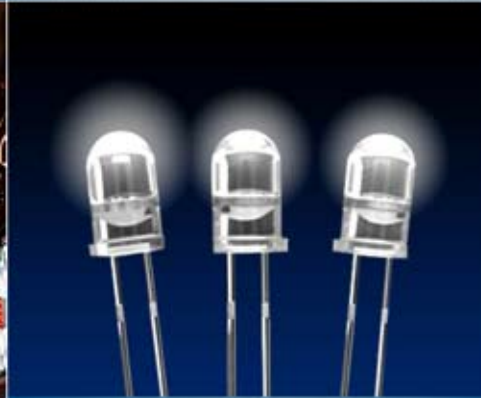


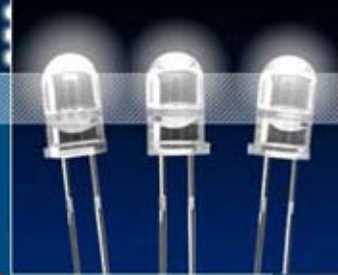
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LED
LIGHT

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What is LED



- A light emitting diode (LED) is a type of diode that emits light when current passes through it.
- LED's are solid-state semiconductor devices that can convert electrical energy directly into light. The heart of the LED is a semiconductor chip of which one side is attached on the top of an anvil that is the negative power lead and the other side is connected with a whisker to a positive power lead. It is entirely encapsulated in an epoxy resin enclosure.
- LED's are based on solid state lighting (No glass or fragile elements)
- LED's last over 100,000 hours i.e. if LED's are lit for 12 hours each day, they will last for $100,000 / 12 / 365 = 22.83$ years (LED's don't blow out, they dim slowly)
- LED's can withstand vibration, heat and extreme cold without affecting it's performance



WHY LED LIGHTS?

- Low power consumption.
- Low light loss with high system efficiency.
- Reliability and long lifetime to minimise maintenance and increase road safety.
- Does not emit Carbon Dioxide as compared to other conventional lamps.
- LED contains NO polluting material (mercury) and easy lamp recycling.



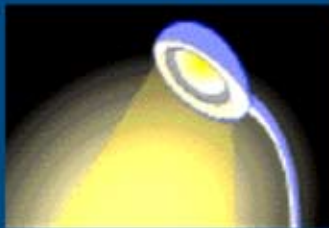
WHY LED LIGHTS?

- Long and predictable service intervals to reduce maintenance cost.
- The light from LED lamps does not distort colours and so increases road safety.
- Small sizes make the fixtures flexible, flat and compact, which also increases application reduces cost.
- With appropriate optical lens, light output can be made with highly directional.

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WHY LED?

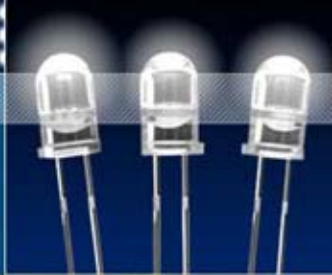


- Comparison of lighting patterns of LED and Sodium Streetlights. The focused nature of the LED system places light on the roadway and also drastically reduces light pollution.



LED STREET
LIGHTS

SODIUM
STREET LIGHTS

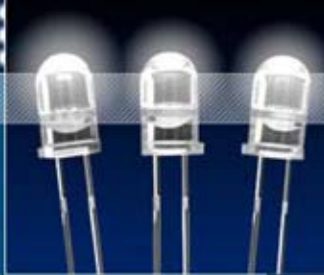


WHY LED?

LIGHT POLLUTION OF SKY

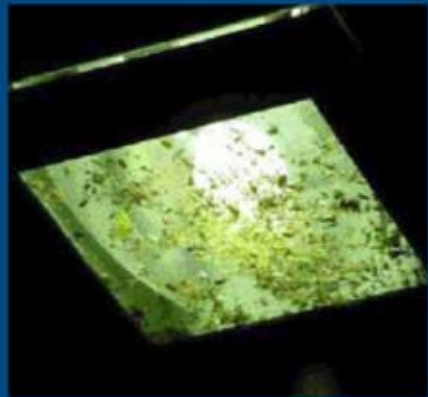


GLARE EFFECTS

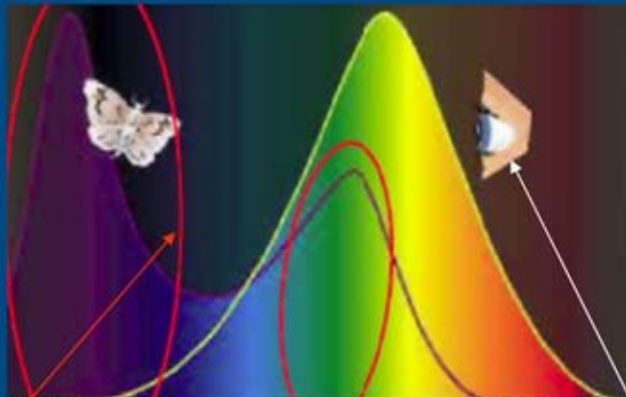


NO POLLUTION FROM INSECTS

Flies and insects cannot see the LED light as it is of a single wavelength, hence you don't have insect pollution and no insects flying around the LED lights and no way to get inside the lights too.

