

# Low carbon spatial masterplanning Beijing, Central Business District



**A**  
**A**  
The new CBD: view towards the north-east  
Showing the diagonal Green Spine and Central Square, which together define the heart of the scheme.

**B**  
**A low carbon spatial layout**  
The fine-grained network of boulevards, streets and pathways connects people throughout the development, integrating the site with its urban context. These links encourage movement on foot and cycle; they also promote shorter-distance vehicle trips.



**B**  
**Working as a design union, CAUPD/Space Syntax have created a low carbon masterplan for the extension of Beijing's CBD - one that puts people first.**

The Central Business District (CBD) of Beijing is scheduled to grow substantially in the near future. Initial growth designated for the Chaoyang district to its north-east. Seven world-leading teams have created visions for this expansion. The brief for the competition put a significant emphasis on the twin themes of sustainability and people-centred design.

The current CBD is characterised by high levels of vehicle traffic, high demands on public transport infrastructure and energy-intensive buildings. People travel long distances to reach the CBD and there is a high degree of severance between the CBD and surrounding neighbourhoods. There is a shortage of public open space and of convivial, non-commercial activities.

The China Academy of Urban Planning & Design invited Space Syntax Limited to create a "design union" to tackle these problems and, in doing so, to develop a radically different vision for the future.

The design union developed a vision for Chaoyang that has five guiding principles: first, to celebrate the deep history of the district, including the ancient movement routes and landmark buildings; second, to integrate new development with the existing CBD and the surrounding urban neighbourhoods in order to embrace the wider city; third, to promote a total energy solution for the new CBD incorporating resource-efficient consumption and renewable energy generation; fourth, to establish a civic identity for the new CBD based on human-scale streets and public spaces; fifth, to balance historic preservation with redevelopment to create a harmonious historic continuity.

The proposal created is an ambitious vision of realistic urbanism: to sustain life everywhere, to create the national CBD and to achieve a global influence.

**Client**  
Beijing CBD Administration Committee  
Chaoyang District Government  
Beijing, China.

**Duration**  
2009

**Project size**  
Site area 305 Ha.  
Total construction area 7,000,000 sq.m.  
New construction area 5,341,600 sq.m.

**Professional team**  
**Lead partners**  
China Academy of Urban Planning & Design  
Space Syntax Limited

**Support partners**  
University College London  
Beyond Green.

**Key features**  
Masterplan Vision  
Design Concept  
Urban Baseline Study  
Urban Characterisation Study  
Spatial Options Assessment.

# Design principles

## Spatial concept & character

Space Syntax contributed both visionary design thinking and objective urban evaluation techniques to the design union.

In the first instance, a set of core planning principles were developed with CAUPD to guide further design development. These are illustrated in Figures A to L.

The design principles were then brought together into a spatial layout that was tested and developed using Space Syntax's urban modelling technology.

**A** Creating a meeting place between the old and new CBDs.

**B** Reinstating the significance of historic routes: Chaoyang Road (red) and the Waterway (blue).

**C** Rebuilding the Golden Stage and historic gateways.

**D** Weaving in a Chinese yard network to create a fine-scale movement system.

**E** Bringing together pedestrian, cycle and vehicle activity on two "Chinese boulevards".

**F** Identifying local open spaces for small-scale social activities.

**G** Working within property boundaries.

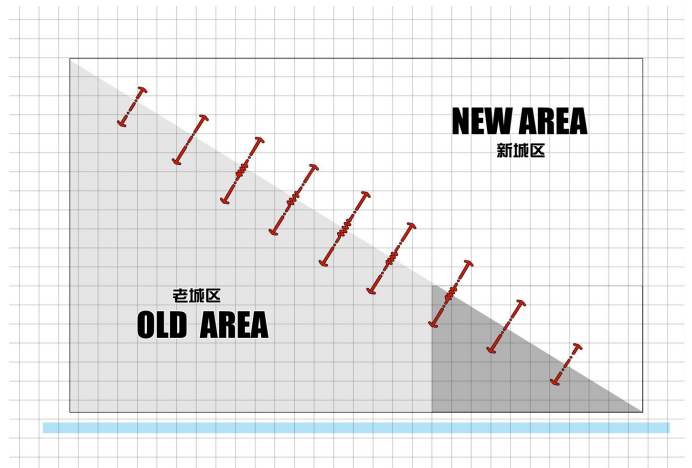
**H** Introducing a comprehensive green space infrastructure.

