Panasonic LED Road Lighting
for
Training Programme on Developing Project Proposals on Climate Change Migration

15 December 2016

Panasonic Corporation Eco Solutions Company
Lighting Business Division
PT Panasonic Gobel Eco Solutions Sales Indonesia

Company profile

Panasonic was found in 1918 by Konosuke Matsushita. Last fiscal year we had a turnover about $65 billion USD, We are committed to creating a better life and better world, continuously contributing to the evolution of society and to the happiness of people around the globe.

Panasonic Corporation

Founded in 1918

Net Sales : JPY7.7trillion (USD65Bil.)
(FY2014, ending March 2015)

Head office: 1048, Oaza Kadoma-shi,
Osaka, 571-8501, Japan

Employees: 254,084

Consolidated companies: 469

Founder
Konosuke Matsushita

Corporate Brand

Panasonic

Brand Promise

Panasonic is committed to creating a better life and better world, continuously contributing to the evolution of society and to the happiness of people around the globe.

Brand slogan

A Better Life, A Better World

Aiming to realize a better life for all its customers, and is promoting environmental initiatives as an important element in achieving that goal.

Panasonic Environmental Policy

A Better Life, A Better World

Aiming to realize a better life for all its customers, and is promoting environmental initiatives as an important element in achieving that goal.

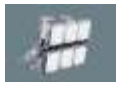
Numerical Targets and Performance Levels under Green Plan 2018

Targets	Results in 2015
Size of contribution in reducing CO_2 emissions: 47 million tons in 2015	Size of direct contribution: 43.12 million tons
	Additional size of indirect contribution: 10.47 million tons
Reduction in CO_2 emissions per basic unit in logistics: By 46% or more in 2018 compared to 2005 (Japan and international)	39%
Reduction in CO_2 emissions from offices: By 2% or more on yearly average until 2018 compared to 2007 (Self-owned buildings in Japan)	4.2%
Recycled resource utilization ratio: 16% or more in 2018	16.9%
Factory waste recycling rate: 99.5% or more in 2018	99.2%
Provide environmental education to 2 million children around the world by 2018	2.709 million children*11

Lighting Business of Panasonic

Panasonic has the No.1 position in Lighting in Japan.
Last fiscal year we had a turnover about USD2.7 billion.