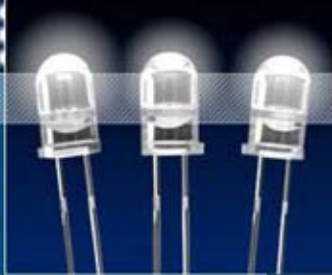


**NOCTURNAL
INSECTS POLLUTION**



**SPECTRAL
SENSITIVITY
OF NOCTURNAL
INSECTS**

**SPECTRAL
SENSITIVITY
OF HUMANS**



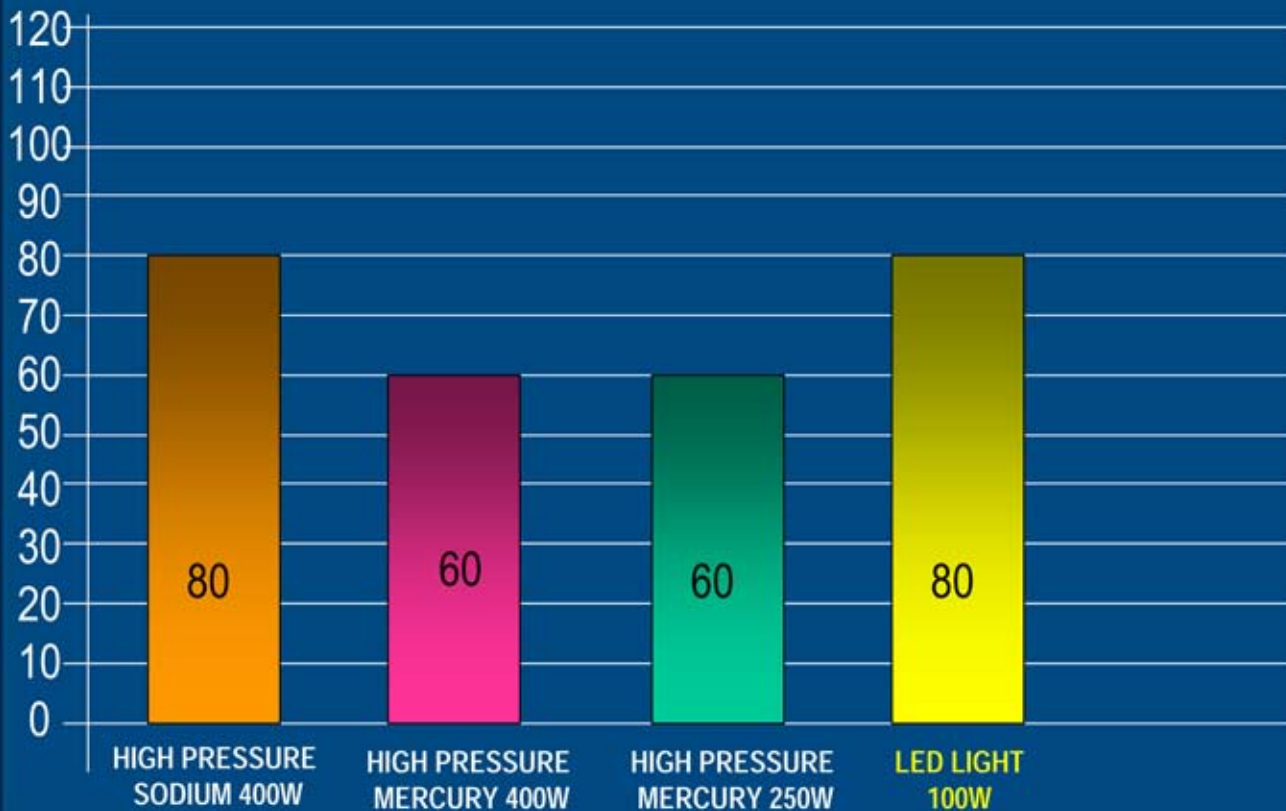
How is the LED Street Light made

- Using advanced thermal technology to maintain LED light performance and long life operation.
- Intensive high power LED's array with oval optical lens design for wide lighting area
- Selected high efficiency LED and power transformation for a green energy product
- Rugged housing for shock, dust and harsh environment resistant
- Because of it's solid state, it can be fitted against gravity with tilt angle mounting to provide most effective ground illumination.
- Uniform heat spreads throughout the housing so high efficiency cooling without power & fan
- Light weight & compact dimensions.



