

The background features a blue horizontal band across the middle. Above and below this band is a grey, 3D-rendered mesh structure that resembles a complex, organic form with many interconnected nodes and edges, creating a series of irregular, rounded openings.

Creating smart campuses and cities using BIM

Andrew Pryke

Digital Lead, BAM Construct UK

Join the conversation [#AULondon](#)

Andrew Pryke

1988 – 1999

James Stirling, Michael Wilford & Associates

1999 – 2006

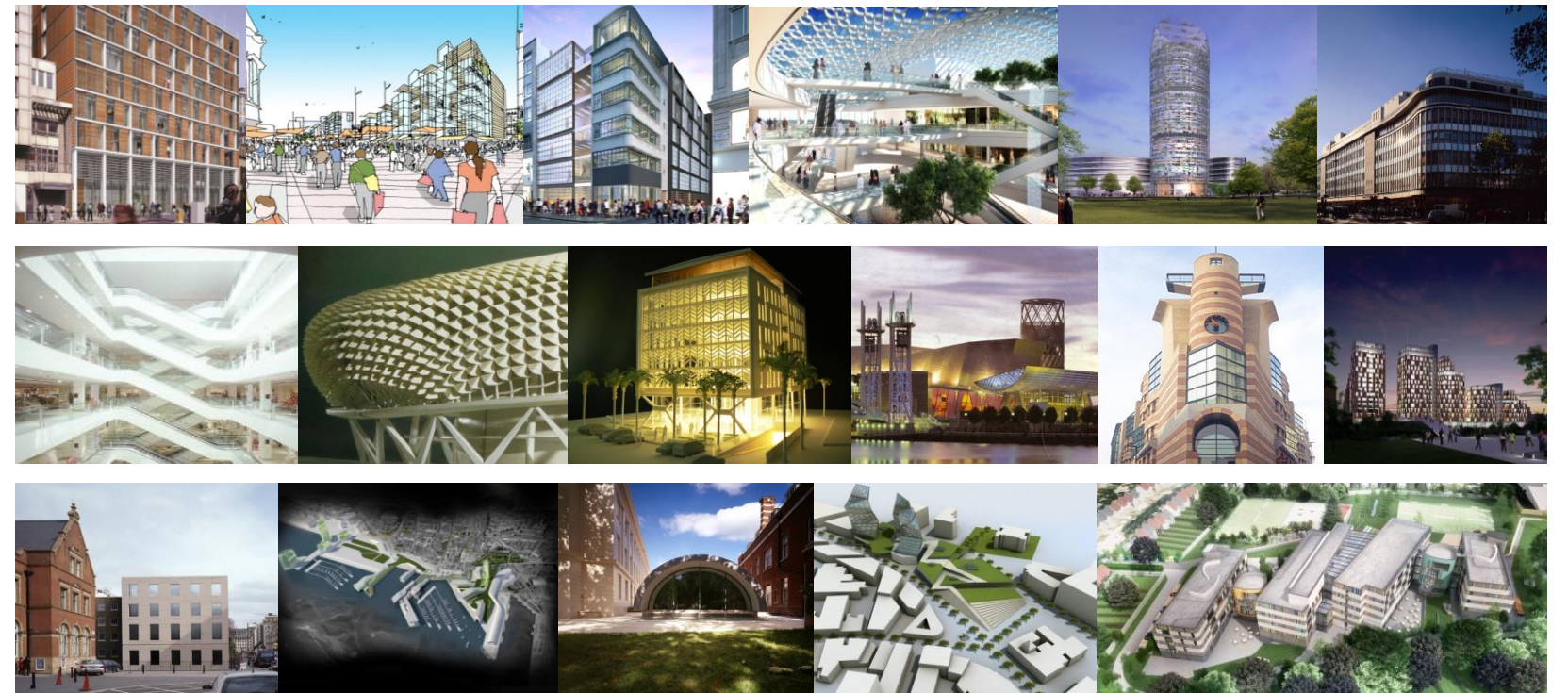
John McAslan + Partners

2007 – 2012

Capita Architecture

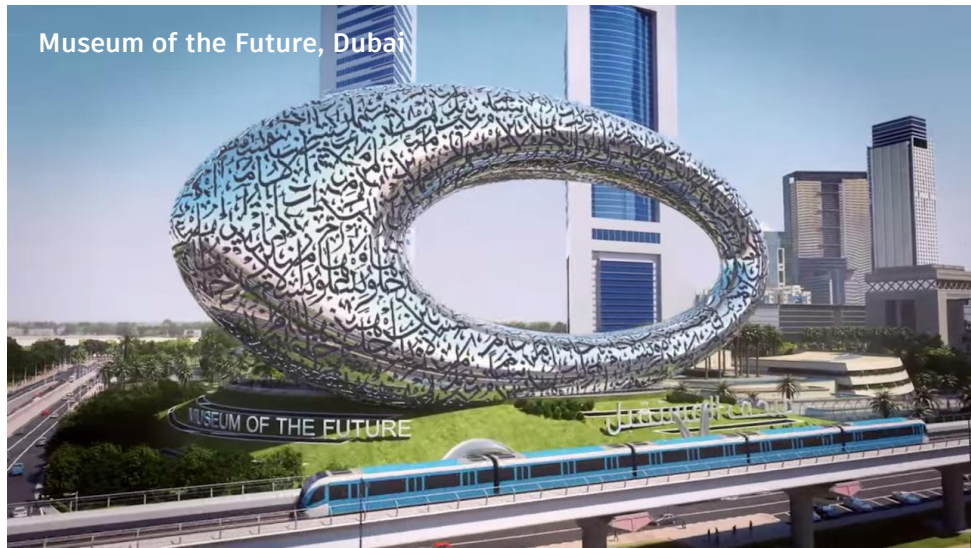
Oct 2012

BAM Design





V&A, Dundee



Museum of the Future, Dubai



FNB Stadium



NATO HQ



WTC Utrecht



Old Port House, Antwerp



Arnheim Terminal Station



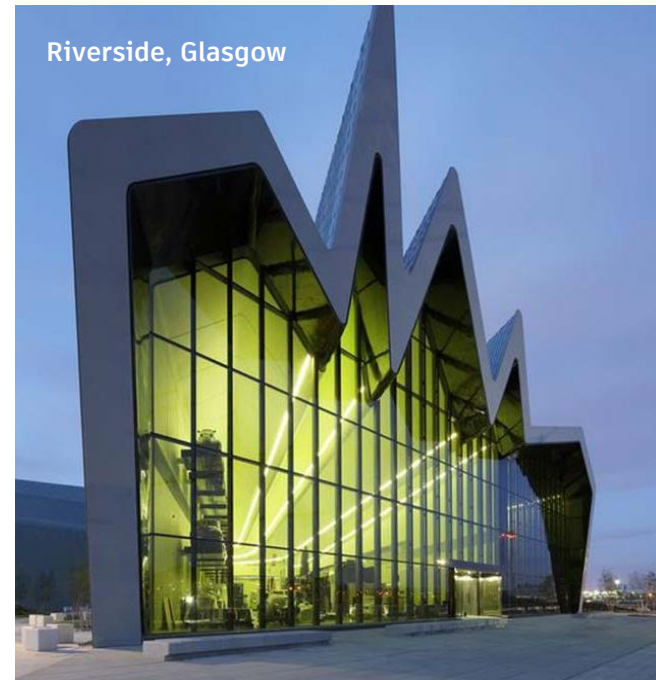
Hazza Bin Zayed Stadium



No 1 Spinningfields



Unilever, Indonesia



Riverside, Glasgow



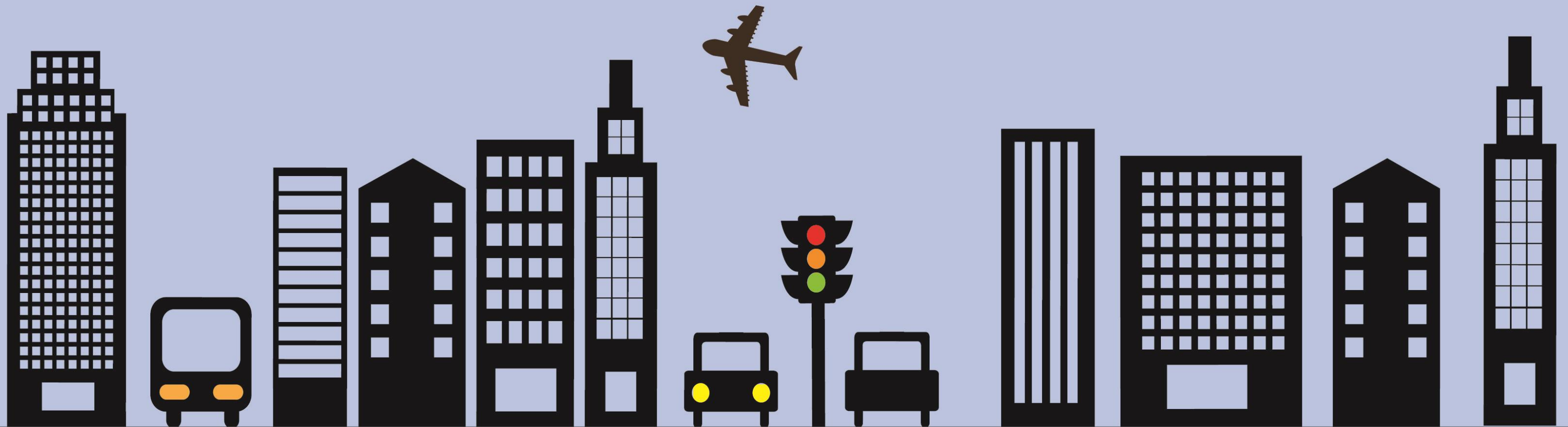
King's Cross, London

The background of the slide is a complex, abstract wireframe mesh. The mesh is composed of numerous interconnected lines forming a series of organic, flowing shapes that resemble a network or a topographical map. The lines are thin and grey. A solid blue horizontal bar spans the bottom third of the image, providing a contrasting background for the white text.

Why focus on campuses and city?

60%

of the world's population will live in urban areas by 2050



We need new ways to improve efficiency,
reduce costs and improve livability





In response cities are starting to explore how they can adopt a smart approach

A high-angle photograph of a man in a dark suit and glasses standing on a grassy field. He is looking towards a large, complex maze made of white concrete walls. The maze is circular and has many paths and dead ends. The man is standing on the left side of the frame, looking at the maze.

But it is often difficult to
know where to start to
deliver the best outcomes

...

... and understand what data is needed to resolve issues





Especially when each city is so unique ...



Transport



Housing



Waste



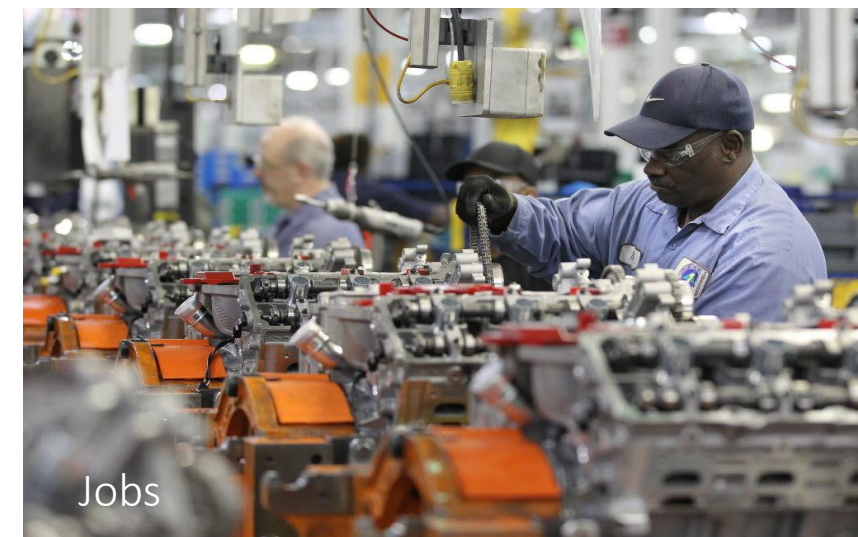
Traffic



Food/ Local production



Aging population



Jobs



Recreation



Local business/ neighbourhood



Social issues



Access to tech



Community

... with its own character, issues and priorities



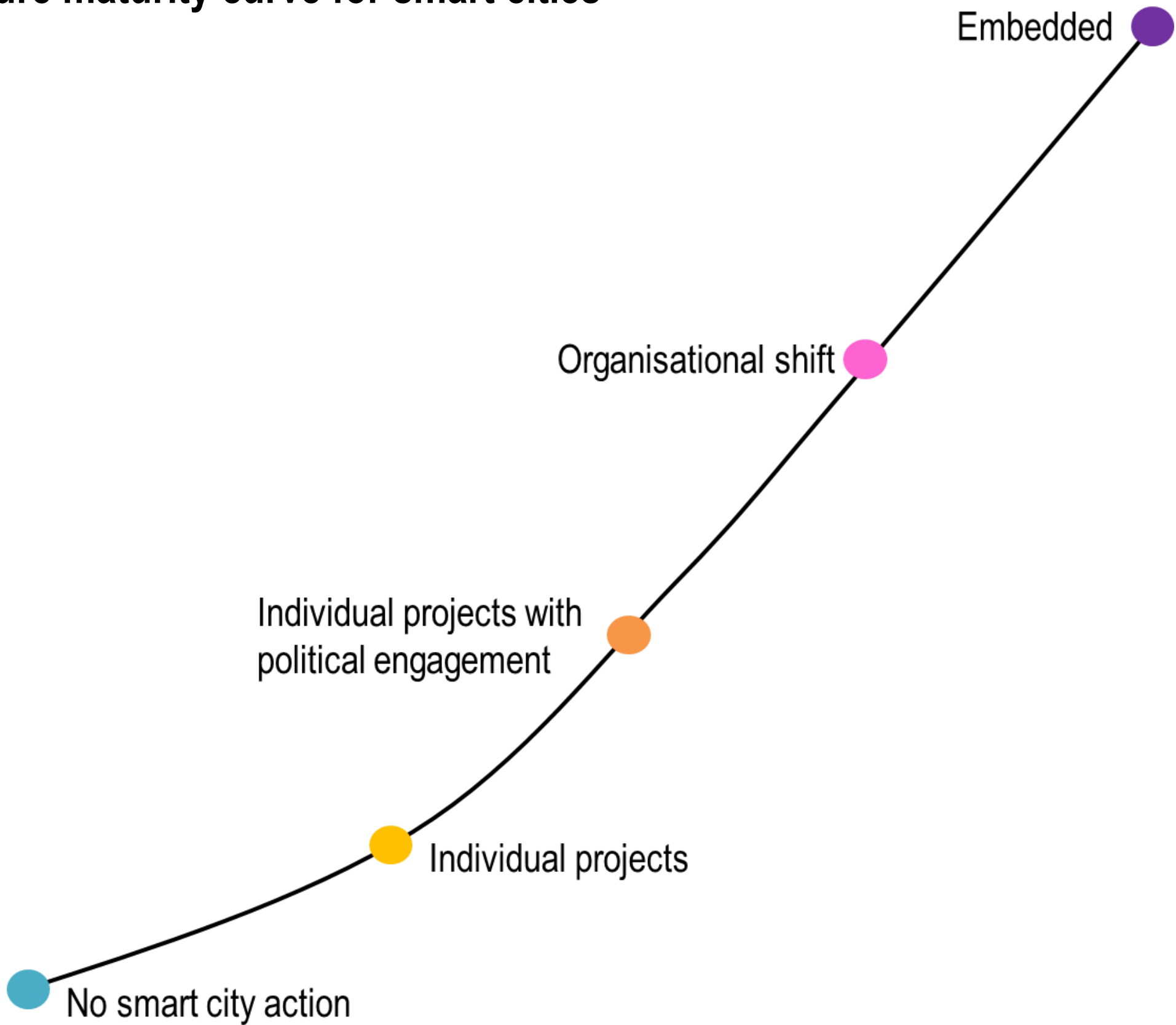
To address this we need a flexible framework and approach



