy use by 30-60%.

The following next steps are proposed to help realise these aims:

- planning policy which incentivises investment in the District;
- connection of public buildings to the LTGHN;
- development of detailed scenarios for an 80% reduction in carbon emissions in the study area through a combination of the above measures.

The following next steps are proposed to help realise these aims:

- planning policy which incentivises investment in the District;

- connection of public buildings to the LTGHN;

- development of detailed scenarios for an 80% reduction in carbon emissions in the study area through a combination of the above measures

6.1 Overview

Perhaps the most significant issue identified through the course of this work is the contrast in public transport access evident within the District. The 'Public Transport Accessibility Level' (PTAL) concept was developed by TfL in conjunction with the London boroughs and is used to inform the development capacity of a site with higher PTAL allowing higher densities. The PTAL level of a specific site also has a direct influence on the level of car parking that may be provided.

The riverside areas of the District are notable in respect of having very low existing public transport accessibility level (PTAL). Given the prime nature of river frontage in more central parts of London (and the higher land values such sites attract) this would suggest these areas have significant future potential.

It is acknowledged that there are issues other than public transport access affecting the value or attractiveness of a piece of land although in many cases the cost of improving public transport accessibility will be beyond what can be reasonably be accommodated an individual development.

The District project is ideal in offering the opportunity of looking at infrastructure from a more strategic perspective and so represents an opportunity to address public transport provision and enable development.

6.2 General measures

6.2.1 More effective use of transport planning

A more co-ordinated approach to high level land-use and transport planning would provide a more structured way to making the very most of existing and future planned infrastructure. Such an approach would inform the placement of development with regard for its transport demand characteristics i.e. the intensity, whether an attractor or a generator, timing of demand and modal split appropriate to the specific land use.

In a similar vein to the above point, more frequent use of pooled approach to S106 contributions should be made. This allows smaller financial contributions from a number of developments to be used collectively to fund more significant elements of new transport infrastructure.

6.2.2 Encouraging the use of alternative fuels for transport

TfL are steadily introducing an increased number of alternatively fuelled vehicles in the form of hydrogen and electric powered buses. The former involves the construction of a hydrogen filling station at Temple Mills Lane. The possibility of using this facility to provide power for commercial vehicles should also be investigated.

6.3 Improvements to public transport

Conventional improvements to public transport would include buses or bus-based systems or extensions to the existing DLR, underground or rail networks.

6.3.1 Maximising use of public transport

Maximising the use of available public transport opportunities will also be an import aspect of improving accessibility for the project area. The adoption of 'area-wide travel plans' could thus be of particular benefit to areas less well served by public transport. This would typically involve the coordination of existing and emerging businesses and organisations to make the best use of available and emerging resources and infrastructure. Sutton's 'Town Centre Business Travel Network' initiative provides an example of how this could develop.

6.3.2 Personal Rapid Transit

Another mode of public transport to be considered is Personal Rapid Transit (PRT) like that recently implemented at Heathrow Airport Terminal 5. Whilst the capacity of this system is lower than that of more traditional public transport modes it is better suited to serving areas where demand will be spread over a number of corridors with relatively low demand. The infrastructure requirements of PRT are less onerous than for a conventional fixed-rail system meaning that such a system would be easier to deliver.

6.3.3 Extension of DLR

The GLA has stated that the DLR extension to Dagenham Dock is unlikely to be progressed in the near future. The predominant reason for this is the Barking Riverside residential-led scheme which is currently on hold. Development in the ELGED area would provide suitable new development along the corridor of the proposed extension that would considerably assist in demonstrating the demand for the extension and the associated business case. Employment opportunities would complement the predominantly residential Barking Riverside scheme creating additional new 'attractors' alongside the residential 'generators'.

6.3.4 Crossrail

It would be possible to build upon the Crossrail story. Feasibility studies could identify what scope exists for extensions to current proposals. In its current guise Crossrail has little impact on the GED study area. Such extensions would have the potential to provide a radical step change in the quality and capacity of public transport provision in this region of London. An extension that crosses the Thames in the same that the Jubilee Line Extension did should be included as part of this. Such an extension would significantly improve the connectivity of the northern and southern portions of east London.

6.3.5 Improved River public transport

Improved river linkages in the absence of the Thames Gateway Bridge coming forward. These should comprise north-south shuttle type services linking the banks of the Thames and express Riverbus services connecting the GED river frontage with the Isle of Dogs and central London.

6.3.6 Bespoke, high profile solutions

More bespoke solutions could be provided in the form of tram or LRT system, or an elevated/suspended rail system similar to monorail that has been operating in Wuppertal, Germany since around 1900. A major benefit of such an elevated system is that it could operate above the river for certain sections, thus overcoming issues of third party land that may present a major obstacle to more traditional forms of surface transport, as well as providing a strong identify to the area.

Development in the District would provide suitable new development along the corridor of the proposed extension that would considerably assist in demonstrating the demand for the extension and the associated business case

A MonoMetro network could extend from Heathrow in the west to the ELGED area in the East. (http://www.monometro.com/network.htm)

6.4 Improvements to freight transport

6.4.1 Consolidation (Logistics) Centres

Set up local Consolidation (or Logistics) Centres for distribution of goods to / from businesses, e.g. stationary, raw materials, waste, etc. The local distribution could use electric vehicles to reduce air pollution.

6.4.2 Linking commercial development and freight initiatives

Develop light-industrial and commercial activities in conjunction with rail and river freight initiatives. The potential for inter-modal options e.g. rail-road to tap the freight potential of the high-speed rail link, should be fully exploited.

6.4.3 Improved use of river for freight movement

Increased river usage for freight movement. A good example of this is the City of London Corporation's operations at Wallbrook Wharf used to transport waste out of central London. Main transport benefits is a reduction in the number of HGV movements on the road. Such a scheme could also assist with the reactivation of wharves and may complement a riverside waste-to-energy facility.

6.4.4 Making use of "spare" rail capacity

There are opportunities for using 'spare' rail capacity for movement of waste or deliveries. The CarGoTram scheme operated by Volkswagen in Dresden is a good example of how infrastructure developed for public transport usage can be maximised and used to move freight.

7 Waste

7.1 Key Opportunities

The main opportunities that have been identified for implementation and development in the ELGED area are as follows.

7.1.1 Waste to energy

This is addressed in the project proposal for this major initiative.

7.1.2 Recycling industries

All Boroughs in the UK have challenging targets for recycling waste materials. While the waste industry is important in ensuring the appropriate separation and collection of recyclable / reusable waste fractions, there is also a need for new industries that will use these materials in manufacture. Typical products include "plastic lumbar" made from recycled plastics and many products that can be made from recycled timber.

7.1.3 Reclamation yard

It is recommended that space is set aside in ELGED for the reclamation and recycling of fittings and fixtures as well as building elements and materials that arise from the deconstruction or demolition of buildings. The site would provide space for storage, treatment and reclamation of products and materials for reuse in construction. It could make a major contribution to the requirement to use "recycled content" materials in all new construction in London (see Draft New London Plan 2009). A pilot project of this type is being implemented on the Olympic 2012 site and another is planned during the development of Brent Cross Cricklewood (http://www.brentcrosscricklewood.com/). This is addressed in the project proposal for this major initiative. It is recommended this is developed in collaboration with Bioregional Reclaimed (http://www.bioregional-reclaimed.com).

7.2 Further Key Opportunities

There will be many specific opportunities for implementing waste initiatives in the District that will require further studies to elaborate. They are all characterised by the need to involve many different stakeholders in the waste industry.

7.2.1 Collection Opportunities

- Municipal separated Waste Dry recyclables collection could be expanded to include a variety of materials such as plastics (including plastic bags), textiles, food waste, batteries and wood waste
- Trade, Commercial and Industrial Waste

Offer recycling services to include a variety of recyclables such as paper, card, plastics, glass, metals, textiles and food waste

- Create unique logistics combination through the use of underground collection and river transport

7.2.2 Processing Opportunities (creating a closed loop)

- Improved and efficient material recycling facilities with state of the art technology on screening and sorting a variety of recyclables to minimise rejects and enhance the value of outputs
- Introduction of energy from waste facilities to maximise value recovery through generation and use of electricity, heat and water (e.g. Anaerobic digestion of food waste could be a net water producer which could then be used as cooling water for industrial process.
- New and emerging treatment technologies – pyrolysis, gasification, autoclave, plasma arc
- Potential to integrate the research and innovation from the universities on site to break through in waste processing
- Markets for establishing WEEE and ELV recycling plants
- Improve efficiency of existing waste management infrastructure and tap opportunities to utilise heat and electricity from energy from waste facilities
- Pioneer establishment of sustainable and secure outlets for process outputs from treatment facilities (e.g. AD digestate, SRF etc.)

7.2.3 Integrating resource efficiency (throughout scheme development)

- Integrating key stages of scheme design to consider facility siting, resource efficiency throughout construction, operation and management stages
- Maximising opportunities for materials segregation, re-use, heat and power generation
- Establish green industrial estates for complementary businesses
- Opportunities for hydrogen from waste
- Use of waste generated energy for fuelling vehicles
- Promote manufacturing using recycled products
- Industrial symbiosis where one process' waste becomes input for another.

7.3 London Waste and Recycling Board

The recently launched London Waste and Recycling Board will provide a means of stimulating many waste initiatives in the ELGED area as well as London as a whole. The objectives and key actions of SWARB hare recently been set out in its 2009-10 Business Plan (http://www.londoncouncils.gov.uk/Transport/lwarb/default.htm)

7.3.1 Summary of main objectives of SWARB

The main objectives are:

To promote and encourage, in Greater London:

- the production of less waste;
- an increase in the proportion of waste that is reused or recycled; and
- the use of methods of collection, treatment and disposal of waste which are more beneficial to the environment.

To provide financial assistance for:

- the provision of facilities for or in

connection with the collection, treatment or disposal of waste produced in Greater London;

- conducting research into new technologies or techniques for the collection, treatment or disposal of waste; and
- securing, or assisting in securing, the performance of any function of a London borough council or the Common Council relating to waste.

7.3.2 Summary of key actions proposed for SWARB

Following analysis of London's waste composition and the way that it is treated the Board has prioritised mixed plastic, organic (including food) and wood, as materials that offer the best opportunities for improvement in treatment, given the proportion of those materials that currently go to landfill with the associated economic and environmental cost; and metals, paper & board and textiles where the current methods of management in some sectors are providing inadequate capture of materials.

The Board has indicated the level of funding it will apportion to its interventions (the waste hierarchy), based on the impact it can realistically have on diverting these materials form landfill and on climate change mitigation. The provisional allocation across the life of the fund is:

Medium to high priority

- Recycling (43%)
- Energy (39%)

Low to medium priority

- Reuse (15%)
- Reduction (3%)

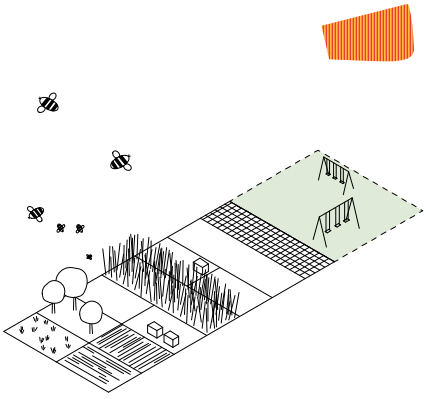
7.3.3 Summary of Benefits to stakeholders

The following benefits of the actions of SWARD have been identified.

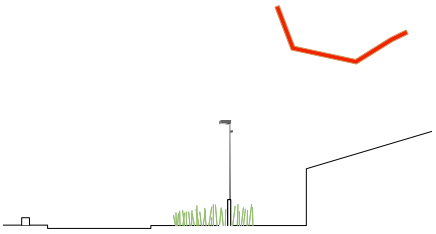
- Benefits to Boroughs
  - long term legacy benefits as opposed to short term support;
  - diversified and credible outlet choices;
  - lower financial costs (direct and indirect) through avoided landfill tax and gate fees;
  - resilience to future market shocks and market prices;
  - active participation in projects plus financial upside through public/private sector involvement;
  - assists with regulatory compliance (e.g. LATS, LAA's) and potential to increase recycling rates;
  - reduction in carbon footprint (NI 85 & 86);
  - creating positive public perception in response to public demand; and
  - local economic development and new jobs.
- Benefits to Business Community
  - market stability for price, supply and costs leading to lower financial costs leading to potential uplift in bottom line;
  - shared Risk exposure;
  - business planning certainty creating an investment opportunity;
  - energy security;
  - simplified logistics leading to less administration;
  - closed loop supply chains providing security;
  - mitigates regulatory impacts (i.e. landfill tax , CRC, packaging).
  - opportunity for social enterprises; and
  - enhanced corporate social responsibility.
- Benefits to Londoners
  - value uplift in London's environmental economy;
  - job creation;
  - greater resource transparency, understanding and environmental 'feel good' factor;
  - market led convenience to increase re-use and recycling;
  - local heat and power plants providing cheap energy;
  - shared participation and benefits; and
  - increased confidence in local authorities and community leadership.

C LANDSCAPE NETWORKS

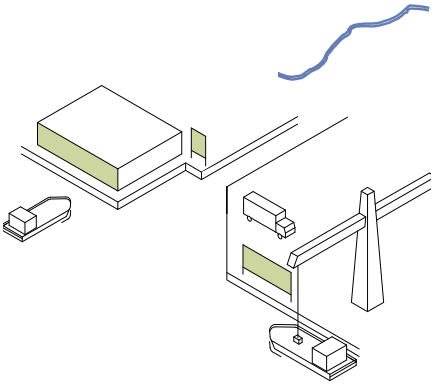
Expanded or new allotments, to include starter mini allotments, beehives and playgrounds.



Roads within industrial areas, to have fence adjusting treatment, lighting, planting of road verges and benches.

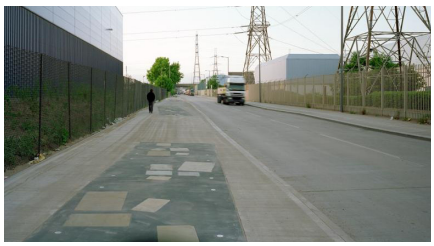


Thousands of meters of riverside where a riverside address will be given to every business. Using signs, distribution centres, making places and creating orientation.



Fencing at Beam Reach 8 by East

River signage in Porto



Chequers Lane environmental improvements by ARU

We propose a range of landscape interventions to address the short-comings of the poor existing public realm, while building on the area's special character. We aim for a public realm that is easy and attractive to use, encourages biodiversity and employs, wherever possible, natural means of water management and land remediation.

Green verges

Where width of footways allows, planting along roadsides is proposed. This is a low maintenance planting scheme with high biodiversity offer, visual benefits to the public realm and aids the natural water management system by collecting rainwater rather than run-off from hard surfaces.

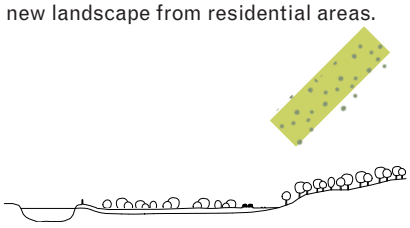
Natural water management systems

Rainfall management: swales are proposed to manage stormwater collection and attenuation back into ground water rather than being directed into storm water systems. Swales have enjoyable topographic qualities that enhance the public realm and can add to biodiversity enhancement.

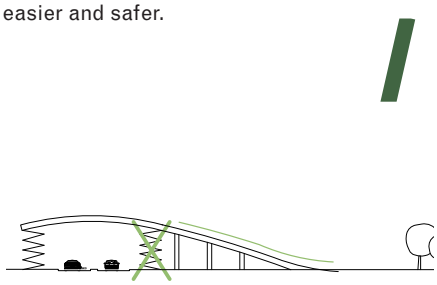
Lighting

The Green Enterprise District should pilot low energy LED street lighting as mentioned in the 2010 'Low Carbon Capital' report by Ernst &Young.

Hundreds of trees to be planted along green routes to the river, allowing access to a new landscape from residential areas.

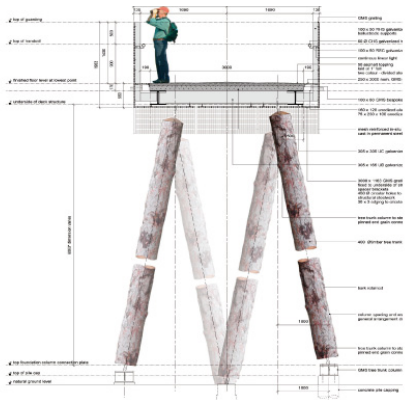


Bridges and crossings, new or improved, to help make walking & cycling in the area easier and safer.



Landscape proposals for the Sustainable Industries Park by Sergison Bates Architects and Vogt Landscape Architects

Greenway in Newham by Adams and Southerland Architects



Ramp to Rainham marshes by Peter Beard_Landroom

D OPPORTUNITY AREA OBJECTIVES

Lower Lea Valley

While the Governance Task Force is tasked with enabling and delivering the District's objectives, across borough boundaries, the existing Opportunity Areas objectives have informed the proposals for economic developments which we describe in this section.

The scale and diversity of the Lower Lea Valley, its proximity to Central London and the international destination presented by the Olympics all provide a basis for activity for Green Enterprise sectors.

Office developments at the Olympics Media Centre or permitted development at Stratford City provide an opportunity for regional headquarters operations for international engineering, environmental or energy related businesses. Given proximity and public transport access to Canary Wharf and the City of London, Stratford City could also be a focus of financial services relating to the energy and carbon trading sectors. The Olympic Legacy setting, and the potential for temporary demonstrations and exhibitions relating to the Green Enterprise District can serve as inward investment and promotional tools in this area.

Existing industrial locations within the Lower Lea Valley can serve as hubs for installation and servicing businesses addressing the retrofitting of residential, industrial, office and public buildings. These locations provide strong proximity to central London markets with their significant existing building stock. There is also the opportunity to extend low energy techniques to production processes, buildings and facilities across existing employers that will be retained in the area.

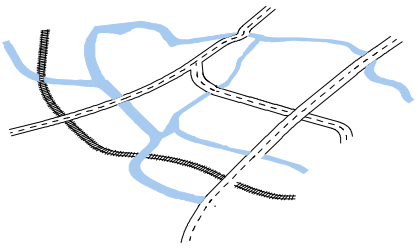
The scale of new infrastructure and property development that will continue beyond 2012 throughout the Lower Lea Valley provides opportunities for a generation of construction businesses focused on the new buildings and the installation of high specification energy conservation and control equipment and materials. A specialised and supported hub of businesses can draw on local labour and integrate with the central London construction sector.

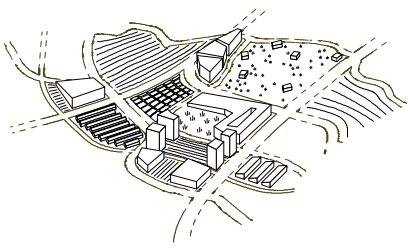
Small scale, high value manufacturing focusing on retrofitting materials and components and building scale energy generating equipment can be located within existing industrial areas and within existing building stock.

The Lower Lea Valley has a long history as an energy generating area. Appropriate locations, with compatible neighbours can be identified for a range of renewable energy, waste to energy or high efficiency power generation in an energy supplier park. Many of the new proposed technologies can be accommodated in relatively small footprints, and with smaller, flexible and movable equipment. This will also provide a range of local employment requirements.

The Lower Lea Valley has also served as a waste processing, outdoor storage and recycling cluster. In the past, this has generated poor neighbour conflicts. The Lower Lea Valley now offers the opportunity to organise small scale and higher value recycling and material reprocessing activities into a local specialisation. This can focus on higher value paper, plastic and metal waster streams coming from Central London's office market. There is also the potential to link to London's hotel market, processing higher value waste materials and providing low energy, high efficiency laundry services.

Office developments at the Olympics Media Centre or permitted development at Stratford City provide an opportunity for regional headquarters operations for international engineering, environmental or energy related businesses.





The Royal Docks and Beckton Waterfront

Given the scale of development opportunity and the timeframe likely for its delivery, the Royal Docks and Beckton Riverside could play a range of roles in promoting and realising the Green Enterprise District. The dramatic setting of the Docks, the nearby Excel exhibition centre, an emerging hotel stock, London City Airport and a developing role for special events, such as the London Triathlon, all point to a strong potential role for demonstration, exhibition and an event related role.

Given the scale of land available there is the opportunity for temporary demonstration of energy generation, new production processes or larger scale products at high visibility and easily accessible sites. Key parcels between the Royals Business Park and the University of East London facing City Airport can play a role here. Similarly Silvertown Quays, opposite the Excel Centre could also be a location for temporary projects. Each has the potential to raise the visibility of the Docks and increase the numbers visiting the area. This would also bring key sites into use for what could be one or two year periods while development, planning and market issues are advanced in support of longer term permanent solutions.

The Royals Business Park emphasis on office development provides an opportunity for regional headquarters operations for international engineering, environmental or energy related businesses. Businesses that need rapid international access and close links to central London, but which do not need to be in prime office locations can be attracted by the distinctive environment of the Docks, particularly if the Green Enterprise District is an overarching driver for the entire area. High specification office buildings can also demonstrate energy efficiency technologies and, or, occupier products.

The University of East London provides and obvious anchor for research and development activities relating to the Green Enterprise sector. This can be in the form of technology development, technology transfer or business consulting for existing businesses transitioning to new sectors.

The University has a strong emphasis on construction trades training. This can be extended to whole building demonstration and skills training projects related to retrofitting existing stock to maximise energy efficiency. This is an opportunity to build full scale residential units on site as working demonstration and teaching tools. This could also be extended to skills training for domestic boiler upgrade and installation. This will further promote the identity and concept of the Green Enterprise District, while supporting locally relevant business sectors and resident participation.

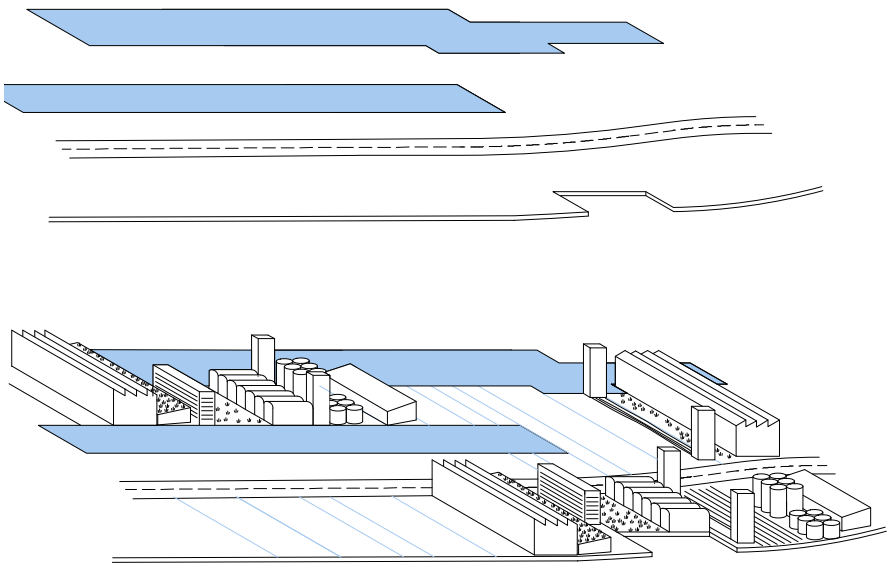
Existing industrial locations to the south along the Thames can serve as hubs for installation and servicing businesses addressing the retrofitting of residential, industrial, office and public buildings. These locations also provide proximity to central and south London market areas. There is also the opportunity to extend low energy techniques to production processes, buildings and facilities across existing employers in the area.

Major production facilities, such as the Tate and Lyle plant can also potentially be integrated into utility networks through heat from industrial processes or the creation of energy from heat products.

Other industrial locations at Armada Way and the London Industrial Park have produced contemporary industrial and logistics environments in recent years. The continuation of this activity is encouraged, with a continued emphasis on refining building technologies as progress is made.

Beckton also has a strong utility history and large swathes of land which are isolated from residential areas. This is also and opportunity to build on the London heat network and use this location as a test bed and potential long term location for low carbon energy generation.

The Royal Docks and Beckton Riverside could play a range of roles in promoting and realising the Green Enterprise District. The dramatic setting of the Docks, the nearby Excel exhibition centre, an emerging hotel stock, London City Airport and a developing role for special events, such as the London Triathlon, all point to a strong potential role for demonstration, exhibition and an event related role.



Creekmouth

The Creekmouth area is located to the east of Beckton. Creekmouth is well served by highway and river access. It is home to manufacturing, distribution and waste and recycling businesses. Proposed highway improvements will strengthen the functional focus of this area. Creekmouth has potentially good access to Central London, Northeast London and East London via the A13 and the North Circular.

Given these attributes, Creekmouth would be a strong location for the manufacturing and material re-use sectors identified or the Green Enterprise District. Businesses associated with the building retrofitting sector could also be located here, taking advantage of smaller sites and building stock available here. At the same time, it could also play a role in local energy generation and the use of alternative fuels, where these are carried out on a small scale.

Dagenham Dock and the Sustainable Industrial Park

Dagenham Dock and the Sustainable Industrial Park offer rapid access to the M25 and also offer waterfront access. Highway access has been upgraded. Public transport access is also being strengthened through improved bus service. This location is distinguished by its large land parcels and large floor plate industrial and logistics buildings.

This location would be appropriate for manufacturing, material re-use and distribution businesses. The array of land parcels and access to the motorway network offers the potential for large scale operations.

This scale and mix of use also offers the potential for accommodating energy generation and the processing of clean fuels. There is the potential to co-locate a series of businesses using renewable energy, waste to energy or high efficiency power generation in an energy supplier park. Many of the new proposed technologies can be accommodated in relatively small footprints, and with smaller, flexible and movable equipment. This technological focus has a strong overlap with the focus of the Sustainable Industrial Park with facilities such as the Closed Loop Manufacturing facility and the high specification Voltaic logistics building.

This location is also appropriate for a range of other businesses that may manufacture or service mainstream economic sectors, but do so using low carbon emitting processes or in low carbon using facilities.

Beam Reach

Beam Reach is a series of larger development sites around the Ford Motor Company Dagenham production facility and to the east at Ferry Lane.

The Centre for Engineering and Manufacturing Excellence provides and iconic gateway building for this location, close to the Ford facility. A focus on manufacturing would build on the existing identity and strengths of the Beam Reach location.

This location has immediate access to the A13 and to the wider UK market via the M25.

The potential for automotive related manufacturing in the Green Enterprise District has been identified. Beam Reach would offer a strong and compatible location for this based on expansion of existing employers. A UK strength in advanced technology smaller commercial motors has been identified. A similar strength has been identified for the UK domestic gas boiler market. These sectors could also be directed to the Beam Reach location.

This location is also appropriate for a range of other businesses that may manufacture or service mainstream economic sectors, but do so using low carbon emitting processes or in low carbon using facilities. To the south and closer to the river there are a number of manufacturing, recycling and material handling businesses. Further development this area, with a view to cleaner and lower energy processes and facilities can add to the overall realisation of the Green Enterprise District.

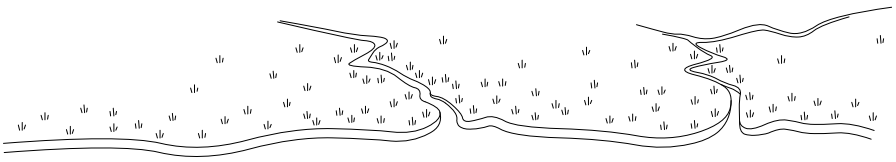
Creek Way / Ferry Lane

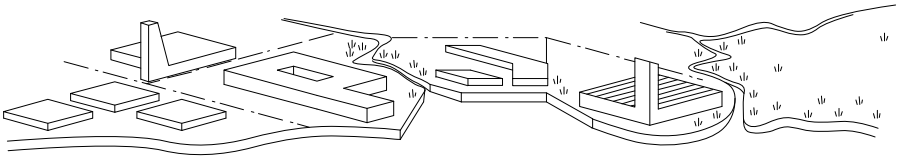
The Creek Way and Ferry Land business area has strong highway access and an array of smaller and larger business facilities. Businesses include manufacturing, distribution and recycling.

Sectors that would be appropriate here include retrofitting – with strong access to the Essex market – recycling and reprocessing for high value materials and waste to energy.

This location may also be appropriate for the location of wind based energy generation, subject to wind viability and addressing any conflicts with wildlife and birds at Rainham Marshes

This location is also appropriate for a range of other businesses that may manufacture or service mainstream economic sectors, but do so using low carbon emitting processes or in low carbon using facilities. Recent investments at the Easter Park multi-tenant small business park indicate the viability of this approach in this location.





E INCENTIVES

The growth of the overall green economy and the success of the East London Green Enterprise District can and should be supported by specific interventions by the public sector.

Government has played a major role in supporting the delivery of infrastructure through its legal, regulatory or investment role. This was as true for the United Kingdom's canal, railway, highway and airport infrastructure as it is for offshore wind farms.

Government can also support and steer business sectors based on its own procurement and purchasing decisions. Materials, services, equipment and energy purchased by government for schools, hospitals, refuse and emergency services are a significant part of the economy. The scale of investment in building stock such as housing, institutions or civic buildings is also significant. As a major purchaser, the public sector can strongly influence the behaviour of producers.

The tax regime can also play an important role. Recognition of this has recently been provided by the lower tax now payable on fleet vehicles that have lower C02 emissions. C02 emissions thresholds will be progressively reduced over time to achieve the same benefit. A Benefit in Kind tax holiday announced in the December 2009 Pre Budget Report will also mean that tax paying company vehicle drivers that use electric vehicles will not have to pay the 9% benefit in kind for their vehicle. Their employers will also save approximately £200 per electric vehicle per year in reduced national insurance contributions. The UK government is offering up to 125,000 households £400 towards the cost of upgrading their domestic boiler if it is higher C02 emitting, to a high efficiency A-rated one or a renewable energy heating technology. By offering financial incentives for particular kinds of purchases, demand for them is raised, supporting the evolution of green economy businesses and transition of new products into the mainstream.

A series of measures that could support the East London Green Enterprise District and the UK's Green Economy generally are presented below. These are driven by the specific economic context of East London on one hand and parallel the wider recommendations of the Prospectus for London, the Low Carbon Capital (Ernst & Young, March 2009) and subsequent research. This prospectus does call for:

- The provision of specific financial incentives for low carbon businesses;
- Work with HM Treasury to explore what can be done with regards to the tax regime in order to incentivise low carbon investment;
- Increased collaboration across national and local government as well as the private sector on the issue of the low carbon economy.

Further evolution will be required. It is recommended that the East London Green Enterprise District Task Force work with local and national partners to evolve demand drivers and define incentives.

Demand Drivers

The following demand drivers relate to green economy growth sectors identified earlier in this report, and focus on the direct role that the public sector can play in supporting these sectors in East London.

Building Retro-fitting

An extension of the Homes Energy Efficiency Programme being piloted by the LDA by focusing on retro-fitting of social housing stock in Newham, Barking and Dagenham and Havering is recommended. This can upgrade housing stock, target local business development within the East London Green Enterprise District, and train a new generation of residential retrofit staff, and build the capacity of businesses to compete across the wider London and East of England region.

A similar extension of the Building Energy Efficiency Programme also being piloted by the LDA to fund energy efficiency projects for public sector buildings can address local authority, local education authority and NHS stock. A focus on procurement targeted at local businesses within the East London Green Enterprise District and building their capacity to compete in procurement processes will support stock transformation and local competitiveness and business growth.

The private sector will also be addressing its building stock. It is recommended that assistance be provided to East London Green Enterprise District businesses accessing corporate procurement contracts for office and industrial building stock.

Domestic and Commercial Boilers

Upgrade of boilers and heating systems within public sector building stock offers the opportunity to support a specific sector the UK has a strong competitive position in. Hospitals, schools, care homes and social housing stock all offer opportunities to transition systems.

Low Carbon and Electric Fleet Vehicles

Low carbon and electric fleet vehicles are particularly suited to shorter rather than long haul journeys, based on their ability to return to power sources and their lighter weight loads. The public sector in East London can drive demand for vehicles by transitioning their own fleets of specialist vehicles as these fleets are replaced. Local authorities and public agencies can also encourage transition among their suppliers by requiring that private service providers also use low carbon or electric fleet vehicles or demonstrate a programme to achieve this over time.

Low Carbon and Renewable Energy

The public sector is a major customer of national electricity distribution companies. As a larger customer, it can influence where supplies source energy from.

There are a number of technologies that use low carbon, high efficiency or alternative fuels. This can include waste products such as used cooking from commercial and institutional kitchens, residual domestic and commercial waste that cannot be recycled and wood chips, as well as wind or tidal generation. It is recommended that public sector organisations act, individually or collectively, to favour purchase of electricity from suppliers that use these sources.

UK government can also address institutional barriers to the growth of this sector. Procurement processes for electricity generation and supply favour large scale entities. Tendering is long, large scale, expensive and favours large scale suppliers. However, many providers are relatively small scale and have difficulty penetrating the market as a result. Those not already supplying energy also have more limited information on demand, potential gaps in it and opportunities to connect to the wider

grid. The establishment of a new parallel procurement processes for smaller suppliers in low carbon and renewable sectors is recommended.

These recommendations also overlap with the LDA's October 2009 report on Delivering Low Carbon Energy for London (Powering Ahead). This includes for recommendations that London Plan Opportunity Areas area able to incorporate decentralised energy systems, and for government to be pressed for support mechanisms for low and zero carbon energy and heat networks.

Recycling

Local government and public agencies have a key role in defining how domestic and commercial waste is addressed. Many will contract directly for these services or regulate them through the land use planning regime. Local authorities within the East London Green Enterprise District should encourage best practices among all suppliers.

Local authorities can also support the growth of local businesses that achieve the highest recycling rates and present the best good neighbour practices. The January 2010 Mayor's Vision for London's Waste also sets ambitious targets for recycling and reducing landfill requirements. This is a clear opportunity for East London to build on an existing sectoral strength. Local authorities can play a clear role in land use planning, but also in addressing operational practices at recycling sites and their external image and identity.

It has been reported through consultation that smaller businesses using emerging techniques face similar procurement barriers when seeking larger contracts. It is also recommended that new parallel procurement processes for smaller suppliers be established.

Tax Regime Incentives

HM Treasury has shown a willingness to use the tax regime to support green economic sectors. The following are offered as a range of additional incentives that would support the sector generally and benefit those parts of it located in East London.

- Reduced VAT on building materials and equipment used for residential building retrofit where its is explicitly for energy efficiency or reducing carbon emissions;
- Reduced VAT on building materials and equipment used for commercial and industrial building retrofit where its is explicitly for energy efficiency or reducing carbon emissions;
- Extend newly announced tax incentives for electric fleet cars to businesses that purchase new high efficiency building heating systems.
- Reduce VAT on purchase of commercial vehicles that use electricity, hybrid or very high efficiency carbon fuelled engines;
- Extend newly announced tax incentives for electric fleet cars to businesses that purchase high efficiency electric commercial motors for use in manufacturing, conveyor or winding equipment,
- or heating, ventilation and air conditioning systems.
- Reduce VAT on the purchase of materials made from recycled products

Government can also support and steer business sectors based on its own procurement and purchasing decisions.

Location Incentives

A range of location specific incentive may also be applicable to the East London Green Enterprise District. Many of these are being applied as part of mainstream inward investment and economic development regimes. A specific focus on supporting the sectors identified by this report should be considered. Location incentives may include:

- Technical assistance by industry experts in support of retro-fitting of the operations of existing businesses;
- Technical assistance by industry experts in support of transition to new allied green sectors and new services by existing businesses;
- Financial subsidy for retro-fitting of the operations of existing businesses;
- Subsidy for site preparation and remediation to meet the specific needs of newly locating green sector businesses;
- Land assembly and identification for low carbon and alternative energy suppliers;
- Installation of highway and public transport infrastructure;
- Reduced business rates for a fixed term for businesses operating in low carbon energy or high energy efficiency buildings; and
- Reduced business rates for a fixed term for businesses within green economic sectors

F DYNAMIC MASTERPLAN

Delivery strategy

This section relates the spatial and temporal aspects of all proposals in a dynamic Masterplan.

A Dymnamic Masterplan is a temporal plan describing an overall delivery strategy for the District. It relates projects to each other chronologically. A Dynamic Masterplan is somewhat like a musical score, used by a conductor, in this case a Task Force, and a group of instruments to realise the music.

The method used to describe the Dynamic Masterplan is a managerial structure that separates out core elements of the overall development process. This managerial structure is an instrument through which the complex dynamics of an ambitious project such as the District can be tackled and given guidance and control. The managerial toolbox is consists of four layers.

Actionplan

Legal, financial and other frameworks enabling the realization of the project.

Scenario

Stakeholders, communities of practice and cooperative networks related to the development of a project.

Prototype

Technologies, design and planning methodologies and pilot projects to address energy efficiency, renewable energies and green enterprise initiatives.

Database

Maps, statistics and any other knowledge needed to set targets, benchmarks and verification processes to study the feasibility for potential projects

The temporal component describes

1. When a project starts, and how in the context of ongoing processes and developments, and how it proliferates through the District. For example a retrofitting project sets an example that is emulated somewhere else in the District, creating a market for the sectors involved in retrofitting.

2. The growth of clusters, in specific sites, or spread throughout the District, and charts their gradual expansion and increased complexity. For example the waste to energy cluster may start with three pilot projects but grow into a District wide strategy until all waste in the District is processed in the same way and is efficiently turned into energy

3. The interlinking between clusters and the relationships between individual projects or between projects and clusters. Individual projects become embedded in different clusters thereby increasing the complexity but also economic viability and energetic efficiency of both.

Prototype project groups

Energies and Utilities Network

Low Carbon energy production and distribution across the whole Green Enterprise District

Transport and Infrastructure Network

Transportation and distribution of people and goods

Ecology Network

Creation and Improvements of accessible and inaccessible public and private green spaces for increased amenity and biodiversity and food production

Environmental Manufacturing

Material recycling and reclamation, and manufacturing of low carbon and environmental goods, and their smart distribution

Exemplar Mixed Use Communities

Mixed use residential, commercial and industrial communities based on smart grids, plug and play sites including local waste treatment and other low carbon energy production facilities

Retrofitting Communities

Upgrading of residential, commercial, industrial and municipal buildings to reduce energy consumption and other environmental impacts, and achieve spatial and visual benefits, including training and supply chains

Governance

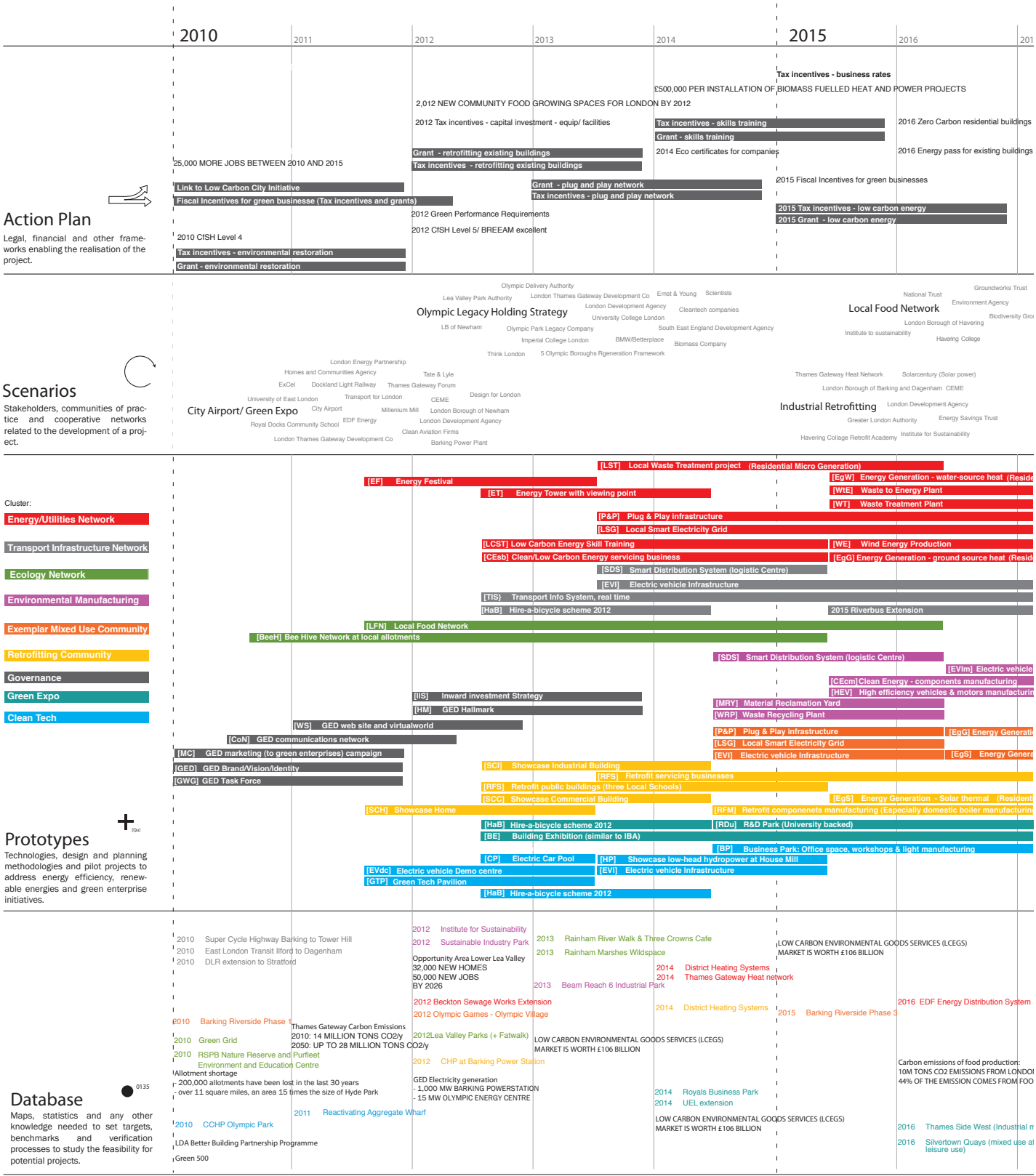
Recommendations regarding management, communication, marketing and branding of the Green Enterprise District.