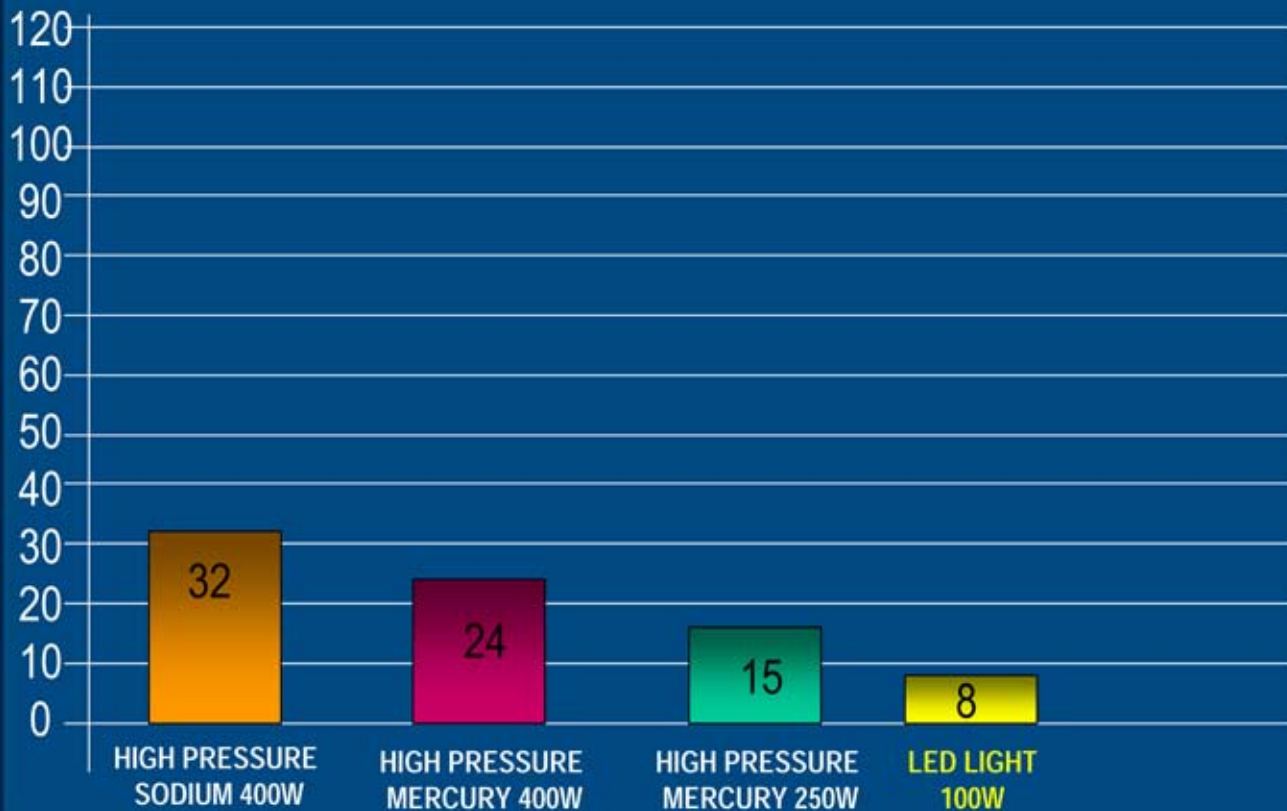
Efficiency (lm/W)

