



Solar Bollard[®] *Lighting*



OUR COMPANY STORY



THE WORLD'S NO. 1

Solar Bollard Light



MIKE ARIENI

Our Inventor & Founder

WELCOME TO SOLAR BOLLARD LIGHTING®

Solar Bollard Lighting® (SBL) have been at the forefront of renewable energy powered lighting design & innovation since commercialising the world's first all-in-one solar bollard light two decades ago.

Ingrained in our DNA is the need to push technological boundaries and further evolve our industrial grade solar lighting to achieve greater lighting performance and a more sustainable outcome for society and the environment.

We've created many first-to-market milestones, including:

- World's first all-in-one solar bollard light commercialised in 2005
- World's first IK10 vandal-resistant solar bollard light
- World's first IP68 submersible solar bollard light
- World's first standalone solar light that can work in fully shaded locations

Our award-winning industrial grade solar bollard lights will continue to improve with each generation, offering further illumination performance capabilities when utilised for public spaces, defence, education, health, maritime, commercial infrastructure, residential type communities, holiday parks, resorts, theme parks, and the mining, gas & oil industries.

We've achieved other key manufacturing milestones, including:

- First Australian Made (AMCL) solar lighting manufacturer - 2012
- First Australian ISO 9001 certified solar lighting manufacturer
- First Australian ISO 14001 certified solar lighting manufacturer (certification coming soon)

WE'VE CREATED MANY FIRST-TO-MARKET INNOVATIONS & MANUFACTURING MILESTONES WITH EACH PRODUCT GENERATION RELEASE

Key Wholesalers Pty Ltd was incorporated in 2003, long before solar lighting had evolved, or climate change had become the hot political topic it is today. Founder Mike Arieni started the journey in 2001 when he first started the parent innovation company.

Solar Bollard Lighting® (SBL), the brand name, was registered in November 2013, when we decided to refocus and specialise in one solar lighting technology.

Since then, we have consistently opened new market opportunities with our Australian Made and vandal-resistant solar bollard lights that would forever redefine, that solar powered lighting does work, and why it has become accepted globally.

The long-life cycle of our SBL2 Series industrial grade solar lighting reduces Co2 emissions, and operational expenditure (OPEX). When compared to the excessive

waste created by regularly replacing imported short life cycle products from Asia, the SBL2 Series is the only standout performer when a positive outcome for society, and the environment is to be achieved.

We're truly inspired by how some of our clients use our products. Seeing this motivates us to evolve further, to find new and creative solutions, so we can support our clients to pioneer into a cleaner and greener future for the generations to follow us.

Our versatile product design gives our global team the unique ability for each individual client's project to be custom designed, ensuring they are delivered a reliable, long-life cycle, fit for purpose renewable energy powered lighting outcome every time.

That is why Solar Bollard Lighting® are the: **World's No.1 solar bollard lighting manufacturer.**

About Us



OUR KEY SUCCESS FACTORS INCLUDE:

Excellence in Fulfilling the Promise

We provide innovative products of uncompromising quality and benefit to customers.

Quality Processes

To ensure quality, we maintain ISO 9001 certification. Our Quality Management System establishes, documents and implements processes, policies and objectives.

We gain and maintain a competitive advantage using the latest research and development, manufacturing, and assembly techniques to keep ahead of the innovation curve.

Loyalty, Dedication and Integrity

We consider these qualities essential to the prosperity of the company and our global group.

We recognise that mutual commitment to success leads to the prosperity of all involved.

QUALITY POLICY - ISO 9001

Our vision is to create a profitable business and management culture based on ISO 9001.

We're committed to:

- Employee welfare and interests
- Advancing in our diversity and inclusion approach
- Conducting business that makes economic, social and environmental sense
- Health & safety, legal and regulatory requirements
- Meet or exceed customer expectations

SOCIAL RESPONSIBILITIES POLICY

We believe that our global reach as a cutting-edge, innovative solar lighting technology company comes with global responsibility.

We know that the way we conduct business can make a difference to global communities and the environment, and we believe that 'good for business' and 'good for people' are not mutually exclusive pursuits.

We conduct business with integrity, ensuring decisions make good economic, social and environmental sense.

We are proud of our continuing efforts to help communities and are committed to implementing responsible practices.

COMPLIANCE POLICIES

Anti-Bribery and Corruption Policy

Corruptly making, offering to make, agreeing to make, or authorizing any payment, loan, donation or gift of money or anything else of value, directly or indirectly, on behalf of the customer or any customer affiliate to or for the benefit of any 'public official', is not acceptable conduct to SBL.

Anti-Slavery and Human Trafficking Policy

Maintaining a supply chain or any part of a supplier's business that practices slavery and/or human trafficking, is not acceptable conduct to SBL.

