

第6回 日ASEANスマートシティ・ネットワークハイレベル会合

Introduction of
**Smart Lighting &
Smart City Solutions**

Contributing in Development of Zero Carbon Society

Smart City Promotion
2024 October 29

MinebeaMitsumi
Passion to Create Value through Difference



Presentation

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MinebeaMitsumi
Passion to Create Value through Difference

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MinebeaMitsumi
Passion to Create Value through Difference

What is MinebeaMitsumi ?

Presentation

What's MinebeaMitsumi ?

(Fiscal year ended March 2024) 4

Toward becoming a one-of-a-kind **INTEGRATION** manufacturer of precision components by maintaining a diverse portfolio.

Consolidated Net Sales

1,402,127 million yen

Operating income

73,536 million yen

15%

Precision Technologies Business

211.4 billion yen

composition **15%**

Main Products

Ball bearings, rod-end bearings, spherical bearings, fasteners, pivot assemblies



26%

Motor, Lighting & Sensing Business

369.4 billion yen

composition **26%**

Main Products

HDD spindle motors, stepping motors, fan motors, DC motors, LED backlights, resonant devices, sensing devices



35%

Semiconductors & Electronics

494.7 billion yen

composition **35%**

Main Products

Precision components, optical devices, power supplies, mechanical components, automotive products, analog semiconductors components for home security units



23%

Access Solutions Business

322.1 billion yen

composition **23%**

Main Products

Automotive parts (door latches, door handles, etc.), industrial machinery components,



*INTEGRATION means "combining" rather than "simple gathering" of the Company's proprietary technologies to create new products in various fields through the INTEGRATION of our advanced technology.

confidential

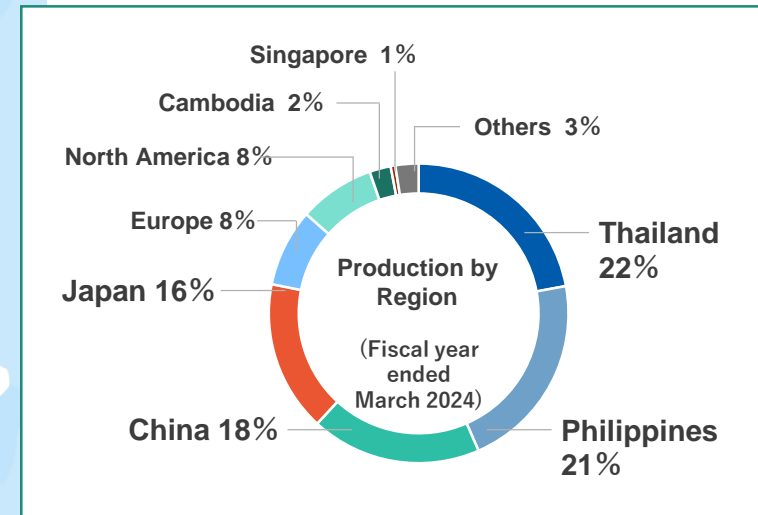
* Net sales of 4.5 billion yen for Other business is omitted here.

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What's MinebeaMitsumi ?

Global Network

We **support our customers' manufacturing** with our speedy and overwhelming supply capacity utilizing our global network.



As of May 11, 2023

2

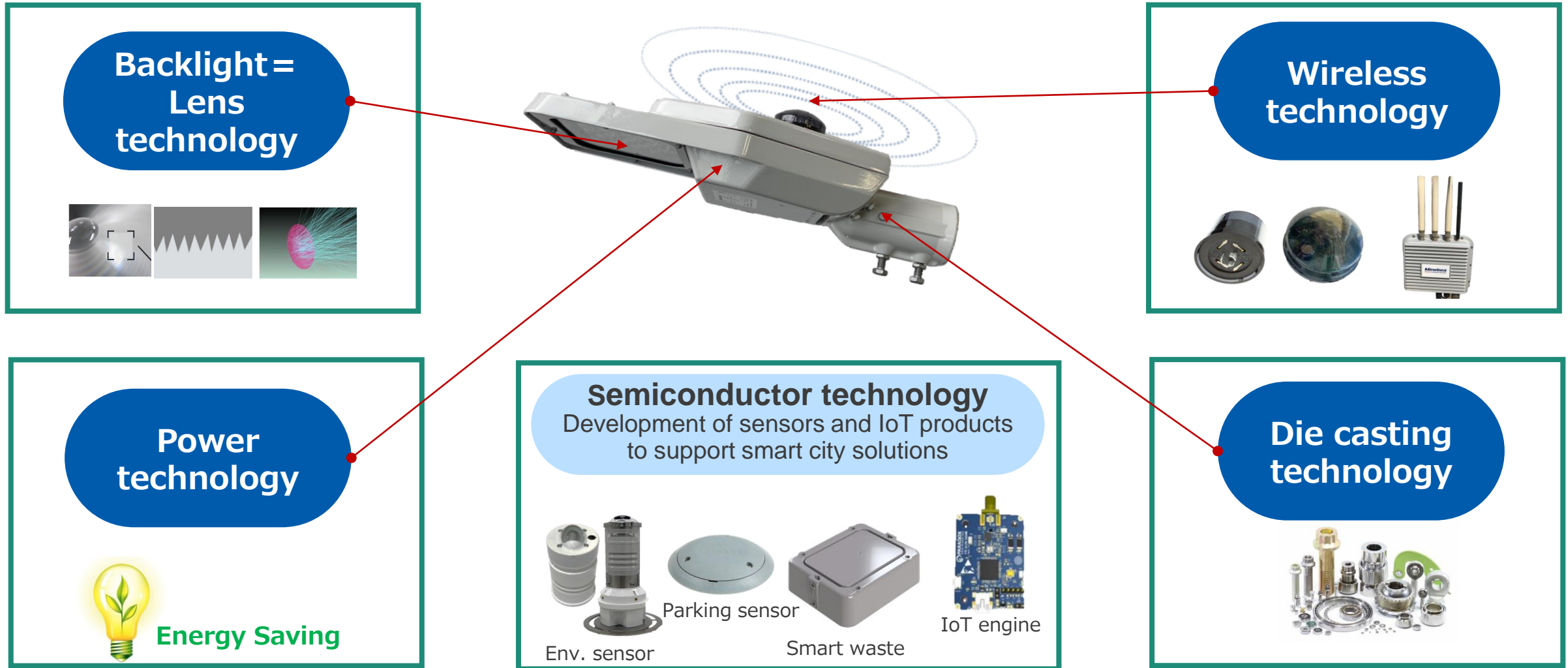
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Overview of Smart City Solutions