ES



Eco Solutions Company

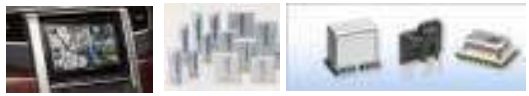
Lighting
Energy System , Housing System

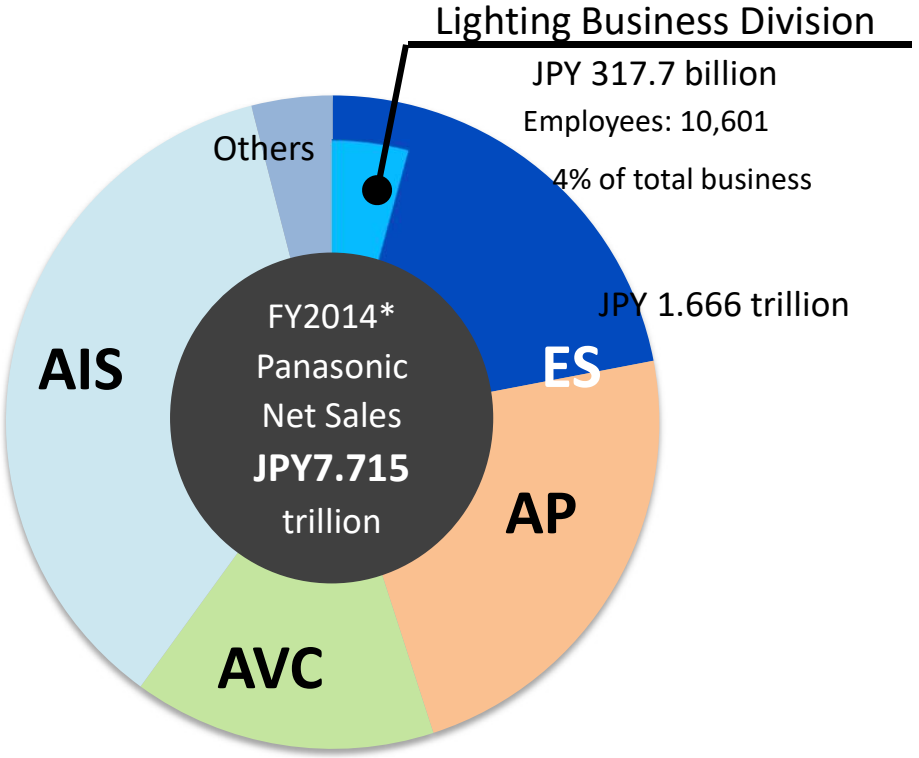
AP

Appliances Company

AVC

AVC Networks Company

AIS

Automotive & Industrial Systems Company

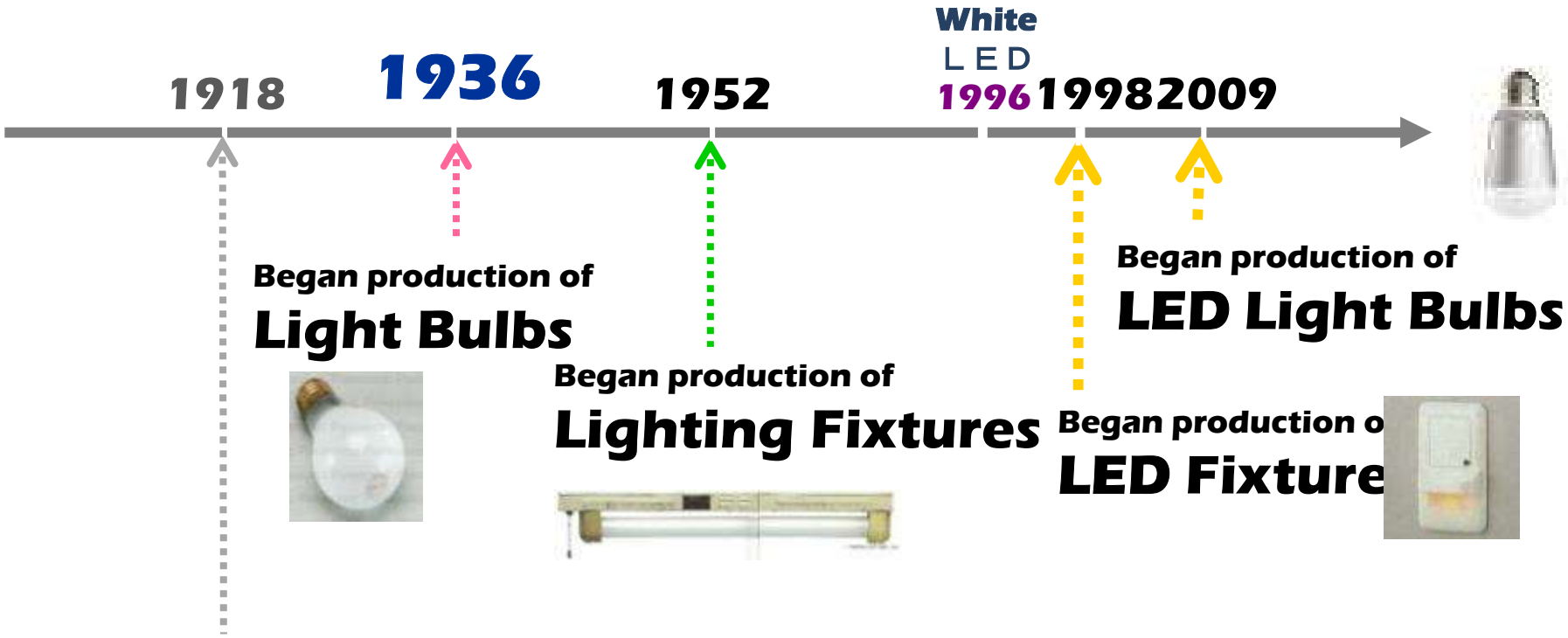


*ending March 31, 2015

Panasonic

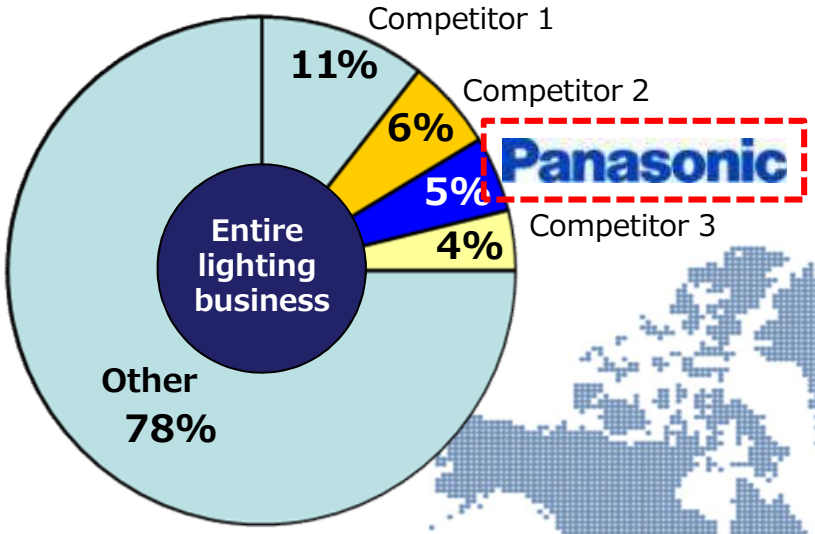
Panasonic Lighting Business History

Panasonic has approx. 80 years history providing lighting products with advance technology.

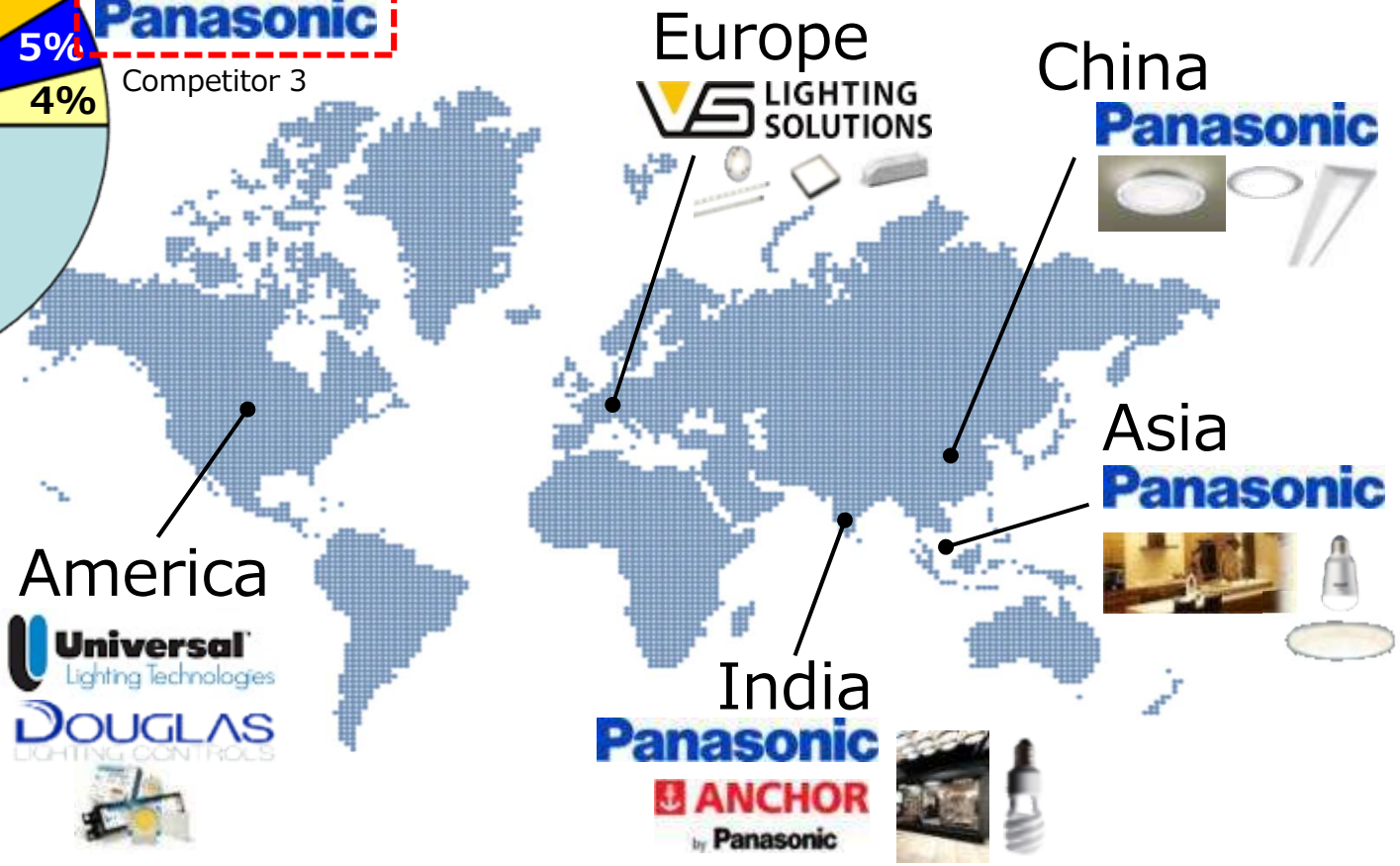


Global position of Panasonic lighting business

Panasonic has expanded its lighting business outside of Japan. It is currently ranked 3rd in the world lighting market.

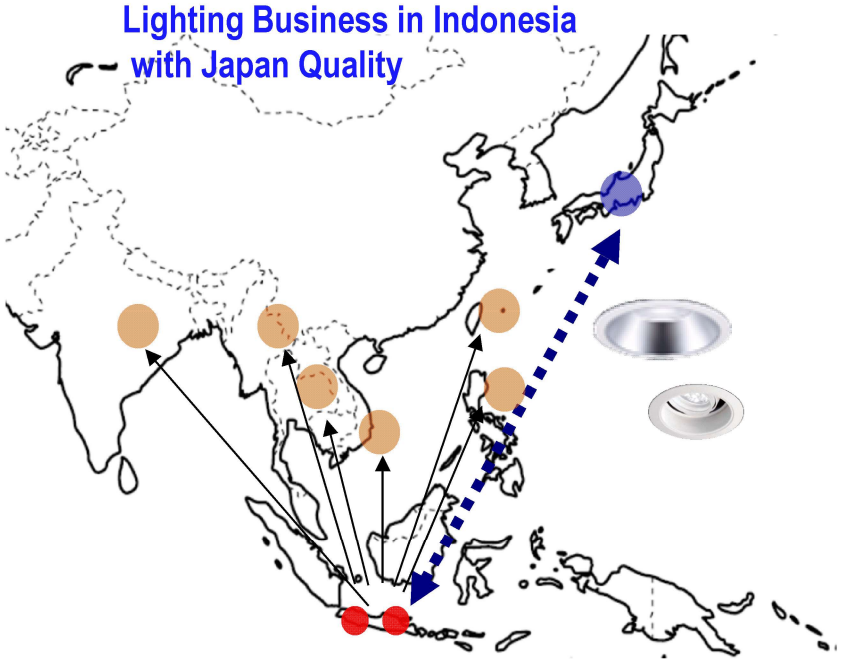


Survey as of October 2011 by Panasonic



Panasonic Lighting Business in Indonesia

Panasonic Corporation, Eco Solution Company, Osaka, Japan



23 years Factory Operation

Indonesia Manufacturing Company Profile

Company	PT.PANASONIC GOBEL ECO SOLUTIONS MANUFACTURING INDONESIA
Factory Location	Jl. Rembang Industri Raya 47, PIER Pasuruan 67152. East Java, Indonesia Jl. Raya Narogong KM23,8 Cileungsi Bogor 16820 Jawa Barat
Production From	Feb 08 1993 (23 years)