**I** Locating the centre: a hub for the redevelopment.

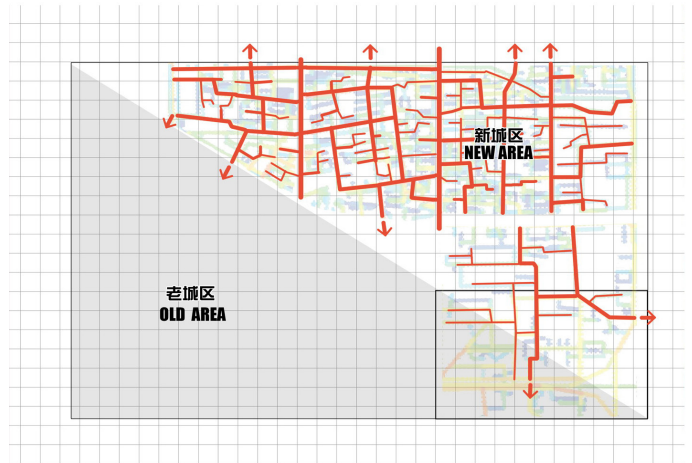
**J** Structuring the wider area into neighbourhoods of different character.

**K** Establishing a clear open space hierarchy.

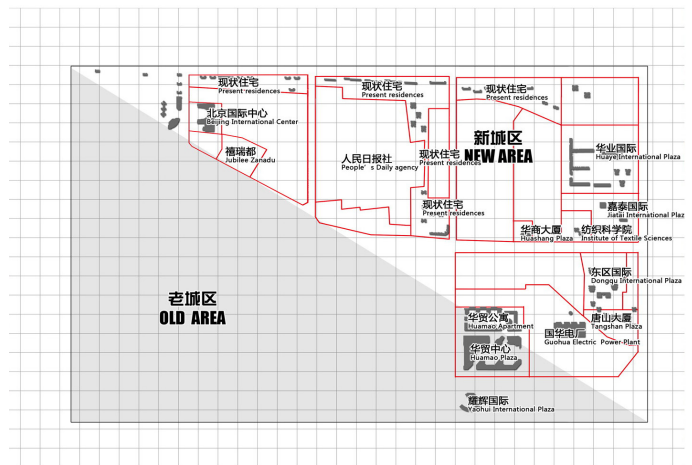
**L** Enhancing the public transport network.



