

SMART LIGHTING

MinebeaMitsumi
Passion to Create Value through Difference

Smart streetlights
for smarter cities



MinebeaMitsumi's Smart City Solutions contribute to accelerate the achievement of some Sustainable Development Goals (SDGs) of UN's 2030 Agenda for Sustainable Development.

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https://product.minebeamitsumi.com/featured/smart_city_solutions/

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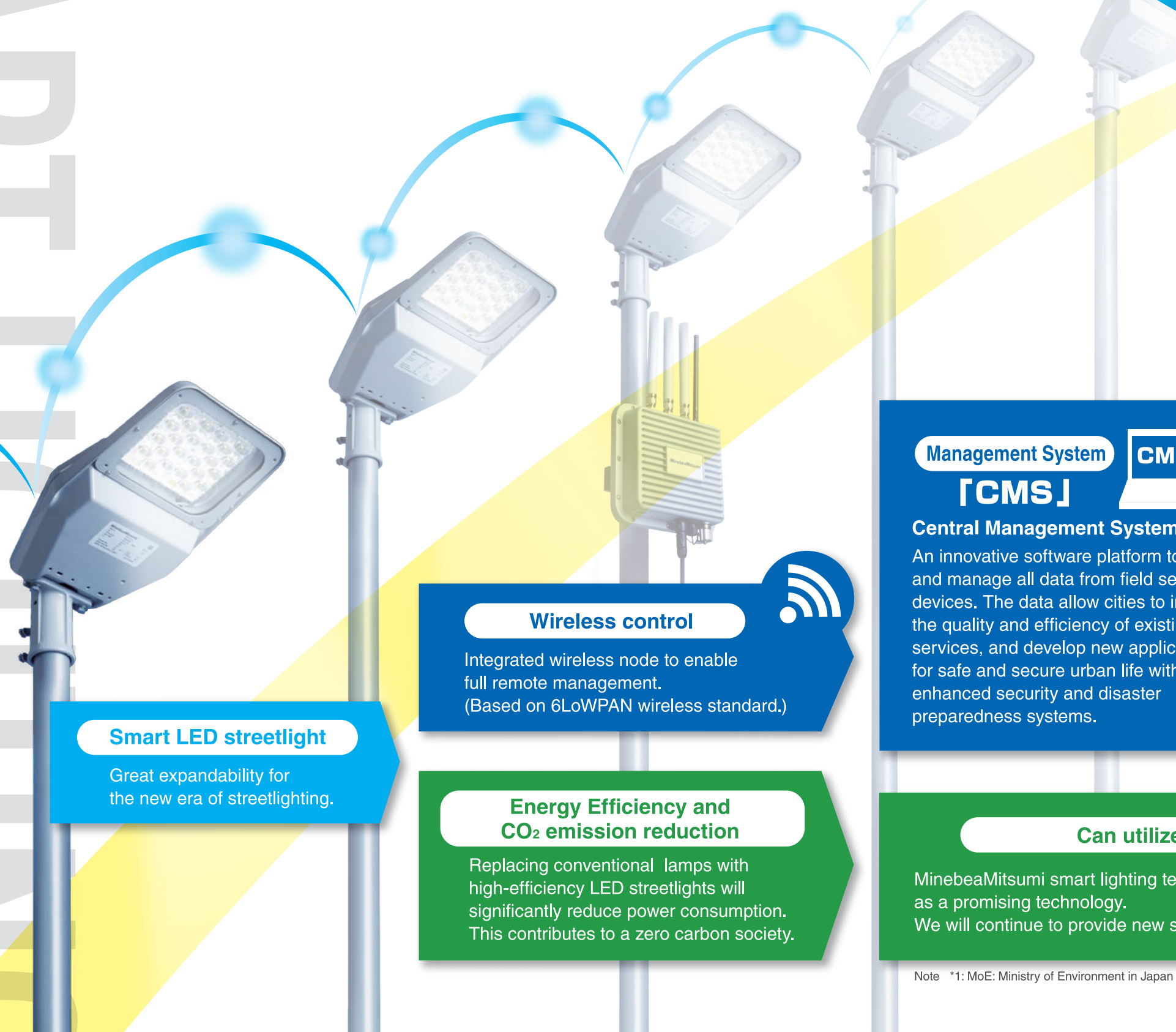
For eco-friendly printing, 60% recycled paper is used in this brochure and is printed using vegetable ink. Please note that the color may fade out due to rubbing or when it gets wet.



SMART CITY SOLUTION

Smart Lighting as the core application of Smart Cities.

MinebeaMitsumi smart streetlights are perfect for smart cities looking for a data-driven sustainable growth. Our LED smart streetlights are constantly connected to the wireless network for remote monitoring and control.



Smart Energy
Energy efficiency

Disaster preparedness
Smart town

Smart mobility and convenience

Weather and environment
Smart life

Smart security

Excellent Expandability

Weather & Environment	Environment sensor Pyranometer Rain gauge
Disaster Preparedness	Rain gauge Water level sensor Flood sensor Security camera
Security	Security camera
Traffic and Urban planning	Parking sensor Guide lamp Display monitor

Wireless control

Integrated wireless node to enable full remote management.
(Based on 6LoWPAN wireless standard.)

Energy Efficiency and CO₂ emission reduction

Replacing conventional lamps with high-efficiency LED streetlights will significantly reduce power consumption. This contributes to a zero carbon society.

Management System 「CMS」

Central Management System

An innovative software platform to collect and manage all data from field sensor devices. The data allow cities to improve the quality and efficiency of existing services, and develop new applications for safe and secure urban life with enhanced security and disaster preparedness systems.

Can utilize subsidy from MOE^{*1}

MinebeaMitsumi smart lighting technology is certified by MLIT^{*2} as a promising technology. We will continue to provide new services by introducing sensor solutions.

