

# Project Mandate

Urban Infrastructure  
Technologies and  
Innovation



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## What are you trying to do?

**Identify how technology and innovation can be used more effectively in the development and management of urban infrastructure, specifically towns and cities.**

### **Stage 1 – Baseline**

This first stage will provide an assessment of what is currently being done across the sector. It should provide a summary of the technologies and systems that are being used; an assessment of current innovation initiatives; a taxonomy to support future analysis and debate; and a summary of the organisations that are engaged in and leading the way, including those non-engineering organisations from the health sector and the ‘humanities’ arena.

It should comprise a desktop study to address the questions, with specific reference to:

- The use of sensors within cities:
  - What is being measured and how;
  - How is data being transferred and collated. (Data infrastructure)
- Modelling and mapping of city data (Linkage to Building Information Modelling).
- Systems utilising city data.
- The connection of city systems – system of systems.
- The decision-making process based on city data; who makes decisions, how are they held to account and governance arrangements.
- Benefits and value of such systems.
- Financial models used to support investment in city systems; COBA; ROI; sources of funding; risks and mitigations.

Reference should be made to city systems that manage city energy use, improve city resilience and address the challenges raised by climate change.

Promising case studies should be identified and summarised and may be investigated further. (Mainly by email/phone but some visits may be required.)

### **Stage 2 – Analysis**

The technologies described in Stage 1 could play a key role in the management of both new and existing infrastructure of cities around the world. There are some key questions which arise from a consideration of the baseline Stage 1. This stage of the study is expected to draw on the data, supported by case studies, from Stage 1 in addressing the following questions, together with others that may arise from the Stage 1 work:

- What are the barriers to implementation?
- Can technologies be easily retrofitted to existing cities/towns? (Buried services that are hard to access, buildings that will remain in place for further decades.)
- How flexible are they? (Technology changes rapidly)
- What are the drivers for investment? City problem lead, for example.
- What is the tangible impact of such technology on the average city citizen? (For example in terms of health and quality of life.)

### **Stage 3 – Future Potential**

Having set out the baseline and considered some of the issues that affect the implementation of technologies and innovation this stage is intended to explore how to realise the greatest potential.

A benefit/value based approach is suggested that should include:

- Identification of a suite of technologies, business models, implementation models etc. that can be applied to cities, bringing real benefits to residents.
- Identify standards that could be adopted.
- Drivers for best practice.
- Identification of the gaps where innovation effort should be focused, research targeted?
- The opportunities due to increasingly inter-connected assets.

### **How is it done today, and what are the limits of current practice?**

Much work is being done on the component technologies and processes. However, a review of this nature, within a clearly defined framework, has not been previously undertaken in any detail.

### **What's new in your approach and why do you think it will be successful?**

The focus of the study is the outcomes, i.e. benefits and value, that the technology can deliver with reference to the lives of people living in cities.

By focussing on outcomes and aligning the technologies, innovations and systems with these, this project takes a very different approach from the traditional model of identifying best practice and seeking to replicate it. This value chain approach may prove more effective in addressing the complex and diverse problems associated with cities and urban areas.

This is also a distinct move away from a technology lead approach. I.e. the solution is x, what is the problem?

### **Who cares? If you're successful what difference will it make?**

The focus on city systems has the potential to have a big impact in the lives of people who live in cities together with the cost and effectiveness of managing city infrastructure.

- Residents
- Municipal authorities
- Infrastructure bodies (e.g. utilities)

## What are the risks and the payoffs?

- The analysis reveals that the integration of sensors and the management of city systems is so complex that it is in effect bespoke – i.e. learning cannot easily be passed from one city to another. However, this risk is considered to be very low.
- The project may become too large and there will need to be consistent control of the scope to retain a focus on the outcomes to mitigate this.

## How much will it cost?

Panel volunteers time (free) and re-imbusement of travel expenses (likely to be very limited.) May require additional resources to fund studies or research.

## How long will it take?

Depends on the number of people undertaking the work and how easy it is to co-ordinate this and pull it together. It is anticipated that the project will take place over a calendar year:

- Stage 1: 6 months.
- Stage 2: 4 months, but overlapping Stage 1 by 2 months.
- Stage 3: 2 months.
- Final review and production: 2 months.

## What are the preliminary and final exams to check for success?

Milestones for completion of stages 1 and 2.

Review at stage 2 – are the outcomes of stage 3 likely to be delivered?

Stage 3 – are outcomes achieved?

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Institution of Civil Engineers  
One Great George Street  
Westminster  
London SW1P 3AA

t +44 (0)20 7222 7722  
f +44(0)20 7222 7500  
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