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Smart infrastructure for a smart sustainable city

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Fransformational solutions ^for transport, energy and infrastructure



Context





Future Proofing Cities











Smart Sustainable Cities



Transformational solutions for transport, energy and infrastructure



Presentation Outline

- Context and Purpose
- □ Smart infrastructure
- Smart cities
- □ Future proofing cities
- □ Smart infrastructure for smart future cities
- Emerging connections





Transformational solutions for transport, energy and infrastructure



Smart Infrastructure

Smart Infrastructure combines physical infrastructure with digital infrastructure to help reduce costs, control risks and improve whole life asset performance in delivering better business outcomes

digital-Enterprise Asset Management

Using digital data and technology to reduce costs, control risks and improve whole life asset performance in delivering better customer outcomes



Life cycle of an asset involves planning, design, construction, operation, maintenance, renewal and disposal stages











Smart Transportation

M62 Managed Motorway, UK











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HS2 – Digitalising High Speed 2







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Digital Railways







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Smart Cities

Cities that use information and communication technologies to deliver services to their citizens

Smart City Framework



Source: Frost & Sullivan



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Masdar City in UAE – Citywide ICT

Atkins provided basis of design and concept design including:

- Infrastructure design from OSI Layer 0 through to Layer 3 with options for providing opportunities for Open Standards at each layer.
- City wide fibre network with a hybrid MPLS/ Metro Ethernet and GPON solution
- Coordination with in-country telecoms service providers (Du and Etisalat).

All city wide ICT infrastructure required to be integrated with:

- Telecommunications systems
- Security and building systems (e.g. motion detection, lighting control)
- Command and control of all of main utilities
- Transport
- Entertainment systems
- Personal data and telephony systems
- Wireless systems (including mobile telephony)
- Business systems







Singapore - ICT

IDA in Singapore have a driving vision to be No.1 in the world in harnessing infocomm to add value to the economy and society.

The solution recommended by Atkins was a 100% Fibre-To- The-Premise (FTTP) network.

Atkins provided:

- Network model and costs for the business case
- Definition of the architecture
- Technical strategy and related tender specifications
- Leadership of the competitive dialogue sessions held with major international telecommunications organizations







Smart Transportation

Transport for London: Surface Intelligent Transport System (SITS)



Customer Interaction

 Connected home will be a reality and transport will be utilised by the consumer as a service
 Generation Y will 3D print goods and shopping traffic will change
 Tourists will be way finding (multi-lingual) by using Google Glass enabled by TfL
 TL will have delivered increased economic benefit through working with major employers and services provides to deliver new mobility solutions

Dynamic Road Space Management

 Logistic companies will be using drones for deliveries

- Driverless pods will be a new mode option for customers
- Gamification will be used for network

management and modelling city scenarios • New telecommunications will exist, a blanket coverage across London provide safe and secure networks for ITS operations, media services, financial payments and personalised information services

Collaboration Hub

 All customers will have personalised information services enabled by TfL
 Cyclists will have route guidance and safety

 Cyclists will have route guidance and safety alerts provided via new in visor head up displays enabled by TfL

 Two way flow of information will exist with the automotive sector (V2X and V2I) supporting new automotive business models

 TfL will be leading on collaborative research projects for new solutions that will shape the future of network operations (strategy led)



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Future Proofing Cities

Future proofing cities is about utilising and developing the capabilities of cities to respond to environmental risks (e.g. climate hazards, resource scarcities, and damage to ecosystems) in a way that catalyses social and economic prosperity.

THE RISKS FACING CITIES

5 million

17%

Estimated area of Mombasa that could be lost from a 0.3m sea level rise causing the loss of hotels, cultural monuments, and beaches that draw tourists.

44 million



\$418 million

ecosystem services (e.g. water provision, flood prevention) provided Durban's network of green open space, 38% of the city's total budget.





MAXIMISING IMPACT: OPTIONS WHICH PRODUCE MULTIPLE ENVIRONMENTAL BENEFITS

FUTURE

CITIES

PROOFING



Atkins FPC Simulator – simulates long term prosperity of a city







Master Planning to maximise prosperity & resilience

Strike the best balance between risk and productivity

In stress testing, we simulate a natural disaster in your city, and evaluate the resiliency of your future proofing measures.





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City Simulation of Las Terrenas, Dominican Republic



- Population 19,000
 - Economy:
 - Tourism
 - Fisheries
 - Agriculture
 - 300% growth since 1990
 - High immigration
 - High unemployment/Poverty
 - Large % under 20
 - High traffic congestion
 - Poor Health

Scenario for City Simulator

- Improve Stormwater system to handle storms up to 50 year storm (majority of city in floodplain)
- Add fiber optic telecoms for city-wide internet access to encourage teleworking/education
- Design new workplaces with **Well Briefing** User-focused design to improve wellness.





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Smart Sustainable Cities

Smart sustainable cities use information and communication technologies to be more intelligent and efficient in the use of resources; resulting in cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint - all supporting innovation and the low-carbon economy

Smart Sustainable Cities – delivering sustainable outcomes

Society & culture (... enabling / enabled by...)

City (... enabling / enabled by...)

Enabling infrastructures (... enabling / enabled by...)

Infrastructure systems (... enabling / enabled by...)

> Infrastructure assets

Be part of past heritage, present prosperity and sustainable future

Commerce, recreation, civil admin, health, education, public safety, mobility for the city – enabling all types of activity

e.g. transport infrastructure: enabling the end-to-end movement of people & goods (also waste, energy, water. etc) to deliver organisational outcomes

e.g. hard transport infrastructure: delivering the desired transport system performance to match demand

e.g. station or individual asset: delivering the desired performance of this sub-system over its lifecycle



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Contains *sensitive* information



Integrating information to support smart sustainable cities





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5D Smart World CIM by City Zenith







---- Chicago

AT DE DE COMPANICATIONS TRANSPORT EMERGENCY ROADS ENVIRONMENT CUSTOM POWER ROUTING SIGNALS HEATMAR REKTROPLES MEASURE SIGNS

SELECTION

Underground Selection

Address Chicago IL 60654 United States

41.891665°N -87.628021°W

 GENERAL DETAILS
 OWNER

 DEPTH: 33ft (10m)
 Owner name unavailable

 AREA: 2,000 sq ft
 MATERIALS

 OPENED: OCTOBER 17 1943
 Steel Iron Glass Concrete

CURRENT STATUS

POWER PROVIDER

WATER

SEWER

For this project, we are focusing on infrastructure assets underground. Here we turn off the buildings ^{GAS} layer to reveal a to-scale 3D model of infrastructure assets underneath the intersection of Erie St and TRAFFIC/STREE Wabash Ave in Chicago's River North neighborhood, the centerpiece of our earlier pilot.

Pune, India - Smart sustainable city master plan

Core City Dimensions





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Smart Sustainable Cities



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Thank you

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