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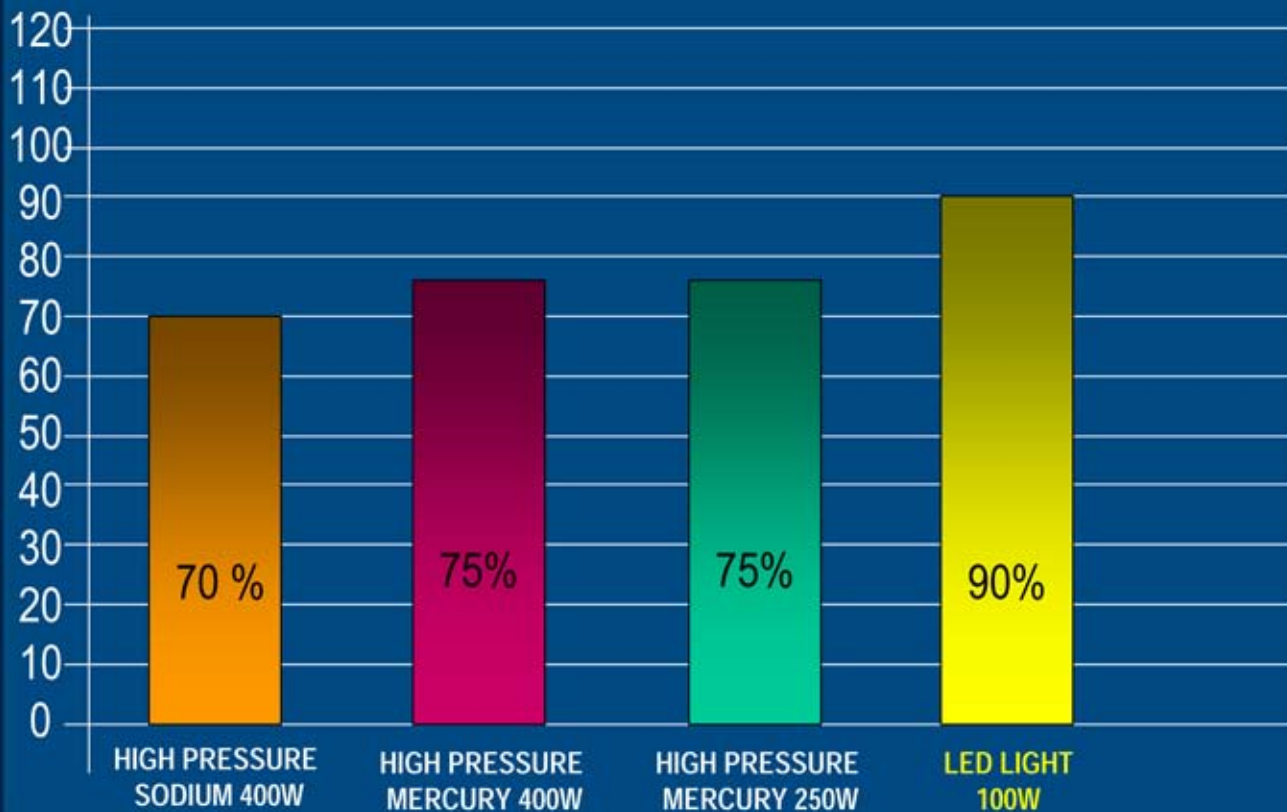
Luminous Flux (klm)

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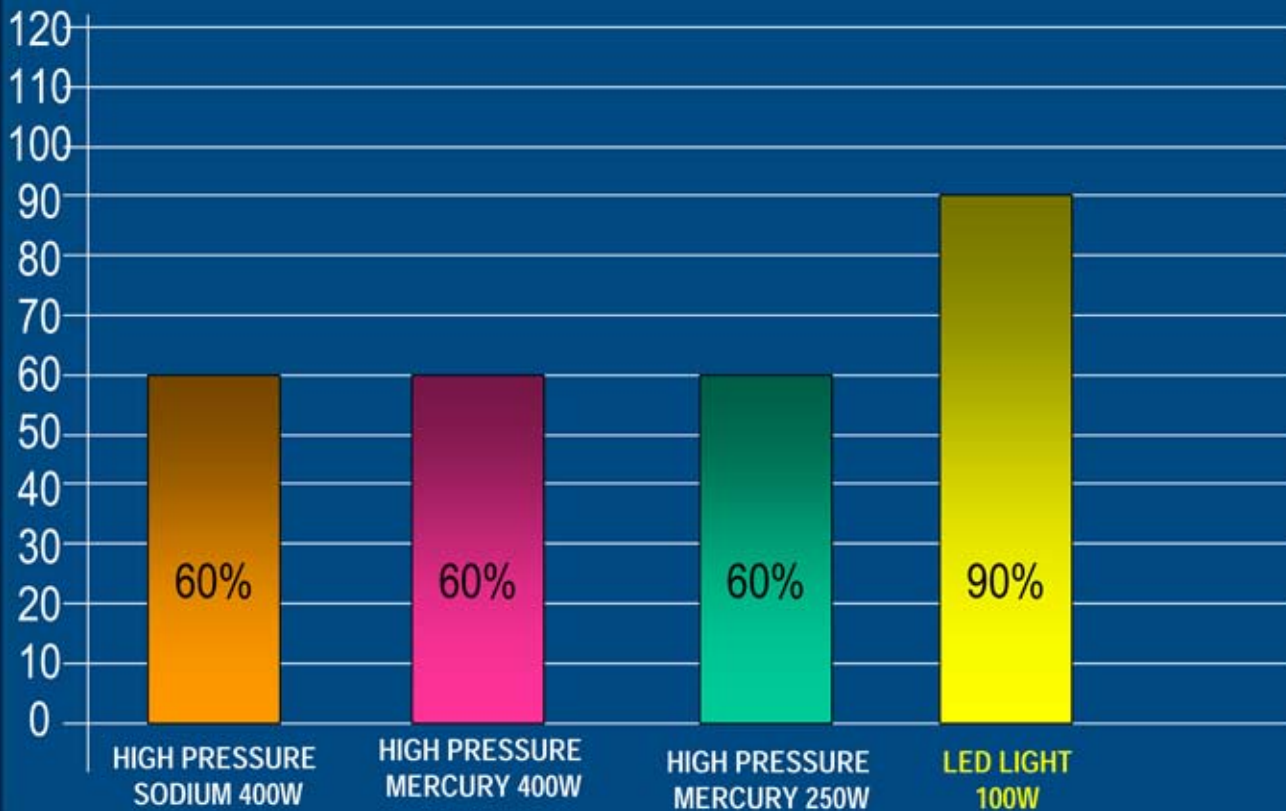
Power Efficiency