Panasonic Road Lighting Concept

Contribution of LED Road Lighting

Panasonic's '3S' Contribution Concept

Safety (Traffic safety)

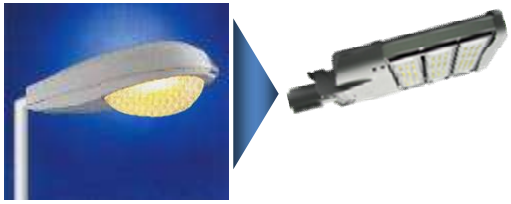
Well planned LED Road lighting provides traffic safety for both pedestrian and motorists.

Security (Crime prevention)

Clear and High Color Rendering LED light provides crime prevention effect. (CRI > 70)

Especially urban residences are able to receive security benefit.

Saving (Energy Saving)



HPS250W LED120W

LED street lights contribute to approximately 50% energy saving from the equivalent light output conventional street lights (HPS).

This benefit also will contribute to reduce carbon emission electricity cost.

LED Road Lighting product range

Specification summary of LED Road Lighting

	C -Series			S-Series		
View						
Model No.	NNP42900	NNP44902	NNP44904	NNP18904	NNP19908	NNP11912
System Power (W)	25	40	90	90	120	200
System Luminous Flux	3300 lm	5280 lm	9740 lm	10700 lm	14300 lm	21300 lm
Color Temperature (CCT)	5000K			5000K		
Power Supply	AC150-242V			AC120-242V		
Life Time (L70)	50,000 hrs			50,000 hrs		
IP rating	IP66			IP66		
Color Rendering Index (CRI)	>70			>70		
Surge Protection	15kV (Common mode)			15kV (Common mode)		
Angle Adjust	0,5,10deg adjustable			0,5,10,15deg adjustable		

<Safety> Road Lighting Design Criteria

CIE requirements for road lighting

CIE Pub115 2nd (2010) Lighting of Roads for Motor and Pedestrian Traffic

Lighting Class	Road surface				Threshold increment	Surround ratio
	Dry			Wet		
	L_{av} in Cd - M_{-2}	U_o	U_l	U_o	f_{TI} in%	R_s
M1	2.0	0.40	0.70	0.15	10	0.5
M2	1.5	0.40	0.70	0.15	10	0.5
M3	1.0	0.40	0.60	0.15	15	0.5
M4	0.75	0.40	0.60	0.15	15	0.5
M5	0.50	0.35	0.40	0.15	15	0.5
M6	0.30	0.35	0.40	0.15	20	0.5

<Safety> Road Lighting Design Criteria

MLIT (Japan) requirements for road lighting

Average road surface luminance

(Unit: cd/m2)

		External road conditions		
		A	B	C
		"Continuously" affected by light from nearby buildings	"Intermittently" affected by light from nearby buildings	"Not" affected by light from nearby buildings
1. High speed roads		1.0	1.0	0.7
		-	0.7	0.5
2.Ordinary national roads	Important traffic routes	1.0	0.7	0.5
		0.7	0.5	-
	Less important traffic routes	0.7	0.5	0.5
		0.5	-	-

- For "cars only" roads among high speed roads, the figures in the second line can be applied.
- On ordinary national roads, if light –shielding equipment for oncoming car's headlights is are installed centrally, the figures in the second line can be applied.

Exchange rate cd/m2 to lux : 15lx/(cd/m2) for asphalt pavement

10lx/(cd/m2) for concrete pavement

<Safety> Road Lighting Design (Calculation)

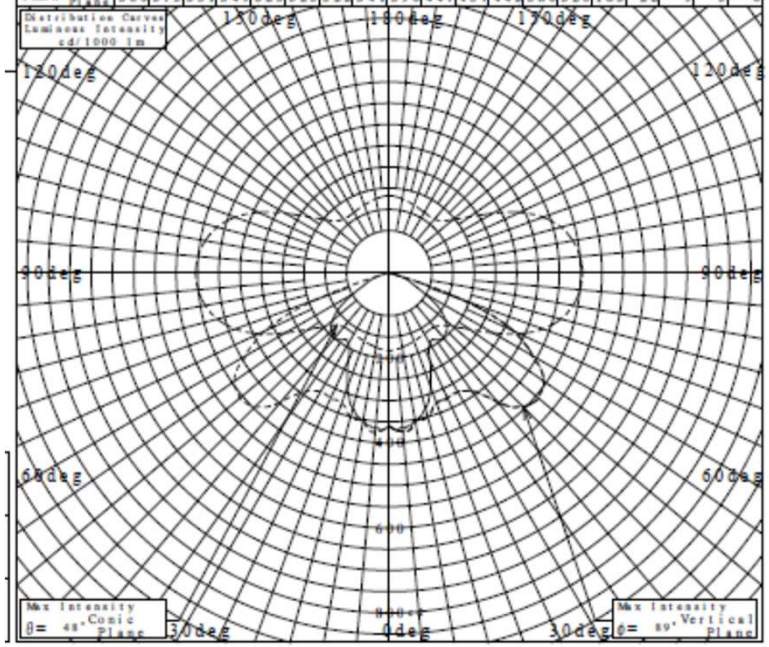
Photometric Distribution Data

PHOTOMETRIC DOCUMENTATION

OUTDOOR TYPE LUMINAIRES

Catalogue No.	NNP18900 $
Lamps	LED ×1 7920.0 lm
Data No.	K0131132(0)DB0
JISC8131-1999	CUT-OFF
Light Output Ratio	97.1 %
Up ward	0.0%
Down ward	97.1%
Intensity directly beneath lamp	360.3 cd/1000 lm
Max Intensity	458.5 cd/1000 lm