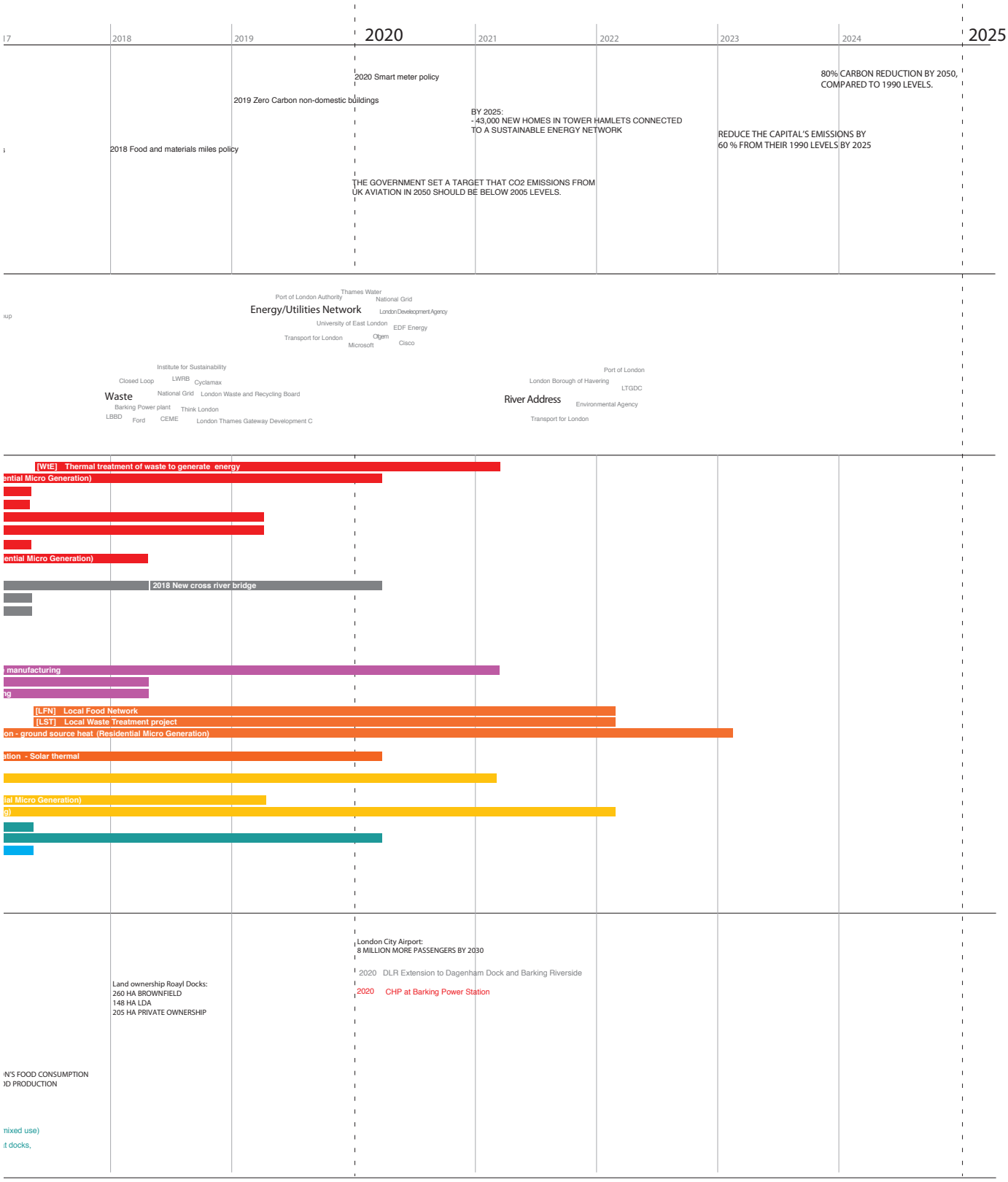
Green Expo

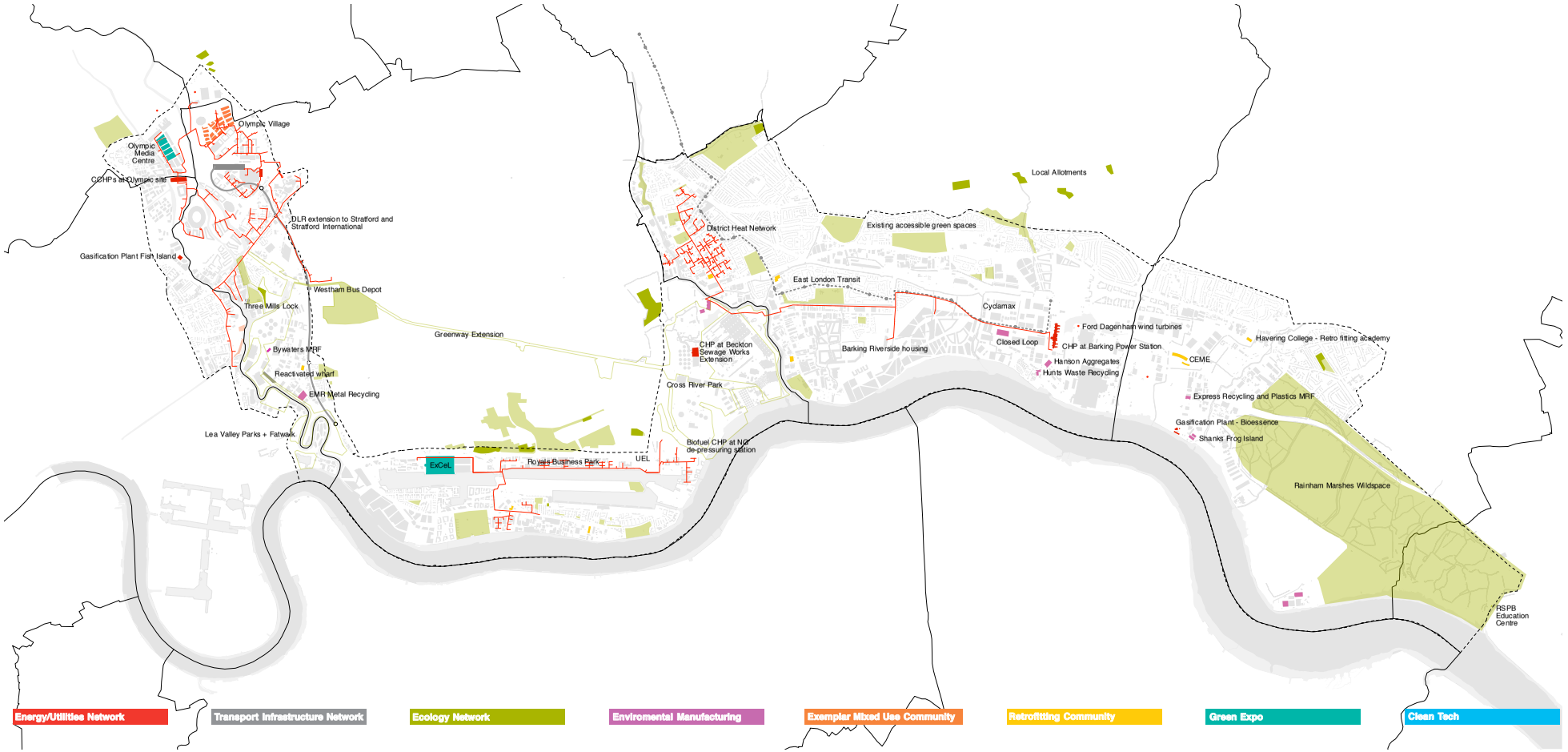
Short and long term exhibitions of low carbon technologies and buildings, including an International Building and Technology Exhibition

Clean Tech

High tech low carbon manufacturing and infrastructure


2010
2011
2012
2013
2014
2015
2016
Action Plan
Legal, financial and other frame-works enabling the realisation of the project.
Tax incentives - business rates
£500,000 PER INSTALLATION OF BIOMASS FUELLED HEAT AND POWER PROJECTS
2,012 NEW COMMUNITY FOOD GROWING SPACES FOR LONDON BY 2012
2012 Tax incentives - capital investment - equip/ facilities
Tax incentives - skills training
Grant - skills training
2016 Zero Carbon residential buildings
Grant - retrofitting existing buildings
2014 Eco certificates for companies
2016 Energy pass for existing buildings
25,000 MORE JOBS BETWEEN 2010 AND 2015
Tax incentives - retrofitting existing buildings
2015 Fiscal Incentives for green businesses
Link to Low Carbon City Initiative
Grant - plug and play network
Fiscal Incentives for green businesse (Tax incentives and grants)
Tax incentives - plug and play network
2012 Green Performance Requirements
2015 Tax incentives - low carbon energy
2015 Grant - low carbon energy
2012 CfSH Level 5/ BREEAM excellent
2010 CfSH Level 4
Tax incentives - environmental restoration
Grant - environmental restoration
Scenarios
Stakeholders, communities of prac-tice and cooperative networks related to the development of a proj-ect.
Olympic Legacy Holding Strategy
Olympic Delivery Authority
London Thames Gateway Development Co
Ernst & Young
Scientists
Lea Valley Park Authority
London Development Agency
Cleantech companies
University College London
LB of Newham
Olympic Park Legacy Company
South East England Development Agency
Imperial College London
BMW/Betterplace
Biomass Company
Think London
5 Olympic Boroughs Rgeneration Framework
Local Food Network
National Trust
Groundworks Trust
Environment Agency
London Borough of Havering
Institute to sustainability
Havering College
City Airport/ Green Expo
London Energy Partnership
Homes and Communities Agency
Tate & Lyle
ExCel
Dockland Light Railway
Thames Gateway Forum
University of East London
Transport for London
CEME
Design for London
City Airport
Millenium Mill
London Borough of Newham
Royal Docks Community School
EDF Energy
London Development Agency
Clean Aviation Firms
London Thames Gateway Development Co
Barking Power Plant
Industrial Retrofitting
Thames Gateway Heat Network
Solarcentury (Solar power)
London Borough of Barking and Dagenham
CEME
London Development Agency
Greater London Authority
Energy Savings Trust
Havering Collage Retrofit Academy
Institute for Sustainability
Prototypes
Technologies, design and planning methodologies and pilot projects to address energy efficiency, renew-able energies and green enterprise initiatives.
Cluster:
Energy/Utilities Network
Transport Infrastructure Network
Ecology Network
Environmental Manufacturing
Exemplar Mixed Use Community
Retrofitting Community
Governance
Green Expo
Clean Tech
[LST] Local Waste Treatment project (Residential Micro Generation)
[EF] Energy Festival
[EgW] Energy Generation - water-source heat (Reside
[ET] Energy Tower with viewing point
[WtE] Waste to Energy Plant
[WT] Waste Treatment Plant
[P&P] Plug & Play infrastructure
[LSG] Local Smart Electricity Grid
[LCST] Low Carbon Energy Skill Training
[WE] Wind Energy Production
[CEsb] Clean/Low Carbon Energy servicing business
[EgG] Energy Generation - ground source heat (Reside
[SDS] Smart Distribution System (logistic Centre)
[EVI] Electric vehicle Infrastructure
[TIS] Transport Info System, real time
[HaB] Hire-a-bicycle scheme 2012
2015 Riverbus Extension
[LFN] Local Food Network
[BeeH] Bee Hive Network at local allotments
[SDS] Smart Distribution System (logistic Centre)
[EVIm] Electric vehicle
[CEcm] Clean Energy - components manufacturing
[HEV] High efficiency vehicles & motors manufacturin
[IIS] Inward investment Strategy
[HM] GED Hallmark
[MRY] Material Reclamation Yard
[WRP] Waste Recycling Plant
[WS] GED web site and virtualworld
[CoN] GED communications network
[P&P] Plug & Play infrastructure
[EgG] Energy Generati
[LSG] Local Smart Electricity Grid
[MC] GED marketing (to green enterprises) campaign
[EVI] Electric vehicle Infrastructure
[EgS] Energy Genera
[GED] GED Brand/Vision/Identity
[SCI] Showcase Industrial Building
[GWG] GED Task Force
[RFS] Retrofit servicing businesses
[RFS] Retrofit public buildings (three Local Schools)
[SCC] Showcase Commercial Building
[EgS] Energy Generation - Solar thermal (Resident
[SCH] Showcase Home
[RFM] Retrofit componenets manufacturing (Especially domestic boiler manufacturing
[HaB] Hire-a-bicycle scheme 2012
[RDu] R&D Park (University backed)
[BE] Building Exhibition (similar to IBA)
[BP] Business Park: Office space, workshops & light manufacturing
[CP] Electric Car Pool
[HP] Showcase low-head hydropower at House Mill
[EVdc] Electric vehicle Demo centre
[EVI] Electric vehicle Infrastructure
[GTP] Green Tech Pavilion
[HaB] Hire-a-bicycle scheme 2012
Database
Maps, statistics and any other knowledge needed to set targets, benchmarks and verification processes to study the feasibility for potential projects.
2010 Super Cycle Highway Barking to Tower Hill
2010 East London Transit Ilford to Dagenham
2010 DLR extension to Stratford
2012 Institute for Sustainability
2012 Sustainable Industry Park
2013 Rainham River Walk & Three Crowns Cafe
2013 Rainham Marshes Wildspace
LOW CARBON ENVIRONMENTAL GOODS SERVICES (LCEGS)
MARKET IS WORTH £106 BILLION
Opportunity Area Lower Lea Valley
32,000 NEW HOMES
50,000 NEW JOBS
BY 2026
2014 District Heating Systems
2014 Thames Gateway Heat network
2013 Beam Reach 6 Industrial Park
2012 Beckton Sewage Works Extension
2016 EDF Energy Distribution System
2014 District Heating Systems
2012 Olympic Games - Olympic Village
2015 Barking Riverside Phase 3
2010 Barking Riverside Phase 1
Thames Gateway Carbon Emissions
2010: 14 MILLION TONS CO2/y
2050: UP TO 28 MILLION TONS CO2/y
2012Lea Valley Parks (+ Fatwalk)
LOW CARBON ENVIRONMENTAL GOODS SERVICES (LCEGS)
MARKET IS WORTH £106 BILLION
2010 Green Grid
2010 RSPB Nature Reserve and Purfleet
Environment and Education Centre
2012 CHP at Barking Power Station
Allotment shortage
- 200,000 allotments have been lost in the last 30 years
- over 11 square miles, an area 15 times the size of Hyde Park
GED Electricity generation
- 1,000 MW BARKING POWERSTATION
- 15 MW OLYMPIC ENERGY CENTRE
Carbon emissions of food production:
10M TONS CO2 EMISSIONS FROM LONDOI
44% OF THE EMISSION COMES FROM FOO
2014 Royals Business Park
2014 UEL extension
2011 Reactivating Aggregate Wharf
LOW CARBON ENVIRONMENTAL GOODS SERVICES (LCEGS)
MARKET IS WORTH £106 BILLION
2010 CCHP Olympic Park
2016 Thames Side West (Industrial m
2016 Silvertown Quays (mixed use al
leisure use)
LDA Better Building Partnership Programme
Green 500


17
2018
2019
2020
2021
2022
2023
2024
2025
2020 Smart meter policy
2019 Zero Carbon non-domestic buildings
BY 2025:
- 43,000 NEW HOMES IN TOWER HAMLETS CONNECTED
TO A SUSTAINABLE ENERGY NETWORK
80% CARBON REDUCTION BY 2050,
COMPARED TO 1990 LEVELS.
REDUCE THE CAPITAL'S EMISSIONS BY
60 % FROM THEIR 1990 LEVELS BY 2025
2018 Food and materials miles policy
THE GOVERNMENT SET A TARGET THAT CO2 EMISSIONS FROM
UK AVIATION IN 2050 SHOULD BE BELOW 2005 LEVELS.
Thames Water
Port of London Authority
National Grid
Energy/Utilities Network
London Development Agency
University of East London
EDF Energy
Transport for London
Ofgem
Microsoft
Cisco
Institute for Sustainability
Closed Loop
LWRB
Cyclamax
Waste
National Grid
London Waste and Recycling Board
Barking Power plant
Think London
LBBD
Ford
CEME
London Thames Gateway Development C
Port of London
London Borough of Havering
LTGDC
River Address
Environmental Agency
Transport for London
[WIE] Thermal treatment of waste to generate energy
ential Micro Generation)
ential Micro Generation)
2018 New cross river bridge
manufacturing
[LFN] Local Food Network
[LST] Local Waste Treatment project
on - ground source heat (Residential Micro Generation)
ation - Solar thermal
ial Micro Generation)
London City Airport:
8 MILLION MORE PASSENGERS BY 2030
2020 DLR Extension to Dagenham Dock and Barking Riverside
2020 CHP at Barking Power Station
Land ownership Roayl Docks:
260 HA BROWNFIELD
148 HA LDA
205 HA PRIVATE OWNERSHIP
N'S FOOD CONSUMPTION
D PRODUCTION
nixed use)
t docks,



Investment attracted
£20m by private sector

Carbon emissions
20% reduction in CO2 (1990 levels)

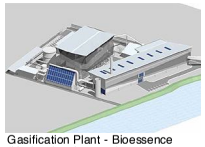
Waste treated
Current % of waste away from landfill

New homes
Estimated 6000 new homes

Job creation
Capturing London's growth in LCEGS sectors

Current and emerging projects within the East London GED, by identified project groups of the dynamic masterplan

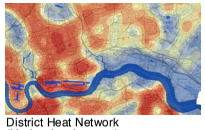
Energy/Utilities Network


Gasification Plant - Bioessence
(Under development)

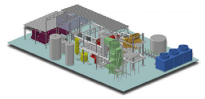

CCHPs at Olympic site
(Under construction)


Ford Dagenham Plant
Wind turbines on site (Existing)


CHP at Beckton Sewage Works
Extension (Under development)


District Heat Network
(Under development)


CHP at Barking Power Station
(Under development)


Gasification Plant Fish Island
(Under development)


Biofuel CHP at NG de-pressuring
station (Under development)

XXX

Transport Infrastructure Network


DLR extension to Stratford and
Stratford International (Under
construction)


East London Transit
(Under development)


Reactivated wharf at South
Crescent

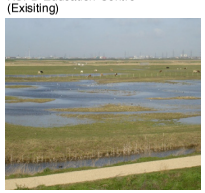

Three Mills Lock
(Under construction)


Westham Bus Depot with green
roof and turbine (Existing)

Ecology Network


Local Allotments
(Existing)

RSPB Education Centre
(Exisiting)


Rainham Marshes Wildspace
(Under development)


Accessible green spaces (Existing)


Lea Valley Parks + Fatwalk
(Under development)


Greenway Extension
(Under development)


Cross River Park
(Under development)

Food Networks such as Growing
Communities or Capital Growth
(Existing)

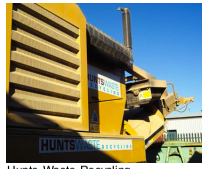
Enviromental Manufacturing


Closed Loop
(Existing)


Shanks Frog Island
(Exisitng)


EMR Metal Recycling
(Exisitng)


Bywaters MRF
(Exisitng)


Hunts Waste Recycling
(Exisitng)


Hanson Aggregates
(Exisitng)

Express Recycling and Plastics MRF
(Exisitng)

CYCLAMAX
maximising waste resource
Cyclamax
(Proposed)

Exemplar Mixed Use Community


Olympic Village
(Under construction)


Barking Riverside housing
(Under development)

Retrofitting Community

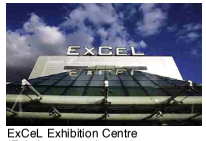

Centre for Engineering and
Manufacturing Excellence -
CEME (Existing)


Havering College - Retro fitting
academy (Existing)


Insulation and boiler
manufacturing or servicing
(Exisitng)


Institute for Sustainability
(Existing)

Green Expo



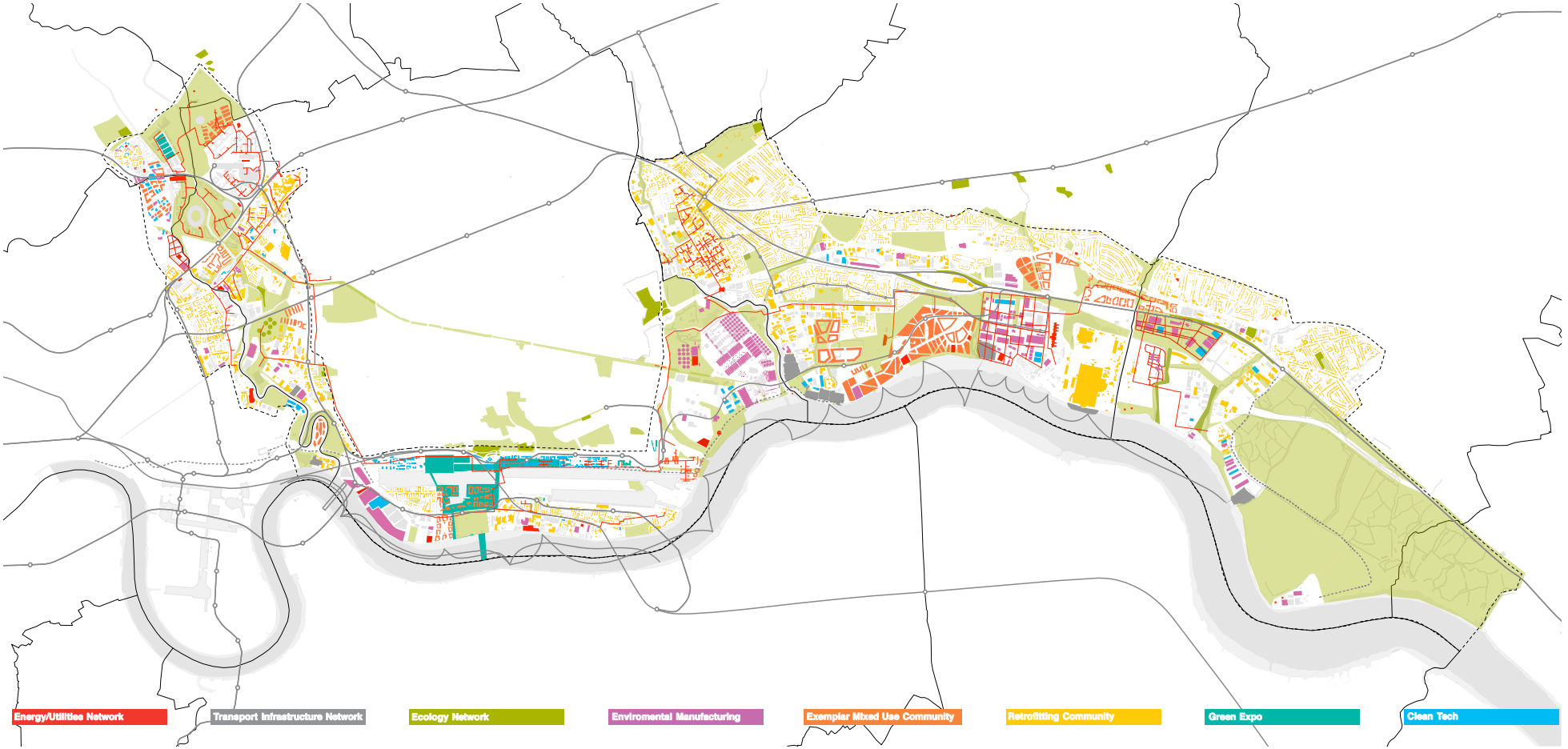
ExCeL Exhibition Centre
(Existing, extension under
construction)


Olympic Media Centre
(Under construction)


University of East London
(Existing)

Clean Tech


Royals Business Park
(Under development)



Investment attracted
£50m by private sector

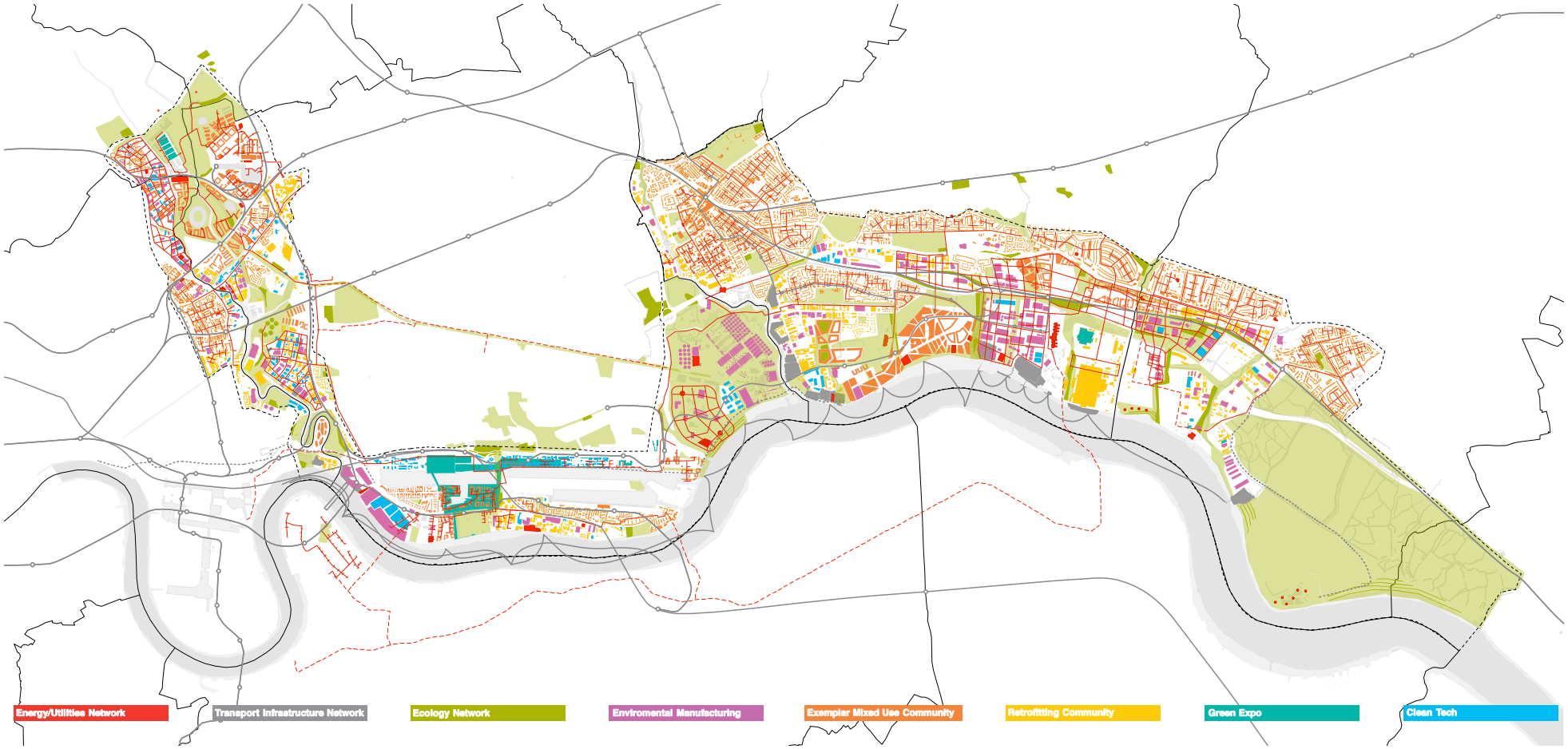
Carbon emissions
60% reduction in CO2 (1990 levels)

Waste treated
100% of waste away from landfill

New homes
Estimated 15000 new homes

Job creation
Capturing London's growth in LCEGS sectors

East London GED concept map for intermediate term, colour coded by the identified project groups of the dynamic masterplan



Investment attracted
£100m by private sector

Carbon emissions
80% reduction in CO2 (1990 levels)

Waste treated
100% of waste away from landfill

New homes
Estimated 27000 new homes

Job creation
Capturing London's growth in LCEGS sectors

East London GED concept map for long term, colour coded by the identified project groups of the dynamic masterplan

G PILOT PROJECTS

The pilot projects should be understood in the context of the broader, area-wide initiatives and projects that are being pursued in area.

These prioritised projects have been selected because they either represent a current lack of focus on these areas or build on other emerging initiatives that we consider in need of further support.

Locations of Pilot projects

1 ENERGY INFRASTRUCTURE PROJECT

1 Introduction

This report presents a study of the opportunities for achieving significant reductions in emissions of carbon dioxide in the District area by delivering a low-carbon infrastructure. The aims and means correspond closely to those set out in the recent State of the Nation report from the Institution of Civil Engineers "Low Carbon Infrastructure (ICE, December 2009). They include both the further development of existing initiatives and proposals for new initiatives.

A reduction of around 80% in the emissions of carbon dioxide in the District area could be achieved by 2050 through a combination of means:

- Implementing national, regional and local government policies;
- Changes to the fuel mix used to generate electrical power;
- Provision of a local energy infrastructure.

This will be undertaken at three levels or scales:

- District wide / beyond site boundaries – efficient energy distribution
- Large sites – efficient energy generation
- Building scale – individual properties or small groups of buildings

The following particular initiatives proposed for the District would contribute to realising this considerable reduction in carbon missions:

- Upgrade of the electrical network to smart-grid-technology and deployment of smart meters;
- Build-out of the London Thames Gateway Heat Network (LTGHN) and connection of new low-carbon sources of energy generation
- Plug-and-play sites for energy generation plant;
- Installation of large-scale low-carbon energy generation systems including large-scale wind power, biomass-fuelled CHP, energy-from-waste schemes and solar farms;
- Upgrade and retrofit of existing residential and commercial buildings to reduce energy use by 30-60%.

A reduction of around 80% in the emissions of carbon dioxide in the District area could be achieved by 2050 through a combination of means

The following next steps are proposed to help realise these aims:

- planning policy which incentivises investment in the District area;
- connection of public buildings to the LTGHN;
- development of detailed scenarios for an 80% reduction in carbon emissions in the study area through a combination of the above measures.
- measures to reduce fuel poverty through improved thermal efficiency and supply of waste heat.

Fuel poverty will be eradicated by 2020

2 Project overview

2.1 Vision for the project

The background to the study has been a number of high-level objectives that are currently emerging from many discussions about how to continue to develop London's economy while reducing the impact of such development on climate change. Our vision assumes the following measures will be implemented:

- Reducing carbon emissions from the District area (including off-site energy generation) by 80% by 2050, with multiple decentralised, low-carbon energy-generation schemes operating within the area.
- The area is fed with waste heat via a large-scale district heating network, tapping into multiple low-carbon heat sources.
- All housing in the area will be upgraded to achieve high levels of energy efficiency using efficient appliances and lighting, and low- or zero-carbon energy systems.
- Social housing will be upgraded to meet a "Passivehaus retro fit" standard, reducing the demand for space heating to 25 kWh/yr.
- Fuel poverty will be eradicated by 2020.
- Renewable- and low-carbon energy generators benefit from location in "plug-and-play" sites where electrical and waste heat export connections are available at low cost.
- High-efficiency energy-from-waste generation will operate using best-practice technologies and process local residual waste streams into useful energy.
- Local businesses and residents will benefit from a carbon information centre which provides advice, funding packages, and project management for building upgrades and the installation of low and zero carbon energy systems. The centre will also provide lifestyle advice on behavioural issues that can reduce individuals' and businesses' impact on the environment.
- All new buildings constructed after 2020 will be "zero carbon".
- Delivering a low-carbon energy infrastructure fits within bigger 'Low Carbon Infrastructure' vision set out by the Institution of Civil Engineers in the 'State of the Nation' report (December 2009).

2.2 The project proposal

The project will address the need for the generation and use of low-carbon and / or renewable energy across the District area. It will aim to assess the opportunities for energy that can be feasibly generated within the District area and propose the implementation of various systems of renewable energy generation including biomass, waste, solar and wind.
It will consider the development of London Thames Gateway Heat Network and opportunities for providing grid connecting to 'plug and play' sites. Smart grid technologies will also be considered.
The strategy will take into account the existing policy from London Boroughs, the GLA, UK government and OFGEM, and consider the commercial landscape at the current time.

The future opportunities for implementing the strategy will be at three scales of development:

- Energy distribution infrastructure, including electricity, waste, gas and heat;
- Large sites, suitable for large-scale energy projects such as energy from waste and utility scale wind generation;
- Building-scale projects, where intervention may be through green leases, development agreement,upgrade of existing buildings, incentive schemes or through the provision of information.

The outline energy strategy will identify opportunities within the District area at these three scales and propose delivery steps likely to be required to realise these proposals.

The outline energy strategy will identify opportunities within the District area at these three scales and propose delivery steps likely to be required to realise these proposals.

2.3 Contribution to reducing consumption of energy and emissions of carbon dioxide

The generation and use of energy represent one of the main sources of carbon dioxide that contributes to climate change. The reduction of this impact can be achieved in three ways:

- Reducing the demand for energy compared to normal benchmark performance
- Increasing the efficiency of generating and distributing energy
- Using energy sources that emit less carbon dioxide over the production cycle than fossil fuels, e.g. renewable energy sources, energy from waste or nuclear power

2.4 Employment generation through low-energy energy infrastructure projects

The delivery of the energy strategy will generate significant employment and related economic activity. The many different activities will generate different types of labour, for example:

- Building and construction workers, for new-build and upgrade of existing buildings;
- Designers (e.g. architects and engineers) for low-carbon energy schemes;
- Research and development, including via links with higher education;
- Administrators for public programmes;
- Manufacture and installation of plant and equipment;
- Operators of energy facilities, such as energy from waste facilities;
- Maintenance contractors.

2.5 Demonstration of the brand / objectives of District

The Green Enterprise District must be seen to facilitate the achievement of government energy and carbon emissions policy. If the energy infrastructure were not developed, this would damage the District brand.

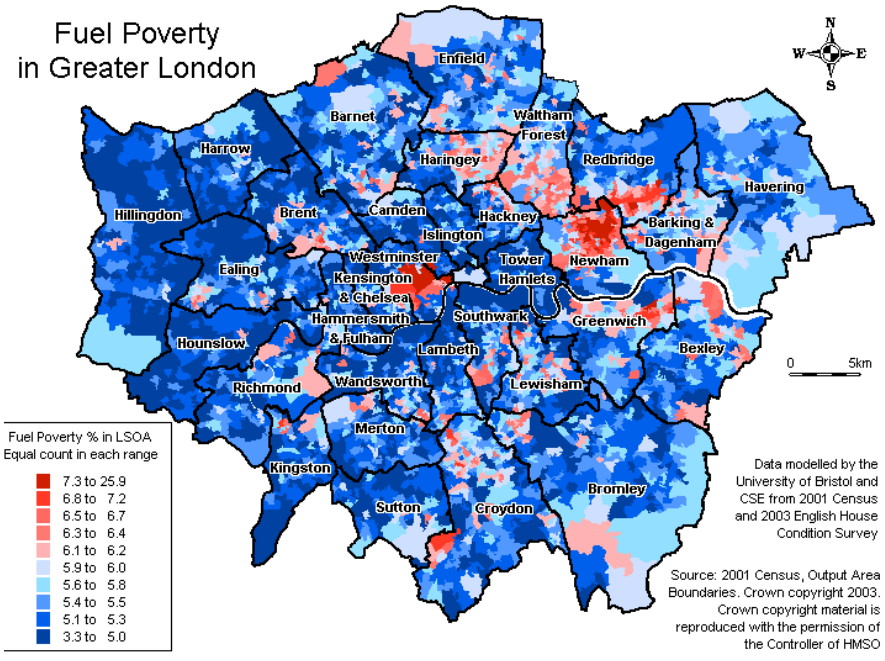
Well-publicised and highly-visible energy projects, such as the London Thames Gateway Heat Network, utility-scale wind turbines on industrial sites and new "high-tech" energy-from-waste schemes, will raise awareness of the District activities and enhance the brand.

Successful visitor centres and well-publicised information and incentive schemes will also help deliver the objectives of the District. Green energy themed attractions such as viewing galleries in wind turbines and educational centres, possibly using the Centre for Alternative Technologies (at Machynlleth in Wales) as an inspiration and influence, could help reinforce this.

Links to academic institutions, at research and development scale through higher education establishments, to training through further education establishments, or at primary and secondary school level fostering curriculum based activities could also enhance the District brand.

Reducing fuel poverty through the improvement of dwelling thermal efficiency and by supply of low-cost waste heat via district heating, can provide direct benefits to local residents in an area with high levels of depravation.

The Green Enterprise District must be seen to facilitate the achievement of government energy and carbon emissions policy. If the energy infrastructure were not developed, this would damage the District brand.



Fuel poverty in Greater London diagram

3 Opportunities

Within the District there are many opportunities for interventions which deliver carbon reductions on a number of scales. The scale of a given intervention affects the requirements and dependencies, and also influences how they might be delivered. These scales are described here.

Intervention	Scale	Description	Treatment in ELGED study
Efficient energy generation	Large-scale (500kW – 200,000 kW)	Larger projects using utility scale energy generation systems such as energy from waste, combined heat and power with district heating, large wind turbines, solar 'farms'.	Constraints and opportunities examined Scale of generation potential estimated
Efficient energy distribution	Large-scale – area wide	Improvement of the utility networks, and particularly electricity, to provide 'smart grid' adapted systems	Improvements to the utilities distribution infrastructure are being progressed by various different actors within each utility sector. A summary of improvements is given.
Building scale: Commercial / public buildings	50kW-5,000 kW	Opportunity for energy efficiency retrofit and building integrated low and zero carbon energy systems	Covered in retrofit building section (Project XX)
Building scale: Residential	5 kW – 50 kW (per dwelling unit)	Opportunity for energy efficiency retrofit and building integrated low and zero carbon energy systems. Most cost effective benefits via building fabric and system efficiency improvements. Further progress towards 80% carbon reduction via use of lower intensity grid electricity and low/zero carbon generation systems on/within buildings. These approaches could directly reduce fuel poverty whilst maintaining or improving comfort levels, by cutting fuel bills.	Constraints and opportunities examined Potential assessed and delivery mechanisms reviewed

Opportunities for intervention

Project	Location	Description	Opportunity
London Thames Gateway Heat Network	Barking and Royal Docks areas, expanding to entire study area	Large-scale, low-carbon, heat network. Supplying otherwise wasted heat from Barking Power station and other sources 150,000 homes capacity	Provides a heat market – connection opportunities to export waste heat Supply – buildings/development can tap into low-carbon heat / renewable heat
Cyclamax Energy from waste plant	Sustainable Industries Park	Large-scale advanced waste to energy plant. 15MW electrical output, treating 100,000 tonnes of waste	Could provide low-carbon power, and heat via the LTGHN. Links to waste processing industries
Large-scale wind turbines	Sustainable Industries Park Olympic Park Ford, Dagenham	Large-scale wind turbines built (or planned) near to the river in industrial area. Turbine proposed for the Olympic Park	Source of renewable electricity Iconic structures
Olympic Park Energy Networks	Olympic Park	Low-carbon heat and cooling networks fuelled by CHP and biomass	Supply – buildings/development can tap into low-carbon heat / renewable heat
Thames Water plant	Beckton	Low-carbon CHP plant planned for desalination facility. Uses biogas to power existing plant	Opportunity to supply low-carbon heat and power. Could be combined with food waste to produce more biogas
Frog Island EfW	Rainham	Advanced conversion energy from waste plant	Possible source of heat for LTGHN Low-carbon power exporter
NG Blue CHP	National Grid de-pressuring station	Biofuel CHP generating power and heat for National Grid site.	Source of low-carbon energy. Potential to use 'geo-pressure' of natural gas grid to drive turbine for gas expansion.
LDA Royal Docks CHP	Royal Docks / Albert Basin	Gas fired CHP and biomass with district heating	Medium scale CHP scheme with opportunities for expansion to serve nearby buildings / future link into the LTGHN

Baseline of proposed/under development interventions

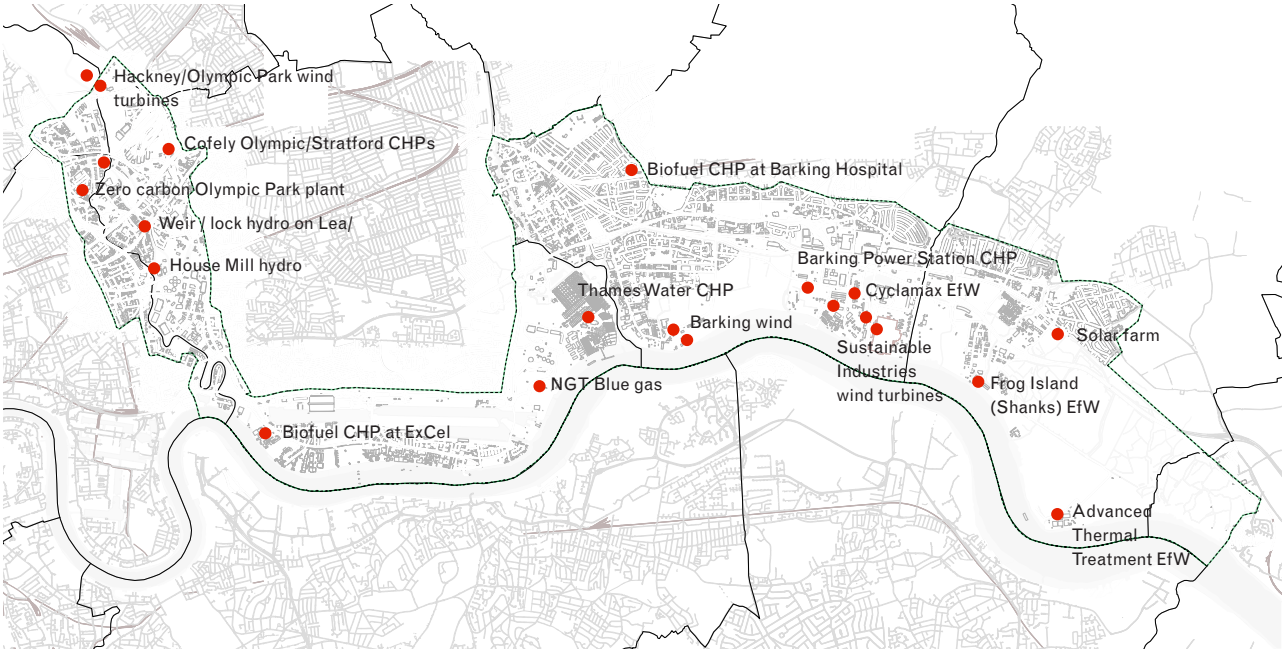
Project	Location	Description	Opportunity
Energy-from-waste facilities using advanced thermal treatment	Sustainable industries park Various sites with good logistics connections and access to grid connection	East London can play a key role in treating, reusing, recycling and finally recovering energy from London's waste streams.	New technologies for waste processing, such as mechanical biological treatment plants mean energy from waste sites can be smaller, and incorporate new energy generating systems. There are several small, UK based, energy from waste technology providers using advanced thermal treatment plants to convert residual waste into energy. Providing low cost sites, waste streams, and electrical connections could attract investors and plant operators to the ELGED area.
Large-scale wind	Northern section of Olympic Park Industrial sites along riverside in Barking and Dagenham Sustainable Industries Park	Utility scale wind turbines of 500kW-3,000 kW can be accommodated given the necessary spatial requirements and offsets from homes.	Large-scale wind power represents the most cost effective form of renewable electricity generation available. Despite being less windy that other parts of Britain the northern bank of the Thames, away from London City Airport and Rainham Marshes bird habitats provide good sites, and can benefit from direct supply to large energy users. Precedents exist for 2 turbines with potential for a further 4-8 along the river and in the vicinity of the Olympic Park.
Anaerobic digestion of waste	Existing sewage treatment plants (Beckton) Large food processors Municipal waste operator sites	Digestion of wet wastes to produce bio-gas to drive CHP plant provide low-carbon heating and power	Anaerobic digestion of waste can operate on waste volumes as low as 5,000 t/yr, though are more economic at scales of 30,000 t/yr or more. Co-ordination of waste strategies across the ELGED area together with provision of suitable sites could attract investment and plant operators. Combining sewage waste and food waste helps to maximise the output.
Use of waste cooking oil for small scale CHP	Distributed – requires user for low-carbon heat generated. Barking Hospital Excel CHP (replace gas)	Collection, processing and use of waste cooking oil as fuel for stationary engine (CHP) systems	Can provide a low-carbon source of fuel suitable for conversion into heat and power using high efficiency CHP engines. Benefits from economic incentives (ROCs or REFITs) Potential for local employment in collection and processing of waste product into a useful fuel. London based businesses supplying this fuel (e.g. Uptown Oil) already exist. Some examples of community operated schemes (Sundance Renewables, Wales) elsewhere.
Solar photovoltaic farm	Large area of low value land, with good grid connection Sustainable Industries Park connected to new primary substation.	Large-scale installation of solar photovoltaic arrays to generate power	Common in Germany. Will benefit from REFITs at a scale up to around 5 MWe enhancing economic viability 'Plug and play' site could reduce costs and improve viability.
Solar district heating collector field	Large area of low value land, adjacent to the London Thames Gateway Heat Network	Large-scale use of solar thermal heat to feed into district heating network	Could supply heat in summer, or pre-heat in winter, provided summer operating temperatures are reduced within the heat network. Large-scale deployment reduces cost.
Natural gas network pressure reducing turbine power generation	Gas pressure reduction station on high pressure network..	Generates power from depressurising of natural gas network to usable pressures	May opportunities in or around the ELGED study area Crucial to ensure energy comes from geo-pressure and not mechanical compressor.

