

# The Future of Street Lighting

Your Guide to Solar Street  
Lighting Technology:  
The Use Cases, Benefits  
& Limitations.

# Executive Summary

This report examines the benefits and potential pitfalls of solar street lighting in the UK. It investigates the recent flooding of the market with cheaper, poor-quality street lights that do not perform in British winters and reveals how to evaluate whether a specific streetlight is suitable for your needs. It explains the key parts and functions of solar street lights and the complex relationship between solar yield, battery size and light output. It also presents real world case studies across a variety of estates and examines the economic and environmental benefits of solar street lighting.



# Executive Summary

## Inflated claims and greenwashing

The UK is a complex country when it comes to solar street lighting. Areas in the South of England can receive 30 per cent more sunlight than Northern Scotland, and whatever the latitude, British winter nights can be notoriously dark and gloomy with up to 16.5 hours of darkness.

This means that solar street lighting needs to be designed and tested in the UK to be sure that performance will live up to manufacturers' claims. Some street lights may claim excellent performance, but suppliers sometimes base their solar power yield assumptions on a perfect day in a sunny foreign country. This is misleading and purchasers should be wary of inflated claims.

Compliance with British Standards is also an important factor in choosing solar street lights and purchasers should be confident in the quality of all aspects of the streetlight, including the column, to avoid potential liability.

## Economic and environmental impact

Cost savings from solar street lighting come from two main sources: zero running costs and installation costs that are typically half those of mains-connected lighting. There are no expensive DNO connections required, no trenches to dig and no cabling to lay. Environmental affects on local communities are minimal, with fast installation, less noise and lower light pollution thanks to sensor-controlled lighting.

Embedded carbon emissions from installation are also dramatically lowered compared with traditional mains-connected street lights and solar street lights emit zero carbon during operation.

## Evaluation and recommendations

Organisations looking to install solar street lighting for its many benefits should first seek advice from experienced designers and manufacturers in the UK who understand the challenging local conditions. Ask them to demonstrate their track record of working out how to get solar street lighting to perform in non-ideal placements, as well as delivering products that are proven to work throughout British winters.

On products, ensure that the solar panel is mounted separately, so that it can face due South and check that alternative fixed angles are available if you are installing in Northern Scotland. Make sure that the solar panel and battery are rated to five times larger than the output, to cope with UK conditions. In all cases, enquire about the solar street light's adherence to British Standards in all aspects, including key components and installation.

# Introduction

Solar street lighting is a growing success story and is becoming the de facto standard for new estates. But as the market is flooded with cheap, unsuitable lights by companies hoping to cash in on this success, how can you be sure you are buying products that will genuinely work all year round in the UK?



Annual expenditure on electricity could reach £379m by 2030 for the UK's mains-powered street lights.

# Introduction

The importance of street lighting in modern infrastructure cannot be understated. Lighting is an essential part of any estate, whether commercial or public. Well-lit areas have been shown to be safer and more welcoming, both in terms of accidents and crimes (according to a study by the College of Policing).

However, traditional lighting is expensive to install and run, and a significant contributor to the country's total carbon emissions. In terms of simple running costs, according to a State of the Nation report on street lighting, annual expenditure on electricity could reach £379m by 2030 for the UK's mains-powered street lights.

The carbon emissions from traditional lighting comes from the generation of electricity to power the lights, together with the embedded carbon generated by their manufacture, installation and maintenance. The UK has a target of reaching net zero carbon emissions by 2050 and, as a result, the country's approach to street lighting is changing to reflect this commitment.

The first permanent solar street lighting was installed in the UK by Prolectric, in 2011. Since then, solar street lighting has proven itself to be reliable,

durable and effective. Installation costs are around half those of mains-connected lighting, while running costs are negligible and operational carbon emissions are zero.

However, the market has recently been flooded with cheap, unsuitable lights that simply do not deliver their claimed performance and reliability in British winters. This poses a challenge for everyone, from facilities managers and property developers to local authorities and large commercial estates, in understanding how to choose a solar streetlight that will deliver on its promises.

**This whitepaper will dispel the myths around solar street lighting and explain what is needed for a streetlight to work reliably all year round in the UK. It will examine the economic savings in terms of installation and running costs, as well as the environmental advantages.**

It includes four case studies where solar street lighting has been installed in a variety of estates. It also explains the risks of buying unsuitable solar street lights in terms of product performance, as well as potential liability when products do not comply with British Standards.



# How It Works

## The fundamentals of solar street lighting technology

The key components in almost all models are a solar panel, LED light, power storage battery, controller and mounting column.



As a result, different models of solar street lights may appear similar, but the performance depends on the specifications of the individual components and how they are designed and engineered to work together. While many products make bold marketing claims, only a few truly deliver on their promises.

**In particular, there are many that are unable to provide the performance and light needed in the depths of a gloomy British winter. This is where local experience and expertise come in. The experts at Prolectric, for example, ensure their street lights work in the winter months by sticking to a 5:1 ratio, where the panel and battery storage is five times larger than the output.**

The variety of hardware components can make it difficult to understand why some manufacturers' claims don't hold up. To address this, over the following pages, we examine each key component, explaining its role and importance in ensuring a solar streetlight delivers the lighting it promises, all year-round, across the UK.

# How It Works

## Solar panel

Solar panels are mature, proven technology. The efficiency of solar cells has been improving at a steady rate since the mid 1970s, with the latest cells hitting nearly 50% efficiency in research facilities.

In the real world, 20-25% efficiency is state-of-the-art for commercial panels, which have a life expectancy of around 25 years (as on the Prolectric AE6 solar streetlight). Given that panel efficiency is generally similar, what matters most is the size, the location of the unit and the orientation or angle of the panel, all in relation to the battery capacity and intended light output. Other factors affecting solar panel performance include any shading and temperature, with cooler ambient temperatures helping them to run more efficiently.