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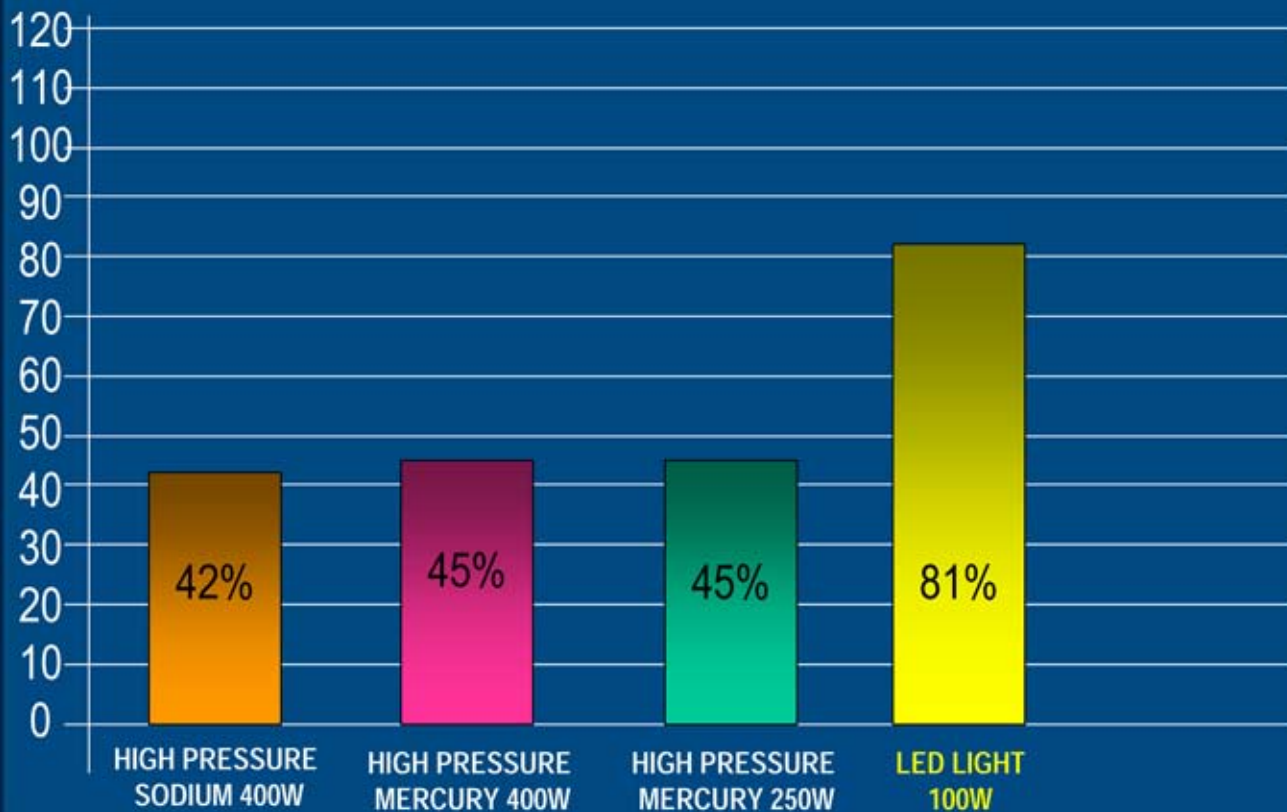