Presentation

Overview of Smart City Solutions: Smart Lighting as core part

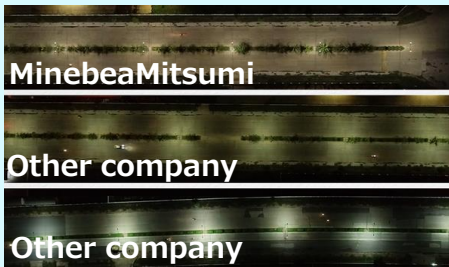
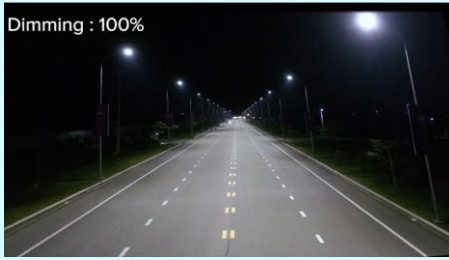
Synergy and Integration of IoT technology and MinebeaMitsumi's original technology





①

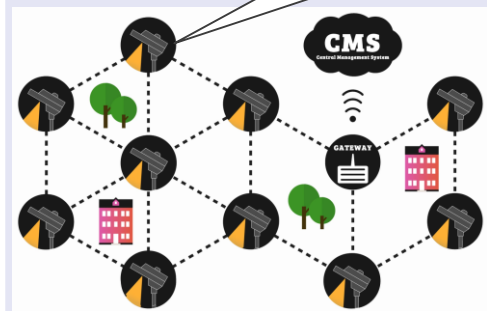
Efficient Lighting



High Efficiency Lighting and Dimming Control

②

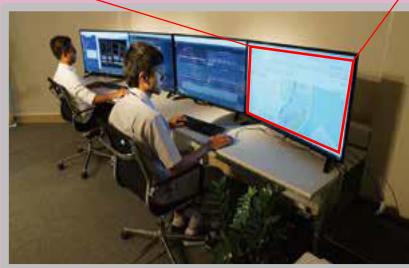
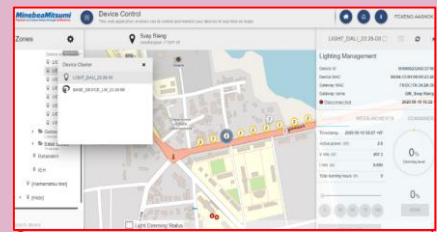
Wireless technology



Robust and effective wireless mesh network based on 6LoWPAN

③

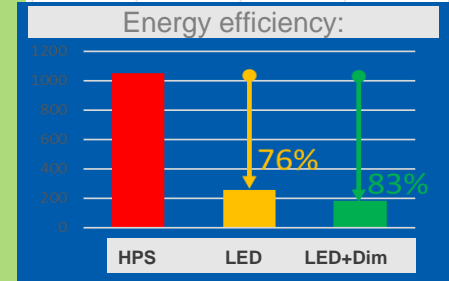
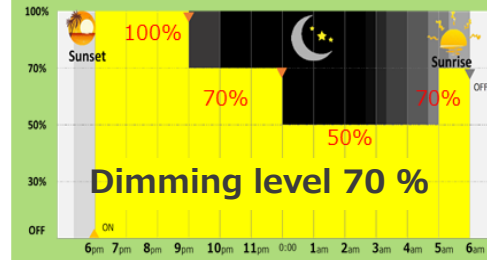
Centralized management



All devices can be centrally managed and controlled from a same CMS.

④

Energy Saving & GHG emission reduction



Energy efficient LED lamps + Dimming control

⑤

Expandability



Can add new IoT devices to the same network platform to expand smart solutions

Dimming control : What is dimming?

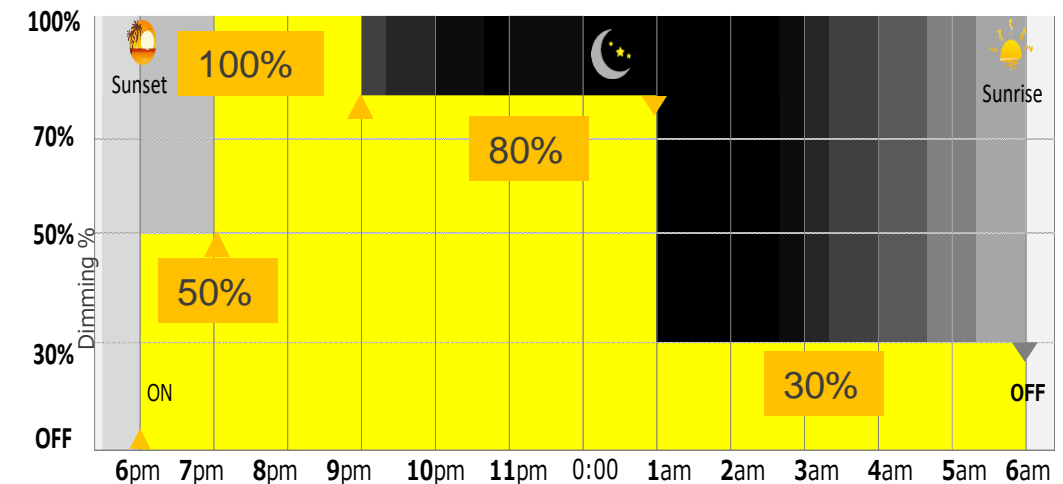
We offer advanced lighting system that significantly helps in energy savings by applying dimming control of lights to provide optimum brightness on road to match the traffic volumes and people`s activities.



