



LEADSUN

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light

EDUCATIONAL SERIES | PART 1

Public lighting for social, economic and environmental benefits

The Shine a Light educational series considers the evidence around the need for appropriate lighting at night in public spaces, with a focus on areas for informal use that are not covered by street lighting and how this should be delivered.

Part 1 introduces the need for appropriate public lighting to support many positive social, environmental and economical outcomes including safety, accessibility & equity.



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Leadsun operations take place on the lands of First Nations people across Australia and we acknowledge them as Traditional Owners and Custodians of the lands and waters upon which we depend. We recognise their continuing connection to land, waters and culture and we pay our respects to Elders past, present and emerging. In particular, the Leadsun team would like to acknowledge the Bunurong/Boon Wurrung and Wurundjeri Woi-wurrung people of the Kulin Nation on whose land we are base.

This paper focuses on areas of informal use that are not covered by street lights, which include paths through parks, along creeks, following train lines and within car parks (excluding sports grounds). Additionally, areas that are insufficiently illuminated by street lights also require lighting to eliminate dark voids next to places where people walk or congregate.

Lighting should create a safe and welcome space for everyone and be designed in consultation with those who might otherwise avoid the area, particularly women, marginalised groups, older people and those with vision impairments.

*Leadsun solar pathway lighting,
Gardiners Creek Trail, Ashburton*

THE VALUE OF WALKING

Walking is an activity most people do every day without even thinking about it. We define walking as "people getting around on foot as well as people using all forms of mobility devices that allow them to travel at human speed, such as walking sticks, wheelchairs and mobility scooters." Walking is a key part of people's lives and important for governments to encourage and support.

Prevalence in Australia

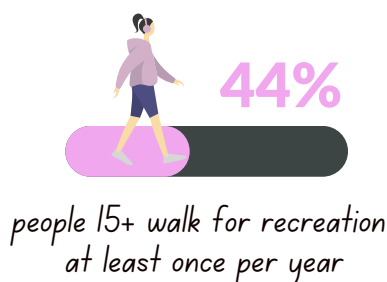
Walking is an activity most people do every day without even thinking about it. It is the most popular recreational physical activity in Australia, with 44% of people aged 15 and older walking for recreation at least once per year. It is particularly important for women, with 54% participating [1]. One third of people walked even more than usual during the COVID-19 related (April-June 2020) lockdown in Australia [2].

Walking can also be a form of transport to get from place to place. Regular surveys of who, when, where, why and how people travel are conducted by some state governments. Walking is sometimes included as 'active transport' and usually only

considered where it is the only mode, making it difficult to know exactly how much walking is happening.

In Greater Hobart, walking is relatively common with over 20% of all trips walked in their entirety [3]. By comparison, in Greater Brisbane 10% of all trips are walked in their entirety, however further analysis finds that more than 20% of all trip stages are walked [4]. In Melbourne 16% of trips are walked based on 2012-16 data. An additional 8% of trips involve some walking, such as to get to the bus stop [5].

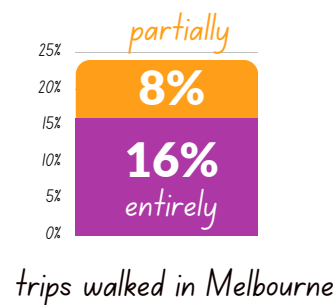
Most popular recreational physical activity



Particularly important to women



Essential mode of transport



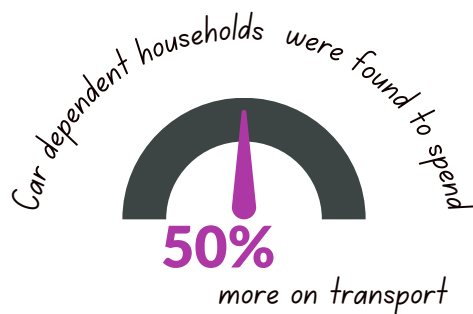
Personal Benefits

Walking has many benefits, both to the individual as well as broader society [6]. An individual who walks might experience:



Physical, cognitive & emotional

Improve health & wellbeing



Reduce or eliminate transportation cost



Improve social connection and sense of belonging

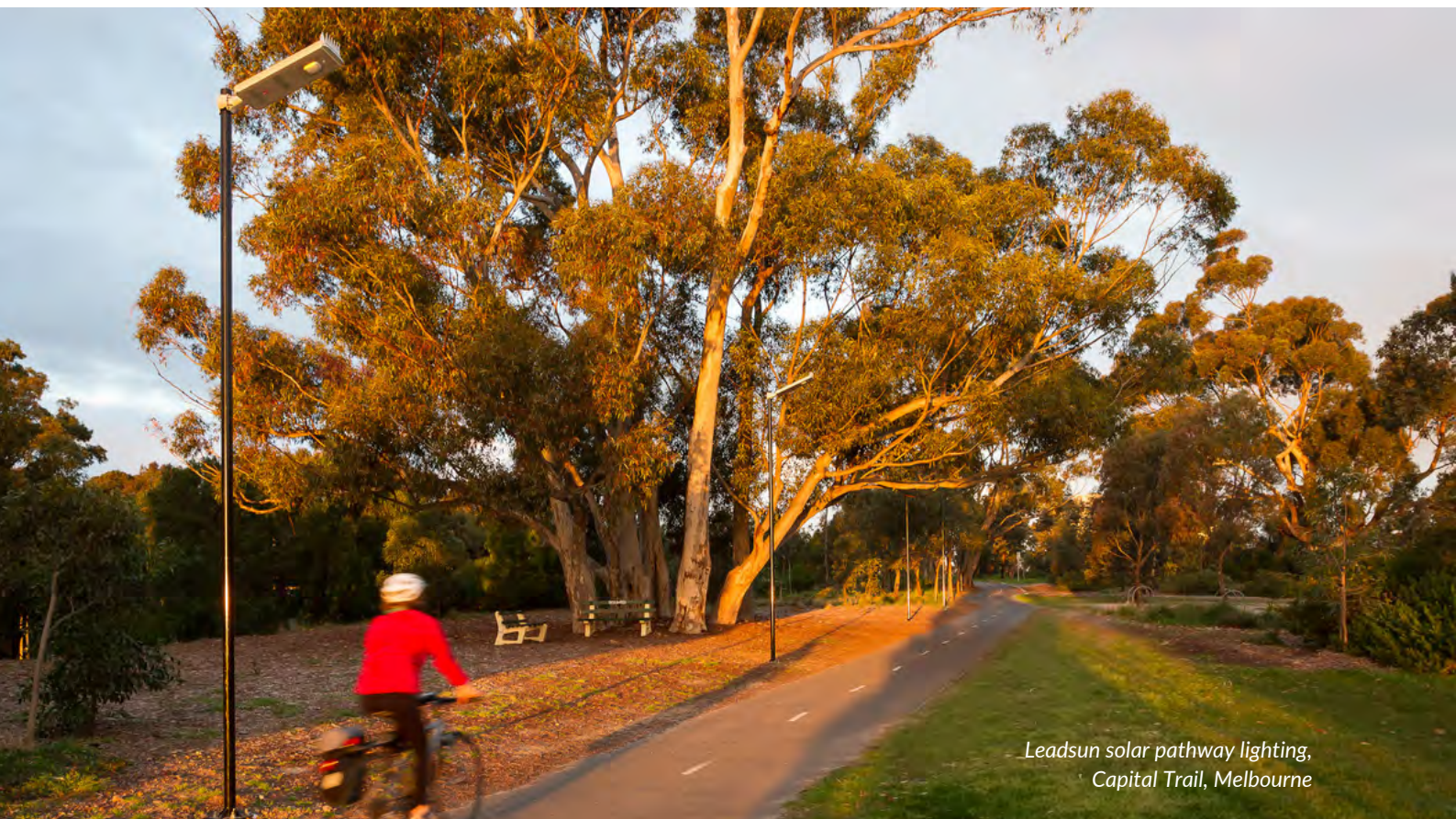
“Many days I would say [walking] is one of the most important prescriptions I’ve written”

“If there were a pill that people could take that would nearly cut in half the risk of heart disease, stroke, diabetes, reduce the risk of cognitive decline, depression, reduce stress, improve emotional wellbeing, everyone would be clamouring to take it; it would be flying off the shelves. But that pill, that magic potion, really is available to everyone, in the form of 30 minutes a day of brisk walking.”