Certified

Note *1: MoE: Ministry of Environment in Japan *2: MLIT: Ministry of Land, Infrastructure, Transport and Tourism in Japan

Smart LED streetlight

Central management of streetlights and excellent expandability of smart solutions to meet new urban needs.

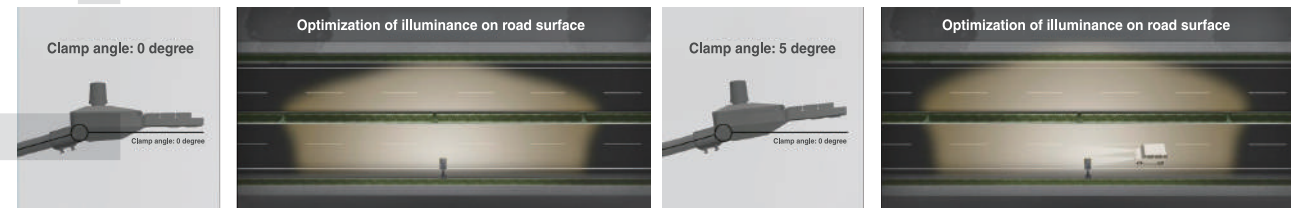
Excellent energy-saving performance thanks to the unique engineering design

MinebeaMitsumi's original engineering design helps to control the dispersion of light on the road surface. The high-efficiency distribution of lights not only saves energy, but also provides conformable lights with reduced dazzling.

Comparison of uniformity



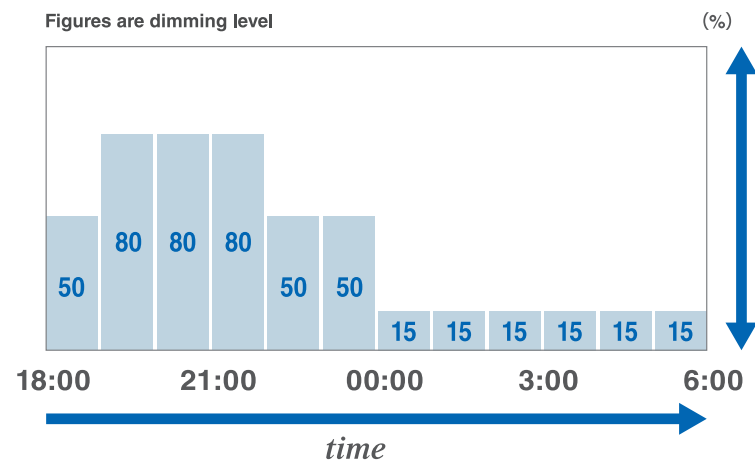
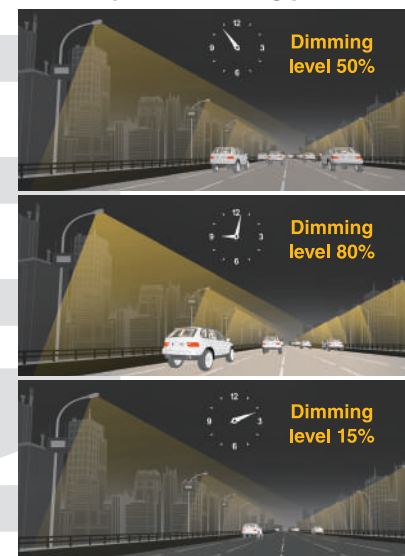
Mounting angle adjustment



Dimming control contributes to GHG emission reduction

Our smart LED streetlights enable dynamic adaptive lighting, with customizable dimming control function. This can significantly save power and contribute to global warming mitigation.

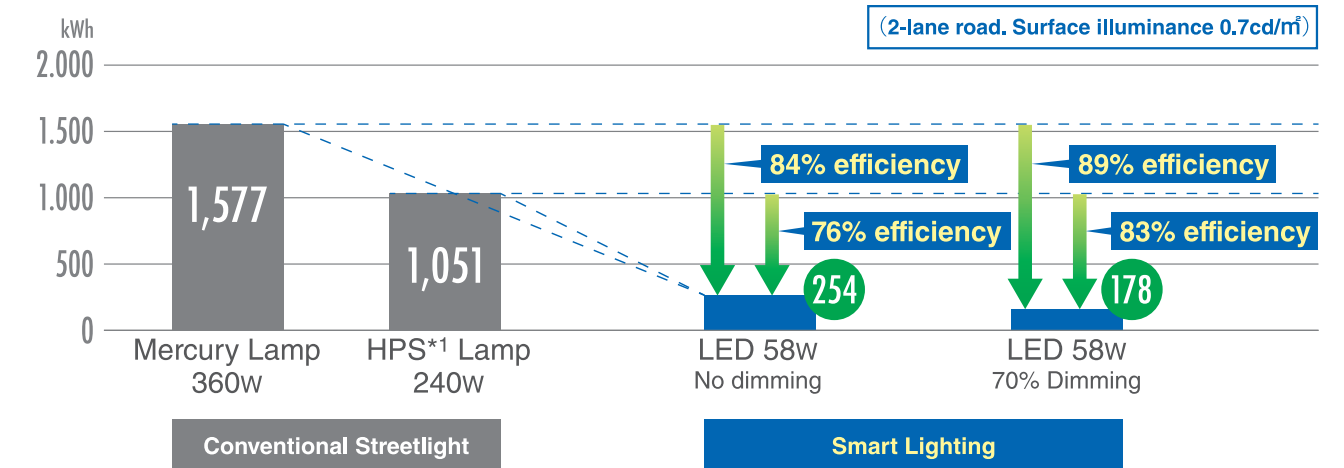
Example of dimming pattern



Excellent energy-saving performance and CO₂ emission reduction

Our smart LED streetlights can reduce power consumption up to 90% compared to conventional mercury lamps. This is a significant contribution to the reduction of CO₂ emissions.