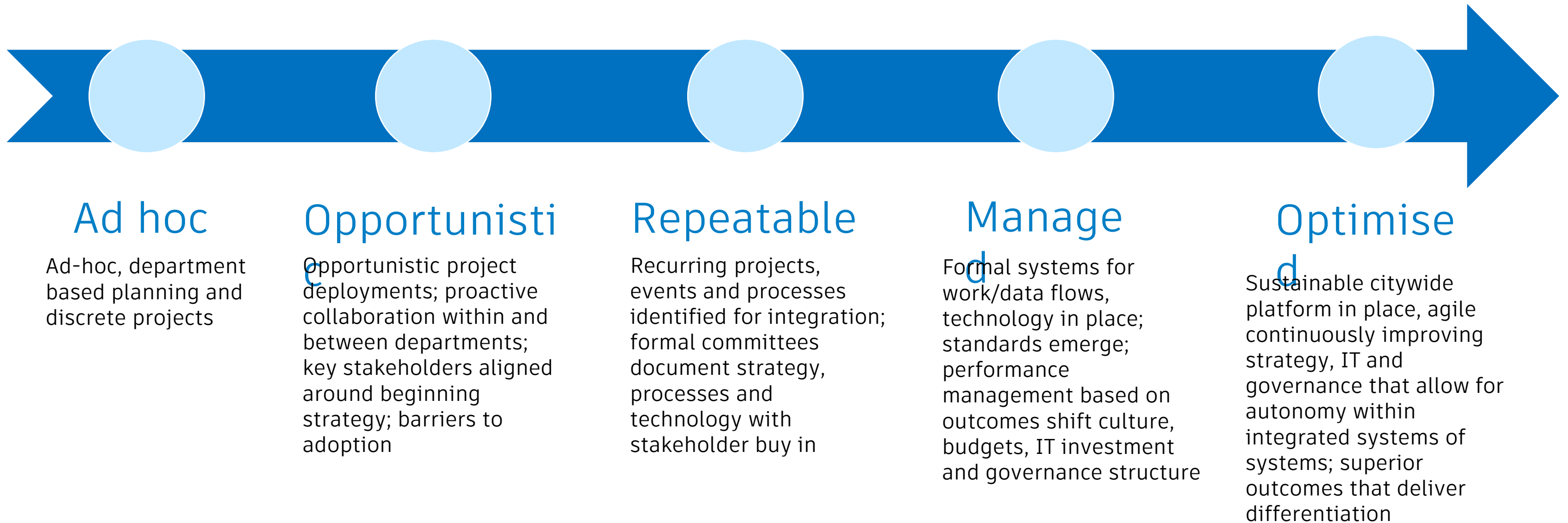
which allows cities to take a holistic approach to tackling issues

Governance structure maturity curve for smart cities

Source: Delivering the Smart City

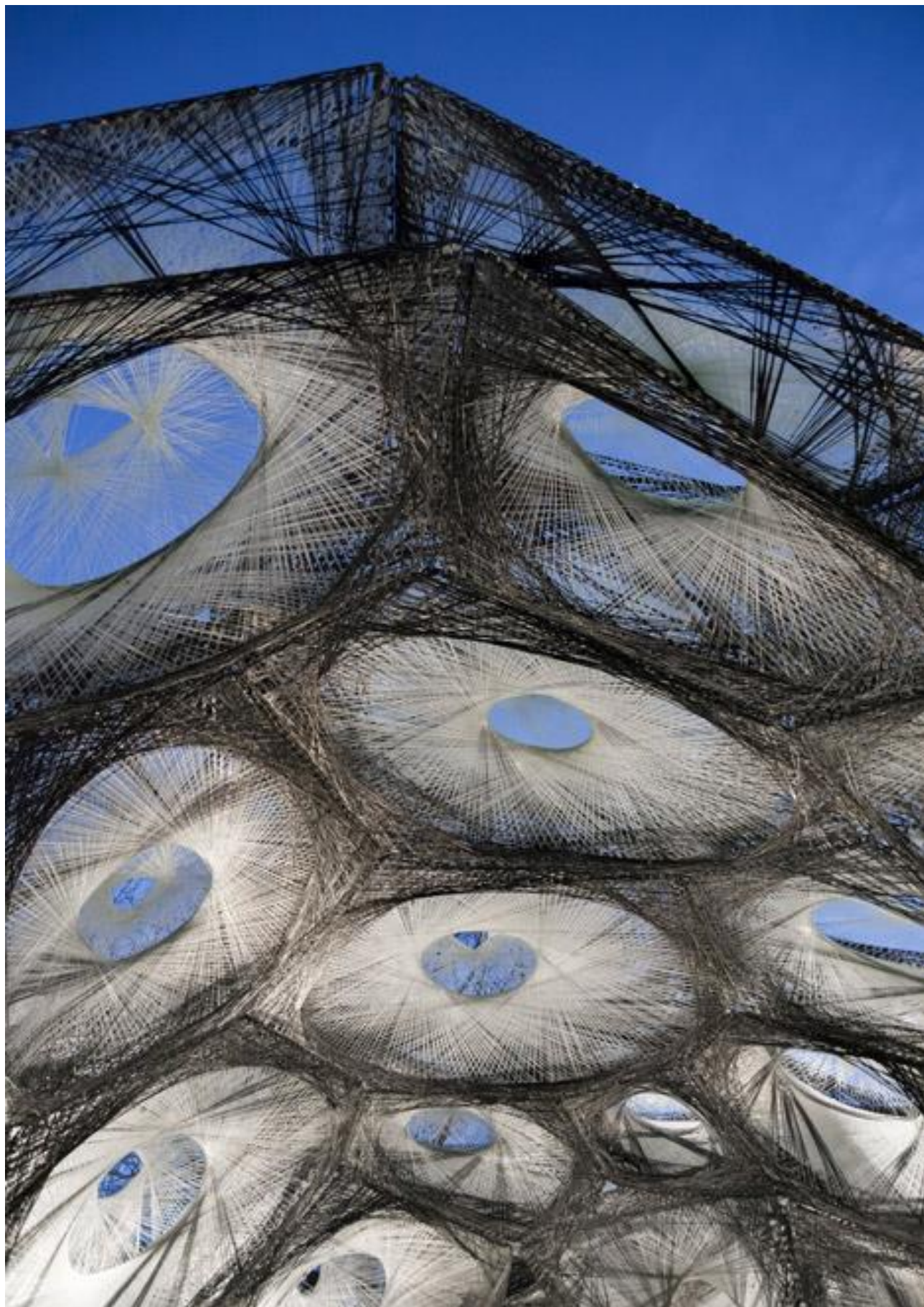


Stages in Smart City development



The smartest buildings in the world??



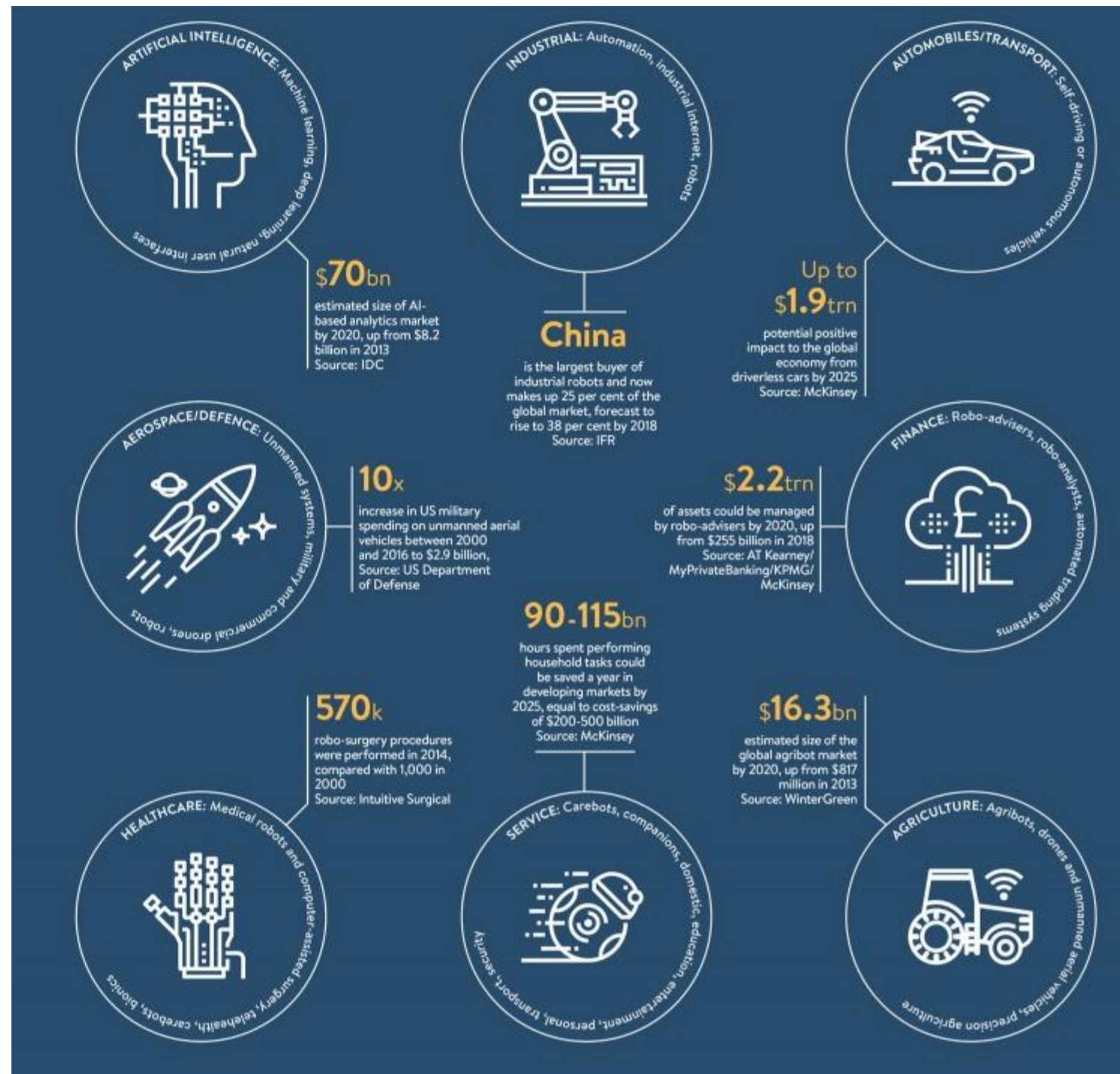


Stuttgart University Pavilion made from carbon fiber by robots



AI by sector

Source: Raconteur Reports



The background features a blue gradient bar at the bottom, transitioning from a darker blue on the left to a lighter blue on the right. Overlaid on this is a complex, light gray wireframe mesh pattern that forms a series of interconnected, flowing, and somewhat circular shapes, resembling a stylized, abstract representation of a network or a series of connected loops.

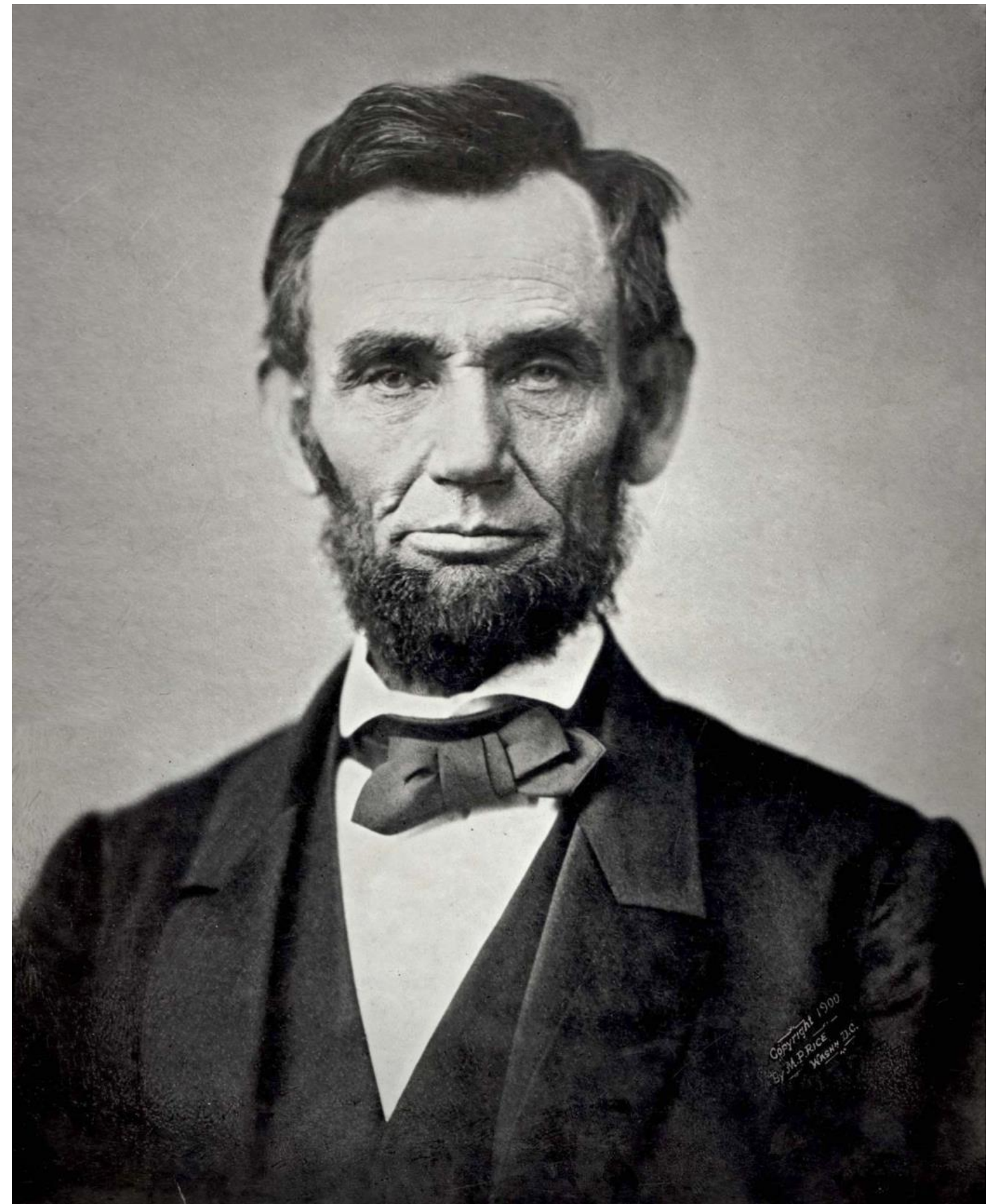
Our smart approach

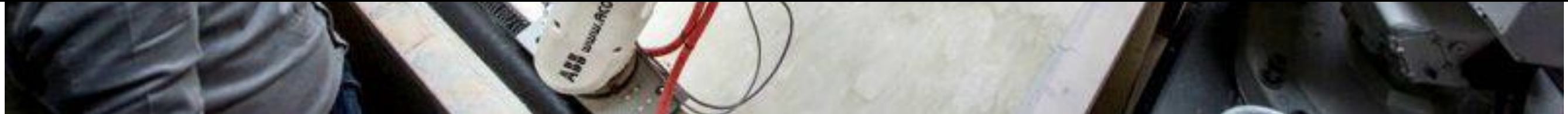


BAM is already working with our clients to understand and capture the data they need to address the challenges they face

“The best way to
predict the future is
to create it.”

