



2019 Guide to Marine Wind Turbines

4 Steps to Finding The Perfect Wind Turbine for Your Boat

sales@ecopowershop.co.uk
+ 44 (0)1403 261062



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Who is this guide for?

This guide is for owners of all types of boats - including yachts, canal boats and house boats – who are interested in generating power from wind turbines.



How will this guide help?

Eco Power Shop's aim is to help our customers reduce their energy use and so reduce their energy costs. We do this by offering a large choice of different products, incorporating the latest technologies to ensure our customers can find the best products to match their needs. We are the UK's largest supplier of boat wind turbines from the leading manufacturers.

It can be hard to choose from the wide range of different marine wind turbines available today, with many different designs and sizes on offer. This is where Eco Power Shop's expertise comes in - we can help you select the best turbine for your particular power needs.

This guide helps first time buyers understand what they need to consider and look for when purchasing a wind turbine. It also provides a useful summary of the latest wind turbine models available for those who need to upgrade or replace their existing boat wind turbine.

Further information

Our website provides lots of information about the marine wind turbines featured:
<https://www.ecopowershop.com/wind-turbines/marine-wind-turbines>.

If you have any questions or need any further information, please contact the Eco Power Shop team. Email: **sales@ecopowershop.co.uk** or call us on + 44 (0)1403 261062.

We're happy to help and can make recommendations on which wind turbine would suit you best.

Step 1 – Check the basics for your wind turbine

Marine-specific

If you are using your boat at sea or in coastal areas (e.g. on a freshwater lake close to the ocean) the wind turbine must be marinised.

This means that the wind turbine's coating and any exposed bearings are resistant to salt water corrosion, which is essential in ocean environments.

Voltage

12V, 24V...

Your wind turbine must be the same voltage as your battery set-up. This shouldn't be an issue as most wind turbines are available in 12V and 24V versions and sometimes a 48V version. However, always double check as there are some exceptions. See Page 11 for our useful **Summary Table of Wind Turbines** for further information.



Step 2 – Determine what power output you need

The power output varies considerably between different types of wind turbine so it's important to consider what you want to use yours for. There are two main applications for marine wind generators:

Application A) Trickle charging

Keeping your boat batteries charged and in good condition when you are away from your boat for long periods. This makes sure that when you arrive at your boat, the batteries are always ready to start the boat's engine.

For this application we'd recommend a vertical axis wind turbine that offers many benefits, including being very compact (see the box below). The small Rutland 504 wind turbine also offers a cost-effective option for trickle charging batteries on smaller yachts and sailboats (generally less than 10m long).

What are Vertical Wind Turbines?

These turbines have a vertical axis rotor, meaning the blades move vertically through the wind.

The Leading Edge vertical axis wind turbines (LE-v50 and LE-v150) have a Savonius-style, 3-blade design which gives great power output for their size.



What are the advantages of vertical wind turbines?

The LE-v50 and LE-v150 wind turbines only have one moving part which means they are virtually indestructible and easy to maintain.

They are also very compact and lightweight which is really useful on boats where space can be limited.

They are totally safe as the rotor design limits its RPM automatically so anything that enters the moving rotor (an accidental hand or bird) will be deflected away without harm.

The Leading Edge vertical wind turbines are also virtually silent.

What are the disadvantages of vertical wind turbines?

The LE-v50 and LE-v150 turbines are great for trickle charging boat batteries but may not generate enough power for larger boats or if you live on board your boat. For these applications, we recommend a horizontal axis wind turbine.

Application B) Providing power if you live on board or do longer boat trips

The power from a marine wind turbine means you will be less reliant on onshore power or running your engine to charge your boat's batteries.

In turn this will reduce your boat's running costs by reducing fuel consumption and also the need to hook up to shore power.

For this application a more powerful, horizontal axis wind turbine is recommended and there is a wide range of models available.

Finding the right horizontal axis wind turbine for your power needs

To find the right turbine for you, roughly calculate what your power requirements are (i.e. how many Watts all the appliances you use on a regular basis draw). Be generous with your estimate as the amount of power used can mount up with all the electronic gadgets available on board nowadays.

We can then look at which wind turbine would produce enough energy for your requirements. Here is what you need to consider:

The power output of different wind turbine models

Manufacturers often state a "rated output" for a wind turbine but the definition of this output can vary between manufacturers. Indeed, it really depends on which wind regime the wind turbine has been designed to operate in. For example, a heavy duty, high-wind unit will not be suitable for use in light winds.

We therefore always recommend you refer to the turbine's **power chart** provided in our product listings. This shows you the power output produced by the turbine at different wind speeds and so gives you a good indication of how much power your turbine will produce.

Also check out our **Summary Table of Wind Turbines** on page 11 which shows the relative "Eco Power Shop Power Ratings" for all the turbines we offer.

Figure 1: The Power Chart for the Leading Edge LE-450 marine wind generator:



Average wind speeds

As the power output is directly linked to wind speed, it's useful to have an estimate of the average wind speed the generator will be exposed to. Obviously this will vary in different seasons and if you move around, but it will help to have a rough idea of whether your wind turbine will be exposed to mainly low, medium or higher winds.



This is usually straightforward for sailors who know more about wind strength than the average person! Otherwise wind meters are available that are small and easy to use.

Some wind turbines are better suited for use in lower or higher winds as summarised in the table below:

RECOMMENDED TURBINES		
LOWER WINDS	MEDIUM WINDS	STRONGER WINDS
Rutland 1200 (5.6 mph cut in speed*) Leading Edge LE-450 (6.7 mph cut in speed) AIR Breeze (7 mph cut in speed)	All marine wind turbines in Eco Power Shop's range are suitable	AIR X Marine Leading Edge Extreme wind turbines (including the LE-v50 & LE-v150 Extreme)

* cut in speed means the wind speed at which the wind turbine starts to generate power



Hybrid solar-wind turbine systems

A hybrid solar/ wind turbine system can offer the best of both worlds – solar energy on sunny days and wind energy on overcast days or at night. This makes them ideal if you have higher power requirements or are planning a long ocean trip.

