



JCM in Cambodia Introduction of High Efficiency LED Lighting Utilizing Wireless Network

2017/03/01

MinebeaMitsumi JCM Team

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MinebeaMitsumi Inc. A vertically integrated technology company

- Sales 630Byen (FY16 forecast)
- Business Integration Jan. 27, 2017
 - Minebea Co.Ltd. + Mitsumi Electric Co.Ltd.
- Technologies
 - Bearing and Machined components
 - Motors and actuators
 - LED Lighting (backlight unit to lighting equipment)
 - Sensors
 - Wireless (components to integrated solutions)
 - Semiconductors

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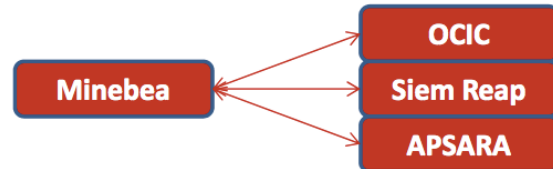
International Consortium

- Private sector in Phnom Penh
 - Overseas Cambodian Investment Corporation ("OCIC")
- Public sectors in Siem Reap
 - Siem Reap Provincial Hall ("Siem Reap")
 - The Authority for the protection of the site and the Management of the Region of Angkor ("APSARA")

OCIC Diamond Island



International Consortium



Angkor Wat
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Teamwork of Japan technologies

- "High Efficiency LED Lighting utilizing Wireless Network" is realized by the Teamwork of three leading companies of each technology domain



Great collaboration and leadership in Cambodia



H.E. Sao Sopheap
Director of Cabinet of Minister, MoE,
and Co-Chair of JCM Committee
Ministry of Environment, Cambodia



H.E. Makara Khov, PhD
Undersecretary of State
Ministry of
Post and Telecommunications



Mr. Chin Hok
CEO of Diamond Island City
Oversea Cambodia
Investment Corporation



H.E. Pov Piseth
Deputy Governor
Siem Reap Province

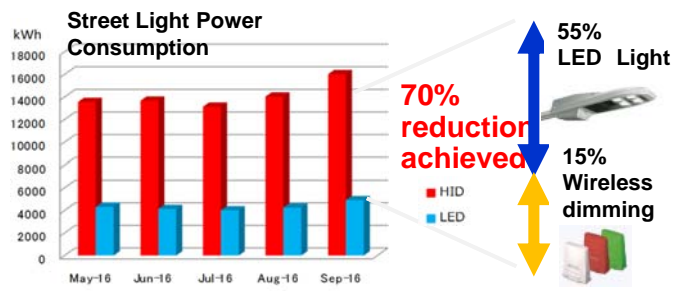


H.E. Hok Peng Se
Deputy Director General
Apsara Authority

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GreenHouse Gas (“GHG”) reduction

- 70% saving is actually achieved
 - 55% by high efficient LED lighting
 - 15% by wireless control
- 4700 tons of CO2 / 10 years will be reduced*
 - USD 1.2M / year electricity cost saving



Result from OCIC Diamond Island

* Based on the calculation in Proposal

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Awarded by Minister of Environment in Cambodia

- Contribution to
 - CO2 reduction
 - Environment
- Dec. 21, 2016 at Cambodia MoE
- Certificate presented by Deputy Prime Minister