*Jo Ann Manson, MD, DrPH in
The Walking Revolution*



*Leadsun solar pathway lighting
Tower Hill Park, Lynbrook*



Leadsun solar pathway lighting,
Capital Trail, Melbourne

Widespread Benefits

There are also many widespread benefits of walking amongst groups and society as a whole, including:



Government

Reducing road, health & environmental costs



Local Businesses

Increasing retail spend & revitalisation



Society

Encouraging everyone to use the street regardless of gender, age or ability.



Communities

Improving social cohesion & feeling of safety



For every trip that is walked instead of driven, there is less:



Congestion

Fewer vehicles on the roads



Pollution

reduced vehicle emissions & less noise

DEMAND FOR WALKING AT NIGHT

Australian life has changed since the post-war years when business and factory workers stopped after work for the six o'clock swill before retiring to their homes. The evenings are now a time for life and activity, work and play.

Night-time Economy

In the period 2016/17 and 2017/18 the national night-time economy provided more than a million jobs in over 100,000 businesses with a turnover of \$134 billion [7].



Extending Functioning Hours

Lighting paths through parks and shared paths extends the hours during which they can be used, making better use of existing council assets. Good public lighting in commercial areas can also lead to more people using the space at night, with a likely outcome of more support for the night-time economy [8].

Lighting, or the lack thereof, is one of many factors that determine where and if people walk at night. To try and isolate the impact of darkness on cycling and walking rates from other factors like temperature and reason for travel, research data from Arlington County, Virginia USA considered the week before and the week after the start and end of daylight savings over five years. It found the

number of people out walking fell by 38% in the hour between 5:30 and 6:30 pm due simply to darkness in the week after the clocks changed, however the number of pedestrians per site was relatively small with fewer than 70 pedestrians per day on average across all counters [9].

Better lighting of recreational spaces offers the potential for more people to exercise after dark, effectively giving them more time to exercise. Lack of time is a key reason people give for not exercising more. 'Not enough time/too many other commitments' was the most common barrier recorded by Australians who are not physically active in the comprehensive Ausplay survey, especially for adults aged under 45 [1].

The evidence is mixed as to whether improved lighting promotes more physical activity, however studies have found that increasing lighting levels in a street (opposed to a park) does result in more people walking [10]. No research was found demonstrating a positive relationship between better lighting in parks and increased walking rates, however studies do find that people avoid walking in parks at night if they are not well lit. In one Swedish study, participants walked a set route through their neighbourhood during the afternoon and early evening (before sunset) and then discussed their experiences and perceptions. People frequently reported avoiding areas with greenery (such as parks) after dark, even if it meant they had to use a significantly longer route or walking along busier roads. Some participants even reported using another mode of transport instead of walking [11]. The authors noted that this was similar to the findings of many other studies, including in Australia.

Same As During The Day

Despite the growth of nocturnal life, there is little information about how much recreational and transport walking happens at night. However, Victoria Walks believes that recreational paths and open spaces that are well utilised during daylight hours should be lit at night. If public space is not well lit, this could effectively exclude broad sections of society including women, marginalised communities, older people and people with impaired vision. Everyone deserves the opportunity to move about their community at night and fully participate in society using their preferred, or sometimes only, form of transport.

