



## Renewable Energy Solutions

# Solar photovoltaic electricity systems

### 1. General Information

*With energy costs always increasing, it's no surprise that hotels are looking for new ways to reduce their energy consumption. Renewable energy technologies such as photovoltaic (PV) systems are a good solution that is becoming more cost effective as fuel prices rise and will help hotels stay competitive and profitable.*

#### What does Photovoltaic (PV) mean?

Photo means light. Voltaic means electricity. Photovoltaic means getting electricity from light.

#### How well developed is PV technology?

PV is a proven technology that has been used for decades; solar PV systems are well suited for use in Europe all year round.

#### For what can my hotel use a PV system for?

Hotels can install PV panels to reduce or eliminate their monthly electricity bills and provide pollution-free electricity to their guests. The electricity produced can then be used to power your hotel, or be fed back into the grid.

#### How is electricity produced?

Photovoltaic materials have the ability to generate a current of electricity when exposed to light. Photons, which make up light, knock electrons of the photovoltaic material, creating an electrical current. Solar panels produce direct current (DC) electricity. The electricity the hotel uses for most applications is at 240 volt alternating current (AC), so the electricity produced from panels will be transformed by an inverter to AC (or alternating current) power, which is the standard hotel current.

#### How do I know if a solar PV system is a good choice for my hotel?

If your hotel is in an area where the sun shines, free from shading of trees, nearby buildings, or other obstructions, your hotel roof or property contain a large enough area and electricity is costly, chances are that PV solar panels will make financial sense for you, especially if there are tax credits, rebates or other incentives available. Contact an installer to get assistance in evaluating your situation.





### PV Systems

- **Off grid:** If your hotel is not grid connected, the electricity will be used to charge a bank of batteries connected to an inverter. This converts the DC into 240 volt AC, providing usable current for most hotel applications.
- **Grid connected:** If your hotel is connected to the grid you can sell the electricity to the grid when the panels are producing more energy than needed and to import energy from the grid when the panels are not producing enough electricity. Therefore there will be a constant supply of electricity, and the solar electricity produced will not be wasted.

### Where do I mount the PV panels in my hotel?

On hotels the PV panels are ideally erected on a south facing roof where they receive the maximum amount of sunlight. Solar PV panels can also be installed on the side of a building, on the ground or on a pole.

### Do installed solar PV panels have to face a southerly direction?

In Europe, facing south at the correct angle of elevation will provide the best performance however solar panels can also be installed facing towards the east or west as long as proper considerations are made. Solar PV panels should not ever face north.

Solar power systems are oriented to the South and inclined in order to generate the maximum amount of electricity from the sun. A certified installer will be able to advise you on the best way to integrate a PV system into the space available in your hotel.

### Do I need any planning permissions in order to install a PV system?

Most solar PV systems generally not require permission. Nevertheless, it is worth checking with your local administration or authorities to find out about any local laws that may restrict solar PV systems placement, especially if you live in a listed building or conservation area.





## What about cloudy days?

PV solar panels will generally produce electricity at a reduced rate under cloudy conditions. Severe clouds will interrupt the production of power.

## How long will a solar PV panel system last?

Solar panels are known to last 40 years or longer. Modules are generally warranted for 25 years and inverters for 10 years. Solar panels are designed to withstand hail, severe wind and weather conditions assuming proper installation.

## How much maintenance does a PV system need?

As solar photovoltaic panels have no moving parts they are virtually maintenance free. For a grid-tied system where no batteries need be replaced, there is typically little or no maintenance required. Other than that, unless there is an equipment failure there should be no maintenance required.

## Do I need to clean the PV panels periodically?

In most areas of Europe, there is sufficient rain to clean the panels. However, if you are in a dusty area (very near a busy dirt road, very urban area, etc.) you may see a performance gain from cleaning the panels monthly.

If necessary, a hose stream is usually sufficient for cleaning. You might consider a periodic inspection to ensure that the panels remain clear of leaves, dirt, bird droppings etc.

## How do the solar PV panels stand up to hail, strong wind, storms etc.?

Solar panels themselves are built using tempered glass for durability and safety and are designed to withstand hail and high winds. Depending on the wind-load requirements in your area, heavier mounting hardware may be required.

## How can I integrate a PV system to my hotel building?

Building-integrated photovoltaics (BIPV) are dual-purpose: they serve as both the outer layer of a structure and generate electricity for use or export to the grid. BIPV systems can provide savings in materials and electricity costs, reduce pollution, and add to the architectural appeal of your hotel.

Though they can be added to a structure as a retrofit, the greatest value for BIPV systems is realized by including them in the initial building design. BIPV is used in facades, rooftops and glazing.





## What is the payback time of a PV system?

This will vary depending on the local cost of electricity, state and local rebates or incentives, and the installed cost of the solar panel system. The range can be from 3-4 years up to 20 years depending on these factors.

## How can I finance a PV system?

You may fund your renewable energy system in several ways. Many financial incentives which can benefit your hotel are available for example - financial incentives through solar rebates and other programs. Some utilities have also net metering programs, which further enhance the economics of PV. However, these have not been used to their maximum potential. Incentives can save you in some cases more than 50% of the cost of your PV systems. Check for national incentives and don't forget that your local utility company or other local organization may also provide additional support. There also banks promoting the use of solar hot water systems by granting long-term, low interest loans.

Visit [www.iea.org/country/index.asp](http://www.iea.org/country/index.asp) under 'related country and regional information' for more information about available incentives in your country (available for IEA member countries only).

## Should my hotel receive an energy audit?

**Follow the next steps to make your solar PV system a reality:**

- Learn as much as you can about solar PV systems before you make a decision
- Schedule an on-site energy audit
- Call an installer and obtain estimates
- Check zoning, permit and utility requirements, insurance, and other legalities
- Look for financing options
- Install and learn how to safely maintain your system
- Enjoy generating your own energy and saving money



**① If you want more detailed information about the solar hot water system please click here**

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Definitively yes. Doing an energy audit before investing in a PV system is in your best interest, because it will help make the existing energy consumption as efficient as possible and will lower your energy consumption and monthly energy bills. By reducing your energy consumption you will need to pay much less for a PV system that's capable of meeting your lowered-new energy demand.

## Who can install a solar PV system for my hotel?

A qualified installer or an Energy Service Company (ESCO). Installers will estimate the overall cost, and will also inform your hotel about rebates and incentives for which you may qualify.

## What is an ESCO?

An Energy Service Company (ESCO) reduce the hotel energy costs, by taking care of the investments involved of installing a PV system and sharing the resulting future cost savings with you by letting the ESCO install the PV system in your hotel.

## Who can help me with the paperwork for applying to receive financial incentives?

Installation companies are more and more taking over of the application paperwork to receive an incentive. Local energy agencies may also help you.