

## Smart cities and the lighting industry

**Simon Newcombe, architectural and lighting designer and business development manager for Schröder UK**

According to Gartner there will be 26 billion devices networked together in the Internet of Things (IoT) by 2020. Many of these connected devices will be part of a global network connecting cities with services, and services with people. The lighting industry is in a unique position to provide the integration cities need to become 'smart'. In doing so, it could transform exterior lighting companies into flexible, high technology electronics suppliers.



### Smart cities are about people, not technology

Contrary to popular opinion it is not just technology driving the need to develop smart cities. It is also the need to stave off the effects of global warming, meet national carbon emissions reduction targets, and improve people's safety.

Cities currently have a negative effect on our environment, waste a lot of money, and consume energy and resources inefficiently. The effects of congestion and air pollution are also damaging the health of citizens.

The global population is currently growing by 1.1% every year, increasing by approximately 83 million people annually. Urban expansion is essential to deal with this rise and is already happening rapidly across the world. By 2030, 41 of the world's 'megacities' will each house more than ten million inhabitants. It is estimated that 66% of the world's population will be living in cities by 2050.

The dramatic increase in urban population has several issues that need managing: public safety, energy consumption, waste management and congestion on the roads. Smart cities will provide the better services and increased data availability needed to protect citizens more effectively, and give public authorities more insight into resource consumption and waste.

### What is a smart city?

Klaus Schwab, founder and Executive Chairman of the World Economic Forum, recently labelled smart cities as the "fourth Industrial Revolution" – a technological revolution that will fundamentally

alter the way we live, work, and relate to one another. A smart city leverages available technology to serve the users and improve the measurement and efficiencies of an urban setting. It is “characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres”.

Fundamentally, smart cities are designed and built around the experience of citizens using them, but with the objective of optimising the city’s available resources more effectively and in turn, promoting sustainability. This ensures future urban development will allow us to monitor finite resources such as energy, food, and water.

For the lighting industry, this is a continuation of the efficiency of LED regeneration. The lighting industry has spent decades installing and upgrading the street lighting network to make lighting more efficient and sustainable. Lighting is poised to take on a new and even bigger challenge: to envisage a future pattern of urban development and city construction and sufficiently design for it today.

### **The big data buy-in**

Big data – the commodity of the future – is at the heart of the smart city idea. Impacting business, society, health, education, crime, retail and even peoples’ homes, huge data sets are being analysed to reveal insight into patterns and trends in every aspect of life. Despite realising the power of big data, public authorities are still struggling to manage the sheer depth and breadth of data society is now creating and recording.

Globally, there is an ongoing race between cities to see which ones will become the first smart hubs of connectivity. This desire is being driven by the inevitable initial business investment, as well as the resulting prosperity this status will bring. Keen to achieve this advantage early on, Japan already has an agreement with an IoT leader in Germany on future commercial arrangements, with other countries following suit. The growing interest in smart city technology has the potential to be commercially far bigger than the LED upgrade, penetrating many industries at once.

### **Lighting’s role in the smart city**

Smart cities have the potential to transform exterior lighting companies into flexible, high technology electronics suppliers. Fundamental to the concept of mass urban data collection is the humble street – a place where connected infrastructure is needed the most. Whilst connected streetlights are becoming increasingly common, the next generation of integrated lighting technology promises to do much more.

The next generation streetlight will be a computer, gathering and disseminating data on an unprecedented scale across cities, whilst delivering enhanced lives for citizens. Multi-functionality – and more importantly upgradable equipment – has already been identified as central to the sustainable rollout of next generation streetlights. Replacing traditional lighting columns, multi-functional smart columns will be the key to achieving a swift and effective upgrade to the connected smart city.

Barcelona, Masdar and Singapore have recently been recognised as the current top smart cities in the world. These cities are implementing smart parking, traffic control and other data-driven functionality. The cities’ smart lanterns are overcoming the obstacles of integration – upgrading an existing lighting ‘network’ provides the nodes needed for city-wide data collection and transmission.