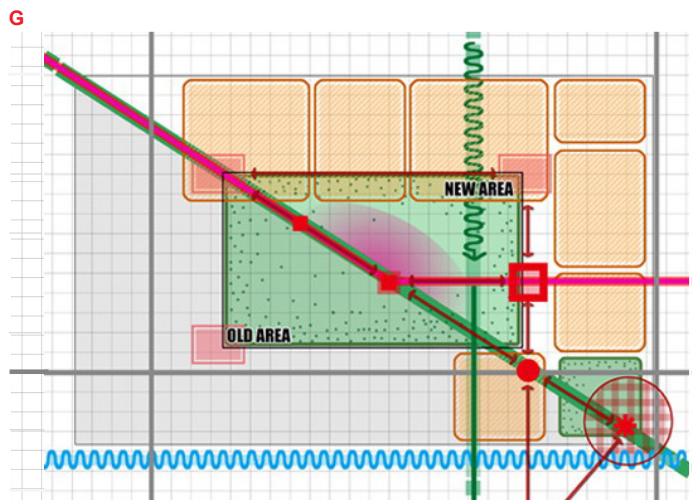
**A**



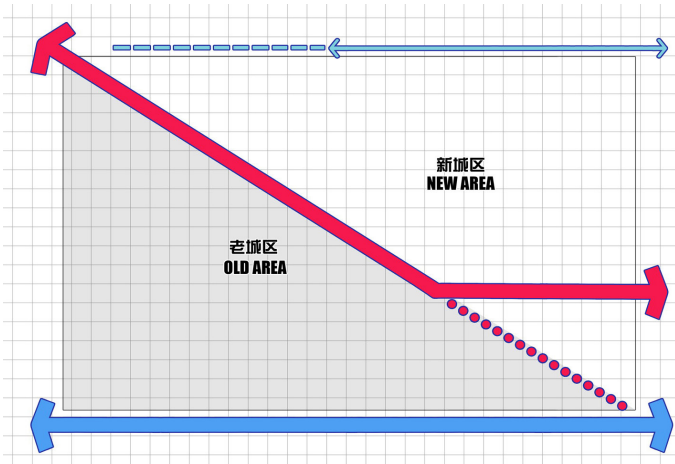
**B**



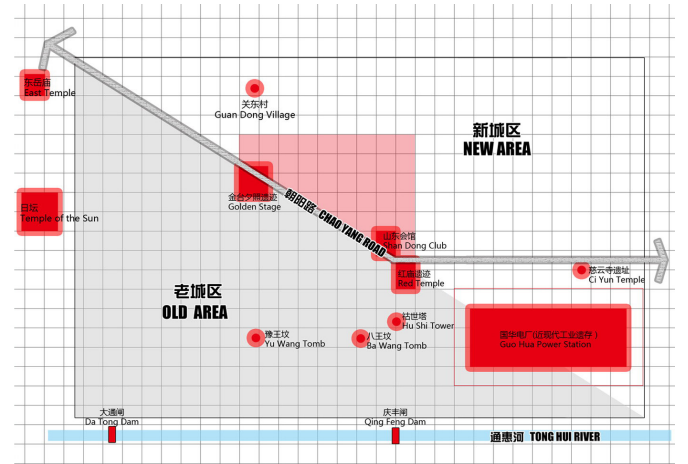
**C**



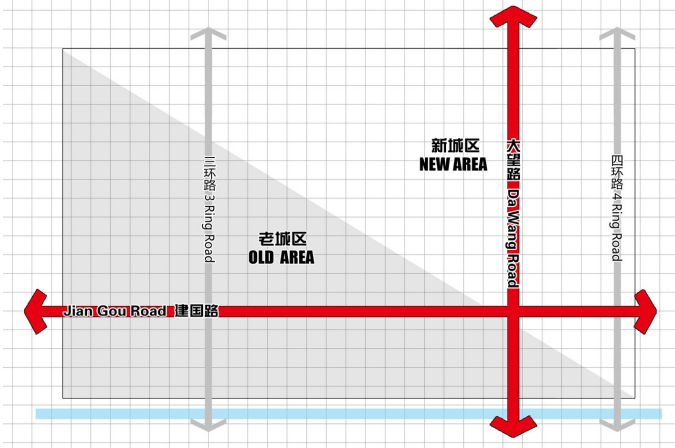
**D**



B



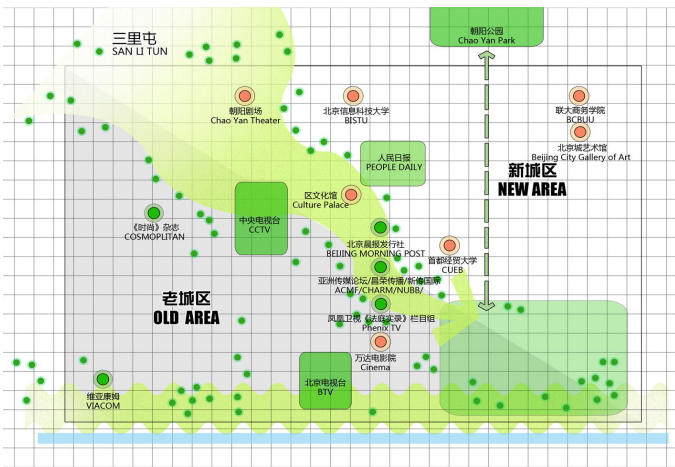
C



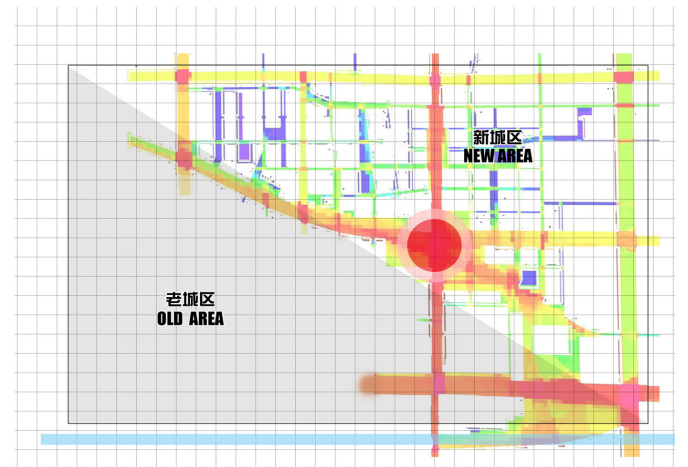
E



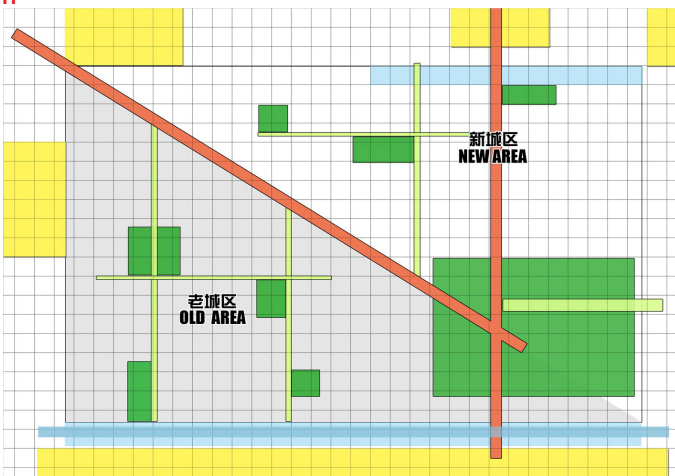
F



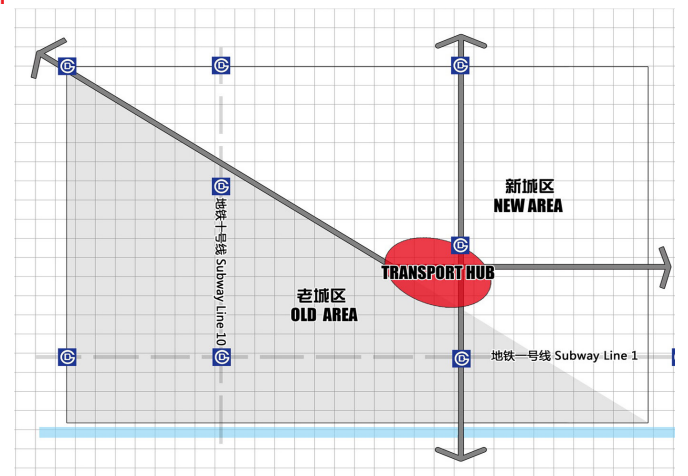
H



I



K



L

## Masterplan vision

A new, low carbon environment that creates a place for human interaction and a stage for cultural celebration.

### A & B

#### The site today

Movement across the site is largely car-dominated and frequently congested. Pedestrians are often forced into subways and onto footbridges to cross the road.

Despite this, there are numerous small pockets of vibrant, local activity. The masterplan builds on these and proposes a rebalancing of the movement system, away from the dominance of large-scale, car-borne journeys.



A



B

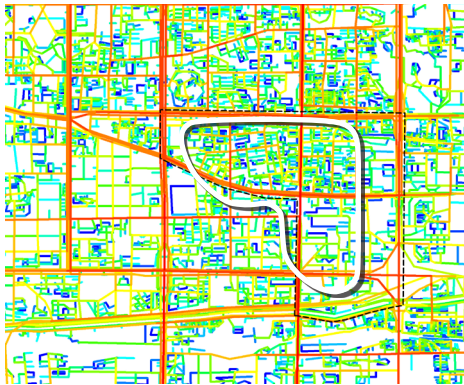