Energy efficiency achieved after implementation of Smart Lighting: Comparison of annual power consumption by 1 unit of lamp



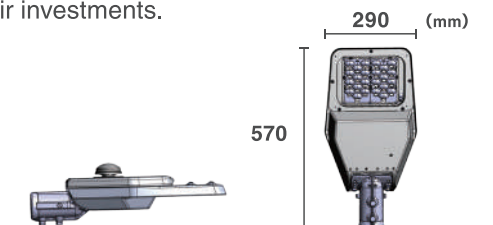
- Energy saving efficiency = CO₂ emission reduction rate
- Estimated annual saving on electricity cost is about 28 thousand yen when replacing 1 mercury lamp to smart LED (with average 70% dimming) and about 18 thousand yen when replacing 1 HPS lamp. (electricity cost = 20.3 yen/kWh)

*1: HPS: High Pressure Sodium Lamp

Specification of Smart LED streetlight

Model No.	ST011-1312-NA	ST011-1512-NA	ST011-2312-NA	ST011-2512-NA
Luminous Flux	5,250 lm	5,600 lm	7,900 lm	8,400 lm
Correlated Color Temperature	3,000K	5,000K	3,000K	5,000K
Color Rendering Index	Ra 70			
Life of LED Module	60,000 hours (Luminous flux maintenance factor:80%)			
Light Distribution	Cutoff type (IES Type 1)			
Input Voltage	AC100V~242V, 50Hz/60Hz			
Power	38W		58W	
Weight	5.9kg		5.9kg	
Ingress Protection Code	IP 65			
Operating Temperature	-20°C~50°C			
Lightning Surge Protection	15kV (Common mode)			

MinebeaMitsumi streetlights have a lifetime of more than 10 years. Such a long predictable life offers our valued customers great benefits from their investments.

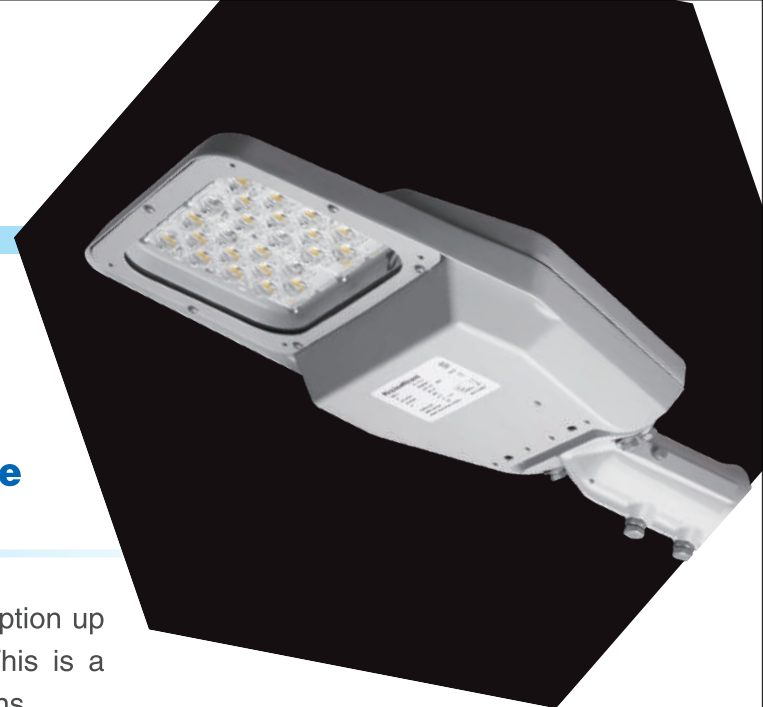


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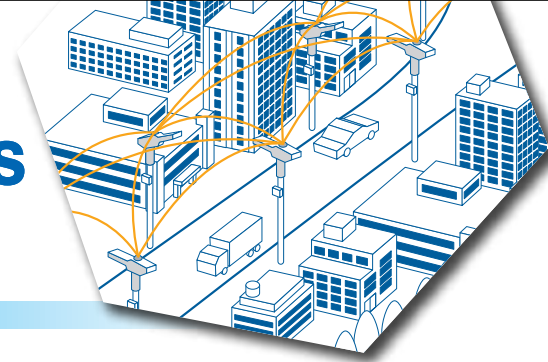
- Scheduled for high output type (80W, 100W, 130W equivalent)
- Our streetlight meets the requirements (excluding wireless function)
 - Road / Tunnel LED Lighting Guidelines (Draft), 2015 March, MILT*2
 - Road / Tunnel lighting equipment specifications, 2018 edition, AETELI*3

*2: Ministry of Land, Infrastructure, Transport and Tourism

*3: Association of Electricity and Telecommunication Engineering for Land and Infrastructure



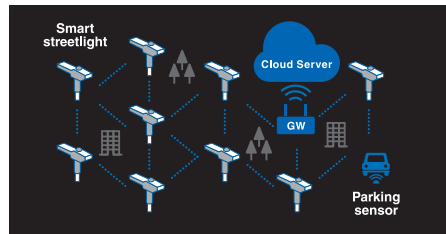
6LoWPAN as our wireless network standard



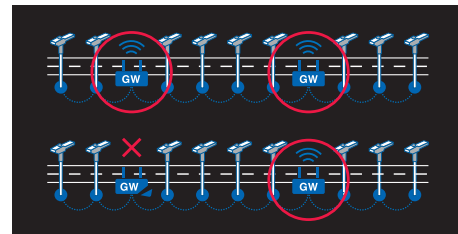
A robust network is resilient and grants data communication even in densely urbanized environments

Benefits of 6LoWPAN mesh wireless networks

• Can automatically adjust its communication route to avoid obstacles such as buildings and trees.



