

MinebeaMitsumi Smart Lighting Solution

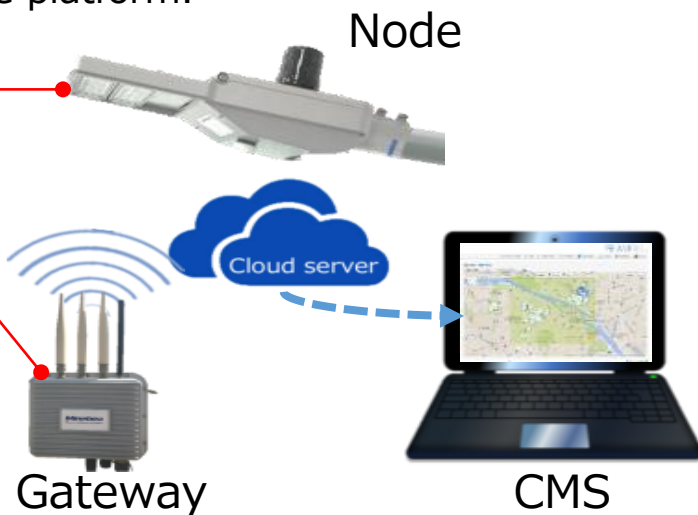
MinebeaMitsumi Inc.

8 Oct. '19



Smart Street Lighting - Introduction

- ❑ Street lighting is core of Smart City Solution by MinebeaMitsumi.
- ❑ Smart street lighting consist of following components:
 - ✓ **Luminaire** is high efficiency LED lamp.
 - ✓ Wireless devices are **Node** and **Gateway**.
 - ✓ **Central Monitoring System (CMS)** is web based software platform.



Advantages of Smart Streetlights

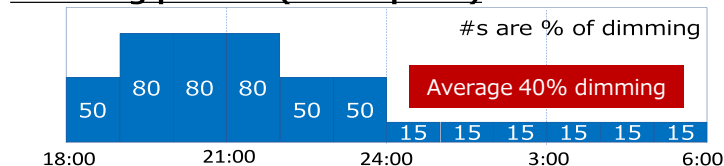
- ❑ Can **reduce electricity consumption** by dimming function (15 to 100% range) and hence **reduce electricity cost**.
- ❑ Contributes in **energy saving** and **reduction of CO₂ emissions**.

Cost saving simulation	Electricity cost saving	Number of LED	No dimming	Average 40% dimming
Case 1 (Phnom Penh City)	USD 542,419/year	12,000	377 kWh/year/LED	151 kWh/year/LED
Case 2 (Provincial area)	USD 45,202/year	1,000		

60% down

◆ Dimming Schedule for example

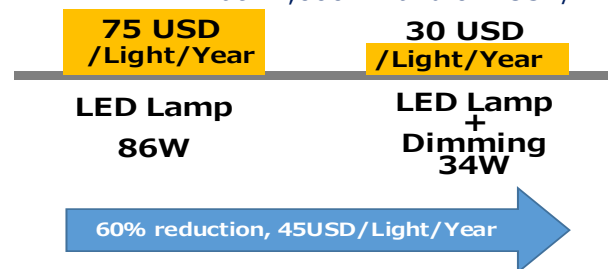
Dimming pattern (assumption)