Solar panels should always be mounted separately on the lighting column, so that they can be orientated to face south at the correct angle. All-in-one street lights commonly position the panel flat, facing directly upwards, which is not optimal for solar yield, meaning they are unable to generate the same power.

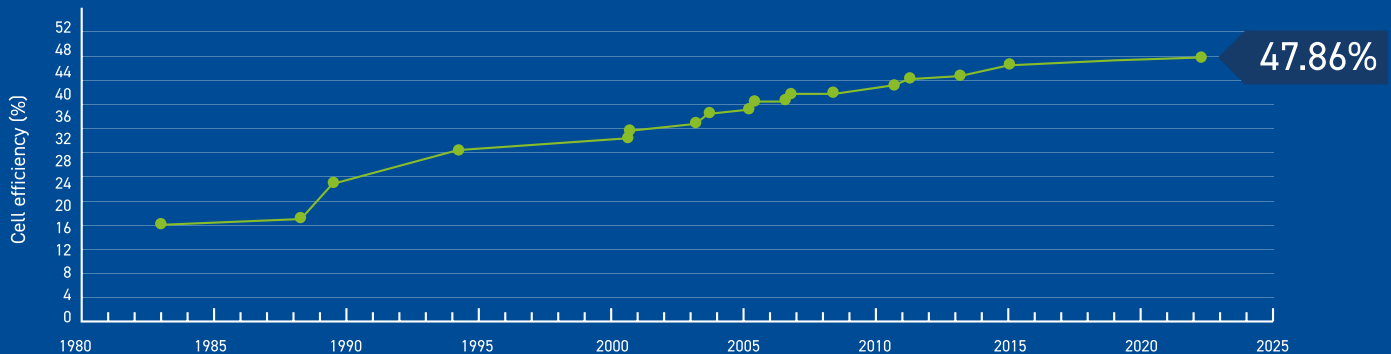
### Is there enough sun in the UK?

**Yes!** All panels will generate electricity, no matter where they are located. They do not need sunshine, only daylight, although more intense sunlight does produce more electricity per hour. Panels must face as close to south as possible to get the highest level of UV light.

The amount of annual sunlight hours a panel receives in the UK varies with geographical location, as does the amount of electricity it will generate throughout the year. For example, a solar PV system installed in the South West of England will generate up to 30% more electricity than one installed in the Shetland Islands of Scotland.

However, Prolectric street lights have been tested and proven to work in Scotland, even in adverse weather during the depths of winter. The key is designing and specifying.

Solar cell efficiencies - 1980-2025



# How It Works

Light and battery

The first solar streetlight was installed in the UK in 2011 by Prolectric and the technology has been growing in popularity ever since.

Over recent years, there has been a concerted push towards the use of efficient LED lanterns in new lighting and in upgrading existing lamps. It is estimated that simply converting the remaining non-LED street lights to LED would save £125m per year by 2030. Today, new solar and mains-connected street lights opt for white LEDs that comply with British Standards, which were amended in 2003 following research done at University College London.

The study found that people can identify faces more easily under white light than under the conventional lighting used in cities, even at a lower level of illuminance.



# How It Works

## Light and battery

### Measuring light

The amount of light that can be given off by an LED light is measured in lumens. High-quality LEDs offer more lumens per watt, which means they can illuminate their surroundings for longer as there is less power demand on the battery.

Light output varies considerably between solar streetlight brands and models. The Prolectric AE6 solar streetlight, for example, uses high-lumen Osram LEDs to maximise light output. The Osram LEDs have 11-13 years life expectancy and can easily be replaced when required.

The amount of lumens required, and the number of street lights needed to light a given area, depends entirely on the use case. It is always recommended to ask for a site visit and lighting design proposal unless you know your exact requirements.



### How to choose a battery

High-performance lithium-ion batteries are standard across most solar street lights. The solar panel charges the battery during the day and that electricity is then used to power the LED light as needed when it is dark.

The best solar street lights units have the capability to store enough power to cope with extreme weather in the depths of the UK winter in Scotland, where solar charging may often be severely sub-optimal for several days at a time.

Important questions to ask your solar streetlight vendor about their proposed battery include:

- Is it a high-performance Lithium LiFeP04 battery?
- Can you choose the capacity, so that you can tailor the streetlight to use case?
- Can it be easily replaced without affecting the rest of the streetlight?
- What is the expected life expectancy and how many recharge cycles is this based on?

You should also look at the output claims, particularly on autonomy (the number of nights that the streetlight can run for without any solar input during the day). For example, if a battery is rated at 3,000Wh, then claims of running at 70W for five nights in winter (85 hours) would actually need a battery twice that size.

# How It Works

## Smart controller

State-of-the-art solar street lights are considerably more advanced than their traditional counterparts, offering a wealth of control, customisation and remote management.

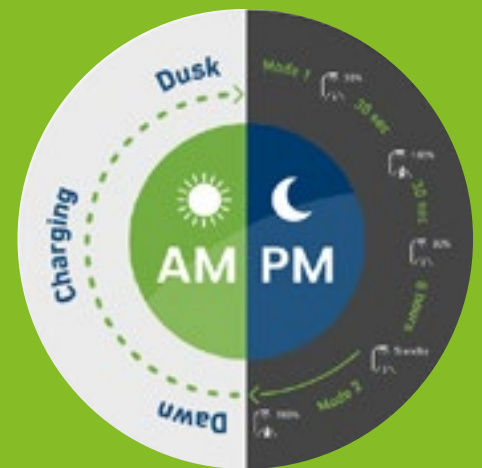
The smart controller at the heart of a solar streetlight is a significant point of difference between makes and models. In conjunction with motion sensors, the controller may be able to switch the light to full brightness when needed, change lighting patterns according to the season or predicted footfall, and communicate with other solar street lights in the same area.



### Motion detection

The most advanced controllers use power and light efficiently to maximise the time, illumination and usefulness of their output. For example, a streetlight may switch on automatically at dusk at 30% brightness, increasing to 100% when it detects motion, then switch off altogether in the early hours of the morning unless activated again. In this way, power is conserved, and light pollution is minimised.