***“This is a new dawn for Chaoyang, the ‘Sunrise District’ of Beijing. The National CBD creates a place in time where history is revealed and where the future is present, where lifestyles are changed.***

***People will come from all parts of the world to meet, greet and trade on a Golden Stage; to walk beneath forests of trees and canopies of lanterns; to sit on terraces and witness the creation of ideas; to share in the generation and consumption of sustainable energy.”***

***Design vision statement***

# Design option evaluation

## Space Syntax technology has been used to create an effective spatial layout and urban movement network.



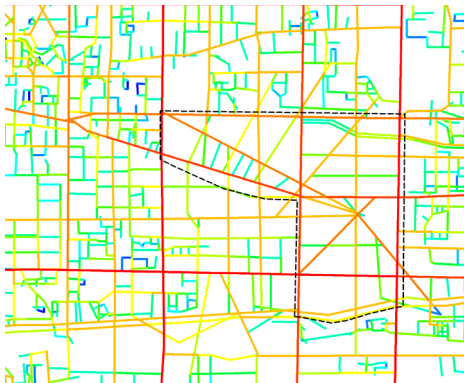
C

Space Syntax technology, developed at University College London, measures the effectiveness of the spatial layout and, in particular, the urban movement network. Movement is the life-blood of cities, creating patterns of social and economic trade that are fundamental to the overall sustainability of places.