Map

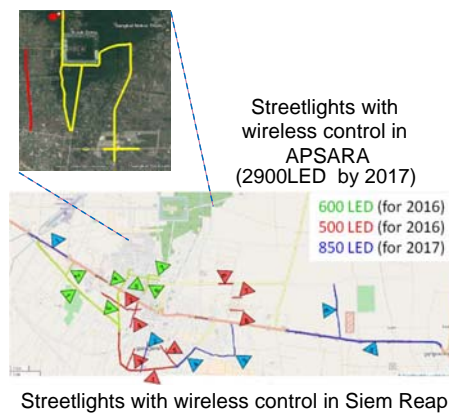
Phnom Penh

Installed LED street lights as of Nov. 2016



Siem Reap

Installation started from Jan. 2017



Streetlights with wireless control in Siem Reap

What JCM realized

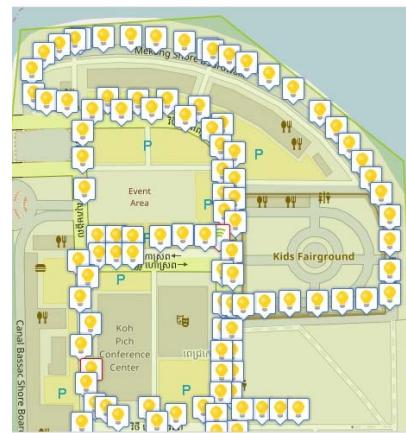
Not only
GHG reduction

But
Spine of Smart City

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Spine of Smart City

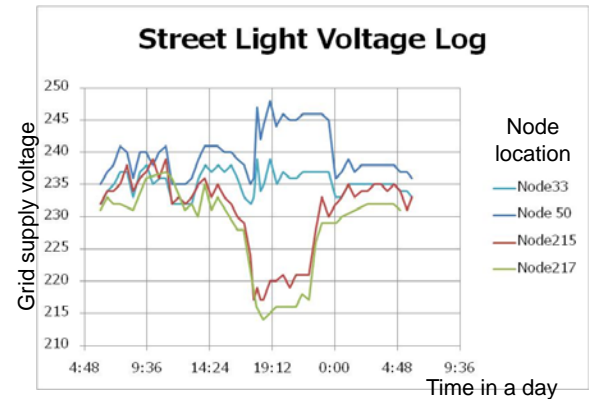
- Node of wireless network for street light control deployed along with the streets across the city
- Various Internet of Things (“IoT”) devices will be connected via Node and Gateway to the server



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Grid safety

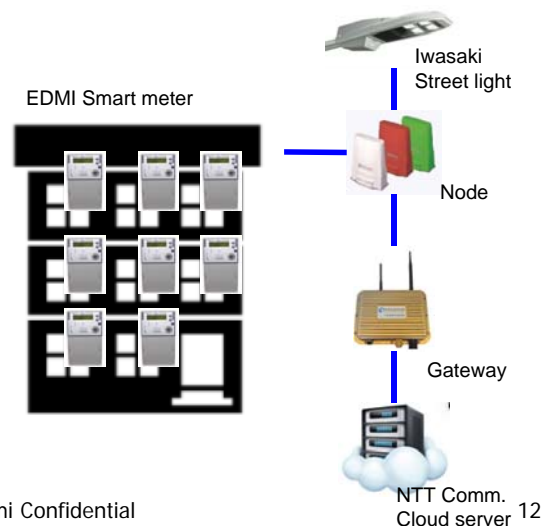
- Each node monitors grid voltage variation continuously
- Visualization of voltage variation helps to design and operate the grid by Electricity Supplier
 - Optimize energy
 - Avoid blackout



Actual Voltage variation data of four different nodes (JCM#1 Phase1)

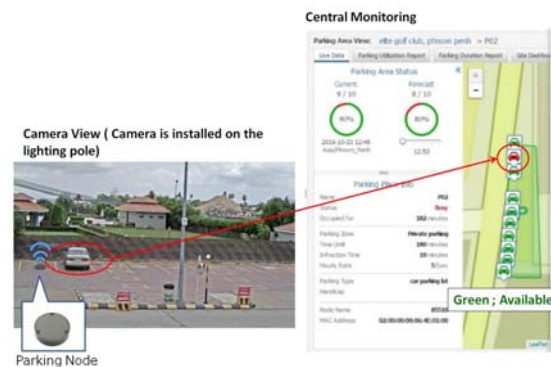
Smart electricity meters

- Monitor private sector electricity usage
- Aggregate electricity usage data via IoT access points
- Manage peak usage of each segment in Province
 - Public sector
 - Private sector
- Avoid blackout



Smart parking (Sensor + CCTV)

- Parking sensors
 - Indicate parking status
- CCTV
 - Visualize parking
- Provide parking status to tourists
- Manage traffic using Smart Traffic lights



Smart parking integrated with smart lighting installed by JCM#1 Phase1

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Lesson learned

- Highlights
 - Make the city "brighter" with LED lights
 - Easier to maintain street lights with the wireless control
 - Actually reduces >70% of GHG
 - Result in Spine of Smart City
- Challenges
 - Delay in development of city

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