Solar street lights detect motion using Passive Infrared (PIR) sensors. Most street lights use just one PIR sensor which gives a 180-degree field of view at a set distance. Prolectric have developed the first model to use three PIR sensors, which combine to give a more sensitive, wider view with a much larger distance. It is important to check that PIR on a streetlight works well from multiple angles so that the light comes on for people as they approach the area, not just when they have already reached it.



# How It Works

## Smart controller

### Remote control and monitoring

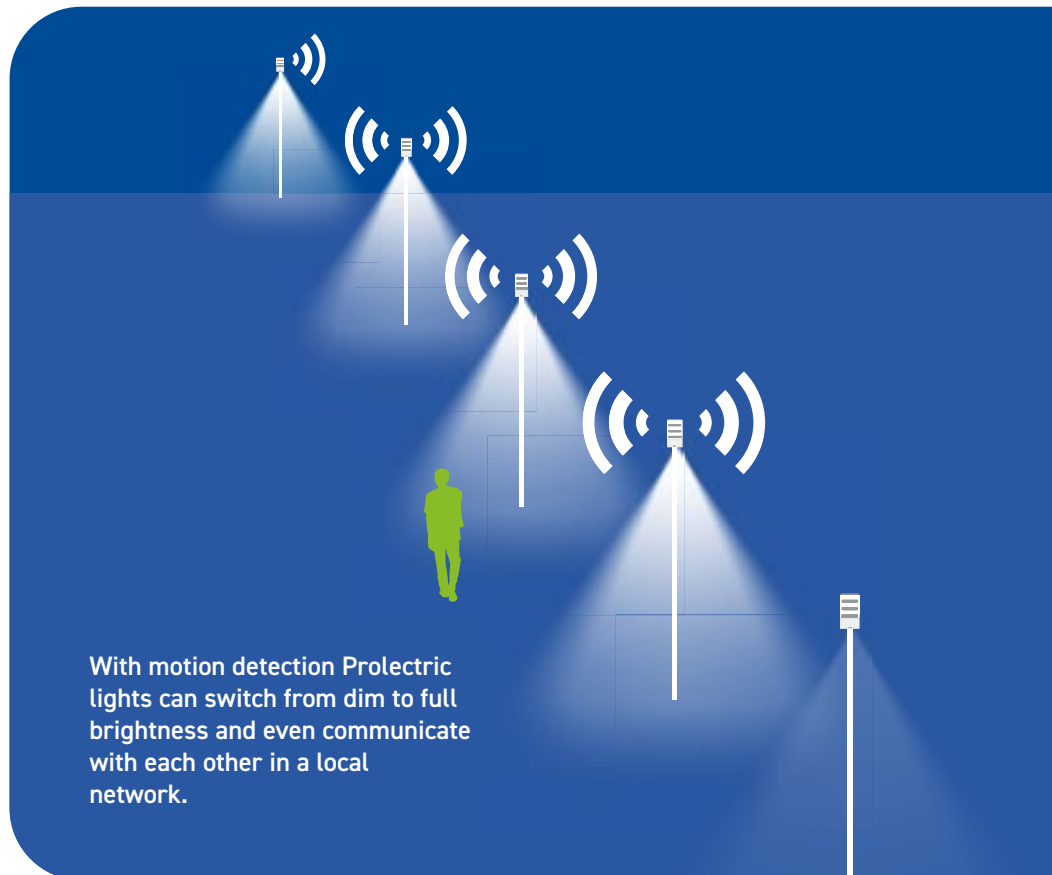
Another consideration is the ability to remotely control and monitor one or more solar street lights through a web portal. This functionality is available from market-leading providers, where you can monitor solar charging, battery levels and lighting intensity. It also enables you to customise the lighting patterns for specific events. For example, in a university setting you might consider setting the lights to go off entirely at midnight outside term dates or set lights to be brighter through the night over Freshers week when there is more late-night footfall predicted.



### Linked lighting

Some solar street lights, such as the Prolectric AE6, can communicate with each other in a local network. In the case of a park, for example, activating one light could be set to trigger all lights to come on, making the environment safer and more welcoming.

In this example, the primary streetlight can also act as the go between for remote monitoring of all the lights in the cluster, which helps to lower both power requirements and cost of mobile network connectivity.



# How It Works

## Lighting column

The quality of the column of a solar streetlight is often overlooked, but it is essential that it complies with British Standards.

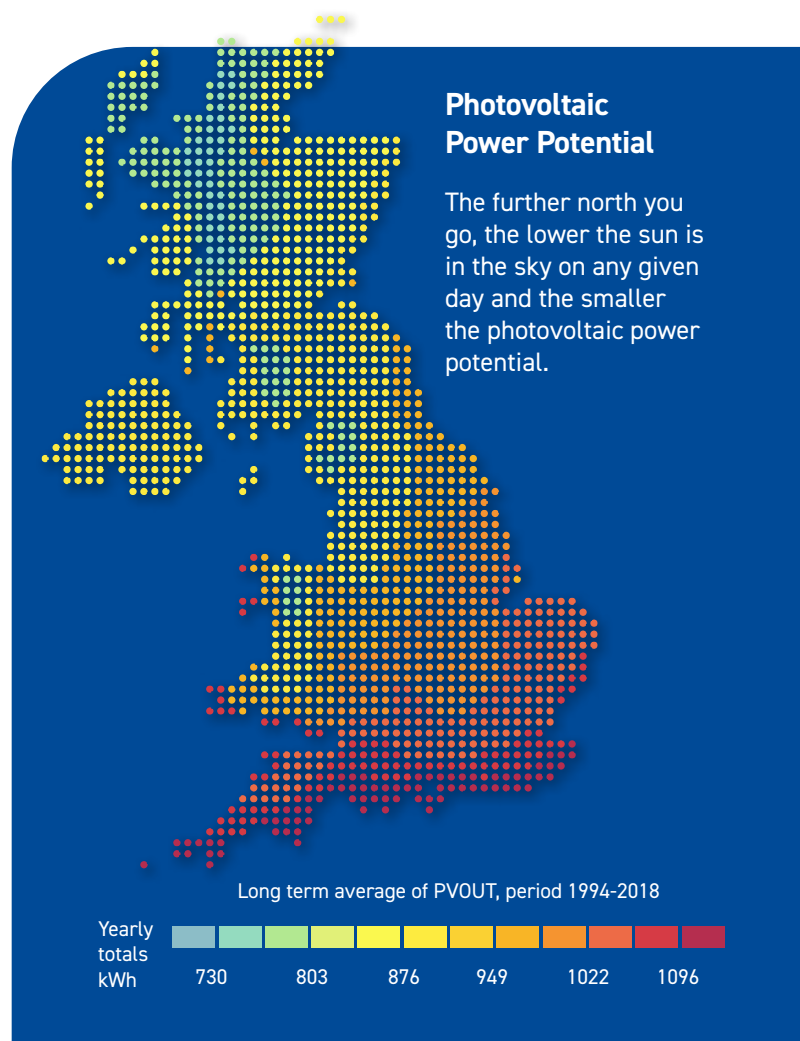
The lighting column on a solar streetlight comes under more stress than the column on a traditional streetlight because of wind loading. This is the force generated by wind against the column and the equipment fixed to the column: the solar panel, battery, controller, sensors and luminaire. The solar panel in particular can act as a sail, placing a great deal of stress on the column during storms and other periods of high winds.