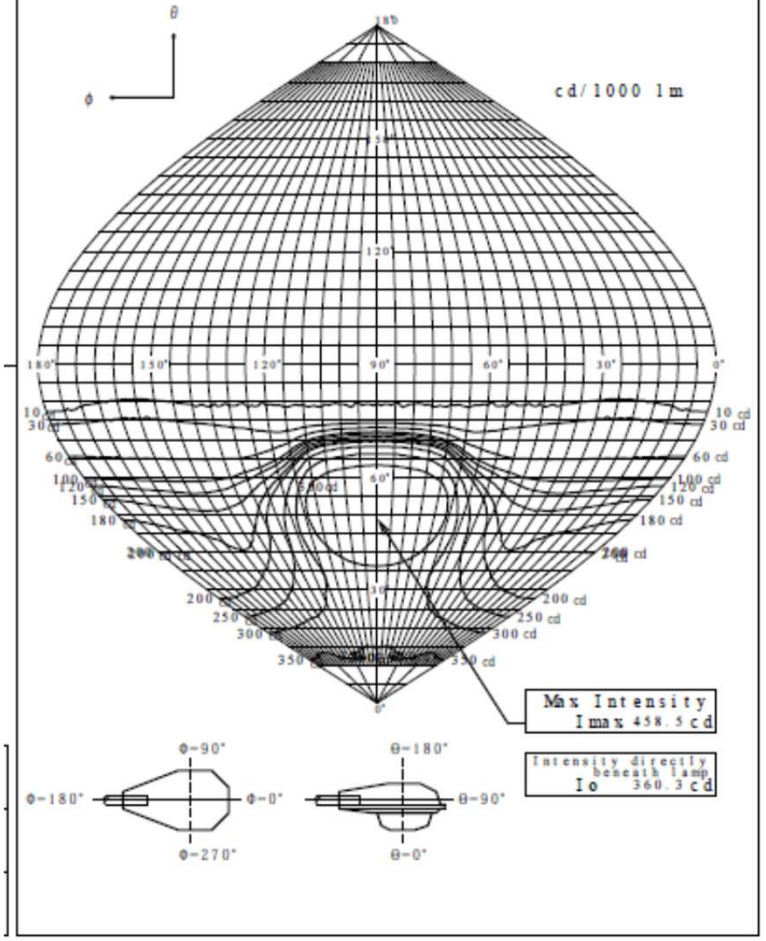
Vertical Angle θ	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
φ=0 Vertical Plane	360	364	352	328	285	225	190	192	200	191	172	142	95	61	46	23	5	3	0
90	360	373	351	349	325	323	322	341	396	447	457	442	386	320	183	22	9	3	0
180	360	364	352	328	285	225	190	192	200	191	172	142	95	61	46	23	5	3	0
270	360	373	351	349	325	323	322	341	396	447	457	442	386	320	183	22	9	3	0
Imax Vertical Plane	360	373	351	349	325	323	322	341	396	447	457	442	386	320	183	22	9	3	0



PHOTOMETRIC DOCUMENTATION

ISO-CANDELA DIAGRAM (社外発表不可)

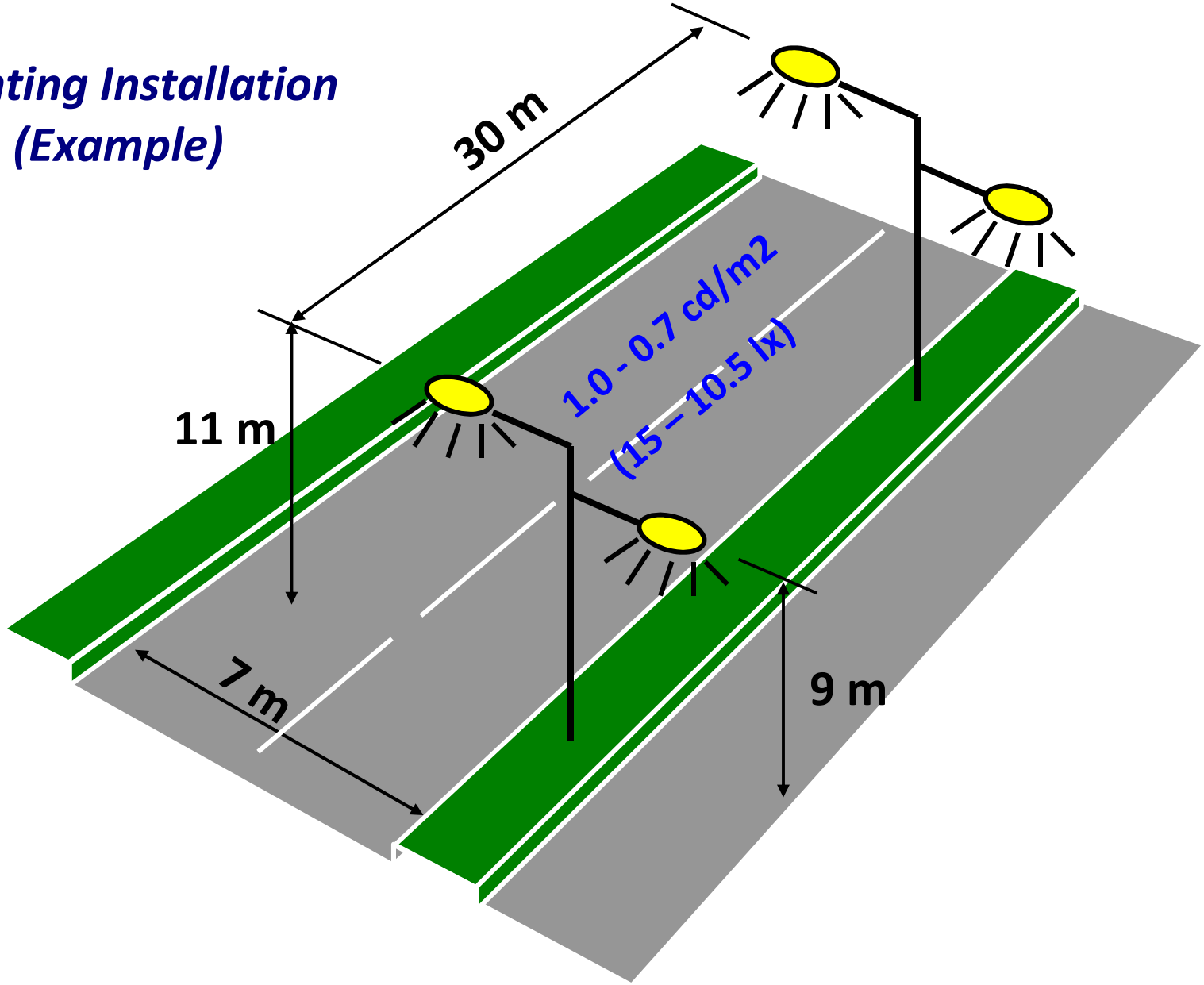
Catalogue No.	NNP18900 $	Lamps	LED ×1
Data No.	K0131132(0)DB0		



Panasonic

<Safety> Road Lighting Design (Calculation)

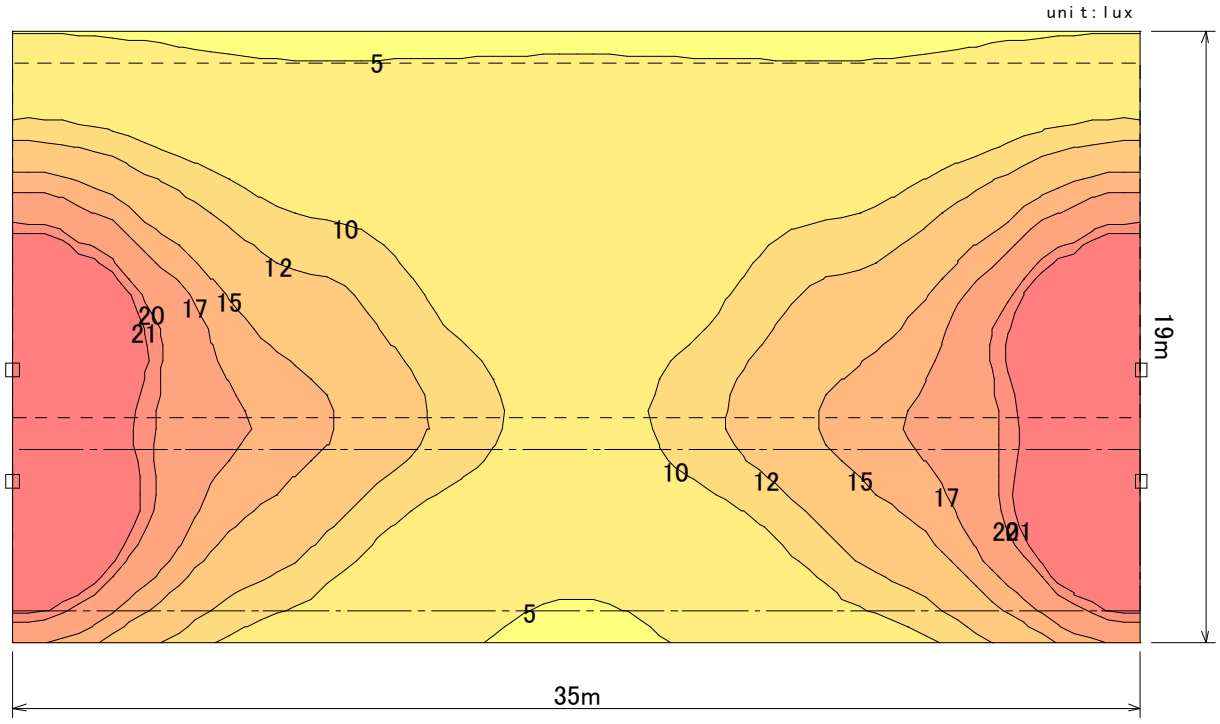
Road Lighting Installation Condition (Example)