• Can withstand adverse events such as a gateway outage.



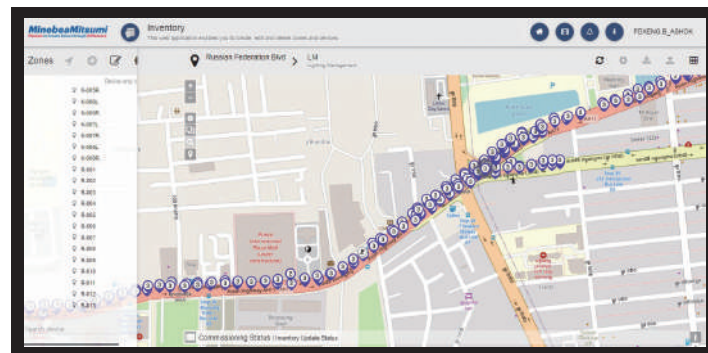
- 6LoWPAN allows to connect all sorts of IoT devices to an IP network and transmit IPv6 data packets end to end across a low power wireless network.
- Our gateway supports dual network communications: 6LoWPAN IoT sensors/devices using low volume of data packets, and high bandwidth devices such as security cameras that require high volume data packets transfer.

Central Management System

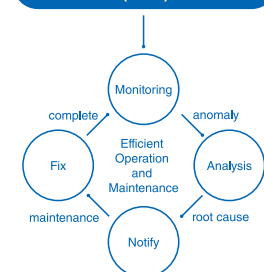
Real time monitoring and data collection to facilitate instant sharing of any occurrence

MinebeaMitsumi's network platform

- Improved efficiency of operations and management by reducing operational costs and effort.
- Easier management of streetlights (Turn-ON, OFF, Dimming) regardless of their quantity, i.e 100 or 10,000 streetlights can be centrally controlled at the same time.
- In any emergency situation, streetlights can be turned on with optimum dimming level to ensure safety and rescue intervention.
- Streetlights will continue to operate normally even if the wireless network is disconnected.

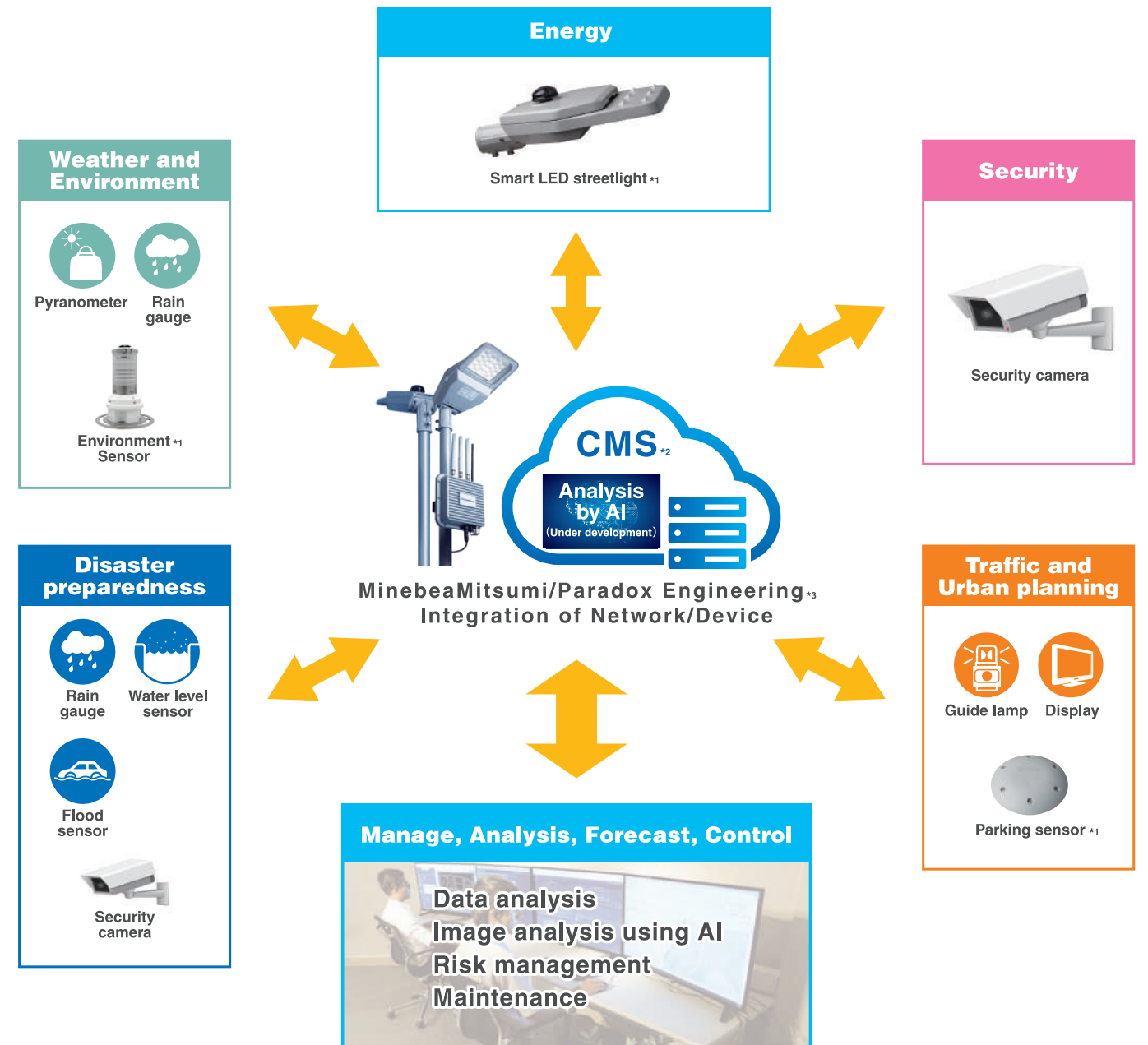


Central Management System (CMS)



Expandability for Smart, Open Cities

Our wireless network can be expanded by integrating additional sensors and IoT devices. This allows our valued customers to innovate and design new applications for their needs.