A survey of skippers in the Atlantic Rally for Cruising (ARC) by [Yachting World](#) found that the general consensus about generating power on board was it's best to use a range of power sources where feasible. "Don't rely on one thing."

Most marine wind turbines can be easily set up to be used in combination with [solar PV panels](#).

Step 3: Keep your crew safe and happy!

Consider your onboard priorities

i) SPACE

Space is at a premium on any boat and therefore the size of a wind turbine may be a deciding factor.

The Leading Edge vertical axis wind turbines are very compact and therefore can be easily fitted to the side of a yacht's main mast with the side brackets supplied. We therefore recommend these as the best choice if you require only smaller levels of power (e.g. for trickle charging boat batteries). The small Rutland 504 wind turbine also offers a cost effective option for trickle charging batteries on smaller yachts and sailboats (less than 10m long). However, it will require mounting from the deck, usually at the stern.

If you require a more powerful wind turbine, there are plenty of other marine wind generators which are small and light enough to be easily mounted on board and marine-specific mounting kits are available.

Here's a summary of the relative sizes of the marine wind turbines we currently offer:

Turbine Size	Turbine
SMALLEST Suitable for smaller or space-limited boats	Leading Edge LE-v50 Leading Edge LE-v150 Rutland 504
SMALL Suitable for mounting on board most boats	Rutland 914i Leading Edge LE-300 Leading Edge LE-450 Silentwind 400+ AIR Breeze AIR X Marine AIR Silent X Rutland 1200

Further details about the weight and size of these turbines are given in our **Summary Table of Wind Turbines** on page 11.

ii) QUIET

Another issue to be considered for keeping your crew (and boating neighbours) happy is noise!

Some earlier wind turbine models could be quite loud but thankfully technology has progressed and most modern small marine wind turbines are quiet or even virtually silent!



See our **Summary Table of Wind Turbines** on page 11 for an indication of the relative noise ratings of all the turbines we stock.



Step 4 – Check what equipment you require with your wind turbine

Before you make a final decision about your wind turbine, you will need to double check whether any other equipment is required to ensure your wind turbine works efficiently and safely.

This is where it can get confusing but in essence it's essential to prevent your boat's battery overcharging and there are **two different mechanisms** to do this:

i) **The braking philosophy** – e.g. as used by the AIR Breeze turbine and Rutland turbines

A charge regulator electronically reverses the polarity of the generator opposing the motion of the blades and effectively 'braking' the blade rotation to stop battery overcharging.

This is a more simple design from the user's point of view, as it requires less wiring and is a more compact system.

The disadvantage is the braking can put increased wear on the components.

ii) **The dump load philosophy** – e.g. as used by the Leading Edge wind turbines



A charge controller is used to divert excess charge from the turbine to a dump load when the batteries are fully charged.

Advantages of this system are it reduces strain on both the turbine and blades as the unit continues to operate without braking when the battery is full.

The disadvantage is it may take longer to install as there are more components. Check out Eco Power Shop's [wind turbine kits](#), which offer the best value to purchase a wind turbine with all the equipment required.

Summary Table of Wind Turbines

The great news is there are lots of different wind turbines available today using the latest technologies available. This means there has never been a better time to purchase a wind turbine that matches your requirements and budget.

Here is our handy 2019 Summary Table to help you pick your turbine:

Turbine	Voltage	EPS Power Rating*	EPS Noise Rating*	Size	Made in
Leading Edge LE-v50 (Vertical turbine)	12V, 24V	Very Low	Very Low	Rotor Height: 0.46m Rotor Diameter: 0.27m Weight: 9 kg	UK
Leading Edge LE-v150 (Vertical turbine)	12V, 24V	Low	Very Low	Rotor Height: 0.92m Rotor Diameter: 0.27m Weight: 13 kg	UK
Rutland 504	12V	Very Low	Very Low	Rotor Diameter: 0.51m Weight: 3.5 kg	UK
Leading Edge LE-300	12V, 24V, 48V	Medium	Low- Medium	Rotor Diameter: 1.0 m Weight: 6 kg	UK
Rutland 914i	12V, 24V	Medium	Low	Rotor Diameter: 0.91m Weight: 11.6 kg	UK
Silentwind 400+	12V, 24V, 48V	Medium	Low	Rotor Diameter: 1.15m Weight: 6.8 kg	Portugal
AIR X Marine	12V, 24V	Medium-High	Medium-High	Rotor Diameter: 1.17m Weight: 6 kg	USA
AIR Breeze	12V, 24V, 48V	Medium-High	Medium	Rotor Diameter: 1.17m Weight: 5.9 kg	USA
Leading Edge LE-450	12V, 24V, 48V	Medium-High	Low- Medium	Rotor Diameter: 1m Weight: 8 kg	UK
AIR Silent X	12V	Medium-High	Low	Rotor Diameter: 1.17m Weight: 6 kg	USA
Rutland 1200	12V, 24V	Medium-High	Low	Rotor Diameter: 1.22m Weight: 7.8 kg	UK

* Relative ratings based on Manufacturer's data and Eco Power Shop's experience and customer feedback.

**We hope this guide helps you choose your
perfect marine wind turbine**

Further Information

**You can find more information about the wind turbines featured in this guide
on our website:**

www.ecopowershop.com/wind-turbines/marine-wind-turbines

If you've any questions or need some help deciding, please just get in touch!

Email: sales@ecopowershop.co.uk

Tel: +44 (0)1403 261 062