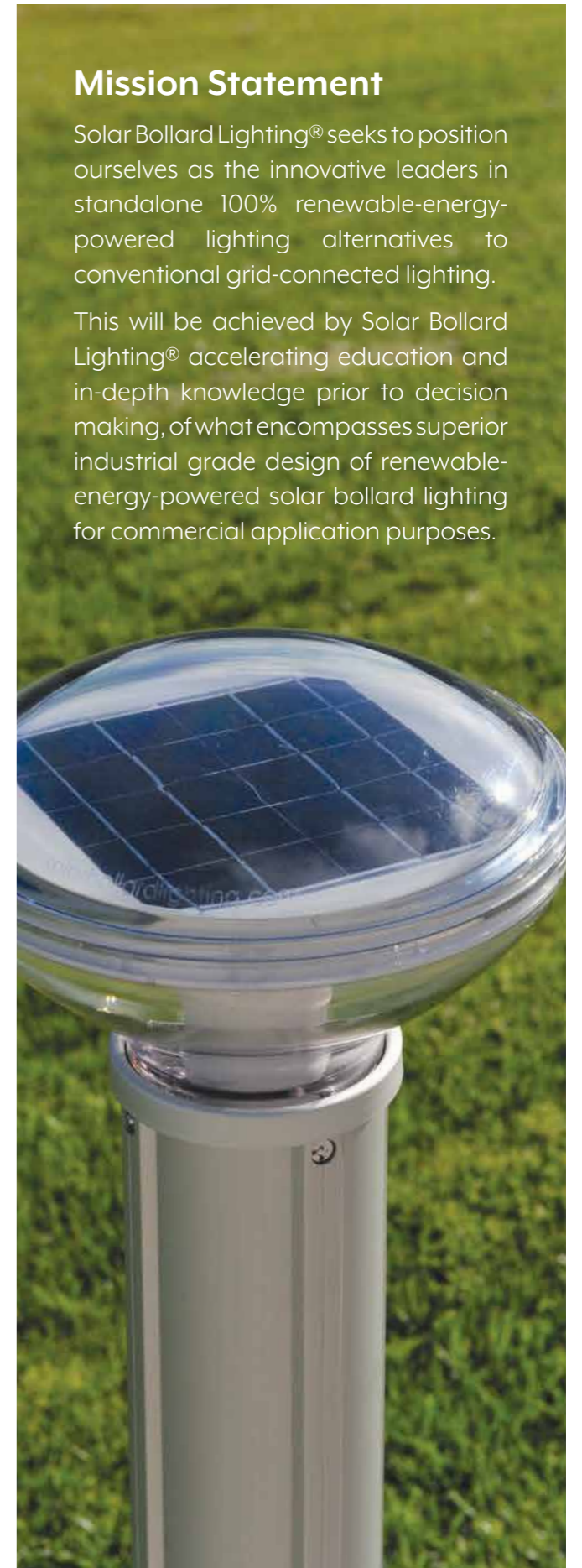
Code of Business Conduct Policy

Using conflict minerals in any manufacturing or contract manufacturing activities or in the provision of the goods or services, is not acceptable conduct to SBL.

Mission Statement

Solar Bollard Lighting® seeks to position ourselves as the innovative leaders in standalone 100% renewable-energy-powered lighting alternatives to conventional grid-connected lighting.

This will be achieved by Solar Bollard Lighting® accelerating education and in-depth knowledge prior to decision making, of what encompasses superior industrial grade design of renewable-energy-powered solar bollard lighting for commercial application purposes.



Designed, Manufactured and Made in Australia



PREMIUM INDUSTRIAL GRADE SOLAR LIGHTS

The global charge towards net-zero by 2050, and a focus on a circular economy that aims to minimize waste and maximize longevity of products through sustainable practices, has shifted product design to focus on durability, a long-life cycle, and reuse, re-manufacturing, or re-cycling capabilities

Over 40,000 of our Australian Made solar bollard lights have been installed in over 40 countries and growing. This global reach and growth demonstrate our commitment to consistent product quality, achieved by combining our innovative design expertise, use of the highest quality raw materials available, and Australian manufacturing excellence under ISO 9001 certification.

Our brand reputation was built on consistently delivering all our clients only the highest quality, premium industrial grade solar lighting product that:

- is 'Fit for Purpose'
- has a long operational life cycle, which:
 - reduces operational costs
 - reduces environmental waste
- is capable of reuse, re-manufacturing, and recycling
- reduces the end user carbon footprint.



ORIGINAL DESIGN INNOVATIONS

Many solar bollard lights marketed by competitors, are utilising similar designs originally innovated by us, and modified by the manufacturers to integrate into their own product design to compete with us.

They can try to imitate our original design innovations that will continue to evolve, and lead the technology curve. Combined with our Australian manufacturing excellence, we will always far exceed their capabilities.

These competitor products are suitable for home use, in the garden, along pathways and driveways, but will never compare to our industrial grade solar lights, designed specifically for commercial applications.

FACT OR FICTION MARKETING

Many solar bollard lights marketed as "suitable for commercial use", are nothing more than home use solar lights being over promoted to mislead buyers.

Here are some examples of what to look out for:

- The price is cheaper than quality products, and the warranty term offered is 5 years or less.
- When you ask a specific technical question, they do not answer in full and back it with evidence.
- Images of the product and its components used in marketing are nothing like the real product.
- The most insane marketing claim and major Red Flag we've seen: **there product is Vandal Proof.**

No product installed in a public place will ever be "VANDAL PROOF"

Lighting up the World

TRUSTED AROUND THE WORLD

Solar Bollard Lighting® is lighting up your part of the world through our international sales network.

With over 40,000 of our Australian Made solar bollard lights having been installed in over 40 countries, you can be sure you will come across one at some point

Our versatile product design gives our global team the unique ability for each individual client's project to be custom designed, ensuring they are delivered a reliable, long-life cycle, fit for purpose, renewable energy powered lighting outcome every time.