Panasonic

<Safety> Road Lighting Design (Calculation)

Road Surface illuminance calculation Result



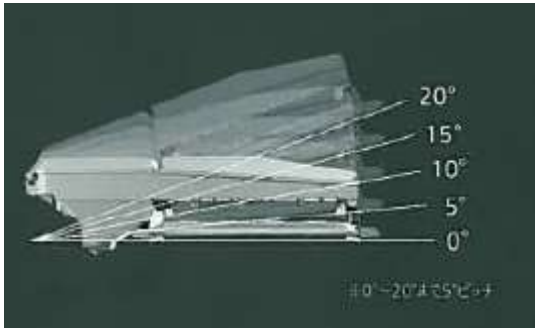
Model No.	NNP18900 $	NNP15900 $
Lamp	LED*1	LED*1
Total Luminous Flux	7920 lumer	4950 lumer
Maintenance Factor	0.90	0.90
Light Distribu-tion Code	#K0131132	#K0131126
Mounting Height	11 m	9 m
Quantity of Luminaire	2 sets	2 sets

	– – – – – –	——·——
Area	2 Lane road	1 Lane Road
Average Illuminance	12.1 lux	14.3 lux
Minimum Illuminance	5.1 lux	4.8 lux
Maximum Illuminance	29.1 lux	29.1 lux
E min./E ave.	0.416	0.334
E min./E max.	0.174	0.165

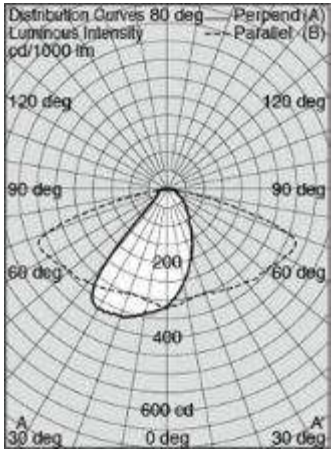
<Security> LED Road Lighting for small street

White LED light makes clear view

Optimizing light aiming for security lighting is required to avoid uncomfortable light pollution.



Adjustable angle of luminaire



Optimized light distribution design

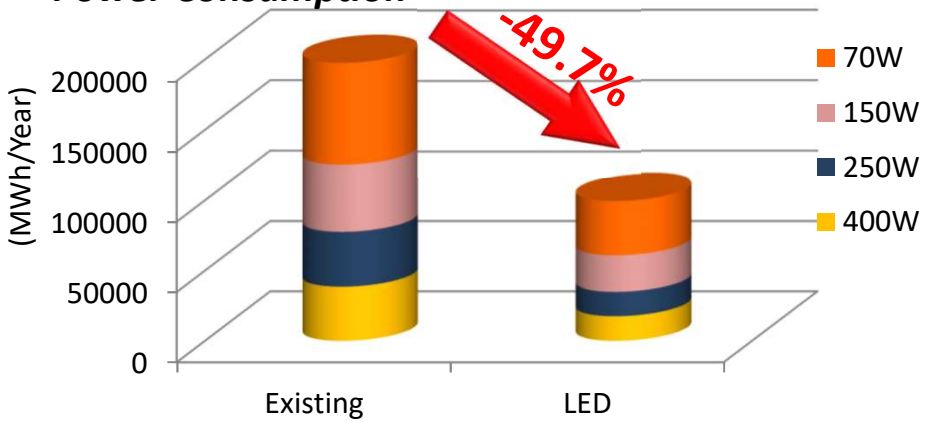
Optimizing light aiming

<Saving> Power Estimation in Jakarta, Indonesia

Power consumption and power saving estimation of Road lighting in Jakarta

Type	Installed Q'ty (Sets)	HPS (Existing)				LED				Saving		
		Input Power (W)	Total Electricity (MWh/Y)	Total Cost (Bil Rp/Y)	Carbon Emission (CO2-e/Y)	Input Power (W)	Total Electricity (MWh/Y)	Total Cost (Bil Rp/Y)	Carbon Emission (CO2-e/Y)	*Total Electricity (MWh/Y)*	*Total Cost (Bil Rp/Y)*	*Carbon Emission (CO2-e/Y)*
400W	20,000	440	38,544	46	28,137	200	17,520	21	12,790	*21,024*	*25*	15,348
250W	33,000	270	39,026	47	28,489	120	17,345	21	12,662	*21,681*	*26*	15,827
150W	66,000	165	47,698	57	34,820	90	26,017	31	18,992	*21,681*	*26*	15,827
70W	220,000	75	72,270	87	52,757	40	38,544	46	28,137	*33,726*	*40*	24,620
	339,000		**197,538**	**237**	**144,203**	**450**	**99,426**	**119**	**72,581**	***98,112***	***118***	**71,622**

Power Consumption



Electricity

197,538 MWh/year → 99,426MWh/year

-98,112MWh/year

Carbon Emission

144,203ton/year → 72,581ton/year

-71,622ton/year

Installed quantity is estimated from "SEMINAR PEMBINAAN DAN PEMANFAATAN SUMBER DAYA PERKOTAAN in Nov. 2012"

Electricity cost is estimated tariff 1,500Rp/KWh

Carbon Emission is estimated from exchange ratio in Jakarta (0.73kgCO2/kWh)

<Saving> Payback Calculation (Sample)

<Case Study>

HPS400W Exiting luminaire will be replace to LED 200W Luminaire

LED road lighting payback calculation

Operating condition

Place		Simulation1 Replace to LED	
Opening Hours / Day	Hrs/Day	12	
Opening Days / Year	Day/Year	365	
Onening Hours / Year	Hrs/Year	4,380	
Electricity Tarif	USD/kWh	0.15	