Baseline of proposed/under development interventions

Small scale hydro at locks and weirs	House Mill historic tidal mill site at Three Mills Lock and weir sites along River Lea, Lea Navigation and other canalised rivers	Using the fall of water generated where rivers and canals change level, micro-hydro can be used to generate small but steady amounts of renewable energy, fed into the local distribution network	Forthcoming incentives for renewable electricity generation such as the 'Feed in Tariff' legislation will provide improved economic performance for such schemes
Biomass CHP plant adjacent to the River Thames	Site with wharfage for large vessels and power connection	Biomass CHP using imported and local woody material or energy crops to generate low-carbon heat and power, heat export via the LTGHN	Biomass CHP is afforded strong incentives under current market framework. At large scale (>10MWe) plant is well understood technology, and can provide base load for district heating system. Biomass CHP restricted by limited number of commercially proven systems. Large amounts of waste heat which should be captured and used to maximise emission reductions. Higher levels of Code for Sustainable Homes will require significantly decreasing emissions from heat networks.

Baseline of proposed/under development interventions

When such projects are brought forward for development consideration should be given to how they might directly benefit local communities. For example the provision of low-cost waste heat, or payment into a community fund which could be used to retrofit dwellings to high standards of energy efficiency should be considered as part of Section 106 or Community Infrastructure Levy agreements/charges.



Potential sites for energy generation systems within the District

3.3 Efficient energy distribution

Generally speaking the development and operation of energy distribution infrastructure is under taken by regulated monopolies, with the exception of district heating.

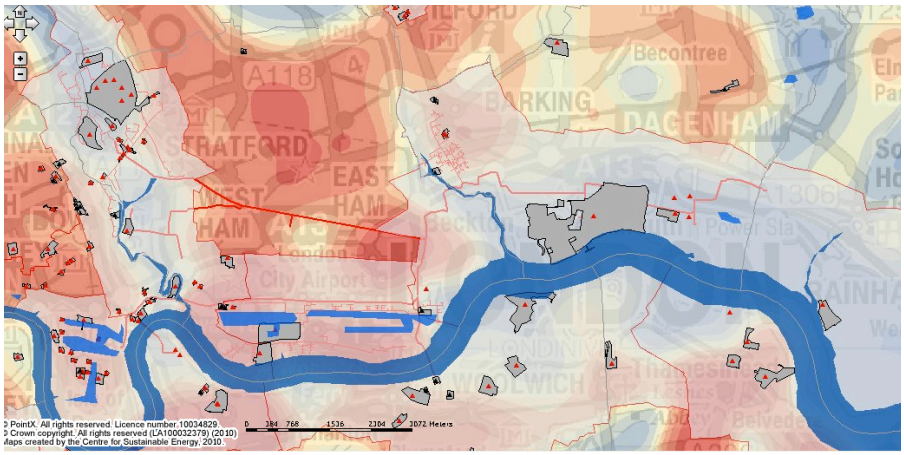
The regulated gas and electricity distribution industries have a number of stakeholders including: network owner operators; supply companies using the networks; energy consumers; regulator (OFGEM), and government.

Policy for the gas and electrical networks are developed nationally and therefore opportunities to influence this within the District area are likely to be limited.

However, within the District area, trials or local roll out of smart grid infrastructure may be possible.

Within the District area, trials or local roll out of smart grid infrastructure may be possible.

Project	Location	Description	Opportunity
Smart grid – active demand management	On selected campus site or trial area of mixed use Sustainable Industries Park with links to Barking Riverside regeneration scheme – this would form a large 'campus' type site where little or no existing utilities are in place. A shorter term, private sector led, scheme located in the Excel area could host a data centre and energy generation scheme (such as energy from waste)	Installation of active demand management system to manage peak loads and incorporate on-site generation	Demonstrate use of smart grid technology Kick start investment in upgrade of the local electrical network as a priority, providing local employment opportunities OFGEM require the local distribution network operator to invest in their networks to ensure secure and affordable energy supplies. A new duty on OFGEM requires them to consider carbon impacts of policy and therefore drive investment in smart grid systems from distribution operators Data centres are required to maintain the competitiveness of London's financial sector as increasing amounts of processing capacity and data storage are required by institutions involved in financial transactions. Locating this in the ELGED area, while providing low carbon energy supplies, could make a 'smart grid cluster' which is private sector led, and quick to deliver. Provision of a 'serviced site' should be considered by LDA. The smart grid projects should integrate smart metering, active demand management, integration of energy generation and small (low voltage/in building) and medium (11,000V) scale
Smart metering	All public buildings Residential dwellings	On display energy meters, with capability to dynamically alter and record electricity tariffs according to market forces.	Smart meters provide energy users with useful information around their use of electricity, enabling behaviour change. Whilst there is limited evidence of effect on user behaviour, future scenarios may include real time price variations for residential consumers, incentivising switch off at peak times. Government has set target of smart meter coverage for all electricity consumers by 2020.
London Thames Gateway Heat Network (LTGHN) later phases	Along length of ELGED study area	Large-scale heat distribution network, capturing waste heat and transmitting it to areas of high heat demand Later phases need heat load to justify business case for investment	The full build out of the LTGHN including extension to the western extent of the ELGED area may require substantial public funding. This investment could attract low-carbon energy plant operators to the ELGED area, reducing emissions. Continuing to build on the momentum



Screen shot from LDA London Heat Map showing areas of heat demand in and around the District

3.4 Building Scale: Commercial / public buildings

There are significant opportunities to upgrade the energy performance large commercial and public buildings as they are often under a single body's jurisdiction, many organisations have policies to reduce carbon emissions, and the CRC Energy Efficiency Scheme applies to many owners or occupiers of large buildings. The energy upgrading of buildings is being encouraged by the requirement (since 2009) that all buildings must have an Energy Performance Certificate (EPC) that must be updated every time its ownership or tenancy changes. Display Energy Certificates (DEC) that must be upgraded annually, are already required for public buildings and are likely soon to be required for commercial buildings.

Examples include council offices, hospitals, schools, commercial offices and large shops. These large users of energy can benefit from energy efficiency measures and often have the space and on-site energy demand to support larger low-carbon energy generation schemes such as CHP or biomass heating. With sufficient scale such schemes can act as key "anchor loads" for the London Thames Gateway Heat Network.

The 'Industrial Retrofit' project covers the potential for this approach in more detail.

3.5 Building Scale: Residential

Most existing dwellings with the District study area were constructed in the early to mid 20th century. Whilst central heating, cavity and loft insulation and new gas boilers have had some impact in general the majority of dwellings could be significantly improved.

The list of applicable measures is well understood, and opportunities include:

- Insulate all lofts and cavity walls to best practice levels
- Insulate hard to treat properties using solid wall insulation and double glazed windows/ secondary glazing
- Improve air tightness
- Replace energy inefficient white goods with 'A rated' appliances
- Replace old gas boilers with new condensing boilers or micro-CHP
- Fit zoned thermostatic controls to central heating systems including a timer and thermostatic radiator valves.

Many of these measures have short term positive paybacks which over a longer period will significantly exceed their capital cost. The barrier is not technology, though this will improve, but take up on a wide scale. The ELGED study brings the opportunity to develop an infrastructure to roll this out on a larger scale. In this section the focus is therefore on delivery.

The East London Green Enterprise District study brings the opportunity to develop an infrastructure to roll this out on a larger scale.

Table 3.5 Opportunities for building Scale interventions for residential buildings

Project	Location	Description	Opportunity
ENERGY EFFICIENCY			
Pay as you save	All residential properties	Innovative financing scheme for energy efficiency upgrades	The majority of buildings in the ELGED area are relatively old and therefore large emissions reductions can be made by retrofit
Energy saving centre / carbon information centre	Town centres – Barking Excel	Information centre providing tailored energy saving advice and service 'bundles' which are developed with the modern consumer in mind	Energy efficiency retrofit is rarely delivered as a packaged, easy to understand approach. Often informational barriers prevent uptake
Street by street retrofit	Residential streets where sufficient residents sign up	Buildings in a selected street are retrofitted by the same contractor in a single procurement	Retrofit at a street scale gives economies of scale, reducing costs and encouraging uptake.
LOW OR ZERO CARBON ENERGY SOURCES			
Micro renewables	All residential properties	Installation of solar PV, solar thermal, ground source heat pumps or biomass heating (for communal blocks)	Most buildings are able to accommodate some form of LZC once energy efficiency measures are exhausted

xxx

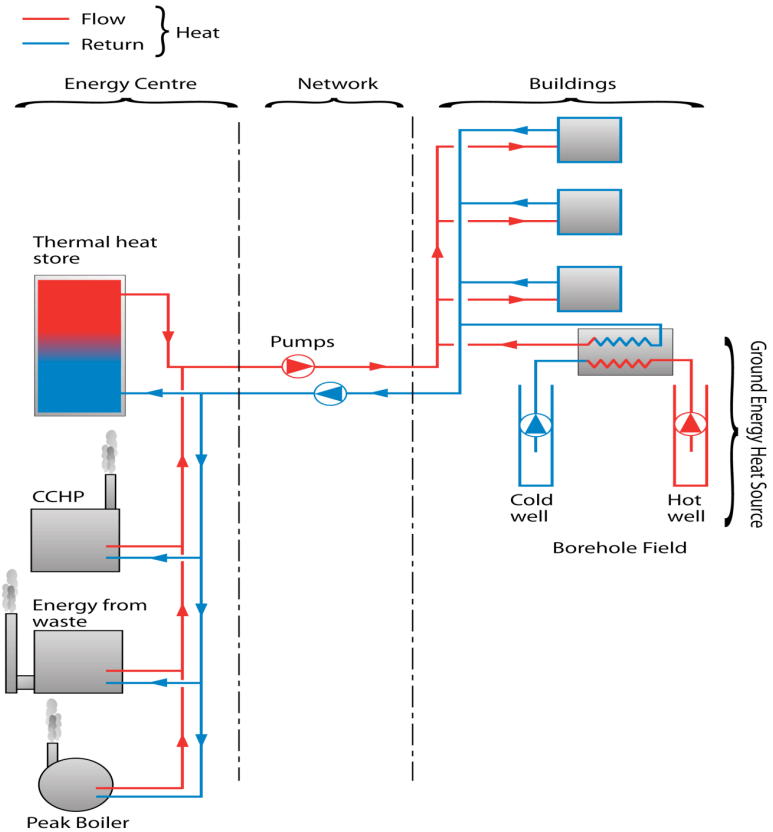
One approach to implementation could be to task a single organisation with delivery. There is precedent for this in the LDA decentralised energy team

4 Low-carbon energy infrastructure requirements and dependencies

The requirements of projects linked to the delivery of the energy infrastructure strategy will vary for different elements. One approach to implementation could be to task a single organisation with delivery. There is precedent for this in the LDA decentralised energy team which is pro-actively taking forward a low-carbon strategy and engaging with public and private bodies on a pan-London basis, concentrating on the provision of district heating making use of waste heat and/or the output of combined heat and power plant.

4.1 Efficient energy generation

The benefits of addressing energy generation across the whole District are that considerable efficiencies can be achieved through the integration of many separate systems, and the linking of many types of energy generation via a large distribution system. The most common example is a district heating scheme, as illustrated in the diagram below. The recruitments and dependencies of the various components of such as scheme are summarised in paragraphs 4.1.1 ff.



Schematic diagram of District heating system

4.1.1 Biomass CHP

Biomass CHP plant adjacent to the River Thames would be likely to require:

- Electrical connection to building or distribution network (latter requires power purchase agreement)
- Available land area
- Wharfage
- Logistics connections for alternative to water based fuel delivery
- Storage area for biomass fuel
- Heat demand for waste heat – connection to LTGHN
- Planning permission

4.1.2 Anaerobic digestion of waste

Anaerobic digestion of waste would be likely to require:

- Suitable waste stream (organic waste)
- Available land area
- Electrical connection to building or distribution network (latter requires power purchase agreement)
- Heat demand for waste heat (nearby buildings or LTGHN connection)
- Logistics facilities for delivery of waste
- Planning permission

4.1.3 Energy-from-waste

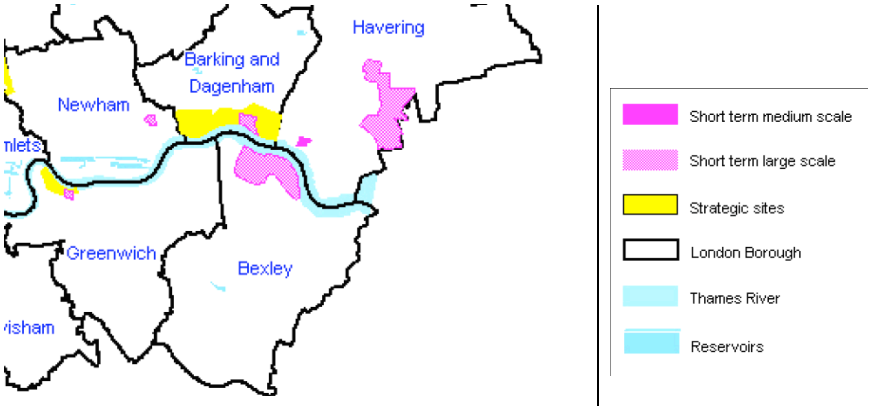
An energy-from-waste facility, for example, would be likely to require at least the following:

- suitable land and, potentially, its remediation
- engagement with the Local Authority in letting waste contracts or involvement of a commercial waste operator
- potential upgrade of transport infrastructure – the key requirement for a viable site is the logistics capability.
- a district heating network and corresponding wayleaves and permits – providing an opportunity for heat off-take gives energy from waste plant operators the opportunity to earn further subsidy under the Renewables Obligation for operating their plant as a CHP system
- potential upgrade to electrical infrastructure if electricity is exported
- obtaining planning permission for such plants can be challenging and time-consuming.

4.1.4 Large-scale wind turbine

A large-scale wind turbine would be likely to require:

- suitable land
- building load or electrical distribution network connection (11kV or above)
- commercial operator OR capital for investment and contract for operation and maintenance
- planning permission
- power purchase agreements which could be with 'on-site' customers, or with energy suppliers via the electrical network.



Extract from London Wind and Biomass study showing strategic sites for wind near or in the District

4.1.5 CHP powered by waste cooking oil

Use of waste cooking oil for small scale CHP would be likely to require:

- Available supply of waste vegetable oil (.e.g. from catering facilities) or other residue which can be converted into bio-fuel
- Available land area
- Electrical connection to building or distribution network (latter requires power purchase agreement)
- Heat demand for waste heat
- Logistics facilities for delivery of fuel and chemicals for fuel preparation
- Planning permission

4.1.6 Solar thermal district heating

Solar district heating collector field would be likely to require:

- Available land area
- Heat demand for waste heat such as nearby building, or connection to a district heating network
- Site with no over shading
- Planning permission

4.1.7 Photovoltaic farm

Solar photovoltaic farm would be likely to require:

- Available land area
- Electrical connection to building or distribution network (latter requires power purchase agreement)
- Site with no over-shading
- Planning permission

4.1.8 Ground-source heat pumps

The use of ground-source heat pumps is usually integrated into individual building development. Their use is likely to require:

- Suitable type of soil
- Area for ground energy heat exchanger (can be vertical boreholes or 'energy piles' or horizontal)
- Combination of heating and cooling demand
- Uprating of electrical connection from distribution network to building vs. gas heated building

4.1.9 Pressure reducing turbines in gas network

Natural gas network pressure reducing turbine power generation would be likely to require:

- High pressure gas pipeline pressure reduction station
- Electrical connection to building or distribution network (latter requires power purchase agreement)
- Planning permission

4.1.10 Small-scale hydro-power

There are likely to be some sites where small scale hydro is technically feasible, though these will be limited. However, they can be useful as demonstration projects, or where power can be used directly in nearby buildings. Small scale hydro at locks and weirs would be likely to require:

- Electrical connection to building or distribution network (latter requires power purchase agreement)
- Civil works to channel water to and from turbine
- Turbine installation works and control system linked to flood defence management
- Permission from Environment Agency (EA) and possibly British Waterways (BW)
- Could be done under permitted development by EA or BW

4.2 Efficient energy distribution

The upgrade of major utilities such as reinforcement of electricity networks and moves to implement 'smart grid' technology widely is likely to require:

- possibility of hosting a trial sponsored by the electricity industry, government (DECC) and the regulator (OFGEM). In 2009 OFGEM announced that network operators would be allowed to invest £6.5 billion over 2010-2015, with a new £500 million Low Carbon Networks Fund for large-scale trials of advanced technology and commercial initiatives;
- the co-operation of private companies, such as the DNO, EDF;
- lobbying of EDF and bodies such as OFGEM;
- the commitment of funding via increased distribution charges or public investment;
- technology providers (large controls manufacturers, switchgear suppliers, systems integration and software providers) should be involved to trial / roll out new technology.

Opportunities may include using the District as a trial area for specific 'smart grid' technologies. Specific opportunities identified include a combined Barking Riverside and Sustainable Industries Park smart grid, and a data centre cluster in the Docklands/Excel area, which includes low carbon energy generation.

Sites in Docklands near protected wharfs could be attractive for data centres due to their proximity to Canary Wharf, potentially lower land value away from the 'towpath premium' on the river bank, and the opportunity to use low carbon heat, converted into cooling via absorption chillers, to reduce their carbon impact. Using the wharfs to offload low carbon fuel for on-site generation could further enhance this opportunity, and help to provide secure power supplies – a potential constraint in this area. This could be a private sector led initiative, though provision of a serviced site could improve the viability.

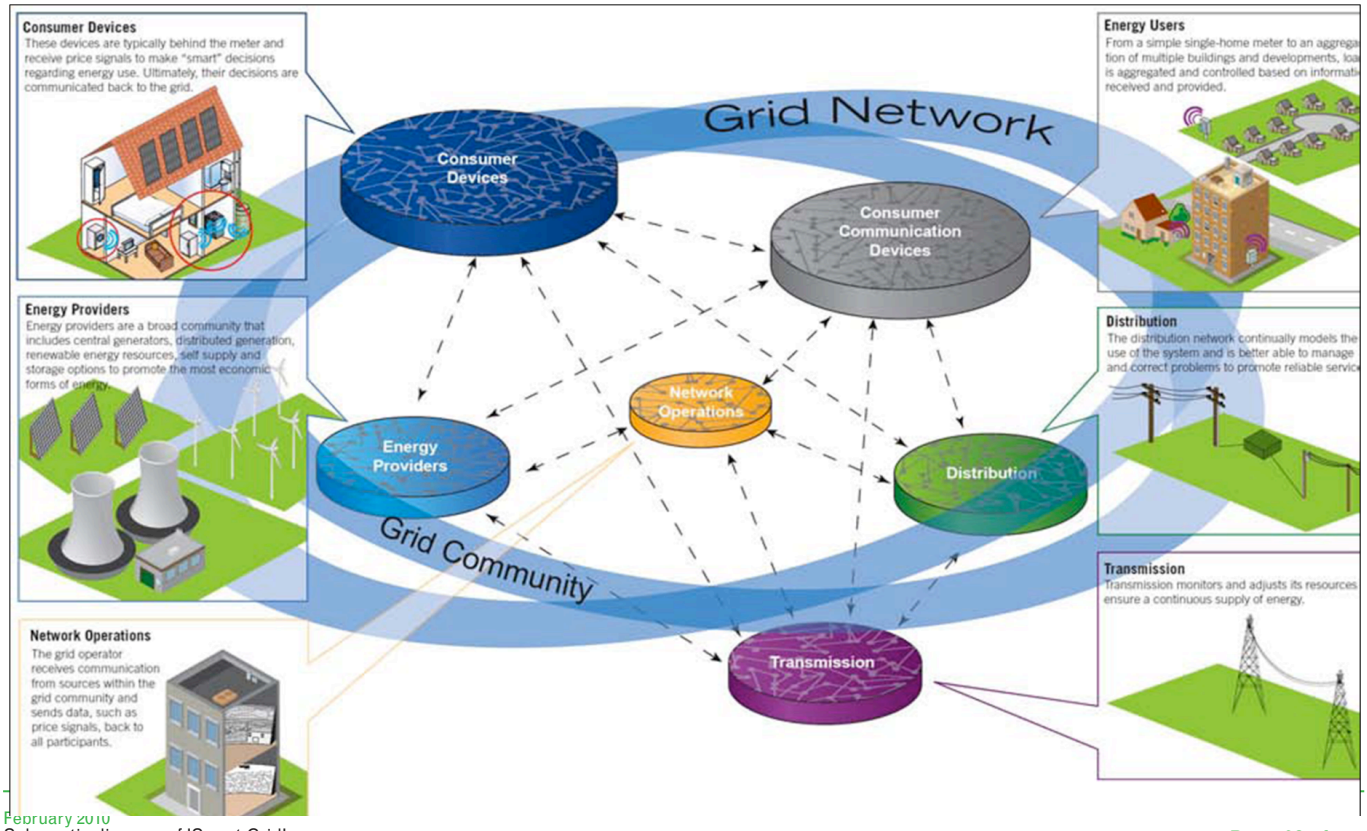
The Barking Riverside and Sustainable Industries Park are well suited to a trial of smart grid systems as they represent a 'campus' type area with limited 'legacy' utility networks in the area. However, deployment of smart grid technologies over such large sites is likely to require multi-stakeholder support (see above).

4.2.1 Plug-and-play" sites

"Plug-and-play" demonstration sites, with planning permission derestricted, and dedicated electrical connection, for demonstrating low-carbon energy technologies

- Electrical connection to building or distribution network (latter requires power purchase agreement)
- Available land area
  Planning permission (possibly outline permission to cover a generic technology type e.g. solar photovoltaic panels, dual axis solar photovoltaic tracking panels)

Opportunities may include using the District as a trial area for specific 'smart grid' technologies.



Schematic diagram of 'Smart Grid'

4.3 Building Scale

4.3.1 Commercial / Public Buildings

See retro fit project report and the GLA's Building Energy Efficiency Programme.

4.3.2 Residential

At the level of new building developments, renewable or low-carbon energy projects can be brought forward in the following ways:

- through development agreements linked to planning permission
- land sale terms
- through establishing minimum performance standards higher than otherwise required across the District meeting which would be a requirement of development, fitting out and leasing.

Intervention in existing buildings can be effected through:

- the provision of information
- offer of incentives through a funded advisory centre, or local fiscal incentives e.g. a small scale version of a boiler scrappage scheme,
- wider trials of Department of Energy and Climate Change 'Pay as you Save' scheme.
- Larger scale procurement initiatives such as street by street retrofit or, the GLA's Home Energy Efficiency Programme (HEEP) or the Carbon Emissions Reduction Target (CERT).

Low or zero carbon infrastructure plant	Carbon saving per unit installed	Assumptions on 'unit' size
	(tonnes CO2/yr)	
Biomass CHP plant adjacent to the River Thames	60,000	10,000 kWe biomass steam cycle CHP
Anaerobic digestion of waste	4,500	12,000 t/yr plant
Energy-from-waste facilities using advanced thermal treatment	700	300 kWe unit running on wood waste
Large-scale wind	2000	2,000 kWe unit
Use of waste cooking oil for small scale CHP	800	250 kWe CHP
Solar district heating collector field	700	5,000m2 solar thermal collectors
Solar photovoltaic farm	450	1,000 kWe solar panels
Small scale hydro at locks and weirs	250	100 kWe turbine

Typical carbon savings for energy generation technologies

5 Impact on reducing emissions of carbon dioxide

5.1 Baseline

Currently available estimates for the entire Thames Gateway indicate a baseline of around 13.8 million tCO2/yr, doubling with the proposed level of development and demand growth to 2050. Of this buildings account for 12.5 millions tCO2/yr. Domestic properties account for 5 million tCO2/yr, industry 6 million tCO2/yr and the remainder is from commercial/public buildings. (see: Feasibility Study to Examine Making London Thames Gateway a Low Carbon/Carbon Neutral Development Area, DCLG, 2008) http://www.communities.gov.uk/documents/thamesgateway/pdf/1074136.pdf

In order to estimate carbon emission reductions and energy savings in the GED a base line number is required for comparison. This work would produce:

- Energy in use estimation for current area
- Carbon emission baseline for current area

Information on current data for the area (census and business rates) would be required to produce these estimates. These figures for the London Thames Gateway area were not made available to the study team.

5.2 Potential emissions savings

This section estimates the potential savings from the proposals listed in the previous section, and presents a scenario for potential emissions reduction from the energy infrastructure.

5.2.1 Efficient energy generation

The potential for carbon savings from various low-carbon infrastructures is listed below. The next stage of work would be to assess sites for such schemes, deriving a total opportunity for the ELGED study area.

5.2.2 Efficient energy distribution

Carbon emissions from efficient distribution are likely to be delivered, in the main, by the LTGHN. Connection to the proposed heat network would reduce carbon emissions from heating (versus gas boiler use) by around 50%.

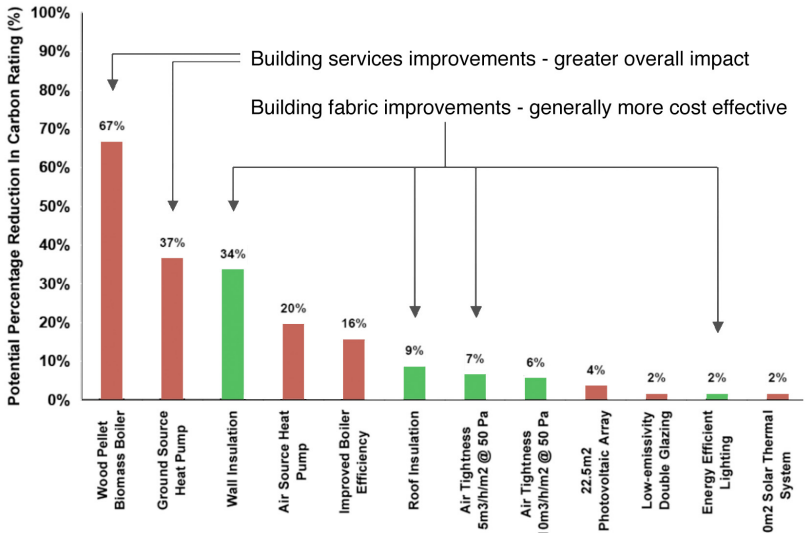
The LDA estimate carbon reductions of around 100,000 tonnes per year from the LTGHN. This would increase if more buildings were connected, interlinking new low-carbon plant with new and existing buildings.

5.2.3 Building Scale: Commercial / Public Buildings

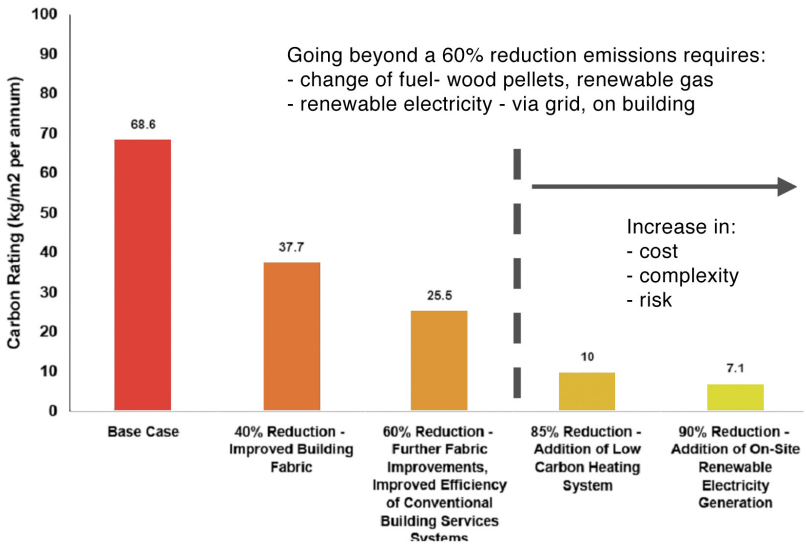
See retro fit project report

5.2.4 Building Scale: Residential

UKGBC estimate that emissions reductions of 30-60% are possible in existing residential buildings based on a 'Pay as You Save' approach. This level of savings would need to be rolled out across all dwellings in the ELGED study area in order to meet the 80% carbon dioxide emissions reduction target.

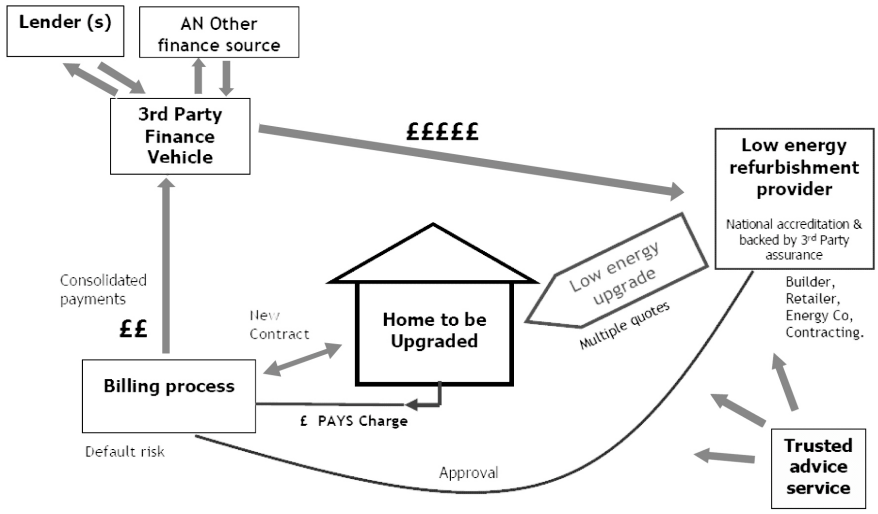


Case study - decarbonising pre-1920's housing (405 of stock). Potential impacts of changes to building fabric and services



Case study - decarbonising pre-1920's housing (405 of stock). Potential impacts of changes to building fabric and services

The UK government has recently launched a scheme for encouraging home owners and occupiers to upgrade their properties. This is described in Pay As You Save: Financing low energy refurbishment in housing, published by the UK Green building council.



Pay As You Save mechanism

Pay as you Save
A low energy refurbishment provider uses finance, from a third party, to cover the upfront costs of the low energy work. An obligation to repay is linked to the property over an extended period of time and the repayments are calculated to be less than the savings that will be made on the fuel bills. Crucially, at change of tenure the benefit of the measures and the obligation to pay is transferred to the new householder. The PAYS Charge is collected by the local authority. The upfront costs are moderately subsidised and/or carbon reductions purchased and incentives are provided to encourage mass take up. The work is undertaken by an accredited company with rigorous enforcement of standards and the mechanism as a whole is promoted by trusted 3rd parties.

5.2.5 Scenario of potential savings

The following table summaries the estimated carbon savings from installed efficient energy generation on large scale sites, based on the estimated potential for such installations:

Low or zero carbon infrastructure plant	Carbon saving per unit installed	No. of installations (estimated)	Carbon saving total
	(tonnes CO2/yr)		(tonnes CO2/yr)
Efficient energy distribution			
London Thames Gateway Heat Network	100,000	1	100,000
LTGHN extension	50,000	1	50,000
Efficient energy generation			
Biomass CHP plant adjacent to the River Thames	60,000	1	60,000
Large scale energy from waste	70,000	3	210,000
Anaerobic digestion of waste	4,500	6	27,000
Energy-from-waste facilities using advanced thermal treatment	700	6	4,200
Large-scale wind	2000	8	16,000
Use of waste cooking oil for small scale CHP	800	10	8,000
Solar district heating collector field	700	2	1,400
Solar photovoltaic farm	450	2	900
Small scale hydro at locks and weirs	250	5	1,250
		TOTAL	478,750

Potential reductions in emissions of carbon dioxide

Estimations of the potential savings from the commercial and public buildings and domestic buildings upgrades are not possible without good quality baseline data on population, no. of households and quantities and types of non-domestic buildings.

6 Policy measures

6.1 National carbon-reduction commitments

The following existing or proposed policy gives national carbon-reduction commitments relate (mainly) to energy use in the built environment.

6.1.1 General

- 2010: National target to eradicate fuel poverty (residential buildings)
- 2020: 20% reduction in CO2 emissions compared to 1990 levels (all buildings) (Source: Carbon Trust)
- 2050: 80% reduction in CO2 emissions compared to 1990 levels (all buildings) (Source: press)

6.1.2 Building Regulations

- Current Building Regulations – Approved Document Part L 2006.
- New Building Regulations are due in 2010, but more likely to be 2011. They are likely to require 25% reduction of carbon emissions compared to Building Regulations Part L 2006.
- Next new Building Regulations are due in 2014 and 2016. These are expected to set targets of a reduction of 44% CO2 emissions, and achieving "zero carbon" buildings, respectively.

6.1.3 Building Types Residential

- 2010: all new buildings to achieve CSH 3* for energy; i.e. 25% reduction compared to 2006 Building Regulations. (Source: Building A Greener Future: Towards Zero Carbon Development. Dec 2006).
- 2013: all new buildings to achieve CSH 4* for energy; i.e. 44% reduction compared to 2006 Building Regulations.
- 2016: all new buildings to achieve zero carbon development (the definition of which is still to be confirmed). This is likely to include a minimum level of energy efficiency delivering 70% reduction of carbon emissions compared to 2006 Building Regulations through on-site measures, and a further offset of remaining regulated carbon emissions (as per Building Regulations) and un-regulated carbon emissions (small power, appliances, etc.).
- NB some local authorities, e.g. Newham, have proposed meeting CSH6* by 2014.
- From 2003: all new buildings to achieve Excellent under BREEAM for schools. (Source: BREEAM website)
- 2016: all new schools to be zero carbon. (Source: Press) NHS buildings
- From 2008: all new buildings to achieve Excellent under BREEAM Healthcare; all refurbished buildings to achieve Very Good under BREEAM Healthcare. (Source: NHS / NEAT Website). Government non-domestic buildings
- 2018: all new Government non-domestic buildings to be zero carbon. (Source: DCLG proposal 2009 "Zero carbon for new non-domestic buildings") Private non-domestic buildings
- 2019: all new non-domestic buildings to be zero carbon. (Source: DCLG proposal 2009 "Zero carbon for new non-domestic buildings") BREEAM
- BREEAM now includes required minimum levels of reduction in carbon emissions, like CSH, for highest ratings.
- Minimum levels are likely soon to be necessary for all BREEAM rating levels.

6.2 Energy Policy in London: The London Plan

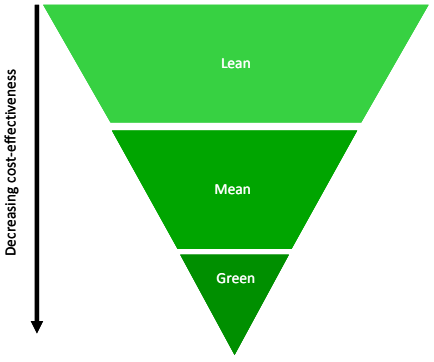
The London Plan includes a number of policies and opportunities that will support the District's Low Carbon Energy Infrastructure project.

Energy policy in relation to town planning within London is well defined through the London Plan. The London Plan aims to ensure London becomes an "exemplary, sustainable world city", whilst allowing London to grow in a responsible and considered socio-economic manner.

The London Plan sets a requirement for carbon reduction beyond the minimum standard, and includes clear targets for use of renewable energy, and the hierarchy of energy systems. Additionally new national standard for buildings are being rolled out over the ten years from 2009-2019, which will eventually require all buildings to be "zero carbon".

The GLA has also promoted 'low carbon zones' within London and any policy approaches in the District should be co-ordinated with this policy.

The overarching approach to reducing carbon emissions in the London Plan is based on the Lean, Mean, Green hierarchy:



LEAN: Energy efficiency measures beyond Part L of the Building Regulations

MEAN: Use of, or connection to combined heat and power or heat network

GREEN: 10-20% renewable energy use on-site

The energy hierarchy for application in London

6.2.1 Policies in the London Plan related to energy

The most relevant policies relating to energy sections in the London Plan are:

Policy 4A.2i Sustainable Design and Construction

- requires new development to feature the highest standards of sustainable design and includes:
- Reduce carbon and other emissions that contribute to climate change;
- Promote sustainable waste behaviour, including support for local integrated recycling schemes, CHP and CCHP.

Policy 4A.2ii Mitigating Climate Change:

- The Mayor will work towards the long-term reduction of carbon dioxide emissions by 80% by 2050, including interim targets.

Policy 4A.5i: Decentralised Energy: Heating, Cooling and Power

- The Mayor will and boroughs should in their DPDs require all developments to demonstrate that their heating, cooling and power systems have been selected to minimise CO2 emissions.
- The heating and cooling infrastructure should be designed to allow the use of decentralised energy (including renewable generation).

Policy 4A.7 Renewable Energy

The Mayor will and boroughs should in their DPDs require developments to achieve a reduction in carbon dioxide emissions of 20% from onsite renewable energy generation where feasible.

6.2.2 Proposals to support the District's Low Carbon Energy Infrastructure

Opportunities to provide flexibility within this hierarchy could help encourage low-carbon solutions. Such opportunities include:

- Granting permission for new buildings providing they connect to planned low-carbon heat networks planned to be built in the future, the immediate renewable energy target could be relaxed, based on the improved future performance. A 'Low-carbon Zone' could be established to oversee this type of arrangement.
- Development plans should identify and safeguard wharfage and potential power generation sites and district heating network routes.
- Each Borough should be required to develop an 'energy masterplan' based on identifying anchor heat loads, which includes sites for wind, solar and biomass plants where feasible, and also assess the potential for district heating networks linked to CHP and waste heat sources. This should be included within the LDF.
- Mandate higher energy and carbon performance standards for new buildings within the ELGED study area (though all buildings built post 2020 will be 'zero carbon' under current government proposals.
- 'Plug and play' sites should be identified in local planning and development policy documents/framework

6.3 Fiscal incentives

The following fiscal incentives could be used to deliver the proposals:

- Reduced business rates for low-carbon generation plants and/ or carbon reducing services provision
- Reduced or zero VAT for low-carbon generation plant and energy efficiency measures
- Reduced Council Tax for 5 years following energy efficiency retrofit of a building
- 'Pay as you save' financing scheme for energy efficiency measures (as proposed by UK Green Building Council)
- Lobbying government to ensure incentives for CHP (Climate Change Levy Exemption) remain in place beyond 2023
- Lobbying government to include incentives for Biomass CHP within the 'Feed in Tariff' policy announced in February 2010
- Lobbying government to include an incentive for low carbon heat supply if this is not included within the Renewable Heat Incentive, on which a consultation was opened in February 2010
- Low lease cost sites for energy plants in strategic locations

6.4 Public procurement policy

The following changes to public procurement policy could be used to deliver the proposals:

- Mandate connection to the London Thames Gateway Heat Network for public buildings which a peak heating load of over 250 kW (this would include most schools, hospitals, offices above 2,000m2 gross floor area) where connection is feasible.
- Require public sector buildings to generate a certain amount of energy they use through on-site low or zero carbon sources (once more cost effective carbon reduction measures have been fully implemented)
- Commit that public buildings undergo energy efficiency and LZC installation as per the London Fire Brigade projects.
- Consider 'bulk purchase' of energy for re-sale on to vulnerable residents, helping to reduce fuel costs and associated fuel poverty

6.5 Opportunities for specific project promotion

There are several opportunities for specific interventions to catalyse low carbon energy infrastructure in the District. Each of these would benefit from a feasibility study, but opportunities for consideration should include:

- 'Plug and play' sites for energy from waste and biomass CHP which have good logistic connections, heat offtake and high voltage electrical connectivity
- 'Smart grid' trial clusters in Docklands (around data centres) and in the Barking Riverside/ Sustainable Industries Park
- Establishment of a carbon information centre in key centres in the District area could catalyse energy efficiency retrofit, and take advantage of the opportunities provided by recently announced 'Feed in Tariffs'
- Continued promotion of the London Thames Gateway Heat Network and the establishment of the early phases of this project in Barking and Royal Docks.

2 WASTE TO ENERGY

Central to this proposal is the principle of waste self-sufficiency

Introduction

Our proposal for waste in the GED sets out a sustainable and comprehensive strategy dealing with all parts of the waste stream; it is based on the principle of using resources effectively, and considers treatment and associated developments. It is based on the ambitions of the London Plan and the Mayor's vision for London's waste to make London a world leader in waste management.

The GED waste strategy addresses all parts of the available waste stream, recycling and composting where possible, and treating the remainder through low-carbon advanced thermal treatment technology, diverting waste otherwise going to landfill or incineration, at the same time as recovering energy.

The proposal promotes symbiosis through the co-location of industries and enterprises that will benefit from outputs of the waste plants ranging from energy to recovered materials. It demonstrates the benefits of an integrated and sustainable waste treatment programme, both in terms of the environment, urban development, energy use, and the economy.

Central to this proposal is the principle of waste self-sufficiency. This is a key element of the London Plan which has far reaching benefits for London in terms of reducing carbon emissions and fostering economic growth.

The strategy will be tested in a series of architectural prototypes that will demonstrate the strategy in action on actual sites within the GED.

Treatment overview

Our proposal is based on using sustainable low-carbon waste treatment processes, identified in the Mayor's vision for London's waste. These treatments have been shown in the GLA report, 'Rubbish In, Resources Out', to have a low-impact on their surroundings. In addition, by generating energy, they remove load from the UK grid which is reliant on coal and gas for 80% of its energy generation.

Crucially, the forms of waste treatment proposed see waste as fuel and not as a problem. The waste treatment processes proposed are anaerobic digestion and advanced thermal treatments.

Anaerobic digestion (AD)

Anaerobic digestion is the natural decomposition of organic waste by bacteria, in a controlled environment without oxygen (anaerobic). Typically, food waste is collected into an enclosed vessel where it breaks down, forming a residue like compost which can be used as a fertiliser in agriculture and horticulture.

During this process, the food waste gives off a biogas which is rich in methane and which can be used for many purposes; it can for instance be burned to power a gas engine to generate heat and electricity, or as a vehicle fuel.