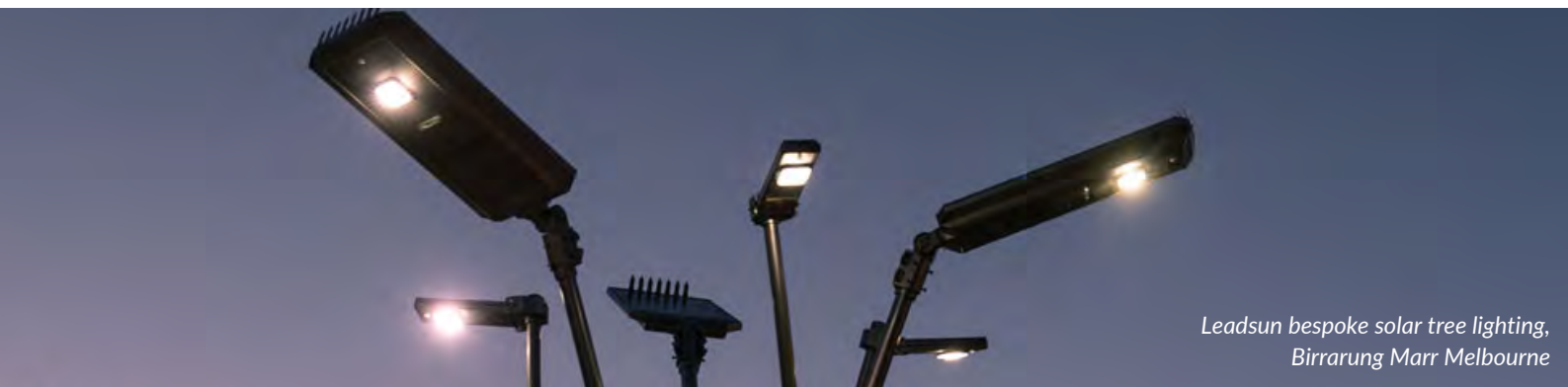
Public Transport

It is well established that walking and public transport use are closely linked. In Melbourne, nearly everyone who leaves home to catch a bus or tram walks to the stop. Walking is also the most common way people get to train stations, with 66% of trips to a train station walked, plus a further 15% involving a bus or tram and so likely some walking [5].

Municipal parks switched from functioning as assets during the day to becoming obstacles after sunset.^[11]

Leadsun solar recreational lighting, Bendigo Future Gardens





*Leadsun bespoke solar tree lighting,
Birrarung Marr Melbourne*

IMPORTANCE OF GOOD PUBLIC LIGHTING

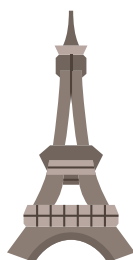
All lighting in a city's public realm contributes to how safe and pleasant it feels to walk there. This includes street lighting, other public lighting such as in parks, gardens and along shared paths, and private lighting from buildings or advertising. Good lighting is important but generally not noticed. Conversely, poor lighting quickly becomes apparent.

Serves a Purpose

The Urban Design Guidelines for Victoria [12] are a useful source of information on public lighting. They recognise that public lighting is "critical to creating a public realm that is safe and inviting for users" and:



**Supports safe travel,
wayfinding, and orientation**



**Emphasises crossings,
landmarks, and destinations**



**Identifies areas of potential
conflict with others**

The Queensland Road Planning and Design Manual (2004) [13] generally focuses on technical details for lighting in road environments but notes that the objective of pedestrian area lighting is "to assist pedestrians to orient themselves, detect potential hazards and to discourage crime against both person and property" [13].

Good lighting helps people orient themselves and find their way at night by ensuring important objects and locations are well lit. It can also help people identify entrances and exits, as well as safe, popular routes through parks and increase their attractiveness after dark.

See, be seen and feel safe

How well and what people can see at night depends on the type and level of lighting provided. During the day most people can see many things around them, including recognising areas they can't see and so might want to avoid. At night, less of the surrounding area is visible and often appears at a reduced distance than during the day. The same objects are visible, but they look different because details and colours are seen differently at night. This means walking at night can be mentally demanding; with one study finding people walking through the woods had to be "unremittingly 'attentive', in a heightened state of alertness, regardless of whether they were in motion or motionless" [14].

When people walk at night, they need to be able to see both the path along which they are walking as well as people and objects in and around the path. A UK study of people walking a set course through a university tracked what people spent time looking at. It found that the most important objects people looked at were the path, especially within 4 m, and other people, especially when they were more than 4 m away [15]. After dark, people appeared to look at the path more.

Good lighting means a path can be clearly seen at night, allowing people to identify obstacles or tripping hazards and so avoid them. This is particularly important to avoid falling or tripping. As injuries from falls in the street are not routinely captured, there is little information about them. Victoria Walks commissioned MUARC to investigate and found falls in the street result in 3,545 people presenting to a hospital emergency department and 1,680 being admitted to hospital each year in Victoria alone. This means that people are more likely to be seriously injured by tripping or falling in the street than being hit by a vehicle [16]. There are almost certainly more falls that result in serious injury which occur in other public places such as parks and shared paths.

A 'legal' approach to lighting provision is to provide enough light on a path so that people can identify a change in height of 25 mm, such as a hazard or uneven surface. It must be able to be seen more than two steps ahead to allow the person time to respond accordingly [17].

One other key function of lighting is to help people see one another, improving perceived safety as well as actual safety. For a person walking in public space this requires:



Be able to see others, and

feeling seen

Good lighting allows a person to identify other people and recognise their intent, particularly whether they are likely to be friendly, indifferent or threatening [17]. The Urban Design Guidelines for Victoria [12] suggest lighting should be sufficient to recognise another person's face from 10 – 15 m distance.

