

Inbuilt lithium ion based Solar Vs Traditional Grid based Community Lighting Solution

By Dr Kushant Uppal

The traditional Grid based Lighting solution is typically a 36/40W rated CFL/tube Light IP54 fixture based community lighting System mounted on a pole of about 4 to 6 meters with real power consumption of about 48W. This requires underground cabling (for safety reasons) from the mains to the pole with necessary grounding. The typical life of the traditional luminaire is one year and is also susceptible to high as well as low voltages. The lights shut off at low voltages below 150V and are susceptible to damage above 300V. The grid based systems shut off in the event of a power cut causing darkness which is a security concern and therefore needs to be connected to a generator set which further increases the cost and complexity of these systems.

Our Lithium ion based LI1 and LI2 community lighting solution are equivalent to the traditional lights in terms of luminosity and are mounted on a similar 4 to 6meter pole. Being a non-grid system it does not require cabling to the grid and the integrated battery gets charged directly from the sunlight. It has an inbuilt sensor which turns on and off based on the level of darkness. The system comprises of high quality and long lasting (25 years) solar panels as well as LM 80 certified (<30% degradation in 10 to 15years) LED lights from Nichia Japan and UL certified Lithium Ion batteries.

The key specifications are as follows:

System	Traditional	LI1	LI2
Power Consumption (Watt)	48W	0	0
Lux* (along 6 meters)	19	12	21
IP Rating	54	65	65
Bulb Lifetime (hrs)	4000-5000hrs	45000-55000	45000-55000

*as per lab measurement

Below are the cost comparisons of 100community lights of the solar LI vs the traditional community lighting systems:

A. Upfront Cost comparison

System	Cost of Cabling	Cost of Pole and Related fittings	Cost of Luminaire	Total Cost
Traditional Lighting system	Rs8lakhs	Rs3lakhs	Rs2lakhs	Rs13lakhs
Intelizon Lithium Ion System Li1	0	Rs3lakhs	10lakhs	Rs13lakhs
Intelizon Lithium ion system Li2		Rs3lakhs	Rs13lakhs	Rs16lakhs

B. Operating /Maintenance (5 years) cost comparison

System	Luminaires	Battery	Preventive Maintenance	Power	Total
Traditional	Rs2lakhs	0	Rs8lakhs	Rs6lakhs	Rs16lakhs
Intelizon LI1	0	Rs3.5lakhs	Rs7lakhs	0	Rs10.5lakhs
Intelizon LI2	0	Rs5lakhs	Rs7lakhs	0	Rs12lakhs

ASSUMPTIONS:

1. Distance between poles is 6 meters
2. Installation of traditional system includes underground 12m cable cost @ Rs 90/meter, Conduit @ Rs 140/meter and laying including digging and closing the Loop @ Rs 210/meter plus the cost of pole, fixture clamps and labour
3. Installation of LI includes pole, fixture clamps and labour
4. Operating cost assumes 10 hour/day 365 days a year running on grid and 500hours/year on diesel generator (during power outage)
5. Luminaire cost is for good quality 36/40W traditional luminaries with our LI system providing equivalent light
6. Preventive maintenance includes cleaning, wiring inspection, chokes/ballast, fixture/pole painting etc

SUMMARY: The total cost of ownership for the 100light community system over a 5 year period is as follows:

System	Initial Set up	5 Year Maintenance	Total Cost for of ownership
Traditional	Rs13lakhs	Rs16lakhs	Rs29lakhs
LI1 Solar	Rs13lakhs	Rs10.5lakhs	Rs23.5lakhs
LI2 Solar	Rs16lakhs	Rs13lakhs	Rs29lakhs

There is an immediate return on investment when factoring in cabling costs and in case of replacement (where cabling is already done) the ROI could go up to 2 to 3years. These savings are on top of the other benefits associated with no blackouts and avoiding diesel generator based backup.

In summary, the LI series is the most advanced wireless lighting option for community lighting with a lowest cost of ownership compared to traditional grid based systems.