To be compliant with British Standards BS EN 40, lighting columns must be engineered with the right design, material and thickness to withstand extreme weather events. Prolectric's column specifications are analysed and approved by structural engineers to ensure they are more than robust enough to withstand the additional weight of a 60W to 200W solar panel, as well as the luminaire and other elements, in adverse weather conditions.

The foundation for the lighting column is another important consideration. Wind loading is calculated by analysing the column location, column height and panel size alongside the elevation of the site. Prolectric's structural engineers then choose the correct foundation design for that specific installation, to ensure correct footings are used for every solar streetlight the company installs.

All these factors are crucial in ensuring that the structural integrity of every individual lighting column is strong enough to withstand extreme weather conditions for the lifetime of the streetlight, wherever in the country it is installed.

Prolectric solar streetlight columns are British Standards BS EN 40 compliant, but the company also offers a retrofitting service, where it is possible to use existing lighting columns to mount solar street lights. While retrofitting can save time, expense and embedded carbon costs, existing lighting columns should always be carefully assessed to ensure that they are fit for purpose, given the increased wind loading compared to their original design tolerances.



# How It Works

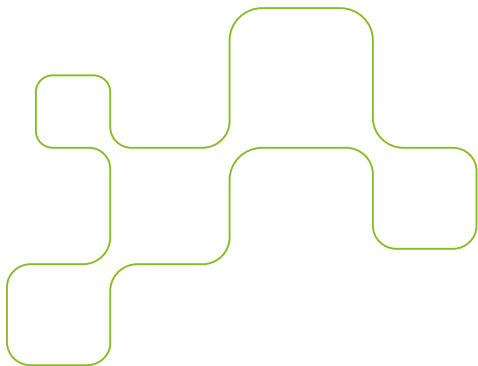
## Lighting column

### Getting the angle right

As discussed in the solar panel section, the solar panel should be installed to face south at the correct angle to receive the most sunlight. This is one reason that single, all-in-one units should be avoided. All-in-one systems prioritise the position of the light, which limits the position of the panel. The panel itself is often mounted at a flat angle, which is sub-optimal for both solar yield and light spread.

Getting the angle right on solar panel orientation is a key consideration in ensuring a solar streetlight will work as promised. The sunlight potential and angle of the sun varies significantly over the course of a year in the UK, so it is imperative that solar street lights have been tested in the North of Scotland, where the sun is weakest, to ensure they are up to the task.

Prolectric have designed a specific fixed angle bracket for use in Scotland, to go with their BS EN 40 compliant columns, which enable better solar yields in Northern Scotland. In theory, a flexible bracket could be used instead but there are concerns around British Standards safety compliance in this case.