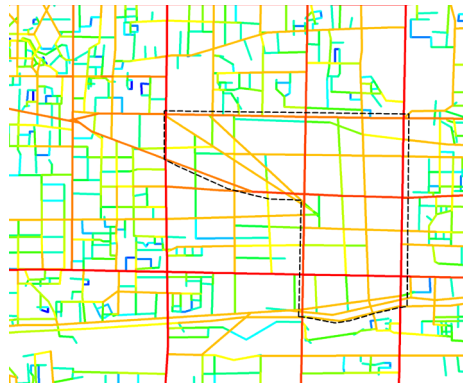
The technology displays highly-accessible, easy to use routes as red and then orange links, through to more weakly connected routes in green and then blue.

The analysis tests different scales of movement for different layout designs, measuring the fitness for purpose of each for walking, cycling and driving. The process is iterative, testing different layout ideas until a preferred option emerges.

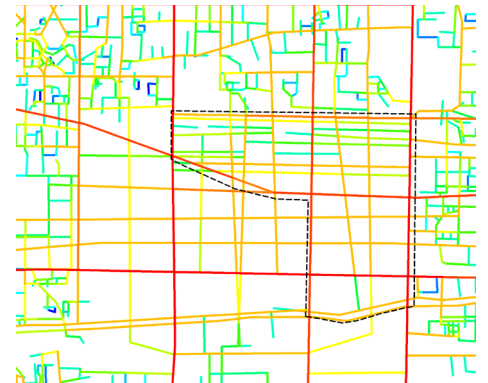
In line with the layout design, land uses are located so that movement-sensitive uses such as retail, key public spaces and major cultural attractions are placed where movement is more naturally going to be. This enhances their inherent attractiveness.



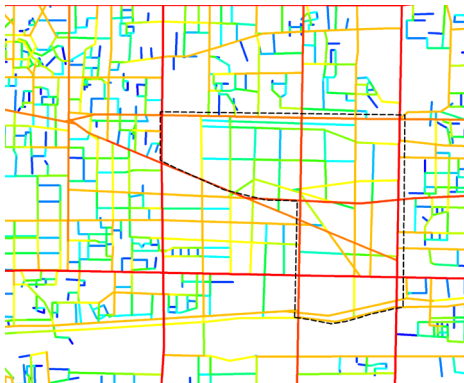
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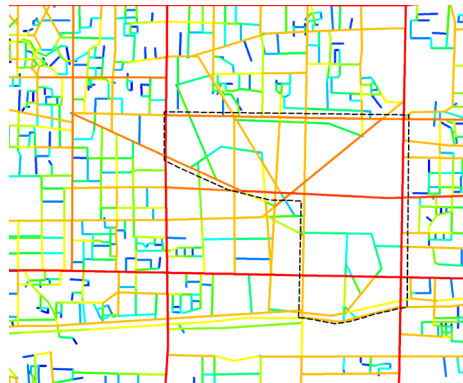
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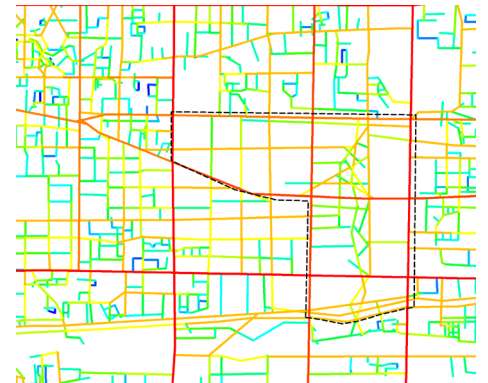
F



G



H



I

**C**  
**Existing site assessment**

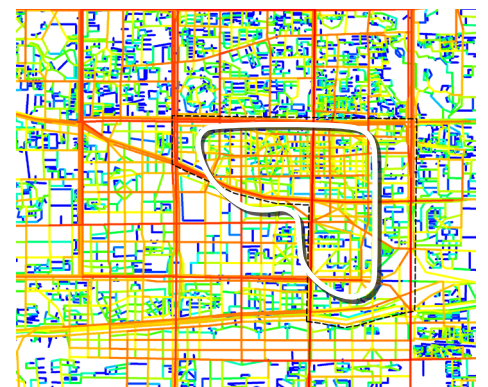
Spatial accessibility analysis highlights a poor secondary network of movement routes.

