



Renewable Energy Solutions

Small wind energy system

1. General Information

Wind energy has been used for thousands of years to mill grain and pump water. Now, modern wind energy systems use the energy of the wind to turn turbines, which convert this energy to electricity. Wind has the potential to produce substantial amounts of green electricity, and small wind energy systems have a genuine role in achieving this.

How well developed are small wind energy systems?

Small wind turbines are a proven technology with a track record of over 30 years. Growing demand for small wind systems could cut costs by more than half over the next decade. Small wind turbine generation capacity usually ranges from 1 to 75 kW.

How does a small wind energy system work?



Simply stated, a wind turbine works the opposite of a fan. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity. Wind turbines convert the kinetic energy in wind into mechanical power that runs a generator to produce clean electricity. Small wind turbines are turbines which have lower energy output than large commercial wind turbines, such as those found in wind farms.

Wind turbines typically consist of three or more blades which can be mounted on a horizontal axis or a vertical axis. Horizontal axis wind turbines are by far the most common.

Smaller models can be roof mounted whilst larger turbines tend to be mounted on masts up to 15 meters high. They are particularly useful where mains electricity is not available or is expensive to connect.

Is there enough wind in my region to install small wind energy system?

Knowledge of the local wind is critical to designing a wind energy system and predicting output. Strong and consistent winds will maximize energy generation. In general, a more exposed property has better wind potential.

Where do I mount small scale wind turbines in my hotel?

Wind speed increases with height so it's best to have the turbine high on a mast or small tower. The ideal siting is a smooth-top hill with a flat, clear exposure, free from excessive turbulence and obstructions such as large trees, houses or other buildings.



However, small-scale building-integrated wind turbines suitable for urban locations have now been developed and sit near to the apex of the roof - similar to an aerial or satellite dish.

Do I need any planning permissions in order to install a small wind energy system?

Yes. Always consult your local planning department for details. Wind towers typically rise some meters to catch the best wind.

Check local zoning ordinances for height and setback restrictions before investing in a small wind energy system. Planning issues such as visual impact, noise and conservation issues also have to be considered.

Are small wind turbines noisy?

Noise levels will clearly vary according to design, wind-speed and so on. A 2.5 kW turbine for example generates a noise that is negligible - hardly greater than the noise of the wind in the trees, and never a cause of complaint for local hotel guests.

How much does it cost to install a solar domestic hot water system, and how much can my hotel save?

Costs vary depending of the turbine, mast, inverters, battery storage (if required) and installation; however it's important to remember that costs always vary depending on location and the size and type of system.

What is the lifetime of a small wind energy system?

Turbines have an expected life span of 20 to 25 years but require service checks every few years to ensure they work efficiently. For battery storage systems, typical battery life is around 6-10 years, depending on the type, so batteries may have to be replaced at some point in the system's life.

How much maintenance does a small wind energy system needs?

All wind turbines should be serviced annually. This usually involves visual and noise checks for blade corrosion and component failure.

Some parts may need lubrication, but most systems have sealed bearings requiring no maintenance. For systems that use batteries you will need to keep the electrolyte regularly topped up and grease the terminals, unless they are maintenance free batteries. You should check in advance the cost of maintenance with your installer.

What is the payback time of a small wind energy system?

Larger electricity users will have a shorter payback period, 10-15 years versus 15-25 years for smaller users, because generation costs decline as you increase turbine size and therefore production and use. The price your hotel pay for electricity, the cost per kilowatt hour and your hotel total monthly bill, dictate how long it will take to recover your investment in a wind turbine.

How can I finance a small wind energy system?

You may fund your renewable energy system in several ways. Many financial incentives which can benefit your hotel are available for example. 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 small wind energy system. 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 small wind energy systems by granting long-term, low interest loans.

Visit 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).





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.

Should my hotel receive an energy audit?

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

Who can install a small wind energy 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 small wind energy system and sharing the resulting future cost savings with you by letting the ESCO install the a small wind energy system in your hotel.

Follow the next steps to make your small wind energy system a reality:

- Learn as much as you can about small wind energy 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 producing your own electricity.

📌 If you want more detailed information about small wind energy systems please [click here!](#)

Disclaimer: The sole responsibility for the content of this factsheet lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EACI nor the European Commission are responsible for any use that may be made of the