Abraham Lincoln





3D builder



Coal Drops Yard - Immersive Virtual Reality

All apps > Lifestyle > BAM VR



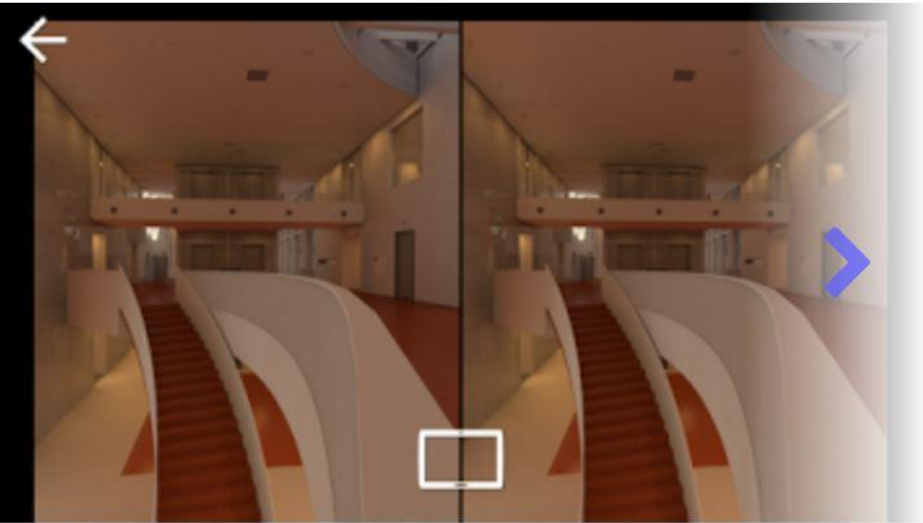
BAM VR

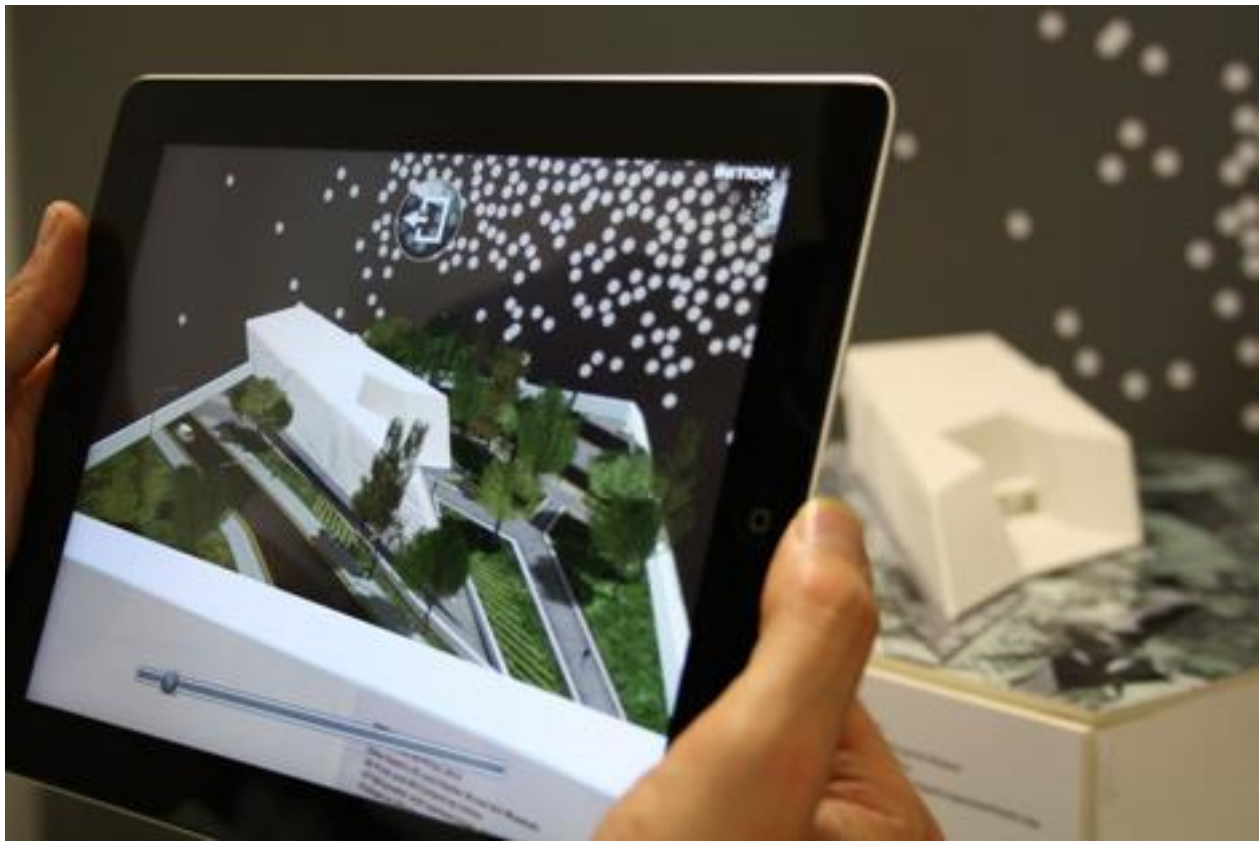
by Smart2VR

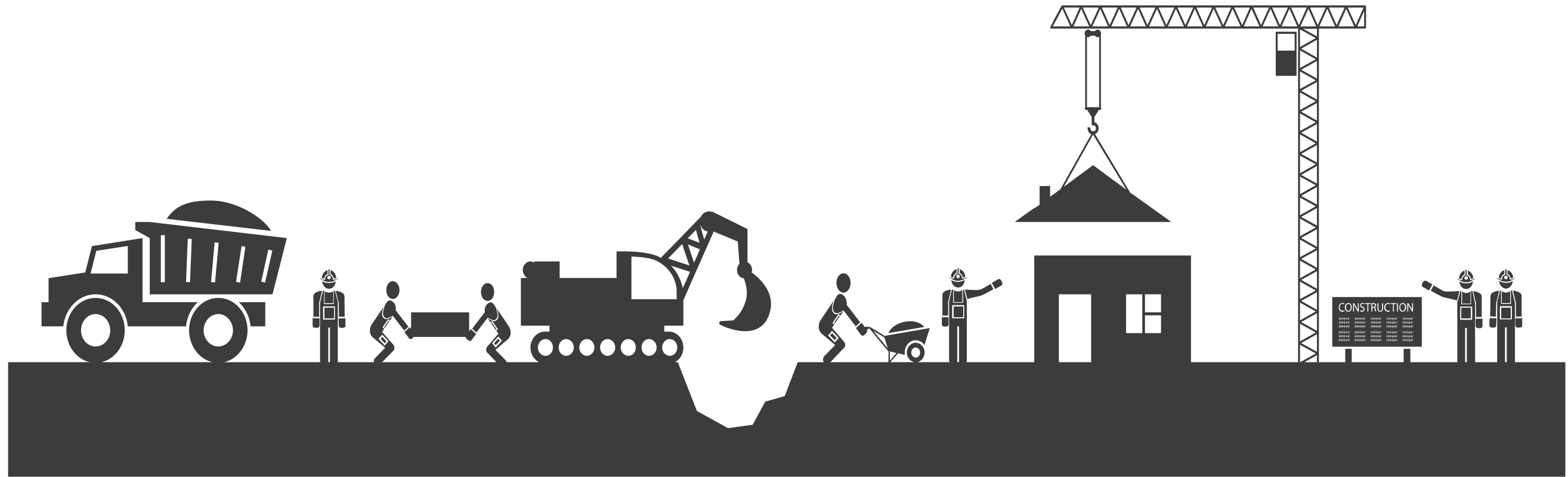


Basic Information

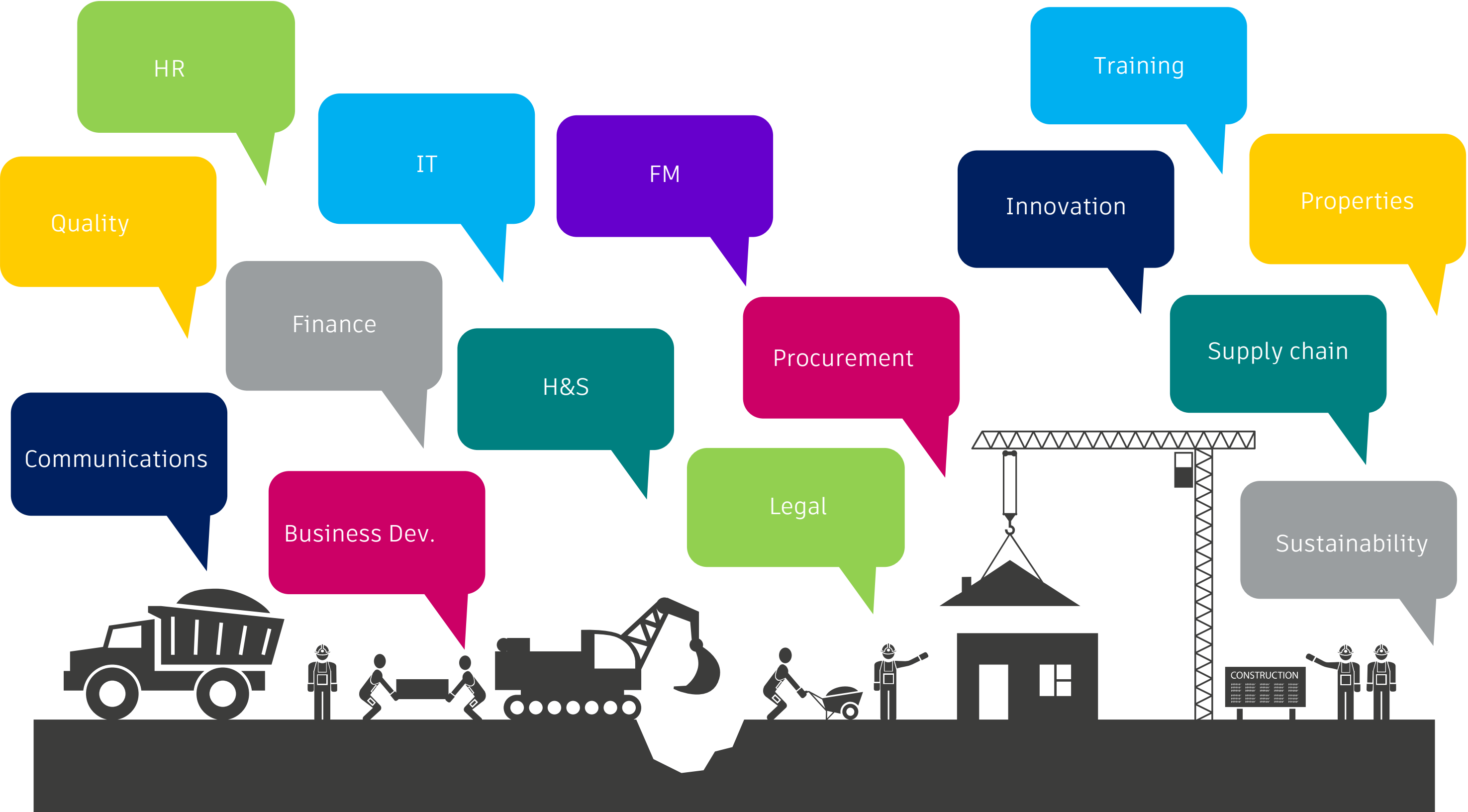
									
500+	4.11 9	Unranked	6	4.0+	5/12/17	2016 November	63.7 mb	Everyone	FREE
Installs	Rating	Ranking	Libraries	Android version	Last updated	App Age	App size	Content Rating	Price