Wide range of dimming from 15 to 100%

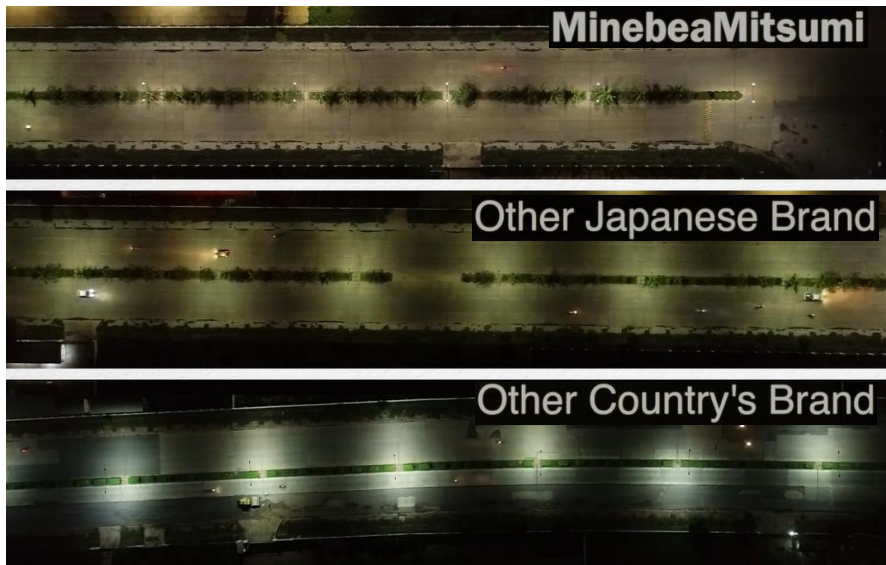
◆ Comparison of Electricity Cost

at 12,000 lm and 0.2 USD/kWh



Uniformity and Dimming

Uniformity comparison



High uniformity by advanced our technology makes more power saving

*1 Uniformity: Ratio of bright evenness. Closer to 1 it is, more even the brightness is.

Diming control



This will not only minimize light pollution in the surrounding, but also increases the luminance utilization factor and energy saving.

Main Features of Our Smart Lighting

Wireless Network

Wireless control
of Streetlight



Central Management System

Fiber, 3G or 4G
ON/OFF/Dim
Monitoring

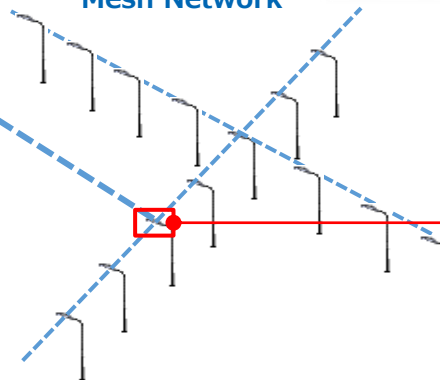
Reduction of Electricity Cost

By dimming control of streetlight



Gateway

6LoWPAN
Mesh Network



Node



Centralized Monitoring

Can Control all streetlights
from a PC remotely

Expandability

Extends the function by connecting other sensors and
devices via 6LoWPAN Mesh Network

Expandability with 6LoWPAN mesh network



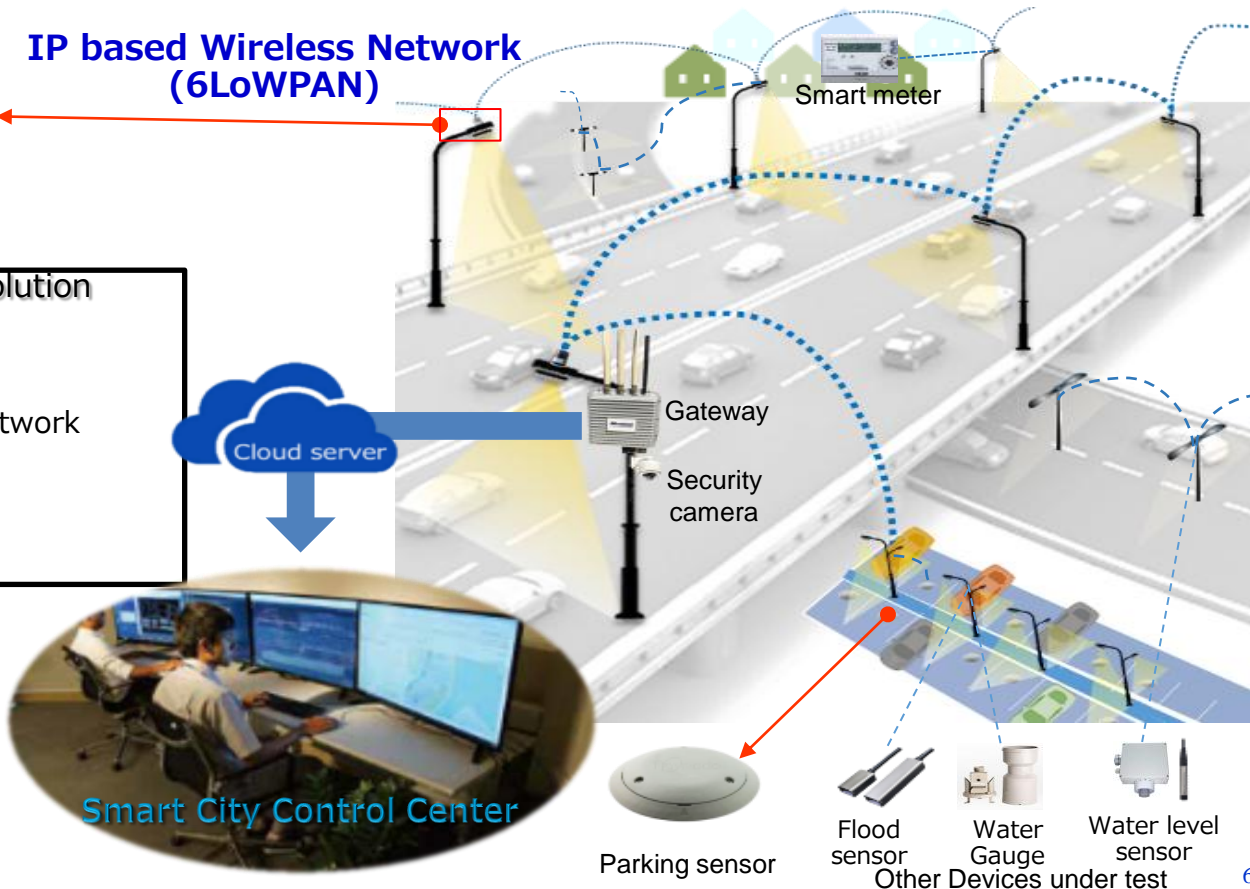
IP based Wireless Network
(6LoWPAN)