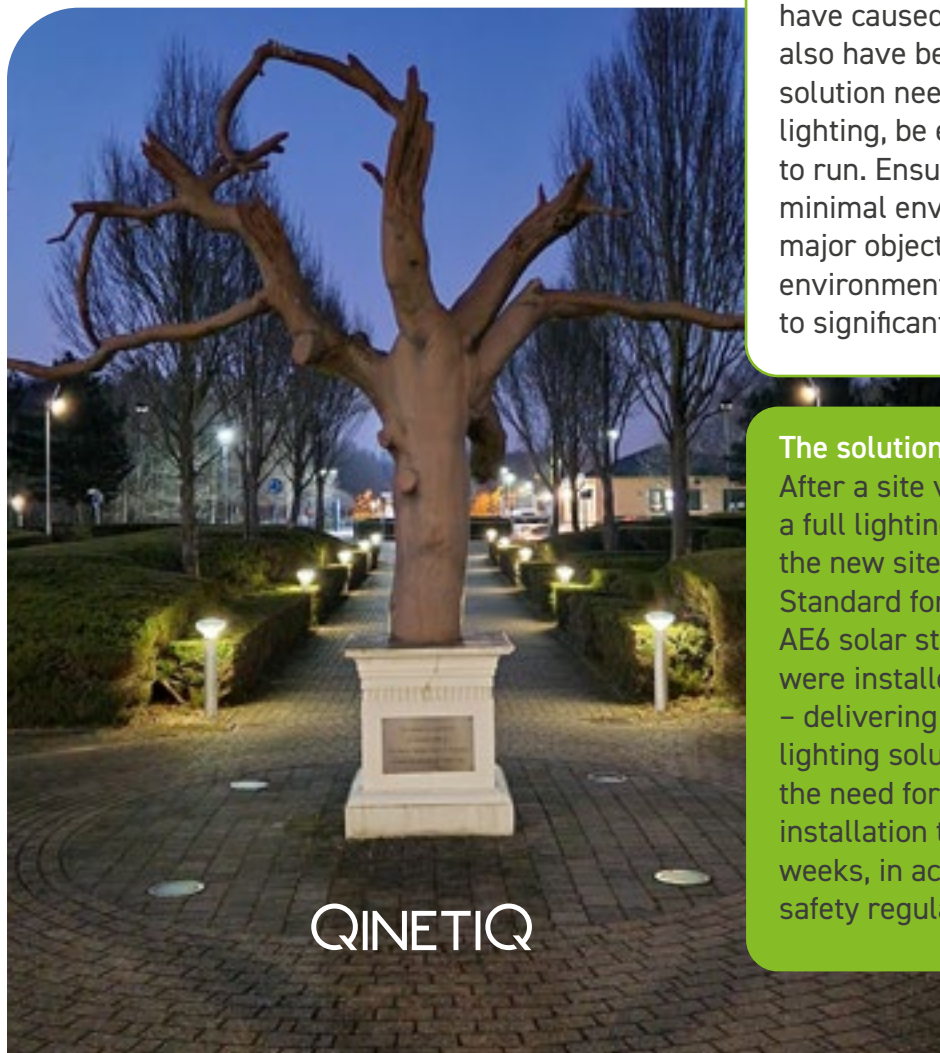


# Case Studies

## QinetiQ Headquarters

How sustainable solar lighting delivers a year-round, commercially viable solution that can help towards reaching sustainability targets.

QinetiQ is one of the world's largest defence technology contractors. They needed to significantly improve the lighting across their large headquarters site in Farnborough, UK. Specifically, there was a lack of quality lighting across the site for pedestrians and vehicles. The existing lighting was high wattage but low quality and needed to be improved.



QinetiQ has a target of becoming a Net-Zero company with ambitious near-term GHG emission reduction targets. To assist with this ambition, Prolectric installed over 129 solar street lights and bollards at our headquarters. The lighting is high quality and proving to be robust in harsh weathers.

**Simon Homer, Project Manager**

### The challenge

Digging trenches for new mains-powered cabling to replace the failed circuits would have caused extensive disruption. It would also have been very costly. The new lighting solution needed to provide quality year-round lighting, be easy to deploy and cost effective to run. Ensuring that installation works had minimal environmental impact was also a major objective. The solution also needed to be environmentally sustainable and help QinetiQ to significantly reduce their carbon emissions.

### The solution

After a site visit, Prolectric experts developed a full lighting design and proposal, ensuring the new site lighting would reach the British Standard for lighting. A total of 64 AE3 and AE6 solar street lights and 65 solar bollards were installed across car parks and walkways – delivering a bright and reliable year-round lighting solution without noise, emissions or the need for mains power. Prolectric's in-house installation team completed the work in three weeks, in accordance with QinetiQ's health and safety regulations.

# Case Studies

University of Lincoln

How solar street lighting has reduced installation costs and problematic embedded carbon and is continuing to lower carbon emissions and save on electricity costs.

The University of Lincoln is recognised as one of the top 10 UK universities for reducing its impact on the planet and plans to achieve net-zero carbon emissions by 2040. The university needed to implement a sustainable lighting solution for their conference centre car park as part of their goals.

## The challenge

The new lighting systems needed to be environmentally sustainable and help to significantly reduce the university's carbon emissions, including embedded carbon. In addition, there was an emphasis on ensuring that the installation works had minimal environmental impact, and that the new lighting solution was quick and easy to install, cost-effective to run and would provide reliable year-round lighting. As the initial site was a busy car park, digging new trenches for mains-powered cabling would have caused extensive disruption. The works also needed to minimise disruption to the busy location on campus.

## The solution

Prolectric experts developed a full lighting design and proposal following a site visit, ensuring the new site lighting would meet British Standards for lighting. The initial project saw AE6 solar street lights with heavy-duty column guards and twin brackets delivered and installed at the car park, providing lighting without noise, emissions, or the need for mains power. The AE6 uses new-generation lightweight lithium-ion batteries and can produce an output of up to 4,000 lumens per unit. Following this successful project, Prolectric visited the university again to install new AE3 solar street lights, all without the need to dig trenches or install trunking for cables. They also retrofitted existing lamp posts with AE3 solar street lights, removing them from the mains power connection to save on future energy costs.

|| The University of Lincoln now benefits from clean, quiet, low maintenance lighting, with reduced carbon emissions and electricity costs. The university has reduced its carbon emissions by 472 kg CO<sub>2</sub>e\* per year. The lights operate reliably and efficiently year-round, from dusk until dawn, even in winter.



UNIVERSITY OF  
LINCOLN

# Case Studies

## VIVO Defence Services

How sustainable solar lighting delivers a year-round, commercially viable solution that can help towards reaching sustainability targets.

VIVO Defence Services is a joint venture between Serco and EQUANS, who are industry-leading facilities management specialists. They have been awarded places on the Defence Facilities Management and Housing Maintenance framework contracts. VIVO Defence Services' purpose is to modernise the lived experience for our Armed Forces. A solution was needed to update and significantly improve the lighting quality across the estates for residents. The lack of quality lighting had implications for health and safety on the site in Brompton.

It's fantastic to be able to work with such a reliable and proactive supplier installing solar lighting adaptations to existing street lighting as well as new designs. The works are incredibly low impact for our families and cause no issues while being completed but result in much better designs as well as eliminating the cost of traditional street lighting electricity bills for our client.

**Christopher Irons,**  
**Regional Billable Works Manager**



**VIVO** | Built for Change

### The challenge

The new lighting solution needed to be easy to deploy, cost-effective to run and provide reliable year-round lighting. VIVO Defence Services also wanted to ensure that installation works had minimal community impact, while being environmentally sustainable and significantly reduce carbon emissions.