Durability

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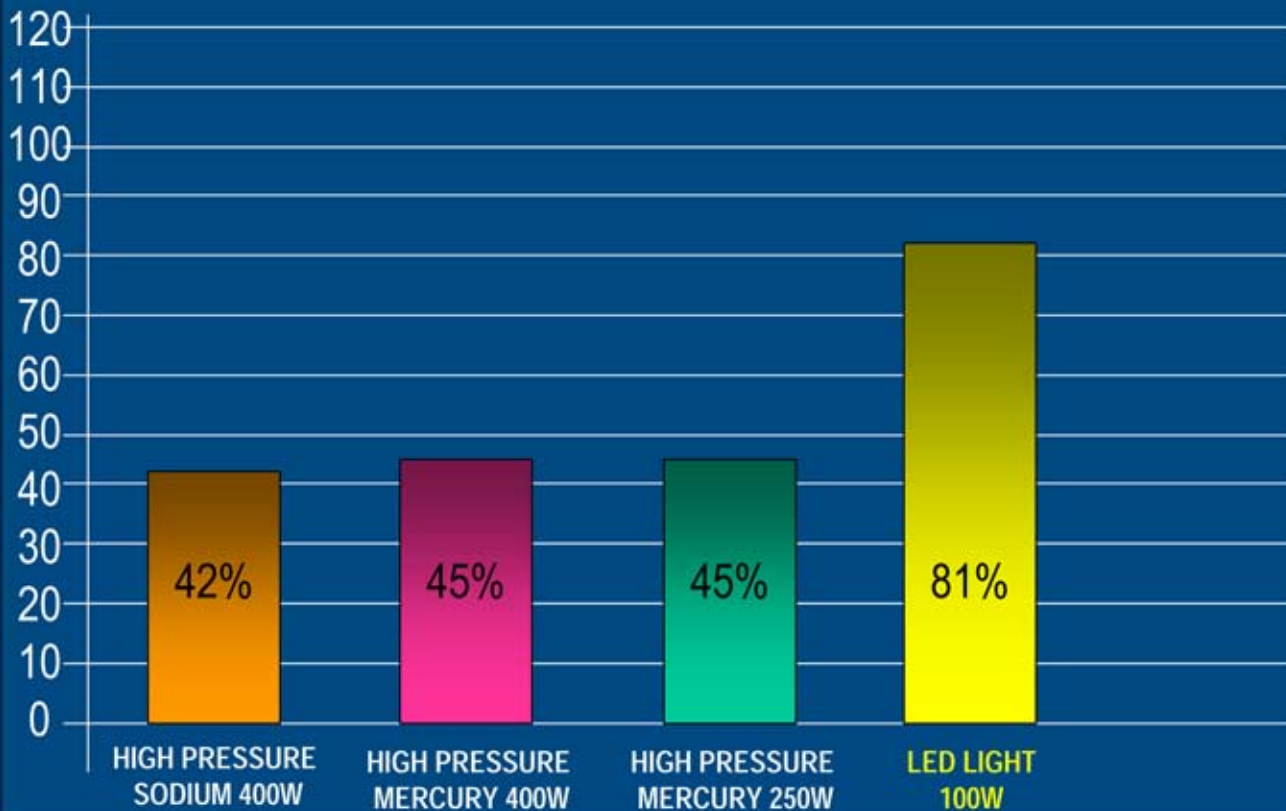


Total Flux (klm) & System Efficiency



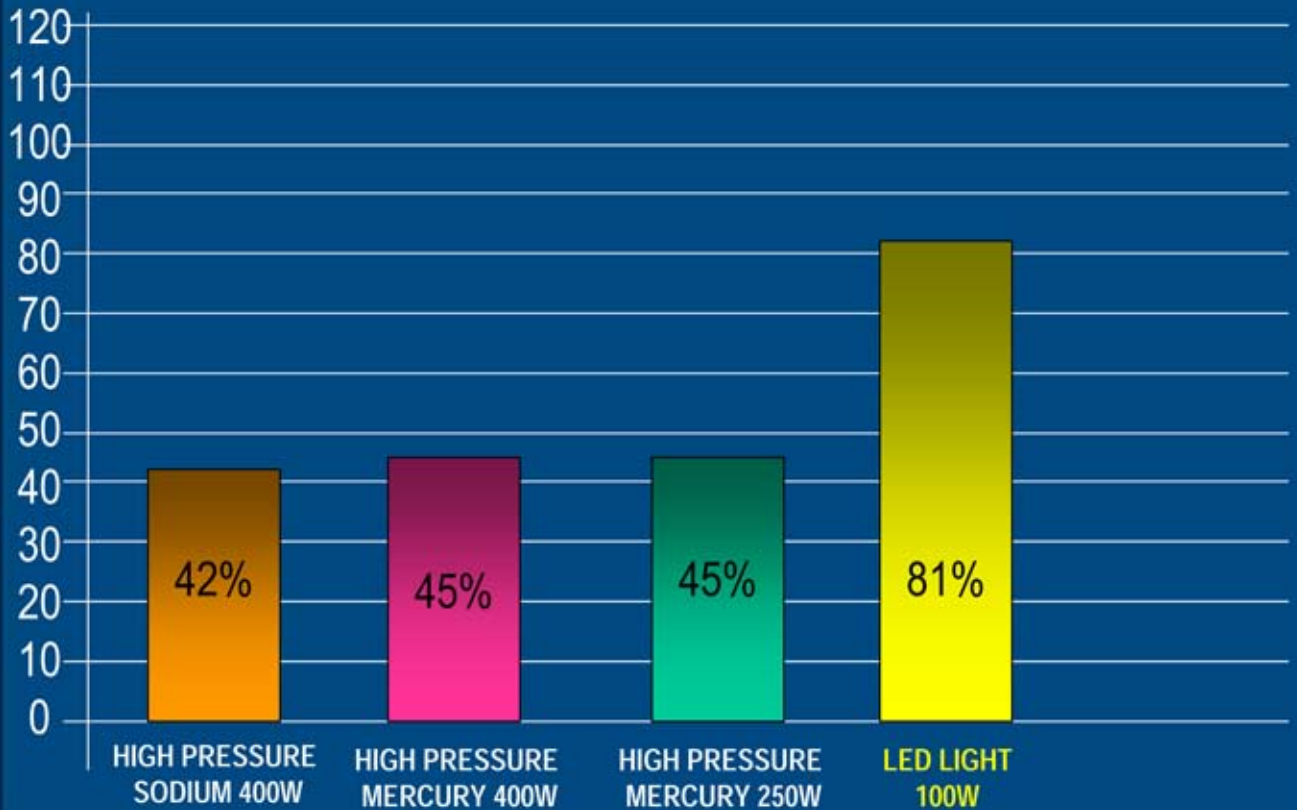
Power Consumption (W/lm)