Feature of 6LoWPAN smart streetlight solution

- ✓ Interoperability with Internet
 - Each device has IPv6 address that enables end-to-end communication.
- ✓ Wide area wireless coverage via mesh Network
 - All Nodes can work as repeater.
 - New devices are easy to deploy.
- ✓ Robust connectivity
 - Routing protocol establish connection.
 - Restructure the path avoiding bad Nodes.



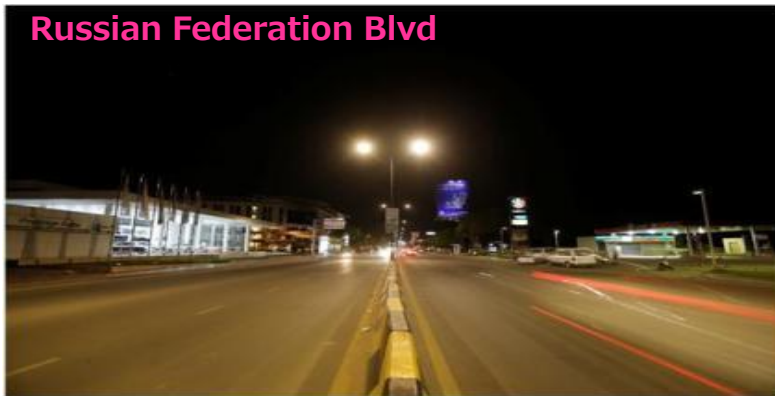
- ✓ LoRa system can not deliver similar features as in 6LoWPAN.
- ✓ MinebeaMitsumi is demonstrating a model of Smart City in Phnom Penh City.



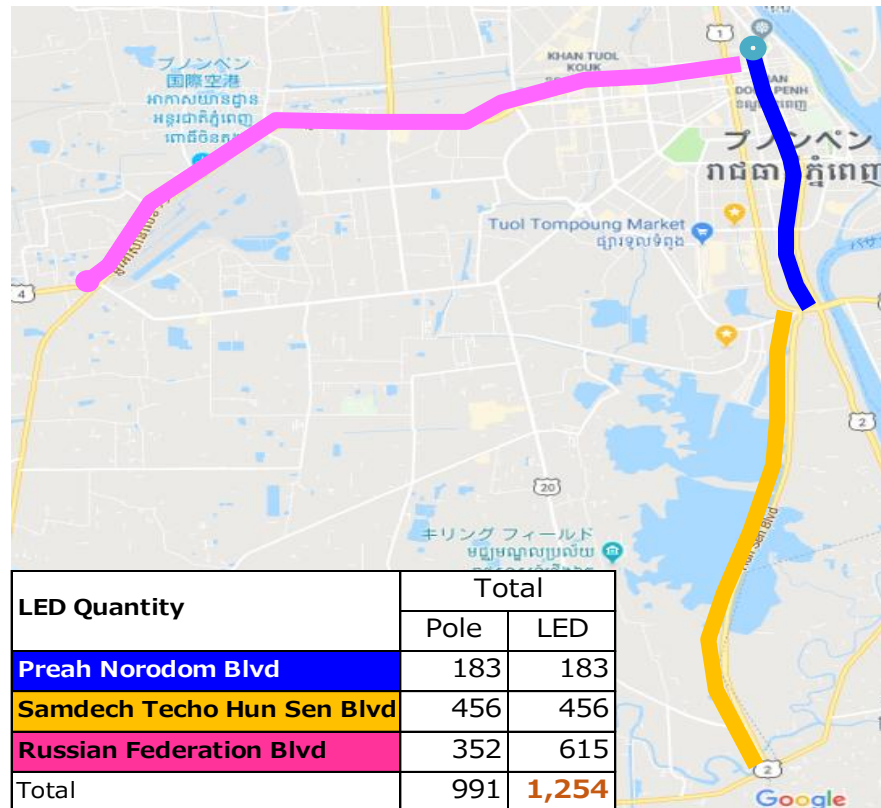
Phnom Penh City Project

- ❑ Implemented 1,254 Smart Streetlights in 3 main roads.