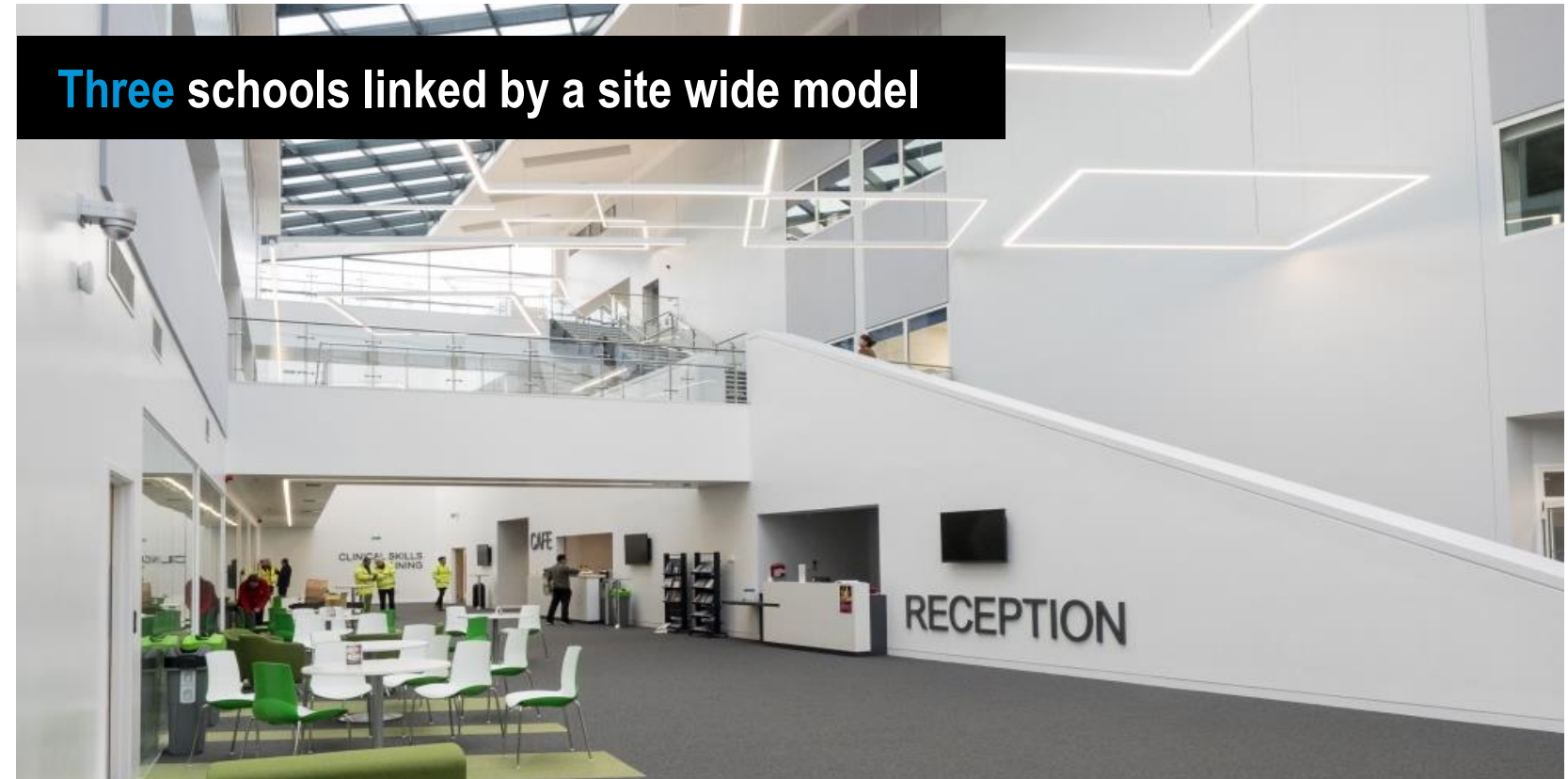


De-risk loss of **2** years of research



New Laboratories Molecular Biology Building, Cambridge

Three schools linked by a site wide model



School of Veterinary Medicine, University of Surrey

Whole Life BIM

54%

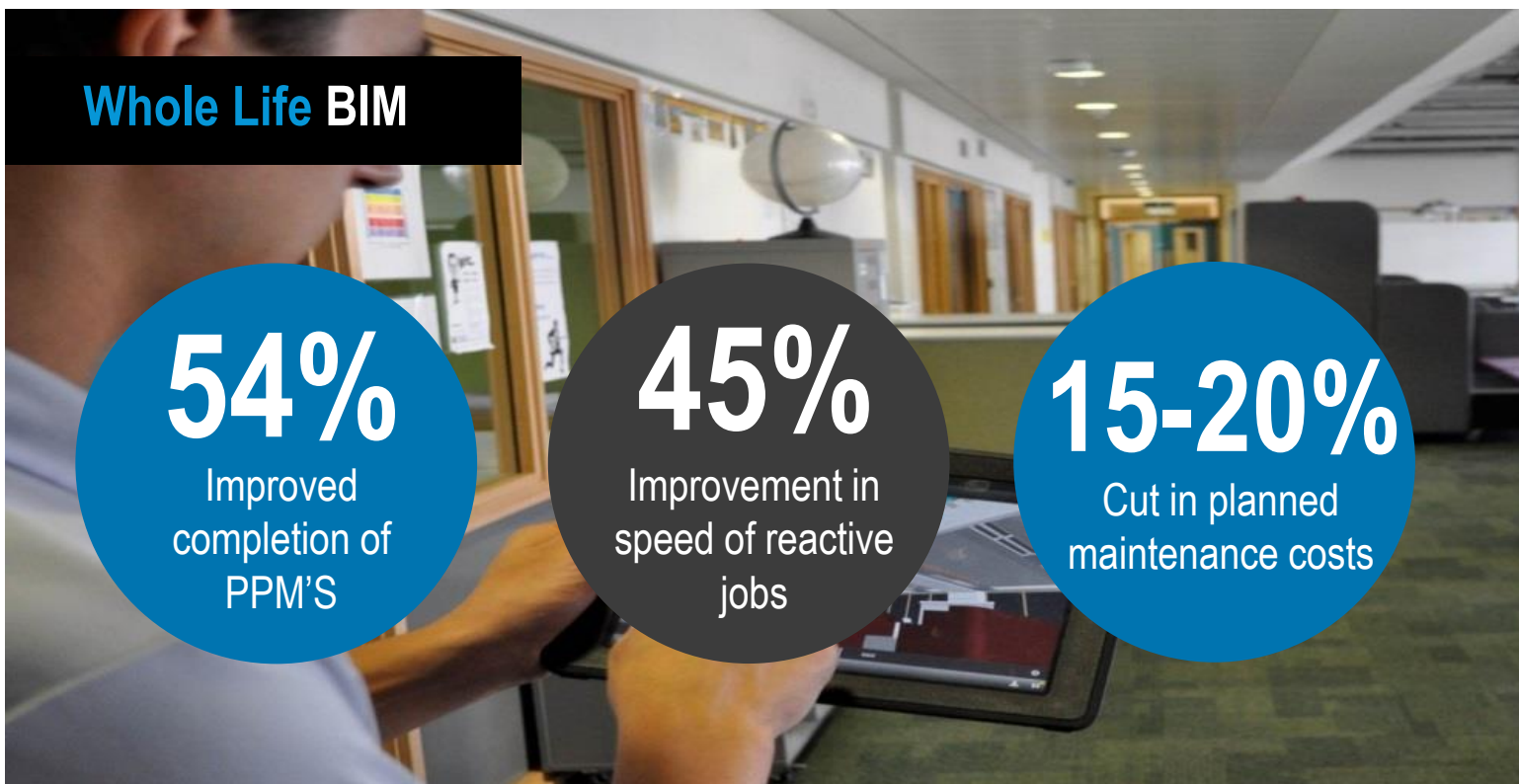
Improved
completion of
PPM'S

45%

Improvement in
speed of reactive
jobs

15-20%

Cut in planned
maintenance costs



UCL Academy, Camden

Proactive maintenance and planning

33%

Faster surveying

28%

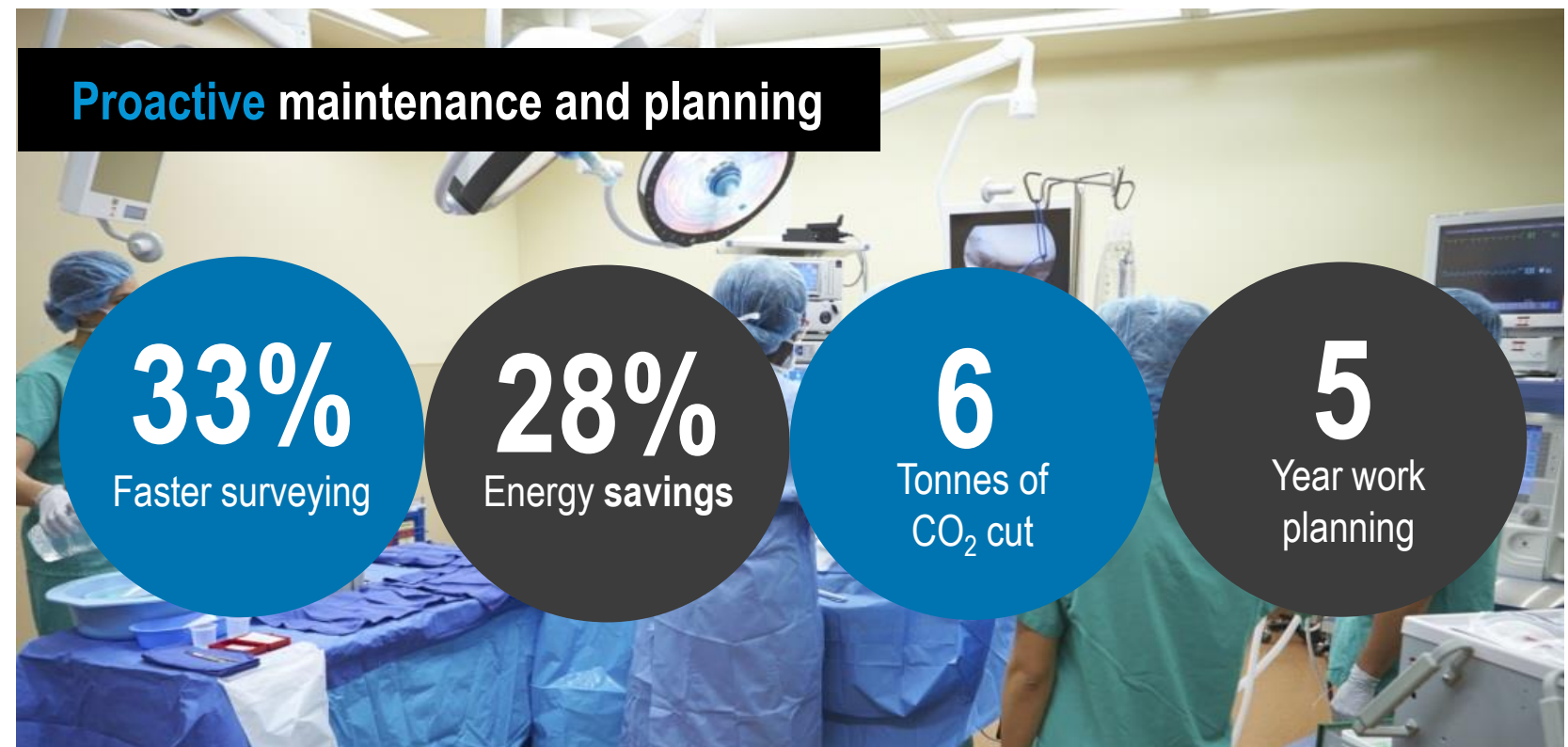
Energy savings

6

Tonnes of
CO₂ cut

5

Year work
planning



Wharfedale Hospital, Leeds



Individual building



Campus



City

Citizen engagement

Issue identification and
prioritisation



Data collection

Right data, at the right
time



Technology

Identifying the
right technology
to do the job



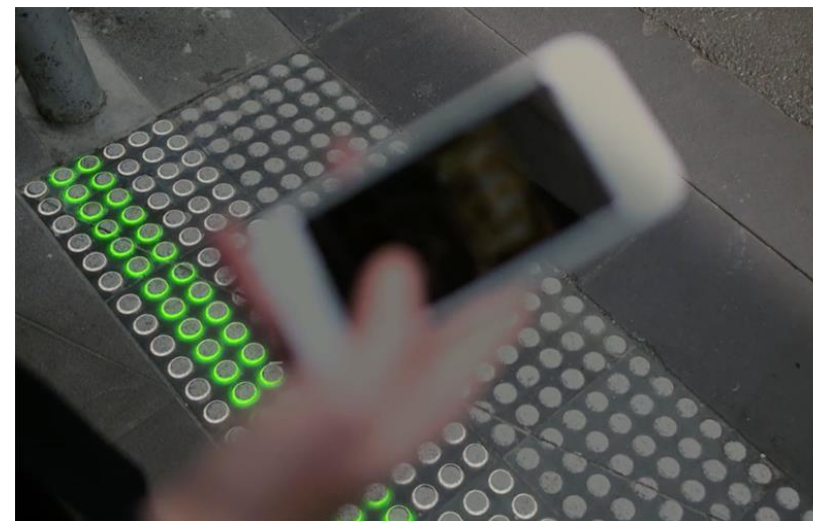
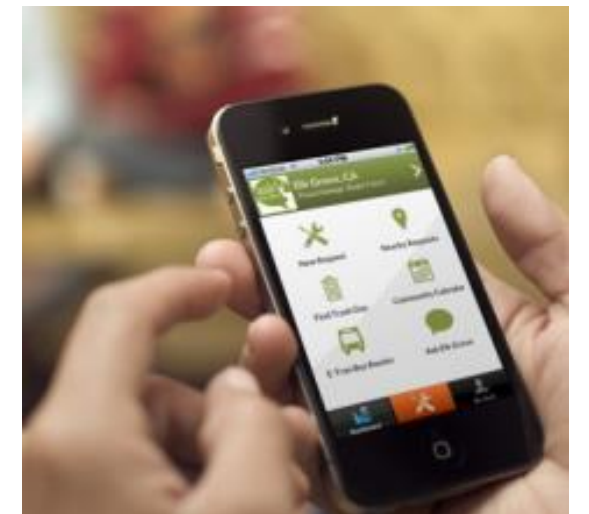
Optimum solutions and value



It gives citizens a greater say in how their communities are run via on and offline co-collaboration



Uses BIM as a vehicle to capture, store and disseminate information

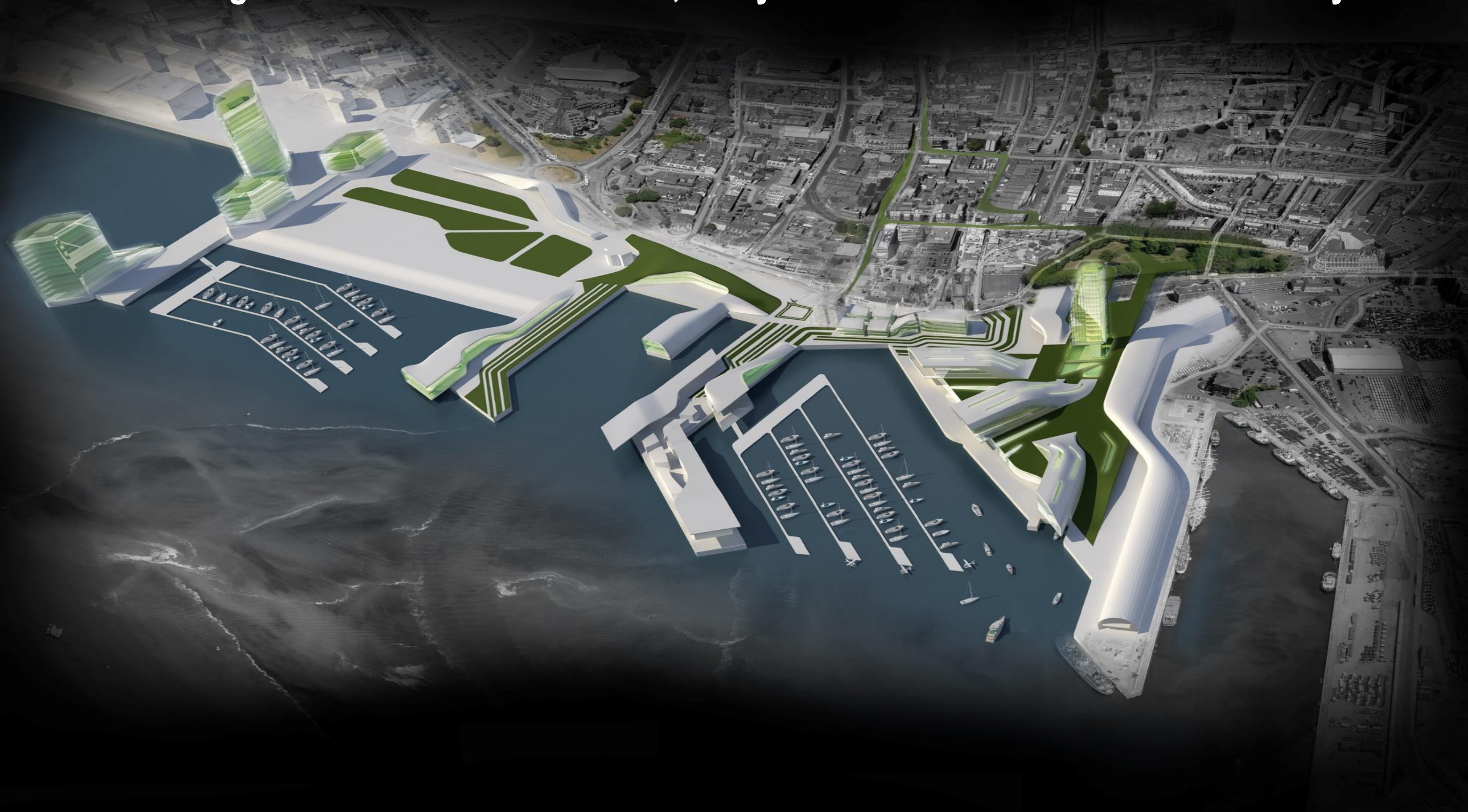


Makes the most of new technologies to support the process



BIM and the city

....But also has Design at the core to understand, analyse and create the solution to the City



The Atlantic Northwest project aimed to reshape Southampton's urban agenda by creating new connections and linking 'off-pitch' and unviable neighbourhoods back to the city. Won a World Architectural Festival Award + Innovate UK Smart City funding.



A blurred night city street with traffic and lights. The image shows a multi-lane road with cars and their headlights, and tall buildings in the background with various lights. The overall scene is out of focus, creating a bokeh effect with the lights.