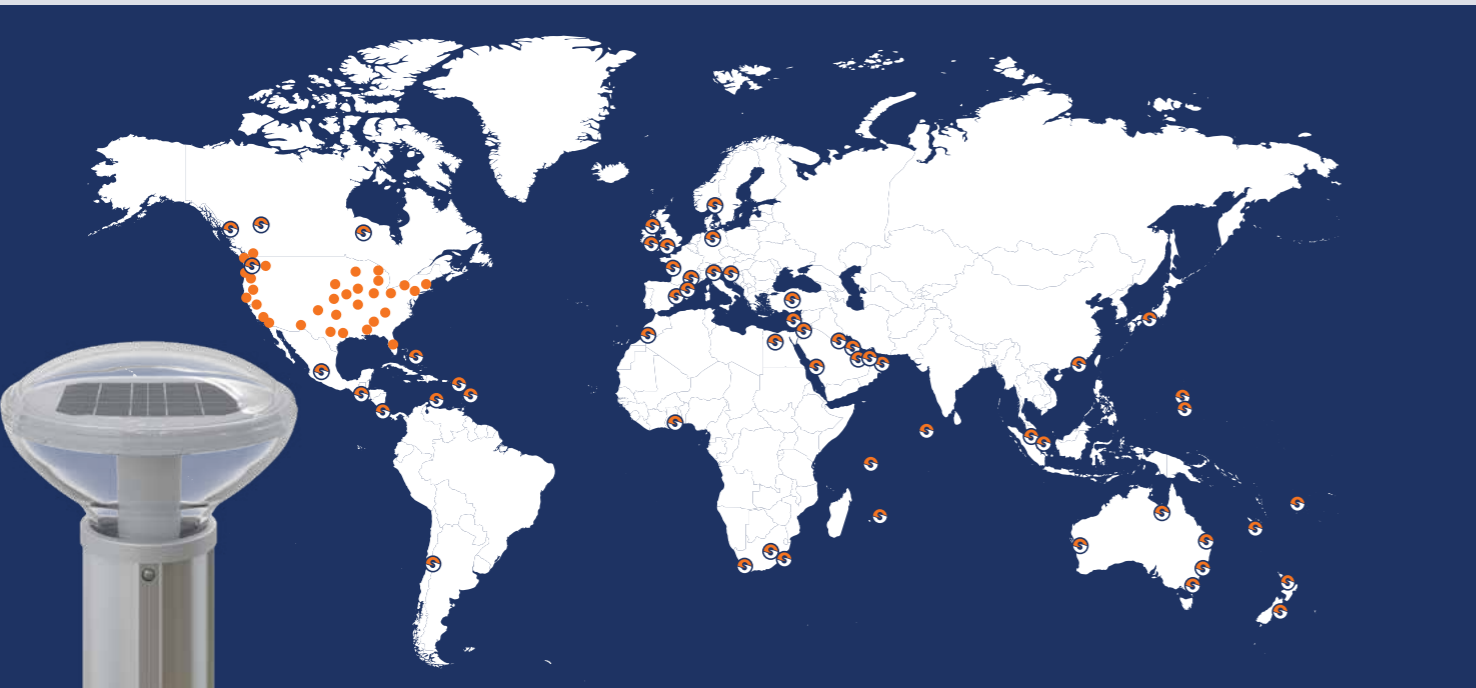


QinetiQ Headquarters - Farnborough England

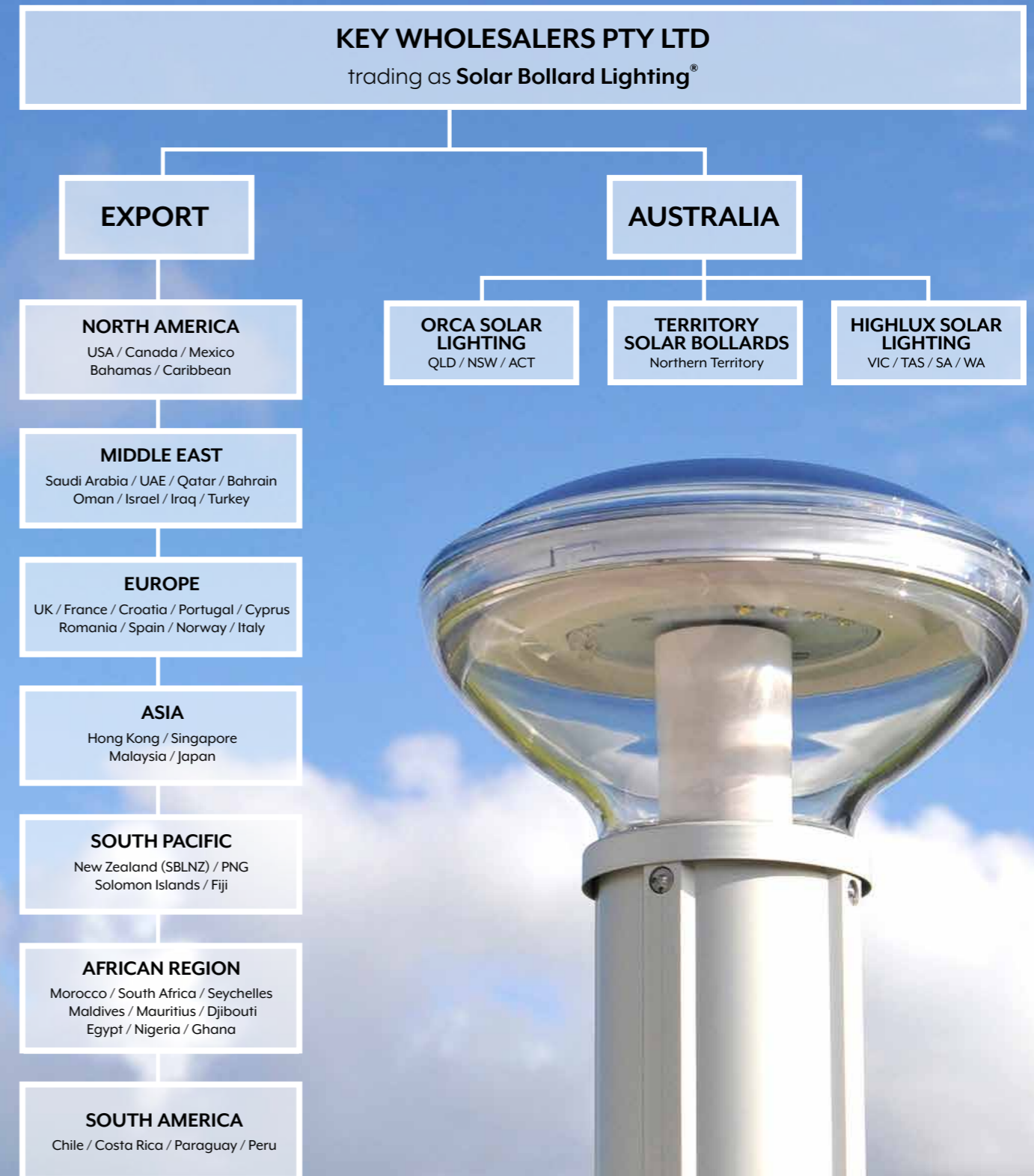
Bahamas - Nassau
 Canada - Maple Ridge
 Canada - Surrey
 Canada - North York
 Chile - La Reina
 Costa Rica - San Jose
 Croatia - Rijeka
 Cyprus - Nicosia
 Egypt - Cairo
 El Salvador - La Libertad
 Fiji - Sigatoka
 Fiji - Nadi
 Fiji - Suva
 Fiji - Nakasi
 PNG - Port Moresby
 PNG - Lae

France - La Chevroliere
 Ghana - Accra-North
 Guam - Tamuning
 Hong Kong - Kwun Tong
 Israel - Rechovoth
 Italy - Ranco
 Germany - Hamburg
 Japan - Miki City
 Mexico - Jal
 Morocco - Agadir
 New Zealand - Halswell
 Rep of Mauritius - Cassis
 Rep of Maldives - Male'
 Saipan - Susupe
 Seychelles - Providence
 Singapore - Singapore

South Africa - Lanseria
 South Africa - Bluff
 South Africa - Hermanus
 Spain - Telde
 St Lucia - Vieux Fort
 Turkey - Ankara
 United Arab Emirates - Khalifa City A
 Oman - Muscat
 Bahrain - Manama
 Qatar - Doha
 Kuwait - Kuwait City
 Saudi Arabia - Riyadh, Jeddah
 United Kingdom - Clevedon
 United Kingdom - Ireland
 United Kingdom - Scotland
 USA - over 40 Sales Agents



Our Distribution Network



LOCAL GOVERNMENT

STATE GOVERNMENT

FEDERAL GOVT.

LOCAL GOVERNMENT

ELECTRICAL WHOLESALERS

MINING-OIL- GAS

TOURISM

COMMUNITY DEVELOPMENTS

CORPORATE

EDUCATION & RELIGION

Global Clients we have provided solutions to



The SBL Design Difference



WHAT MAKES SOLAR BOLLARD LIGHTING® UNIQUE?

