

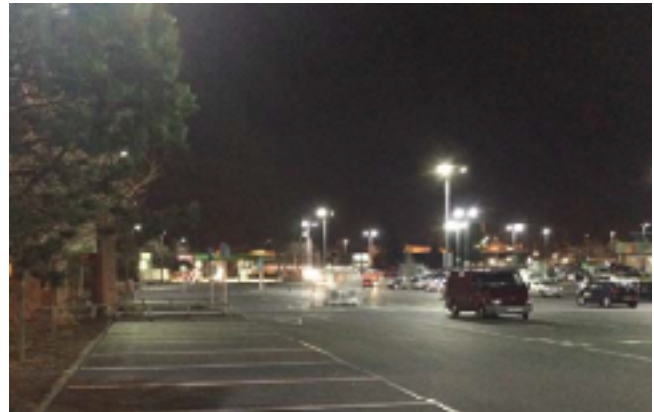


Sunnytek Solar Sweden

Solar power for city street lamps



Sunnytek offers a range of very efficient LED street lamps for urban applications. Here often many lamps are working on an own ring of cables powered from one single point. Of electricity is cost in specific tropical areas where costs can be from just less USD 0.2 to USD 1 per KWH. Typically many lamps are used for just over 4200 hours / year and this will be lots of high costs.



The smart solution is a solar farm from Sunnytek solar and make your own power for all nights. This farm is a solar panel array and electronics charging a battery back up system. Inverters convert battery power to electricity to replace the not needed costly grid for the future. Our streetlamp typically needs 20-100W in power and are far more efficient that possible all competitors in saving electricity. Old Sodium lamps can need 8-10 times more electricity and still offers not very good light quality. Lamps are normally operated a bit over 12 hours / day so a typical 40W/ 6000 Lumen lamp needs about 0.5 KWH / night.



1000 lamps in a small city then needs totally about 500 KWH in power / night. Compare to Sodium lamps that needs about 4000 KWH with not that good light quality. 500 KWH at USD 0.4 = USD 200 / night and over the year USD 73 000 in costs. In 10 years this is USD 730 000 = a lot of money for a smaller city.

The solution can then be a solar farm only for street lamps. Here we save 100% of costs for grid electricity and make all our selves. Our general comment is that if power is over USD 0.2 / KWH for lamps this is very interesting and profitable in most cases. Let us know you lamp inventory and location and we make an offer. **We have a financial solution for this power system !**

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Solar panel solution 1000 pcs 40W led lamps that can replace old 250 W Sodium lamps needs about 500 KWH &/ day cycle. In tropical areas a rule of thumb says panels shall make all power in 4 hours witch is OK in many locations.

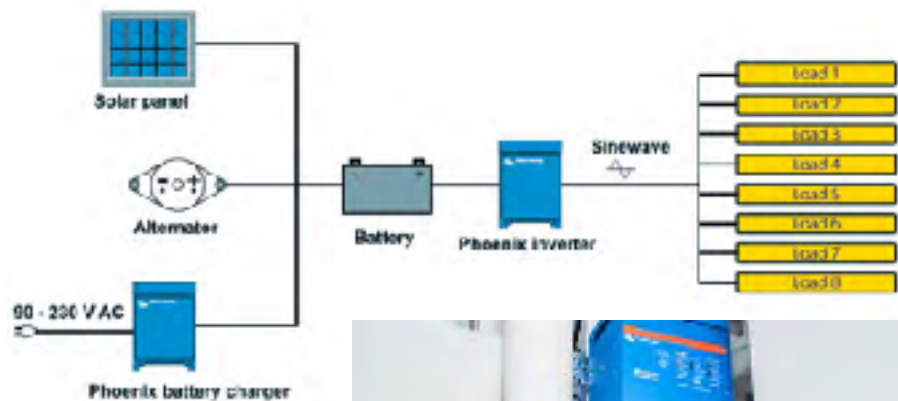
Here we see we need about 125 KW in solar panels. Mostly we use thin film panels mounted in a v-shape to give more power in mornings and evenings. This is about 850 pcs of our 145 W solar panel. Frames for installation is made in aluminum profiles. Battery is charred by MPPT solar chargers to get best efficiency.

In rainy areas we have some extra panels and when sunny we can remove a few panels.

Lamps needs $1000 \times 40 = 40$ KW in electricity so we can use a 3 Phase inverter system of about 50-60 KW peak power.

Here we may use 4 pcs 3 Phase 15 KW inverters in parallel. This gives better redundancy as we can make several lamp loops.

In several location s we have lightning rods and special protection to prevent damage by lightning. Tropical thunderstorms can make damages and dangers by electricity so we need special protection here to stop most of problems.





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Battery system. 12 hours operation is about 500 KWH in battery capacity. Upon this it is good to add at least 25% extra in capacity. The heart and most costly part is the battery system. Depending on temperature we have 2 solutions. When less 25C when charged we can sue Lead Gel battery packs of best quality. They will typically live for 7 years if well installed. Cells have no liquids and are not spillable. Photo shows a 100KW system in Kenya. Here we can deep cycle max 30% of battery capacity if we need long life time. Here we need a capacity of up to 1.5 MWH in cells so it is a large and heavy system.



When hotter a Ni-Mh or Lithium system or a Ni-Cd battery We want life cycles of preferable 10-20 years. Lithium is OK for max 10 years and if more is needed Ni-MH or Ni-Cd can be best. This battery can be deep cycled to 95% with no problems.



Conclusions

Some numbers and costs Lamp system in example needs electricity for USD 73000 / year = USD 730000 in 10 years. Cost was calculated to be USD 0.4 / KWH.

Old lamp system Sodium lamps needs 280W in power and then 1000 lamps need about 1176 000 KWH / year. At USD 0.4 this is power for USD 470 400 / year. Savings are huge USD 397 000 / year New lamps are paid in less 1 year.

Costs for power by sun. This depends a lot of solar radiation and site location. One country can often have local variations of 50% so this needs a deep analyse.

Payoff for complete system. If we have a electricity cost of USD 0.3 / KWH we ca possible get full pay back in 3-5 years. If More it pay back much faster. If only USD 0.2 this needs more time to be paid. In areas where power comes from a diesel generator it is very profitable.

It is always very profitable to change to Sunnytek Led street lamps and if power is costly the solar battery system makes all a bitr extra better.