**D - I**  
**Options assessment**

Further analysis was undertaken to test different layout design ideas and develop a preferred proposal.

**J**  
**Final scheme assessment**

Spatial accessibility analysis of the final scheme demonstrates significant improvements across the entire movement system.



J

## Sustainable transport

The layout connects at every scale, encouraging pedestrian movement, cycling and public transport usage.

**A**  
**Multi-level transport interchange**

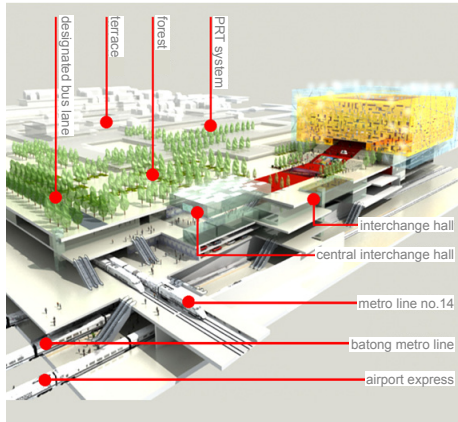
A transport interchange beneath the Central Square encourages movement flows and convenient transit.

**B**  
**People-first public space network**

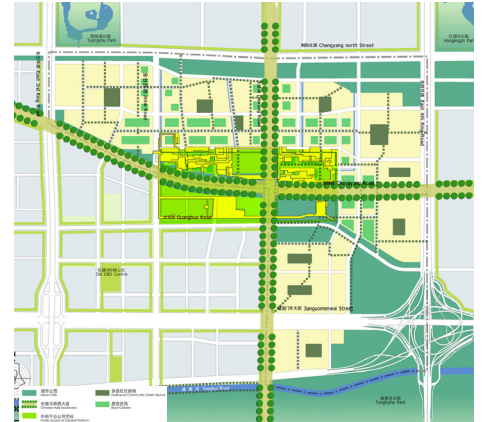
The 'Green Grid' of streets and paths integrates the various activities of the CBD.

**C**  
**Chaoyang Road: historic urban boulevard**

The connection between the new CBD and the existing business centre is made along Chaoyang Road. Designed as a major civic axis, the boulevard brings together people on foot and cycles with drivers of public and private vehicles.



A



B



C

## Clean energy

Each building is a power station, generating energy and controlling emissions.

**D**  
**Integrated mix of urban activities**

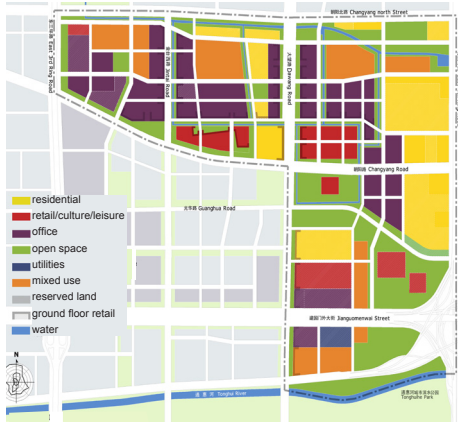
The varied land use pattern brings people closer to a greater range of complementary uses, reducing travel times and conserving energy.

**E**  
**Energy Tower: a place for hands-on education**

The historic Power Plant is preserved and converted into a renewable energy factory.

**F**  
**Golden Stage: at the heart of culture and innovation**

The opera house acts as the main cultural attraction, supported by a critical mass of creative industries.



D



E



F



A

### Space has a real and realisable value

To find out how **Space Syntax** can help you in the process of low carbon, sustainable urban planning, please contact:

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A

### A central space - a Golden Stage

The principal focus of the masterplan gathers movement from every direction, bringing people together for trade, leisure, retail, entertainment and all forms of central urban living.

create space : create value