All Solar Bollard Lighting® product releases are original design innovations, our brand reputation was built on consistently delivering to all our clients only the highest quality, premium industrial grade solar lighting products available.

Our Australian Made, award-winning, all-in-one, SBL2 Series is the world's first IP68 submersible solar light designed to suit locations with potential for cyclones, hurricanes, typhoons, tidal surges, tsunamis, and seasonal flooding.

When all other solar bollard lights and grid powered lights have failed, our SBL2 Series will continue to light up the night, every night, even when under water.

The SBL2 Series also includes a model that lights up from dusk to dawn at full power every night of the year even though it is installed in full shade all day.

Despite receiving only ambient indirect irradiation, the battery will still be fully recharged daily in many SBL approved installation locations.

The complexity of our design expertise has made the Solar Bollard Lighting® brand the dominant market innovator and with over 40,000 solar bollard lights installed around the world, means only one thing, *“we know how to design and manufacture them right”*



DESIGNED FOR YOUR LOCATION

Some installation locations may only see two or three hours of sunlight a day or are situated under a fully shaded canopy of trees, with no direct sunlight at all.

Every location has its own unique dynamics, so when we designed our SBL2 Series we wanted to push the innovation curve further to offer product line that would ensure continuous illumination every night.

The only way to achieve a reliable, fit for purpose lighting outcome is by each individual project having an initial geographic location site assessment completed based upon the winter solstice month.

This winter solstice snapshot considers:

- the longest winter night illumination is required for
- the shortest daylight hours when recharging the battery takes place,
- what further disruption of Peak Sunlight will occur due to:
 - the low-tracking sun when shadows are longest
 - historical averages of any snow fall expected,
 - historical averages of any winter rain

We then carry out a Power In = Power Out protocol assessment so we know what current usage will be and what is required to be replenished each day before any product is supplied.

Competitors have a single product design to suit all locations, which rely on LED dimming for battery conservation that use motion or PIR sensors to trigger full power activation upon approach. The downside to this concept is these sensors are located close very close to ground level, so can be triggered by animals, rodents, reptiles, insects and vehicles at the times it needs to be conserving battery power.

This example shows how much operational variance can occur between locations, installed in full sunlight:

Darwin, Australia is closer to the equator.

- Nightly run times of each light between summer and winter differ by 1.28 hours
- Peak sun hours to recharge differ by 0.41 hours

Hobart, Australia is further from the equator.

- Nightly run-times of each light between summer and winter differ by 6.21 hours
- Peak sun hours to recharge differ by 5.18 hours





Only genuine SBL products have our name moulded into the top dome cover

SBL2 SERIES IS THE ONLY PRODUCT CHOICE FOR COMMERCIAL USE

When procuring product for a commercial project, value for money is not just about initial asset price and involves other considerations such as:

- quality of the asset & level of innovation in design
- fitness for purpose
- supplier's industry experience and market history
- warranty term & exclusions (i.e. battery warranted)
- operational life-cycle (based on warranty term)
- environmental sustainability
- whole of life costs = CAPEX + OPEX which include:
 - initial purchase price (CAPEX)
 - maintenance, operating, and transition out costs (OPEX)

The warranty term & exclusions, are an indication of the expected product life-cycle. Most imported product suppliers do not warrant their batteries.

Long life-cycle products, have a 10 year warranty:

- low ongoing operational expenditure (OPEX),
- no battery replacements
- low disposal cost
- low environmental impact
- bollard pole will last in service without requiring replacement for at least 25 years or more.

Short life-cycle products have a 2-5 year warranty:

- require more frequent asset replacement intervals
- have very high operational costs (OPEX) due to
 - complete asset and/or battery purchase costs
 - high labour costs
 - high disposal costs & environmental impacts due to volume of interchange intervals of expired assets, new asset packaging that would contain polystyrene being imported.

The SBL2 Series is the only solar bollard light that is market proven for commercial use because:

- it is a proven industrial grade design
- is manufactured with only quality raw material grades and utilises the latest componentry.
- is manufactured under a strict ISO9001 QMS
- each assembled product has:
 - a consistent high quality finish
 - with no moulding defects
 - with perfect optical clarity
- it has an operational life-cycle exceeding 10 years
- is the only product available on the market with a
 - 10 year product and performance warranty
 - that includes the pole and the battery
- has all product certification tested through NATA accredited laboratories in Australia.

Why Choose Solar Bollard Lighting®

There are many reasons architects, landscape designers, facility managers, town planners, developers, civil contractors, mining & resource companies, and governments from around the world choose the SBL2 Series.





Australian Made



AUSTRALIAN INNOVATION & MANUFACTURING EXCELLENCE

The state of Queensland, also known as the sunshine state, is the home of Solar Bollard Lighting® based in the heart of Moreton Bay.

Australia has produced great innovations, like Wi-Fi technology, Google Maps, the Black Box flight recorder, the Heart Pacemaker, the Ultrasound Scanner and the Electric Drill, to name a few.

So, in 2004, when Mike Arieni from Queensland had the idea of a bollard pole with an all-in-one solar light mounted to the top of it, he joined a long list of Australian inventors.

The first-generation solar bollard lights were manufactured in Taiwan from 2005-2009, and by the start of 2010, all research & development of the next generation had been moved to Australia. Today, all our products are designed and manufactured in Australia.

Solar Bollard Lighting® are the only solar lighting manufacturer in Australia licensed to use the Australian Made logo globally.

Australian design and manufacturing excellence ensures that the quality of the SBL2 Series, and all future product releases are:

- manufactured under ISO 9001 QMS standards
- all product certifications are tested by Australian NATA accredited laboratories

Our high standards are why we can confidently offer our Australian manufacturer backed 10-year product and performance warranty on our SBL2 Series product range.

Solar Bollard Lighting® is committed to not just meeting, but setting the world's best standards in solar bollard light innovation and manufacturing.

If it doesn't say solarbollardlighting.com on the top dome cover, it's not an original Solar Bollard Lighting® product.

So, beware of imitations.



Multi Award Winning

OUR AWARDS FOR BUSINESS, INNOVATION & EXPORTING EXCELLENCE

In 2020, the SBL2 Series achieved "Gold Award" product design recognition at the Good Design Awards.

In 2022, the SBL2 Series achieved lighting industry design recognition at the National Excellence in Lighting Awards, winning the "Overall Innovation" award.