Good lighting also helps people feel safe because they feel others in the space can see them, along with people in nearby buildings or passing vehicles. One study found that people felt reassured to walk at night because of the lighting provided in 62% of 210 locations evaluated. This was second only to feeling reassured by having access to help if needed, reported for nearly 80% of locations [17]. Many studies have found that better lighting is related to increased feelings of safety, even when there is no evidence that the changes make any difference to actual crime levels [18].

Equity

Public lighting is an equity issue, affecting accessibility and both actual and perceived safety, which is inherently gendered.

Gender

A person's perception of walking at night is closely related to their gender.

YourGround's survey reported that safety in public space is a massive concern for women and gender-diverse people, with big impacts on health and well-being [19]. Places where specific community groups are reluctant to exercise, play and connect are not inclusive [19].

Poor lighting was the most common reasons selected by YourGround participants as to why a place might feel unsafe [19].

According to the OECD's Better Life Index, 50% of Australian women feel unsafe walking alone at night [20]. In comparison, only 20% of Australian males feel the same. This discrepancy is universal, with females more likely to feel unsafe than males in all countries studied, but is greater in Australia than any other OECD country.

People often nominate better lighting as a way to make an area feel safer. In Sydney, 90% of females reported feeling unsafe walking after dark [21]. Lighting was identified as a factor in feelings of safety, with adequate lighting the third most common reason for nominating a good location and lack of lighting the fifth most common for bad locations. As part of a study in the US, participants were asked what would encourage them to walk more. Once again, there was a difference in reports by men and women, with lighting mentioned by 33% of women but only 25% of men [22].

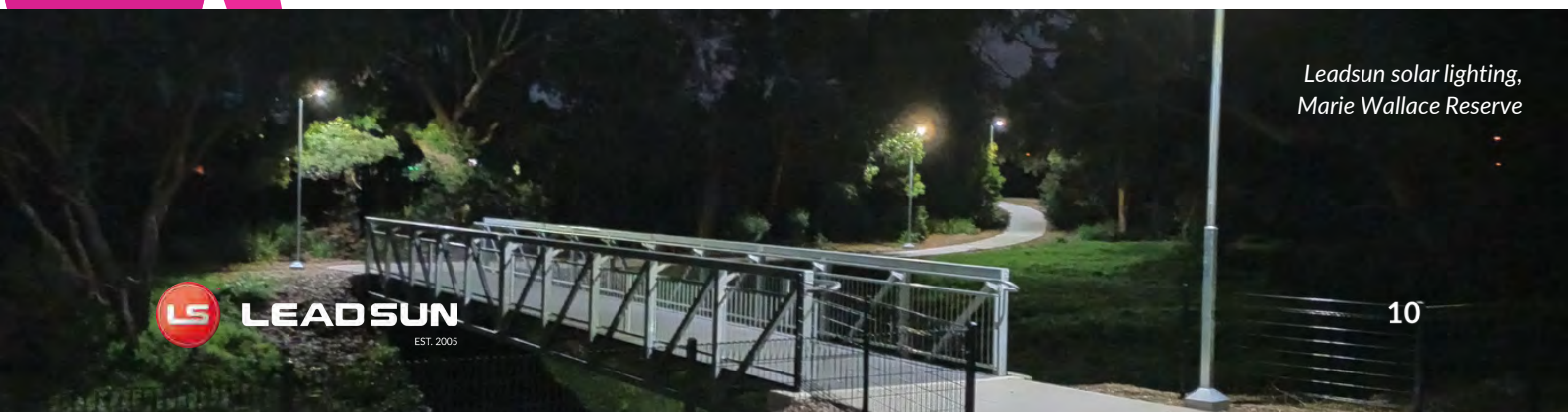
Concerns around walking at night may be particularly acute for young women. A survey of Victorians aged between 15 and 20 found 88% of females felt safe walking during the day, but only 15% felt safe at night, compared with 54% of young men [23].

As a result of feeling unsafe, women change their behaviour. A Women's Safety Audit of the Merri Creek trail in Coburg, Victoria found that following an attack there in 2019, women avoid walking along the trail or only walk with other people [24]. The aforementioned US study similarly found that women tend to walk with others, with 49% walking with friends and family compared to 36% of men [22].

