



UNIVERSITY OF
FLORIDA

Florida Cooperative Extension Service

Fact Sheet EES-96

March 1993



Solar-Powered Outdoor/Landscape Lights¹

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INTRODUCTION

Nighttime outdoor lighting along paths and stairways in your yard are nice for safety and convenience. They can direct company to your front door, relieve worries of evening guests stumbling in the dark and highlight your artistic landscape creations.

Getting the electricity from your utility to the appropriate places in your landscape might be a barrier to installing landscape lighting. Digging trenches to bury electrical wire underground might require tearing up some of your landscape. This can be time-consuming and costly. If low-voltage wiring is not used, buried 110 volt wires can be hazardous if cut by gardening tools. Also, improper electrical connections are dangerous.

Solar-powered lights are another landscape lighting option (Figure 1). They require no electrical wiring. They are powered by DC electricity generated from sunshine and can easily be relocated should you redesign your landscape. They have built-in photo sensors so they automatically turn off during the day and turn on at night. Best of all, light from solar-powered lamps doesn't require the burning of fossil

fuels and the generation of carbon dioxide (CO₂) and pollutants associated with the generation of electricity by a utility.

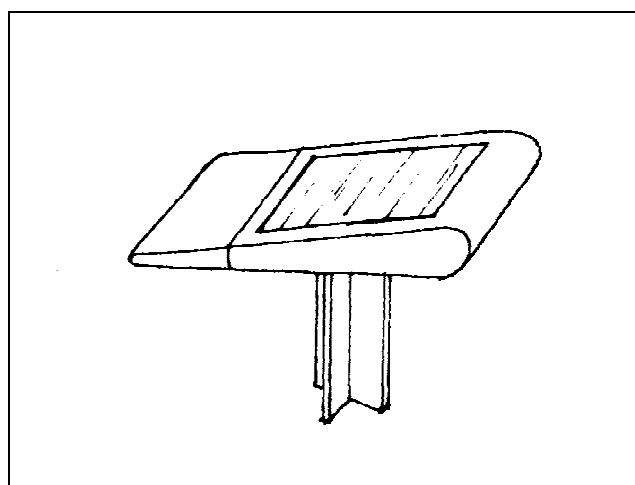


Figure 1. Solar-powered landscape light

SOLAR PHOTOVOLTAIC (PV) ELECTRICITY

The sand on the beach is made of silicon, the second most abundant element on Earth. Many PV cells are also made from silicon, but from a highly purified form.

1. This document is Fact Sheet EES-96, a series of the Florida Energy Extension Service, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: March 1993.
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The term "plates," where used in this document, refers to color photographs that can be displayed on screen from CD-ROM. These photographs are not included in the printed document.

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Table 1. PV outdoor/landscape lights

Size	Type	Provide light (up to)	Approx. 1992 Prices
small	red incandescent (Plate 1, 2)	12 hours	\$25
	white incandescent (Plate 3, 4)	6 hours	\$50
		10 hours	\$60
	halogen	12 hours	\$35
large	fluorescent (Plate 5, 6)	10 hours	\$90
	security fluorescent	2 weeks without sun	\$200

A PV cell has two sides; one side has extra electrons, and the other side has a shortage of electrons. When sunshine hits a PV cell, the solar energy detaches electrons from the side with too many. These homeless electrons, which have a negative charge, are drawn to the positively charged side of the PV cell with the electron shortage. This sets up a flow of electrons in the tiny wires connected to each PV cell. Electrons flowing from all the PV cells form one circuit and generate direct current (DC) electricity. Landscape lights store this energy in a built-in, rechargeable battery and use this energy to power the light at night.

The only things that move in a PV cell are the electrons. Because there are no moving parts to break, PV cells can last more than twenty years.

SOLAR PV LIGHTS: TYPES

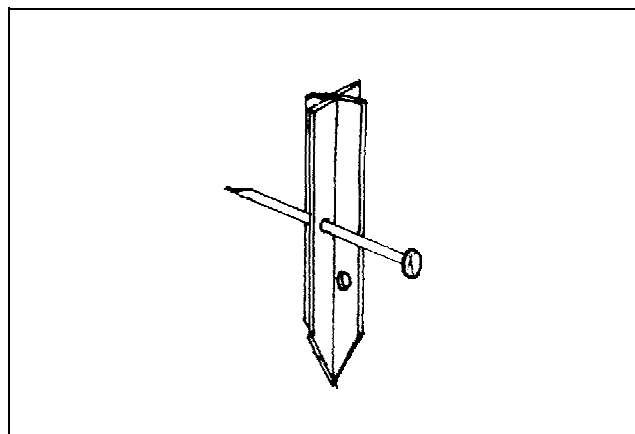
PV landscape light fixtures come in a variety of shapes and sizes. Select the ones that best compliment your landscape. There are small ones that can outline a driveway with a red glow for safety; there are brighter, 4-watt florescent lights (comparable to a 16-watt incandescent) to mark a fence gate or dock ramp (Table 1). For shady spots there are lamps with detachable PV panels; place the lamp where you want it to shine at night and attach the PV panel to the roof or another sunny spot. There are also PV security lights that automatically turn on when triggered by heat or motion.

SOLAR PV LIGHTS: TIPS

- To provide as much light as possible, the PV cells that power these lights need to receive as much sunlight during the day as possible. Most of the PV landscape lights currently on the market have

the PV cells built into the lamp. These lights must be placed in your landscape where they can receive the fullest sunlight. Scout your yard at several different times during a sunny day to make sure that the installation sites selected aren't shaded as the sun moves through the sky during the day.

- PV landscape lights should come with at least a 12-month warranty.
- Install the lamp stake firmly in the ground before attaching the lamp. Never apply force to the PV panel itself.

**Figure 2.** Cut away view of lamp post security

- PV lights are very easy to install. They are also very easy to remove. If you are concerned about theft, the PV lights should be installed more securely. One suggestion is to drill two or three holes through the plastic stake near the pointed end (Figure 2). These holes should be large enough for a 3-inch galvanized nail. Fill a plastic plant pot, at least 6 inches in diameter, with cement and stand the plastic stake with the nails

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straight up in the center. Allow the cement to harden. Bury in the site selected and attach the lamp appropriately.