In 2023, Solar Bollard Lighting® was recognised by @AuManufacturing as one of "Australia's Top 50 Innovative Manufacturers".

The SBL2 Series is recognised for being:

- Australian Made
- ISO 9001 certified QMS
- IP68 certified - operational when fully submersed
- IK10 certified - extremely high impact resistance
- Will operate in fully shaded locations
- Will operate at full power from dusk until dawn
- Backed by a 10-year warranty

Business excellence and product innovation is the driving force behind Solar Bollard Lighting® winning many awards. These include:

- **2007 Winner** SCEC Greenhouse Gas Reduction Award
- **2007 Highly Commended** MSC Entrepreneurial Business of the Year
- **2016 Winner** Australian Smart Lighting Summit 2016 "Most Innovative Product Award"
- **2018 Winner** RDA Moreton Bay Exporting Excellence Award
- **2018 Finalist** TELSTRA Innovation Excellence Award
- **2019 Winner** Brendale Business Awards Business innovation
- **2019 Winner** Moreton Bay Region Business of the Year
- **2019 Winner** RDA Moreton Bay Exporting Excellence Award
- **2019 Winner** Australian Coastal and Marine Ecology Environment & Sustainability Award
- **2020 Winner** Good Design Gold Award
- **2021 Top 10 judge's finalist** on Australia by Design: Innovations TV series
- **2021 Finalist** Premier of Queensland Export Awards – Sustainability Award
- **2021 Finalist** Premier of Queensland Export awards - Small Business Award
- **2021 Finalist** Premier of Queensland Export awards – Overall Innovation Award
- **2021 Winner** Moreton Bay Exporting Excellence Award
- **2022 Finalist** Premier of Queensland Export Awards – Sustainability Award
- **2022 Inaugural Hall of Fame Inductee** Moreton Bay Council – Queensland
- **2022 Winner** Lighting Council of Australia National Awards for Lighting Excellence – Overall Innovation Award
- **2023 Winner** Australian Owned – Proudly Australian Award
- **2023 Silver Award** @AuManufacturing's - Australia's 50 Most Innovative Manufacturers
- **2023 Finalist** Premier of Queensland Export Awards – Sustainability and Green Economy



Mike Arieni – Founder of Solar Bollard Lighting receives another Industry Award





IP68 Submersible

THE WORLD'S FIRST IP68 SUBMERSIBLE SOLAR BOLLARD LIGHT INNOVATOR

The SBL2 Series meets ISO 9001 standards, and its engineered quality is unmatched by our global competitors.

Completely sealed and watertight, the lights are fully submersible. NATA testing certified the lights well above minimum IPx8 test procedure standards.

Installing mains power within a marine environment brings unique challenges. If live wires are exposed to water which is conductive, it can have dangerous outcomes.

The advanced design of our SBL2 Series solar bollard lights achieves the engineering feat of working underwater without a connected power source.

Very few solar lights can withstand the effects of saltwater environments, which is another reason the innovation of the world's first IP68 submersible light is a game-changer.

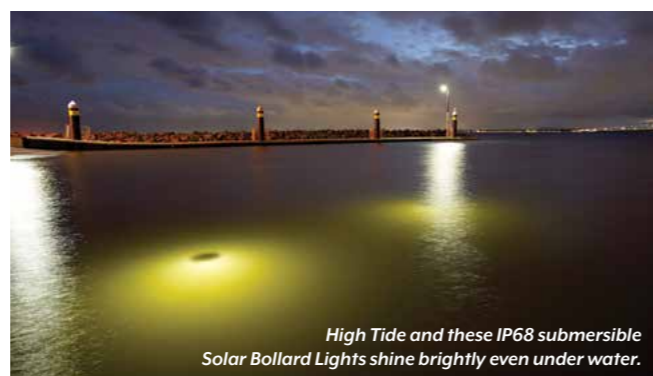
Designed for the harshest marine environments, the applications for this light include:

- marinas, pontoons, docks, jetties or piers
- foreshores
- quay side pathways
- ocean front boardwalks
- wetlands

Our SBL2 Series submersible solar light was designed for locations with potential for flooding, cyclones, tidal surges, and tsunamis. Even coastal regions that are receiving higher than expected king tides because of sea level rise from climate change.

So, when all other solar bollard and grid powered bollard lights have failed, we continue to light up the night, every night, even when under water.

Very few solar lights can withstand the effects of saltwater environments which is why the innovation of the world's first IP68 submersible solar bollard light is a game-changer.



High Tide and these IP68 submersible Solar Bollard Lights shine brightly even under water.



IK10 Impact Resistant

WORLD'S FIRST IK10 VANDAL RESISTANT SOLAR BOLLARD LIGHT INNOVATOR

Solar Bollard Lighting led further innovation when we released the SBL Series solar bollard light in 2012. It would become the world's first IK10 vandal-resistant solar bollard light.

Bollard lights, in general, are easy targets for vandals because they are highly visible and accessible in public thoroughfares. Continually replacing them can be an expensive ongoing exercise. If they're connected to mains power, damage can expose wiring which, in turn, exposes the public to the danger of electrocution. Our world-first innovation of the solar-powered bollard light in 2004 eliminated that risk.

When designing the SBL2 Series, we needed to increase its impact resistance because this new product would also be submersible for locations susceptible to flooding. We modified our injection moulding tool to ensure a more heavy-duty solar bollard light luminaire that would be tough enough to sustain impacts from floating debris in rapidly flowing floodwater.

We tested the impact capability of the upgraded design in our factory using a 3kg (6.6lbs) sledgehammer. It was only when the solar bollard could sustain the forces without any damage to the luminaire that we were satisfied it was ready for production.

The test of time has proven that vandals have very rarely been successful in damaging our solar bollard lights, making the replacement levels to date extremely low.





Charges in the Shade

WORLD'S FIRST STAND-ALONE SOLAR LIGHT FOR FULLY SHADED LOCATIONS

When designing the SBL2 Series, we thought strategically about all the installation locations that existing stand-alone solar lighting products in the market could not fulfill.

The goal: Find a way to design a standalone solar light that can function in full shade.

We aimed to become the first solar lighting manufacturer to tap into this completely new market sector and create another world-first innovation at the same time.

We needed the light to work continuously at full power from dusk until dawn, then fully recharge the following day only from ambient indirect irradiation. We worked hard to calculate the operating parameters needed to achieve an acceptable outcome for the end user. We eventually worked it out but had to now prove it.