IoT Engine

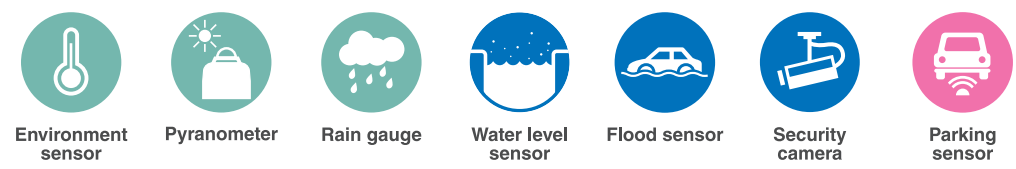
By integrating this device into various sensors, we can connect them to the 6LoWPAN mesh wireless network.

*1:Product of MinebeaMitsumi

*2:Central Monitoring System (CMS). Software management platform to monitor and control all IoT devices and sensors.

*3:Paradox Engineering is a MinebeaMitsumi Group company.

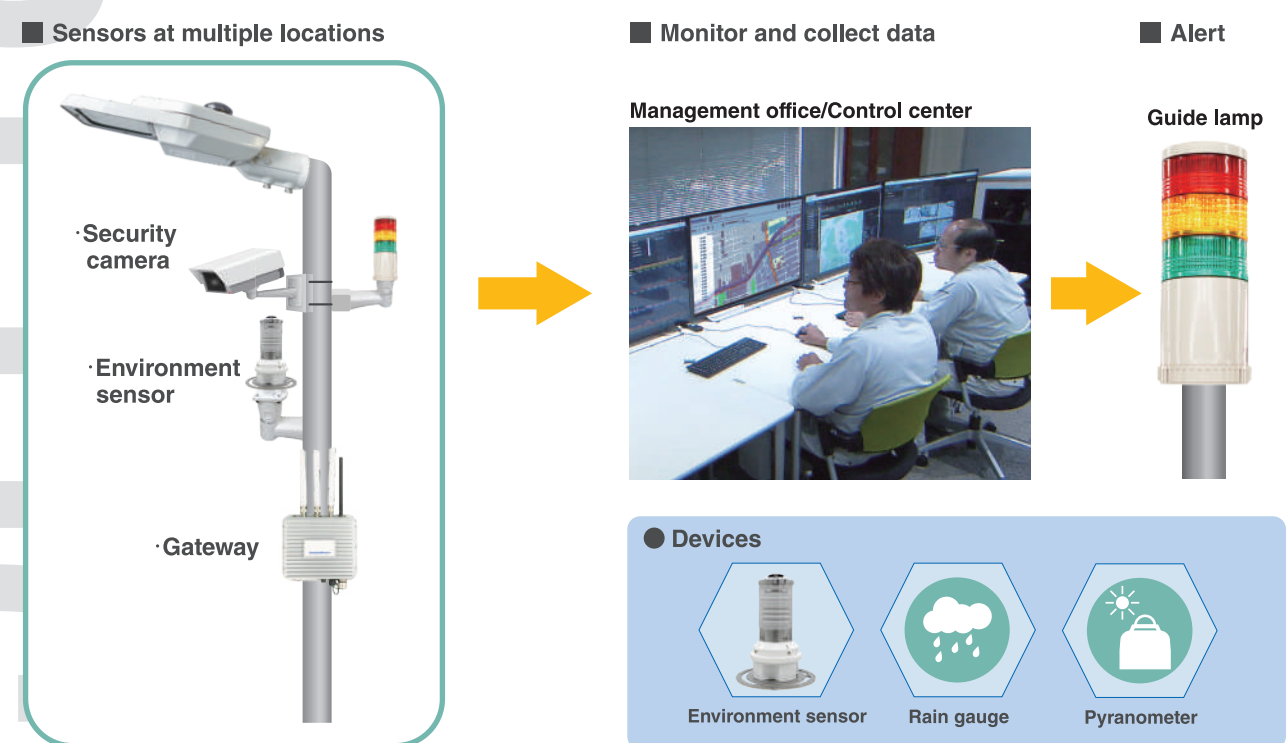
Expandability for Smart, Open Cities



Our smart city solutions monitor changes in the environment in real time and help to take early countermeasures.

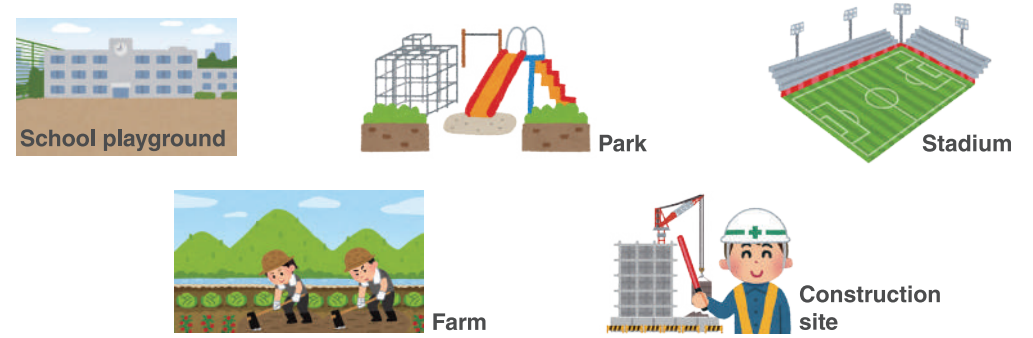
Weather and Environment

We enable environmental monitoring solutions that collect and analyze data from multiple sensors installed in different locations.