SMARTVILLE

BUILDING ADAPTIVE CITIES



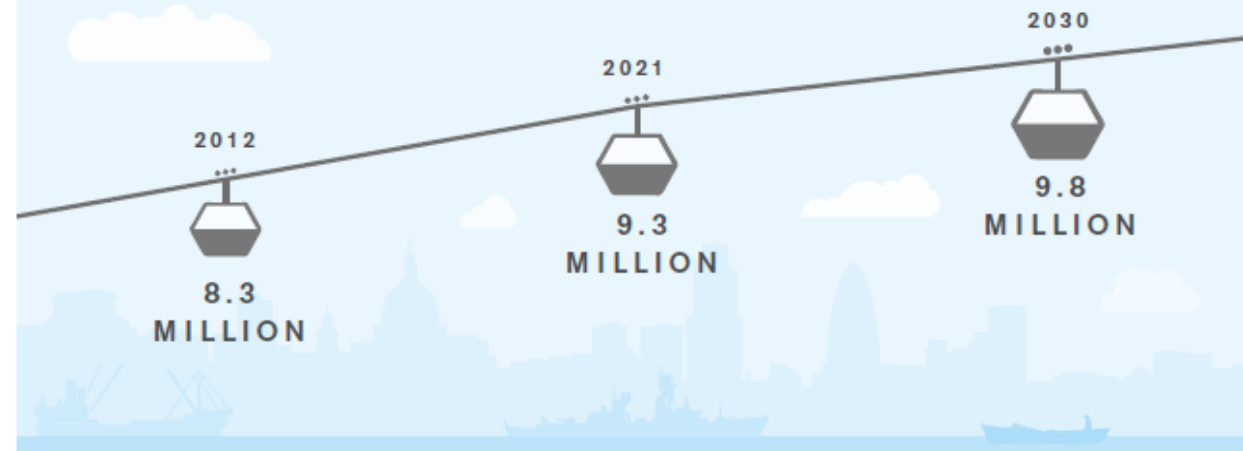
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How can we apply this in London?



LONDON'S GROWTH

POPULATION PROJECTION



LONDON
WILL HAVE
641,000
MORE JOBS
BY 2031



LONDON WILL NEED AT LEAST
800,000
MORE HOMES

PUBLIC TRANSPORT WILL
NEED TO ACCOMMODATE
MORE THAN
600,000
EXTRA PASSENGERS
AT PEAK TIMES



CONGESTION ON
LONDON'S ROADS
COSTS THE ECONOMY
OF £2 BILLION A YEAR

Citizen engagement
Issue identification and
prioritisation



Data collection

Right data, at the right
time



Technology

Identifying the
right technology
to do the job



Optimum solutions and value



Participatory Citizens

Governments encourage citizens to participate in shaping policy and decision making

Responding to issues put forward by the city e.g. city strategy or transit route changes

Creative Citizens

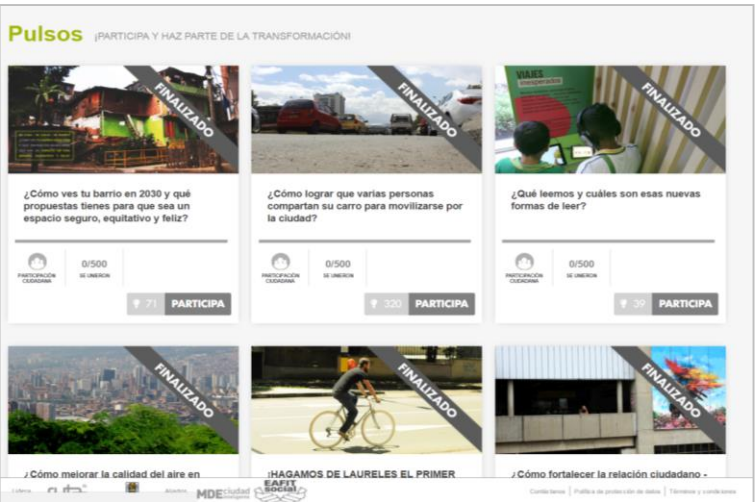
Citizens are empowered to create solutions (tools and approaches) to tackle the issues they face

Citizens develop their own solutions to address issues they want to tackle e.g. maker faire, fab labs

Data Citizens

Citizens seen as a source of data that can be used to improve city services

Issues relating to how we collect the data created by citizens such as privacy and security



Establish ways for citizens to collaborate

Make a list of priorities



Citizen engagement
Issue identification and
prioritisation



Data collection

Right data, at the right
time



Technology

Identifying the
right technology
to do the job

= Optimum solutions and value



Determine the data that needs to go into the model and how it will be obtained



Identify, install and implement the required technology and data collection methods



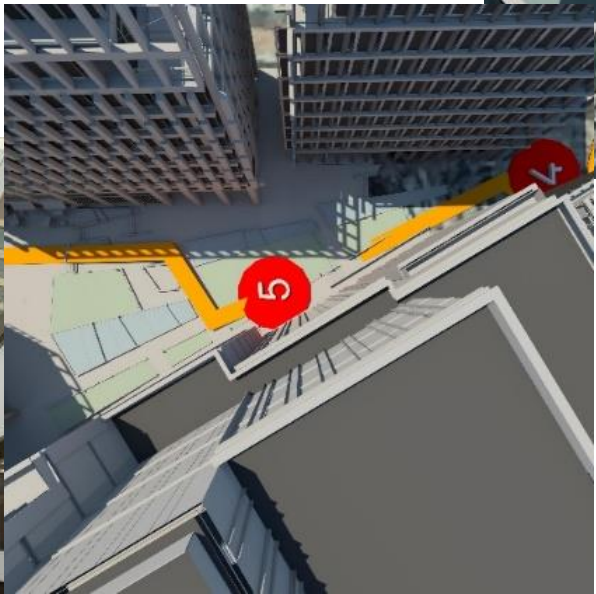
Create a 3D and virtual model of London using Revit and Infraworks

Kings Cross

Kings Cross



bam



Kings Cross Eastern Goods Yard re-development
Eastern Transit Shed proposed glazing details

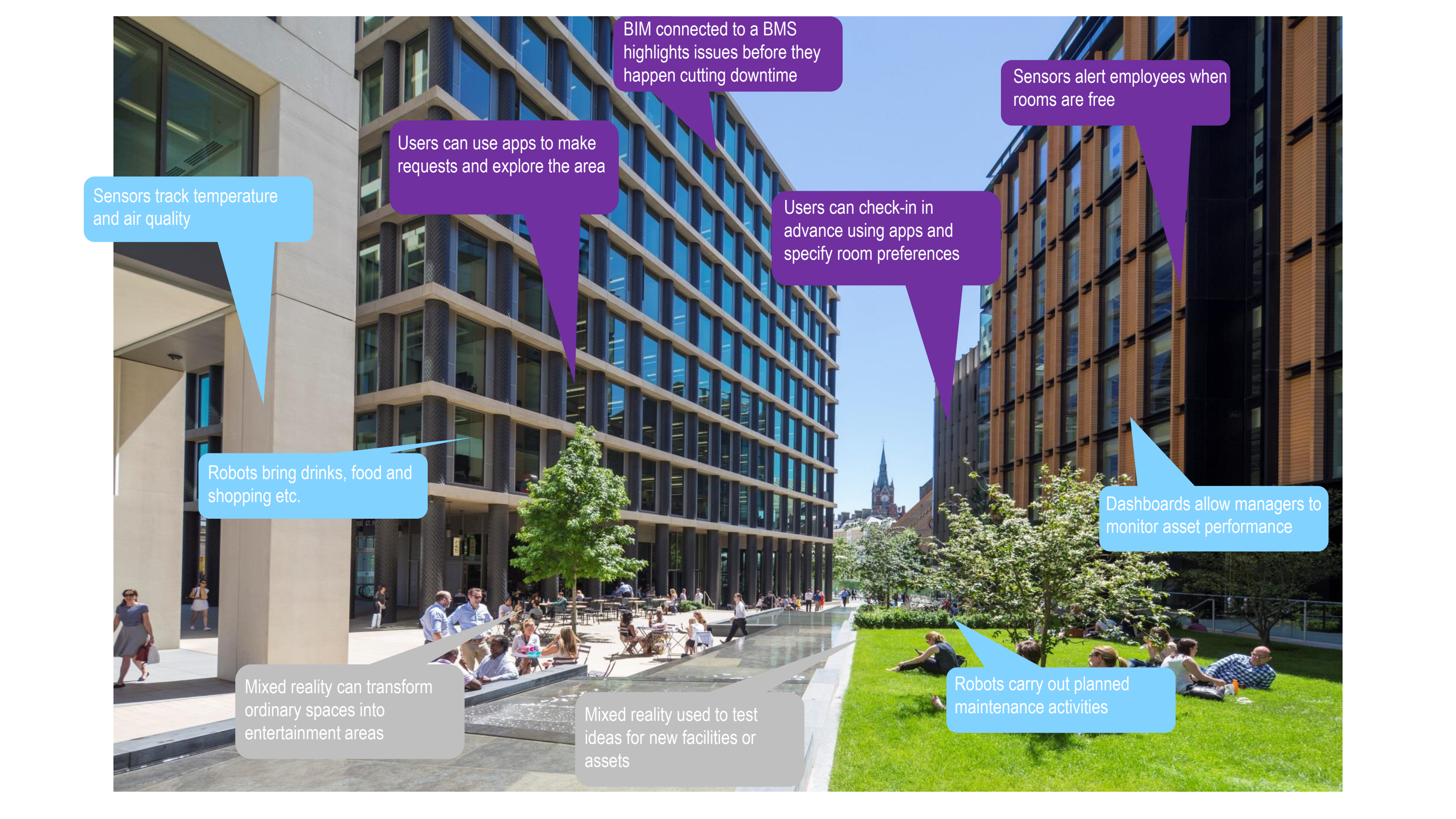




King's Cross Virtual Tour



Kings Cross Central - Interactive Virtual Tour



Sensors track temperature and air quality

Robots bring drinks, food and shopping etc.

Mixed reality can transform ordinary spaces into entertainment areas

Users can use apps to make requests and explore the area

BIM connected to a BMS highlights issues before they happen cutting downtime

Users can check-in in advance using apps and specify room preferences

Sensors alert employees when rooms are free

Dashboards allow managers to monitor asset performance

Robots carry out planned maintenance activities

Mixed reality used to test ideas for new facilities or assets

Citizen engagement
Issue identification and
prioritisation



Data collection

Right data, at the right
time



Technology

Identifying the
right technology
to do the job



Optimum solutions and value

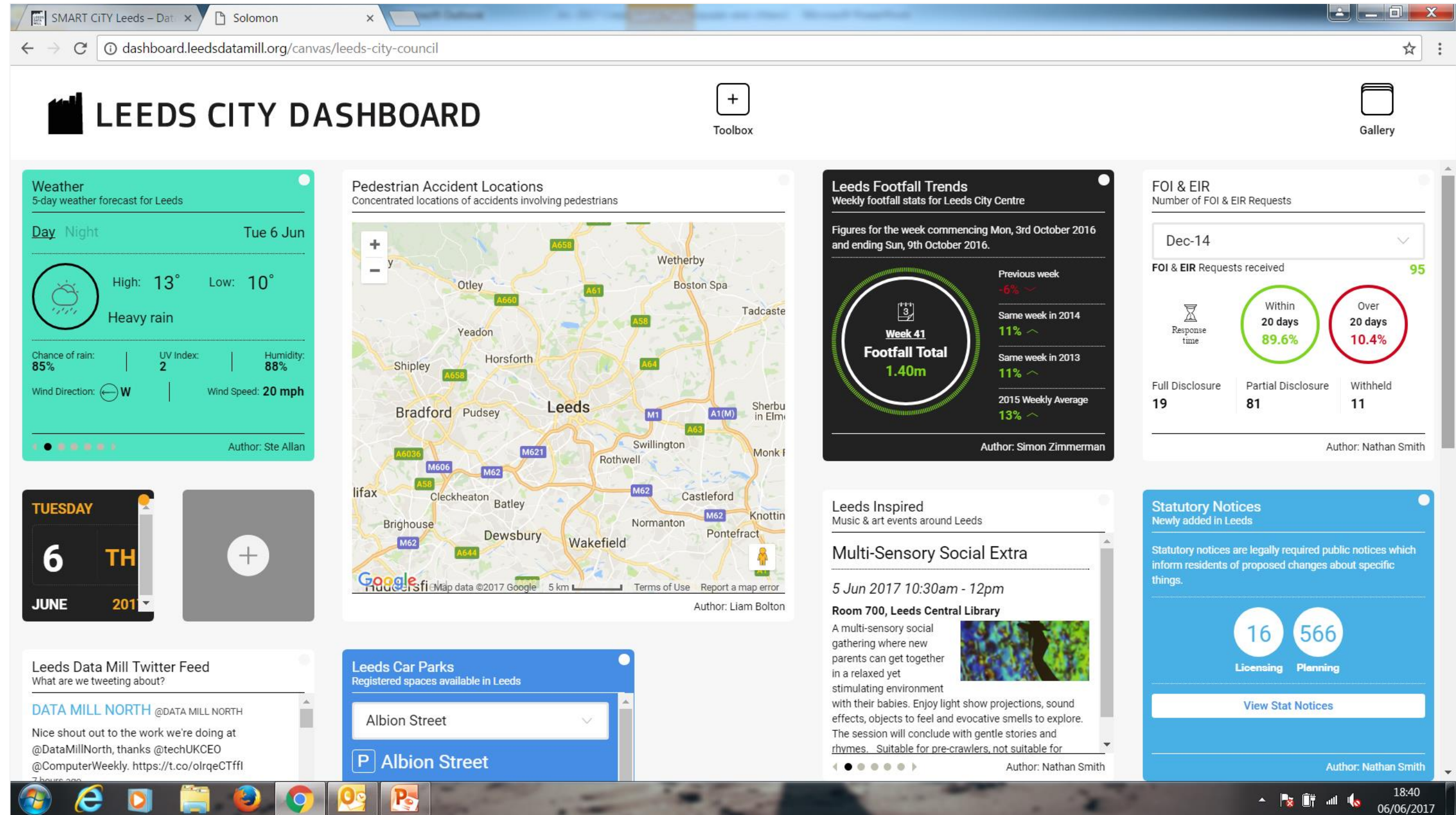
Ericsson Global Smart City Index 2016

City	Rank in 2016
Stockholm	1
London	2
Singapore	3
Paris	4
Copenhagen	5
Helsinki	6
New York	7
Oslo	8
Tokyo	9
Seoul	10
Taipei	11
Los Angeles	12
Barcelona	13
Hong Kong	14
Berlin	15