### The solution

After a site visit, Prolectric experts developed a full lighting design and proposal, ensuring the new site lighting would meet British Standards for lighting. A total of 89 AE3 solar street lights were retrofitted and installed across various housing estates. Prolectric's in-house installation team carried out the work, which took only two weeks to complete. The project delivered a bright and reliable year-round lighting solution without noise, emissions or the need for mains power.

# Case Studies

## Persimmon Homes

How solar street lighting provided instant light to housing estate residents with minimal disturbance, reducing the estate's carbon footprint and giving long-term energy cost savings.

Persimmon Homes is one of the UK's most successful house builders. The company is known for constructing over 13,500 new homes a year in more than 350 prime locations nationwide and is committed to the highest standards of design, construction and service. Persimmon needed an efficient lighting solution for their private estate project, Sycamore Rise, which was facing a number of challenges including a tight deadline.



3-PIR sensor is the only light, unique to the market, offering detection for a wider range of motion, up to 20m.



Installation costs are halved compared to conventional mains power and long-term costs are eliminated.



Dark Sky Approved, meaning projects produce minimal glare, reducing light pollution, and don't clutter the night sky.



No need for ducting, cables and trenching, reducing disturbance to the estate residents.



5-Year Warranty cover on all parts of the lights and solar panel.



'Setup and forget' technology offers long operating life with no maintenance.

### The challenge

Persimmon Homes had several challenges in providing efficient lighting for Sycamore Rise. It was a private estate, and the roadways were not adopted by the local council, which meant the added complexity of management by a private company. Additionally, traditional mains power connections would have been costly due to a DNO connection being required. Persimmon Homes also needed a rapid turnaround for their lighting solution, as the project had to be handed over to buyers within a tight deadline.

### The solution

After a site visit, Prolectric experts developed a full lighting design and proposal, ensuring the new site lighting would meet British Standards for lighting. Prolectric's in-house team quickly installed 40 AE3 solar street lights with steel columns across approximately 175 plots on the estate. The AE3 units were chosen for their ability to provide lighting without the need for trenching, cabling or mains power. Sycamore Rise residents now benefit from zero maintenance and zero carbon emitting solar lighting, eliminating the need for mains power.



# Future Trends

The future of street lighting in the UK is trending strongly toward sustainable and smart solutions, driven by advances in solar technology, energy-efficient LEDs, and the goal of reducing emissions in alignment with the UK's net-zero ambitions.

Here are key developments and trends in this sector:

## Increased Solar Integration

Solar street lighting is gaining popularity for both residential and commercial projects due to its long-term cost savings and environmental benefits.

Off-grid solar lights, which don't require extensive cabling, are especially attractive for new residential and commercial developments, reducing both installation and operational costs. Companies like Prolectric have established reliable, fully solar-powered street lights suitable for UK weather conditions, appealing to sectors that seek low-maintenance, carbon-neutral solutions across housing estates, business parks, and public spaces.

## Smart Technology for Energy Efficiency

With the rise of smart cities, smart street lighting systems are becoming essential. These systems allow remote management and real-time monitoring, enabling customised lighting schedules, dimming, and precise energy tracking.

Enzen's ZenLumen system, for example, uses smart technology to adjust lighting based on need and time, helping commercial and industrial estates cut energy usage by up to 46% by controlling lighting individually or in zones.

This not only improves energy efficiency but also contributes to better safety and lower light pollution.



# Future Trends



## LED Advancements and Durability

The shift to LEDs continues, given their lower energy consumption and longer lifespan. LED-based solar street lights are now more robust and energy-efficient, which makes them suitable for the UK's fluctuating weather. Solar lights with integrated LED technology are now commonly used in areas like parking lots, pathways, and open spaces, particularly in business and commercial estates looking to meet sustainability goals while maintaining consistent lighting.

## Enhanced Appeal for Property Developers

For property developers and commercial estate managers, adopting solar lighting aligns with both regulatory pressures and public demand for sustainable development.

Solar-powered street lighting enhances the appeal of residential and business areas by reducing energy costs and meeting eco-friendly expectations, a significant draw in today's market.

The move toward greener infrastructure is expected to continue as solar and LED technologies advance, making them more viable for large-scale adoption.

These trends underscore the growing emphasis on smart, sustainable lighting infrastructure as part of a broader commitment to eco-friendly development in the UK's residential and commercial sectors, supporting cities and businesses in their sustainability and net-zero objectives.

# Environmental Impact

Why the benefits of solar street lighting run much deeper than reduced electricity bills - and how to tell when a solar supplier's claims are too good to be true.

When it comes to the environment, solar street lighting has many advantages over mains connected lighting, both in terms of reducing ongoing carbon emissions and lowering embedded carbon.

## Ongoing emissions

Ongoing carbon emissions are straightforward, being the operational emissions created by the generation of the electricity to power the lights when they are turned on.

As solar street lights are independent of the grid, they emit zero operational carbon and increase the amount of available power in the grid, which is an important consideration as the UK turns increasingly to electric cars and heat pumps.

## Embedded carbon

Embedded carbon is a little more complex. Also known as embodied carbon, it refers to the total greenhouse gas emissions associated with the entire life cycle of a building or estate. It means considering every aspect, including:

- Resource extraction such as the mining required to provide the basic materials.
- Manufacturing processes, where the raw materials are turned into those elements used in the estate's construction, from bricks and mortar to permanent street lighting.
- Transportation in every aspect and stage of the building process.
- Installation and construction, including preparatory excavation works.
- Any ongoing maintenance, replacement or removal.

Embedded carbon matters because it is a hidden but significant contributor to climate change.

# Environmental Impact

Replacing 10 unadopted, mains-powered street lights with solar-powered alternatives would yield substantial cost, carbon, and maintenance savings. Here's how:



Solar street lights don't require trenching or cabling, cutting installation costs. Resulting in up to 60% savings on initial setup costs as compared to mains-powered systems, especially if installed in remote or challenging locations. You also eliminate the ongoing electricity costs. The savings here vary by usage, but given that street lights generally operate for around 12 hours per day, this can add up.

