Transformation of Street Light In Indonesia

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Indonesia Brief Information

Total Area: 5,180,053 km2
Land Area: 1,922,570 km2
Road length: 496,607 km (283,102 km asphalt)

Road Class:

Toll Road (High way /Express road), 2 to 5 lanes , max speed 100 km/h
Main road / national Road (class 1), 2 to 4 lanes , max speed 60 km/h
Province road (class 1 and 2), up to 2 lanes, max speed 40 km/h
Municipal road (class 2 and 3), up to 2 lanes, max speed 30 km/h

Dry season: April – October (average temp 32o C)
Wet/Rain season: October – April (average temp 28oC)
Humidity: 60 – 90 %

Various Installed Street Light

LED PV

Sodium

LED recessed mount

LVD

Various Types

SODIUM Type

Meta halide

LED

COB LED

LVD (induction)

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Various Street Light Technology

Technology	Mercury vapor	HPS vapor	Induction	New Ceramic	L E D
Relative age	*OLDEST*				*NEWEST*
Descriptions	Older Very common white light HID	Most prevalent HID Light source for SL	White Light and electrodeless light source with Long Life operating	White light HID technology ; New CMH > 35% than previous CMH	White Light ,directional , SSL light source
PROS	Low initial cost, longer life , white light, sudden failures are uncommon	Low initial cost, longer life lamps, High efficacy (70 – 150 lumens/watt)	Long Life 100 k hr, white light High CRI Low maintenance cost ; High fixture efficiency	White Light Longer life High efficacy, high efficiency	Long Life >50 k hr, white light High CRI ;Hi uniformity cost ; High fixture efficiency ; No mercury
CONS	Poor efficacy ;Low fixture efficiency Mercury contains	Low Initial Cost Low CRI Mercury contains	Hi Initial cost ; Lower efficacy Mercury contains	Hi initial cost Mercury contains	Hi Initial cost Lower efficacy (- 90 lumens /watt)

Standards and Regulations

SNI 04 – 6973 – 2005 … Luminaries for Road Light
SNI 7391 – 2008

Ministry of Public Works reference (on construction)

Ministry of Transportation reference (road safety)

Ministry of Energy and Mineral Resources (energy conservation)

Local municipal/province requirements

Standard Product SNI 7391 - 2008

Jenis/ klasifikasi jalan	Kuat pencahayaan (Iluminansi)		Luminansi			Batasan silau	
	E rata-rata *(lux)*	Kemerataan *(Uniformity)*	L rata-rata (cd/m2)	Kemerataan *(uniformity)*		G	TJ (%)
		g1		VD	VI		
Trotoar	1 - 4	0,10	0,10	0,40	0,50	4	20
Jalan lokal : - Primer - Sekunder	 2 - 5 2 - 5	 0,10 0,10	 0,50 0,50	 0,40 0,40	 0,50 0,50	 4 4	 20 20
Jalan kolektor : - Primer - Sekunder	 3 - 7 3 - 7	 0,14 0,14	 1,00 1,00	 0,40 0,40	 0,50 0,50	 4 - 5 4 - 5	 20 20
Jalan arteri : - Primer - Sekunder	 11 - 20 11 - 20	 0,14 - 0,20 0,14 - 0,20	 1,50 1,50	 0,40 0,40	 0,50 - 0,70 0,50 - 0,70	 5 - 6 5 - 6	 10 - 20 10 - 20
Jalan arteri dengan akses kontrol, jalan bebas hambatan	15 - 20	0,14 - 0,20	1,50	0,40	0,50 - 0,70	5 - 6	10 - 20
Jalan layang, simpang susun, terowongan	20 - 25	0,20	2,00	0,40	0,70	6	10

g1 : E min/E maks
VD : L min/L maks
VI : L min/L rata-rata
G : Silau (*glare*)
TJ : Batas ambang kesilauan