Lighting running cost calculation

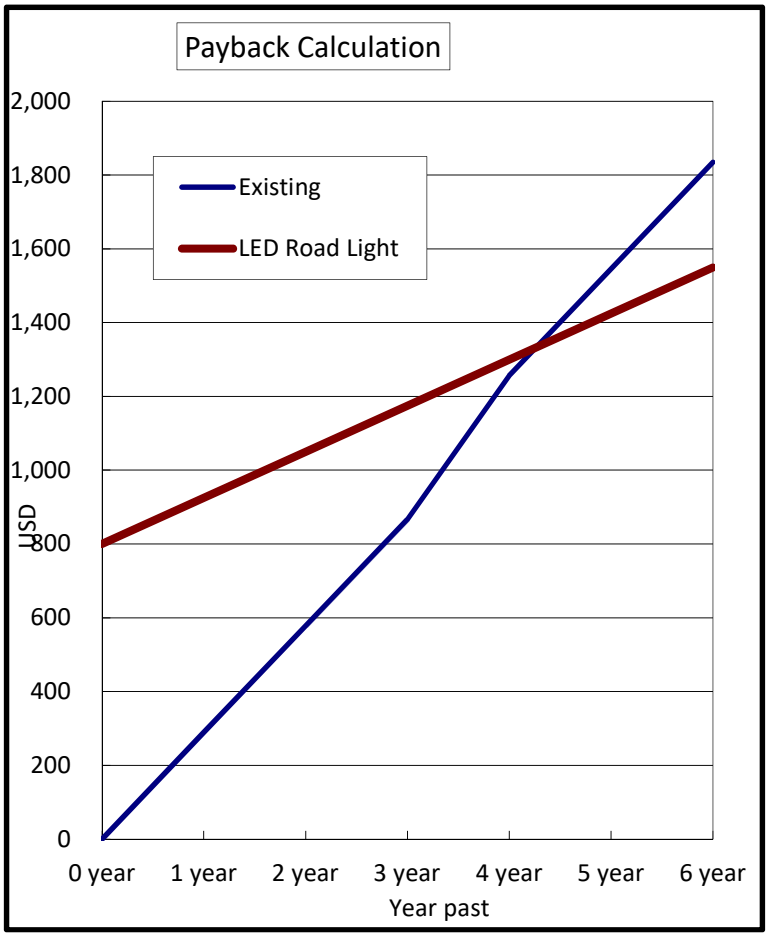
	Unit	Existing	LED Light			Remarks
Model No		HPS400W	LED180W			
Input Power	W	440	200			
Installed Quantity	Nos.	1	1			
Lamp Type	-	HPS400	LED			
Yearly Power	kWh/Year	1,927	876			
Lamp life time	Hours	12,000	50,000			
Lamp Replace Time	Years	3	11			
Lamp maintenance cos	USD/pc	100	-			
Total Electricity	USD/year	1,927	876			

Initial Cost of Lightign Fixture

Luminarir price	USD / pc	0	**800**			
Total initial cost	USD	0	800			

Yearly Running Cost Reducting Calculation (USD)

	0 year	1 year	2 year	3 year	4 year	5 year	6 year
Existing	0	289	578	867	1,256	1,545	1,834
LED Light	**800**	931	1,063	1,194	1,326	1,457	1,588



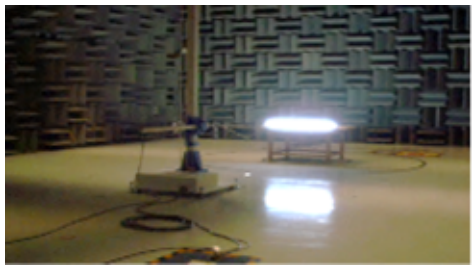
Feature of Panasonic Road Lighting

Panasonic Product Quality

As LED lighting has such a long lifetime, we perform various quality evaluations with our strict quality standards.

High-accuracy photometric distribution measurement


EMC (EMI & EMS)

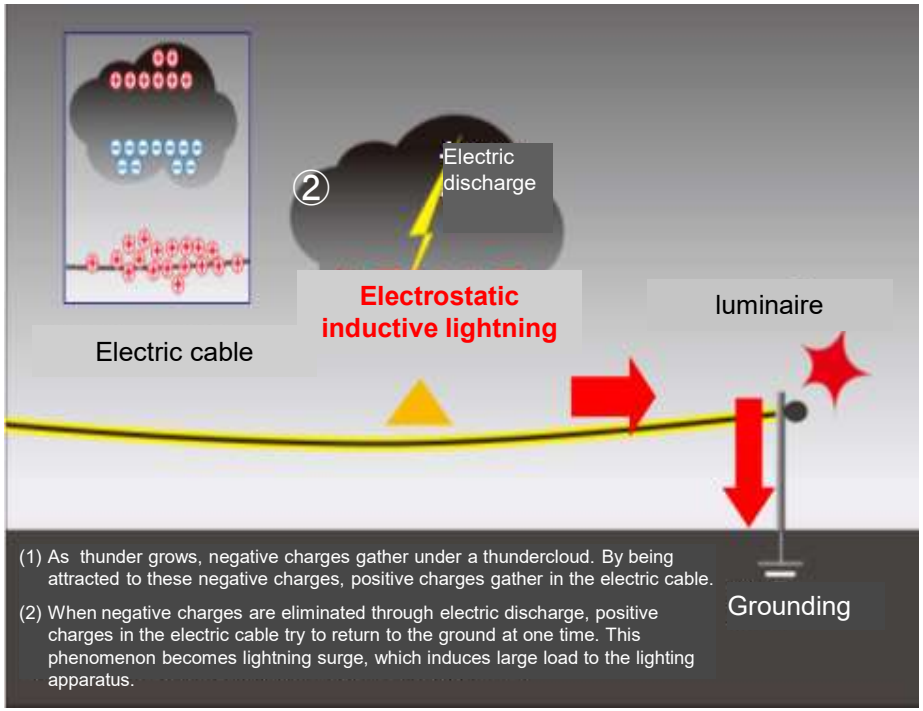



Surge Protection


Earthquakes Resistance


Strong Wind (Typhoon) Resistance


Lightning Surge Protection



Institute of Electrical Installation Engineers
Inductive lightning overvoltage level distribution (Figure 1)