■ Comparison of brightness at various dimming level



■ Example of dimming pattern



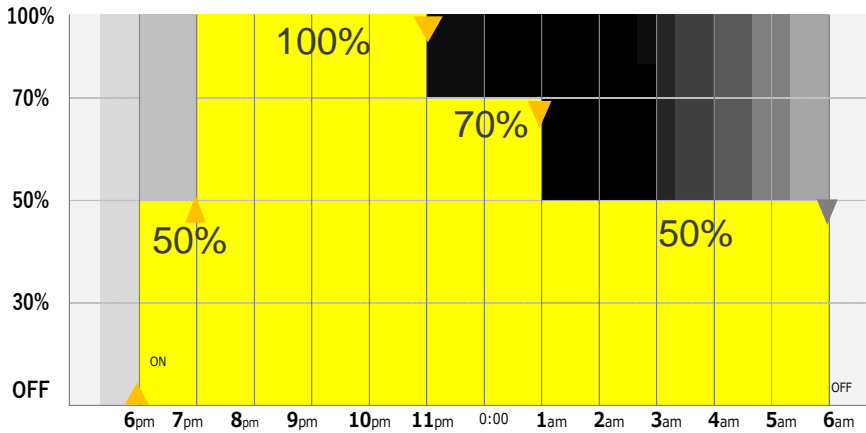
Overview of Smart City Solutions: Energy Saving & GHG emission reduction

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.



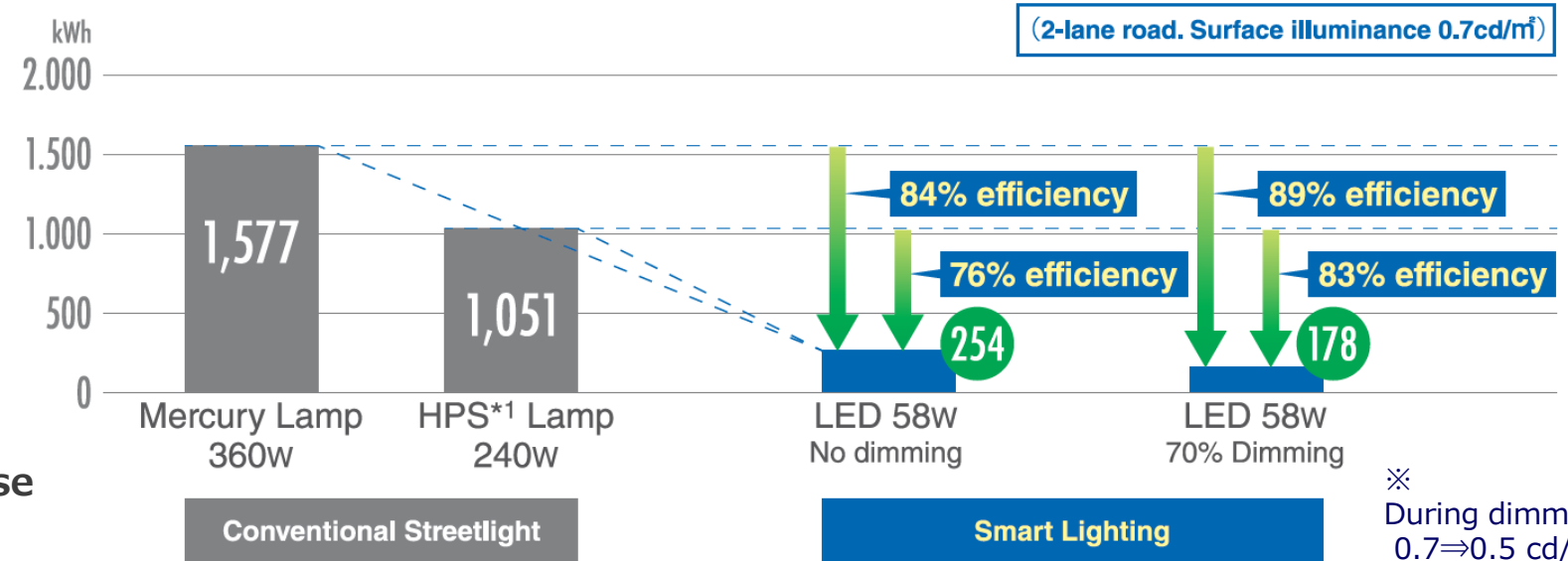
Excellent energy-saving performance and CO₂ emission reduction

■ Dimming pattern (Average 70% dim)



Sunset —————> Sunrise

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



※ During dimming 0.7⇒0.5 cd/m²

If 1,000 conventional lamps are replaced by smart lighting (average 70% dimming),
The **annual electricity cost saving is 26.9 Million Yen**
from mercury lamps. 16.8 Million Yen cost saving from HPS lamps

CO₂ emission reduction

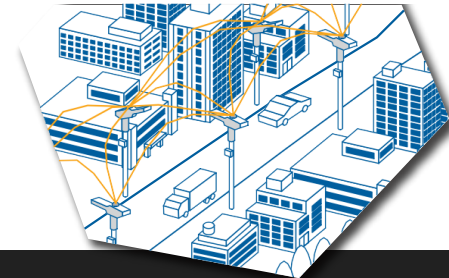
- 646 t-CO₂ from Mercury
- 403 t-CO₂ from HPS

※Electricity tariff : 19.25 Yen / kWh ※CO₂ emission factor is 0.462 t-CO₂ / kWh

Overview of Smart City Solutions: Centralized management from CMS

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

It is possible to centrally manage sensors and devices connected to the network from the same CMS screen, so it is possible to improve the efficiency of operation management.



Monitoring by CMS



Street lamp in the field

CMS map view

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Narrowband Network monitor
This web application enables you to monitor your network on maps

PDENG.ASHOK_BAJRACHARYA

Zones: Root, Unassigned, [Removed], Japan, Philippines, Cambodia, Diamond Island (9 gateways)