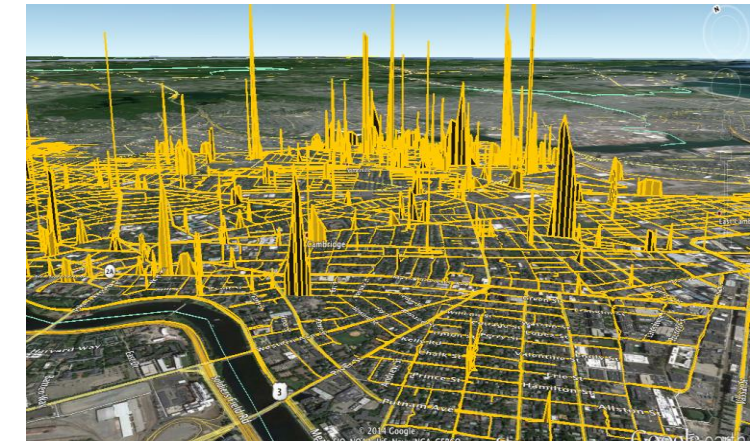
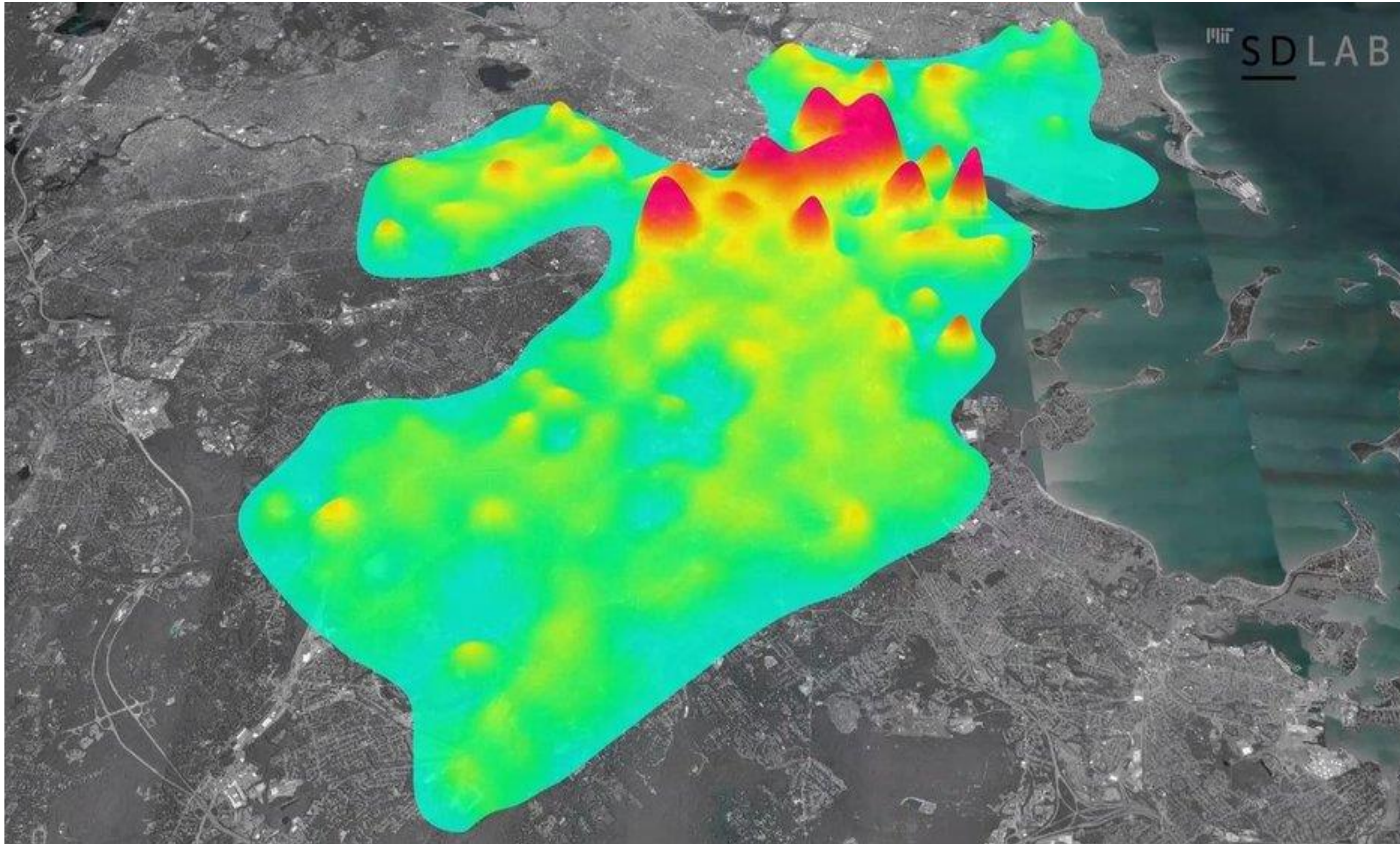
Manchester Verve project



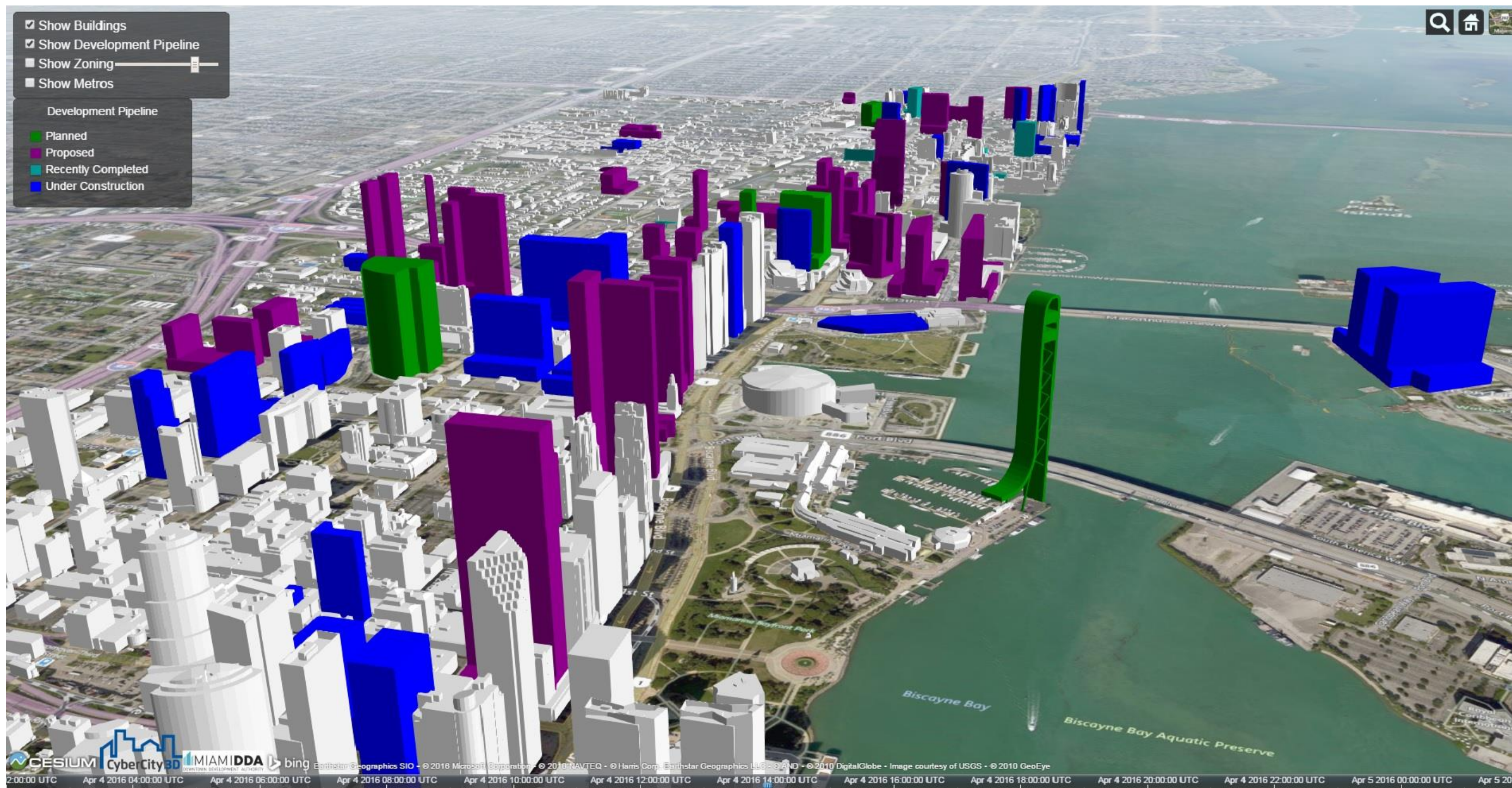
Leeds city dashboard



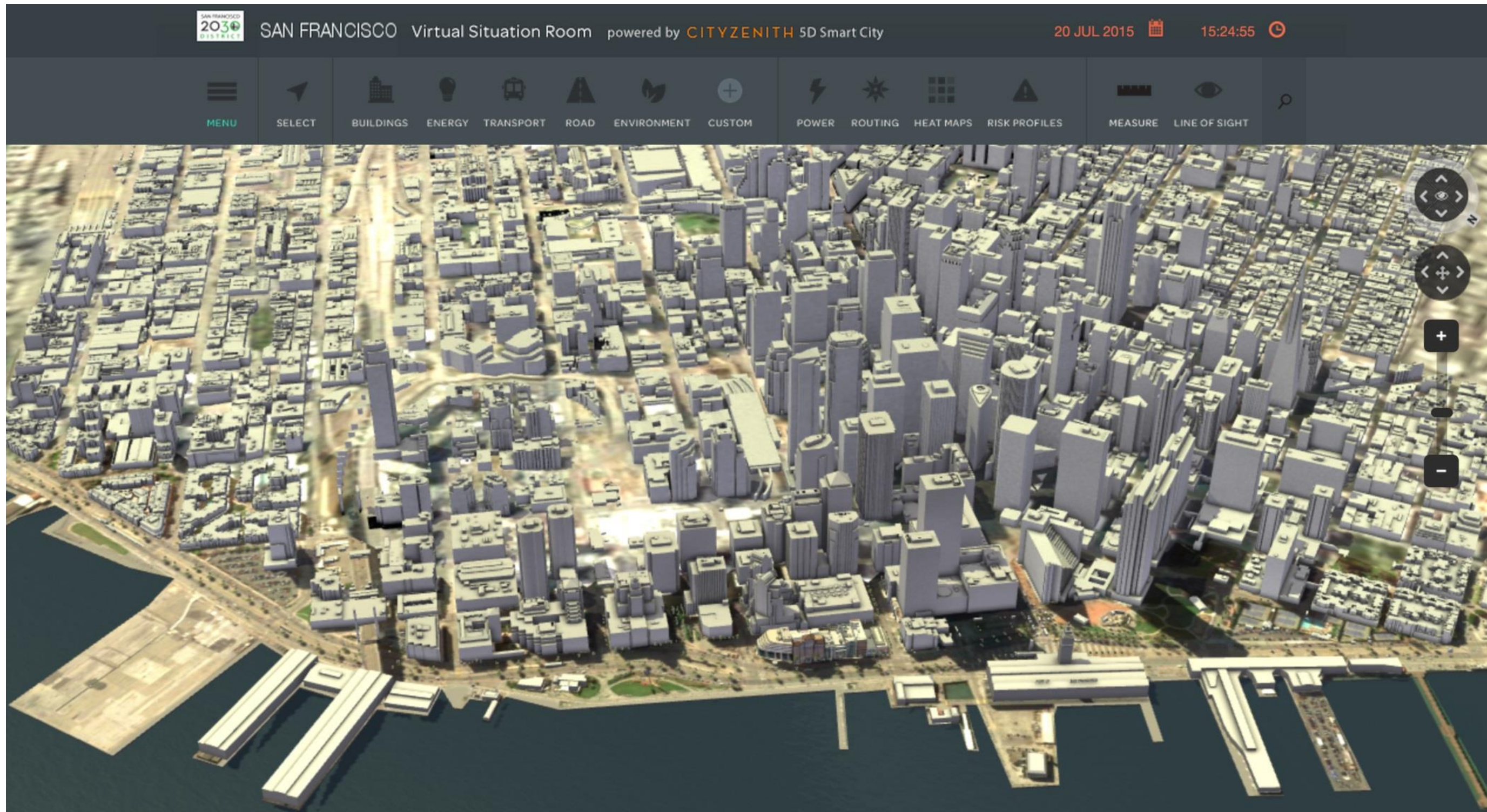
Boston smart city heat and gas leaks map