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Lamp Life

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A Better LED Street Light (System Efficiency)

| Lamp Type | Efficiency (lm/w) | Luminous Flux (klm) | Power Efficiency | Durability | Total Flux (Klm) & System Efficiency | Power Consumption (W/lm) | Power Consumption to LED Light | Lamp Life |
|----------------------------|-------------------|---------------------|------------------|------------|--------------------------------------|--------------------------|--------------------------------|------------------|
| High Pressure Sodium 400W | 80 | 32 | 70% | 60% | 13.4 (42%) | 0.0298 | 1.93 | 2000 hrs |
| Low Pressure Sodium 250W | 120 | 30 | 70% | 60% | 12.6 (42%) | 0.0198 | 1.28 | 2000 hrs |
| High Pressure Mercury 400W | 60 | 24 | 75% | 60% | 10.8 (45%) | 0.0370 | 2.4 | 1600 hrs |
| High Pressure Mercury 250W | 60 | 15 | 75% | 60% | 6.75 (45%) | 0.0370 | 2.4 | 1600 hrs |
| LED Light 100W | 80 | 8 | 90% | 90% | 6.48 (81%) | 0.0154 | 1 | 10000 hrs |

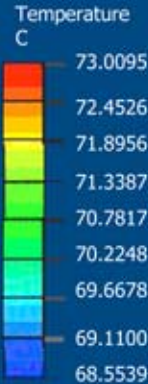
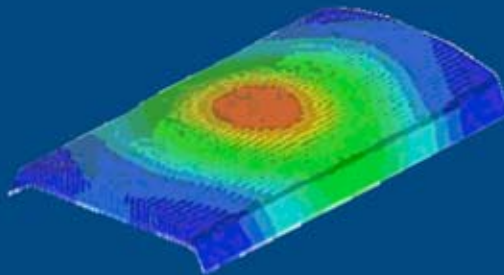
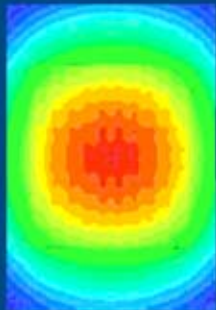
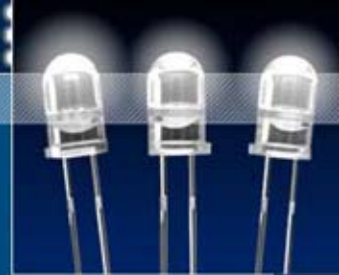
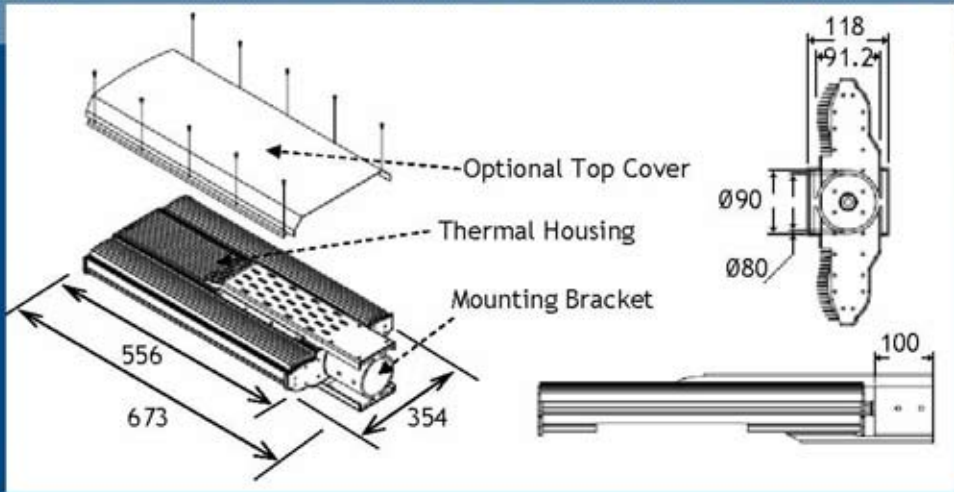
The table shown below compares various lamp technologies and assumes a standard geometry with overhead power of 80m spacing and 7.5m mounting height and a 20m road reserve.