As society moves towards a 24-hour model, many will be working after dark, particularly those in female dominated industries like retail, cleaning, hospitality and healthcare, thus more women will be working and finishing work during hours of darkness.



How many Australian women vs. men feel unsafe walking alone at night



Leadsun solar lighting,
Marie Wallace Reserve

Age & accessibility

The Australian population is aging. In 2018, one in every six Australians (15.9%) was 65 or older, an increase of 0.8% in only three years and 2.6% since 2009 [25].

Whilst there is little age-based research specifically on feelings of safety walking at night, there is significant evidence that a person's ability to see deteriorates as they age. The most common causes of vision loss – including macular degeneration, cataracts, diabetic retinopathy and glaucoma – all become more common as people age [26].

The American Optometric Association [27] and Sharecare [28] report that as people get older changes to the pupil mean:

- More light is needed to see the same things. A UK study found that people aged over 45 need 30% more light than those under that age [29].
- It becomes harder to see in low light,
- It takes longer to adapt to changes in light, such as walking from a well-lit road to a dimly lit park, and
- Bright lights are harder to recover from.

Aging population



In 2018, 1 in 6 Australians were aged 65 or older

Sight deterioration



A person's ability to see deteriorate as they age

Age & light



People aged over 45 need 30% more light to see

More than 13 million Australians, including 93% of people aged 65 and over, have long-term eye conditions [30]. Most can overcome this with corrective lenses, but for many this may compromise their capacity to see at night. In 2016, Vision Australia estimated that 384,000 Australians were blind or had low vision that affects their daily

functioning and cannot be corrected with glasses, with the number expected to grow to 564,000 by 2030 [30]. However, this represents only the most acutely affected people and it is likely that a higher proportion of the population have vision impairments that affect their capacity to see while walking at night.

Long term eye conditions



13 million

Australians including 93% of people over 64 have long-term eye conditions

Blind or low vision



384,000

Australians are blind or have low vision



expected to grow to
564,000

OBLIGATION & COMMITMENT

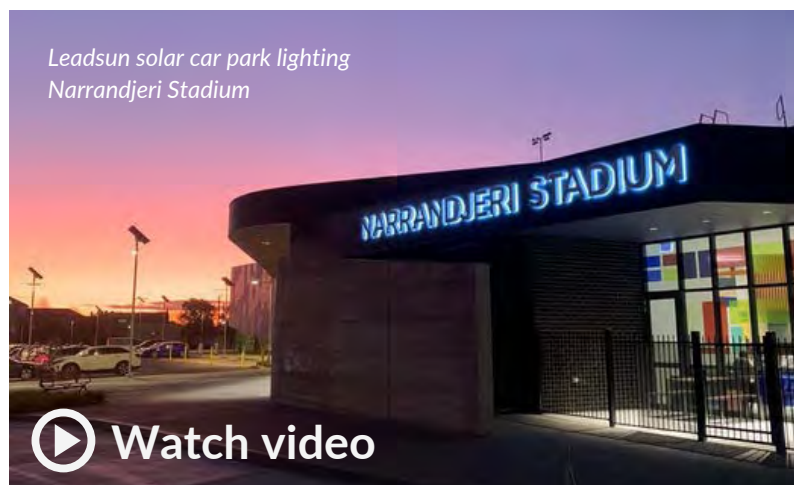
In Australia, authorities are locally and internationally obligated and committed to providing appropriate public lighting in areas not covered by street lights, to meet the needs and benefits discussed earlier in the report.

Victorian Local Government

With the implementation of Victoria's Gender Equality Act 2020, creating inclusive spaces for women and gender-diverse people is a statewide priority.

This was demonstrated by Darebin City Council, with the inclusion of safety enhancing solar lights in their car park - a solution to ensure the facility was welcoming and friendly in the evenings which also helped them promote women and girls' participation in sport (a key priority for the project).

Leadsun solar car park lighting
Narrandjeri Stadium



[▶ Watch video](#)

Internationally

The need to promote walking and provide lighting in a sustainable, energy-efficient way is backed by several government policies ranging from local and global levels. For example, there are several UN Sustainable Development Goals that relate to this, as shown right.

Beneath these goals sit a series of targets. Examples include:

"11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities"

"7.2 By 2030, increase substantially the share of renewable energy in the global energy mix"



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