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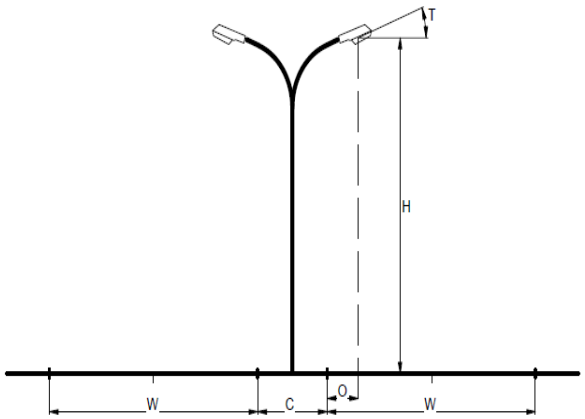
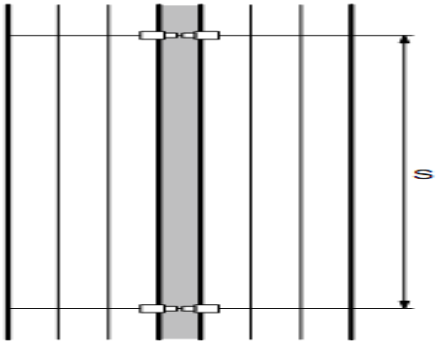
Calculation & Measure HPS 250

- **Design of Road Lighting :**
  - Carriageway: Dual Carriageway
  - Road Width (W): 14.50 m
  - Height (H): 10.00 m
  - Spacing (S): 35.00 m
  - Overhang (O): 2.00 m
  - Tilt 90: 100 deg



- **Results of Illuminance** :
  - Average: 21,30 lux
  - Minimum: 9,00 lux
  - Maximum: 39,00 lux
  - Minimum/Maximum: 0,23
  - Minimum/Average: 0,42



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Problems

1. Electricity availability, high consumption and charges
2. Short life time
3. Maintenance
4. Financing for investment

Electricity Availability and Billing

1. Electricity coverage area limitation and prioritized for housing/industry
2. Theoretical billing charge by Electricity company to customers
3. Energy management and system control
4. Bad planning and installation

COUNTER MEASURES

- Selection of photovoltaic/solar LED street light or other low watt product
- Installation of electricity meter by areas/group
- Time switch, dimming, system control data implementation
- Rearrangement with energy management control and data
- Replacement of lamps and components based on economic value instead of functional value

Short Life Time

1. Technology and quality product selection
2. Contractors/installer qualification
3. Components and material selection
4. Standard establishment and implementation
5. Regular maintenance and control

Maintenance Cost

1. High investment for equipment
2. Patrol system by human being might be changed with others system control
3. Establishment of preventive issues, glass cover and PV (dust ,insect etc), battery and connections
4. Part Stock management
5. *Part availability support*

Financing for Investment

- Limitation of annual investment budget
- Expensive product due to technology
- High maintenance cost absorb investment budget
- High electricity operational billing charge
- Possibilities of utilize carbon market fund being study

Recommendation Actions

NO COST	□ Re mapping and data base □ Adjustment based on real demand □ Maintenance management control establishment
LESS COST	□ Electricity meter installation □ Time switch/cable/parts control
HIGH COST	□ Photovoltaic □ LED/LVD □ Dimming or other energy management system

Present Condition

Energy management information	□ Promotion thru seminars ,meetings and exhibition □ Share experiences and case studies introduction
Guidance on Technology & products	□ Preparation on Guidance book (Cooperation with JLMA / GTZ) □ Technology and product promotion
Investment incentives	□ Taxation, duties exemptions □ CDM program and Loan system (NAMA project)
Standard, system and facilities	□ SNI Standard preparation for LED □ Laboratories and calibration body preparation □ Operator Skill and knowledge training with JLMA/GTZ
Local content /maker	□ Secure inventory and supply management □ Quality and after market assurances

Thank you for attention

See you at next meeting

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Road Map Indonesia

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Jawa Road Map