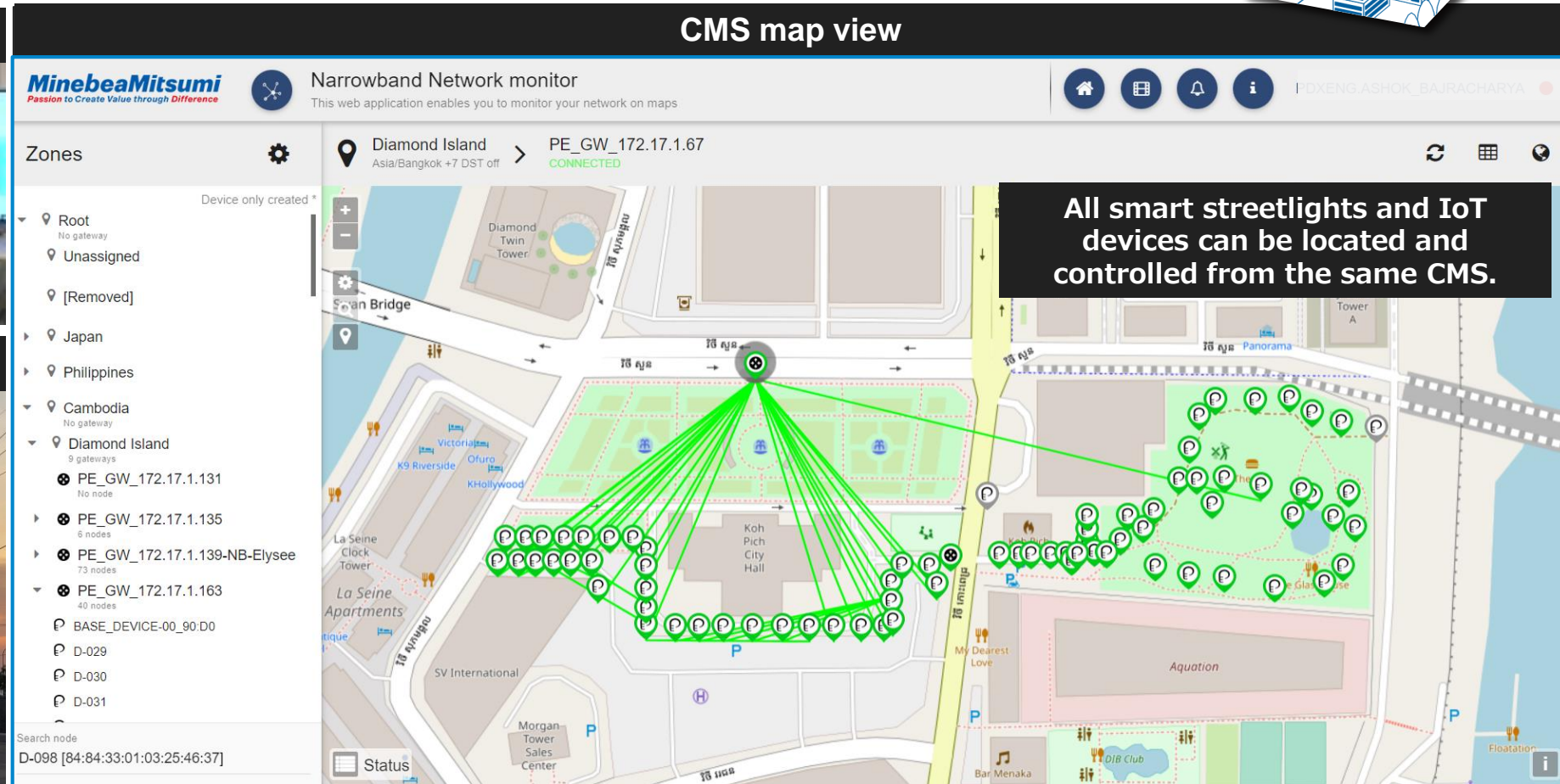
- PE_GW_172.17.1.131 (No node)
- PE_GW_172.17.1.135 (6 nodes)
- PE_GW_172.17.1.139-NB-Elysee (73 nodes)
- PE_GW_172.17.1.163 (40 nodes)
- BASE_DEVICE-00_90.D0
- D-029
- D-030
- D-031

Search node: D-098 [84:84:33:01:03:25:46:37]