Assuming a traditional streetlight uses around 100 watts - annual electricity savings would be approximately 4,380 kWh per year across 10 lights (based on UK's average 40p per kWh, this could equate to £1,752 per year).



Replacing mains-powered street lights with solar can cut roughly 1.2 tonnes of CO<sub>2</sub>e per light annually, based on average emissions from grid-sourced electricity in the UK. For 10 lights, this could reduce emissions by approximately 12 tonnes of CO<sub>2</sub>e per year, supporting corporate and community sustainability targets.



Require much less maintenance than conventional systems. LEDs have longer lifespans, and solar systems operate independently, reducing the need for regular inspections and grid-related issues. With solar units, maintenance intervals often extend to every five years or longer, resulting in estimated savings of 30-50%. Modern solar street lights are also designed to withstand weather variations, which makes them robust for long-term, low-maintenance operation in the UK climate.



# Environmental Impact

When it comes to the environment, solar street lighting has many advantages over mains connected lighting, both in terms of reducing ongoing carbon emissions and lowering embedded carbon.

## How solar street lighting reduces embedded carbon

Replacing existing external lighting with solar lighting is an effective way to reduce embodied carbon emissions on large commercial properties and public estates.

The Prolectric AE6 Solar LED Street Light, for instance, can even be retrofitted to existing lamp posts to provide power-free, maintenance-free lighting without installing new columns.

Even when replacing lamp posts, permanent solar lighting involves less embedded and operational carbon. There are no trenches to dig or cabling to lay, the lights are fully independent and need no external power to operate.

There is no maintenance required, while components that come to the end of their life can be swapped out without changing the whole unit, again helping to reduce embedded carbon.

## Impact on local communities and Dark Sky accreditation

Solar street lights have significant benefits for local residents compared to traditional mains-connected lighting.

There is less noise during installation and less light pollution as the default brightness before being activated can be set to dim or even off, depending on the requirements of the project.

Prolectric is Dark Sky Approved, an objective, third-party certification for products, designs and completed projects that minimise glare, reduce light trespass and don't pollute the night sky.

This is important for both people and wildlife, with bat conservation a particularly important topic in the UK. Prolectric street lights are designed to focus the light on the specific areas that need illumination, minimising the effect on wildlife and the night sky.

# Environmental Impact

Replacing grid-connected street lights with solar-powered alternatives has a notable impact on reducing grid reliance. Here's how this shift impacts the grid and benefits related sectors:

## Enhanced Energy Security and Decentralisation

Solar lighting promotes a decentralised approach to energy, which is less vulnerable to disruptions in central power infrastructure.

Each unit operates independently, making it ideal for areas prone to grid outages or limited infrastructure. This strengthens local energy security while aligning with the UK's goal of a more resilient power network.

## Reduced Grid Demand

Solar lights run off-grid, reducing demand, especially during peak hours.

Replacing just 10 street lights with solar eases strain, while large-scale adoption, such as across an entire neighbourhood or commercial estate, boosts grid stability and lowers outage risks.

**Overall, moving to solar street lighting reduces grid dependency, eases peak demand, and enables future grid interaction.**

**This shift supports not only grid efficiency and carbon goals but also enhances energy resilience in both urban and rural areas.**

## Lowered Carbon Intensity of Grid Power

With fewer lights pulling power from the grid, power plants reduce output, thus lowering carbon emissions from fossil fuel-based generation.

This also aligns with decarbonisation goals, as utilities can prioritise renewable energy integration on the grid rather than expanding capacity for street lighting.

## Potential for Future Grid Support

While solar streetlights operate off-grid, future solar-powered units may incorporate battery storage or smart grid technology, creating potential for these systems to supply stored solar energy back to the grid.

Acting as a micro-grid resource, providing backup power during shortages or high-demand events.

# Does it work in the UK

If you are considering solar street lighting, it is important to make sure that you are getting lights that will perform to your requirements.



Greenwashing is the practice of making claims for products or services that exaggerate their environmental or sustainable credentials. Solar street lights are only a sustainable option if they work, delivering the light you require in the location that you choose, whether that is the South of England or the far North of Scotland. The success of solar technology has prompted more companies to jump on the bandwagon, but are their lights really fit for purpose?



# Does it work in the UK

There are four questions to ask of any potential supplier:



**Are they based in the UK and are their solar street lights tested and proven to work in all weather conditions, throughout the year?**

Companies are likely to test their products in their country of manufacture, many of which have more reliable sunshine than the UK. An inferior solar streetlight may work well in the British summer but fail when it comes to winter, when the light is most needed.



**What is the company's track record in solar technology?**

How long have they been designing and building solar lights? Are they a green-focused company or are they jumping on the solar bandwagon to make a quick profit? Can you customise their products or are they one-size-fits-all?



**Do their solar street lights, including columns, comply with British Standards?**

Compliance with official UK standards is vital in all aspects of a street light's construction, particularly the column. Ensure that you ask about British Standards compliance and receive a written reply.



**Are they too good to be true?**

Does their product claim to provide maximum illumination throughout the night, even with a tiny solar panel and battery? If their performance claims are out of line with the UK market leaders in solar street lights, be wary and seek further advice.



## How to tell if a streetlight will work in the UK?

Products designed and manufactured outside the UK are likely to be intended for the Middle East, Australia or parts of the US where the solar yield is commonly a lot higher.

To determine whether a streetlight will work in the UK:

In Bristol, a conservative number of sunshine hours is around 0.6 when considering losses. In the winter we also have 17 hours of night. Take the power of the solar panel, multiply it by 0.6, and divide it by LED power, to get the number of runtime hours at that LED brightness.

$$80W \text{ (Panel)} \times 0.6h = 48Wh$$

$$48Wh \div 20W \text{ (LED)} = 2.4 \text{ hours (number of runtime hours at that LED brightness)}$$

To find the LED brightness setting for it to last all through the night in winter:

Take the power of the solar panel, multiply it by 0.6, and divide it by the number of runtime hours, and you get the LED brightness for the LED to last all through the night.

$$80W \text{ (Panel)} \times 0.6h = 48Wh$$

$$48Wh \div 17h = 2.8W \text{ (LED brightness for the LED to last all through the night)}$$

# Economic Impact

Saving money through solar street lighting and reducing carbon emissions goes hand in hand.