City managers can use a well designed direct data connection to the streets to control the direction and the movement of people. This can lead potential customers towards events or special offers, but more importantly away from danger, congestion and even pollution. Emergency services can be made more effective if traffic is moved out of the way in advance. Traffic flow can also be guided around roadworks, accidents, or terrorism in real-time and people can even be diverted out of the city at a moment's notice if required.

The lighting network is already partially monitoring the city infrastructure remotely. This is an advantage when upgrading – we simply need to make the network even smarter and more integrated in its functionality.

An increasing number of devices, both big and small, are becoming connected and interconnected through IoT, automating basic tasks and actions and allowing remote control. Whilst lighting telemetry has been available and widely used for many years, the industry is now facing the concept of connecting vast numbers of machines via the internet, rather than through central management system (CMS) protocols. Currently, the biggest road-block to smart city implementation is the integration of the physical network – the quickest way to do this is to use existing networks. The lighting network offers the link needed to complete this upgrade, and the industry is in an unrivalled position to offer the hardware and connection services to both local authorities and large private clients.

### **What are the initial benefits of improved connectivity and functionality?**

Economically, increased connectivity can drive spending in retail environments. A significant proportion of people spend more time in public areas when they can connect their laptops and smartphones via Wi-Fi. Surrounding shops and facilities in turn report more spending when this happens. Free connected services can tell customers about local transport, retail offers and events every time they visit the location.

When information is available in real-time, local knowledge will no longer be confined to what you have learnt yourself, or searched for online. Information dissemination becomes automated, based on individual preferences. This will develop in a similar way to how people use search engines as online encyclopaedias – there could be a local service giving you a relevant local feed, changing as you make your way through national 'networks'.

Although most of this general information *is* available separately online, there is significant data showing people prefer to engage with a dedicated service that reports crucial alerts autonomously to a phone. Google already provides a 'cards' service that aims to be a sort of personal assistant, and big retail companies are taking an interest in funding larger networks which use their branches as interconnected hubs. Businesses realise that this puts them in the best position to access the data being generated.

### **Putting the smart in the city**

Technology companies and universities around the world are collaborating on the smart city concept to better understand the data and how to optimise its management. Being informed like this as a society is invaluable on many levels. The world is already seeing how this technology can penetrate industries quickly. Uber is the biggest supplier of taxis in the world now, and the company does not own a single car. Airbnb is the biggest supplier of rooms in the world, and the company does not own a single room.

The biggest challenge to providing this new level of connectivity is the physical integration of the network into the existing urban centre. This integration, however, needs to be planned carefully, and obstacles overcome creatively. In Bristol, new high speed fibre cables are being laid in the canal and river networks of the city, reducing cost, disruption, and implementation time.

Most cities face the same infrastructure problems. Creating a network of hardwired hubs with high power Wi-Fi, optimised supply metering, electric vehicle (EV) charging, CCTV and audio will support sustainable development while creating new revenue streams.

## **Conclusion**

As connectivity becomes ubiquitous and smart cities come into their own, there are exciting possibilities for future integration. Providing connectivity through public infrastructure can revitalise trade for local businesses, while enabling local authority intervention to better manage urban centres.

Integration within the existing lighting network declutters and modernises shared public spaces. It is the logical choice to promote connectivity as it is already hardwired to the wider city network and evenly distributed throughout urban areas. Providing technology opportunities in this way will enable manufacturers to work alongside urban designers and local authorities to successfully futureproof cities in a sustainable way.

Smart cities are a great opportunity for the lighting industry and with good partnerships the industry, they can play a part in making cities safer and healthier; businesses can prosper, citizens are happy and the economy is sustainable.



## **About Simon Newcombe**

Simon Newcombe is an architectural and lighting designer and business development manager for Schröder UK. Simon works closely with urban designers and local authorities, building partnerships,

to develop new ideas and ways of implementing challenging lighting designs and smart city technology.

### **About Schröder**

Schröder develops intelligent solutions that go far beyond simple lighting. Schröder partners with its customers to deliver stunning projects that transform public and private spaces into safe, comfortable, and sustainable environments. Schröder operates at the forefront of its industry offering solutions that create engaging and interactive experiences. The company's innovative products include state-of-the-art LED lighting, wireless control systems and connected 'smart' features such as cameras, wireless internet and a range of charging applications.