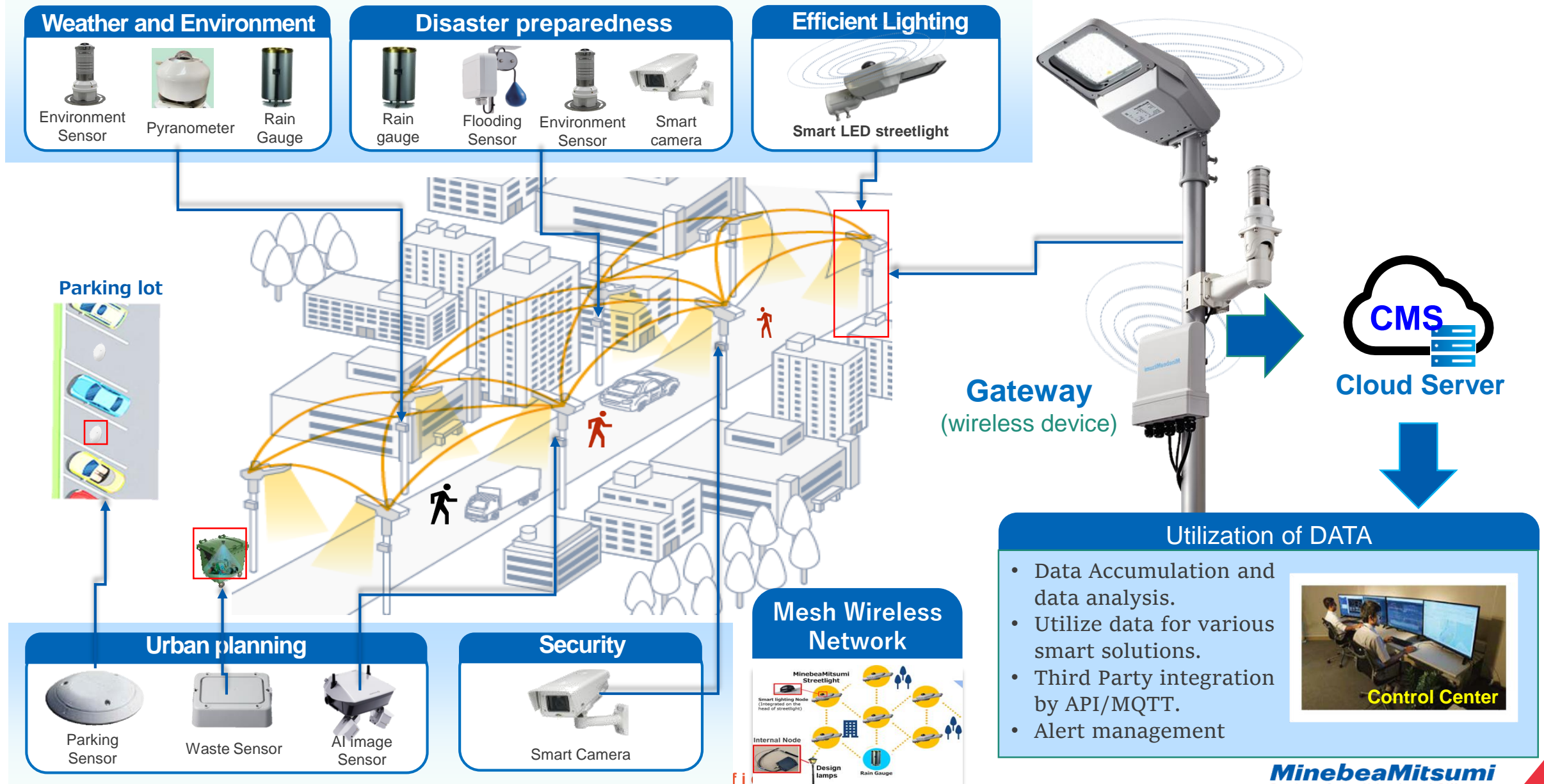
Status

Diamond Island > PE_GW_172.17.1.67
Asia/Bangkok +7 DST off
CONNECTED

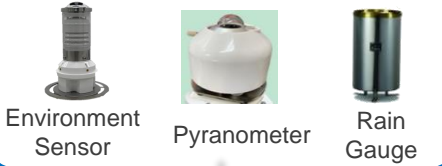
All smart streetlights and IoT devices can be located and controlled from the same CMS.



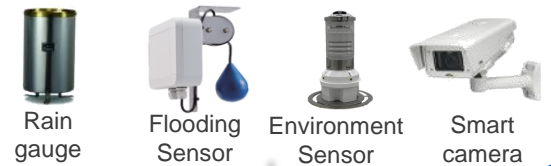
Overview of Smart City Solutions



Weather and Environment



Disaster preparedness



Efficient Lighting



Parking lot



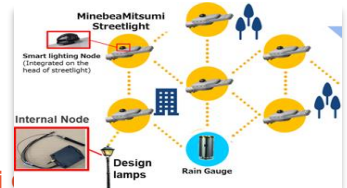
Urban planning



Security



Mesh Wireless Network



Gateway
(wireless device)

CMS
Cloud Server

Utilization of DATA

- Data Accumulation and data analysis.
- Utilize data for various smart solutions.
- Third Party integration by API/MQTT.
- Alert management



Control Center

*CMS: Central Management System

Note: the pictures are only representations

3

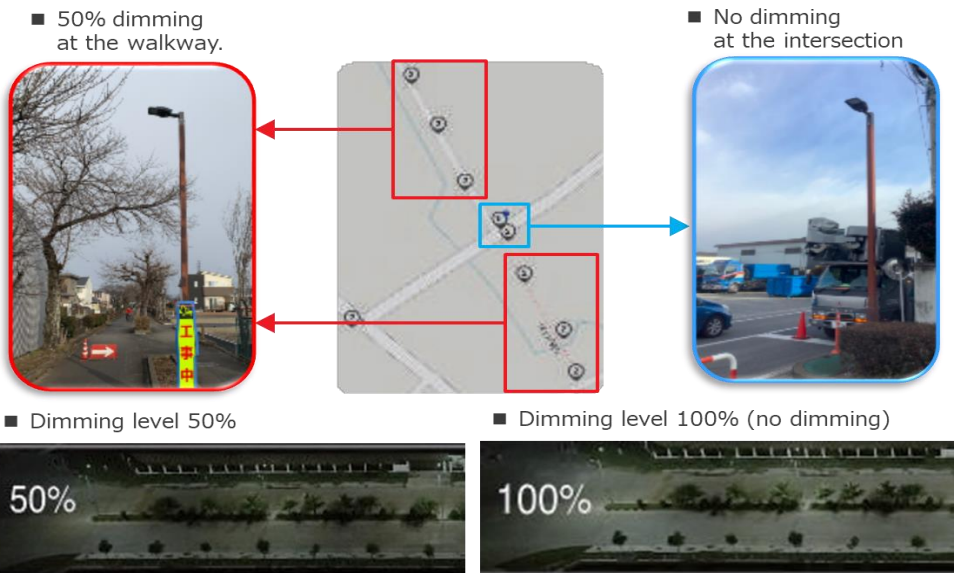
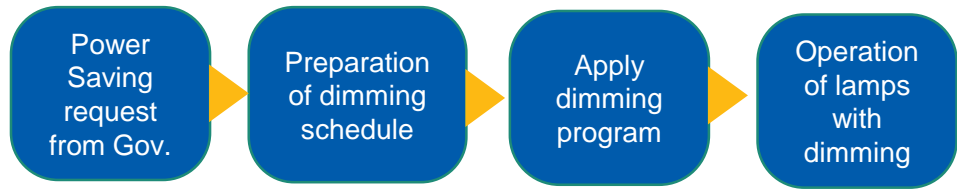
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Use cases of Smart City Solutions

Presentation

- IoT network for central management of lamps.
- Quick response to Government request to save electricity

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.



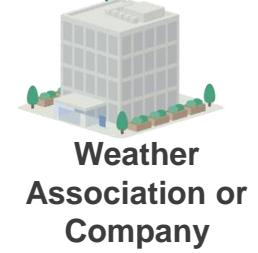
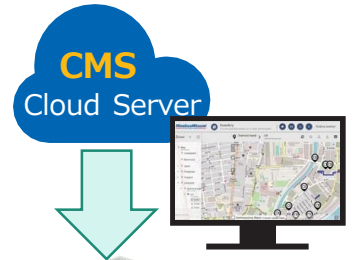
- Utilize sensor data
- to prevent Heat stroke,
- to predict solar power generation.



Prevent heat stroke accidents by monitoring weather condition and alert dispatch to residents about the risk.

Predict Solar power generation using solar radiation data.