At first glance, the cost savings of solar street lighting may seem self-evident, with no ongoing electricity bills to pay or administration to deal with from the moment of installation.

In these terms, a Proelectric streetlight typically pays for itself within five or six years. However, solar street lights offer even greater savings when we look at installation costs, which are typically half those of mains-connected lighting.

Taking a real-life example, the Proelectric AE3 and AE6 Solar LED Street Lights are high-quality, year-round, solar-powered LED systems. Replacing existing exterior lighting with one of these systems, or choosing one of them to light a new commercial or public estate, offers significant cost savings in several areas:

- No cabling or trenches to dig during installation. The lights do not need to be connected, so no contractors are required for cabling and no machinery is needed to dig trenches. Typically, this means that installation costs are halved compared to mains-connected street lights.
- Fast installation, which means less disruption to roads and traffic.
- Fewer contractors on site for a shorter time, which is particularly important for estates that are security sensitive.
- No maintenance required. When an element in the streetlight comes to the end of its operational life, a new part can easily be swapped in.
- Simpler and less costly project management for the duration of the works.
- No expensive DNO connection is required to link to the mains grid for power.
- No ongoing electricity costs. No mains energy or grid connection is required, which also means that the lighting will continue to work even in a power cut.



**Reduced  
maintenance and  
fast installation**



**No mains energy  
or grid-connection  
required**



# Evaluation Criteria

## For Long-Lasting Solar Street Lighting

When considering which solar streetlight solution is appropriate for a specific use case, there are a number of evaluation criteria.

### Consider the effectiveness of a suppliers solution



What is the street lights performance during a British Winter?

#### Performance and efficiency

Has the streetlight been tested and proven to deliver its claimed performance in Northern Scotland during a British winter?

Does the streetlight have a separately mounted solar panel that can be oriented south at the correct angle to harvest the most light in both Southern and Northern Britain?

Can you access the streetlight remotely to check on performance and control its lighting schedule?

How many nights of autonomy, where it can keep delivering the expected light output with no solar input at all, does the unit offer?



Is the street light built to British Standards?

#### Reliability and durability

Is the streetlight British Standards compliant in all aspects of design, components and built quality?

Are the specific components used in each key part of the streetlight the best high-quality choice?

#### Cost-effectiveness over its lifespan

Does the company have experience in planning and installing lighting projects similar to your use case?

How long is the warranty and how will problems be addressed if the streetlight is not made in the UK?

What redress is there if the streetlight does not perform as promised by the supplier?

#### Sustainability and environmental benefits

What is the track record of the supplier? Is it focused on quality, cost savings from a long-term sustainability viewpoint?

Are they experienced in design and installation to minimise embedded carbon on lighting projects?

# Conclusion

Solar street lighting is here to stay but some manufacturers need to be more transparent and honest about the ability of their panels to cope with conditions in the UK.

The benefits of solar street lighting are clear for countless use cases, from facilities managers and property developers to local authorities and large commercial estates. Installation is faster and half the cost of traditional mains-connected lights, there is no need for an expensive DNO connection, maintenance is negligible and operating carbon emissions are zero. Embedded carbon is also dramatically lowered, lights can be remotely monitored and controlled, and light pollution is minimised.

However, the claims of some manufacturers who are new to the UK market should be taken with a pinch of salt. There is a responsibility on suppliers to be transparent and honest about the ability of their panel to perform as promised in British winters.

**There are solar street lights, such as the Prolectric AE3 and AE6, that have been designed, tested and proven to work all year round in the UK, whatever the weather, even in Northern Scotland.**

However, this is not the case with all manufacturers, whose products may only deliver 6-8 months of proper performance in Britain. If a product looks too good to be true, it probably is, so be proactive in challenging inflated claims about product performance.

It is recommended that anyone who is seeking to move to solar street lighting for its many benefits should first engage with the experts, who should be happy to offer free advice and site visits. Engage with designers and manufacturers in the UK who understand challenging local conditions and have a track record of working out how to get solar street lighting to perform in non-ideal placements, as well as delivering products that are proven to work.



# Appendix

Street lighting study by the College of Policing:  
<https://ukrlg.ciht.org.uk/media/12713/sotn-report.pdf>

State of the Nation: 2020 Street Lighting Survey:  
<https://www.college.police.uk/research/crime-reduction-toolkit/street-lighting>

Solar cell efficiency chart, National Renewable Energy Laboratory:  
<https://www.nrel.gov/pv/cell-efficiency.html>

Photovoltaic power potential across the UK map:  
<https://globalsolaratlas.info/download/united-kingdom>

Setting the standard for street lighting, University College London:  
<https://www.ucl.ac.uk/bartlett/ideas/setting-standard-street-lighting>

UK government to achieve net zero by 2050:  
<https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zeroemissions-law>

Solar Street Lighting Market Trends  
<https://www.marketresearchfuture.com/reports/solar-street-lighting-market/market-trends>

Permanent Solar Street Lighting  
<https://prolectric.co.uk/permanent-solar-street-lighting/>

Shaping the sustainable cities of the future with smart street lighting  
<https://www.enzen.com/global/insights/case-studies/shaping-sustainable-cities-future-smart-streetlighting/>



# Market Leaders In Solar Powered Street Lights

Prolectric were the first company to introduce permanent, solar-only street lights to the UK in 2011. Now, with tens of thousands of units installed nationally, we are the market leaders. Designed, tested and proven to work in the UK in all weather conditions, all year round.

[prolectric.co.uk](http://prolectric.co.uk)

## We're Here To Help

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