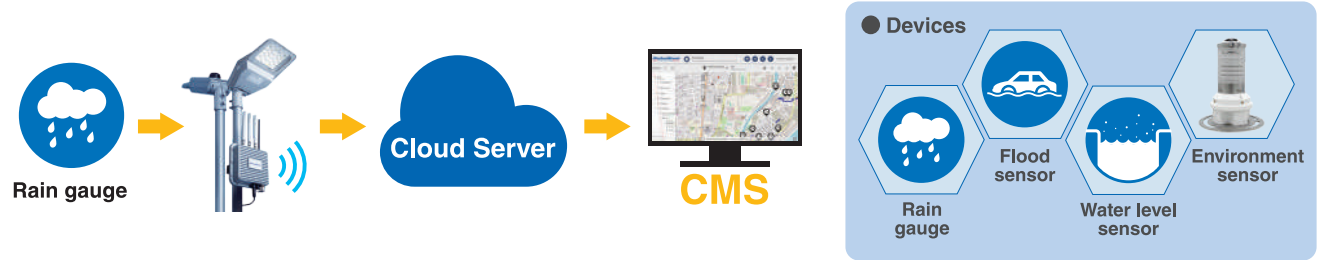
Applications

- Prevent heat strokes by analyzing heat indexes and data collected in each region. Promptly inform citizens about the risks.
- Support IoT educational programs.
- Increase the efficiency of solar power generation by leveraging pyranometer data.



Disaster preparedness

Sensor data can be efficiently collected from multiple installation location through our smart lighting wireless network and they can be monitored from same CMS.



Applications

- Mitigation of damages caused by river flooding or torrential rains, thanks to early warnings.
- Effective use of water resources for agriculture.

Security

Integrate security cameras on smart lighting poles to support video surveillance applications and contribute to crime reduction.



Applications

- Video surveillance along streets and at building entrances.
- Traffic monitoring and control.
- Prevent abuses related to illegal littering.
- Waste bin filling level monitoring (under test).



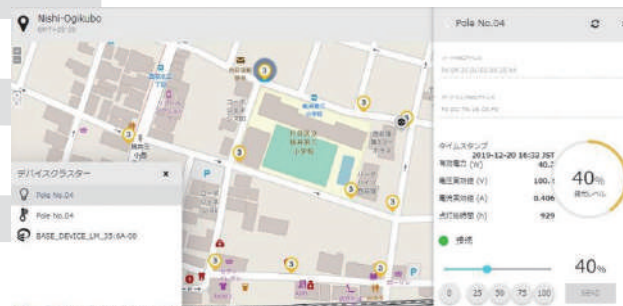
Contribution to more innovative and sustainable communities.



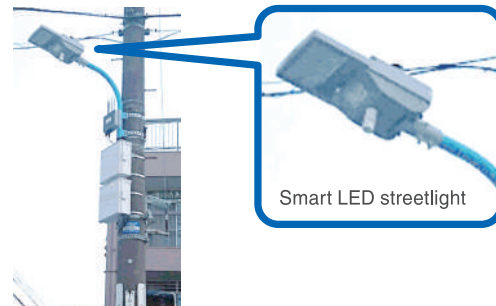
Energy Saving by Smart lighting: Tokyo, Suginami

As a major manufacturer of electrical equipment and high efficiency smart streetlights with wireless network control, MinebeaMitsumi is promoting Smart City projects since 2015.

[Monitoring of smart LED streetlights on CMS]



[Smart LED streetlight installed in field]



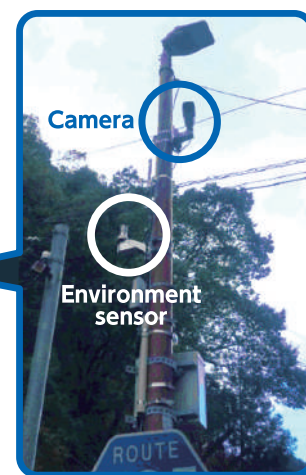
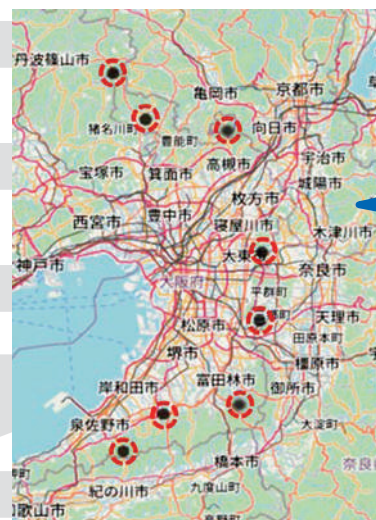
We can easily control the brightness of smart LED streetlights through our wireless network. Our solution monitors the status of operations and power consumption of installed streetlights, and also contributes to energy efficiency by dimming lights to use less power.

*We are also demonstrating smart street lighting in a section of National Route 176. Here, we monitor the status of streetlights including energy saving achieved by dimming level control.

Disaster preparedness: Osaka prefecture, 8 locations.

We are conducting a pilot project combining smart lighting, security cameras and environment sensors.

■ Pilot project locations in Osaka prefecture



- Camera image
- Environmental data
- Management office / Control center

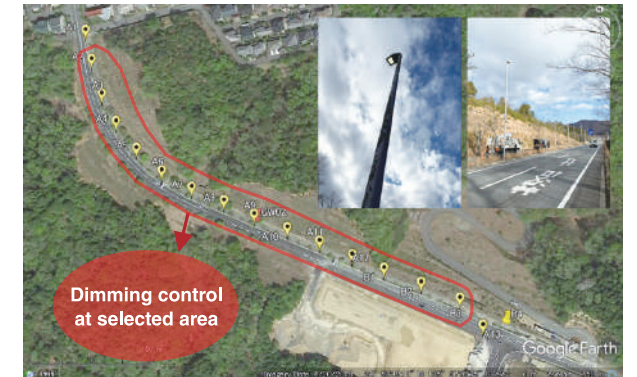
Raw data of multiple parameters such as temperature, humidity, atmospheric pressure, illuminance, wind speed, rainfall etc. from multiple points are collected and analyzed for predicting possible disasters and early detecting risks.