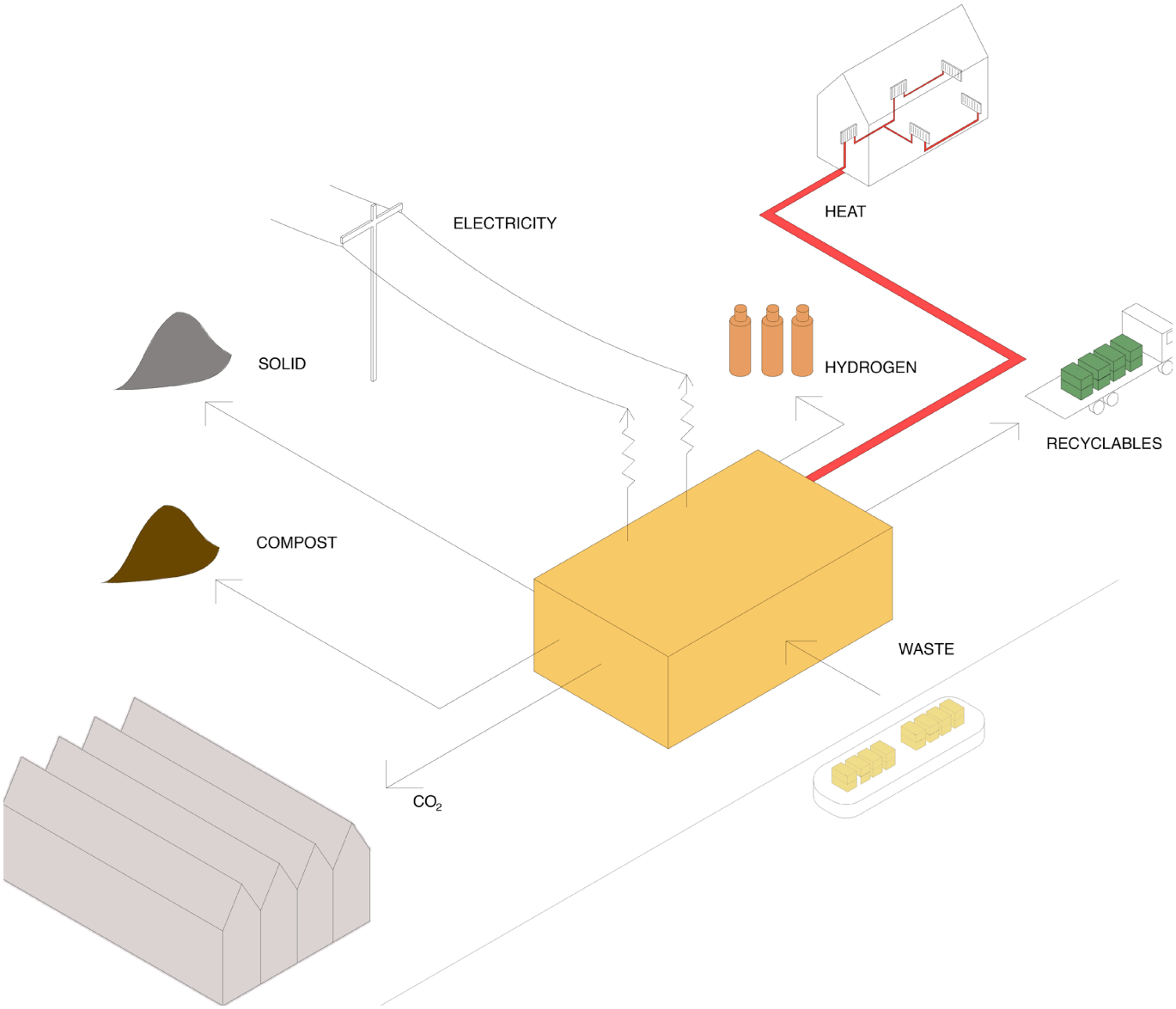
Anaerobic digestion is completely energy self-sufficient and produces a considerable surplus of carbon-neutral energy, displacing the use if fossil fuels. Anaerobic digestion produces on average a surplus of electricity of 0.2MWh/tonne of waste, and a heat surplus of 0.18MWH/tonne.

Advanced thermal treatment technologies

Gasification, pyrolysis and plasma gasification are advanced thermal treatment technologies which recover energy from waste. Gasification burns waste with a limited amount of oxygen; pyrolysis breaks waste down in the absence of oxygen. Plasma gasification converts gas into a plasma which gasifies the waste at high temperatures. The processes leave an inert glass-like residue which can be used as an aggregate.

Gasification and pyrolysis processes produce on average a surplus of electricity of 0.7MWh/tonne of waste, and a heat surplus of 2MWH/tonne. Plasma gasification produces on average a surplus of electricity of 1MWh/tonne of waste and a heat surplus of 2MWH/tonne.

The ATT technologies produce a synthetic gas which is rich in hydrogen; this gas can be used as a fuel to generate heat and electricity.



Resource flow diagram

GED COMMERCIAL AND INDUSTRIAL WASTE VOLUMES 2020

A	process		recycling	ad	gasification			
	proportion		47%	23%	30%			
	tpa	700,000	329,000	161,000	210,000			
	area requirements		5tpa/m2 annum	7.5tpa/m2 annum	33tpa/m2 annum			
	plant area		65,800	21,467	6,364			
	heat available			0.18MWh/annum/t	2MWh/annum/t			
	heat total		-	28,980	420,000	448,980	MWh/annum	
	power available (gasification pyrolysis)			0.2MWh/annum/t	0.7MWh/annum/t			
	power total		-	32,200	147,000	179,200	MWh/annum	
B	process		recycling	ad	gasification			
	proportion		47%		53%			
	tpa	700,000	329,000		371,000			
	area requirements		5tpa/m2 annum		33tpa/m2 annum			
	plant area		65,800		11,242			
	heat available				2MWh/annum/t			
	heat total				742,000	742,000	MWh/annum	
	power available (plasma gasification)				1MWh/annum/t			
	power total				371,000	371,000	MWh/annum	

Waste stream

Our waste strategy is based on a response to the current waste handling arrangements in the GED area, and looks at future developments in the waste market. Our waste strategy provides a number of new facilities which treat the whole waste stream without recourse to landfill or incineration. These augment the sustainable waste facilities being developed in the GED, such as the proposed Cyclamax plant and the MBTs at Frog Island and Jenkins Way.

The GED overlaps with both the unitary authority of Tower Hamlets (LBTH) and the East London Waste Authority (ELWA), a consortium consisting of Barking and Dagenham, Havering, Newham and Redbridge. They are currently responsible for both the collection of municipal waste in the GED and a GLA apportionment for commercial and industrial waste.

Municipal waste

Contracts are let with Shanks to administer ELWA's municipal arising for 25 years from 2002. ELWA is reliant on landfill for non-recyclable waste treatment until its two proposed MBT (gasification) facilities at Jenkins Lane and Frog Island are in operation. These two plants have targets to reduce waste to landfill by 67% and to increase recycling to 33% in ELWA by 2016.

Tower Hamlets' contract for municipal waste expires in 2014. Currently the majority of their waste is taken to landfill. LBTH are examining an in-borough waste treatment and energy plant and have carried out studies into their preferred technology and location. In 2020 LBTH will be responsible for 170,000tpa of municipal waste.

Commercial and industrial waste

The predicted commercial and industrial waste arisings for 2020 are 314,000tpa for LBTH and 1,436,000tpa for ELWA. This is a total of 1,750,000tpa, of which it has been estimated that 700,000tpa will arise within the GED.

Model

This report will demonstrate how the GED can be self sufficient for commercial and industrial waste, and how LBTH can be self sufficient for municipal waste with a facility within the GED.

Commercial and industrial waste self sufficiency in the District

The Mayor's vision for London's waste states an ambition to make London waste treatment self-sufficient by 2031. This has many benefits, ranging from reducing carbon emissions and minimising transportation to raising public awareness. At the same time, it re-instates industrial buildings within London's urban fabric, re-invigorating the urban quality of the city as a dense mixture of building types. The GLA report 'Rubbish In, Resources Out' demonstrates that sustainable waste treatments are appropriate for urban use, and have an important part to play in the functioning of our cities in a sustainable economy.

The GLA's proportional subdivision of commercial and industrial waste suggests that of the 700,000 tpa available 330,000 tpa will be recyclable (47%), 161,000 tpa will be compostable (23%), and the remaining 210,000 tpa will be treated by advanced thermal treatment technology (30%).
To this end, we are proposing three new facilities that will process the entire commercial and industrial waste stream within the GED: a recycling centre, an anaerobic digestion site, and a gasification site.

The plant sizes demonstrated within this report respond to the ambition of making the GED self sufficient for the treatment of commercial and industrial waste. It also proposes three separate plants and demonstrates two advanced waste technologies, gasification and anaerobic digestion. These plants could be enlarged to treat waste from beyond the GED, or gasification used exclusively as it has a proportionally smaller footprint for a given throughput of waste than AD; however, for the purposes of this report the technologies chosen and the buildings required to house the process respond to the sites and the symbiosis associated with them.

These proposals respond to food waste anticipated through the food waste targets of the Food to Fuel Alliance and the London Waste and Recycling Board, and respond to the anticipated shortfall in recycling provision in London to meet the Mayor's Vision for London's Waste recycling targets (80% of all London's waste to be recycled or composted by 2031).

It is assumed that waste collection will be handled by the market in the way it is currently structured, and that Landfill tax and legislative (dis)incentive will provide competitive gate fees for these plants.

We also envisage that use of the GED sustainable waste facilities will form part of the GED Hallmark and accreditation scheme for enterprises within the GED.

This report will demonstrate how the GED can be self sufficient for commercial and industrial waste, and how LBTH can be self sufficient for municipal waste with a facility within the GED.

Left

Chart showing total energy available from commercial and industrial waste within the GED. Option A assumes all available organic waste is put through AD process, Option B assumes all non recyclable waste is gasified.

Municipal waste in the GED

The objective of this proposal is to demonstrate how strategic waste treatment can benefit the GED while addressing the municipal waste needs of Tower Hamlets. Tower Hamlets is not part of a multi-borough waste partnership and their current service contract ends in 2014. Currently their waste is taken to landfill by lorry, which is both wasteful of resources and unsustainable.

This proposal is for an Integrated Resource Recovery Plant, which takes the entire municipal waste stream from LBTH. This prototype processes 180,000Tpa of waste, which is sorted and broken into the following waste streams: 50,000Tpa dry recyclables, 40,000Tpa of wet food and green waste for Anaerobic Digestion and 90,000Tpa of waste for the Gasification.

This proposal will demonstrate how all of the municipal waste from LBTH can be processed within the GED and how the energy produced by this process can be harvested for use within the GED.

This facility will replace LBTH's current use of landfill and will meet their obligations under the London Plan.

Site characteristics

The sites identified in this report share the following characteristics:

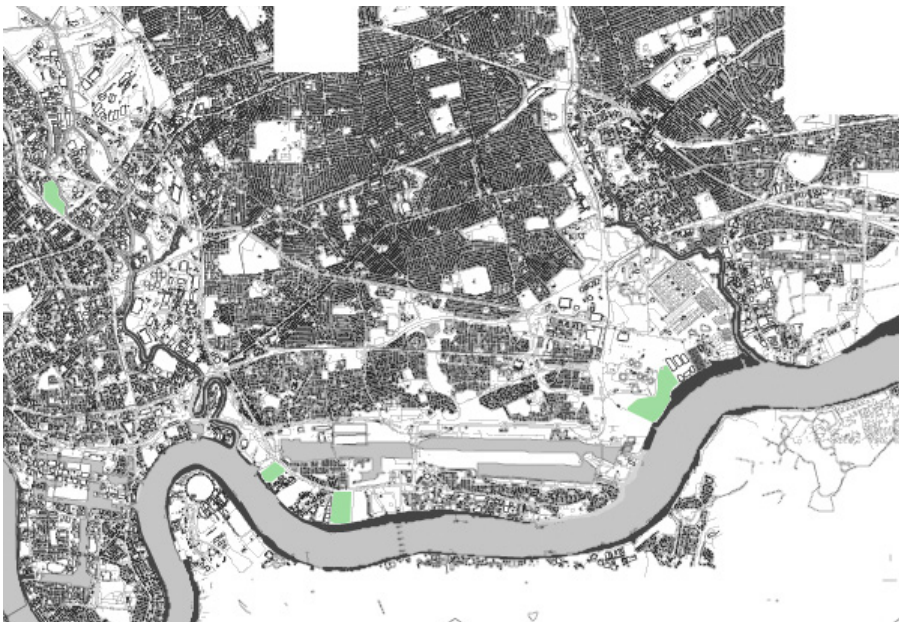
1 Transport

Sites are well served by road and some also have rail access. The primary means of collection of waste in the GED will be by road, with intelligent collection (ie pre-sorted) and the use of electric or hybrid vehicles.

The GED commercial and industrial plants are located on the Thames, allowing transportation by barge as well as by road. Much of London's waste is currently transported from waste management sites by barge to landfill sites. The placement of new waste sites along the river allows transportation of by-products (compost, gasification residue, recycled materials) as well as products associated with co-located industries.

Crucially, a Thames side location allows for future possible contracts to be developed with waste that currently passes these site on its way to landfill or incineration further down stream.

The riverbank sites identified are not however safeguarded wharves; waste is typically transported in flat-bottomed barges which do not require deep wharves when being loaded and unloaded, and which can be manoeuvered in and out of position at high tide.



Location of prototypes within the District

2 Energy customers

The sites are located near an identified industrial or large volume residential beneficiary (existing or planned) of the energy yield, or with access to the proposed LDA heat network. Electricity produced by the plants can be fed into the National Grid or be taken by a 'Smart Grid' that is being proposed within the GED.

3 Symbiotic enterprise

The identified sites have sufficient area for the co-location of industries or enterprises which can benefit from by-products produced. This is important not just to minimise transport but also in terms of developing the re-use network by supporting a culture of making and using products from re-used or re-cycled materials.

4 Carbon

The sites that treat the GED commercial and industrial waste are all close to City Airport. The positive impact they have in terms of carbon reduction from energy generation from waste can be offset against the negative effect of the airport within the GED as a whole.

5 Development requirements

The GED waste proposal reflects the ambitions of the GLA London Plan and Design for London development proposals, both in terms of building types, land use and specific sites. It meets the objectives of the London Waste and Recycling Board and the Food to Fuel Alliance.

Economic and development benefits

1 Energy security

Energy from waste establishes a long-term and secure sustainable source of energy and reduces losses through a localised distribution network.

2 Potential sectors

Energy from waste and the derivatives from the processes create a range of opportunities for associated enterprises, from alternative fuel generation (both hydrogen production from AD and ATT and the production of bio-diesel) to manufacturing using recycled materials.

3 Employment

The creation of employment, as a result of these proposals are many and varied. There are short term employment opportunities associated with the construction of waste facilities and associated developments of infrastructure. In addition, there are long-term employment prospects for the management and operation of the waste treatment process, from street-side collection to plant operation and maintenance. Related symbiotic businesses bring associated employment uplift, through manufacture and distribution.

4 Business enterprise and development

Low carbon energy encourages symbiotic enterprise and knock-on developments; logistics are simplified as a result of self-sufficiency and closed-loop.

Using energy from an energy from waste plant will give residential developments Code For Sustainable Home CODE 6 status. This will prove ever more enticing to residential developers seeking to achieve their legislative obligations.

Anaerobic digestion and ATT technologies are compliant with the Renewables Obligation and deliver ROCs. Investment in these technologies is compliant with local authority energy procurement procedures, and yields feed-in tariffs (FITs)

5 Community

Closed loop economies encourage community engagement through increased resource transparency; local developments benefit from cheap energy from waste plants, and from participation in community and social enterprises.

6 Finance

Grants identified to develop projects of this nature include the London Waste and Recycling Board funding, DEFRA's Waste Resources Action Programme (WRAP) for anaerobic digestion and other food waste treatment facilities, Carbon Trust Investment funding for low carbon technologies, and the London Thames Gateway Economic Development Investment Plan (EDIP) funding for waste infrastructure in this area.

Private finance models for the development of AD and ATT plants are well established, especially for the treatment of commercial and industrial waste. Several plants are currently operational in the UK that have been procured in this way.

Prototypes

The following prototypes demonstrate how these strategic ideas for waste in the GED can be realised as viable architectural proposals.

Site 1 - Beckton Riverside / National Grid site

Project proposal

This proposal is for an anaerobic digestion plant treating 210,000tpa of food and other organic waste in a plant of 2.15ha. The source of this waste is primarily commercial and industrial compostable waste from the GED; it is anticipated that in the future, municipal compostable waste collected thoughout London, could be delivered for treatment to this plant by barge.

We are proposing to co-locate commercial greenhouses on the site that use the heat and CO2 from the process to accelerate vegetable growth, and the compost from the AD plant as fertilizer for the vegetables.

Location

The site is on the bank of the Thames at Armada Way, in the London Borough of Barking and Dagenham, to the east of Royal Docks Road and Gallions Reach DLR station.

Site

The site is 15ha, the plant size is 2.15ha.

The site is owned by the National Grid, and is currently undeveloped. A masterplan for residential development on the site was previously submitted to LB Barking and Dagenham but rejected on grounds of proximity to the neighbouring sewage works.

The plant is located next to the river. The river adjacent to the plant dries at low water and is suitable for waste barges but not other shipping.

Quantity

This anaerobic digestion plant prototype processes 210,000tpa of waste.

The energy yield will be:
37,800 MWh/annum of heat
42,000 MWh/annum of electricity

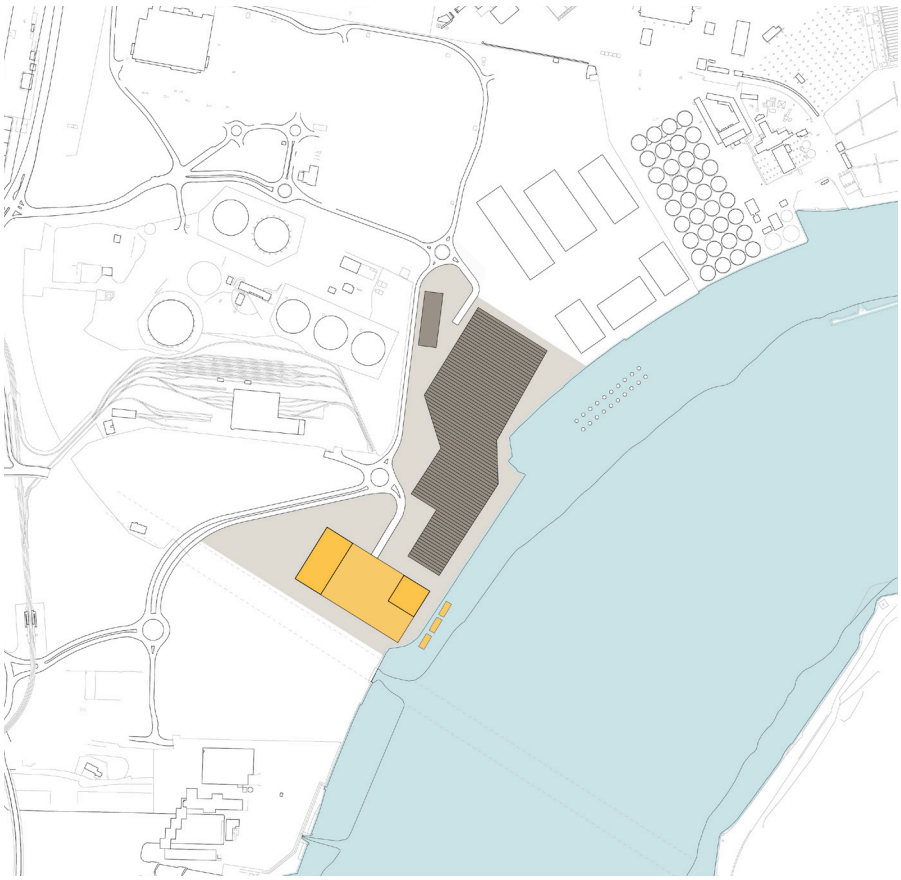
This is the equivalent heat and electricity to heat 1,844 homes and provide electricity for 12,727 homes. (calculations in accordance with OFGEM fact sheet 59, April 2006).

Layout

Access to the site is by vehicle from Armada Way or the Thames. The plant is located on the site so that both waste sources are centrally processed. The plant consists of a reception area where bio-degradable waste is sorted and then fed to the enclosed composting vessels. Here, the waste breaks down over a three week period, producing the compost-like material.

Appearance

The building is generally low lying with two small towers that accommodate the craneage and the vertical elements of the AD process, the gas flares from the storage cylinders and the flues from the power generators.



Transport

Degradable waste collected within the GED will be transported to the site by truck. Food waste from other boroughs can be delivered by barge. Compost from the plant will be transported by barge. Transportation relating to co-located industries will be by both barge and river.

Benefits

There are obvious uses for the heat and power from this plant. It is located adjacent to the National Grid sub-station and so connection to the grid is straightforward. It is also on the GED heat network so the heat can be transferred to residential areas.

There are also industrial co-location benefits, the most interesting of which for this site is greenhouse agriculture on the remaining 12.85ha of the site. Our proposal is that greenhouses are sited adjacent to the plant, and that the heat from this plant is used for heating, and the CO2 that is derived from the anaerobic digestion process is pumped into the greenhouses to accelerate growth.

This mode of agriculture is established and operational in Holland; data suggests that 20m2 of greenhouse will yield 1 tonne of food production, and that this is equivalent to the quantity of vegetables eaten by ten people in a year. Our proposed greenhouses of 4.5ha will therefore yield 2,250 tonnes, ie. supplying vegetables to feed 22,500 people for a year.

In addition, the co-located greenhouses can be developed as a community food scheme, giving this waste site proposal the capacity to be a catalyst in the local community. This also relates to the food prototype within the GED.

In addition, we are proposing that a bio-diesel plant is co-located alongside, benefiting from the energy from the plant and also from the river for delivery of food oil.

This proposal is an exemplary model for the Mayor's Food to Fuel Alliance, which is investing in food waste infrastructure in London, specifically AD and bio-fuel.

This co-location of symbiotic industry provides a closed loop economy.

Employment impacts

This proposal brings both short and long term employment opportunities; in the short term, with regard to the construction of the plant and infrastructure, and in the long term in the operation and maintenance of the plant.

Similarly, the symbiotic industries of food production and bio-diesel processing create employment opportunities.

Demand drivers

This prototype responds to the Mayor's Vision for London's Waste, which emphasises composting organic waste as a priority, and includes anaerobic digestion in this definition.

It is also ideally placed to benefit from the predicted increase in food waste collection across the city, which can be delivered by barge.

Site 2 - Vanesta Wharf

Project proposal

This proposal is for a recycling facility for 330,000tpa of waste in a 6.5ha building. The source of this waste is principally recyclable commercial and industrial waste generated in the GED.

Location

The site is on the bank of the Thames to the west of the Thames Barrier on North Woolwich Road, and to the south of the Royal Victoria Dock. It is located between West Silvertown and Pontoon Dock DLR stations.

Site

The site is 10ha, the plant size is 6.5ha, organised over two floors with a footprint of 3.25ha.

The site is currently occupied by a small number of industrial units.

The plant is located next to the river. The river adjacent to the plant dries at low water and is suitable for waste barges but not other shipping.

Quantity

This plant will process 330,000tpa of recyclable waste.

Layout

The recycling plant is organized over two floors so that there is land available for symbiotic industry to develop adjacent to the facility. The building is arranged to accept mixed recyclable materials from both the Thames and North Woolwich Road.

Appearance

The building is designed as a castellated modular structure which allows for good natural light penetration within the depths of the building and provides sufficient height for all aspects of the recycling process to take place. It is a fitting form to sit adjacent to the river and echoes the robustness of its industrial wharf location.

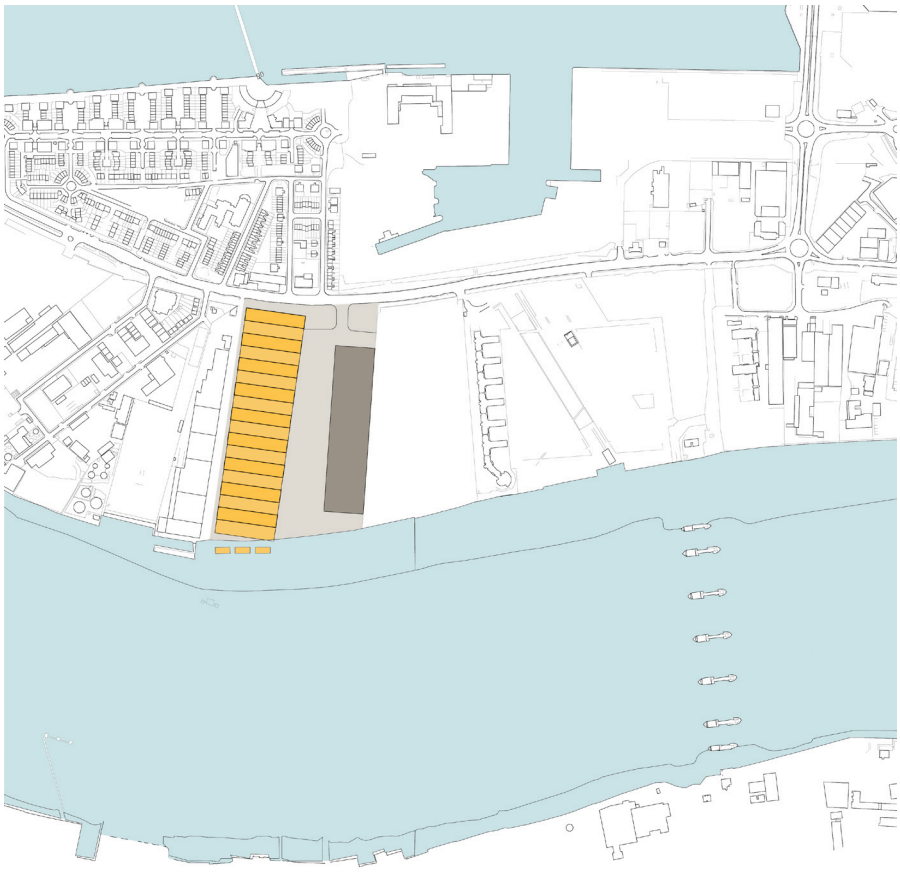
Transport

Recyclable waste collected within the GED will be transported to the site by truck. Transportation relating to co-located industries will be by both barge and river.

Benefits

This proposal shows co-location of industries that use recycled materials for re-use and re-manufacture.

This co-location of symbiotic industry provides a closed loop economy. The source of recycled materials from this plant could precipitate manufacturing along the Thames that uses its output – such as paper, glass and plastics re-use.



Employment impacts

This proposal brings both short term, in terms of the construction of the plant and infrastructure, and long term, in terms of the operation and maintenance of the facility. There are similar short and long term employment opportunities in the symbiotic industries.

Demand drivers

This prototype responds to the Mayor's Vision for London's Waste prioritising re-use and recycling.

The proposal responds to the GLA waste team gap analysis modelling that demonstrates that the development of recycling facilities is lagging behind demand, and at current rates of growth there will be a short fall of 2million tpa by 2020.

Site 3 - Carlsberg Tetley

Project proposal

This proposal is for a gasification plant for 210,000tpa of waste in a 0.65ha building. The source of waste for this plant is commercial and industrial waste generated in the GED.

Location

The site is on the bank of the Thames, south of Dock Road and accessed from Bell Lane. It is at the western end of the Royal Victoria Dock, and near West Silvertown DLR station.

Site

The site is 4ha; the gasification plant size is 0.65ha.

The site was formerly occupied by the Carlsberg Tetley warehouse, and is currently occupied by temporary industrial units that are used to store construction machinery and vehicles.

The site is safeguarded by the LDA as it forms the northern end of the proposed new river crossing. This crossing may take the form of a bridge or a tunnel. If a bridge is built the site will be bifurcated by the bridge approach road and ramp, which will prejudice future development of the site. To accommodate this possibility we are proposing two buildings that are organized to account for the bridge infrastructure.

The plant is located next to the river, which it uses for transport. The river adjacent to the plant dries at low water and is suitable for waste barges but not for other shipping.

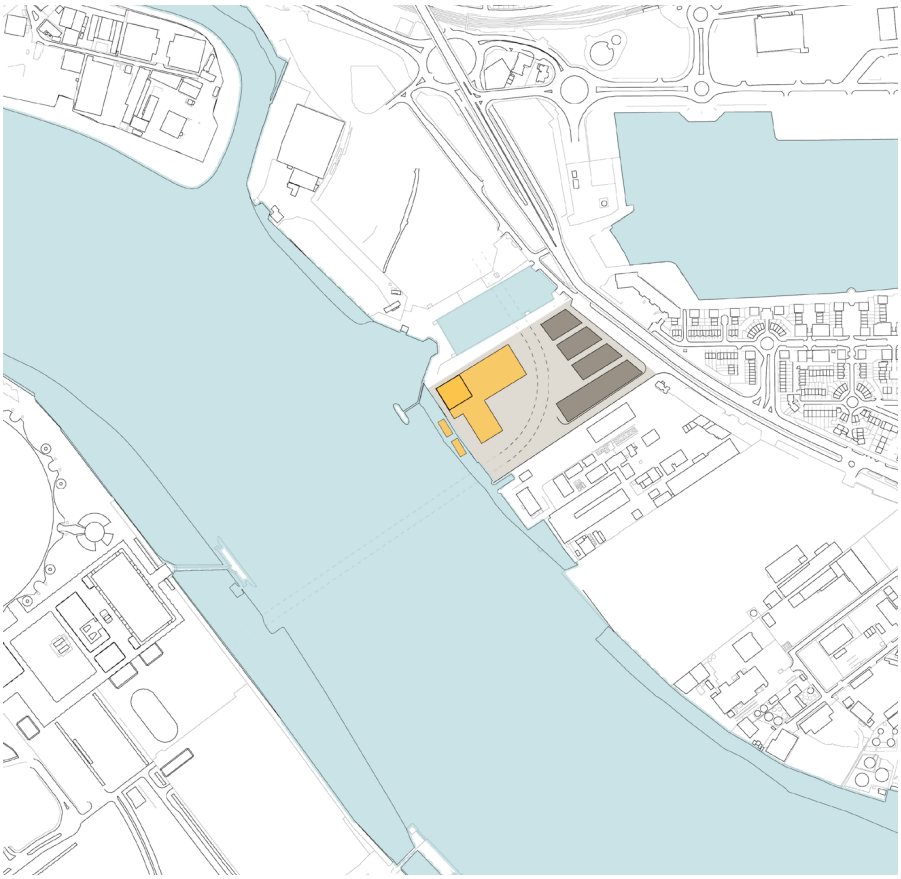
Quantity

The energy yield will be:
420,000 MWh/annum of heat
147,000 MWh/annum of electricity

This is the equivalent heat and electricity to heat 20,487 homes and provide electricity for 44,545 homes. (calculations in accordance with OFGEM fact sheet 59, April 2006).

Layout

The site organisation is divided into two parts to accommodate the new river crossing. The gasification plant is located to the east of the crossing, while co-located industries are located to the west.



Appearance

The design for this plant needs to be of a very high quality, appropriate to its prominent riverside site opposite the O2 Arena and the development on Greenwich peninsular. The tower takes its place comfortably alongside the industrial and residential buildings of a similar scale, and becomes a local landmark along the river frontage. The gasification equipment is stacked vertically in order that the plant occupies a small footprint, and also so that the flue can be contained within the overall form of the building. This enables the building to avoid having a visible flue and thus it overcomes the negative connotations that large flues accrue in urban environments.

This facility has the capacity to form a contemporary icon for the Thames in the way that Bankside, Battersea and Lots Road power stations have done historically. The relationship between the building and its role within the life of the city is similarly explicit, and serves as a powerful reminder of the responsibility we have for our waste and the city.

Transport

Non-degradable waste collected within the GED will be transported to the site by truck. The gasification residue from the plant will be transported by barge. Transportation relating to co-located industries will be by both barge and river.

Benefits

There are obvious benefits from the high energy yield on this site, supplying co-located industries, the GED heat network and the National Grid. The area of land to the south of the Royal Albert dock around Millennium Mill is proposed for residential development, which could use the heat. There are uses for heat and power at City Airport and this plant can form a central part of reducing the carbon profile of the airport.

We propose that construction industry businesses are co-located to benefit from the gasification residue as aggregate.

Employment impacts

This proposal brings both short and long term employment opportunities; in the short term, in terms of construction of the plant and infrastructure, and in the long term in the operation and maintenance of the plant.

Similarly, the symbiotic construction industry enterprises create employment opportunities short term in terms of construction, and long term in terms of operation and maintenance.

Demand drivers

This prototype responds to the Mayor's Vision for London's Waste by processing waste within the city.

The heat from this proposal, if used in an adjacent residential development, will enable the residential development to achieve the Code For Sustainable Homes, CODE 6.

Site 4 - Fish Island South

Project proposal

This proposal is for an Integrated Resource Recovery Plant treating 180,000tpa of municipal waste on a 6.25ha site.

A plant of this scale will be able to process the total municipal waste that Tower Hamlets have a responsibility for under the London Plan predictions for 2020.

Tower Hamlets published a Waste Evidence Base Report in August 2009 which analyses current and projected waste volumes and methods for its treatment. Gasification is identified in this report as the preferred method of treatment and Fish Island South is identified as their preferred site for a plant.

Location

The site is located in Tower Hamlets. It is formed by the land to the east of the A12, and the west of the River Lee, with Autumn Street to the north and the railway to the south. The nearest station is Pudding Mill Lane DLR.

Site

The site is 6.25ha and the plant is 3.6ha.

The centre of the site is currently used as a concrete batching plant and for the storage of construction machinery. To the south there us a protected railhead. The north of the site has small nineteenth century industrial units in various states of repair and use.

Quantity

An Integrated Resource Recovery Plant takes the entire municipal waste stream. This prototype processes 180,000Tpa of waste, which is sorted and broken into the following waste streams: 50,000Tpa dry recyclables, 40,000Tpa of wet food and green waste for Anaerobic Digestion and 90,000Tpa of residual waste for the Gasification.

Gasification energy yield will be:
180,000 MWh/annum of heat
63,000 MWh/annum of electricity

Anaerobic Digestion energy yield will be:
7,200 MWh/annum of heat
8,000 MWh/annum of electricity

A total of 187,200 MWh/annum of heat, or enough for 9,122 homes, and 71,000 MWh/annum of electricity, or enough for 21,515 homes. (calculations in accordance with OFGEM fact sheet 59, April 2006)

Layout

The 36,000m2 (3.6ha) facility is organised around a central reception and sorting area. From here, waste is directed to the different treatment plants located around the perimeter.

The recycling plant and sorting area forms the heart of the building, with gasification to the south and AD to the north. The form of the building is adapted to the site conditions and the context. The height of the building varies locally according to the requirements of the process inside and the need to accommodate taller areas for craneage and hoisting. The anaerobic digestion cylinders and the biogas storage are also accommodated in a taller section of the building and a small flue from the generator and a gas flare from the gas store are concealed within the same form.

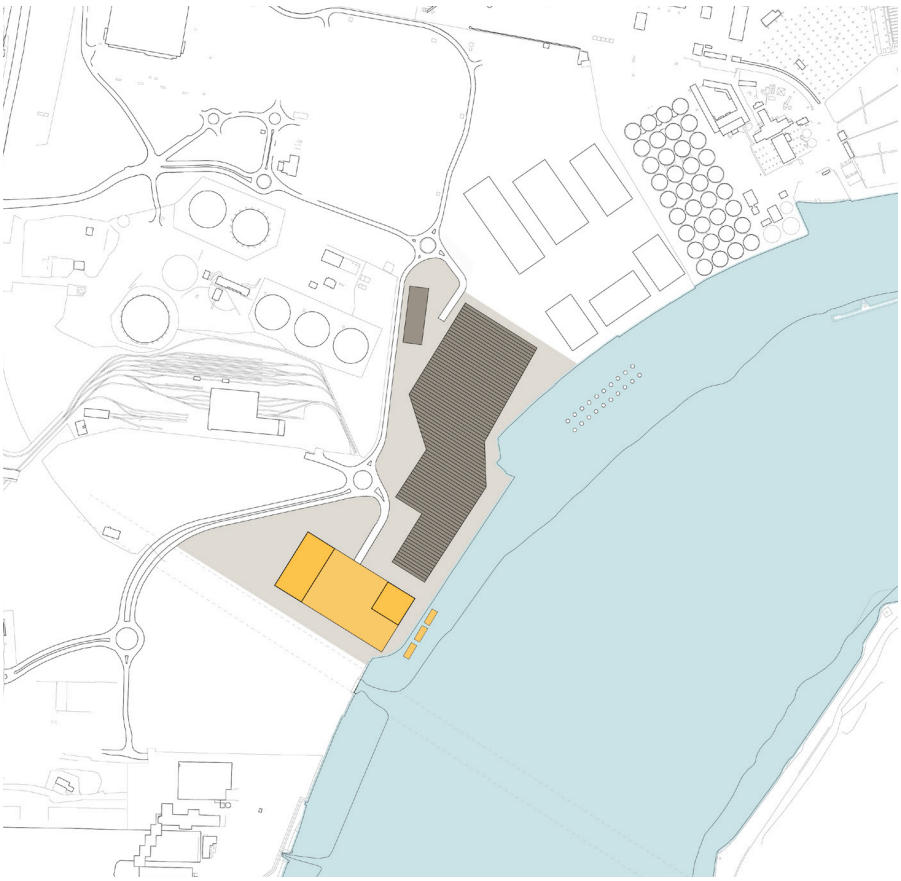
The gasification plant is located low tower. The gasification process equipment has been stacked vertically to reduce the footprint but also so that the flue can be concealed within the overall volume of the building. This enables the building to avoid having a visible flue and thus it overcomes the negative connotations that large flues accrue in urban environments.

Appearance

The building takes its formal expression from an idea about breaking up the mass of the building into distinct zones which are dealing with the different parts of the waste stream. This strategy avoids the building becoming a monotonous block and creates a more interesting addition to the visual landscape of the area. The faceted volumetric approach to the design of the building catches light and accentuates its form whilst also appearing to reduce the overall mass and volume of the building.

Transport

The site is very well located for road transport. Municipal waste will be delivered to the site by RCV and sorted and treated on site. Bi-products from the waste treatment processes can be transported away by road or by rail. The site is located on a protected rail head, this proposed use for the site would enable its continued use.



Benefits

There are obvious uses for the heat and power generated by this plant. The electricity can be connected to the grid and the site is on the proposed LDA heat network.

Tower Hamlets is committed to the creation of 43,000 new homes by 2025 that they want to connect to a sustainable energy network that uses energy from waste. Residential development that uses energy derived from waste will achieve Code For Sustainable Homes, CODE 6.

In addition, this plant is very near the Olympic site and the heat and power could be used by the Legacy developments in this area, or by local industries.

The concentration of waste treatment on one site within the heart of the borough is an extremely efficient idea, and exemplifies the waste model described in the London Plan.

Employment impacts

This proposal brings both short and long term employment opportunities; in the short term, in terms of construction of the plant and its associated infrastructure, and in the long term in the operation and maintenance of the plant.

The construction of new homes in the area associated with a local heat network will also generate employment

Demand drivers

Tower Hamlets published a Waste Evidence Base Report in August 2009, which analyses current and projected waste volumes and methods for its treatment. Gasification is identified in this report as the preferred method of treatment and Fish Island South is identified as their preferred site for a plant.

The development of these prototypes demonstrates that joined-up strategic thinking about waste within the GED provides numerous economic opportunities on the way to reducing carbon and providing sustainable energy for the GED.

The central principle in the GED waste strategy is that waste is fuel and not a problem.

3 RIVERFRONT ADDRESS

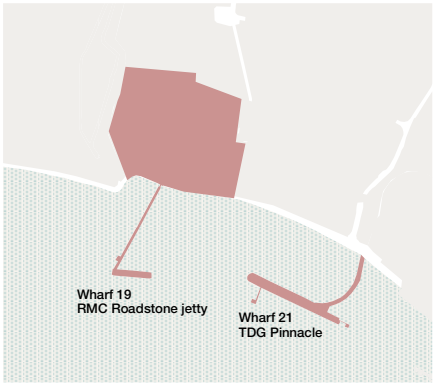
The river is the singular spatial, physical element uniting the District

Economy - The river as infrastructure

The river is the singular spatial, physical element that unites the entire District. This unifying aspect is twofold; it connects both the sites along the rivers edge as well as the water itself with the land that lies further behind. Furthermore, in a wider economic context the river is described as the Thames Gateway, a gateway to and from mainland Europe which involves the 32 London Councils as well as the counties of Essex to the north and Kent to the south.

This project seeks to explore the roles the river can play in the operation and experience of the East London GED.

The most important role the river can play in the GED area is that of the river as infrastructure. The transportation of goods and people is where economic potential of the river lies. Currently there is a number of protected wharves in the district that are connected to the water via large jetties that allow boats to on-and off load freight. Some of those are in operation while others are currently not in use and could potentially be reactivated. In terms of the Business Development Impact from the river these wharves are key to the further economic development of the district as they act as an interface between the river and the land. The types of industry that can benefit from a proximity to the river are waste facilities, storage for goods like biomass, recycled building materials and items related to the domestic retrofitting industry.



Site 1

Wharf 19 (protected), Dageneham, RMC Roadstone jetty

Proposal

This is an existing protected wharf in Dagenham where currently aggregates are delivered via a conveyor belt and stored on the land. This mechanism could be utilised to support the delivery and storage of biomass; tree logs are deliverd by boat and transported to the wharf via the conveyor belt. On land these logs are chipped and dry stored in a large shed from where this bio fuel can be dispersed throughout the District.

This could potentially be extended to distribution and storage of recycling materials.

Area

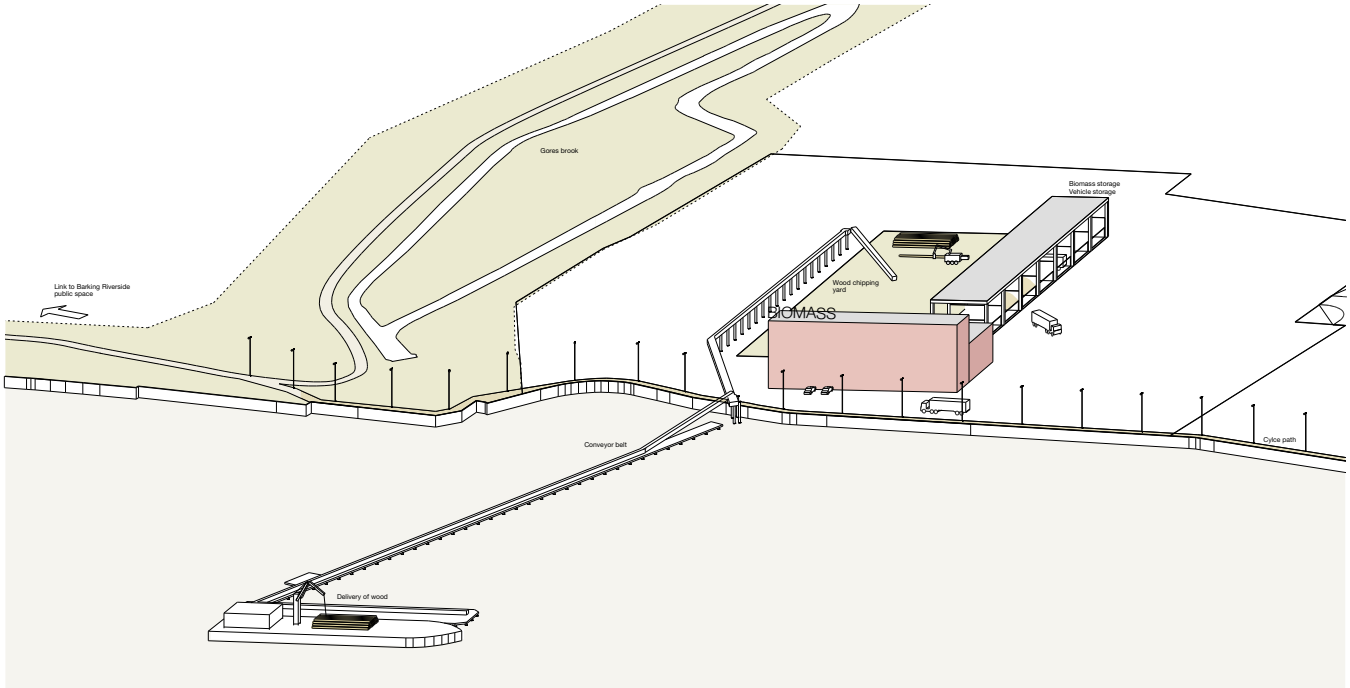
Protected wharf: 50000 sqm

Sector

Manufactoring, distribution, recycling

Employment impacts

Technical and crafts
Dock, crane operators
Warehousing, drivers



This is an existing protected wharf in Dagenham where currently aggregates are delivered via a conveyor belt and stored on the land. This mechanism could be utilised to support the delivery and storage of biomass; tree logs are delivered by boat and transported to the wharf via the conveyor belt. On land these logs are chipped and dry stored in a large shed from where this bio fuel can be dispersed throughout the District.