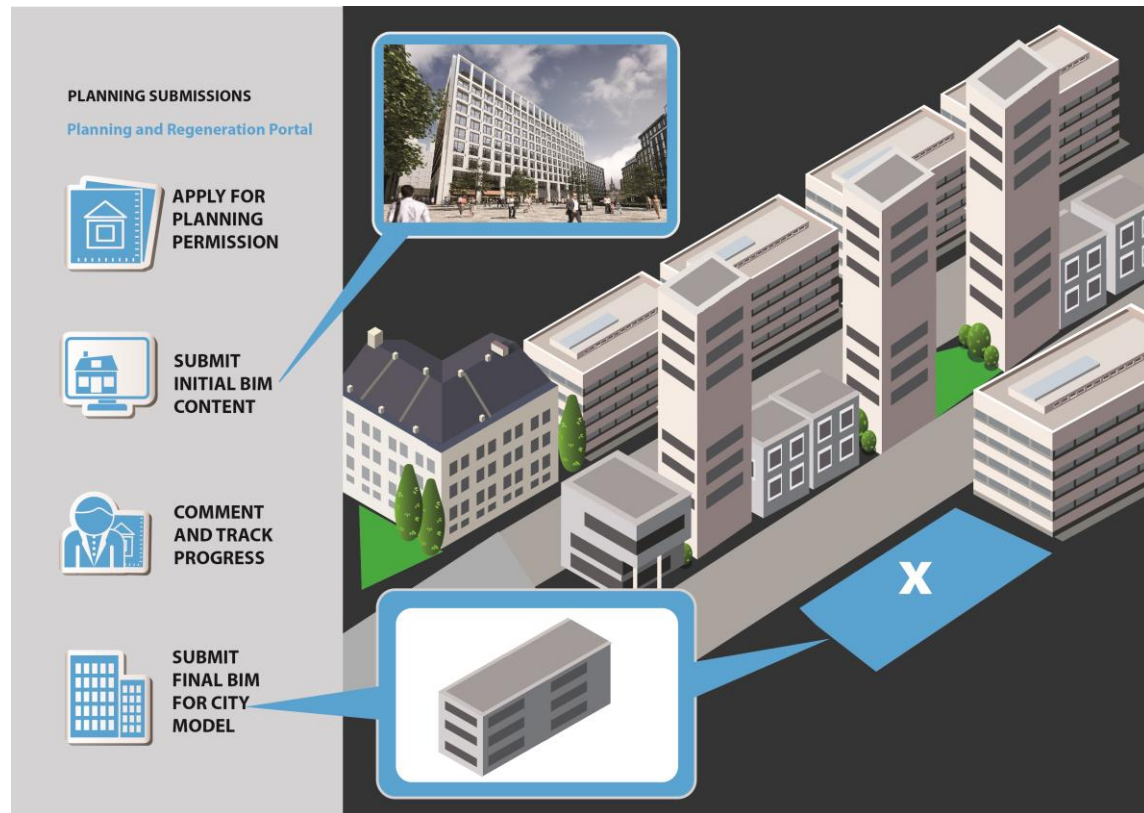
Miami skyline planning



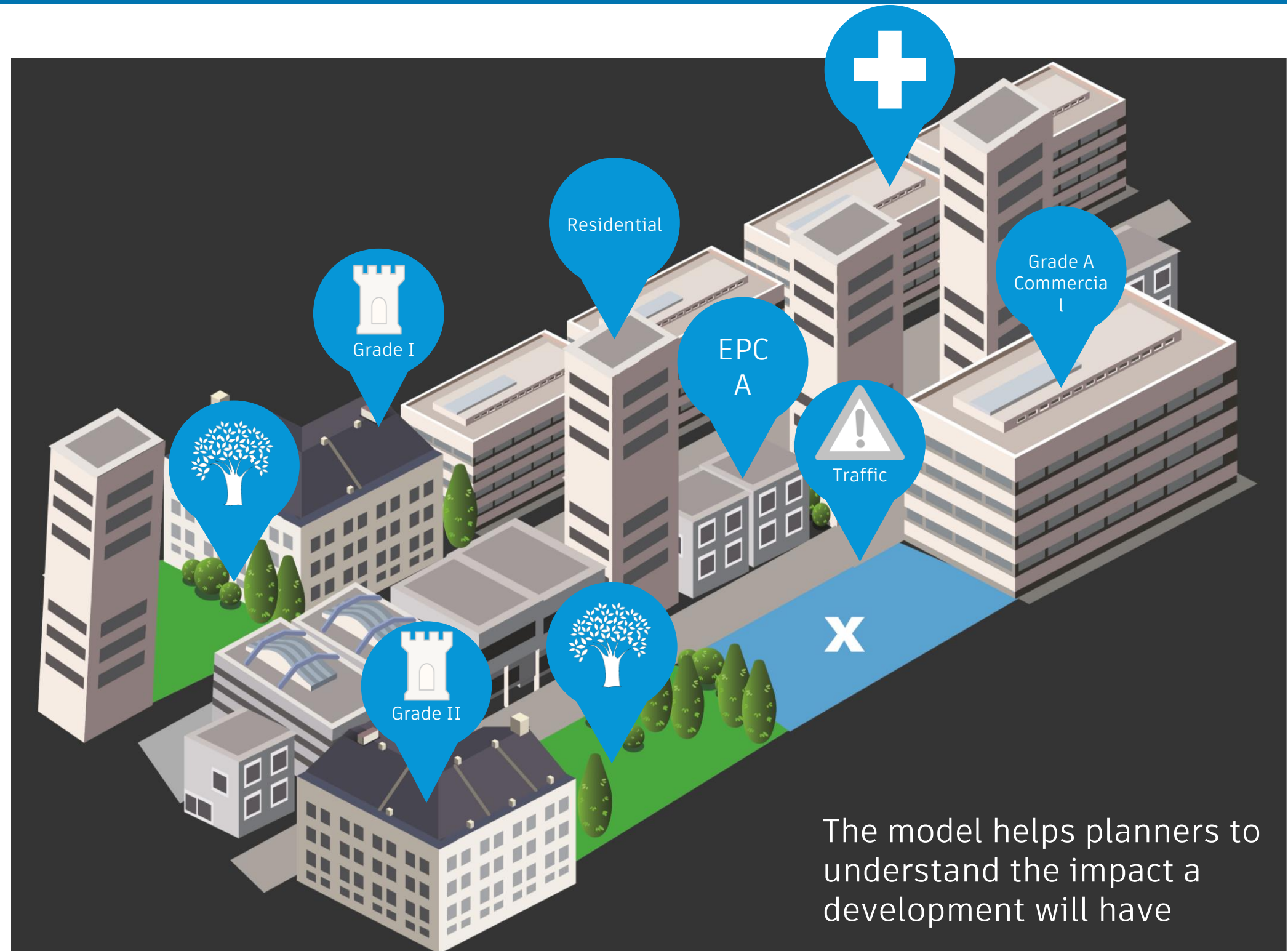
San Francisco virtual situation using City Zenith



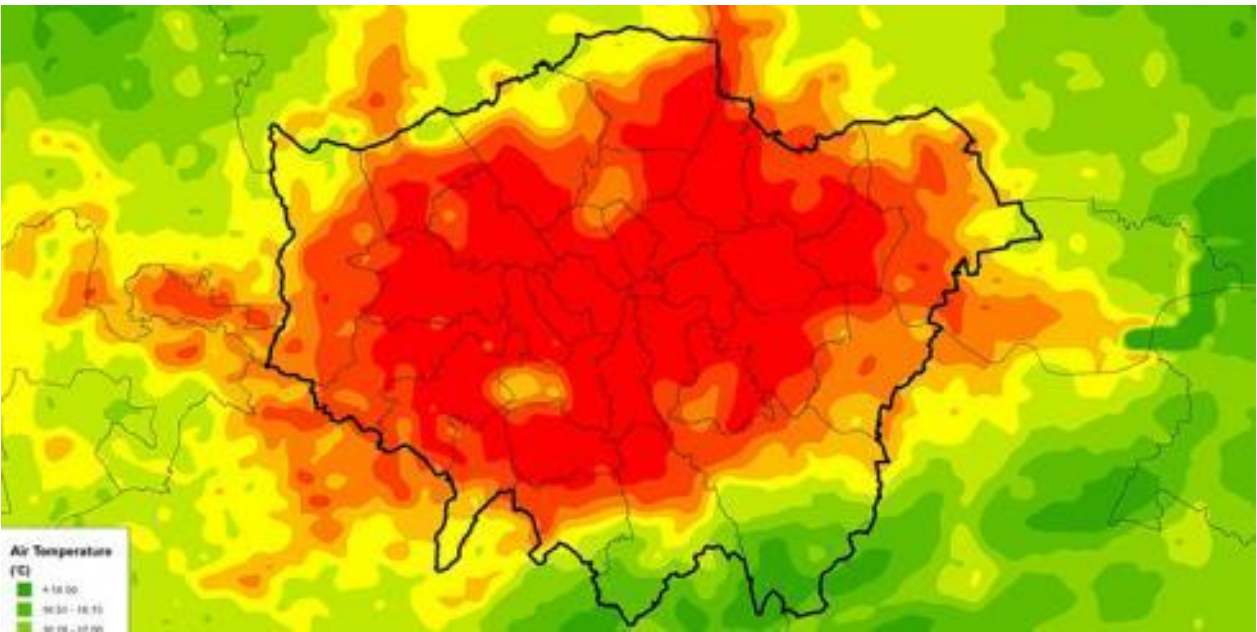
Better more informed planning decisions using the model



At planning the concept model is placed in the model

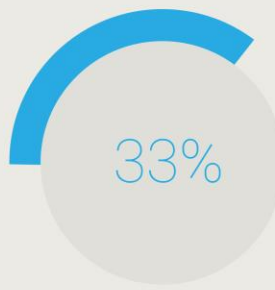


Monitoring performance across the city – via the model and linked dashboards



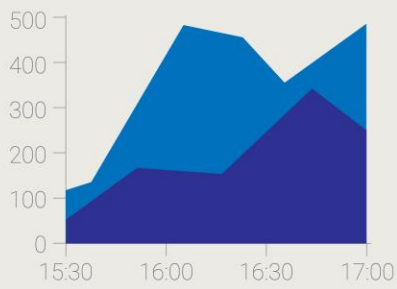
BREEAM EXCELLENT
SCHEMES
860

% of BREEAM schemes that are
excellent



CARBON EMISSIONS
4.2T PER CAPITA

Air quality predicted v actual

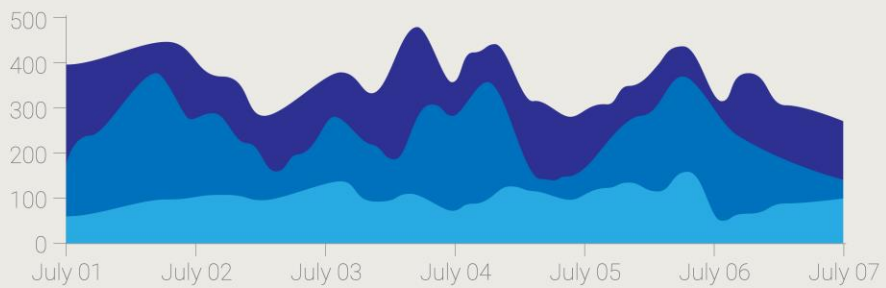


NEW OFFICE SCHEMES
159

Under construction/completed



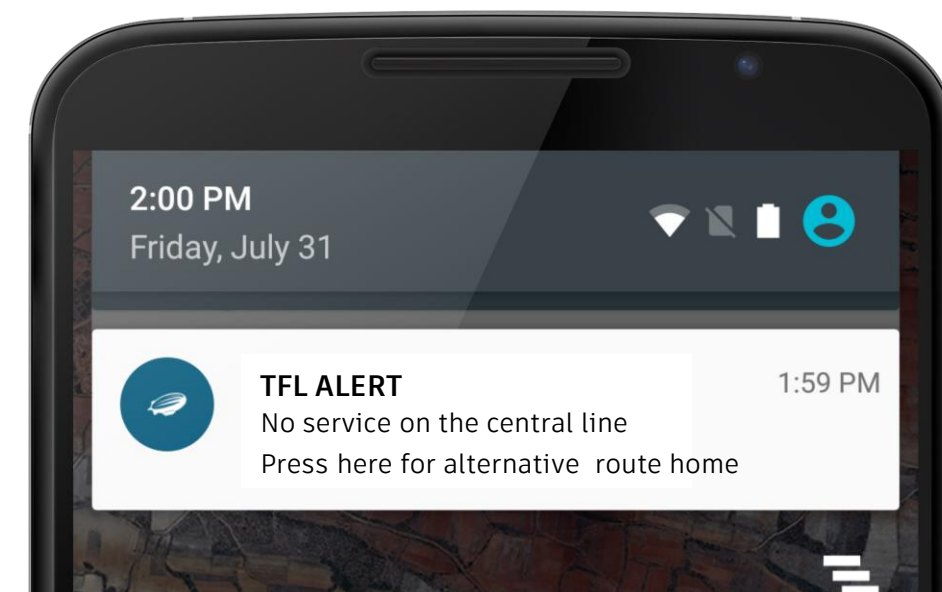
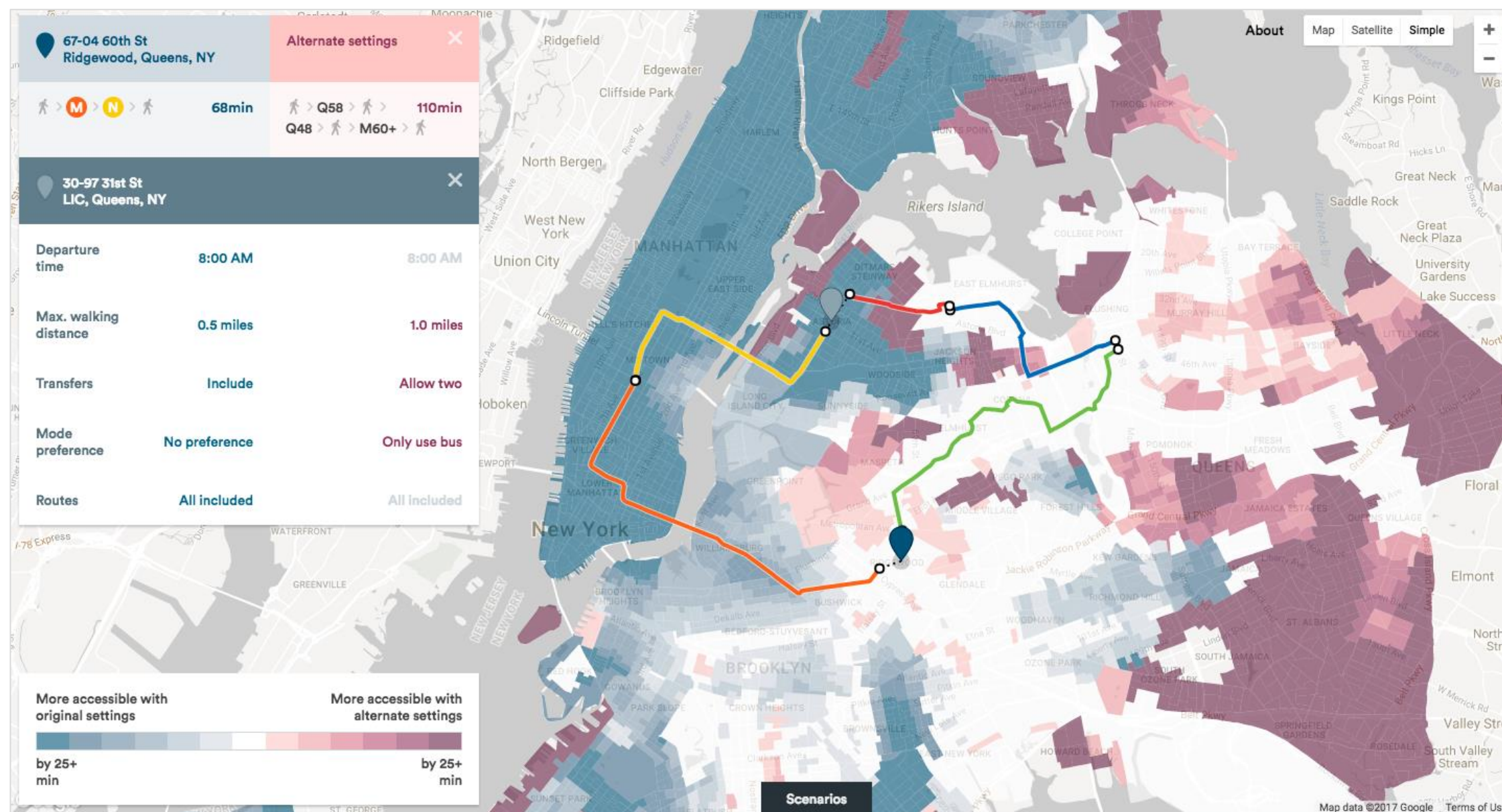
Energy, carbon and water usage in London's
buildings (July 1-7)



Number of offices with energy
reduction schemes in place



Transit delays and cancellations – lead to frustrated passengers and over crowded stations



Alerts to users with alternative route calculated on busyness and travel history

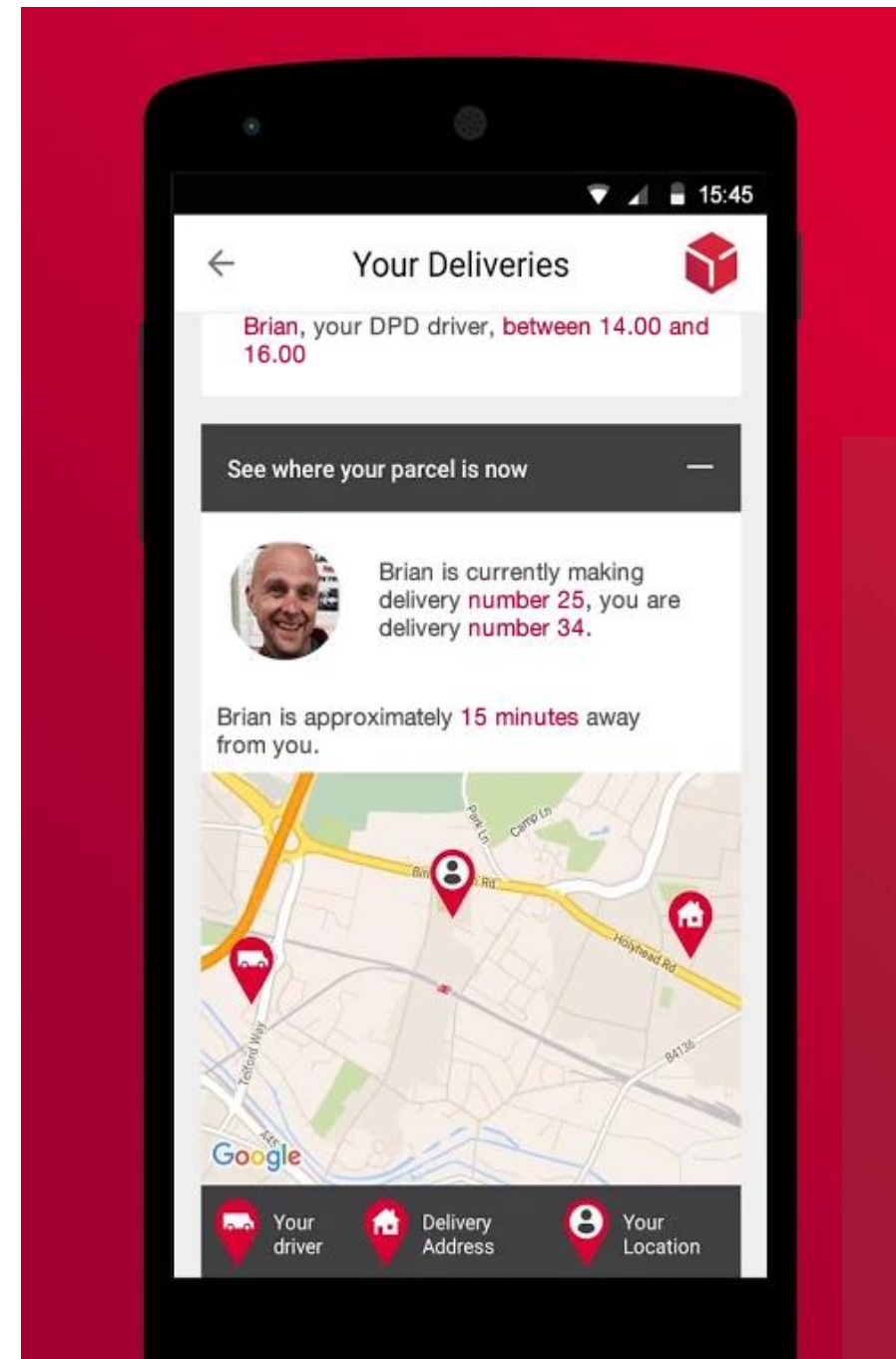


Interactive totems outside the station provide information and alternative routes