The trial: Our first installation was to be Albany, Western Australia, in highly dense vegetation with no broken sunlight throughout the day. Trenching to lay cabling for mains-powered lighting was not possible due to the density of tree roots and the environmental impact it would cause in the area. The trial was installed in 2018 and would push the SBL2 Series to its limits and confirm if our Power In = Power Out solar power design formula was correct.

It was concluded a complete success, and still today the solar bollard lights are working at peak efficiency and reaching the required lighting standard under AS/NZS 1158.3.1:2005, as was originally specified.



Constant light all night, even fully shaded under trees



Product & Performance Warranty

WORLD'S FIRST 10-YEAR SOLAR BOLLARD LIGHT WARRANTY AND INCLUDES THE BATTERY AND BOLLARD POLE

We understand that when our customers invest in solar lighting powered by renewable energy, they expect the positive outcomes to be sustainable and long term.

That's why our SBL2 Series solar bollard lights come with the world's only 10-year product and performance warranty, which includes the battery and bollard pole.

There is no other product on the market that comes close to the capabilities, longevity, and strength of our SBL2 Series industrial grade solar bollard lighting range.

Most competitors use low grade raw materials, and componentry, and is:

- how they keep their products price cheap,
- why their warranty term is always 5 years or less
- why they exclude the battery and bollard pole

Some even wind up every few years to avoid honouring their warranty, then start new companies with a similar name or brand, making the exact same products and leaving their customers with no ongoing support.

The SBL2 Series being an Australian Made product, from an Australian-owned company that has been around already for two decades, you are assured of our ongoing support.

Solar Bollard Lighting® ensures our customers get value for their investment with us, and a long term partner, with a long to market history, and proven track record globally.



There is nothing on the market that comes close to the quality and longevity of our SBL2 Series solar light bollard



100% Clean Energy



POWERED BY 100% RENEWABLE ENERGY

Solar Bollard Lighting® has been at the forefront of design & innovation of stand-alone lighting products powered only by renewable clean energy from the sun for two decades, and long before climate change had become the hot political topic it is today.

As a renewable source of power, solar energy has an important role in reducing greenhouse gas emissions and mitigating climate change, which is critical to protecting humans, wildlife, and ecosystems. Energy provided by the sun is a reliable and consistent energy source, and solar power is much more sustainable and it's free.

Over a 10-year duration, to create the same amount of light generated by 100 of our SBL2 Series solar bollard lights, you would need to produce in energy from the grid:

100 units = *1,100watts x 12 hour per night average = 13,200Wh
13,200Wh x 365 days = 4,818,000 Wh / 1000 = 4,818 kWh x 10 years = 48,180 kWh
48,180 kWh would have created #25.39 tonnes of CO₂

Unlike lights that are connected to a grid, our SBL2 Series is a stand-alone product that has minimal environmental impact when installed, as there is no requirement to dig trenches or lay power cables. And best part is, when the grid goes down our SBL2 Series solar powered lights will keep on working.

*Based on historical 11-watt compact fluorescent lamp
Based on Australian data 2021 - 526.9 grams of carbon dioxide equivalent per kilowatt-hour



100% Recyclable

LONG LIFE CYCLE PRODUCT DESIGN

- SBL2 Series has:
- an in situ life cycle of 10 years minimum
 - a single 3.2VDC cylindrical LiFePO4 cell as battery

Having original 2005-2009 GENI models in operation still today, after only requiring gel battery interchanges and dome top polishing to keep them operational.

From this earlier model data, we can assume that our Australian Made products from 2012 utilising superior co-polymer PC, low cycle LiFePO4 cells, and latest electronic componentry available, will see the products achieve life cycles well more than 10 years.

SBL2 SERIES HAS NINE MATERIAL CATEGORIES:

1. Luminaire PC & ASA polymers in situ life cycle:

- 10 years minimum > 15 years.
- Recyclable

2. Solar Panel in situ life cycle:

- 10 years at 100% power output > 15 years possible
- Recyclable or Re-purpose

3. PCB with LED Chips in situ life cycle:

- > 15 years possible. Recyclable

4. Silicone O-Ring & EPDM Gaskets:

- > 15 years possible. Recyclable

5. Single cylindrical LiFePO4 cell in situ life cycle:

- 10 years minimum > 15 years.
- Recyclable or Re-purpose

Below components have good recycle value

6. Tinned Copper Wire Cables in situ life cycle:

- 10 years minimum > 15 years possible.
- Recyclable at any cable recycling facility

7. 316 SS Screws & Security Bolts in situ life cycle:

- > 30 years possible.
- Recyclable at any metal recycling facility

8. Aluminium Collar in situ life cycle:

- 10 years minimum up to 15 years possible.
- Recyclable at any metal recycling facility

9. 6106 T6 Aluminium Pole in situ life cycle:

- > 30 years possible.
- Recyclable at any metal recycling facility.



SBL EXTRUDED ALUMINIUM BOLLARD LIFE CYCLE

Our 6106 T6 Aluminium Pole has an in-situ life cycle that could well exceed 30+ years.

The SBL bollard pole will be capable of 2-3 solar luminaire changeovers throughout its operational life, before requiring replacement.

Due to this fact OPEX costs are minimal, as replacement of a new SBL solar luminaire is completed by removing the 4 x M6 316 SS security bolts and interchanging the expired luminaire with the new replacement.

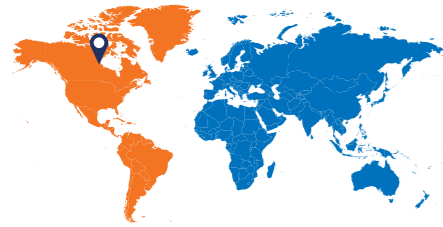
Since releasing our first GENI in December 2005, our pole profile design has not changed, as we have also done with our luminaire mounting shafts with all releases since, which will continue with all future releases as well.

Competitor products have an expected 3-5-year life cycle, before requiring complete asset (luminaire and pole) replacements over a comparative 10-year life cycle.

This means OPEX costs will be increased as a new complete asset will be required, with additional labour charges for asset removal and re-installation, then disposal of packaging and the expired complete asset.

Projects throughout the World

THE CITY OF DULUTH - MINNESOTA



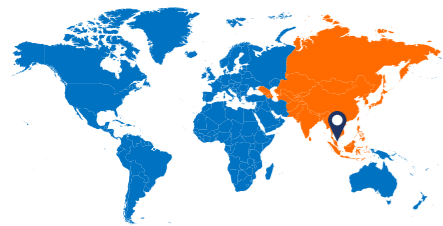
Located on the western side of Lake Superior, the port city of Duluth is the largest US city on the world's largest freshwater lake. The City of Duluth installed nine SBL2 Series solar bollard lights along the lakeside Veteran Memorial Walk.