Leisure – The river as a space

Leisure is the element that is mostly absent in the current experience of the river. At the moment the river stands as a hard edge between water and land and doesn't allow for much interaction between the two. Although this edge could be softened by turning the metal sheet into a green element there are constraints in terms of how this wall can be used. Currently the EA require a buffer strip between the wall and any kind of development (behind the wall) in order to allow for access by vehicles for maintenance. In addition to this, the bufferzone is expanded into a zone of 15m above the wall to allow access by cranes. In order to integrate leisure functions along the river edge while while getting around the problem of building in the river or on it's edge, a large jetty could be transformed into a linear park on to which floating leisure platforms, either stationary or mobile depending on their use, can dock.

A large jetty could be transformed into a linear park on to which floating leisure platforms, either stationary or mobile depending on their use, can dock.

Site 2

Wharf 21 (jetty only), Dagenham, TDG Pinnacle

Proposal

This jetty in Dagenham is transformed into a green finger that can support a number of connected platforms, one of which is a swimming pool. These platforms and their arrangement can be flexible. For instance, on summer evenings this configuration of platforms could be arranged and extended in such a way they can operate as an open air theatre that can be used by a number of travelling theatre groups. Access can be achieved by operating a water taxi service from the city.

Sector

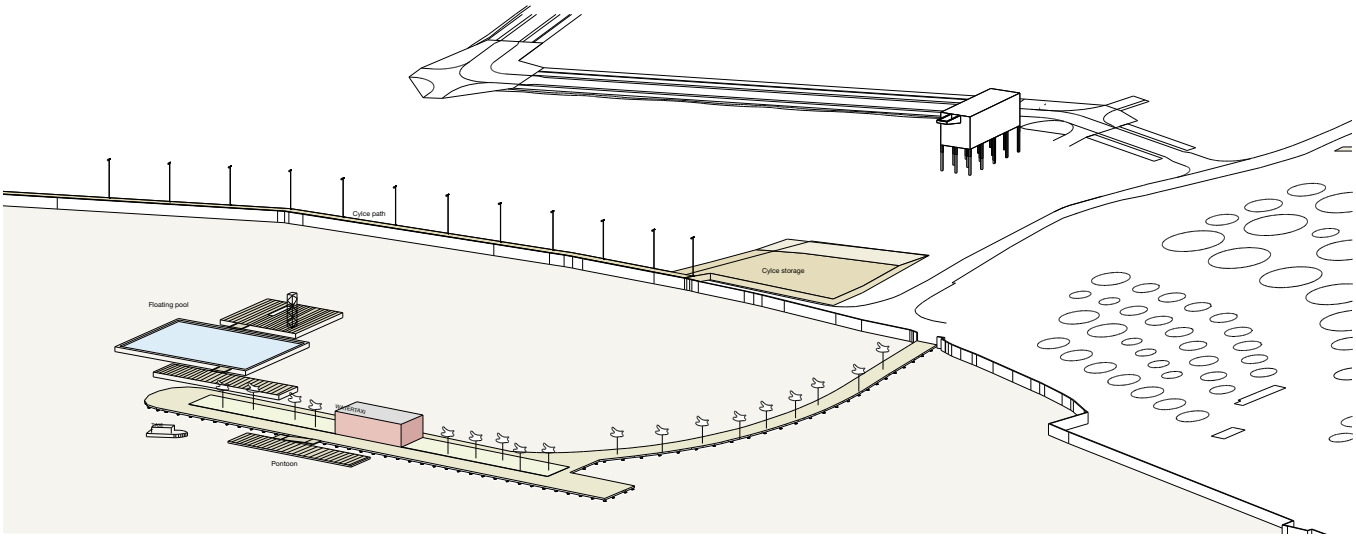
Leisure

Employment impact

Water taxi operator
Dock, crane operators, drivers
Security personnel
Leisure: swimming pool personnel
Entertainment: theatre groups

Highline in New York; new use for redundant infrastructure

Riverside pool in Berlin; leisure uses in the river



This jetty in Dagenham is transformed into a green finger that can support a number of connected platforms, one of which is a swimming pool. These platforms and their arrangement can be flexible. For instance, on summer evenings this configuration of platforms could be arranged and extended in such a way they can operate as an open air theatre that can be used by a number of travelling theatre groups. Access can be achieved by operating a water taxi service from the city

Leisure is the element that is mostly absent in the current experience of the river

Environment – River as landscape

The Environmental Agency is encouraging biodiversity for the district and the river edges in particular. As best practice it is currently proposed to introduce a terraced landscape that allows for a variety of species (dry, semi-dry, wet) to grow on different levels. In this way the river defence would be set back to allow flood waters to spill in a controlled way. This implicates a loss of plot area and which means that this strategy can only happen in certain places.

This idea could develop further by treating the main river defence line, which needs to be replaced in some areas at some point, as a flexible landscaped (where appropriate) element that runs freely towards and from the rivers edge, while creating intermediate (semi flooded) zones that can support biodiversity (terraces) or leisure activities (plateaus used as sporting grounds).

Dutch river landscape - tolerance between defence line and river edge

4 INDUSTRIAL RETROFIT

Introduction

This cluster looks at applying the idea of retrofitting to industrial and commercial buildings as a way of providing carbon reduction as well as spatial and visual benefits. A common definition of retrofit is the act of applying new technology to old systems. In building terms this generally means that in order to achieve carbon reduction, certain technology is applied to a building that aims to improve the energy efficiency of a building. This can be achieved by either reducing the energy use of a building (adjusting and metering of usage), improving the thermal envelope of the building (air tightness, insulation), or by adjusting the building services by replacing a percentage of the energy demand by using renewable energy sources (biomass boiler, photo voltaics). Before any of those measures are taken an audit of the building will establish where energy is used and where energy use can be reduced.

In certain cases it could mean that the reduction of energy usage can not be achieved by adjusting buildings alone but by improving the infrastructure that surrounds and connects these buildings. This could be described as a collaborative approach; by sharing infrastructure and common facilities a reduction of the carbon imprint can be achieved. Especially smaller enterprises with small energy demands, and therefore relatively small wins, could benefit from a collaborative structure. An example of this shared infrastructure is a freight consolidation area; goods for all tenants are delivered at a central delivery point, from here electric vehicles can deliver specific goods to specific tenants. In this way a carbon reduction is achieved by reducing transport.

At the moment 9 industrial estates within the District can be identified where a form of collaboration could be established in order that their environmental impact be reduced.

This project looks at applying the idea of retrofitting to industrial and commercial buildings as a way of providing carbon reduction as well as spatial and visual benefit

They all have the following characteristics:

- They have, or soon will have, energy generation and distribution on or near their location.
- They have all received some assistance (to a varying extent) from the local borough, LDA, GLA or similar body, to help the estate to thrive.

Industrial Estates in the District - west to east

Lea Valley

1. Fish Island
2. Bromley by Bow / Sugarhouse Lane
3. Cody Road

Airport

4. Thames side west (Tate and Lyle)
5. Thames side East

Barking / River Roding

6 River Road Industrial Estate/ Creek Mouth Industrial Estate
7 Dagenham Dock
8 Rainham West
9 London Riverside Business Improvement District (BID)

Conditions that should make "retrofit" more likely

Important to propose improvements appropriate to who benefits:

Short term payback for leaseholder / tenant

- Reducing energy / water bills
- No investment in the building fabric
- Benefits of collaborative procurement etc

Medium term for those with Interest in the building

- Improvements to fabric / U-values
- BMS & improved controls

Long term for those with interest in the land

- Investment in major upgrade
- Investment in new, high performance buildings

NB many of the buildings use very little energy (e.g. warehouses) and so there is little benefit in energy improvements.

Collaborative procurement

- purchase of stationary and other supplies
- freight consolidation centres (Axa planning to open one)
- car pool for use during the day

Green Leases

These will only come in when the property industry is ready for them – unlikely to be easy to persuade current agreements to be renegotiated / replaced. Some freeholders may be able to be persuaded to introduce them gradually, if benefits can be identified.

In some cases it could mean that the reduction of energy usage can not be achieved by adjusting buildings alone but by improving the infrastructure that surrounds and connects these buildings. This could be described as a collaborative approach; by sharing infrastructure and common facilities a reduction of the carbon imprint can be achieved.

Approach to retrofit

The following actions are recommended (not necessarily in this order):

Make contact with:

• the land owners
• the current tenants and any tenant groups
• the local authority

Undertake an audit of the estate / existing properties, to identify:

- the nature of the business and their needs
- the nature, age and condition of the buildings
- what sort of improvements could be beneficial

Engage with the tenants to:

- let them know what sort of improvements may be possible
- how they could benefit
- how they could go about doing themff

As a mechanism to collect ideas that can improve not only the energy efficiency of a building, but also improve the biodiversity and work environment of an area, we have started to develop handbook of ideas that can both reduce the energy use as well as enhance the physical environment and working conditions of business parks. Although there are overlaps between most of these, the concepts presented in this handbook are devided into 3 sections;

1 Economy of use - concepts that promote an efficient use of what is there already.

2 Technology -concepts that have a direct impact on the envelope of the building.

3 Environment - concepts that can stimulate the improvement working conditions.

*Some of these measures can result in a direct carbon reduction.

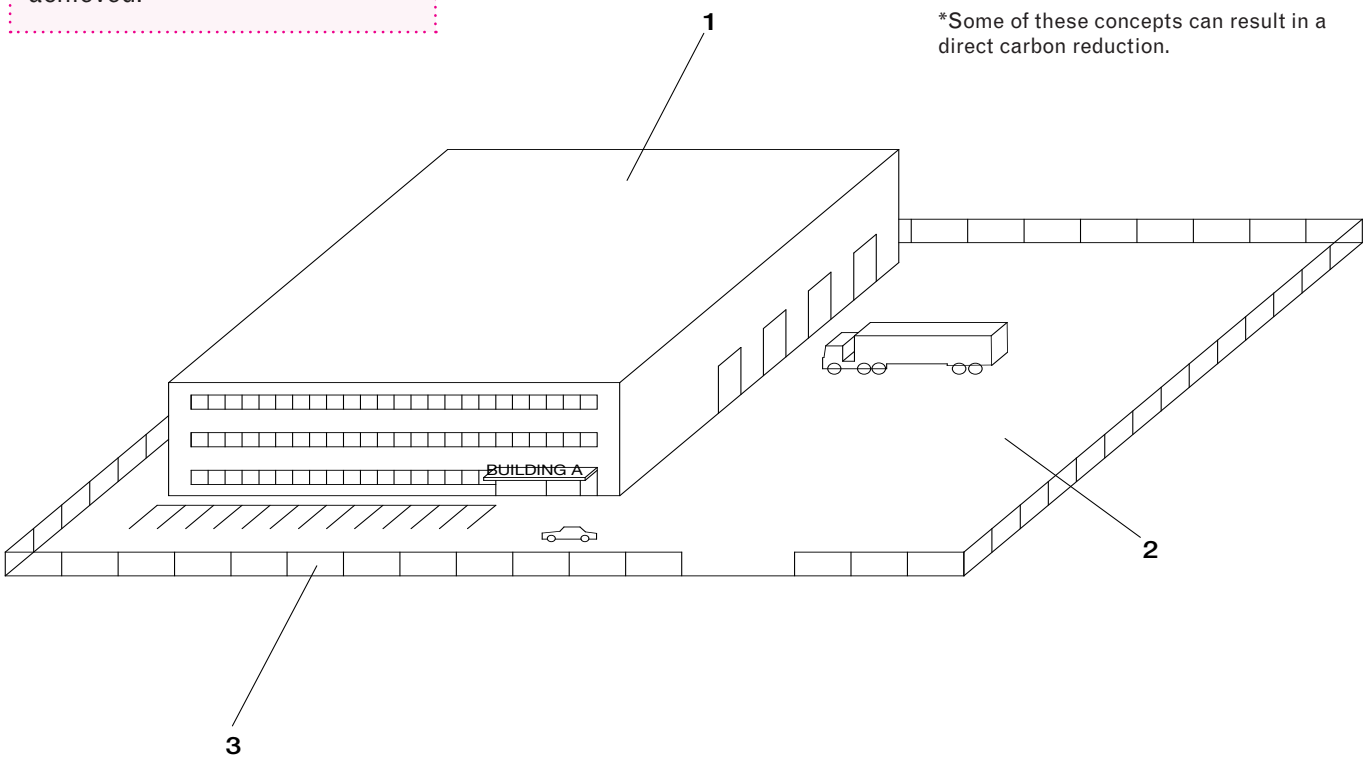
As a way of illustrating these concepts we use a typical compound where 3 physical areas of intervention are identified;

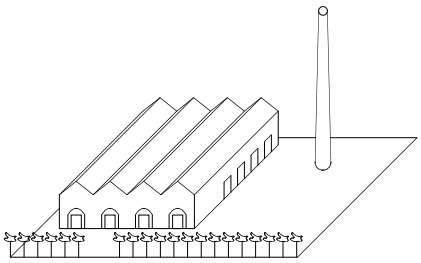
1 Building

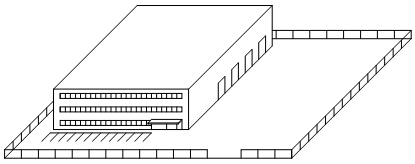
2 Compound

3 Boundary

*Some of these concepts can result in a direct carbon reduction.







1. Economy of use - concepts that promote an efficient use of what is there already.

2. Technology -concepts that have a direct impact on the envelope of the building.

3. Environment - concepts that can stimulate the improvement working conditions.

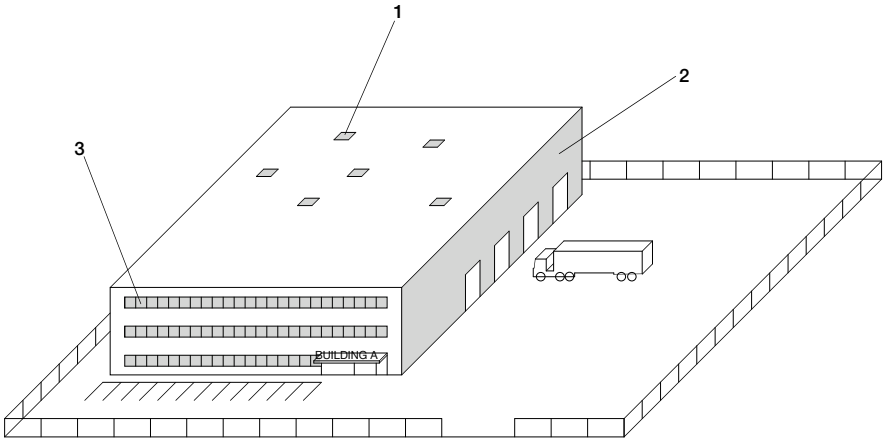
1 Valuation

A number of assessments need to be made in order to establish if a building or parts of a buildings should be retrofitted;

1. Cultural assessment – what architectural qualities are worth maintaining

2. Technical assessment – where is energy used and/or lost?

3. Economic assessment – what measures are cost effective?



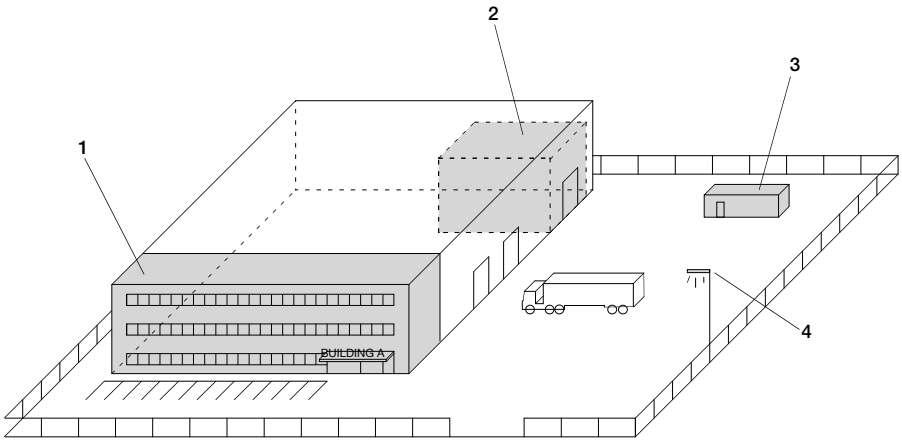
2 Light touch*

A number of small measures can be taken to enhance the performance and appearance/identity of a building;

1. Introducing natural day light to reduce energy costs for lighting – standard roof lights, or in case of larger industrial buildings PTFE cushions that span between beams could be an efficient measure.

2. Use signage and paint to create an identity.

3. Window replacement (where appropriate)



3 Retrofit elements*

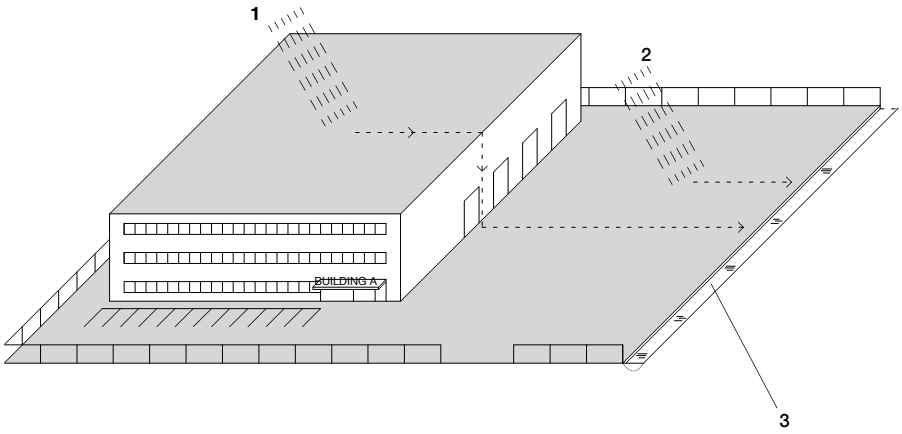
The outcome of the assessment might be that only parts or elements of a building need retro-fitting;

1. Only the office part is retro-fitted

2. An external element can be introduced that benefits from the protection against weather conditions that existing shed provides. In this way heating requirements for these new elements can be minimised.

3. External elements like a porta cabin can be introduced as a short term solution.

4. External elements like external lighting can be retro-fitted.



4 Water management

A site wide strategy for the harvesting and potential re-use of water run-off from roofs as well as the compound: sustainable drainage system.

Examples are:

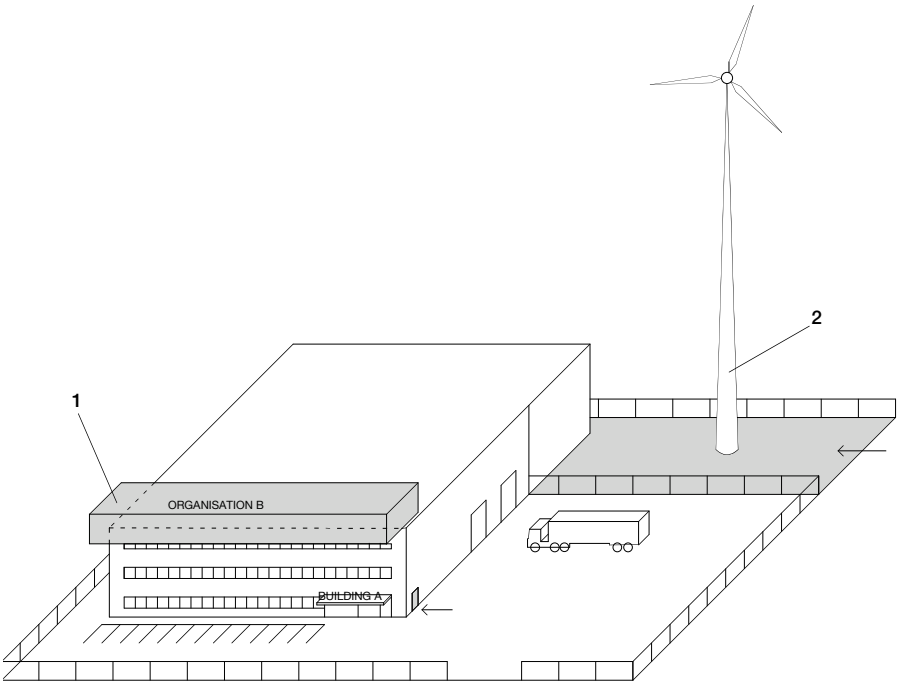
Permeable pavement: water is collected, filtered and stored underground (this involves ground works which is not suiatble for a retrofit project)

Swales and ponds: water is collected and transported to attenuation ponds. This is an estate wide strategy that could be suitable for the GED area.

1. Rainwater collection from the roof. Green and brown roofs can be used to slow down the water run-off.

2. Rainwater collection from the compound

3. Swale

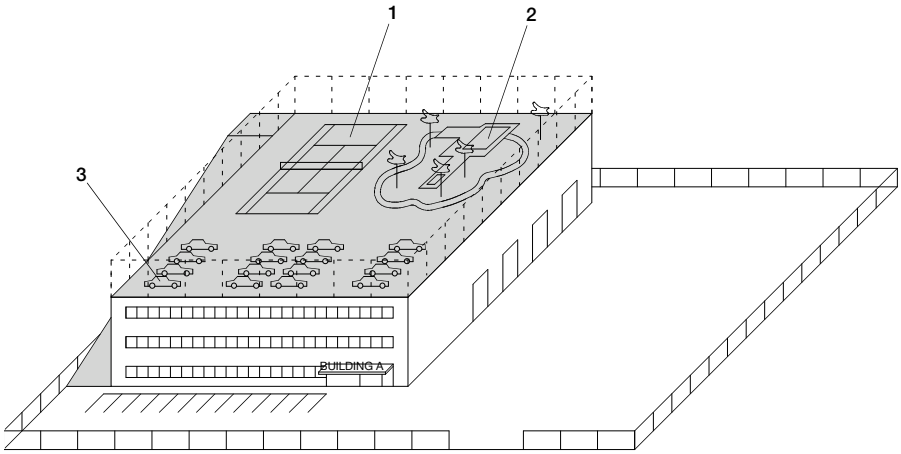


5 Extend use*

The use of a building can be extended by allowing external organisations to use parts of the building .

1. Small incubation units could connect to existing infrastructure (water, heating etc.)

2. A wind turbine could be incorporated that generates energy fro the area.



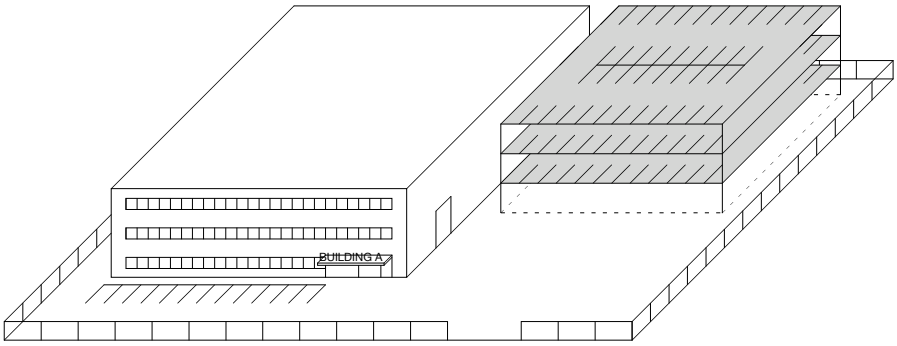
6 Roof potential

In general 40% of the area of a business park is roof space. Depending on structural conditions these roof spaces could be utilised to produce energy, encourage biodiversity (green roofs) or incorporate leisure activities.

1. Sports

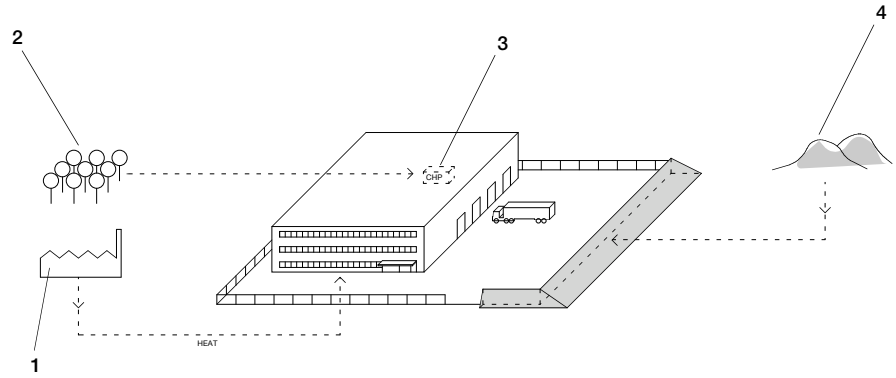
2. Japanese garden

3. Carpark (structure needs to be enhanced)



7 Densification of the compound

A building or a piece of infrastructure can be added to densify the site. It should be considered that in areas that are in close proximity to the river the reduction of flooding capacity could be minimised by raising these buildings from the ground.



8 Closed loop*

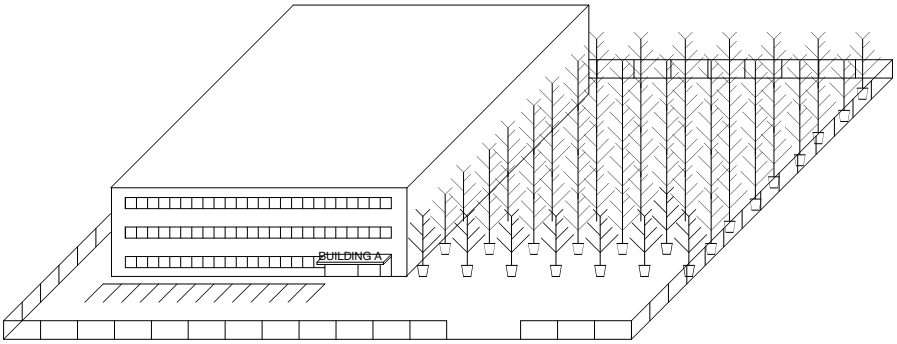
A number of resources from within the GED area can be utilised to generate energy or encourage recycling;

1. Heating as by-product from a waste facility could be utilised (large scale only)

2. Biomass can be used to operate a biofuel CHP

3. Bio fuel CHP unit (suitable for large building or group of buildings with a constant energy demand).

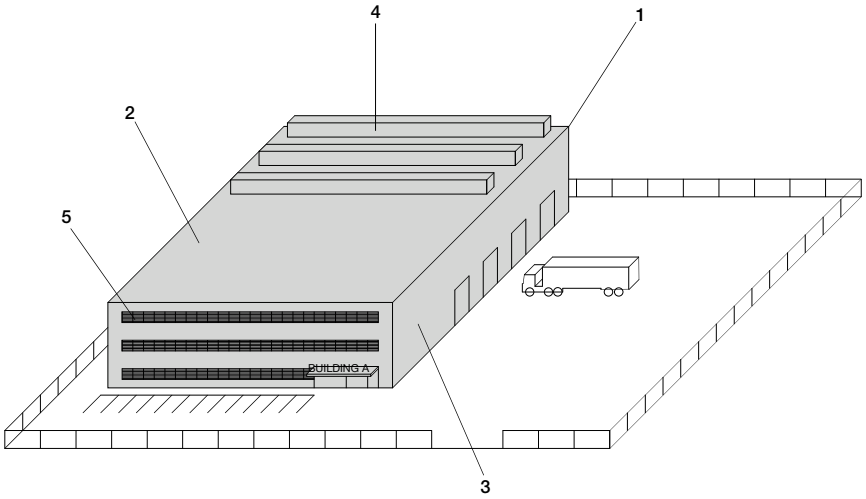
4. Soil and materials from elsewhere within the GED area can be re-cycled (excavation from Olympic site can be used for landscaping purposes).



9 Empty tenancy

In case of empty tenancy it could be considered to use a site as a holding place for other activities.

1. Tree nursery; tress can grow in pots on a site before being transferred to designated areas.



Section 2:

10 Appropriate technology*

Before adjusting the building medium measures can be taken in order to improve the thermal performance of the envelope.

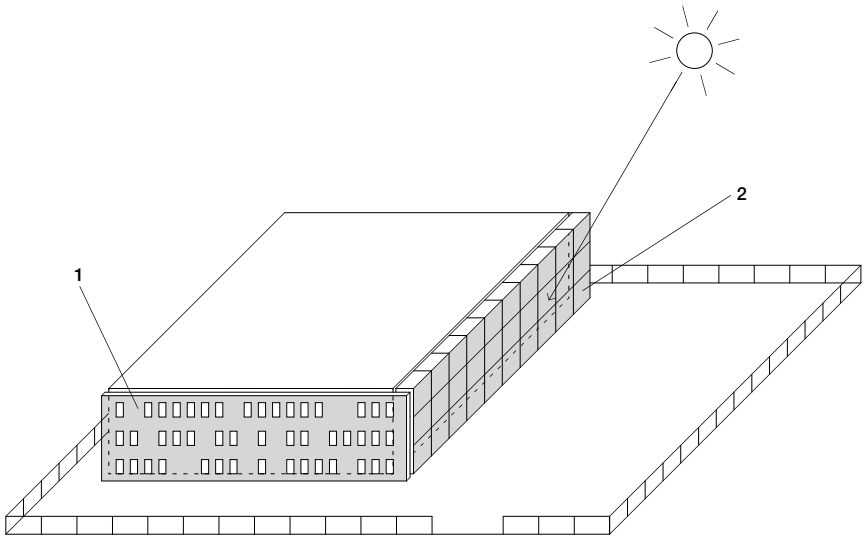
1. Detailing: air tightness is the no. 1 area where direct improvements can be made (especially large buildings).

2. Roof: a green roof can improve the thermal performance

3. Recladding of the façade

4. Introducing natural day light on a large scale can reduce internal lighting

5. Window replacement and/or external solar shading

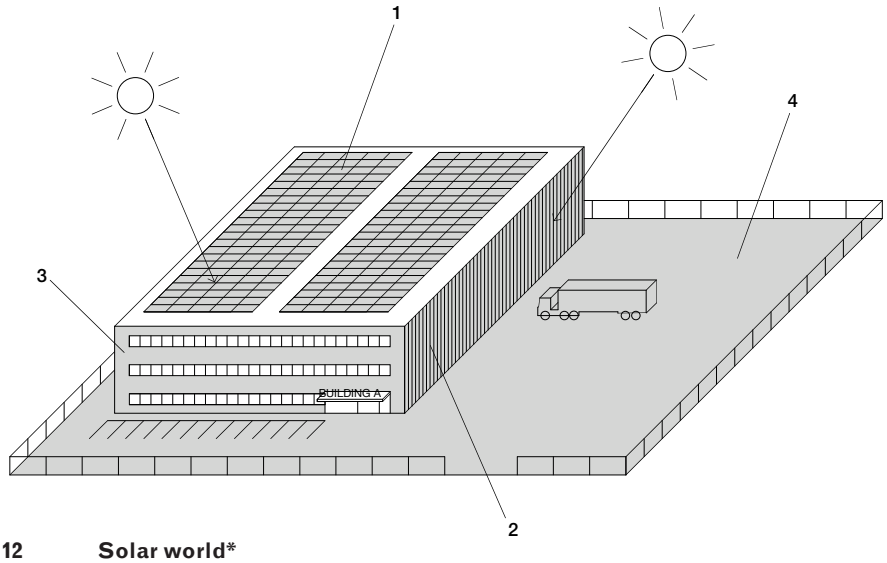


11 Double skin*

The performance the envelope of a building could be enhanced by adding a second skin;

1. Overcladding: adding rendered insulation to improve thermal performance and presence.

2. Second skin: a buffer zone can be created by adding a second (glass) skin: 20mm -3m. This buffer zone could take up functions like circulation or services.



12 Solar world*

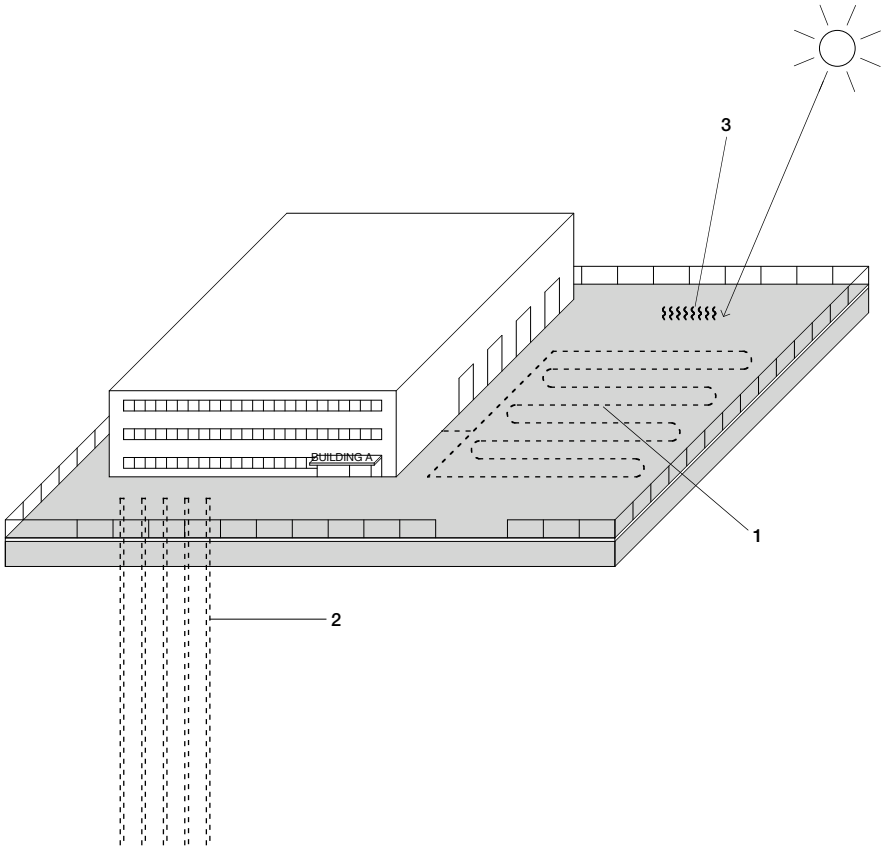
Various options that utilise the sun to generate energy;

1. Active solar energy: Photovoltaics to generate electricity (panels, sheets)

2. Passive solar energy: solar wall to generate heating; warm air is trapped in cavity between the façade and a second skin of folded metal sheets. The hot air rises up and can be used to heat the building.

3. Photovoltaic paints might be an option in the future.

4. Solar collection



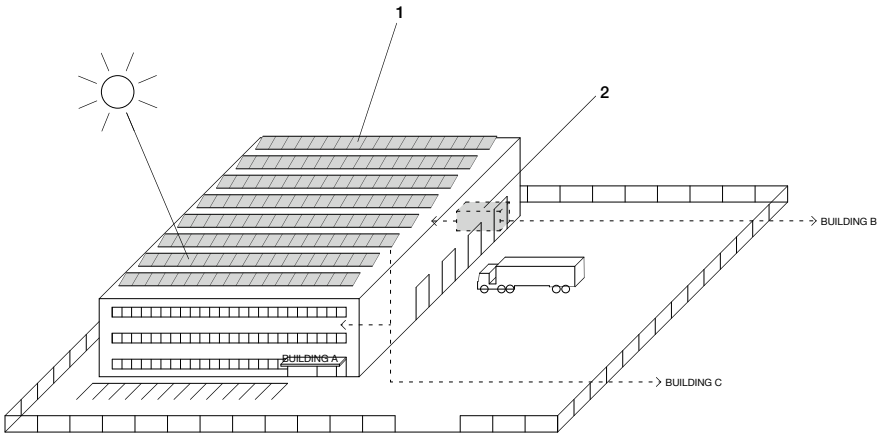
13. Productive compound*

46% of the sun's energy is absorbed by the ground. This energy can be collected by using;

1. Ground source heat pump, horizontal where large surface is available, ca. 1-2 m deep.

2. Ground source heat pump, vertical where the area is restricted, ca. 100m deep

3. Solar collection: large surfaces of black tarmac can be utilised to produce heating; the surface is heated by the sun, this heat can be transferred to heat up water in pipes that run beneath the surface.

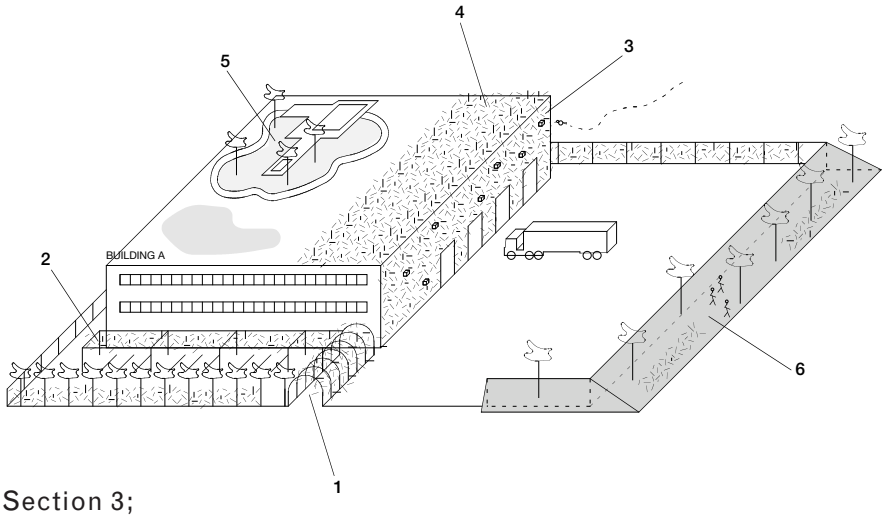


14 Every building a powerplant*

Large buildings have the potential to produce energy:

1. Photovoltaics on the roof can generate electricity to serve not only the building but also other buildings or communities.

2. Combined heat and Power units can produce electricity by using renewable sources (bio fuels). This process invol;ves the release of heat that can be used to heat the building in winter or cool the building in the summer by using absorbtion chillers.



Section 3;

15 Green pleasures

There are unlimited options to encourage biodiversity and photosynthesis in, on and around the building;

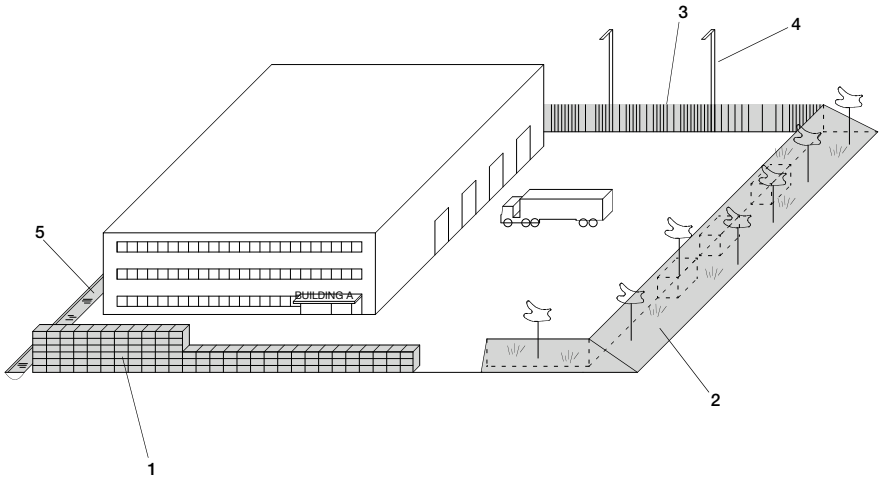
1. Scented planting at entrance area

2. Green car park

3. Greening to walls including bird's nests

4. Green roof

5. Roof garden



6. Landscaped boundary

16 The boundary layer

Various ways of treating the boundary:

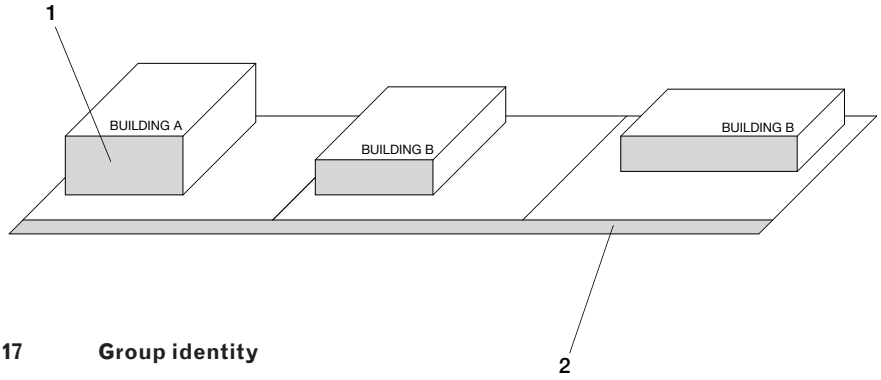
1. Gabion wall

2. Bund – slope can be used to incorporate storage of waste

3. Various levels of transparency

4. Integrated lighting

5. Swale as part of an Sustainable drainage system

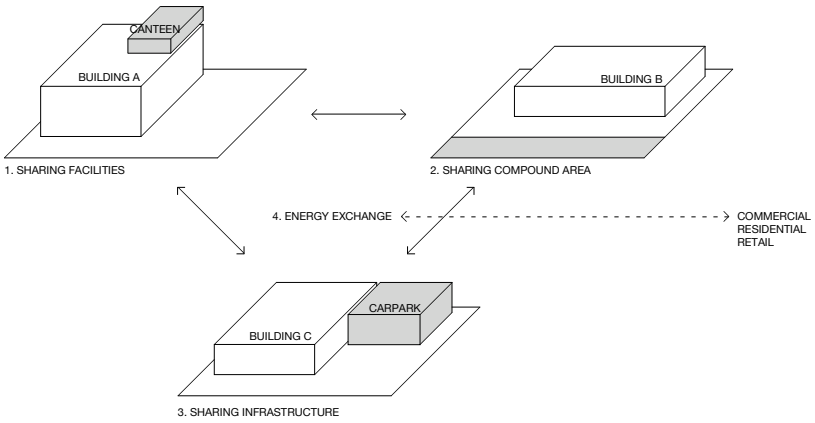


17 Group identity

A group of buildings can be treated in such a way that a shared identity is established;

1. Façade treatment

2. Boundary treatment



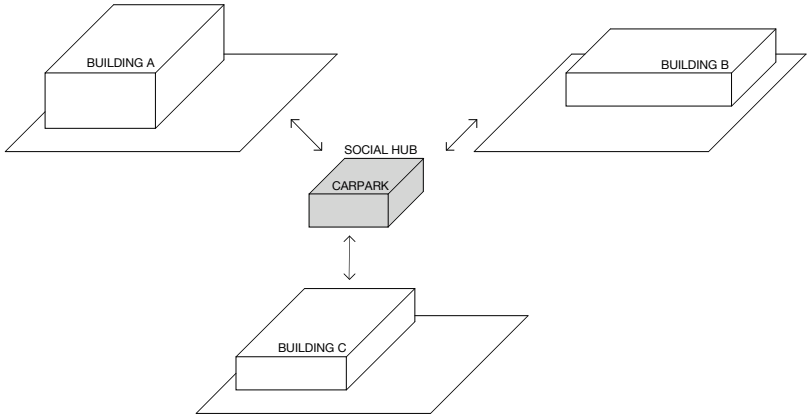
18 Industrial community*

Parts of a building or compound can be shared in order to save energy;

1. Sharing facilities: a restaurant can be shared to minimise the energy demand for kitchens.

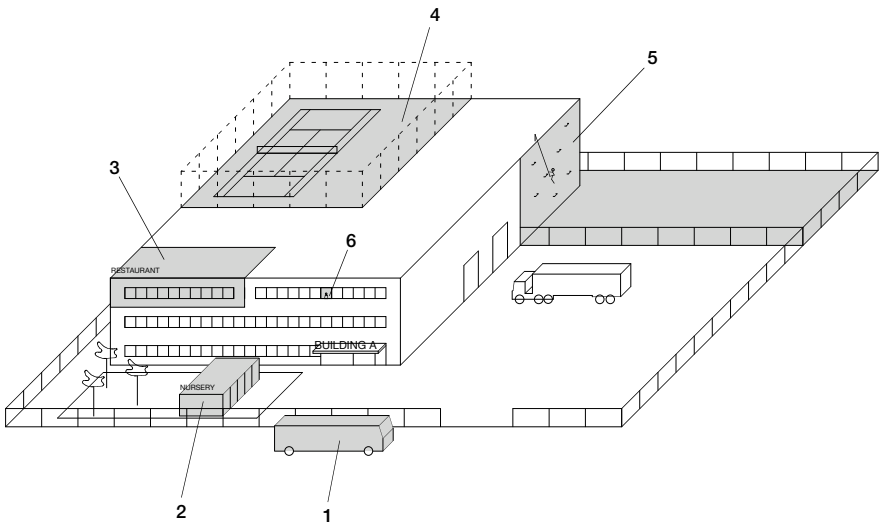
2. A compound area can be shared for temporary storage of goods and vehicles.