Convenience: Osaka prefecture, Toyono

Effective operation of smart lighting. Demonstration at Toyono.

■ Dimming control at selective area

Each streetlight can be controlled individually. In Toyono, the brightness of streetlights at the junction section are set at 100% while others are set at 70% after midnight.

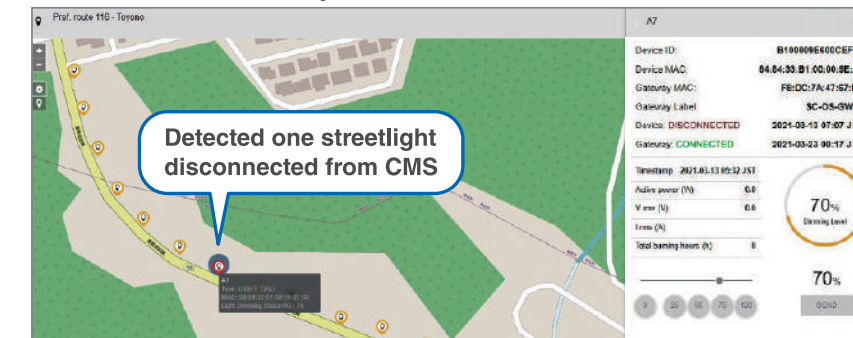


■ Efficient operation

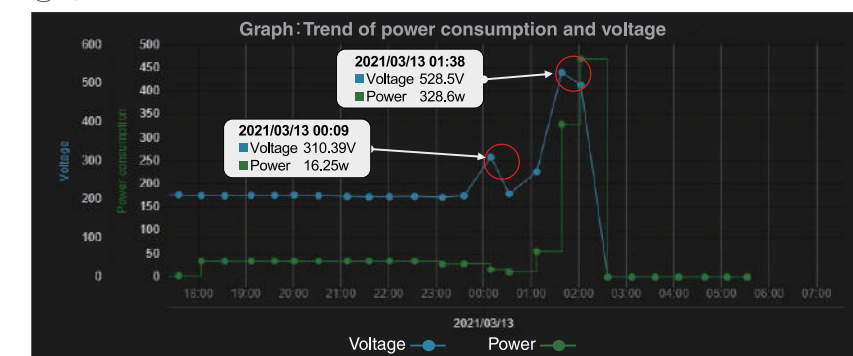
It is possible to identify the location where anomaly occurred including the nature of the anomaly, and this leads to effective maintenance work.



① Detection of anomaly



② Check details



④ Field check



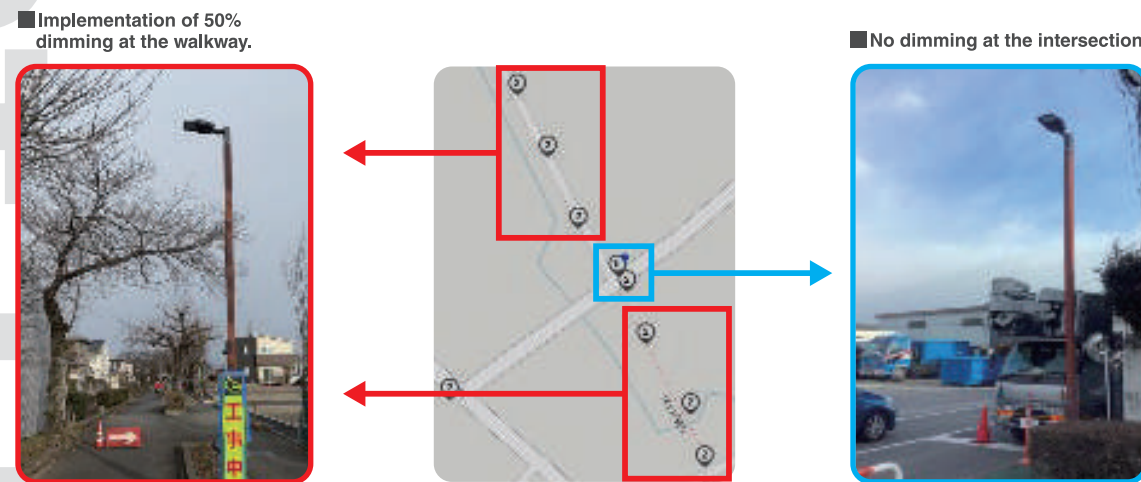
Demonstration project is supported by a promotion team formed by members from Osaka prefecture, Osaka city, and Osaka Chamber of Commerce and Industry.

Quick response to Government request to save electricity: Nasushiobara City



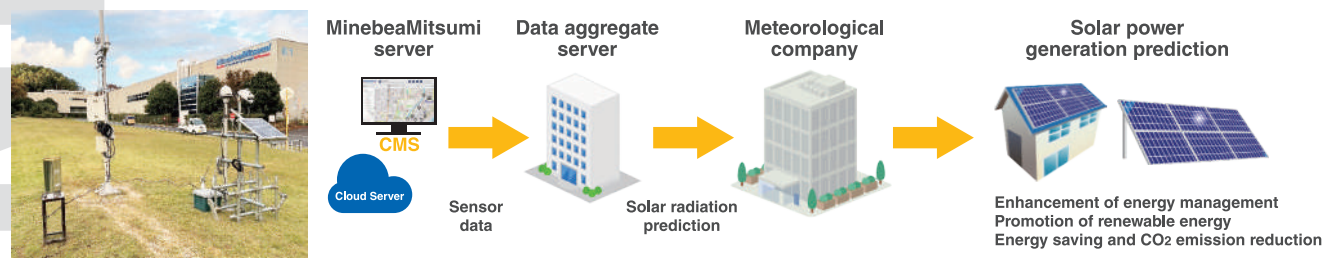
Our wireless network has been adopted in Nasushiobara City. Operation of smart LED street light and utilization of data from environmental sensors and pyranometers has started.