Energy saving/CO₂ emission reduction by Advance Energy Management

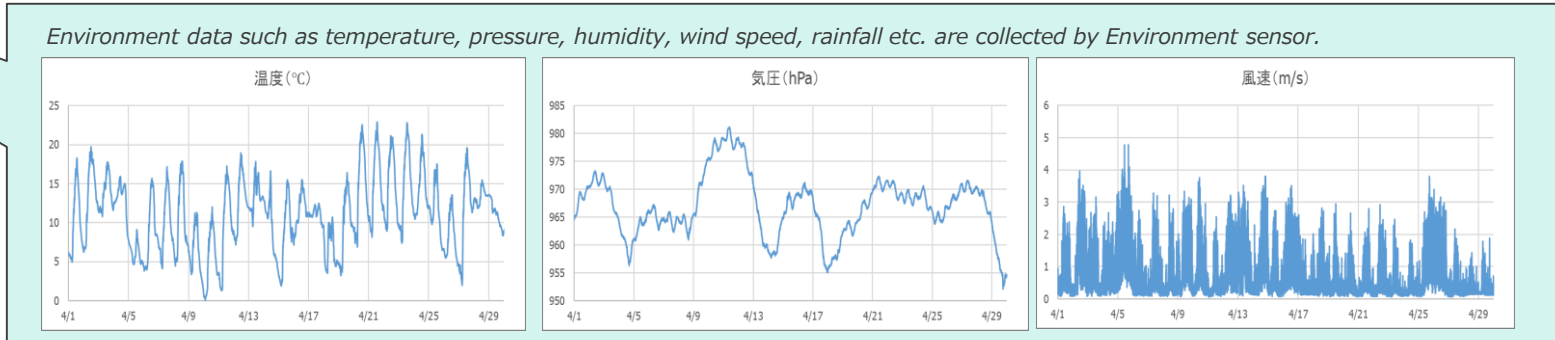
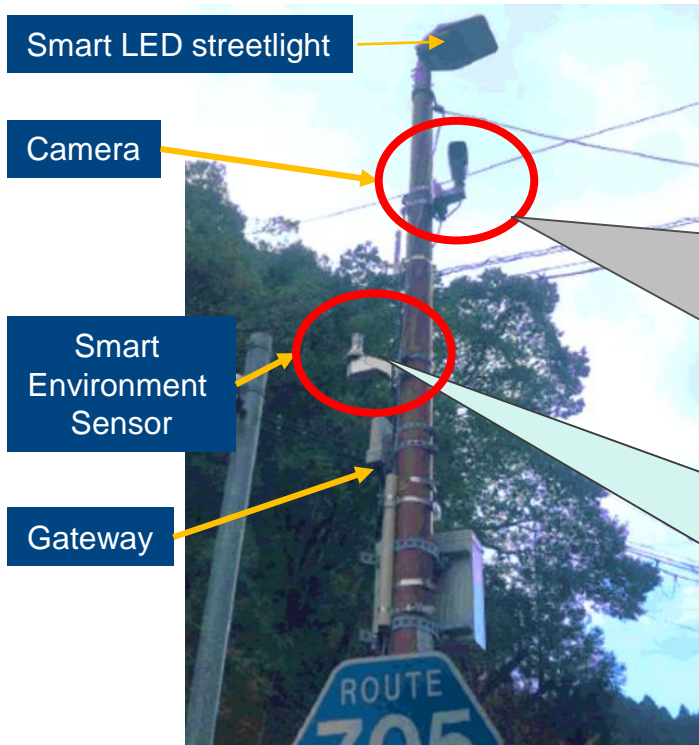


Weather and Environment information solution in Osaka

Problem: Many accidents occur due to road icing, snowfall, heavy rainfall in mountain roads.

Solution: Monitoring of the roads condition using Camera and Environment Sensor

Based on sensor data and camera image, city can check the road condition. If there is "heavy rainfall" or "snowfall" or "road icing", city can issue alerts to vehicles moving toward those roads or make decision to block traffic for safety and to prevent road accidents.