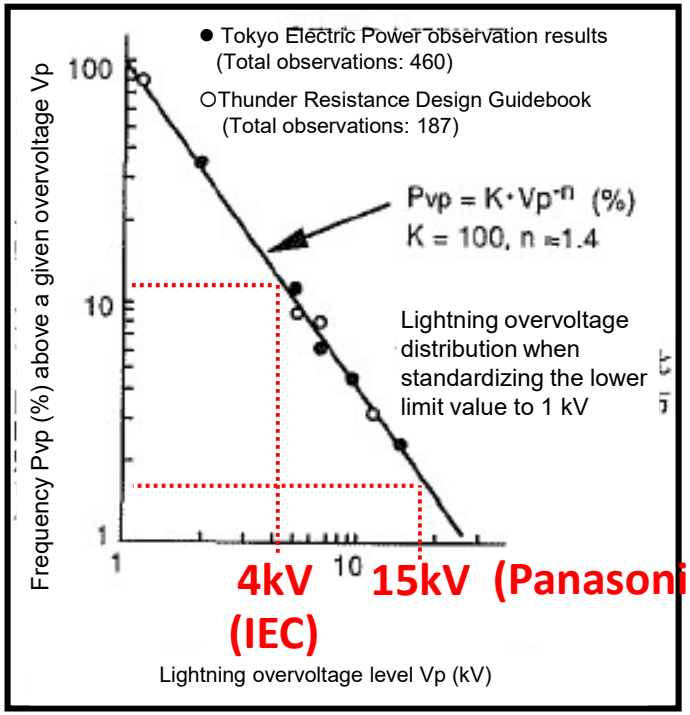


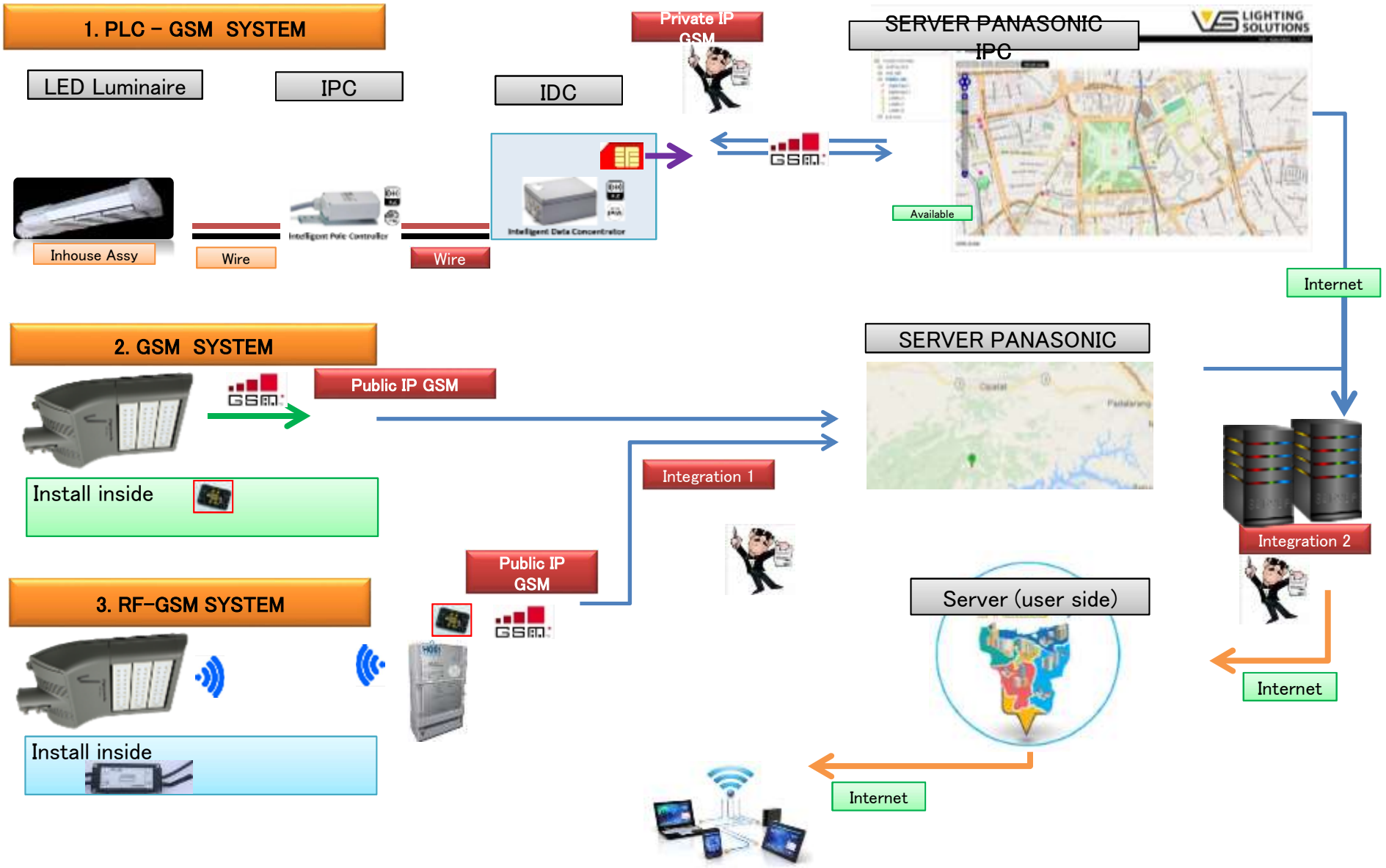
Figure 3.2.4 Low-pressure distribution line lightning overvoltage total distribution

Designed Protection level

-15 kV surge protection design (between two power lines and ground: Common mode)
…. Approx. 4 times of IEC 4kV

-15kV surge protection can cover 98% of inducted lighting occurred in Japan.
…. 4kV surge protection can cover only 80-90% of inducted lightnig

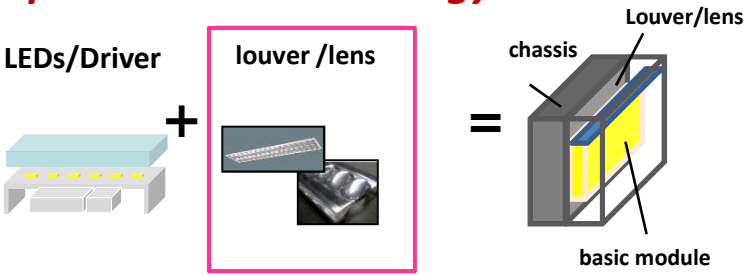
Panasonic Advanced Products (Smart Road Lighting)



Panasonic Advanced Products (Balustrade Luminaire)

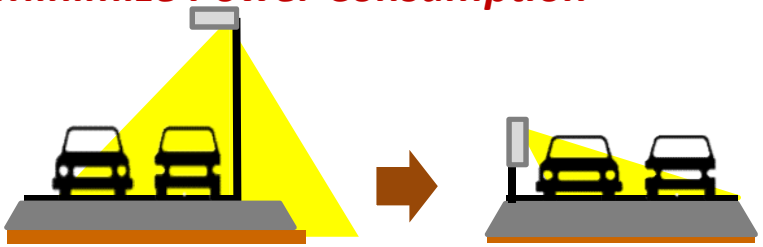
Balustrade Luminaire is new road lighting concept instead of pole lighting.

Optic Control Technology



Panasonic's LED device and optic control technology ca n provide Balustrade lighting avoiding glare for drives and make easy installation.

Minimize Power Consumption



Luminaires can be installed near road surface and it can be reduced non necessary light.

Minimize Installation Cost

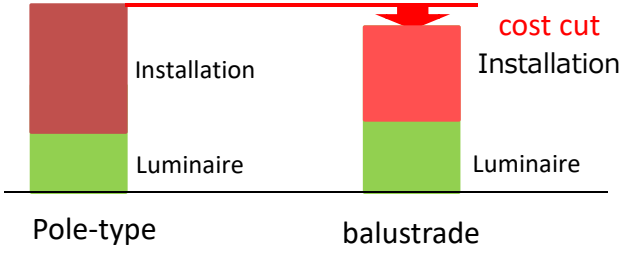
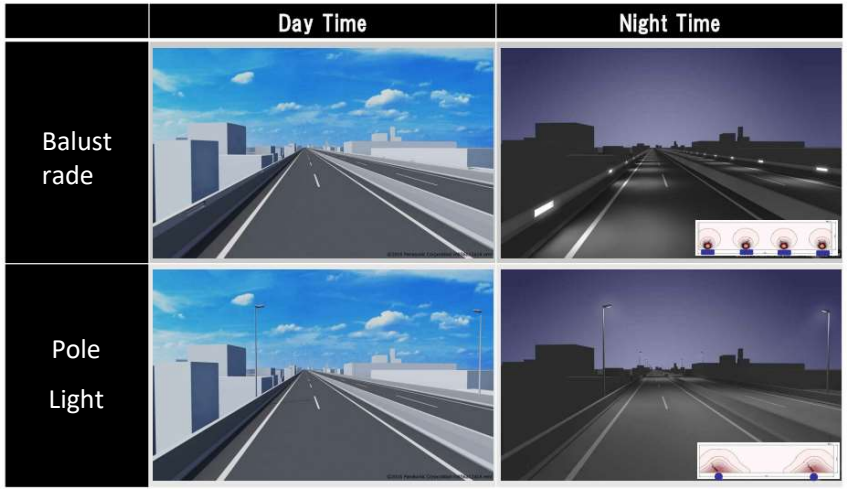


Image comparison

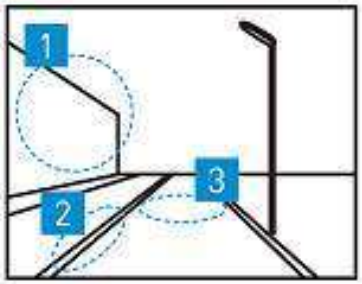


Installation Reference

Panasonic Advanced Products (Application)

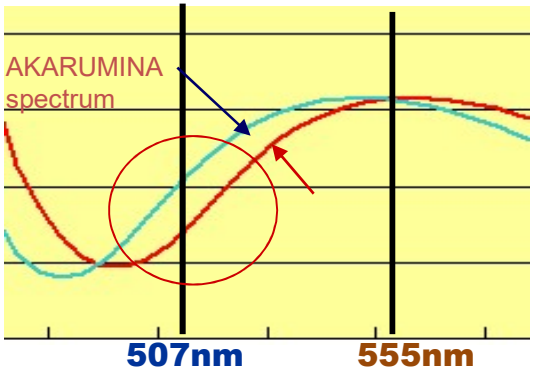
LED security light utilizing 'Purkinje effect'

