



Sunlight at Night

Solar Powered LED Lighting Solutions

Some 1.6 billion people worldwide have no access to electricity. What's more, for people living near the equator, darkness falls around 7 p.m., all year round, slowing down or completely stopping many vital tasks. Not only does darkness dramatically affect the quality of life of individuals, it also reduces safety at public places and on roads.

PHILIPS
sense and simplicity

Extending the day with Solar Powered LED Lighting Solutions

There is a desperate need for high-quality, affordable and reliable lighting systems at sites where the electricity grid is either non-existent or unstable (for applications such as road lighting, residential lighting, area lighting and security lighting).

Solar Powered LED Lighting Solutions are designed with these objectives in mind.

These innovative, off-grid solutions can transform sites with limited or no electricity by providing high quality, reliable, solar powered LED lighting.

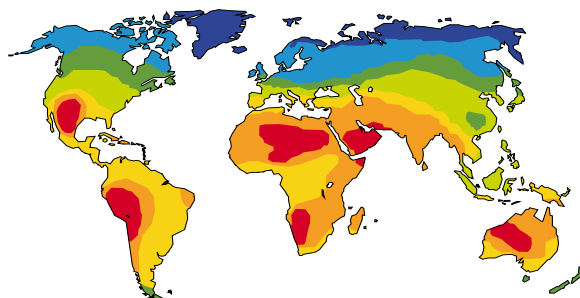
Enhancing lives within the communities:

- Increasing productivity
- Improving safety
- Bringing communities together

Innovative light you can depend on

Solar Powered LED Lighting Solutions are high-tech, reliable solutions.

Solar insolation map



The solar insolation map is used to choose the size of solar panels necessary to meet your needs, even during periods of the year with the shortest amount of sunshine for your location.

Why Philips Lighting?

- Expertise: knowledge of lighting and design
- Proven leadership in lighting applications
- State of the art LED technology

Total Cost of Ownership

LED and solar technologies offer cost and performance opportunities that were previously unachievable. As a result, the Total Cost of Ownership (TCO) of our Solar Powered LED Lighting Solutions can be significantly lower than a comparable grid-based solution. Obviously there is no electricity bill, but other cost benefits come into play, such as lower running costs (no re-lamping) and higher uptime in areas with an unstable electricity network. Also of great relevance is that our solution does not require the installation of an electricity grid which is the major cost driver. This contributes further to the cost-effectiveness of this innovative solar powered LED lighting solution. But that's not all! Solar power is environmentally friendly!

Adding value

- Improved safety for people - Lighting available at places where it was previously impossible
- Sustainable renewable energy – Green solution makes 100% use of solar energy
- Low installation cost (off grid) and no energy bills

Our Solar Powered off-grid LED Lighting Solutions are a cost-effective way to bring high quality lighting to places where currently there is no (reliable) source of light. Using state of the art LED and power technology, our systems offer an alternative to grid-connected lighting – without any compromise on performance.

Why LED?

- Low voltage (no conversion needed, therefore more efficient)
- Fully dimmable
- High Color Rendering index
- Long lifetime
- Reliable technology

Your own tailor-made solution

Our Solar Powered LED Lighting Solutions are individually designed to your precise conditions:

- Application (road, residential, area, security etc.)
- Geographical location
- Required light levels
- Required uptime (number of hours of light)
- Possibility of dimming the light (during off-peak hours).



This unique tailor-designed approach is divided into four key steps

1. Define, agree and validate the functional requirements

During this stage a professional Philips Lighting team will:

- Optimize the solution for the specific geographical location
- Analyze and adapt the light levels to illuminate, for instance, specific roads
- Specify the required panels, batteries and fixtures
- Ensure compliance with applicable standards for (road) lighting (upon request).

2. Create and validate the light plan

Based upon functional requirements (and applicable norms) our lighting designers make light plans using sophisticated software to simulate reality and they will engineer the light distribution that is required. This follows having defined it in step 1.

3. Design a matching power system

Energy is the most vital part of the system. We create great lighting solutions, generating their own energy. Transforming solar energy into lighting consists of 3 steps:

- Harvesting
- Storing
- Converting stored energy into lighting at the time and place you need it at the light level you require.

The system design is a sophisticated match between the geographical location with its typical sunlight and climate factors, the solar panel, battery capacity, the efficiency of the fixture and the lighting requirements. The solution guarantees that the intended light levels will be met during the entire night, even when there are a number of days without sunshine. We can even react to changing conditions.

4. Design a project plan

Prior to designing a project plan a site survey will take place. A project plan covers time planning, resource planning, risk assessment and installation planning. It ensures proper alignment of expectations between the customer, Philips and other parties involved.

The secret of success

Our systems offer 'intelligent lighting', that anticipates and reacts to environmental conditions, such as dimming during hours of low traffic or a longer period of no sun than is indicated by the best available data.

Intelligent control system

The intelligent heart of the Solar Powered LED Lighting Solution is the control system. It is much more than just a battery charger. It provides energy management based upon advanced algorithms that enable self-learning behavior. The key algorithms used are:

- Maximum Power Point Tracking (MPPT) – A module that makes sure that maximum energy from the solar cells is transferred into the batteries at all times. MPPT technology can have up to 30% more energy efficiency than traditional charge controllers, leading to more compact, cost effective and reliable systems.
- Run Time Extension (RTE) – A self-learning intelligent module with a history log of several days. By making use of self-adapting dimming scenarios during 'off peak' situations, the system sustains uptime to the maximum achievable during worst-case conditions.
- Extended battery life – Charging and discharging is controlled in a smart way to maximize battery life and reduce maintenance costs. Too low discharge levels are prevented by a Low Voltage Disconnect function, whilst the charging process is controlled and protected against overcharging.



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