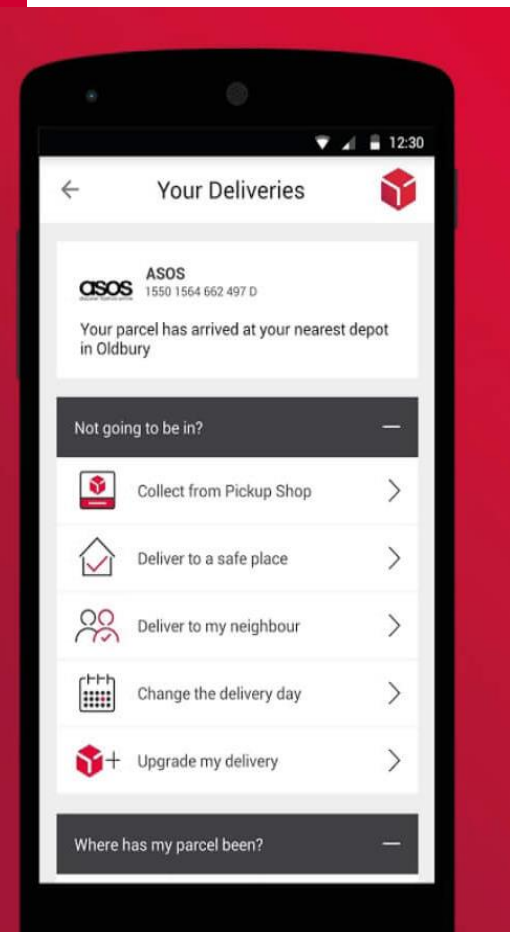
Use data to pre-plan alternatives and understand impacts elsewhere

Example: Sidewalk Labs LLC's L line shut down in NY

40% of fly-tipping in the UK takes place in London



Book, track and change collections via app
Example: DPD's delivery app



Smart recycle and waste bins



Report an issue



Next Steps.....

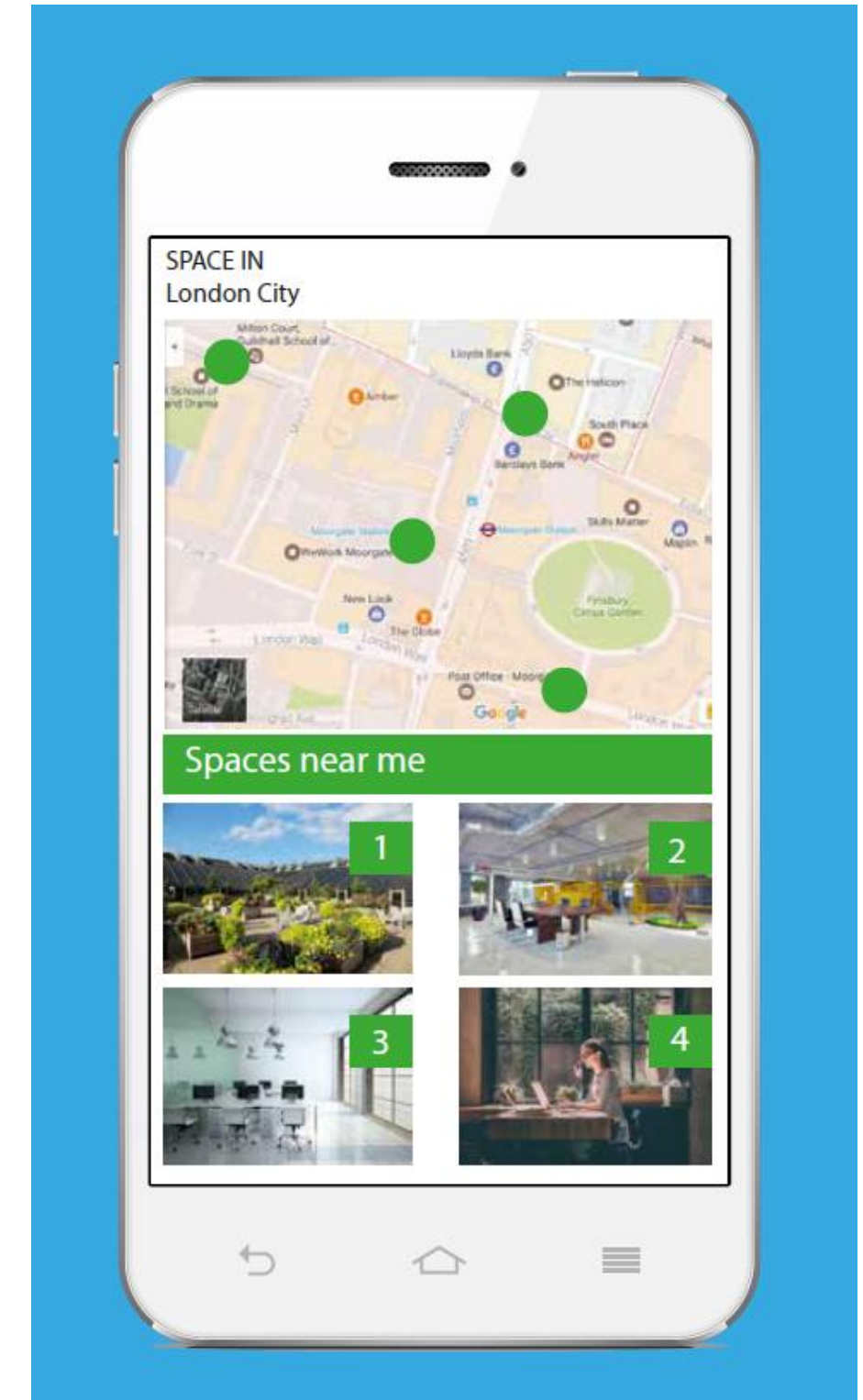


We are living in an ever interconnected world.



Smart Cities need to utilise data to meet the ever demand for 'quicker, cost effective, better living/ working environments.

Making the most of underutilised space and a more agile way of working in London



The VR City Timetransporter - Utilising VR for Tourism, Planning Impact

Don't read about London's history ... be there yourself!

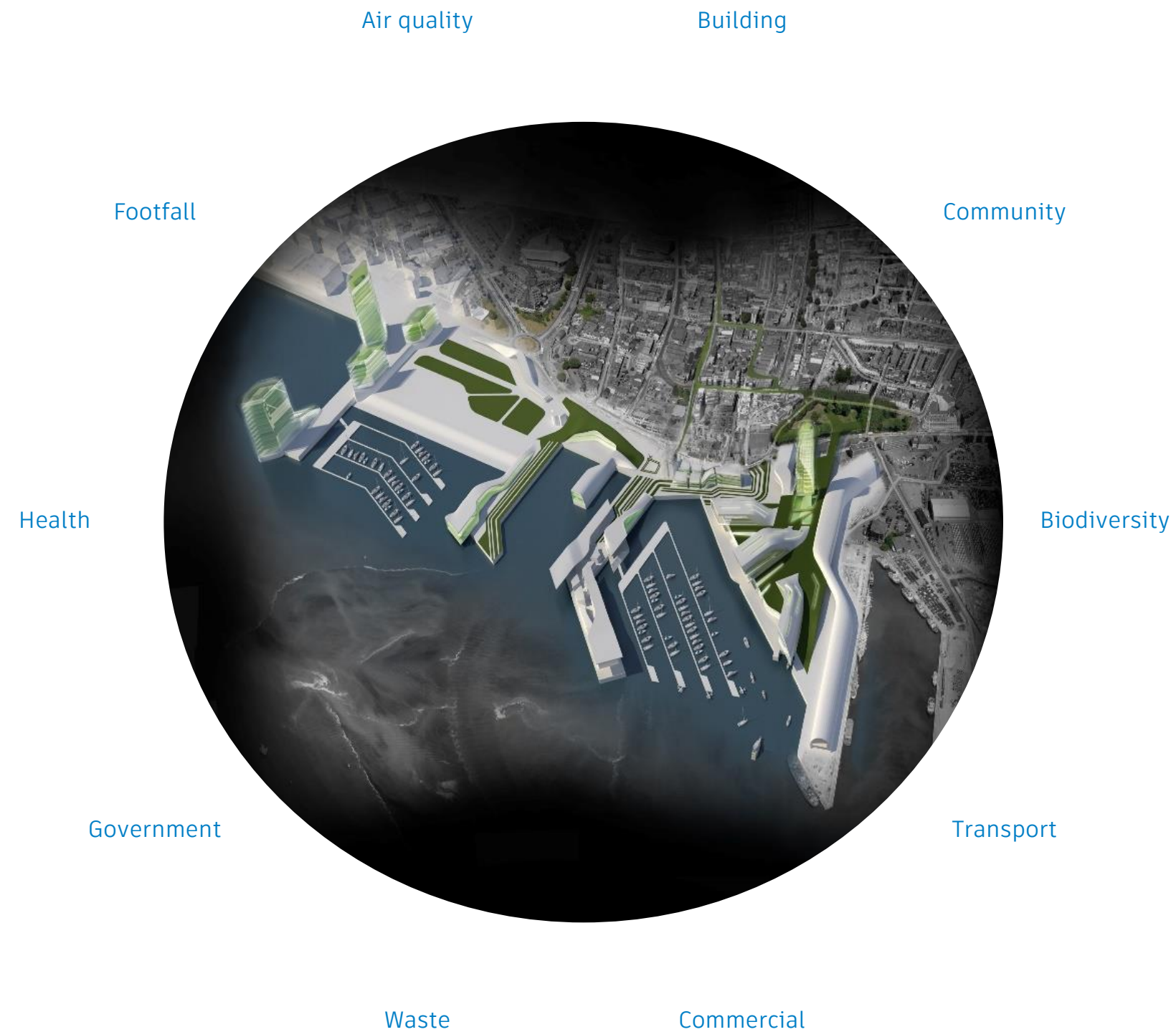
Experience the City's history in 360



Model of the City of London with VR – Planning?



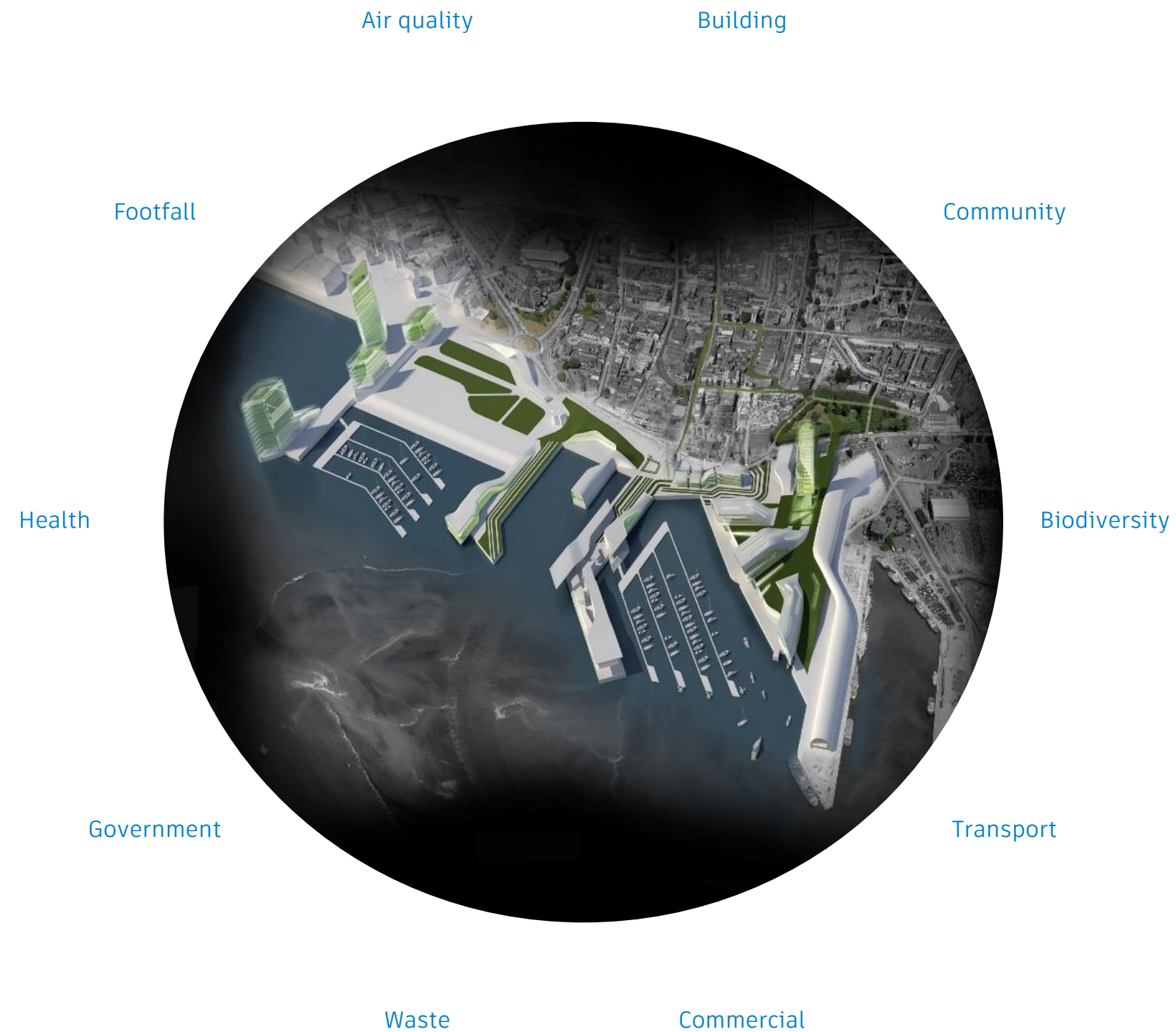
In Summary.....



3d Digital Model
with
Intelligent Data
is
essential
for
Smart Cities



City 4.0



But
Design
is
Critical
to solve the unique
issues
for a
Smart City



City 4.0

We actually don't need
Smart Cities.....



We need to create.....
Smart Citizens!



The background of the slide is a complex, abstract wireframe mesh. The mesh is composed of numerous interconnected lines forming a series of organic, flowing shapes that resemble a stylized, interconnected network or a series of overlapping, curved planes. The lines are thin and grey, set against a white background. A solid blue gradient bar runs horizontally across the bottom third of the slide, providing a contrasting background for the text.

Thank You

Andrew Pryke
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