Russian Federation Blvd



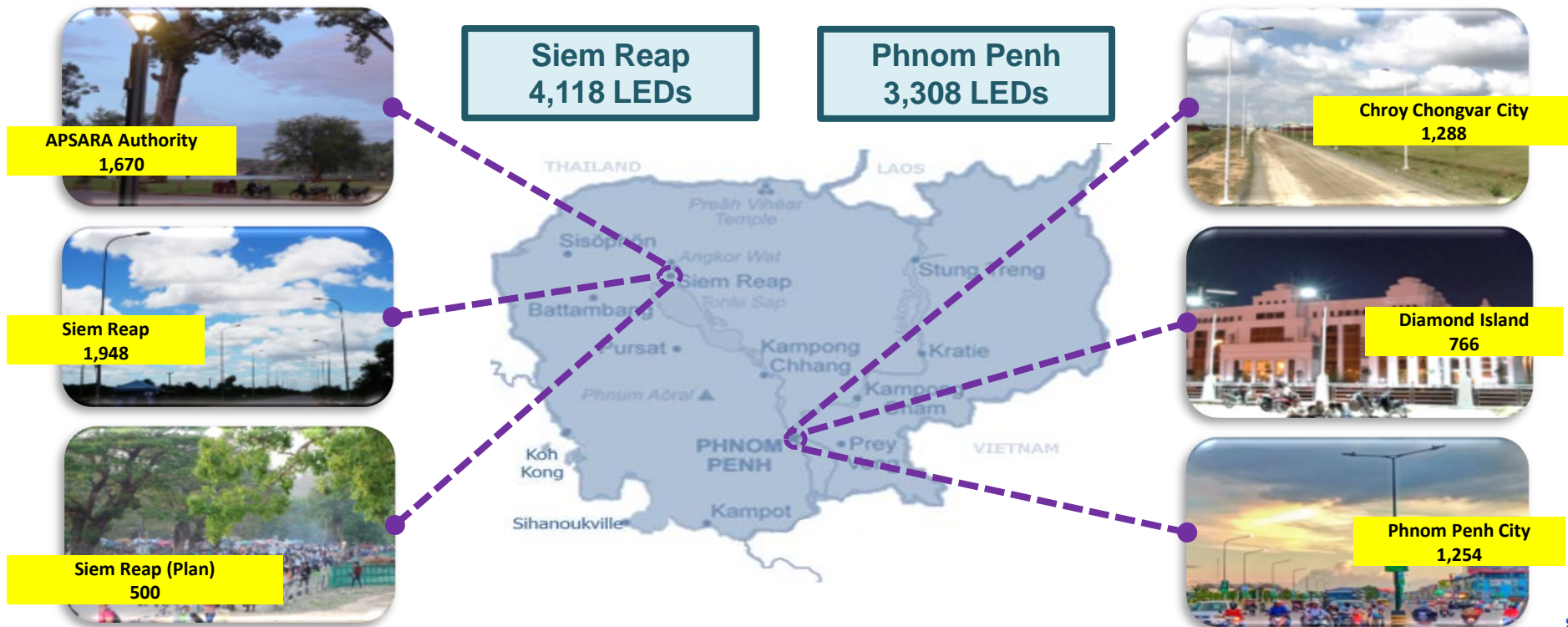
Samdech Techo Hun Sen Blvd



LED Quantity	Total	
	Pole	LED
Preah Norodom Blvd	183	183
Samdech Techo Hun Sen Blvd	456	456
Russian Federation Blvd	352	615
Total	991	1,254

Smart Streetlight Projects in Cambodia

- ❑ Total of **7,426** Smart Streetlights will be under operation by this year.
- ❑ Out of that, **5,672** Streetlights are operating under JCM project.



Our Smart City Solutions in other countries



Cambodia
Phnom Penh



Cambodia
Siem Reap



Chile
Santiago



U.S.A
California



Japan
Tokyo/Suginami



Switzerland
Chiasso



Switzerland
St. Gallen



Switzerland
Bellinzona



Italy
Siracusa



Spain
Gijon