The competitive advantage that convinced them to choose Solar Bollard Lighting®'s SBL2 Series included:

- The SBL2 Series 100% renewable solar bollard light does not require mains power, which meant no trenches were needed when installing the solar bollard lights in this environmentally sensitive location.
- In the harsh winter environment around Lake Superior, temperatures can drop below -15°C. The lighting solution had to be robust and not subject to corrosion and rust.
- The SBL2 Series extruded 6106 marine grade aluminium pole, was ideal for this environment.
- Despite only 8.5 hours of daylight in winter, the low light and fast charge SBL2 Series solar bollard lights maintain full power throughout the longest nights.
- The City of Duluth required a solar light that limited light pollution, so the 100% renewable-energy-powered SBL2 Series solar bollard light met all the criteria.



SINGAPORE SPORTS HUB



The Singapore Sports Hub is one of the world's best fully integrated sports and entertainment lifestyle hubs. The sports hub includes a 55,000-capacity national stadium, and a 12,000-capacity indoor stadium.

Solar Bollard Lighting supplied 153 SBL2 Series solar bollard lights for the sports hub. The lights delivered the following benefits:

- They met the 100% renewable energy requirements for the sports hub's pathway and walkway lights.
- Would activate at a higher lux level than normal dusk to dawn operation.
- The versatility of the SBL2 Series in coping with a variety of light and shade was a necessary and important advantage with light placements in full sun, half sun locations.
- The IP68 and IK10 rating, and the 6106 aluminium light poles meant the SBL2 Series bollards exceeded the extreme weather and climate challenges of the region.
- Product longevity was a requirement, and the SBL2 Series' 10-year product performance warranty and with up to 30-year life expectancy of the poles, is an unmatched feature of the product.



FORBES NSW AUSTRALIA



The town of Forbes is located in regional New South Wales in Australia. The Forbes Shire Council wanted pathway lights for their lakeside parks, and were conscious that the Lachlan River was prone to severe flooding.

Following installation of over 400 SBL2 Series lights, a massive flood occurred in 2021. All the solar bollard lights that went underwater were still in perfect working order after the floodwater subsided. Since then, it has flooded five times with the same outcome.

The benefits of choosing the SBL2 Series for Forbes Lakes pathways included:

- The SBL2 Series is the only solar bollard light in the world with an IP68 submersible rating. This is why the solar bollard lights survived the Forbes floods numerous times.
- All Solar Bollard Lighting models have an IK10 vandal-resistant rating which makes them ideal for impact from floating debris during flood events.
- The independent 100% renewable SBL2 Series required no connectivity to the main electricity grid which is affected during flood events.
- The versatility of coping with a variety of light and shade conditions is an advantage, with the Forbes Lake light placements needing to be in full sun, half sun and full shade locations.



AGAETE LAS PALMAS SPAIN



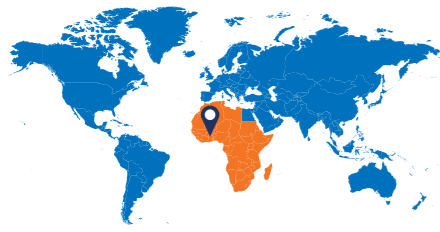
In the beautiful Canary Islands off the western coast of Spain, solar bollard lights were required for a pathway and steps leading down to the coastline and beaches. The

Solar Bollard Lighting® SBL2 Series was selected as the preferred option due to its many benefits, including:

- 100% renewable-energy-powered as mains power was not available in the nearby vicinity so to cost-prohibitive to connect to the grid.
- The installation required the solar bollards to light the hillside stairway that led down to the ocean. Being a narrow stairway the SBL2 Series was ideal due to its small footprint design.
- Consistent reliability was required as these lights were installed to improve security and safety for tourists and locals using the path and stairway.
- The 3000K warm white LED light suited the location's aesthetics
- The SBL2 Series has proven reliability, which is especially valuable when being installed in a remote location.



TEMA LNG TERMINAL GHANA



Solar Bollard Lighting® can be found all over the world, but you would seldom find a more challenging environment than the Tema LNG Terminal in Ghana in sub-Saharan Africa. The port facility is designed to receive LNG carriers, store LNG, then refill the carriers for export.

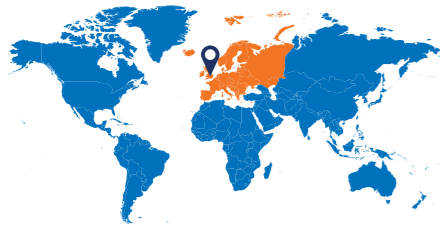
The required lighting had to meet and overcome many challenges and the SBL2 Series solar bollard light is the only commercial grade product in the world that met the brief, which included:



- The proximity of the lighting to the ocean meant the solar bollard lights were often within a few metres of the water's edge.
- The SBL2 Series has unique properties that make it the only solar bollard light in the world able to operate and survive in these rough seas and high salt environments.
- The SBL2 Series is the only IP68 solar bollard light with a submersible rating.
- The SBL2 Series is ideally suited to operate in extreme marine environment, including unpredictable bad weather and storm surges.
- Salt corrosion is a constant problem for most port environments. The commercial-grade, 6106 T6 extruded aluminum alloy pole used on all Solar Bollard Lighting® models is impervious to rust or corrosion from salt water.
- SBL2 Series solar bollard lights are extremely strong with an IK10 rating.



QINETIQ FARNBOROUGH ENGLAND



When defence technology giant QinetiQ required a solution for lighting the grounds surrounding their large headquarters in the English countryside, they wanted a sustainable green lighting solution with low environmental impact, and no digging of trenches.

After a review of all available commercial solar lights, QinetiQ selected Solar Bollard Lighting. The advantages of this first-class commercial solar bollard light that satisfied all their requirements were:



- A 3-week installation with no trenching and very little disruption.
- An installation of lighting to reduce electricity costs, with low maintenance and a superior operational lifespan, to further reduce their operational expenditure.
- Lighting that provided consistent year round security, running independently of the power grid.
- Aesthetically pleasing, industrial grade solar lighting to help achieve QinetiQ's sustainability targets.