On March 16, 2022, a strong earthquake of M7.4 struck off the coast of Fukushima Prefecture. After that, smart LED streetlights at some roads excepts for those intersections were operated at 50% dimming level and this kind of operation reduced about 36% of electricity consumption.

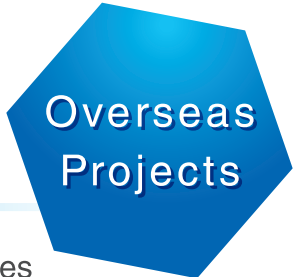


Utilization of Sensor Data

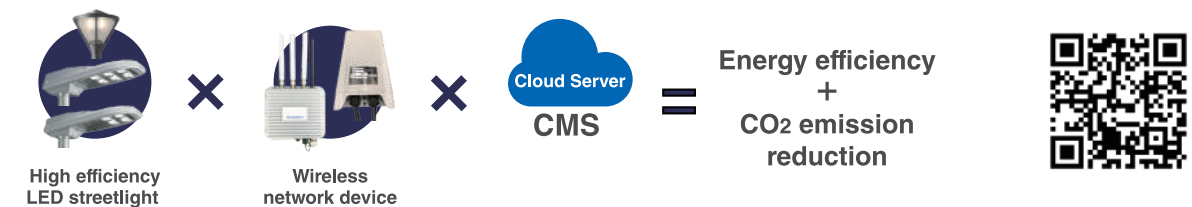
Sensor data is collected through smart lighting network and it is under verification to utilize the data for energy management from renewable sources and hence to contribute to CO₂ emission reduction. The verification project is being supported by Ministry of Environment in Japan.



Cambodia



We are running operation and maintenance of 5,672 streetlights at 4 sites under JCM* Project (Subsidy project by Ministry of Environment of Japan).



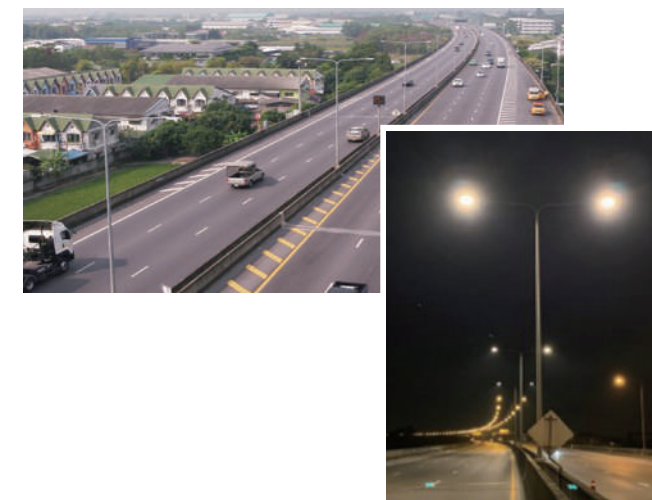
This project will contribute to reduce CO₂ emission by saving power consumption of smart LED streetlights. It aims to reduce 559 tons of CO₂ annually (5,589 tons in 10 years).

*JCM (Joint Credit Mechanism) is a bilateral offset crediting mechanism to cooperate with developing countries by sharing advance technology for mitigating GHG emissions in host country.

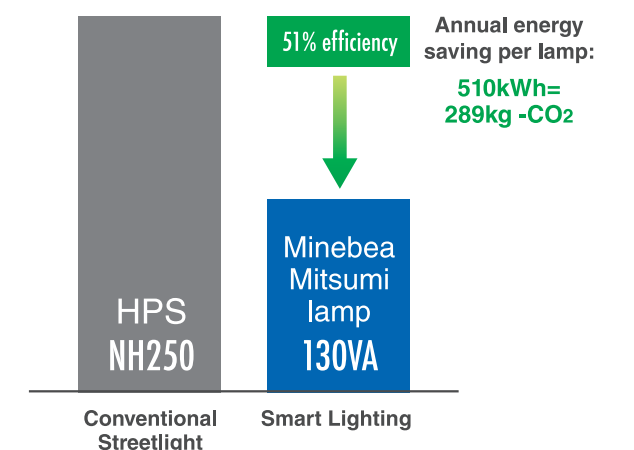
Thailand

By introducing smart lighting in Thai highways, we consume less power and reduce CO₂ emissions, as well as maintenance costs.

Smart LED streetlights installed in Highway (EXAT)



Energy efficiency achievement (Energy efficiency = CO₂ emission reduction)



Overseas Projects

Thailand

We have joined as a collaborative research partner with Thammasat University in the project “Thammasat AI City for Innovation, Digitalization and Sustainability” for promoting the future of smart cities.



Our smart LED streetlights were installed on the campus



Spain

Gijón City is promoting smart city with cooperation from its citizens and collaborating with industry, government and academia, including University of Oviedo. Here, our smart city network has been adopted.



Europe and America

Overseas Projects



France Eure-et-Loir

Installed smart parking sensors for monitoring EV parking facilities.



Germany Darmstadt

Installed smart lighting with motion sensors and wireless control.



Switzerland Massagno

Installed 1,600 smart lighting.



Switzerland Bellinzona

Installed 2,000 smart lighting.



Chile Santiago

Installed 22,000 smart lighting and 1,200 smart parking sensors.



North America San Leandro

Installed 5,300 smart lighting.