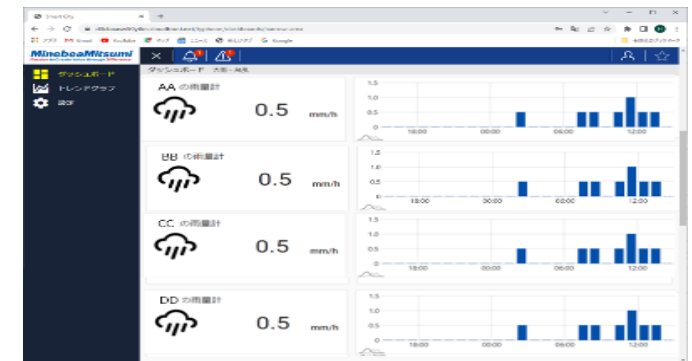
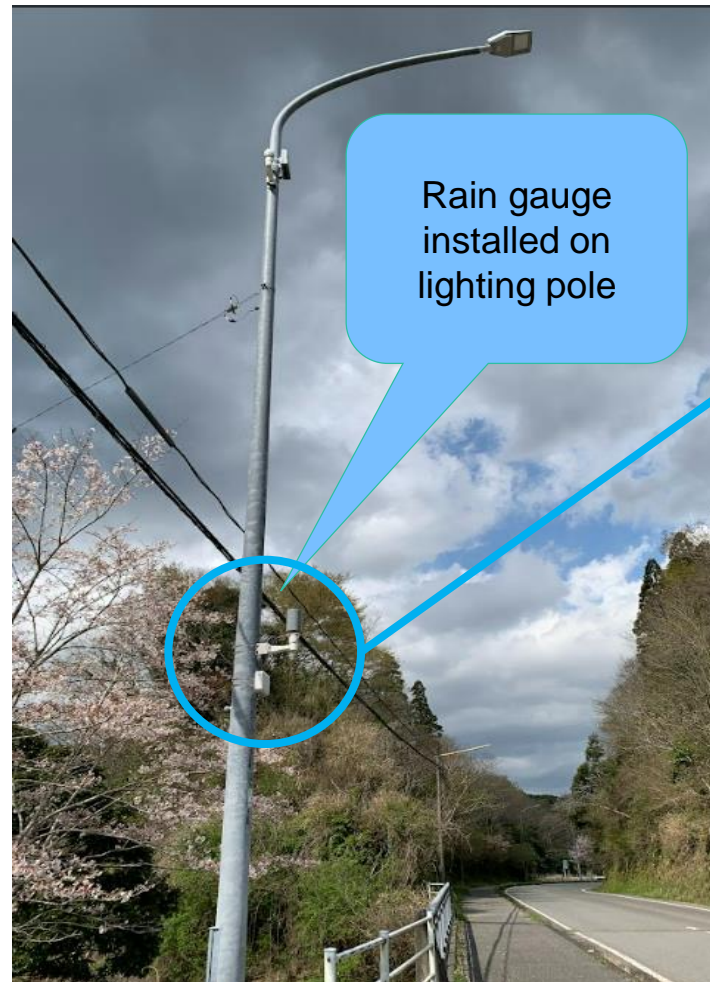
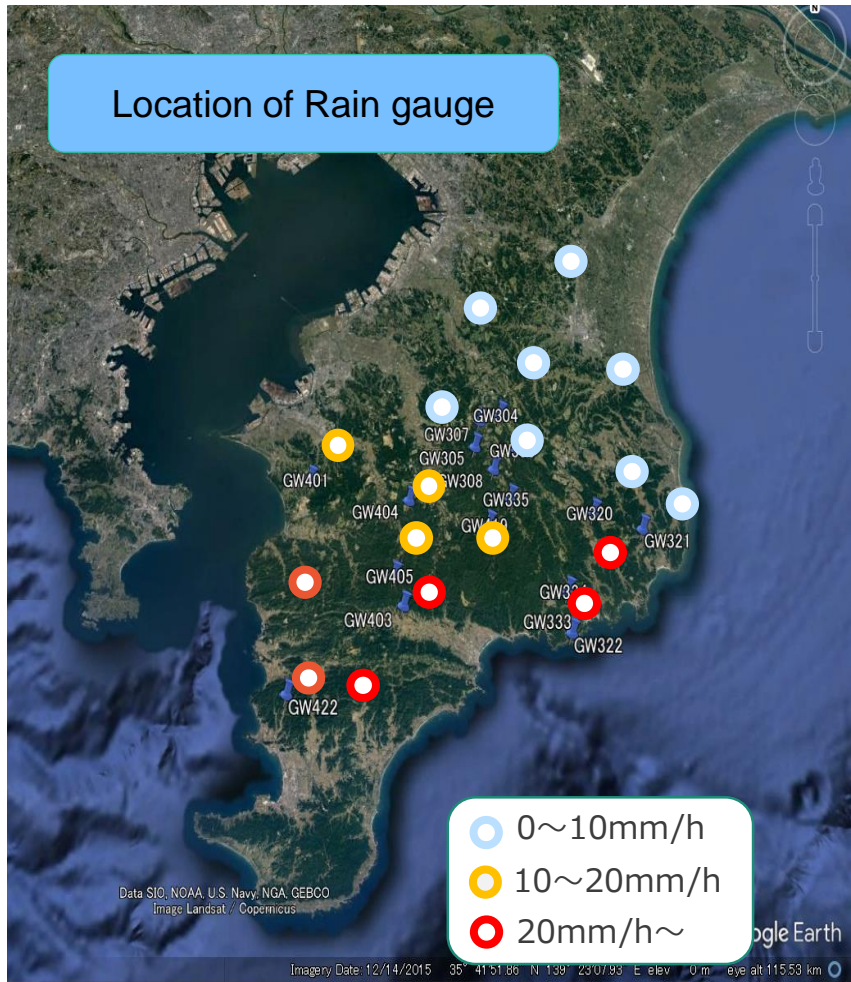


Weather and Environment information solution in Chiba

Problem: sudden and heavy rainfall effect in traffic condition at multiple points.

Solution: Monitoring the rain level using Rain Gauge.

And system shall send an alert notification when rainfall exceeds a certain level.



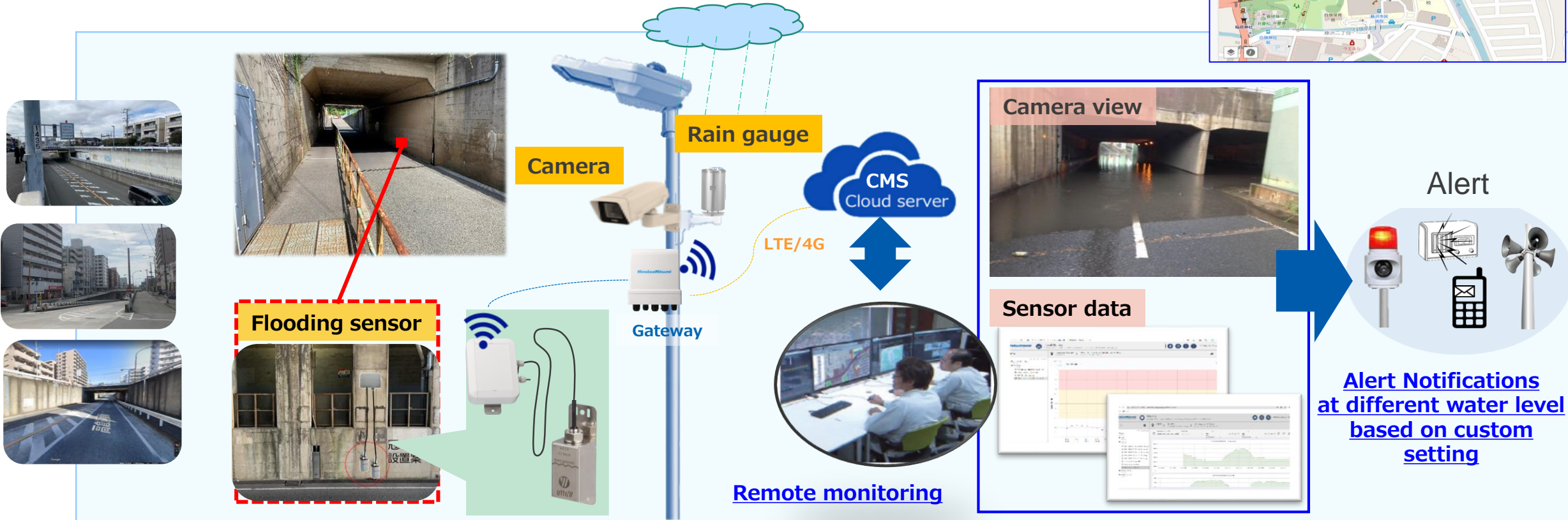
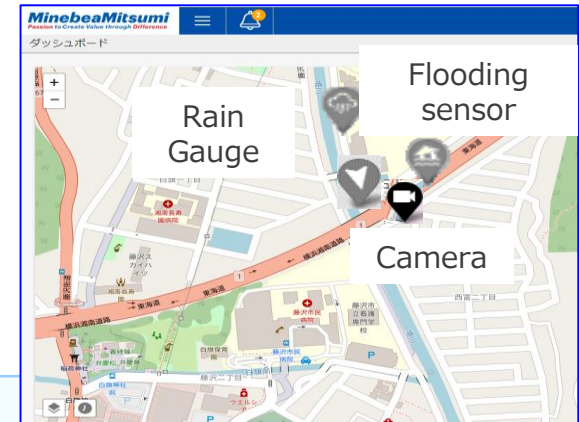
Advanced Monitoring System