3. A compound area can take up a carpark that is shared.



19 Collaborative environment*

The idea of sharing can develop into central hub area that can serve as a social hub, car park or freight consolidation point.



20 Green work place

A variety of measures can be taken that improve the work environment;

1. New forms of collective transport can lead to the re-use of the car park area

2. Nursery instead of car park

3. In-house facilities to enhance social interaction

4. Sports activities can be integrated

5. Part of the façade could be used by others in the from of a climbing wall.

6. Make users aware of their behaviour.

2. Case study

Project proposal

Retrofit Hub building: small businesses that operate in the domestic and industrial retrofit market combined with large warehouse space for storage as well as freight consolidation point and social hub for the Dagenham estate.

Location

Sustainable Industries Park, Dagenhan Dock

Site

Voltaic, G-park, Dagenham. This large warehouse building, including a small office block, is currently empty and could be transformed into a Hub building.
This building was promoted as an Eco-building and proposed a photovoltaic solar generator, ground source heat pump and 15% rooflighting. Owner: Gazeley.

Proposal

A linear office building to the north of the existing building act as a new Hub building. All circulation takes place in the zone between the two buildings. As the hub strip is higher than the warehouse it has views to the river to the south while at the same time it forms a big billboard to the A13 motor way. In some areas the hub building directly meets the ground in the from of work shop spaces which have direct assess to the compound. The compound area is zoned in areas for large and smaller vehicles. An additional steel car park deck provides extra spaces for the hub building and its visitors.

The roof scape is zoned and includes a garden exhibition centre, existing roof lights and photovoltaics can be extended. As an alternative for pv panels zones of voltaic sheets are proposes, which are lighter and easier to install. The south façade is turned into a solar wall that can generate 1750 kW heating, mostly for the hub building as the warehouse might only need little heating or cooling.

Areas

Exiting building: warehouse 20.680 sqm, office 963 sqm

Site area: 10.95 acres, 4.43 hectares

Hub building: 9500 sqm

Benefits

The mixture of a large warehouse combined with small business units has several benefits:

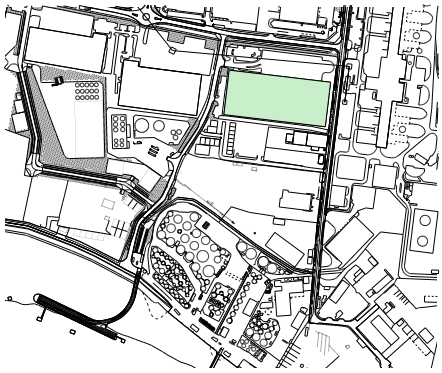
1. Energy use: the large surfaces of the warehouse can generate energy for the small units while one shared central storage area is needs less servicing than several smaller ones.
2. Transport: As freight for several companies is delivered to the same building, transport can be reduced.
3. Collaboration: with so many companies in one large building knowledge and facilities can be shared.

Employment impacts

Assessment, design, roofers, glazers, gas fitters, electricians, insulation, gardeners...

Demand drivers

Potential extension of Pilot HEEP and BEEP programmes.



Notes to existing building:

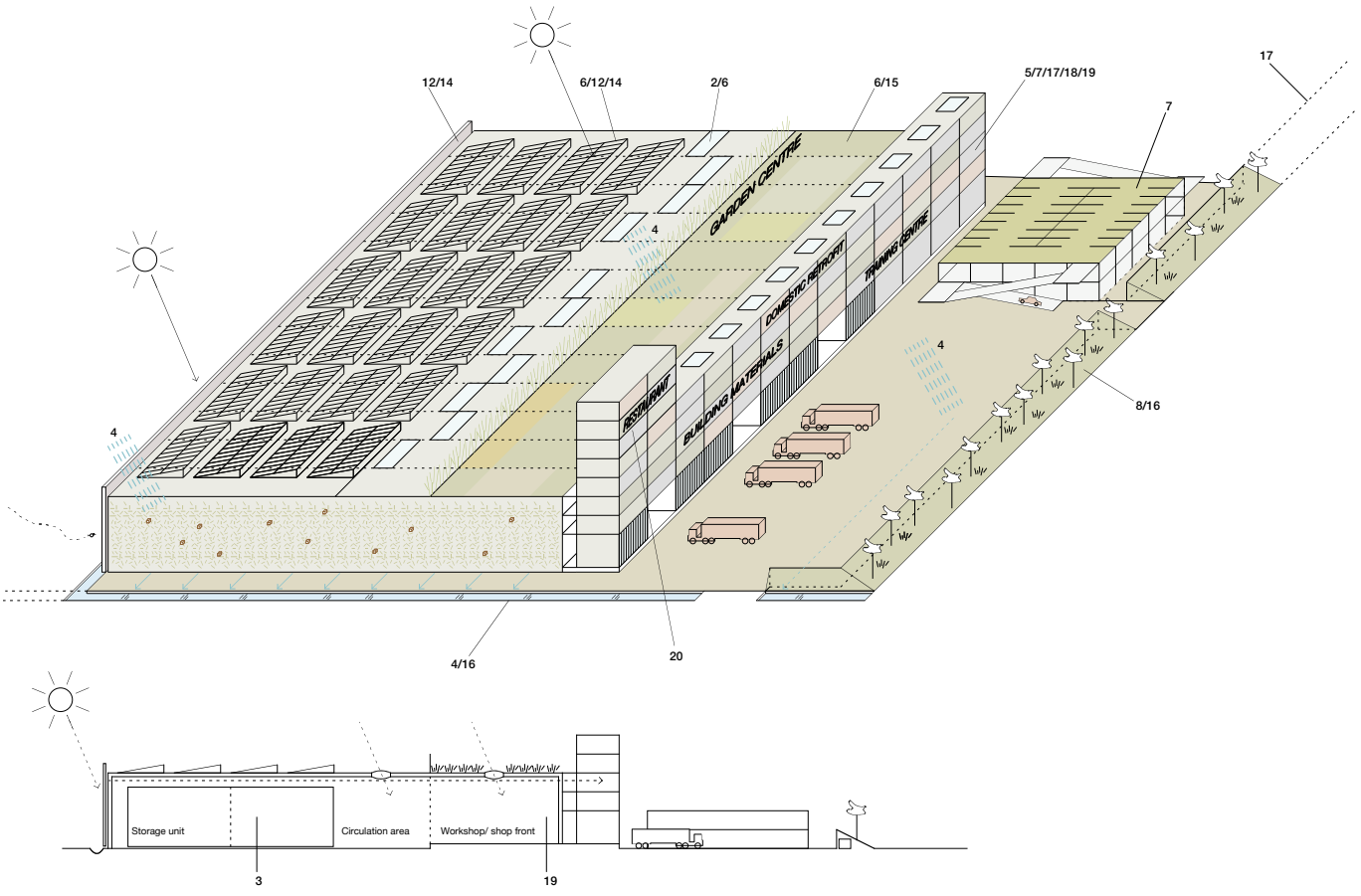
1. Warehouse
2. Office space (2 storeys)
3. Entrance gate (secure)
4. Car park area 90 spaces
5. Area for heavy goods vehicles (HGV): 37 spaces
6. Green strip (potential ELTR zone)

Notes to proposed hub building:

1. Access gate
2. Boundary to Choats road: green bund, integrated waste storage and services
3. Boundary to Checkers lane: Swale as part of a sustainable drainage system
4. Loading area HLV
5. Ground floor access to incubation units, smaller vehicles
6. Retrofit Hub building:
   - staff facilities (restaurant, gym)
   - small business units:
   - retrofit training centre and employment hub
   - material and equipment hub
   - freight consolidation point for the Dagenham estate
7. Car park deck: 56 spaces, green roof

Roof scape zoning (structure locally reinforced) :

8. Existing roof lights and green roof garden exhibition centre
9. Bigger ETFE roof lights in the middle
10. Zone for photovoltaic sheets on metal trays: provide electricity for small business units.
11. Solar wall to south façade: provide heating for small business units. Warehouse might only need little cooling or heating locally.
12. Green wall to east and west facades to encourage biodiversity and birds nesting.
13. Integrated strategy for rainwater collection: water from roofs and compound collected in swales and transported to attenuation pond.



5 LOCAL FOOD NETWORK

Low carbon context

Food production and distribution is a key part of the global carbon emissions reduction story and consumers are continually and increasingly being made aware of the impact of food miles on their personal carbon footprint.

This food network project takes the stance that 'local and seasonal' food is good, and builds on the potential for community benefits arising from local food production including social skills, education, health, leisure, skills training and employment benefits. It considers potential for allotment expansion, conversion of unused ground to productive use eg. along railway embankments, provision of communal green-houses, a public realm planting strategy of food productive trees. The project also addresses the life cycle of the food itself: how and where is it grown, how is it distributed, who does it go to and what happens to it if it isn't consumed while still fresh: what role does food waste specifically play in the waste strategy?

This project supports the Mayor's 'Capital Growth' scheme, aiming to deliver 2012 new plots of land for community food production between 2008 and 2012, the 'Foodwaste to Fuel' ambitions and the Mayor's 'Food Alliance'.

This food network project takes the stance that 'local and seasonal' food is good, and builds on the potential for community benefits arising from local food production including social cohesion skills, education, health, leisure, skills training and employment benefits.

The project proposal

This project identifies land for conversion into active food production areas as well as identifying key partners to enable and help deliver this conversion. It also identifies loops or systems where food production, consumption and waste are considered as a cycle and how symbiotic relationships can develop all the while creating an attractive, recognisable character to the area.

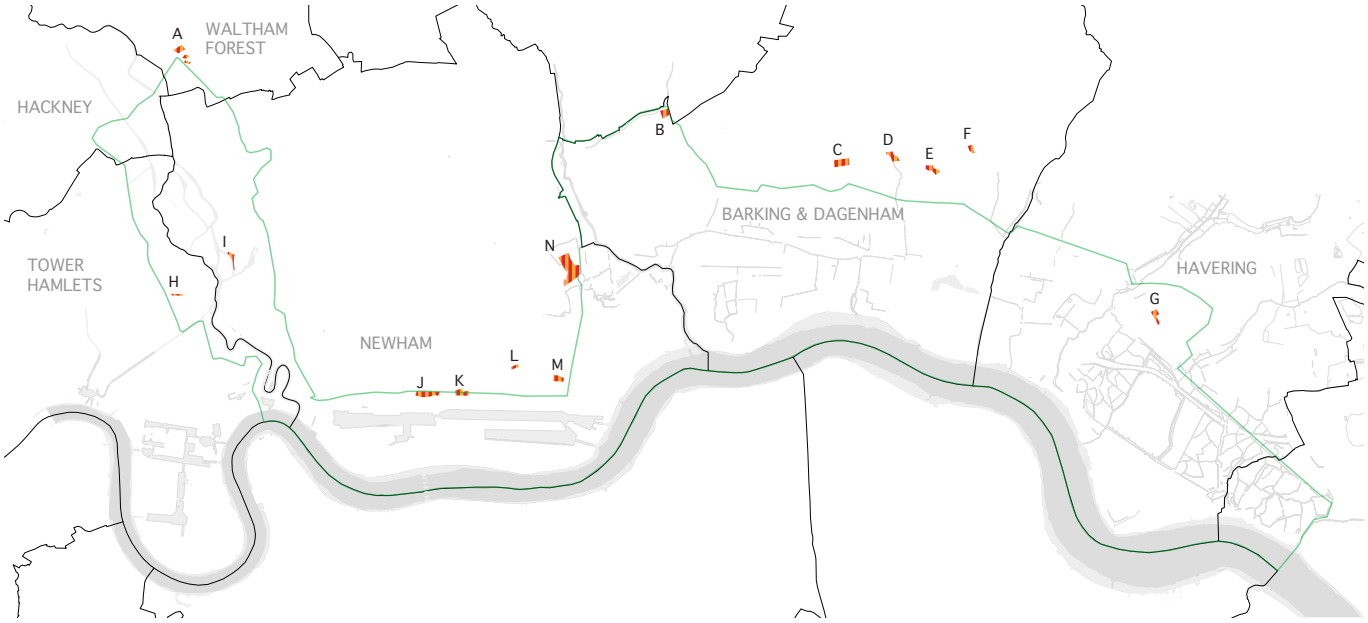
Components of the proposal

Making space for growing food

Allotments are generally understood as spaces for food production on a domestic scale, typically for houses without garden space to grow food. This generally means that the closer to the city one is, the more dense development becomes with fewer gardens, and therefore more pressure on allotment sites. This is true for the East London GED area too and the existing allotment sites to the west of the area, in Newham and Hackney have longer waiting times than those in Havering for example. Several waiting lists are so long that they have now been closed.

Residents of an estate in Brixton transforming underused open space into productive food growing space

Existing allotment sites across the District



Hackney

9 allotment sites in total
No allotments within the District (Manor Gardens allotment was relocated due to Olympic development on March 2009)

All sites are all full with long waiting lists.

Hackney is planning new allotments as part of the Olympic Park Legacy

Waltham Forest

29 allotment sites in total
1 allotment bordering the District
The current average waiting time is 6 - 18 months and longer on smaller sites

Allotment sizes:
10 rod plots (27.5 x 9 metres)
5 rod plots (13.75 x 9 metres)

Barking & Dagenham

13 allotment sites altogether
One in Barking, the rest in Dagenham
5 within or bordering the District

No allotments are available at present

Allotment sizes:
10 rod plots (27.5 x 9 metres)
5 rod plots (13.75 x 9 metres)

None of the sites are borough managed

Tower Hamlets

6 allotment sites in total
1 within the District

No plots are available at present and the waiting list for all sites are closed

None of the sites are borough managed

Newham

7 allotment sites in total
6 within or bordering the District

800 people are on the waiting list

The borough are considering plans for allotment expansion and some schools have started their own plots within their school grounds
2 allotment sites have beehives

Havering

25 allotment sites in total
1 with in the District

Allotment sizes:
10 rod plots (27.5 x 9 metres)

None of the sites are borough managed

Key to allotment sites above

A	Ruckholt Road
B	Barking Park
C	Gale Street
D	Hedgeman's Road
E	Exeter Road
F	Reede Road
G	Melville Road
H	Reeve Road
I	West Ham Allotment
J	Leyes Road
K	Connaught
L	South Beckton
M	Cyprus
N	Folkestone

No allotments are currently available in Hackney, Waltham Forest, Barking and Dagenham or Newham

Using unused spaces:

The Green Enterprise District has a large amount of infrastructure which has been implemented in a fairly haphazard way. The Channel Tunnel Rain Link for example runs almost in parallel to the more local c2c trainlines. In addition, raised crossings have been put in place for crossing the Channel Tunnel Rain Link, but not the c2c lines. This gives the opportunity to view and access land, owned by network rail. The proposal is for the Green Enterprise District to negotiate management agreements between landowners such as Network Rail and Community organisation such as allotment societies or local food networks such as Hackney Growing Communities. Priorities should be given to land which is strategically located on the Green Grid, A 'Friends of Green Grid' group could be created, starting with everyone on the boroughs waiting lists.

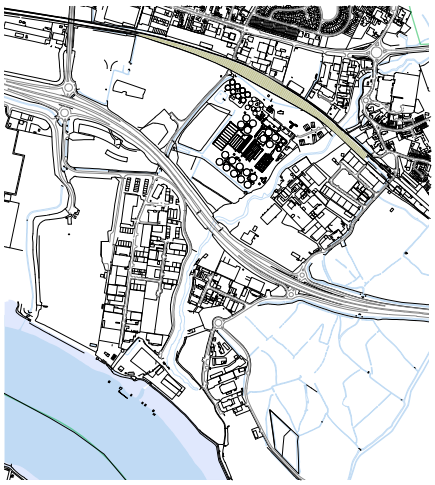
Strategic and also pragmatic routes are to be kept free.

Next steps:

Boroughs and GED to negotiate management agreements.

Contamination surveys and remediation / land capping where required.

Cost: £ 100 – 500,000 for fencing, paths and decontamination where required



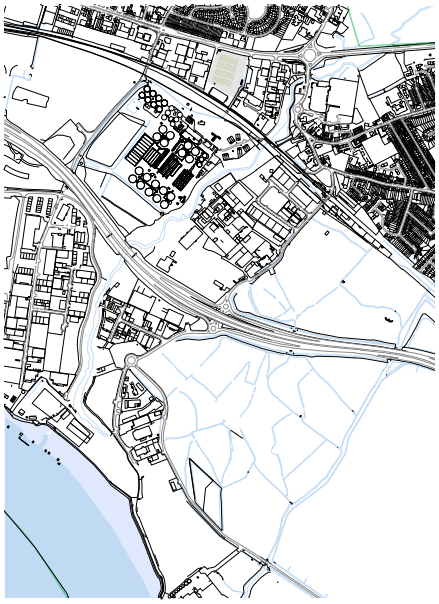
Existing and proposed situation

Havering College

A 1.9ha site is currently vacant north of Havering College's Rainham Construction Centre. The land is owned by LTGDC. The proposal is for a private enterprise or the college to make use of the site for growing food or trees commercially.

The first proposal is for a Green Enterprise District tree nursery which would be buying young trees to grow them on in white bags. Rain water will be collected for tree irrigation. It would be able to supply schemes such as the SIP, Beam Reach 5 and 6 and the Olympics with locally grown semi mature trees. The focus would be on food productive as well as ornamental trees. The compost is a by-product of the Anaerobic digestion plants and other local composting / whole food lifecycle schemes. The site would need a secure boundary, which we propose in the shape of a hedge in combination with the existing creek – providing habitats for wildlife as well as improving the visual amenity.

An alternative proposal is for a food production site in polytunnels or greenhouses. Irrespective of possible ground contamination fruit, salads, and vegetables can be grown in raised beds or trays. As is the other scheme the compost would come from other scheme, within the District. The boundary is also identical to the first proposal.



Next steps

LTGDC to agree temporary use.

Discussions with Havering College or other potential users

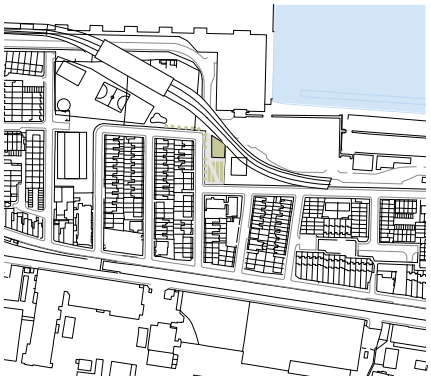
Engagement with Groundwork or other environmental charities to begin works on boundaries.

Pilot projects like these would test opportunities for addressing the largely contaminated land in the District

Communal Greenhouse Restaurant
Leonard Pocket Park

Just south of City Airport an underused site has recently been identifies as one of a number of Pocket Parks. The current proposals are for a diagonal route, grass and a few trees. We propose to use this prominent site to pilot a community greenhouse restaurant. The already proposed diagonal route should be retained and one triangle be occupied by a restaurant green house on two levels, the other for productive ornamental gardens.

The restaurant will serve food as fresh and local as possible – you can watch the chef pick your salad after you place your order. The proximity to city airport places the restaurant right at the centre of the visitor experience of the GED. Precedents such as Petersham Nurseries in Richmond or De Kas in Amsterdam are very successful.



Next steps

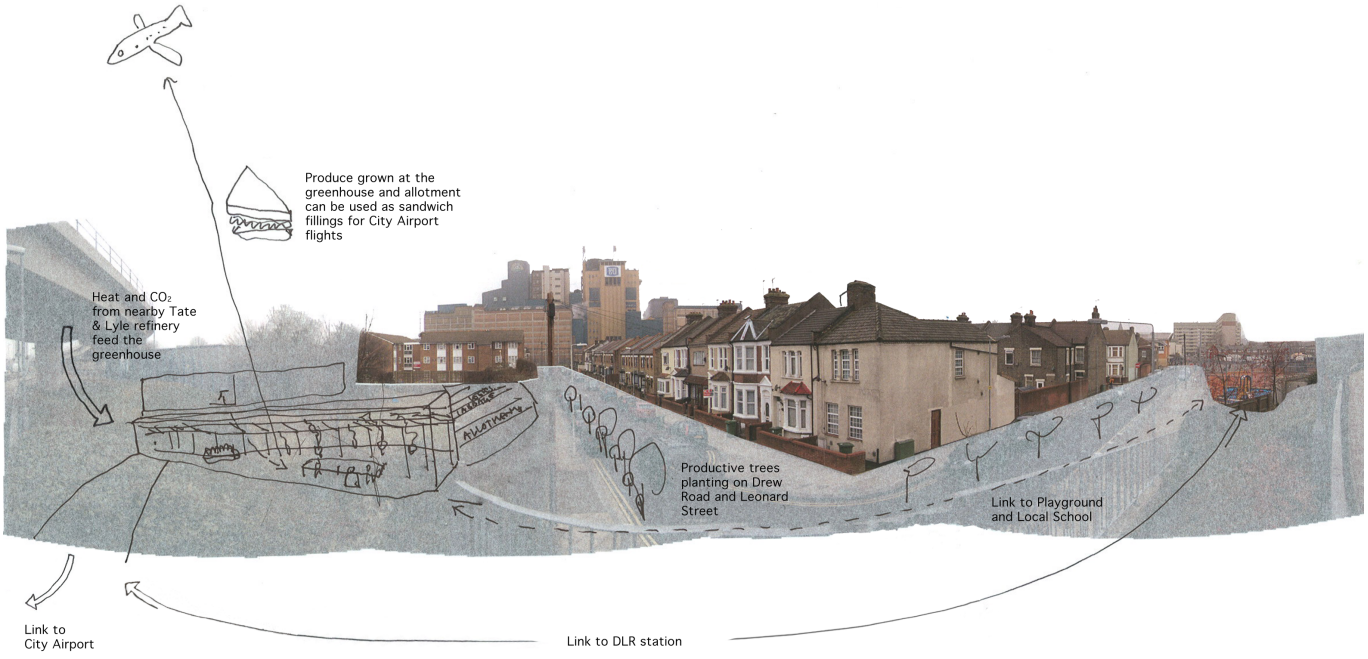
Boroughs and GED to agree Greenhouse restaurant in principle.

Further exploration of partnership with restaurateurs who have expressed their interest in locating in the GED under the principles described above

Contamination surveys and remediation / land capping where required.

Design brief / competition

Cost:
£1 – 1.5,000,000 construction cost,



Beckton Riverside National Grid Site

A similar proposal to the pilot project at Havering College on a much larger site, using the proximity of the proposed anaerobic digestion plant , a 4.5ha greenhouses could benefit from CO2 which is derived from the plant. 8.35 ha are available for growing food in the ground. See the Waste in the GED section for more detail.

Meeting the neighbours

Industrial and residential uses sit alongside each other across much of the GED. As well as industrial ecology, symbiotic relationships are encouraged between these users too. This may mean that large under-used areas of land can be used for straightforward food growing. Also, waste products from industry and enterprise can support food production with heat and CO2.

Where industrial plots have large areas of underused land, but lack the resource etc to use them for food production, adjacent uses, schools and homes are encouraged to establish relationships to make best productive use of the land. It may also be possible that any excess heat, or other waste product form the industry is used to complement the food growing. This could be extended to include food growing for consumption on site eg. a new canteen for Ford staff.

Helpers

Sustained food production relies on pollination, by bees. As well as introducing a diverse range of trees and plants as part of food production, we propose bee hives across the District. These helpers will ensure pollination for the new food growth areas and support the global failing bee population while producing honey for consumption and retail, as well as educating local people. A similar, smaller initiative was undertaken in Regents Park and the honey is sold in shops, raising funds for the bee-keepers and awareness of the diminishing bee population.

Proposed locations for the hives include allotments, gardens and rooftops of schools, as well as churchgrounds and cemeteries.

Waste

The potential for food waste to generate energy is addressed in the Waste to Energy pilot project but smaller collections of organic waste are proposed for food cycle. For example allotment societies and food growing communities will collect and compost their own organic waste.

Community and other benefits

Schools will be encouraged to visit/ sponsor/convert school areas into food-growing sites. Community payback teams could be involved too. The influence of the food network programme extends its benefit beyond just the production of food into nutritional information to a general improvement of the quality of life by improving access and quality of the public realm, and secondary benefits such as flood alleviation and reduction of heat in summer.

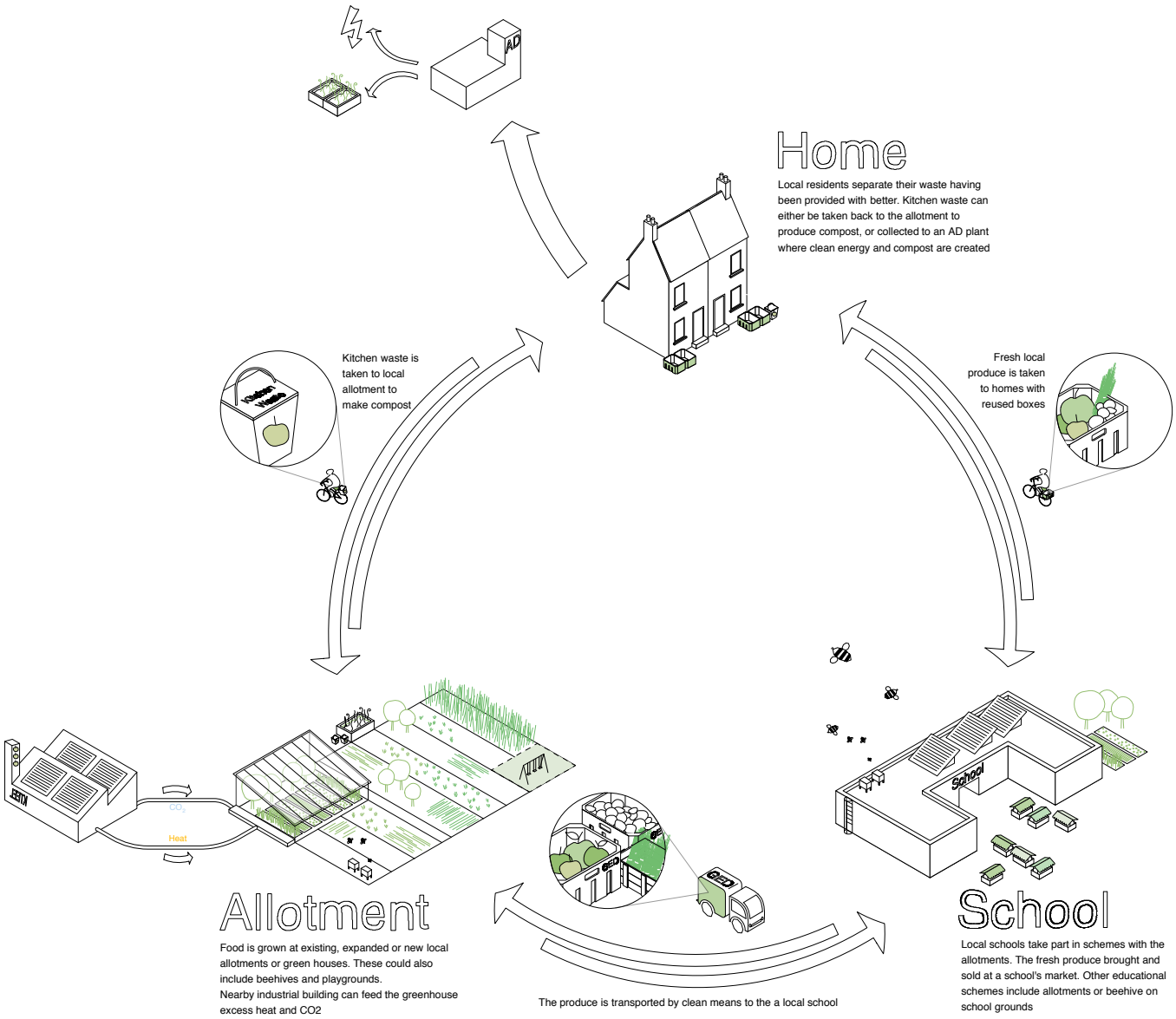
New species for public realm

Street trees are often found in residential areas and towns but less so in industrial areas. The SIP in Dagenham has proposals for extensive tree planting.

We are suggesting fruit trees are added to existing street tree planting and fruit trees are introduced where currently no planting exists, to establish a distinctive, dense, local green network of fruit trees. Species such as Figs, Walnuts, Crabapples are low maintenance as well as ornamental and productive.

A similar initiative has been undertaken in Barcelona where orange trees have been introduced into the public realm providing a crop for harvest but also a distinctive character to the place that is world renowned.

Local food network is a closed loop of production and consumption.



As well as identifying land for new allotment sites and expanding existing ones, we are extending the scope of what is considered appropriate for food growing. Depending upon site conditions, the following should be considered by all for food production:

- rooftops
- balconies
- low amenity open space
- patios and balconies
- playgrounds
- verges
- industrial sites
- street trees

Building on the precedent established by the designers at the SIP, this idea takes a step further toward proposing fruit or nut trees.

Relationship to reduction of consumption of energy and carbon generated energy

- Local food production, especially for perishable crops such as salads, herbs and soft fruit reduces food miles (carbon).
- Using heat and CO2 waste from neighbours reduces need to produce these for green houses.
- Food waste collection and processing reduces amount sent to landfill and methane production there

Demonstration of the brand/ objectives

- Reduction in food miles
- Education about carbon
- Creation of attractive physical environment that visitors want to come to

Potential employment impacts

Market gardening
Hospitality

Type of Employment

Market gardeners
Chefs, service staff
Arboriculturalists

Public Sector Demand Drivers

School kitchens
Hospital kitchens
Care home kitchens

Dependencies / Requirements
Decontamination or Capping
Import of new topsoil
Skills training
Agreements between landowners/ LA

6 ROYAL DOCKS INTERNATIONAL BUILDING AND TECHNOLOGY

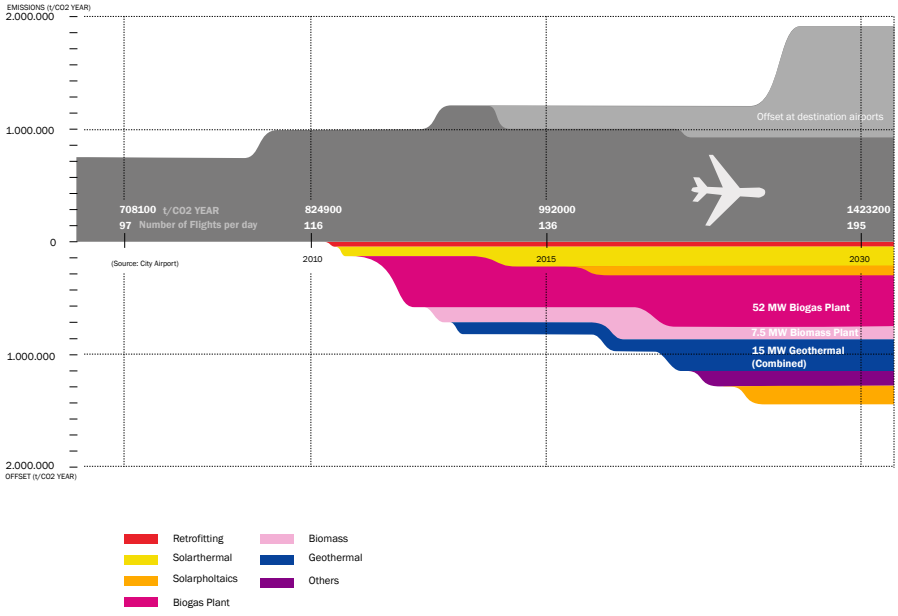
The project will focus on the concept of an International Building and Technology Exhibition (IBTE) as a core urban strategy for this district of the GED and as an example of a new relationship in cities between an airport, urban growth, and renewal. The IBTE will be a world-class exhibition of possibilities, how cities can contribute to the mitigation of Climate Change through energy efficiency, storage and renewable energy production. The IBTE is an exhibition for housing projects, industrial buildings and systems.

The area of the Royal Docks is a unique location with programmatic diversity and contrast and at the same time great opportunities. The location of the London City Airport, the internationally known exhibition centre Excel, the University of East London, as well as the proximity to the River Thames and the well-developed public transportation network give the site enormous potential to expand into a prosperous location for industry and businesses as well as residential and cultural program within the Green Enterprise District, an Airport City. London City Airport is the main actor to bring forward urban growth. The planned expansion of the London City Airport due to the increase of mobility will implicate urban growth, which means a boost of new constructions, immigration of new businesses and also population.

The IBTE will be a model case for the GED and will aim at meeting all the main CO2 reduction targets:

- The national target to reduce CO2 emissions by 80% till 2050
- The target of the London Plan to reduce CO2 emissions by 60% till 2025
- The target by CsFH that all new residential buildings should be zero-carbon-emission houses by 2016
- The Aviation target that all CO2 emission should be below 2005 in 2050

This means that in its total energy efficiency and renewal energy production the Airport City could offset the total emissions generated through the flights coming in and going out of the airport. Mobility will steadily increase and so will CO2 emissions. This is a consequence of the current life style and the mobility of modern society. But the IBTE can develop with its numerous projects an alternative powerplant in the Royal Docks through which the offsets will be achieved. In this way the Royal Docks Airport City becomes a flagship for other cities with inner city airports.



Energy diagram showing the offset of carbon dioxide emissions emitted by landing and departing aircrafts at London City Airport

Through Section 106 and land-swaps a relationship with the airport can become a mutual benefit. The airport could buy into the high profile message of the alternative powerplant, and adds this to its corporate responsibility. Through Section 106 and the land-swaps the airport contributes directly to the funding of the IBTE.

The development of an Airport City that includes businesses, commercial program, research and education facilities, public program and housing will have a positive impact on the local employment rate. The IBTE will be an attractor for invert investment. The expected extension of the London City Airport till 2030 will entail job creation. 2500 new jobs are expected to be created until 2030 due to the increase of flight numbers and passengers handled at City Airport.

The Royal Docks were once a major infrastructure for London, a giant new project completed between 1855 and 1921 and part of the global trade of the British Empire. It was a global infrastructure serving hundreds of cargo and passenger ships at a time. At some point the docks were the largest enclosed docks in the world with a water area of nearly 100 ha and an overall estate of 450 ha. This is equivalent to the whole of central London from Hyde Park to Tower Bridge. Although the Royal Docks suffered severe damage during World War II, they recovered after the war but underwent a steady decline from the 1960s onwards, finally closing in 1981. The docks' closure led to high levels of unemployment and social deprivation in the surrounding communities of North Woolwich and Silvertown.

The Royal Docks were a global infrastructure serving hundreds of cargo and passenger ships at a time.

The London Docklands Development Corporation undertook work during the 1980s and 1990s to improve local transport and promote new residential and commercial developments in the area. Several major projects have been implemented since then. One of them is the London City Airport that was opened in 1988 on the quay between the Royal Albert Dock and the King George V dock. With the establishment of the airport the Royal Docks became once again a global infrastructure. Despite its relative small size –compared to Heathrow Airport- the airport is a major infrastructure catering one of the main financial centers of the world.

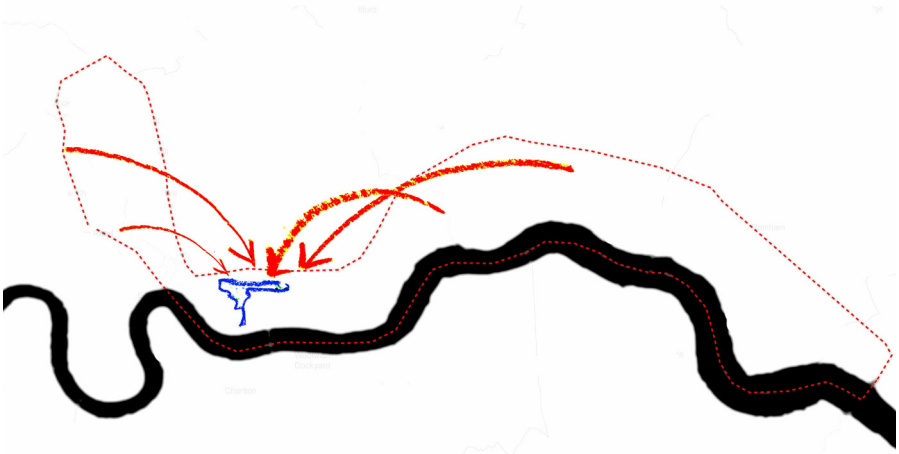
Green Technology Expo

The energy infrastructure proposed by the IBTE will give the Airport another mutation, namely using the extent and spatial typology for intelligent energy distribution and renewable energy systems that use the full length of 4km of the basins and their simple layout. Effectively this historic infrastructure becomes a new plug in system -an infrastructure of the 21st century- linking all IBTE projects and additional renewable energy production projects.

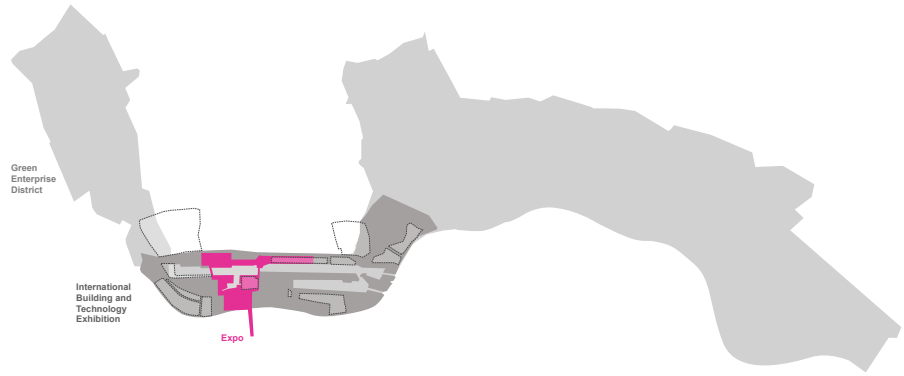
Preceding the IBTE and as a kick-off project for the development of various pilot projects within the GED a Green Technology Expo will be organized. The Green Technology Expo will open up the issue of climate change mitigation to the public through an Energy Festival and a long-term Exhibition. The Expo will start at the time of the Olympic Games in 2012. After the various Medal Ceremonies in the ExCel Building people will be guided via a system of paths and walkways through the Expo site to the southern DLR branch, to Pontoon Station in order to release pressure on the stations next to the ExCel building Custom House for ExCel and Prince Regent Station.

The Expo will be located in Silvertown Quays on the plot of the Millennium Mills with a direct link to the Excel Building across the Royal Victoria Dock, stretching eastwards on the North side of the Royal Albert Dock and will reach out to the Thames Barrier in the South. The entire Expo site will comprise 85 ha, including the Excel building and the Thames Barrier Park. The site is a major urban intervention within the Royal Docks. The area links the two banks of the dock, establishes a connection to the river and emphasizes the elongate scale of the docks, following the direction of the airport's runway. Furthermore it forms a connection piece between the major stakeholders of the site, such as UEL, Excel, the London City Airport LTD., and the Thames Barrier run by the Environment Agency.

The Expo will be exhibiting various emerging technologies and methods as well as the energy strategy and the range of planned projects within the Green Enterprise District. Different large companies and stakeholders can participate in the Expo and present different projects that become eventually part of GED program. A network of paths and walkways, small bridges over water



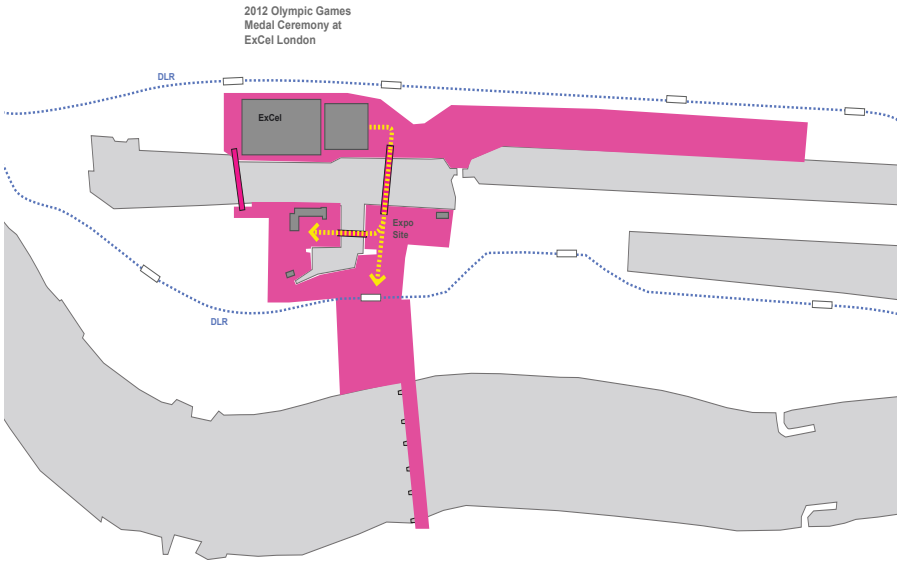
The Expo mirrors the future of the Green Enterprise District projects



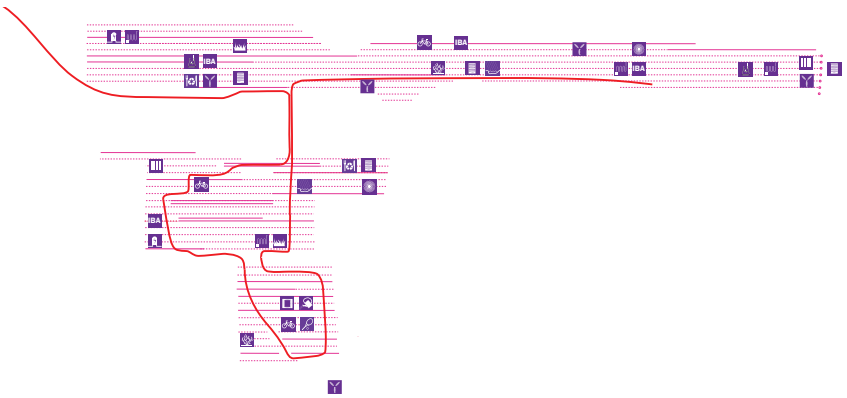
IBTE and Expo in the context of the District

connected to the public transport system will a guide the visitors through a field of the newest technologies and also soft environmental structures. A catalogue of state-of-the-art technologies and methods currently developed around the world will form the exhibition material of the Expo. Installed across the expo site and showcased in special pavilions, these technologies and inventions will be accessible to and tangible for the public. In the Excel building a large energy efficiency and renewable energy generation project fair could be organized. Examples are the International Energy Efficiency in Buildings Expo in Xiamen-China. A wide range of companies could exhibit their products on this fair. The fair will become an important event in the expo calendar.