| | | | | | | | | | |
|-------------------------|------|-------|-------|-------|-------|-------|-------|--------|--------|
| CO ² /km (T) | 4 | 2 | 2.2 | 3.4 | 2.4 | 3.4 | 2.8 | 0 | 0 |
| Mercury (mg) | 14 | 4.5 | 6 | 0.01 | 0.02 | 0.02 | 4.6 | 0 | 0 |
| Lamp Life (h) | 1600 | 12000 | 20000 | 10000 | 20000 | 20000 | 10000 | 100000 | 100000 |

- MV = mercury vapour, CFL = compact fluorescent, FL = fluorescent, MH = metal halide HPS = high pressure sodium, LED = Light Emitting Diode
- Power per lamp measured in Watts.
- Power required per kilometre based on a normal spacing of 80 m.
- Tones of CO² produced per kilometre per annum based on 4 000 h burning and 0.9 kg of CO² per kWh.
- AS/NZS 1158.3.1 Category, X = non – compliant.
- Mercury content in each lamp measured in milligrams.
- Lamp life in hours (typical burning hours for all night streetlights are 4000 per annum)
- Annual energy cost / lamp based on Western Power tariff Z18 (\$1.1676/kWh per day)

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Thermal Analysis of Metal PCB & Housing



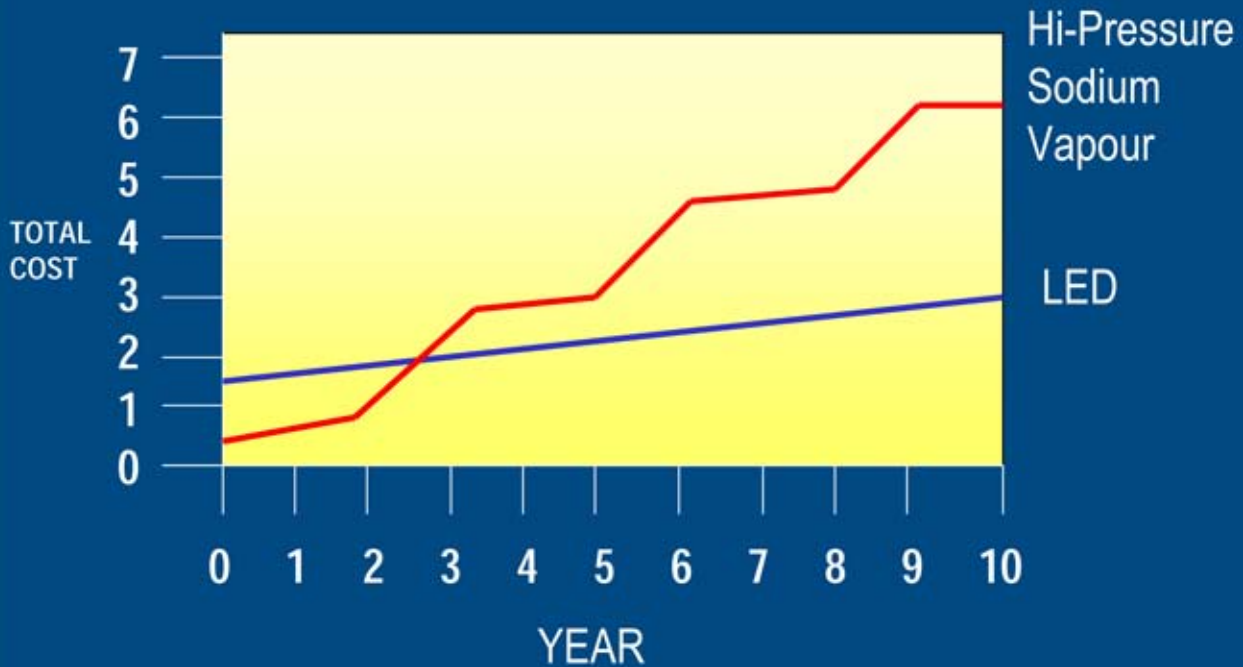
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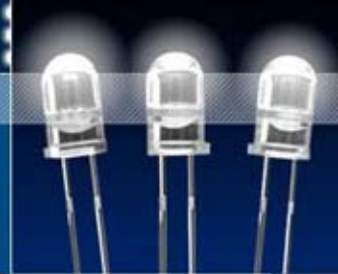
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What does this mean for Australia ?

| | HPS Lamps | LED Street Lights |
|----------------------------------|------------------|-------------------|
| CAPEX | | |
| Operational Expenses Per year | | |
| Replacement | 4.6 years | 22.8 years |
| Power Consumption | | |
| Production of Co2 | | Nil |
| Disposal | Contains Mercury | No hazards at all |



Be keen to keep your city clean &
green!!

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THANK YOU
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