



## Smart innovation for smarter communities: a postcard from Cambodia

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## Introduction

All around the world, **cities are more densely populated and more interconnected** than ever before. Local governments are increasingly challenged to **favor urban development and quality of life** while sitting at the convergence of three global megatrends: **climate change, urbanization, and globalization**.

Moving towards enhanced sustainability and carbon-neutrality, Cities should explore any possible path to reduce energy consumption and GHG emissions. **Street lighting is one of the first public services to come under scrutiny**.

This should not be too surprising. There are about **326 million streetlights in the world, expected to grow to over 361 million by 2030**. Lighting represents almost 20% of global electricity consumption and 6% of global carbon dioxide emissions. Given **public lighting accounts on average for 40% of a City's electricity bill**, it is easy to understand why **it is often prioritized to increase environmental and financial sustainability**.

According to Northeast Group's analysis, a quarter of all streetlights globally have already been converted to LED technologies and over 10 million have been connected to smart Internet of Things (IoT) networks. If forecasts are right and investment trends are confirmed, **we will have about 73% LED-based lamps and up to 25% smart streetlights in the world by 2030**.

Advantages of Smart Lighting are very well known. **Installing energy-efficient LED lamps immediately makes Cities save up to 70% in power consumption** and related costs. **Additional savings can be achieved** if enabling full remote management and control of single or grouped luminaires **by connecting them to a sentient IoT network**, introducing key features such as scheduled on/off switching, and adaptive dimming.

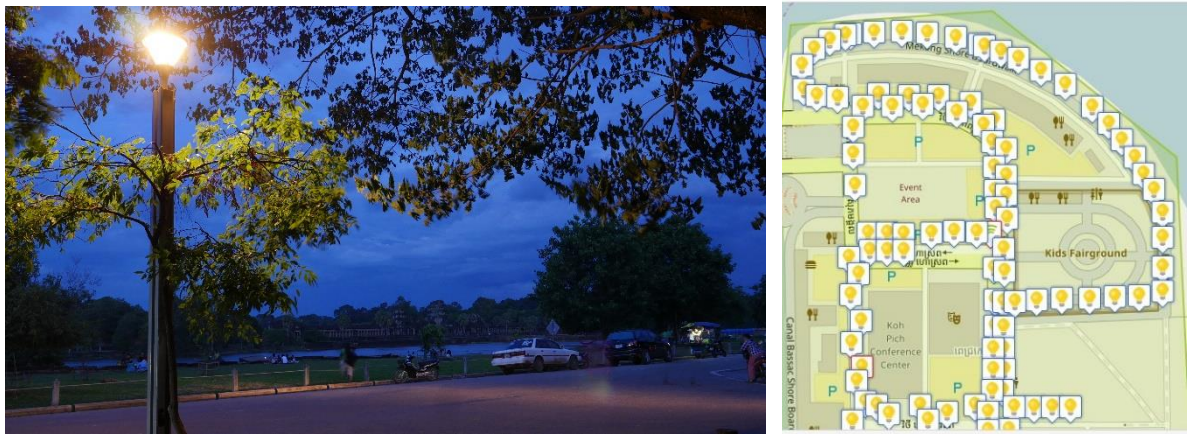
There is more. **Streetlights can turn into a canvas for urban innovation**, improving not only sustainability and efficiency, but creating opportunities for mobility, public safety, tourism, and overall quality of life. **A valuable example comes from the Kingdom of Cambodia**.

## Working for a smarter Cambodia

In the Kingdom of Cambodia, MinebeaMitsumi committed to a **high-efficiency LED streetlight project**, working with Paradox Engineering. The project was **selected for adoption in June 2015** as the first to be conducted in Cambodia under the Ministry of the Environment of Japan, using a Joint Crediting Mechanism (JCM). MinebeaMitsumi was awarded the **Cambodian Environment Minister's Prize** for this installation in **February 2017**.

Under the JCM project, in 2016 **5,672 streetlights** were replaced with **LED luminaires** and connected to a **wireless network platform** to allow **remote monitoring and control**. The infrastructure was extended over time to **more than 12,000 streetlights in all Cambodian states**, including well-known locations such as Phnom Penh City and Siem Reap City.

Streetlights can be **turned on/off and dimmed from remote**. The **Central Management System** enables the **definition of customized lighting patterns** for single districts, streets, and even single lamps, adjusting operating times and brightness levels according to programmed schedules or ambient conditions. The platform allows the **ongoing monitoring of the status of light points** and related power consumption, with the possibility to elaborate accurate reports or call for specific maintenance actions in case of failures.