The Expo starts off with an Energy Festival. On the Expo site big temporary tents and constructions will be erected. Numerous attractions will be showcased and inaugurated during the festival. Simulators and interactive installations attract the public and communicate the newest developments in the field of renewable energy production, technologies and computing.



Plan of the Expo



Spatial concept with circulation

Royal Docks International Building and Technology Exhibition (IBTE)

The concept of an international building exhibition (IBA) derives from an instrument of urban planning and -design that has been applied in Germany for many years. The aim is to trigger urban renewal and growth in a particular area by stimulating and managing new ideas and projects in social, cultural and ecological context. The IBA motivates international participation in different building and infrastructural projects through competitions and tenders. The IBE requires a company structure that is set up for a limited duration, mostly for seven years. This company functions as the managerial and organizational body for the development of projects as well as for the stimulation of public awareness and discussion. It has a curatorial role in the development of the IBA site. The company is a subsidiary of the city in which the IBA takes place and entrusted to develop the IBE site. The budget derives from public funds.

The project envisages projecting the IBA concept onto the site of the Royal Docks and extending the program by combining housing, industrial, infrastructural, and energy efficiency projects.

A corporation that has been set up will manage the different projects in the Royal Docks that aim at the realization of modern residential, office and industrial buildings that demonstrate innovative energy concepts, as well as the development of infrastructural projects and that deal with energy production and systems for energy distribution and storage. An example for such a corporation could be the The London Docklands Development Corporation (LDDC) set up by the UK Government to regenerate the depressed Docklands area of East London. The ambition is to initiate projected development of the Royal Docks, to turn the site into an exemplary Airport City as well as the realization of a new and ambitious energy concept -the introduction of an alternative, decentralized powerplant that is able to offset the carbon dioxide emissions generated though incoming and outgoing flights from the airport and will therefore turn the London City Airport into the first ‘green airport’.

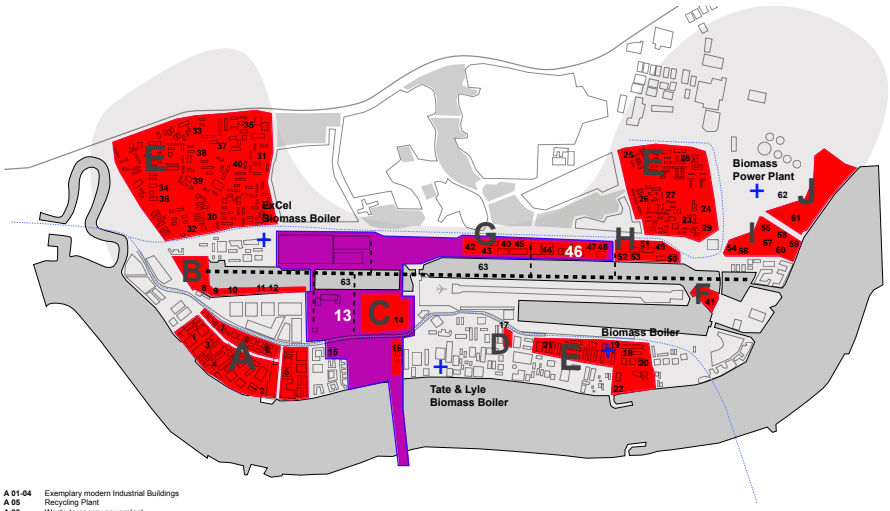
The site of the London City Airport has one of the highest CO2 emissions within in GED caused by the daily flight movements. Increasing mobility especially a raise of air traffic in the coming years implies higher CO2 emission. The CO2 emissions at the airport are expected to double in the next 20 years and reach 1.4 million tons CO2/ year in 2030. The airport plans to increase the number of flights and the amount of passengers. At present the airport handles 2 million passengers per year; in 2030 the number will grow to 8 million per year. The number of flight movements per year will rise from 61.000 to 143.000 per year in 2030. The London City Airport is planning to accomplish the expansion with a more efficient use of the existing runway. No other runway is planned. (source: London City Airport Ltd.)

Our calculation shows that with a gradual implementation of a range of renewable energy production- and energy efficiency projects the CO2 emitted by aircrafts departing and landing at the airport can be offset. These projects include large retrofitting plans in Canning Town, Beckton and North Woolwich, the implementation of powerplants generating energy form biomass/gas, solar and geo thermal energy production, and the installation of solar-voltaics. The totality of the projects realized during the IBTE will manage the offset plan. Some singular projects will contribute to a great extend to the offset like a new powerplant, others contribute in their plurality like the retrofit of existing houses.
The energy performance of all projects of the IBTE together will become a benchmark for the GED as a whole and demonstrate the potential of actual carbon reductions in growing cities, which is crucial in regard to the European CO2 emission reduction target of 90% till 2050.

An essential action within this plan is the development of a Local Smart Grid that will connect existing and the newly developed projects in the course of the IBTE. Suppliers and consumers will be connected through a modern and digitalized energy network.
Major characteristics of such an energy network are:

Increasing reliability, efficiency and safety of the power grid
Enabling decentralized power generation so buildings can be both an energy client and
Provide consumers with interactive tool to manage energy usage
Flexibility of power consumption at the client’s side to allow supplier selection
Increase GDP by creating more new, green-collar energy jobs related to renewable energy industry manufacturing

In collaboration with government, boroughs, the GED Management Company, energy suppliers and other companies the smart grid will be developed. The local smart grid within the GED will eventually expand into the entire Green Enterprise District.



A 01-04	Exemplary modern Industrial Buildings
A 05	Recycling Plant
A 06	Waste-to-energy powerplant
A 07	Hybrid Houses: Living on top of Industrial Buildings
B 08-12	Housing Projects – Water living
C 13	**Expo Infrastructure**
C 14-16	Exemplary Houses on Expo Site
D 17	Communal Green House
E 18-40	Retrofitting and densification Projects
F 41	New Aircraft Fuelling Station
G 42-47	Example Office Buildings
G 48	**Green Enterprise and Cleantech Incubator**
H 49-53	University Campus
I 54-60	Example Buildings Mixed-use
J 61	Beckton Loop Anaerobic Digestion Plant
J 62	Green Houses
K 63	Royal Docks Smart Grid

IBTE programme

In the following five potential pilot projects will be sketch out that can be developed in the near future as start-off projects for further developments and activities in the Royal Docks – The Green Technology Expo and the IBTE.

1 Infrastructure of the Green Technology Expo

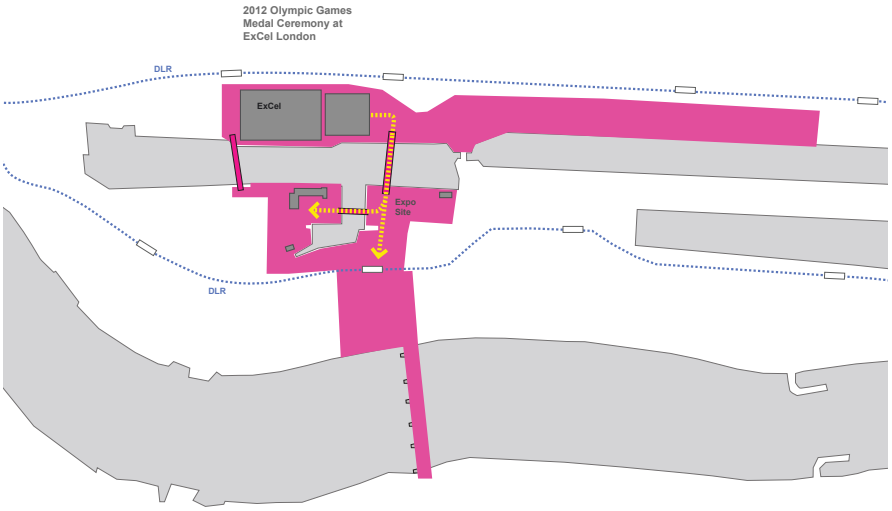
The project will develop the infrastructure of the Expo. The project will include an entrance area and several walkways and paths through the expo site. Basic service facilities will be designed and the Millennium Mills will be partly cleaned for future use. A number of small landscaping projects could also be part of the infrastructure project. Main focus will be a bridge linking the two banks of the dock and establishing the link between the ExCel Building and the Expo and between the two DLR branches.

Size: Interventions on 15 ha of the Expo site

Costs: 5 Million £ (including bridge, walkways, service facilities and landscaping)

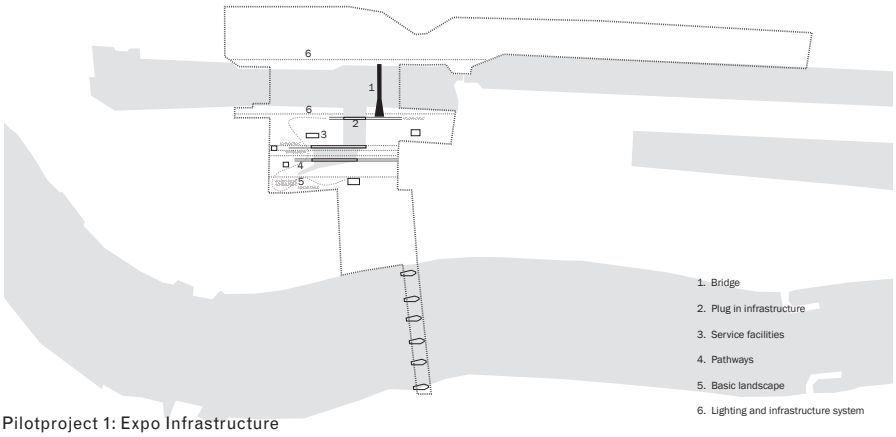
Our calculation shows that with a gradual implementation of a range of renewable energy production- and energy efficiency projects the CO2 emitted by aircrafts departing and landing at the airport can be offset

Olympic Medal Ceremony 2012 in the Excel building



The new infrastructure will guide visitors of the Olympic Medal Ceremony 2012 in the Excel building into the Expo site

The site of the London City Airport has one of the highest CO2 emissions within in GED caused by the daily flight movements. The CO2 emissions at the airport are expected to double in the next 20 years and reach 1.4 million tons CO2/year in 2030.



Pilotproject 1: Expo Infrastructure

2 Hybrid Buildings - Thames Side West

This pilot project explores new forms of floating housing. The project will show solutions for a medium size floating apartment block. Main questions are how comfortable water-bound living can be realized without any harmful impact on the environment or residents' security concerns and also how an inhabitation of the Royal Victoria Dock could look like. Water should become an integral part of the energy concept of the building.

Size: 1 appartment block, 2000 sqm with 20 housing units
Costs: ca. 3.5 Million £

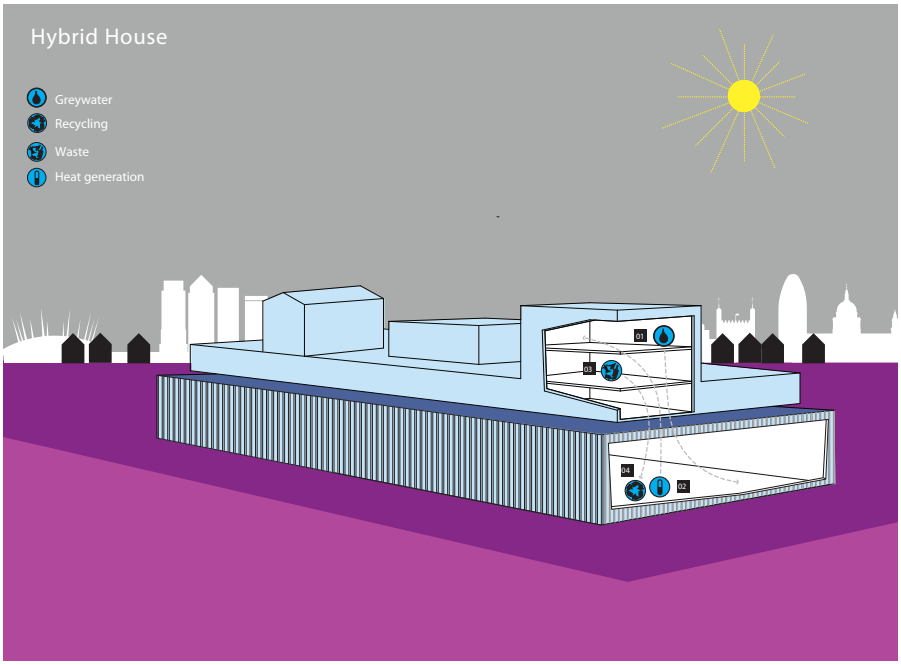
Citadel residential concept in Holland

Ijburg in Amsterdam Architect Zaaijer

3 Hybrid Building Thames Side West

The pilot project combines different programs within a building. The lower part of the building is reserved for industrial purposes like workshops, storage space and offices. Companies dealing with recycling and re-use of materials could settle down here and work closely with the proposed recycling plant in the Vanesta Wharf. The upper part of the building will contain working/desk space and studios as well as residential units. How could the different functions support and benefit from each other? What kind of energy concept could form a valuable link between the different programs?

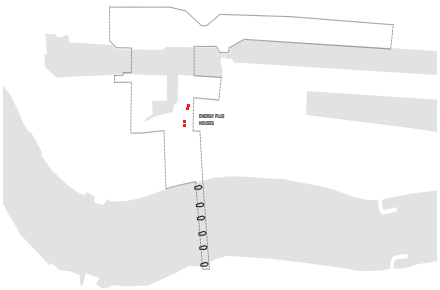
Size: 1 example building, ca. 1500 sqm
Costs: 2.5 Million £



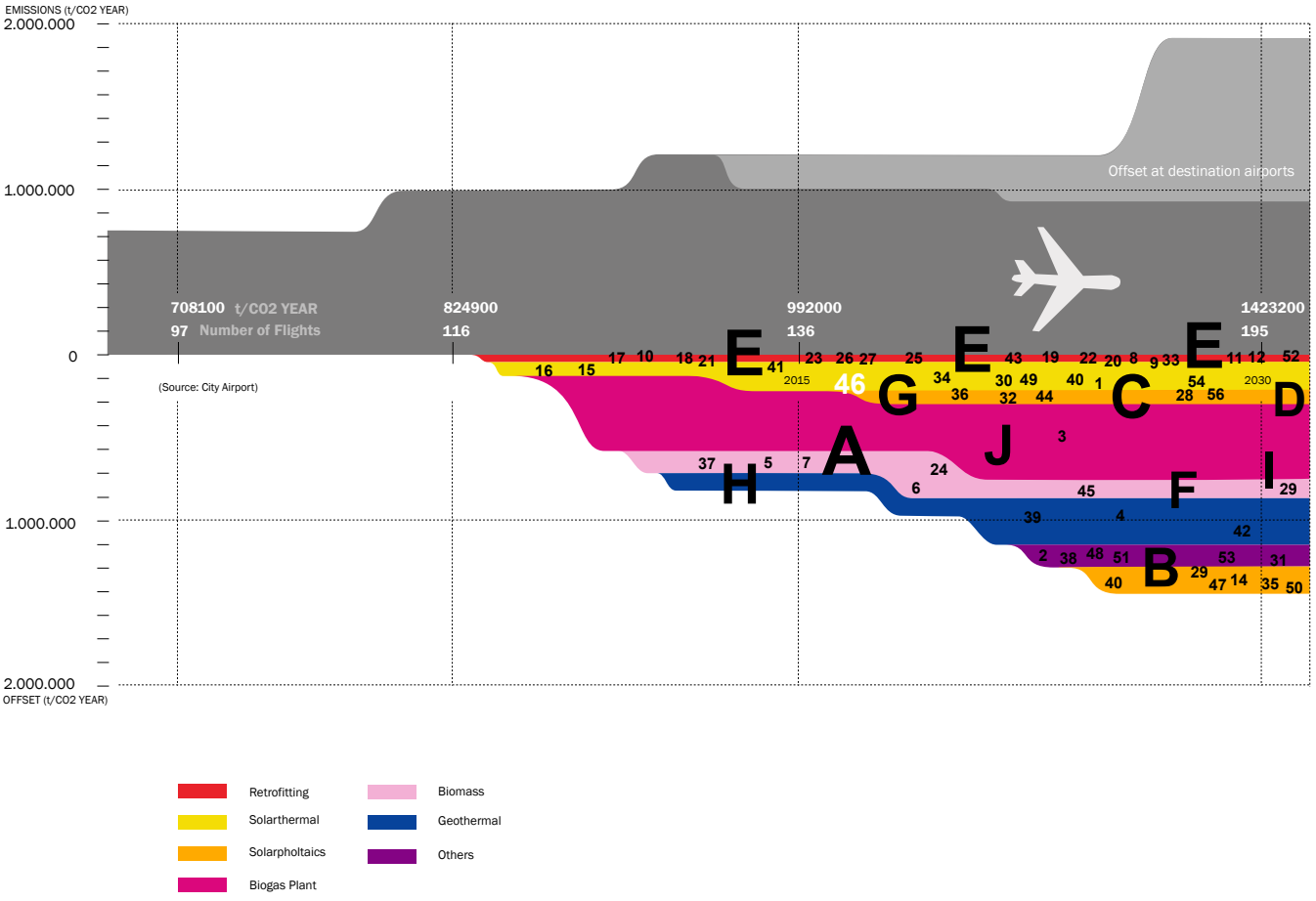
4 Energy-Plus Houses on the Expo Site

Exemplary housing units will be developed on the future Expo site that demonstrate a highly efficient energy concept. The units should be able to generate the energy that the inhabitants use and even a surplus that can be fed in the local energy grid. What kind of new materials could support the energy concept?

Size: 4 example buildings, each 150 sqm
Costs: each 400.000 £

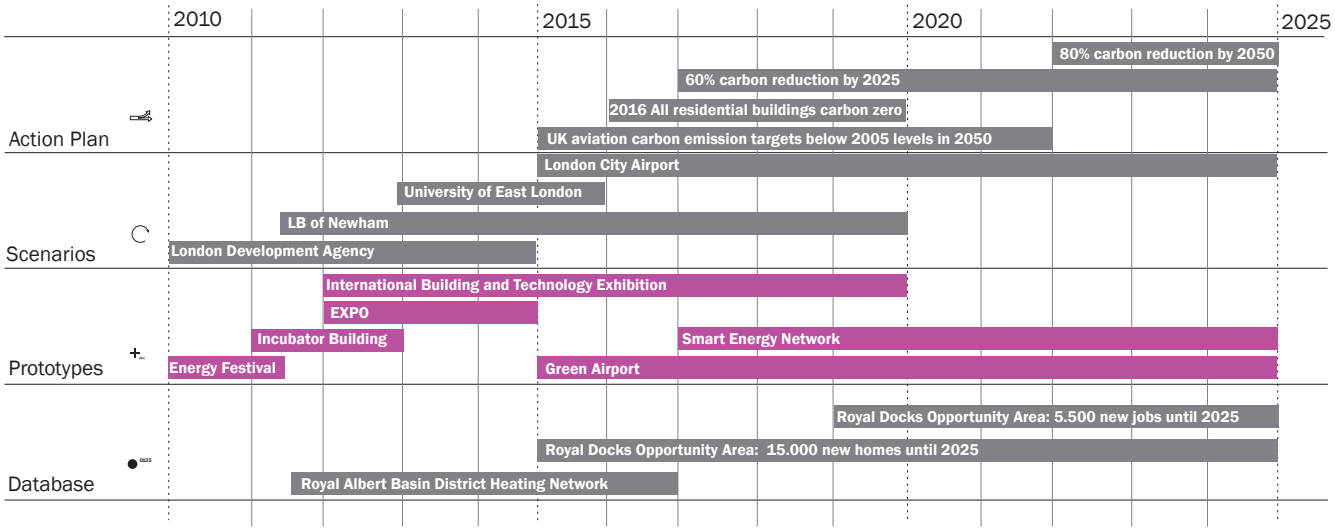


In their totality the IBTE project are able to offset the CO2 emissions generated at the City Airport



In their totality the IBTE project are able to offset the CO2 emissions generated at the City Airport

Delivery Strategy International Building and Technology Exhibition / EXPO



7 OLYMPIC LEGACY HOLDING STRATEGY

The project proposal

After the games, a number of sites designated for residential and commercial developments will, in the current economic climate, remain unused although located in high quality parkland space, with excellent infrastructure.

The original Olympic Legacy Masterplan is currently being reviewed as its reliance on high density development is felt to be undesirable, with a focus now on family housing. The phasing and the interim uses are therefore also under review. Assuming the legacy areas will remain, there are up to 70ha of land available for interim uses.

The Green Enterprise District Study is well placed to make proposals for these interim uses, avoiding a post games park full of unattractive hoardings.

Newham, one of the Olympic Host Boroughs, is also keen to achieve convergence with Londons western boroughs, by addressing its fuel poverty. Energy generated sustainably, locally and at low cost will help towards this.

Proposals will aim to:

- improve the physical and visual amenity of the Olympic park and its adjacent sites post games.
- create a continuous attractions within the park beyond sport, based on innovative low carbon technologies, sustainable energy production, local food production
- raise revenue from sites which are not suitable for immediate development

Proposals :

- Testing and demonstrating innovative low carbon technologies such as photovoltaics.

Prototypes such as street lighting generated by pv panels in paving slabs, or by the footsteps / movement of people could be tested in a 1:1 scale and contribute to the visitor attraction during and beyond the games.

2012 Olympics

Land available for interim uses

Olympic legacy final phase delivery

Energy production

- Growing Biomass in the form of short rotation coppiced wood, bamboo or grasses to help supply the Olympic CCHP plant.

Assuming 40 % of the available 70 ha could be used for this the area could produce 1,400Mw/ha per year.

Hemp can be grown to be used as an insulating material, helping to make new buildings carbon negative through sequestration.

A temporary or permanent plant can collect spent food fats, especially during the games, and converted these into bio diesel.

- local small scale waste facilities (such as small scale anaerobic digestion facilities, or in-Vessel composting (Rocket)

Montages produced by the designers to show the Legacy. Below and across, how the holding pattern for the legacy could look

The Olympic quarter looking south, a legacy phase 4 projects, as illustrated in the current legacy masterplan; and a proposal for using temporary site for growing biomass with short rotation crops

- Creating a local food economy, from growing fruit and vegetables, to production of food, to consumption. A global food market (similar to Borough Market) close to Stratford City, building on the diversity of communities in Newham. 250,000 strong population speaks more than 100 languages

Tree or other plant nurseries

- (locally grown trees supplying the street required in the landscape strategy of the GED or in the SIP and Barking Riverside)

- supporting biodiversity – woodland or meadow planting

The Olympic quarter looking south, a legacy phase 4 projects, as illustrated in the current legacy masterplan; and a proposal for a global food market.

While most of the park will be ready for post games use in 2013, the first development are not expected to be complete until 2015/16 and the final phases until 2040, so some temporary uses could be there for up to 30 years.

We are assuming that of the 70ha land designated for legacy uses, 30% will not be available for interim uses. Of the remaining 49 ha we recommend the majority to be used for growing biomass, about 7 ha each for photovoltaic arrays and meadows (these could also overlap), and 1-3ha each for food market, testing technologies and energy from waste facilities.

This strategy can apply for the Olympic legacy site, as well as other currently unused sites awaiting development such as Barking Riverside, and the LDA landholdings north of the Ford Works in Havering

Montages produced by the designers to show the Legacy. Below, how the holding pattern for the legacy could look

Stratford City development, a Legacy Phase 4 projects, as illustrated in the current legacy masterplan; and a proposal for annual or perennial meadows. These can be planted on sites with low soil quality and even rubble

Stratford City development, a Legacy Phase 4 projects, as illustrated in the current legacy masterplan; and a proposal for illuminating bridges with electricity generated by photovotaic panels in paving slabs, and temporary pv arrays.

Relationship to reduction of consumption of energy and carbon generated energy

There are various proposals for use in the dormant sites. Those proposed for energy reduction; this proposal aims to produce clean energy from renewable sources for use by local people. This will begin to address the 'convergence' aspirations of East London boroughs to achieve similar energy conditions to West London residents.

This initiative is supported by the already operational initiatives of the GLA/IFS and others to retrofit existing housing stock and public buildings across London, including those within the GED area. This will mean that less energy generation is required as buildings will be more efficient in their energy consumption.

Opportunities include supporting a switch of the Olympic CCHP plant to locally grown biomass, and locally sourced gas.

The local food production uses will bring about associated benefits of reduced transportation of food and emissions associated with it as well as avoid need for mass refrigeration storage etc.
7 Ha photovoltaic arrays could produce 1190 Mw per annum.

Demonstration of the brand/ objectives of District

The project ties in directly with the London Olympics proposals to be the most sustainable Olympics ever. Not only during the Games but thereafter sustainability issues will remain at the heart of the Olympics, addressing and improving the local environment.

The uses on the land plots, energy production or food production are in keeping with the overall GED objectives. Demonstration sites/facilities could be incorporated into sites, educating and extending ideas to a broader audience. The proposed visitor centre focussed on sustainability should be supported.

Potential employment impacts

Potential for job creation during establishment of these uses on these sites, thereafter likely to be low, ongoing maintenance requirements.
Medium for local food projection.
If the portable/temporary energy generators are successful, there is potential that this initiative is rolled out across London/UK creating more employment opportunities.

Requirements / dependencies for project delivery

Generally the leverage and purchase power the Olympic Legacy Company has through owning all land, buildings and leases should be used to influence the partners and operators behaving in a Green Enterprise way wherever possible.

- Availability of land and systems/ networks established for distribution of generated energy
- Contamination of land to be considered – food growing might need to be on raised beds/trays
- Timing important - ideas to be developed to influence the new brief for the intermediate masterplan.

INWARD INVESTMENT EVENT 9 DECEMBER 2009

This consultation event was organised in collaboration with Think London and Gateway to London. Both the East London Green Enterprise District and The Low Carbon Capital project (carried out by Ernst & Young in tandem with the GED project) were consulted on.

The event's discussion was divided into 4 themes – Waste, Sustainable Transport, Clean Tech and Smart Distribution. The notes below reflect the summary of the discussion for each of these themes.

Smart distribution table

What is being done already that is driving new low carbon businesses, services, jobs, inward investment etc

- Additional power consumption is occurring for IT businesses seeking to expand – but little support to incentivise business expansion and carbon reductions;
- Business model is changing in light of climate change but cost associated with lower energy use technologies (those in the supply chain should also be encouraged to provide lower carbon products);
- Retrofitting not considered to be an option for these businesses as legal fees and planning process is prohibitive – more scope for Greenfield businesses;
- Other countries are 'aggressively' pursuing opportunities (for example: strong involvement of Mayor; focus on specific sectors; shorter planning processes; offering incentives such as tax breaks and employment funding);
- Increasing competition on London's key strengths – business services and finance centre;
- Economic drivers are absent compared to other countries;
- Real opportunity for the London – 65% of UK internet traffic routes through London;
- Physical connectivity is a key strength – financial services and bandwith;
- Think London support has been key to investing in London.

What are some of the barriers to achieving low carbon investments

- Planning delays and multiple authorities is a barrier to investment;
- No vision for skills required for the future;
- Lack of funding to encourage low carbon investment;
- East transport routes are not excellent (and poor across London)
- Lack of sites with power generation is an issue and legislation is prohibitive;
- Fragmentation on policy (lack of joined up thinking) and agencies;

What can be done to unlock some of these barriers

- Existing businesses should be retained and encouraged to expand;
- East London GED should have one planning authority;
- Sectors should be prioritised and supported to grow;
- The Olympics is a real opportunity – particularly post 2012 – it will be the most 'fibred' site. Manchester and Wales are also key hubs for comms. Olympics should be one of several pilot projects;
- The right infrastructure is required – drives investment, jobs and economic growth;
- Low carbon projects in London should be prioritised and supported to drive investment;
- Renewable energy needs to be provided in London – how will national policy provide enough energy to meet demand? Will intensive users be 'forced' to buy brown power? East already has identified sites suitable for power generation but no investment has occurred
- London should identify/coordinate and agree locations for data centres to create clusters and collaboration;
- Collaboration is key on incentives – one incentive cannot displace/increase another issue. There should be clear vision on infrastructure (for example power generation and supply);
- Global training centre should be based in the UK – London is a base for recent graduates but they are seeking the best opportunities so do move abroad;
- The whole value chain should be targeted to be energy efficient – in its use and implementation;
- Mayoral support and championing (not just on 2012 opportunities);
- London should provide one clearly defined agency;
- Top level understanding of issues to drive business cases (in the competitive environment)

Sustainable transport table

What is being done already that is driving new low carbon businesses, services, jobs, inward investment etc

- Recent significant commitment from Central Government to invest several million pounds in electric vehicle sector development. This complements previous commitment of to fund development of hybrid cars

What are some of the barriers to achieving low carbon investments

- The UK and London in particular is seen as too expensive to locate manufacturing businesses. Among the French companies, there is a strong desire to locate here as London (and its associated vehicular congestion issues) is identified as a strong market opportunity. East London would be a highly desirable location especially because of opportunities of sea and river freight, and the proximity of City Airport for commuting. The current costs of locating here are prohibitive.
- The lack of clear communicated and committed demand from public and private sector is a barrier to investment
- London lacks critical mass from a manufacturing perspective – the lack of existing clusters of manufacturing in London precludes further investment.
- Other locations cited above and below appear to be more supportive in terms of culture, finances and expressions of clear demand.

What can be done to unlock some of these barriers

- Recognised need for change in behaviour
- Some standardisation is needed, particularly within the charging systems (plugs) and charging points
- London should adopt a more joined up approach to accommodating EV's. While EV's are exempt from the Congestion Charge, parking regulations and charging infrastructure varies across the various boroughs. Charging points also need to be regularised so that drivers are confident that they will able to recharge, wherever they are in London
- The opening up of public information (local government) to be made available on an information portal for passengers could help drive consumer behaviour towards making sustainable / low carbon transport costs
- London will need to provide financial / tax incentives to attract manufacturers in particular as other locations already do this.
- Further must be done by the public sector to more clearly commit to large infrastructure projects in order to stimulate private sector investment
- Clusters can promote investment – London needs to focus on specific industries / segments to attract new enterprise and investment eg, Electric vehicles
- London and the UK do create a lot of value from R&D but do not do enough to retain/attract new commercial enterprises who monetise that R&D. In particular SMEs who are successful are often attracted elsewhere by persuasive financial incentives.

Cleantech table

What is being done already that is driving new low carbon businesses, services, jobs, inward investment etc.

- Some success in replacing boilers and in retrofitting homes
- A start in the Electric Vehicle debate
- What works well is CERT (Carbon Emissions Reduction Targets) and CESP (Community Energy Savings Programme)

What are some of the barriers to achieving low carbon investments.

- The major utilities, who are purchasers of electricity or heat are opaque on where there is demand for energy, the scale of demand or what the points of connection to the grid area
- Procurement processes for energy suppliers are long and cumbersome and favour the very large supplier. There are similar issues with gaining access to municipal waste
- The sector faces planning constraints based on the definition of their products – waste to fuel or energy means treatment as a waste operation
- There is a presumption against waste to energy facilities in Town Planning regimes
- The overall regulatory environment is lagging behind technology innovations in waste to energy and alternative energy generation
- UK is considered to be less supportive than other EU Countries and the US in this regard
- Feed in tariffs emphasize solar and wind power, but offer less of an incentive to biomass and biofuel
- OFGEN – not set up to count biomass as a fuel. Barrier to transition from coal. Fuels still classified as waste
- Planning uncertainty
- The UK is the only EU country not manufacturing its own wind turbines – this is because it is difficult to gain permission for on shore schemes
- Products classified as a waste rather than a fuel
- Lack of investment in R&D in retrofitting, adding to existing systems, modification of existing, complementary as well as new products.
- There is a lack of education at leadership and governmental level regarding these issues
- It is perceived that it is more difficult to deliver in the South than the North of the UK
- The South East is a net importer of energy from power stations across the UK. In 2012 a £20bn national upgrade will begin. A range of back up systems will be required during the upgrade process. This an opportunity for local supply networks to be established

What can be done to unlock some of these barriers.

- OFGEM, as the national regulator, has a role to play in improving access to smaller energy supplies using new and lower carbon technologies
- Positive regulatory environment
- Stability of regularity environment.
- Long term policy commitment
- Easier procurement processes for access to supply of materials and connection to the grid
- Incentives to investors in capital facilities
- Industrial land and premises are considered to be high when comparing with other regions in the UK

Waste table

What is being done already that is driving new low carbon businesses, services, jobs, inward investment etc

- The London Waste and Recycing Board's brokerage service is considered helpful.
- East London's Waste Authority Loan Guarantee is anther good example of such a partnering commitment.

What are some of the barriers to achieving low carbon investments

- Large scale waste facilities are risky, the current PFI process is too slow and will need to speed up over next 5 years. Local authorities find it difficult to enter joint ventures.
- There is a skills shortage in handling machinery in Barking and Dagenham.
- Land cost are also too high for small entrepreneurs – Wales for example is much more competitive.
- Plants that are testing new technologies had a mixed history in the UK and banks are picking this up. For these new technologies to go ahead they need underwriting by public bodies as part of their commitment to move waste away from landfill, this will go some way toward bridging a gap between equity and bank loans. East London's Waste Authority Loan Guarantee is a good example of such a commitment. Also a continuous waste source needs to be guaranteed.
- Planning can be another barrier – some facilities cannot go ahead as section 106 wordings link facilities to the take up of heat. As housing market has slowed down a delay in residential development will also delay waste to energy plants, even though financially they would stack up without selling of heat.

What can be done to unlock some of these barriers

- Overhaul of the planning regime:
  The LDA and other public bodies to make land and property more easily available to low carbon businesses. In addition, take efforts to reduce the red tape in planning permission process.
- Planning regimes to be simplified and void rates waived when properties are targeted and marketed for sustainable use. Introduce planning policies specifically targeted at sustainable industries / build. A monitoring mechanism should oversee that buildings/properties follow sustainability specifications for which they were approved.
- Waste contracts:
  Currently Defra PFI credits do not encourage scalability in waste contracts, Could incentivise the collective use of waste contractors within the same industrial estates and/or collection of neighbouring Boroughs. Could pilot in GED.

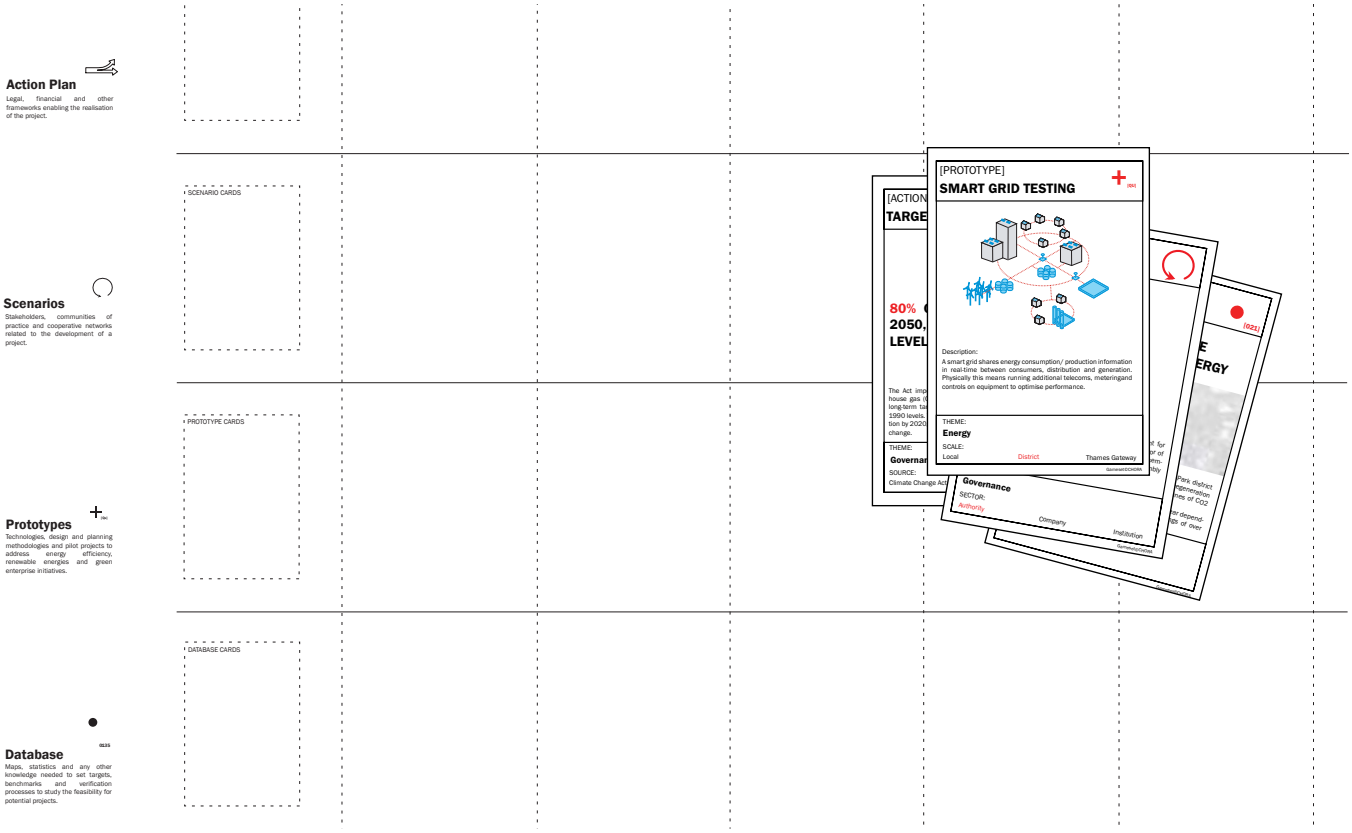
  Introduce funding guarantee in contracts similar to the London Waste Management Board's brokerage service and funding opportunities made available to help manage London's rubbish and boost recycling
- Introduce waste plans for commercial sites similar to Surface Water Management Plans (SWMP) for Construction and Demolition. Carrot and stick approach in terms of setting clear targets for waste reduction and incentivising the achievement of those targets as well as penalising instances where targets have not been met.
- Extend the Carbon Reduction Commitment to include specific clauses with regards to recycling and re-use. Alternatively, introduce a similar cap and trade scheme that allocates waste credits and incentivises waste reduction among industries that generate high volumes of waste. Entry level would need to be low to allow for maximum uptake.
- Increase the rate of landfill tax to "send a strong signal" to waste producers and encourage waste managers and local authorities to consider alternatives to landfill. Extra funds could be used to finance education initiatives (see last point below).
- The public sector and waste authorities should partner and engage with businesses to influence behaviour. Rate rebates could be offered to 'good corporate citizens'.
- Introduce education and training schemes for local authorities in terms of waste management processes to increase breadth and depth of advice and support made available for businesses. Enhance collaboration between various authorities and create a central focal point allowing businesses to approach 'a one stop chop' that Wfacilitates support and guidance required.

SCENARIO GAMES
2 FEBRUARY 2010

The stakeholder session on February 2nd consisted of a test of the pilot projects in their current state of development and simulations of how they would perform. We used a game set based on the Dynamic Masterplan management structure. Cards presented the main ingredients of the different pilot projects and maps of the GED and of specific pilot project areas were put on the tables together with empty management boards.

Stakeholders were grouped around the tables, with an animator leading the discussion. The task for each table was to discuss the project and to create an outline for a delivery strategy and timeline using the cards or filling in new ones. While there was a limited set of tables, one per pilot project, and accordingly a limited set of stakeholders, the whole scenario session was more like a chamber orchestra playing a reduced version of a large piece of music, something like a suite that forms an outline of a symphony. The advantage of such a reduced orchestration was to be able to be quite precise about the individual projects. After a first session aiming at a generally more exploratory strategy, some of the stakeholders were moved around and more focused strategies were exercised. The movement of stakeholders between tables was intended to refresh the discussions but also led to a form of cross-pollination: a first exercise in interlinking different pilot projects.

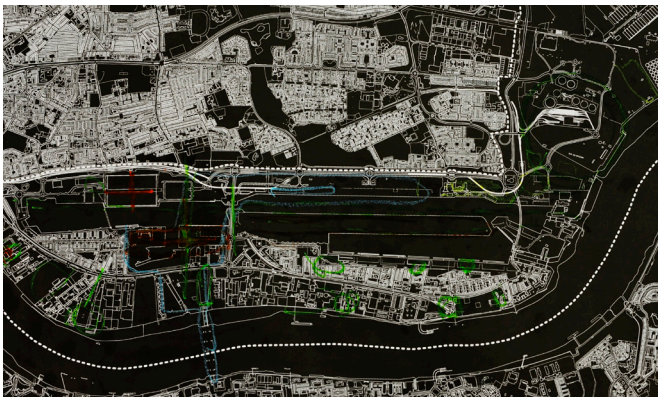
The core dynamics of the Dynamic Masterplan is this interlinking of projects while they evolve, each phase of growth, each proliferation, expansion, increases the degree of interconnectivity and leads to different forms of co-evolution. In practical terms that means increased chances for synergetic organization of business parks, of shared energy infrastructures, of exchanges of heat, waste, between different sectors and projects, of interlinking supply chains, combining sectors in mutually beneficial relationships.



The dynamic masterplan describes a choreography. The stakeholder session is a test version of this choreography, albeit in a highly reduced manner. However, the participating stakeholders all represent a sector, a planning authority, or a academic institution, and thus can play themselves, or be representative of other similar stakeholders. The scenario is therefore test and simulation and often shows conflicts, obstacles, but also additional potential such as public sector demand drivers, basic requirements, quantitative appraisals of numbers of jobs gained, energy generated, and they may flesh out project descriptions with plausible narratives and scenarios.

The delivery strategies tested in the stakeholder session are extractions and adaptations of the overall Dynamic Masterplan. These and further test sessions will refine and transform the main plan.

The stakeholder session in the form of a scenario game with a basic management structure game set is a tool that needs to be repeated, during the planning phase but also during the realization of different projects to ensure that so-called 'Communities of Practice' are formed and sustained during the process of generating the GED, and to keep testing the potential interlinking between projects.

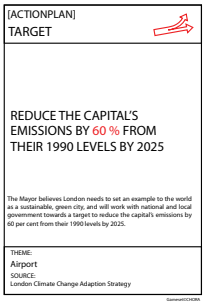


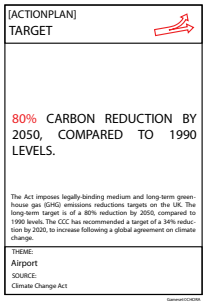
The four layers

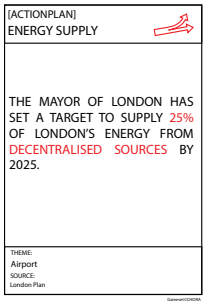
The timeline is a management matrix that consists of the following four layers:

Actionplan

Legal, financial and other frameworks enabling the realisation of the project.