HERON HEAD PARK - SAN FRANCISCO



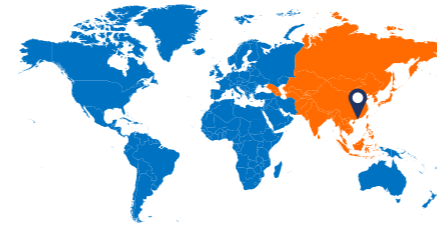
Located within 5 km of the Golden Gate Bridge, Heron's Head Park is a sanctuary for bird life and has its own eco centre. When a new eco-friendly children's playground was built on the site, Solar Bollard Lighting® was selected to provide the solar bollard lights for the walkway and paths around the playground and park.

Here are some of the reasons the Port of San Francisco chose Solar Bollard Lighting® for this eco-sensitive location:



- Green energy was a mandate to power the park's lights. The 100% renewable-energy-powered SBL2 Series lights require no external power and are 100% recyclable.
- Twenty-four SBL2 Series solar bollard lights were installed along the pathways and areas around the playground to enhance security and safety for children and general public using the facilities.
- The reliability of the solar powered lights was essential.
- The SBL2 Series was the only solar bollard light with a 10-year warranty and IP68 submersible rating, and with unmatched impact performance due to the IK10 vandal-resistant rating.
- SBL originally designed this project for the Port of San Francisco Authority before going out to tender.

HONG KONG AIRPORT



Hong Kong International Airport is one of the largest and busiest passenger hubs in Asia and the busiest cargo gateway in the world.

When the Airport Authority Hong Kong was looking at lighting solutions for the airport precinct, they searched China, Asia and the world. With very specific requirements for a commercial grade product, Solar Bollard Lighting was selected to produce 153 SBL2 Series solar lights for the Scenic Hill Sky Rail entry walkway and staircase.

The unique requirements that the Solar Bollard Lighting SBL2 Series model met and surpassed included:



- 100% renewable energy powered solar bollard lights with a long lasting battery autonomy, so no connection to mains power was required.
- Being close to the airport, the solar bollard lights needed to conform to EMC regulatory standards.
- A lighting solution which provided consistent security and safety for pathways and stairs in non-lit areas of the airport precinct.
- The solar bollard lights had to be vandal resistant, so the preferred choice was SBL2 Series, which has an IK10 vandal-resistant rating.
- Hong Kong Airport is located on reclaimed ocean land. The environment is prone to heavy storm activity and severe rain during the wet season. The SBL2 Series is the world's only IP68 submersible solar bollard light.



NAMBUCCA NSW



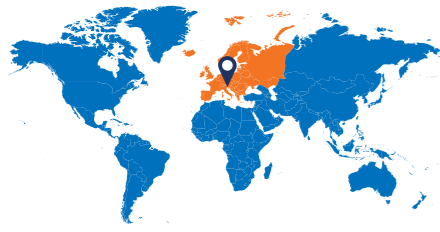
Nambucca Heads is a quiet seaside town on the mid north coast of New South Wales in Australia. The Nambucca Valley Council installed 90 solar bollard lights along the sea wall footpath. The path which is a local tourist attraction and outdoor gallery where the sea wall boulders are painted in bright colours by artists from the local area.

This unique location had several challenges which made the Solar Bollard Lighting® SBL2 Series, the solar bollard light of choice, these include:

- Although beautiful, the path along the sea wall means salt water is constantly present in the air. The SBL2 Series commercial grade extruded aluminum alloy 6106 was selected because the pole would not rust or discolor in this corrosive environment.
- The SBL2 Series is the only solar light in the world with an IP68 submersible rating. With unpredictable storm surges and high tides, this model is ideally suited to operate in coastal environments.
- The solar bollards are strong and durable. The SBL2 Series is the only solar bollard light with a 10-year warranty and unmatched reliability including an IK10 vandal-resistant rating.
- A unique security feature of the SBL2 series is that the light head is secured by 4 x 316 stainless steel security bolts. The bolts can only be removed with a Solar Bollard Lighting® supplied tool.



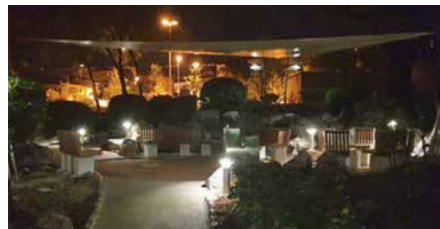
RIJEKA CROATIA



Located in the south of Croatia, Rijeka is a port city on Kvarner Bay in the northern Adriatic Sea. It's known as a gateway to Croatia's islands.

When the local authorities decided to install lights in a local park, they selected Solar Bollard Lighting® to supply 58 solar bollard lights to meet their specific requirements as follows:

- The 100% renewal energy lights caused no disruption to the park and no trees or plants had to be removed when installing the lights.
- The lighting solution provided security and safety for the local residents who used the parks pathways at night.
- The solar bollard lights had to be vandal resistant, so the preferred choice was the SBL2 Series, which has an IK10 vandal – resistant rating.
- The SBL2 Series lights had the advantage of working in a variety of different locations in the park, from full sun to full shade.



AL JERYAN QATAR



Located North of Doha, the Al Jertan Palace needed solar lighting to line the streets around the palace compound.

Solar Bollard Lighting® supplied 20 SBL2 Series solar bollard lights which met all the client's requirements, including:

- 100% renewable energy powered products. This was stipulated to show a further green footprint in construction.
- Qatar is one of the hottest regions in the world, where summer daytime temperatures frequently exceed 40°C, so durability in withstanding temperature was critical.
- Ability to withstand high UV exposure without yellowing. The SBL2 Series dome top made of SABIC Lexan™ SLX has the highest UV rating in the world, so outperformed other products.
- The SBL2 Series design was thought to be futuristic in design, so was considered aesthetically suited to the palace precinct.



PAPUA NEW GUINEA



Across the Pacific in Port Moresby, the capital of Papua New Guinea hosts the Independence Hill that signifies the declaration of independence for the island nation.

To commemorate the country's 37th Independence Day anniversary Solar Solutions PNG were tasked with installing solar bollard lighting to rejuvenate the look of one of PNG's iconic landmarks as well as providing lighting for the tombs of former heads of state.

The SBL2 was selected to re-purpose all incandescent light poles based on the following

- As part of the vision to introduce green technology around the gardens and landmark sites, the SBL2 was chosen as it outperforms previous technology in aspects of durability, operation redundancy and electricity cost savings.
- The solar bollard lights being Australian Made, guaranteed a quality finish and long lasting product would be installed.
- The solar bollard lights sophisticated modern design is aesthetically pleasing that it rejuvenates the landmark and tomb sites at nighttime.
- Located below the equator, PNG is prone to seasonal monsoons and extreme heating conditions so the solar bollard lighting was chosen because of its robust features.





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