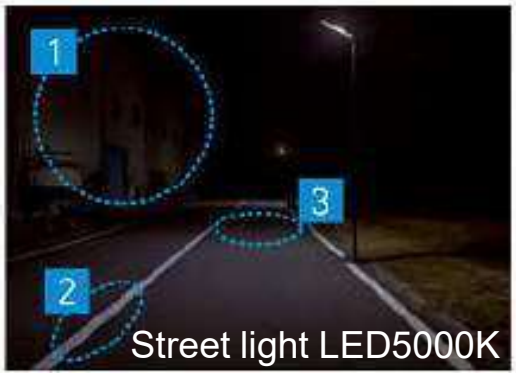
Bluish light wave shows more clear and more safety in dark place through human eyes



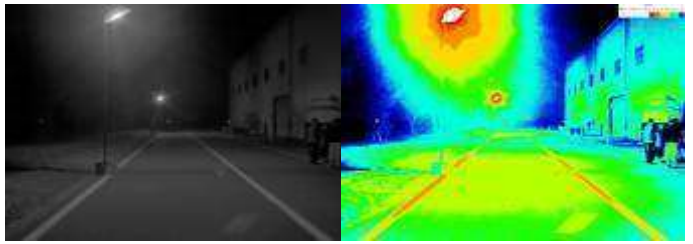
Purkinje effect

1. Wall of the buildings look brighter
2. White line of the road look brighter
3. Surface of road look brighter and uniformly

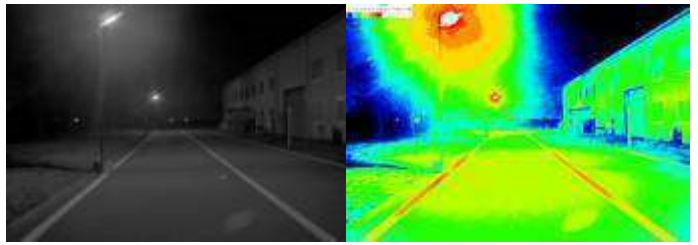




(1) 5000K brightness distribution



(2) 8000K brightness distribution



Street light

Makes pedestrians feeling safe

Panasonic LED Lighting Products and Job References

Panasonic LED Lighting series

Indoor

Outdoor

» Residential Lighting

Project Reference in Indonesia

Grand Indonesia, Jakarta

LIPPO Mall Puri, St Moritz

AEON Mall BSD

Cihampelas walk, bandung

Project Reference in Indonesia

Anho Bio Prima Jakarta

Motion Blue, Jakarta

Maranatha University, Bandung

AlfaMidi Utama, Jakarta (JCM Project)

Project Reference in Japan

Tokyo Sky Tree

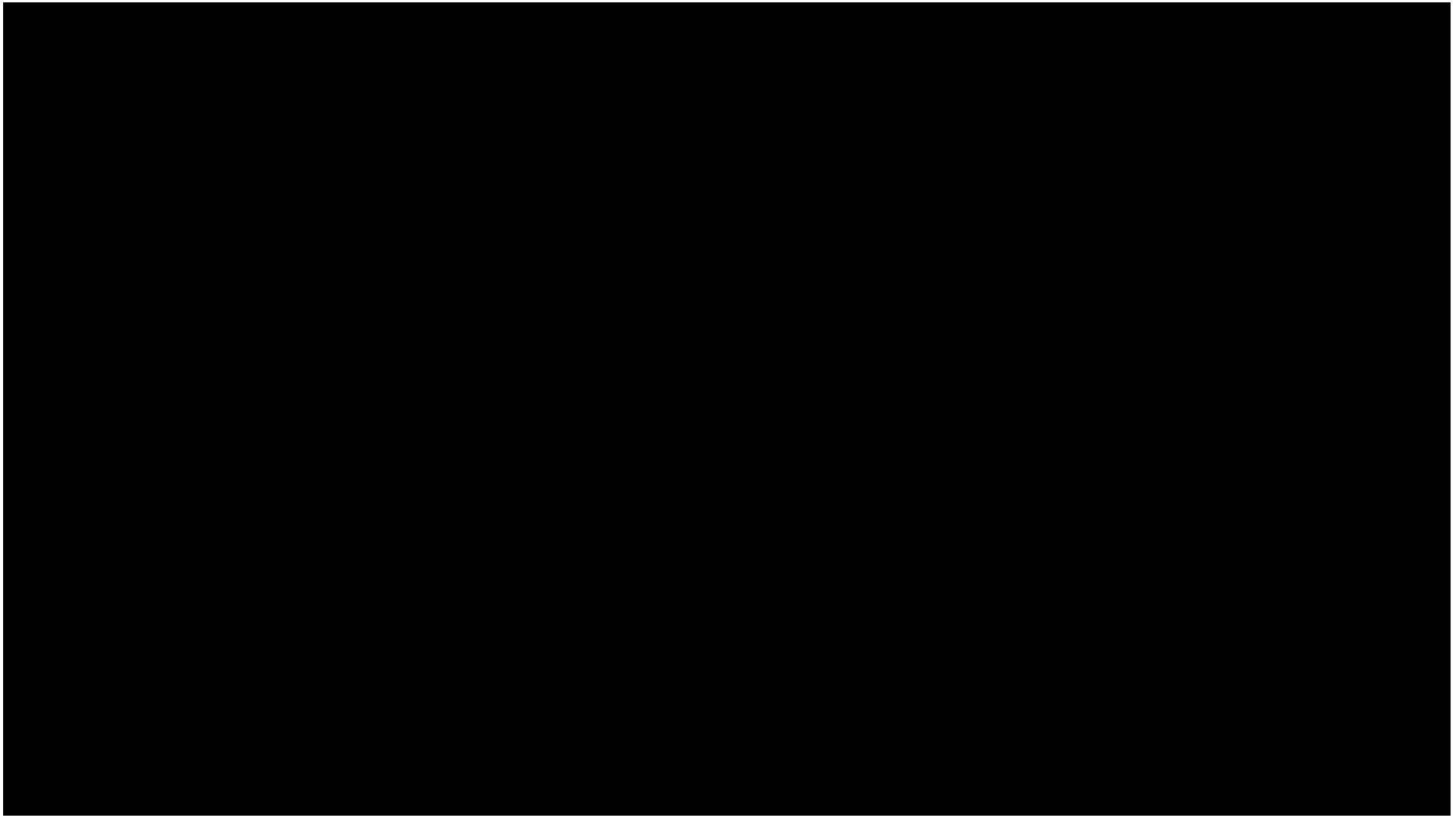
Project Detail

Owner	**: Tobu Tower Skytree Co. Ltd.**
Design & Management	**: Nikken Sekkei Inc.**
Lighting Consulting	**: Sirius Lighting Office Inc.**
Main Contractor	**: Obayashi Corporation, Japan**

(Photo and CGs are provided by Tobu Tobu Tower Skytree Co. Ltd.)

Panasonic realized the concept color 'Old Edo color' which designer strongly required.

Project Reference *Prambanan Temple (World heritage site)*



Acknowledgement

Regional Resource Centre for Asia and the Pacific
Asian Institute of Technology

Institute for Global Environmental Strategies

Climate Change Asia

Ministry of the Environment, Japan

Panasonic

Thank you for your kind attentions!

Panasonic Corporation Eco Solutions Company
Lighting Business Division
PT Panasonic Gobel Eco Solutions Sales Indonesia