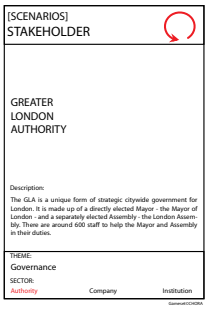


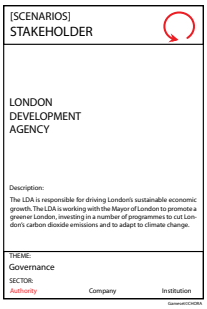


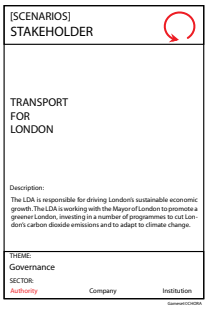


Scenario

Stakeholders, communities of practice and cooperative networks related to the development of a project.

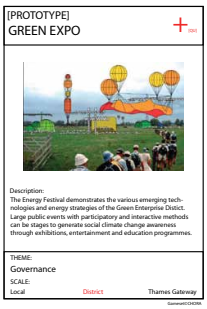






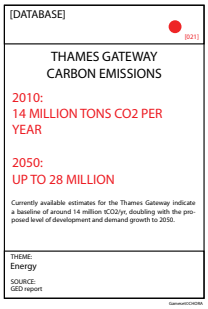
Prototype

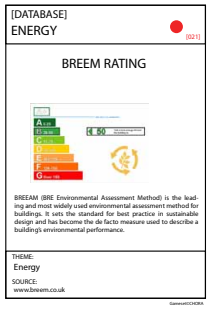
Technologies, design and planning methodologies and pilot projects to address energy efficiency, renewable energies and green enterprise initiatives.

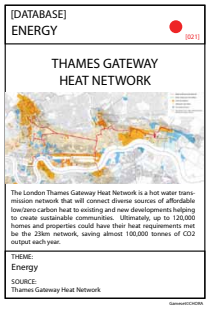


Database

Maps, statistics and any other knowledge needed to set targets, benchmarks and verification processes to study the feasibility for potential projects.







Energy

Animator: Alasdair Young

Session 1

Stakeholders

Nick Carter – LB of Newham
Joe Dack – TfL River Freight
Jimmy Hanley – North London Waste Authority
Paul Clarke – Design for London
Ralf Trottnow – Bioessence

Summary

The group mentioned that fuel poverty was not given sufficient coverage within the project. They discussed that this needs to be addressed to make the relevant local boroughs aware of the issue. The group mentioned that fuel poverty is a much bigger driver than carbon emission reduction targets.

It was pointed out that the London Thames Gateway Heat Network would play a major role for the Green Enterprise District. The group paid attention to the pilot projects for new and existing buildings around the Royal Docks which would be part of the London Thames Gateway Heat Network.

Secondly, the group discussed the key requirements for renewable energy generation sites. Good road and water logistics, as well as heat and power connections would add to the attractiveness of the potential sites. The group mentioned that incentives would be needed for the realisation of renewable energy projects like a Biomass CHP.

It was mentioned that local residents and communities should benefit from the proposed renewable energy projects.

Session 2

Stakeholders

Kizzian Owen, GLA
Robin Daniels, Living Planit
Jimmy Hanley, North London Waste Authority
James Howarth

Summary

The group discussion turned around the testing of smart grids in the Green Enterprise District. It was mentioned that these trials could attract a nation wide testing how smart grids could work.

The group mentioned smart grid projects like smart metering, dynamic load management, integrated power and heat generation and plug & play sites for energy generation. It was identified as a potential to partner with governmental organisations, other authorities but also private companies like Microsoft, Cisco or Siemens to trial smart grids.

Two smart grid testing trials were explored by the group. The first trial would be a smaller commercially driven one whereas the second trial would address housing and include the Institute for Sustainability and the public sector.

The group suggested three ways of how to meet the national 80% carbon reduction target by 2050. The demand for energy would need to be reduced, more low carbon energy would have to be generated and energy networks would have to be capable to transmit low carbon energy.

Animator: Judith Loesing/ Angela Spencer (East)

Session 1

Stakeholders

Nigel Young – LB of Havering
Liz Cowie – HCA
Marissa Hernandez – LB of Tower Hamlets
Gill Marshall - Gateway to London

Summary

The scenario focused on local food networks within the Green Enterprise District. The idea was to use temporal existing structures around Havering College for growing trees and food in Polly tunnels. The group also looked at the possibilities for a communal greenhouse close to City Airport and mini sized allotments. Land contamination was identified as an obstacle.

The group also looked at how farmers markets could work in the Green Enterprise District and pointed out that there would a lack of storage facilities for local food boxes.

It was proposed to integrate allotments into the Green Grid as it would be difficult to take them away once temporarily set up. Furthermore the team mentioned that lots of money could be made from food waste.

Session 2

Stakeholders

Darryl Newport – University of East London
Liz Cowie – HCA
Nigel Young – LB of Havering
Marissa Hernandez – LB of Tower Hamlets

Summary

After the identification of suitable sites for food production local authorities/ LDA will lead to ask utilities provider/ network rail to hand over land for management. A 'Friends of Green Grid' will be created starting from the waiting list of existing allotments at strategic locations to create a network of green spaces.

It was pointed out that the Code for Sustainable Homes needs green roofs that could be turned into food growing spaces. The question arose how to support the existing food businesses in Tower Hamlets. The group discussed to supply food locally and use waste productively.

Animator: Alun Jones Dow Jones Architects

Session 1

Stakeholders

Fiona Heyland – LB of Tower Hamlets
James Howarth - SITA
Jeannette Buckle – Veolia
Andy Gilbert – Orchid Environmental Ltd.
John Chesters – Cory Environmental

Summary

The group identified a potential site for a municipal solid waste (MSW) plant in the London Borough of Tower Hamlets. It was pointed out that the development of a waste to energy plant would be a viable solution for the site which is located on Fish Island south. The plant could potentially be linked to heat networks to make use of the surplus heat. Other symbiotic industries could be located around it.

The group addressed land procurement as a main issue. It needs to be defined what kind of waste would be used for the plant, municipal solid waste or commercial and industrial waste.

The group pointed out that the plant would have to create benefits to the taxpayer and the borough of Tower Hamlet through heat and power supply and waste obligation cost.

Session 2

Stakeholders

Fiona Heyland – LB of Tower Hamlets
Jeannette Buckle – Veolia
Andy Gilbert – Orchid Environmental Ltd.
Ralf Trettnow - Bioessence

Summary

The group was looking at the idea of the Green Enterprise District being waste self sufficient. It was pointed out that this idea is certainly achievable for commercial and industrial waste. The question arose to look at treating waste from other boroughs beyond the Green Enterprise District to harvest heat and power.

The group looked at gate fee economics being now comparable with other sources in the tax incentive regime. However, the comparative viability of individual technologies was questioned. It was pointed out that it would not be an issue of public money and there would be the potential to create a lot of heat and power.

Furthermore, group mentioned the great interrelation of the waste project with other Green Enterprise District pilot projects like river transport.

Governance

Animator: Chris Hall (GVA Grimley)

Session 1

Dennis Moynihan – Institute for Sustainability
Chris Dow – Closed Loop Recycling
Craig Harrison – Think London
Bob Doyle – Gateway to London

Summary

The group looked at a management structure rather than a governance structure. During the session the concept of the Task Force was tested. It was pointed out that the boroughs need to be connected and have to commit for recourses. The Task Force could be represented through the local boroughs, the LTGDC, the Institute for Sustainability, the Olympic Delivery Authority and the LDA.

The group focussed on how the Task Force could be set up. It was mentioned that three days per week secondments from existing organisations would have to be secured. The group suggested that the Task Force should be located in an existing building like Gateway to London, ExCel or City Airport with sufficient workspace and meeting space.
The Task Force could be set up by autumn 2010 supported by a Green Business Forum. The group mentioned that a web portal could be initiated within the next year.

The Group paid attention to the key roles of the Task Force. The first task would be to advance the concepts of the pilot projects next to supporting East London's existing green enterprises. Furthermore, the group pointed inward investment, visibility raising and demand driver implementation as a further part of the Task Force's duties out.

River

Animator: Paul Clarke – Design for London

Stakeholders

Joe Dack – TfL River Freight
John Brosnan – London Waste
John Chesters – Cory Envrionmental

The group focussed on the issue of river freight including origin and destination and the relation between receiving and supply. It was pointed out that the river Thames takes up almost half of all inland water freight. The group identified waste, aggregates and construction demolition as the main freight components. It was mentioned that the waste volume declines already due to recycling. Companies like Cory, Shanks and Biffa sort their waste and recycle it before the incineration process.

The group also discussed the commercial aspects of the river. How could the wharves or docks be shared? A consortium that shares leases and operations like the phone tariff system is needed. Tilbury port was mentioned as an example of such a cluster. The recourses could be shared and a river hierarchy could be created. It was also pointed out that supermarkets would be interested in using the river for transportation.

The group also discussed the possibilities of transporting material like biomass for renewable energy generation. For self-sustaining uses of supply of energy material funding sources like the London Waste and Recycling Board would need to be addressed.

Retrofitting

Animator: Emiel Koole

Session 1

Stakeholders

Mark Bradbury – LTGDC
Terry Mc Givern – Institute for Sustainability
Andy Butler – LBBD

Summary

The group focussed around the retrofitting issues of existing compounds rather than separate buildings. Industrial and commercial mixed sites within the Green Enterprise District were identified. The group also looked at the existing building stock that would provide a greater variety.

It was suggested to establish collaborative structures like a Business Development District. The proposed collaboration would include multiple buildings as well as multiple occupiers. Facilities could be shared and local networks like Havering College could develop.

The group discussed the idea of a retrofitting handbook that could develop solutions to be potentially applied to the entire Green Enterprise District site. Individual enterprises have to be encouraged to collaborate and benefits of collaborations need to be explained.

Session 2

Stakeholders

Mark Bradbury – LTGDC
Terry Mc Givern - Institute for Sustainability
Bill Addis – Buro Happold

Summary

During the second session the group identified ten potential collaborative zones for retrofitting initiatives. These sites mostly consist of small businesses that do not have the capacity to upgrade.

The group pointed out that an audit would be needed to identify the current use of energy on site. It was mentioned that energy would be an important financial driver. The group explored different investment and payback schemes ranging from short-term investment to long-term investment with stakes in buildings and land.

Collaborative green procurement methods were proposed including a green lease. These procurement methods could adjust existing infrastructure to reduce the carbon impact. The group pointed out that they were not only looking at the actual building rather at where the energy is used.

Airport

Animator: Raoul Bunschoten

Session 1

Stakeholders

Kevin Worster - Siemens
Darryl Newport – University of East London
John Brosnan – London Waste
Tobias Goevert – Design for London

Summary

The Royal Docks Expo would be one of the first realised Green Enterprise District prototype projects, mirroring the future developments within the GED. Some events could be linked to the 2012 Olympics to strengthen the low carbon legacy of the games. Temporary events could fill in some of the empty sites within the Royal Docks and leave the energy infrastructure behind beyond the duration of the Expo. The group pointed out that the Royal Docks have the potential to be turned into another centre of London. And international Building and Technology Exhibition could be the instrument that stimulates and coordinates the development of an Airport City.

The second focus of the discussion was the offsetting of emissions caused by landing and departing aircrafts at City Airport. It was suggested that discussion with the airport and airlines has to be initiated. Offsetting the emissions was identified as a potential local employment improvement and up scaling of the community.

An airport city with a strong economy the site of the Royal Docks can be turned into an alternative powerplant that is able to offset the emission caused at the airport.

Clean tech companies could be attracted by the new image of the 'clean' Airport city. The group suggested using shop fronts as display for companies to show how green they are.

Session 2

Stakeholders

Debbie Jackson – LDA
Tobias Goevert – DfL
Gill Marshall - Gateway to London

Summary

How could the airport be persuaded to turn into a green airport? What are the stimuli that could trigger the airport?

Different steps are needed to offset the carbon emissions caused by aircrafts at the airport.

The branding power of being the cleanest airport in Europe or even worldwide is attractive for London City Airport.

Benchmarks and regulations from the government regarding emission reductions are needed.

But already small interventions like green travelling to the airport could contribute to the airport's sustainability. All taxis travelling to the airport could be electric vehicles and a charging station could be installed at the airport. The group also mentioned retrofitting residential units and heating and cooling systems around the airport would help to offset the emissions.

The group agreed the airport but also the airlines need to get greener to achieve national and international carbon reduction targets. It was mentioned that major steps like solar panels along the runway or a geothermal infrastructure would help to offset the emissions.

All Scenario workshop photographs credited to Mimi Mollica

PRECEDENTS

The following pages capture the key aspects of various precedent studies for the East London Green Enterprise District. These include financial models, environmental strategies and branding and communication strategies.

From our research we have found that eco-industrial parks are emerging as the primary arena for testing and implementing industrial ecology. Similar in some respects to standard industrial parks, eco-industrial parks are designed to allow firms to share infrastructure as a strategy for enhancing production and minimizing costs. They offer firms the opportunity to cooperatively enhance both economic and environmental performance through increased efficiency, waste minimization, innovation and technology development, access to new markets, strategic planning, and attraction of financing and investment. (http://www.smartcommunities.ncat.org/business/ecoparks.shtml)

Kalundborg Eco Industrial Park, Industrial Symbiosis

Location:
Kalundborg, Danmark

Stated purpose/vison:

The overall goal of the Industrial Symbiosis in Kalundborg is to improve the environmental standard through efficiency, further development and information exchange of utilisation of bi-products in industry. Trough these actions will enterprises minimise the utilisation of energy, water and natural raw materials.

Size:

The network occupies the city of Kalundborg with approximately 20.000 inhabitants

Age:

The history of Kalundborg Industrial Symbiosis activities began in 1961 when a project was developed and implemented to use surface water from Lake Tisso for a new oil refinery in order to save the limited supplies of ground water. The City of Kalundborg took the responsibility for building the pipeline while the refinery financed it. Starting from this initial collaboration, a number of other collaborative projects were subsequently introduced and the number of partners gradually increased.

By the end of the 1980s, the partners realised that they had effectively "self-organised" into what is probably the best-known example of Industrial Symbiosis. The material exchanges in the Kalundborg region include: conservation of natural and financial resources; reduction in production, material, energy, insurance and treatment costs and liabilities; improved operating efficiency; quality control; improved health of the local population and public image; and realisation of potential income through the sale of by-products and waste materials

Participating enterprises:

A partnership evolving over the last 20 years between the Asnaes Power Company, a Novo Nordisk pharmaceutical plant, a Gyproc wallboard producer, and a Statoil refinery is the best example to date of industrial ecology in action.

Success:

Kalundborg was the world's first eco-industrial park. More than 25 different symbiosis projects are on-going to day. All projects with a positive environmental impact and a positive economic result.

Shared processes

In Kalundborg, Denmark an Industrial symbiosis network exists where companies in a region collaborate to use each other's by-products and otherwise share resources. At the center is a 1500MW coal fired power plant which has material and energy links with the community and several other companies. Surplus heat from this power plant is used to heat 3500 local homes in addition to a nearby fish farm, whose sludge is then sold as a fertilizer. Steam from the power plant is sold to Novo Nordisk, a pharmaceutical and enzyme manufacturer, in addition to a Statoil plant. This reuse of heat reduces the amount thermal pollution discharged to a nearby fjord. Additionally, a by-product from the power plant's sulfur dioxide scrubber contains gypsum, which is sold to a wallboard manufacturer. Almost all of the manufacturer's gypsum needs are met this way, which reduces the amount of openpit mining needed. Furthermore, fly ash and clinker from the power plant is used for road building and cement production.

The development of the Kalundborg model was not driven by compliance to environmental regulations alone. The partners created the inter-firm arrangements for a variety of reasons: cheaper materials and energy, minimization of disposal costs, income generated from production residue, and greater environmental responsibility. This combination of motives clearly demonstrates an innovative and promising relationship between economic incentives and reduced environmental impact through industrial ecology.

Layout

At the center is a 1500MW coal fired power plant which has material and energy links with the community and several other companies. Surplus heat from this power plant is used to heat 3500 local homes in addition to a nearby fish farm, whose sludge is then sold as a fertilizer. Steam from the power plant is sold to Novo Nordisk, a pharmaceutical and enzyme manufacturer, in addition to a Statoil plant. This reuse of heat reduces the amount thermal pollution discharged to a nearby fjord. Additionally, a by-product from the power plant's sulfur dioxide scrubber contains gypsum, which is sold to a wallboard manufacturer. Almost all of the manufacturer's gypsum needs are met this way, which reduces the amount of open-pit mining needed. Furthermore, fly ash and clinker from the power plant is used for road building and cement production.

Kalundborg Environmental Savings Per Year:

Reduced Resource Consumption:
Oil 19,000 tons
Coal 30,000 tons
Water 600,000 cubic meters

Reduced Emissions:
CO2 130,000 tons
SO2 3,700 tons

Reuse of Waste Products:
Fly Ash 135 tons
Sulphur 2,800 tons
Gypsum 80,000 tons
Nitrogen in sludge 800,000 tons

What do we learn from it?

The Kalundborg project can be very useful for the GED in that it shows us how an Industrial Symbiosis Network can work. It is an example of how different companies in a region can work together and use each other's by-products and share other resouces.

This model could be adopted for clean tech firms who work together in the region of the GED to create jobs and lower carbon emissions. It could be a good way of creating interconnected clusters of different programmes within the GED region.

Web address
http://www.symbiosis.dk/industrial-symbiosis.aspx

Fairfield Eco Industrial Park, Baltimore, US

Location:
Baltimore, US

Size:
More than 500 ha

Age:
Since early 1990s

Stated purpose/vison:

More than 1300 acres zoned for heavy industrial development. Approximately 60 businesses already operate within the ecological industrial park's primary boundary. Represents the only Empowerment Zone City grantee with a designed ecological industrial park. Inter-modal transportation opportunities and mass transit commuting options which are intimately tied to economy redevelopment.

Establishing business information networks within the park to expand collaborative efforts and material reuse opportunities.

Playing a more active role in identifying industry education and training skill requirements and in establishing or coordinating linkages with training providers.

Provides the State of Maryland with a new voluntary compliance approach to Brownfields redevelopment.
Completing a master planning exercise which will produce site ownership and environmental quality matrices, electric and natural gas line grids, inter-modal transportation and commuter alternatives, and infrastructure suggestions and priorities tied t o promoting sustainable business practices.

Participating enterprises:

Clean Manufacturing or Commercial Uses Which Practice Environmental Responsibility and Leadership: 1-3 significant size companies (350-500 employees) to expand the industrial/ commercial base of the area.
Environmental Technology Providers: 8-10 environmental technology providers (50-100) employees) to expand the pollution prevention, business networking, and closed loop capabilities associated with the Eco-park.

„The Multipliers" or Service and Other Environmental/Recycling Companies: 10+ small service oriented company's (10-50 employees) to fill in strategic needs created by the increased markets and demand generated through the Business expansion.
Expanding Existing Employers: improve the regulatory environmental and operational conditions to help stimulate business expansion of existing firms, especially among those firms which possess excess property. http://clinton2.nara.gov/PCSD/ Publications/Eco_Workshop.html#v-b

Measures of Success:

Demonstrate that environmentally motivated business networking leads to greater productive efficiency by lowering direct and indirect operational costs, while improving the cross-media environmental conditions of the site.
Preserve critical areas and decrease cross-media emissions and environmental impacts, improving the quality of living for neighbouring residents.

Create 2500 new jobs with above average wage scales over the next 5-10 years.

Eco-Park, Tuen Mun, Area 38, Hong Kong

Location:
Tuen Mun, Area 38, Hong Kong

Stated purpose/vision:

The EcoPark occupies 200,000 square metres of land in Tuen Mun Area 38. The EcoPark will be divided into lots of different sizes. Lots in EcoPark will be tendered for specific recovered materials and processes that help achieve Hong Kong's government waste management objectives, in particular, in recycling local wastes. Admission criteria will be developed with priority given to processes involving value-added technologies, and target materials of the proposed Producer Responsibility Schemes.

Hong Kong Government has consulted the Tuen Mun District Council and members support the development of EcoPark and agree that EcoPark will help promote development of local recycling industry and create job opportunities in Tuen Mun. The Council hopes that EcoPark will become a landmark for Tuen Mun.

Local trade associations and recyclers were also consulted and they support the development of EcoPark, agreeing that by providing long-term land at affordable cost, together with supporting infrastructure, EcoPark will help enhance recycling technology development and improve waste recovery rates in Hong Kong.

Size:

19 hectare

Age:

As pledged in the Policy Framework, the aim is to commission Phase I of EcoPark towards the end of 2006 and Phase II in 2009.

Opportunities for Companies:

The Environmental Protection Department has proposed spending $316 million to build a 19-hectare EcoPark in Area 38, Tuen Mun. The EcoPark will be developed solely for use by the environmental and recycling industry. Individual recycling companies can acquire an area of land at affordable costs with tenures sufficiently long to justify their investments in adding value and for higher-end operations. To provide flexibility for a wide range of companies that have different land area requirements, the lots will be designed and allocated in different sizes, ranging from 400 to more than 8,000 square metres, and with the majority sized at 800 and 1,600 square metres. This would allow companies to rent lots in a modular fashion to meet their own needs and acquire more lots as they expand their business.

Park Layout and Management:

The Government will build and fund the EcoPark's basic physical infrastructure, including a road network, drainage, sewers, telecommunication networks, power supplies, berthing facilities, a wastewater treatment plant, a waste collection and management facility, and car parking spaces.
Central to these will be an administration building containing management offices and common facilities including a visitor and education centre, an information centre, training and conference rooms, and other facilities.
Another key feature is the diversity of its Eco-Industrial Round table and the process it has undertaken to develop an EIP. The Round table is a multi-stakeholder steering committee comprised of representatives from government, business, nonprofit and educational institutions.

Success:

Success will be creating new jobs for residents, increasing tax ratabilities, utilizing Brownfield sites, creating value-added products that generate additional money in our local economy. Success will be more easily measured in terms of economic development, but at the same time will improve the environment through less waste, less pollution and cleaner industries being recruited.

Web address:
http://www.epd.gov.hk/epd/ecopark/

Trenton Eco-Industrial Complex, New Jersey, US

Location: NJ, US

Stated purpose/vision:

Trenton‘s EIP will not necessarily be a physical place, but may be a network of businesses; firms won‘t need to be located next door to each other to participate; there will be a management structure to assist businesses with these linkages, matchmaking, and other technical assistance.

Another key feature is the diversity of its Eco-Industrial Round table and the process it has undertaken to develop an EIP. The Round table is a multi-stakeholder steering committee comprised of representatives from government, business, nonprofit and educational institutions.

Success will be creating new jobs for residents, increasing tax ratabilities, utilizing Brownfield sites, creating value-added products that generate additional money in our local economy. Success will be more easily measured in terms of economic development, but at the same time will improve the environment through less waste, less pollution and cleaner industries being recruited. The intent is to change the position of Trenton to a „green“ city.

Oekopark, Hartberg, Austria

Web address:
http://www.oekopark.at

Location: Hartberg, Austria

Stated purpose/vison:

Hartberg Ecopark in the Austrian region of Steiermark is a business park which combines on its premises a wide range of ecologically conscious businesses and industries, scientific research institutions as well as a permanent public exhibition on environmental protection technology and the natural environment. The aim is to provide scientific, structural economic and marketing support to ecological businesses by facilitating cooperation and interaction and by presenting the environmental problem in an attractive and imaginative manner to the general public. Through the eco-park it is intended to meet economic development needs in a sustainable way.

Size:

The Ecopark covers a 15 ha area owned by Stadtwerke Hartberg on the outer edge of Hartberg. Part of it had previously been in use as the town's waste site and for commercial purposes. These businesses and facilities, i.e. the municipal utilities' composting and waste management facility, a producer of wooden low energy houses and a construction waste recycling and disposal firm, will be integrated into the Ecopark.
Age: Initiative to establish the Hartberg Ecopark was first taken in 1996 by the management of the local public utilities company, Stadtwerke Hartberg, which is owned by the town of Hartberg. In close cooperation with local government, initial plans were drawn up and a first marketing strategy was designed to raise awareness and support for the project.

Number of enterprises:

20 enterprises are currently part of the Oekopark Hartberg

Success:

The Ecopark Hartberg is an established Business Park, a recreational park and a centre for applied research.

Principles/Vision- or Mission statement

The concept chosen for Hartberg Ecopark is based on three interconnected fields of activity:
First, an ecological business park. Hartberg Ecopark will provide space for medium- sized companies covering large sections of environmental production and many ecological service providers and retailers. With the idea of natural cycles in mind, preferences in selecting businesses to move in is given to those which can and wish to enter into cooperation and symbiosis with neighbouring firms. For instance, a waste paper recycler provides the resources for a firm producing insulation materials, which in turn can be utilised by an ecological building company. From this cooperation, positive side effects are expected for the environment as well as the individual company's balance sheet. Furthermore, customers have a chance to be informed in an integrated and comprehensive manner.

Second, an explorative exhibition and recreational park. An integral part of Hartberg Ecopark, permanent exibitions on major subjects such as water, energy, waste, ecology are addressed to the general public consisting of adults as well as (school) children. The aim is to explain in an imaginative and interactive way the manifold aspects of environmental problems and to indicate practical ways to solve them. Included in the exhibition will be, for instance, a walk-in dung heap and explorative installations centred around the topics of energy or human cognition. For recreation, woods, a biotope and other natural areas are designed. A solar train will make the different sections of the ecopark accessible to the visitor. Moreover, following a policy of 'open doors', the businesses will be open for visitors. Thus, basic technical processes as well as their ecological contexts and impacts can be made transparent.

Third, a centre for applied research . Continuous scientific and conceptual guidance is provided by a research centre to be established in Hartberg Ecopark. The underlying thought is to point out the way from scientific research to development and, thus, to help technical innovations on their way to practical application. To facilitate this, renowned research institutes are invited to open laboratories in Hartberg Ecopark. Thus, many technical innovations can either be directly put to use in supplying the ecopark with utility services and/or they can be integrated as part of the various exhibitions.

What do we learn from it?

The Ecopark Hartberg could be a good example for the GED as it combines the concepts of Business Park, recreation and research. It shows how an integrated approch can create a new image for a green business park.

Hammerby Sjoestad

Web address: http://www.hammarbysjostad.se/

Location: Stockholm, Sweden

Stated purpose/vison:

Hammarby Sjöstad – an eco-friendly part of town Hammarby Sjöstad is an exciting new district in Stockholm where the City has imposed tough environmental requirements on buildings, technical installations and the traffic environment, from day one.Stockholm Water Company, Fortum and the Stockholm Waste Management Administration have jointly developed a common eco-cycle model designed to ensure organic recycling throughout Hammarby Sjöstad – known as "The Hammarby Model". This model is the thread that binds together the entire environmental programme and demonstrates how the various technical supply systems are integrated.

Size:

Hammerby Sjostad is a 200 hectare city district (11 ,000 residential units for just over 25,000 people and a total of about 35,000 people will live and work in the area by 2015)

Age:

The concept for a new district in this location was born in the early 1990s. Impetus was gained for development and infrastructure in the area when plans for Stockholm's bid for the 2004 Olympic Games were being prepared. The core area of Hammarby Sjöstad was envisaged as an Olympic Village with a strong emphasis on ecology and environmental sustain-ability, which was promoted as one of Stockholm's unique selling points as an Olympic city. Although the bid was unsuccessful, development was already underway and the momentum for change had been established. Approximately half of the total area has been developed to date and it is anticipated that the final scheme will be completed by 2015.

Number of enterprises:

Stockholm Water Company
Energy company Fortum Stockholm Waste Management Administration
Sucess: 40,000 people from around the world have been to the visitors center to learn about this community and its use of clean energy, and the project is already inspiring developments in other cities around the world.
Principles/Vision- or Mission statement
Environmental goals for Hammarby Sjöstad (50% Carbon emission reduction, compared to 1990 levels):

Land usage:
Sanitary redevelopment, reuse and transformation of old brownfield sites into attractive residential areas with beautiful parks and green public spaces.

Transportation:
fast, attractive public transport, combined with carpool and beautiful cycle paths, in order to reduce private car usage.
Building materials: healthy, dry and environmentally sound.

Energy:
renewable fuels, biogas products and reuse of waste heat coupled with efficient energy consumption in buildings.

Water & sewage:
as clean and efficient as possible – both input and output – with the aid of new technology for water saving and sewage treatment.

Waste:
thoroughly sorted in practical systems, with material and energy recycling maximised wherever possible.

Effects of the project:

The project has worked with the energy company Fortum, a vast number of developers, eco-technology companies, and the Stockholm Water Company to make sure that all aspects of clean energy are taken care of. A joint proposal for the provision of energy, water and waste-treatment was initially developed by the lead agencies: Stockholm Energi, Stockholm Water and SKAFAB (the city's Waste Recycling Company). There is great emphasis placed on the importance of collaboration and synergistic thinking between these agencies, which each have responsibility for different segments of the closed-loop system.
Hammarby Sjöstad is a full-scale, living proof of the fact that the usage of clean energy and energy saving solutions don't have to increase project cost. Hammarby Sjöstad is contributing significantly by serving as a role model for the planning of new urban areas. Integrated planning, innovative eco-solutions, and technologies and environmental demands can, and should, be used in every urban development project.

What do we learn from it?

The Hammerby Sjostad example is relevant for the ELGED in that it creates an interconnected cluster of different programmes. Although this example focuses more on a new housing development, this strategy could be part of the ELGED concept. The Hammerby Sjostad example would be of a similar size as the new housing scheme "Barking Riverside" with homes for 26.000 people on an area of 350 acres which will be created in the middle of our site and recently got planning permission.

The interesting part about this project is the Hammarby Model which demonstrates how an integrated environmental programme can work and demonstrates how the various technical supply systems are integrated. It creates an eco-cycle model in which Energy, Water, Sewage and Waste are involved to ensure organic recycling throughout Hammarby Sjöstad.

Hammerby Sjostadt is also interesting for the GED because it is not only initiated by the City of Stockholm, but other existing companies, like Stockholm Water Company, Fortum and the Stockholm Waste Management Administration play a very important role to make the cycle work. It could be an interesting approch for the ELGED to collaborate with existing and new business to create the first eco-cycle scheme of the UK.

IBA Emscher Park, Germany

Web address:
www.iba.nrw.de http://sustainablecities.dk/en/city-projects/cases/emscher-park-from-dereliction-to-scenic-landscapes

Location: Rhur Valley, Germany

Stated purpose/vison:

Emscher Park: From dereliction to scenic landscapes Once one of the most polluted and environmentally devastated regions of the world, the Ruhr district has been reborn. With the "International Building Exhibition (IBA) at Emscher Park" initiated in 1989, the run-down industrial landmarks of the region have been transformed to serve new recreational uses while still preserving the area's rich history. The redevelopment has given the region a greener image, created a more cohesive community and maintained the area's identity.

Size:

800 sq. km

Age:

1989-1999

Number of enterprises:

In 1989 IBA was given a ten year mission to achieve the ecological, economic, and urban revitalization of the Ruhr valley and the Emscher River through the creation of collaborative partnerships with local authorities, private industry, professional associations, environmental groups, and citizens. Seventeen local authorities of the Ruhr area joined the building exhibition at its creation.

Success:

IBA is partly a building exhibition in the classic, architectural sense but is also a state-supported entity that oversees individual redevelopment projects and seven area-wide master plans. Approximately 100 projects have been developed and implemented on five sites in the area between the cities of Duisburg and Kamen, covering an area of over 800 sq. km. IBA's projects illustrate the latest thinking in the ecological and economic regeneration of a former industrial region. Many of these innovative urban and architectural designs were fostered by IBA's workshops, competitions, and spatial planning guidelines.

Principles/Vision- or Mission statement

The IBA Emscher Park projects range from re-naturalization of watercourses to building new housing, business parks and research centres. The IBA administers no project funds of its own: all its projects make use of existing private and public funding available through regional, national and inter-European subsidy programmes. The IBA also has no direct influence over local developers and municipalities. IBA staff may suggest projects to the local authorities, or a municipality will apply for one of their own initiatives to become an IBA project, the incentive being that the Land North Rhine-Westphalia will give an IBA project funding- and administrative priority. To accept a project, the IBA has to make certain that it reaches a certain level of quality in respect of their overall aims, which include social, aesthetic and ecological criteria, and a contract is signed to ensure that the required level of quality is achieved. At the end of the 10-year project period, around 5 billion DM will have been channelled through IBA projects in the region.

What do we learn from it?

The IBA Emscher Park gives a good example of how a whole industrial brownfield site can be turned into a spatial area with lots of attractions, business facilities, landscape and educational facilities to attract locals and tourists. It is an example of an integrated approach which created a new image for the whole area.
The Emscher Landscape Park that acts as a "green connector" between the settlements of the Rhur valley, following the path of the Emscher River and using the abandoned industrial areas along it as a unique form of greenspace could be used as a good example for integrating the East London Green Grid into the site of the ELGED.

International Building Exhibition (IBA) Hamburg

Web address:
http://www.iba-hamburg.de/

Location:
Hamburg, Germany

Stated purpose/vison:

– Hamburg International Building Exhibition (IBA Hamburg) has set a clear project focus on climate action, selecting as its third focus theme "City in Climate Change"
– The "Climate Action Policy for Renewable Wilhelmsburg" is a long-term concept developed by IBA Hamburg to convert power supply of a whole urban district (the IBA demonstration area) to Renewables.
– IBA gives Hamburg a tremendous opportunity to try out innovative concepts in a kind of "urban laboratory" and to experiment with them in model projects. The international networks and the high profile of the International Building Exhibition can be used to present Hamburg initiatives and models to a wide international audience and hold discussions with them.

Size:
the area of Wilhelmsburg (suburb of Hamburg)

Duration:
2007-2013

Number of enterprises:

The objectives of the IBA have been laid out in a type of municipal treaty, the IBA Convention which was signed by more than 50 companies and institutions. The IBA partners undertake to further the aims of IBA in the spirit of trust and partnership. The objective is to create joint project structures in the shape of public-private partnerships, engage in mutually supportive public relations work and take steps to assure the quality of the projects. Additionally, the partners are to contribute their professional, constructive advice. This means the IBA Hamburg has achieved one important goal: to activate civic participation. This gives IBA multi-industry, Hamburg-wide support for the process of development and restructuring in Wilhelmsburg, Veddel and Harburg upriver port. And the list of IBA partners who have signed the Convention is growing steadily longer.
Success:
The IBA has started very successfully and more than 40 projects are already under way. But there are not only projects involved but also cultural events, exhibitions, lectures and discussions.

Principles/Vision- or Mission statement

From 2007 to 2013, the International Building Exhibition IBA Hamburg offers a unique opportunity, in a kind of "city laboratory", to develop and test innovative concepts for renewable energy supply in an urban context. The testing grounds at IBA Hamburg are the Elbe islands, a microcosm of the metropolis, which offers the ideal urban, landscape and social preconditions. Furthermore, strategies for climate change management in architecture and urban planning will become the focus of discussion. The climate protection project Renewable Wilhelmsburg is part of the implementation strategy of the IBA theme "Cities and Climate Change". It is intended as a key concept in the area of climate protection and a trend-setting energy policy. A fundamental aim of the project is to gradually transform the supply of Wilhelmsburg and Veddel with CO2neutral and mainly renewable energy. This will serve as a benchmark for the whole of Hamburg – and for other cities worldwide.

What do we learn from it?

The GED could also act as a Climate Change laboratory for renewable energy production but could also achieve a better understanding of the public. The GED would have the right size, location and critical mass to create a long lasting Green Exhibition with the aim to find strategies to lower carbon emissions and to create a good environment for green business.
The example is also interesting in that it uses an innovative governace model. The operating company is IBA Hamburg GmbH, a subsidiary of the Free and Hanseatic City of Hamburg. Since practically the entire IBA budget is funded by the city, this organ allows political and administrative representatives of the city to have their say in running the company.but also for building up a clever governance structure for the project.

A green Expo can not only be used as a catalyst by also as a marketing tool for the area. It attracts attention, not only from the public but also other from other companies. The IBA convention has been signed by more than 50 companies in the region of Hamburg which connects and integrates local companies in the region with the same aim to reduce carbon emissions and create a sustainable future.

Dagenham Sustainable Industries Park, London (planned)

Web address:
http://www.londonsip.com

Location:
Barking, London, UK

Stated purpose/vison:

The Sustainable Industries Park represents a major opportunity for London's environmental technology businesses. It provides access to Europe's largest urban conurbation, it has an unrivalled source of raw materials and a multi-billion pound marketplace on its doorstep. We are up and running and open for business now offering a supportive environment and flexible accommodation to businesses which represent the industrial future for London and the UK. Come and be a part of that future.
London Sustainable Industries Park will take the lead in enabling occupants to use waste materials from one company to provide power or raw materials for another, providing cost savings, minimising on-site waste and encouraging innovation.
By creating the UK's largest concentration of sustainable industries and environmental technologies, the London Sustainable Industries Park will help transform the east of London into a vibrant hub leading British industry into the future. LTGDC has already invested £19 million and has committed a further £27.5 million to the Sustainable Industries Park. We aim to create a development model which others will follow, establishing a benchmark for environmental technology business parks in the UK and beyond.

Size:

25 hectares of land dedicated to the sector of environmental technology businesses

Age:

In 2001 the consultancy Scott Wilson were appointed to produce an Implementation Strategy to bring the vision to reality. Since 2009 Sustainable Industries Park London

Number of enterprises:

Closed Loop Recycling Ltd opened in 2008, Thames Gateway Institute for Sustainability Waste management firm Cyclamax, will build its fourth – and flagship facility – on a 3.5ha site at the London SIP. Cyclamax intend to lodge a planning application for its plant this summer and expect to be operational in early 2012.

Success:

Still under development
Principles/Vision- or Mission statement
The London Sustainable Industries Park, with the Thames Gateway Institute for Sustainability at its core will become the focus of UK and global sustainable technology innovation, attracting international business opportunities, collaboration and recognition. And with the largest market in the UK on its doorstep it offers unrivalled business opportunity for forward looking sustainable industries.

The vision for the SIP is centered on environmental sustainability and involves transforming the currently fragmented and under-developed 142 hectare industrial site at Dagenham Dock into an exemplar park for emerging technologies operating in the field of sustainable resources and energy technology. The aim is to make the park a wholly self-sustainable enterprise and to develop an industrial symbiosis over time, where businesses use each other's by-products and share resources. A spectrum of environmental industries will be based in the SIP, from heavy industry to businesses working with new and emerging technologies, and each will be involved in a variety of production including renewable energy generation (micro generation (manufacture) and larger scale energy production from waste facilities), materials recycling, sustainable construction materials and processes, research and development, environmental services and training related to these sectors.

Other Examples of up and running Eco-Industrial Parks - Great Britain

Green Park, Reading, UK http://www.greenpark.co.uk

Size: 70 ha enterprises: approx. 33 enterprises timeframe: 1997 Masterplan by Sir Norman Foster, phased development, Phase 1 completed
One of the biggest developments of its type in Europe, Green Park is truly a park for business, combining an attractive landscape with first class amenities. At Green Park's heart is Longwater Lake, home to a variety of native plants and wildlife.
On completion of Phases I and II, GreenPark will provide 209,000 square metres (2.25 million square feet) of high quality business space for around 10,000 working people. More than half this space is already occupied by some of the world's leading corporates such as Cisco, VERITAS and Logica.

New Greenham Park, Newbury, Berkshire, UK

http://www.new-greenham-park.co.uk/
size: 60 ha
New Greenham Park is a 150-acre, sustainable business park in Newbury, Berkshire and offers a wide selection of commercial property in the M4 corridor, one of Europe‘s leading business areas. The business park provides cost effective office, industrial and warehouse space in a highly accessible location.

In April 2003 and again in April 2008 The Queen‘s Award Office announced that Greenham Common Trust had been granted the Queen‘s Award For Enterprise: Sustainable Development, for its work in creating a sustainable commercial development, the management of which makes a significant contribution to the prosperity of the wider community by improving the local environment and producing a flow of income that is distributed through charitable awards.

Crewe Green Business Park, UK

http://www.crewe-nantwich.gov.uk/business/crewe_business_park.aspx
Size: 30 ha
Enterprises timeframe:
Crewe Business Park in South Cheshire is a 67 acre site established as the premier business park in the north west and was the first ecologically-based development of its kind - ‚The Times‘ named it ‚Britain‘s first genuine eco-business park‘.

Dyfi Eco-Park, Wales
http://www.ecodyfi.org.uk/

Our vision is for the Dyfi valley to be a thriving bilingual community with a reputation for sustainability.
It is based on the following ideas:
- Strengthening the local economy is the key to meeting social needs
-Tourism and farming are the most important local industries.
-The only kind of tourism that will succeed here is sustainable tourism. Short-term fixes will not do. Equally, the only kind of farming that will succeed here is sustainable farming.
- Local distinctiveness is the key to success in many markets nowadays, particularly in tourism and increasingly in local produce (including foodstuffs).
- Food, holiday and other products will all benefit from being associated with a clean, green image of the valley - where the Dyfi valley is a leader in sustainable community regeneration.
- Globalisation of production and distribution systems leads to unsustainable levels of resource use and waste creation and makes local economies more vulnerable to external factors. Reversing this trend is sometimes called "relocalisation".

Our mission is "to foster sustainable community regeneration in the Dyfi valley".

Waste to Power plant, Cheshire

http://www.greenwisebusiness.co.uk/news/cheshire-to-get-sustainable-industrial-park-with-95-mw-power-plant-647.aspx

Peel Environmental, which manages and develops the Peel Group's waste and mineral assets, has just been given the go-ahead to build a specialist industrial park for the environmental technologies sector with a 95 megawatt (MW) waste-to-power plant in Cheshire.

Wheldale North (Sustainable Growth Park Concept), Castleford, East Midlands (planned)
http://www.bdr.group.shef.ac.uk/web_pages/project_outline_urbanm.html
http://www.emra.gov.uk/what-we-do/housing-planning-transport/waste/case-studies/the-sustainable-growth-parks-sgp-concept

New Greenham Park, Newbury, Berkshire (operating)
http://www.new-greenham-park.co.uk/

New Greenham Park is a 150-acre, sustainable business park in Newbury, Berkshire and offers a wide selection of commercial property in the M4 corridor, one of Europe's leading business areas. The business park provides cost effective office, industrial and warehouse space in a highly accessible location.

In April 2003 and again in April 2008 The Queen's Award Office announced that Greenham Common Trust had been granted the Queen's Award For Enterprise: Sustainable Development, for its work in creating a sustainable commercial development, the management of which makes a significant contribution to the prosperity of the wider community by improving the local environment and producing a flow of income that is distributed through charitable awards.

Ince Resource Recovery Park (planned)
http://www.incerrp.co.uk

Peel Environmental Ince Ltd (hereafter "Peel") proposes to develop a site at Ince Marshes, Cheshire for a Resource Recovery Park (RRP). The proposal involves the phased development of an Eco-Industrial Park focused on resource recovery and research and development. Of regional, and in some ways national significance, the development has been designed to be a multi-modal facility with use of road, rail and ship transportation. It comprises a cluster of environmental technology industries, with synergies internally and also with the existing facilities surrounding the site at Ince.