*Pictures: Smart streetlights installed in Angkor Wat, Siem Reap (left); Status of connected light points in Diamond Island, Phnom Penh, monitored through the Central Management System (right).*

The projection is to **reduce 559 tons of CO2 every year**, this means 5,590 tons of CO2 in a 10-year timeframe. About **55%** of emissions saving is accountable to LED technologies, while an additional **15%** to the wireless control system.

Positive results were also achieved in terms of **grid safety**. Each node can continuously monitor grid voltage variations, supporting the electricity supplier in designing and operating the grid according to visualized peaks and drops. This contributes to energy optimizations and minimizes the risk of blackouts in an area that is particularly vulnerable to power outages.

Working for a **smarter Cambodia**, MinebeaMitsumi continues to operate and support the wireless network platform and gradually integrate **additional urban applications**, providing the Group's latest technology to contribute to **sustainable development** in the country and increase **attractiveness** of future-looking cities and locations.

In Diamond Island (Koh Pich), the new district of Phnom Penh, a **Smart Parking project is being piloted** as demonstration experiment, with about 60 car lots equipped with vehicle detection sensors and video surveillance cameras. **Environmental sensing and Smart Metering applications are also being evaluated.**

## Interoperability, a lesson to learn

In a country such as Cambodia, where energy demand is forecasted to double by 2030 and energy prices are currently among the highest in Southeast Asia due to high dependence on import (source: Asia Development Bank), **Cities need to contribute to reducing power consumption** to alleviate pressure on the national budget and enable sustainability targets to be achieved.

**MinebeaMitsumi's LED streetlight project definitely went in this direction and proved to be effective** in saving energy and decreasing related CO2 emissions. Although the project was aimed at these specific goals, it was clear that **an interoperable and multipurpose network was to be preferred since the very early stage**, since investing in technologies that might have impacted the life of cities and communities in the medium and long run.

**Lots of cities around the world have IoT solutions** to monitor and control key urban services remotely, **but many of them adopted a siloed strategy**, thus installed single-application networks to manage public services one by one. **This is ineffective and costly.**

Having separate infrastructures for smart streetlights, parking management, solid waste collection, video surveillance, etc. increases complexity, duplicates implementation and maintenance efforts, generates a higher risk of obsolescence, and a poorer return on investment.

**Cities are systems – not silos.** And technology should contribute to break down technical barriers in the management of urban services, and support different departments in sharing and managing data, extracting more value from it. Such a **holistic city development can only be enabled by a smart, interoperable infrastructure.**

**Interoperability is the ability of systems to share data and turn information into action without any access, implementation, or usage constraint.** MinebeaMitsumi and Paradox Engineering's network platform allow Cambodian stakeholders not only to take advantage of a valid Smart Lighting solution, but to **integrate a number of different devices**, scale up and add new functionalities when and where needed.

Smart Parking, environmental sensing, and any other future application will not require the implementation of a new network. **They will be hosted on the same infrastructure, managed from the same central system, and work together** in a seamlessly integrated way.

In such an architecture, **data can be smoothly exchanged and correlated.** Think for instance of the possibility to mitigate traffic congestion through better synchronized public transports or a smarter management of car parks, facilitate emergency support and law enforcement through brightened street lighting in case a road accident happens, or a crime is committed. **An IoT-based solution could also support municipal waste collection**, accurately tracking trash input to optimize truck routes upon parameters like bin status, filling levels, etc. This increases service quality and efficiency and generates further savings on fuel expenses and overall maintenance costs.

**This is a relevant benefit for Cambodia – providing value for today and securing the possibility to innovate and grow in the future.**

## Ready to walk the talk?

At Paradox Engineering, **we think like a paradox and engineer intelligent technology solutions to unleash opportunities for people and communities through digital information.** Established in 2005 and headquartered in Switzerland, **we are the IoT Excellence Centre of MinebeaMitsumi Group**, a leading global provider of Electro Mechanics Solutions™, and specialize in future-proof solutions for Open Cities and other smart environments.

Customers and partners can take advantage of **our proven blend of competences to develop end to end IoT solutions and industry specific developments**, seamlessly integrate existing third-party components, and kick off new information-driven business models.

**Active members of the uCIFI Alliance**, we are deeply committed to the development of multi-transport, multi-supplier and cost-efficient network solutions to **build truly interoperable and open IoT infrastructures.**

If you are ready to walk the talk, **MinebeaMitsumi and Paradox Engineering are here to help.**

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