Weather and Environment information solution in Fujisawa

Problem: Underpass are easy to get flooded during rainfall and it blocks traffic flow.

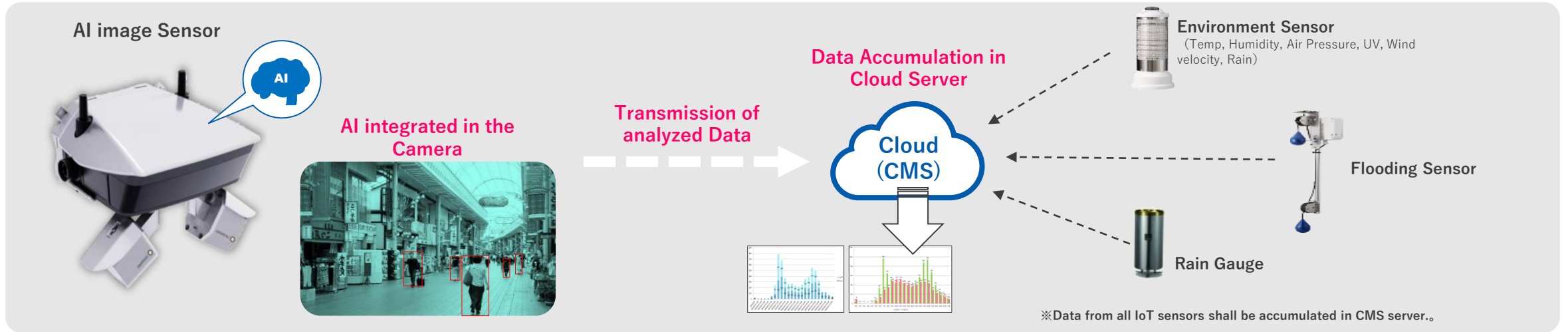
Solution: Monitoring of rain level and water level using flooding sensor, rain gauge and camera.

By installing Rain gauges, Flooding sensors and camera, the city has good visibility of the condition at the field. In addition, the system will send alert notification to the city to inform the water level at certain threshold points.



Urban Planning Solution using AI Image sensor

Under Verification



Use case

Streets, Shopping area, Parks, Stations



- ✓ Pedestrian and bicycle counting
- ✓ Detecting time spent and number of people
- ✓ Detecting crowds

Use case

Road intersections, streets, Traffic volume survey area etc.



- ✓ Counting vehicles by type and flow direction
- ✓ Counting vehicles by flow direction at intersections

Smart Lighting



LED smart streetlight to prevent light pollution

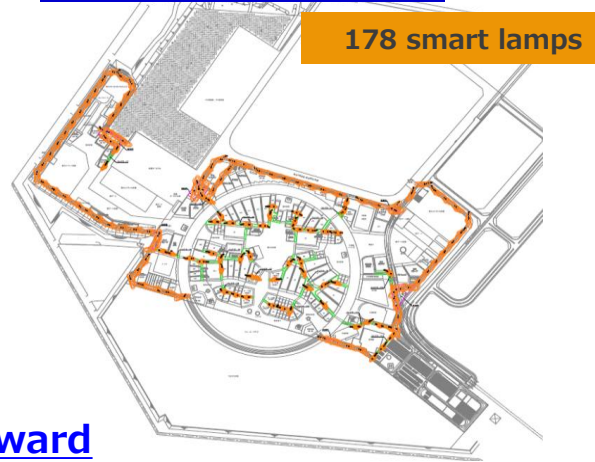


1. Designed to prevent light from leaking upwards.
2. Color temperature (3000K) with less blue light.

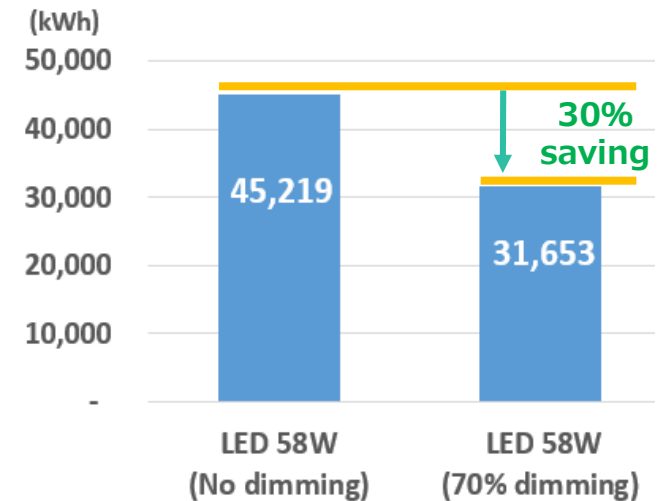
→ Prevent light from leaking upward matches with the concept of the EXPO.



Installation area



Energy Saving (by 178 Lamp/year)



<Examples of expected usage>

Reduce power consumption and CO2 emissions

We can control the Dimming level to optimum level from remote by using CMS.

At the EXPO, the brightness of the lamps can be easily adjust to optimum level from 10% to 100%.

Such dimming control can save energy consumption.

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Presentation