



Emerald Coast Solar



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10 questions to ask about solar inverters:

When buying a solar system, it is important to understand the various major components that go into your system. Our previous 2 articles have focused on the installation company and on solar panels. A solar system is a major expense and you need to be aware of the different components and what makes a good product vs a bad product.

There are many things to consider when deciding not just on who will install your solar system, but also the quality of the equipment being used. This is our third article in our series on solar systems and ensuring you get the best system for your needs.

1) Is the inverter a string inverter or a micro-inverter?

String inverters are big boxes that hang on your wall and take all the power produced by the solar panels as a chunk of power and convert it from D/C power (same as your car battery) to A/C power for use in your home.

Micro-inverters are, as the name indicates, small power inverters that mount on your roof under the panels. Each inverter converts the power from one solar panel and sends it to your home for use as A/C power.

This is the very basic difference between the two types of inverters, but the differences are much deeper than this. Micro-inverters are far more efficient in power delivery. A micro-inverter system will produce far more power per panel, than any string inverter system.

2) Who makes the inverter or string inverter?

Top level companies have stood the test of time. Their products are dependable, and the companies are dependable if there is a problem. These days the market is being flooded with cheap, lower quality knockoffs, made by companies that either will not be around to help when there is a problem, or simply do not stand behind their products.

The top-level micro-inverter manufacturer is Enphase and it is a huge step down to look at any other micro-inverter or string inverter.

The field of string inverters is more open. There are many, top of the line companies such as, Kaco, Fronius and Sunnyboy to name a few. Other offerings should be looked at carefully both for the quality of the inverter and the quality of the company that made the inverter.

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Specifically, what is the track record for the inverter and what is the track record for the company when there is a problem. These are questions that your installer should be able to provide you information on.

3) How long is the standard warranty? And, can it be extended?

Most string inverters of high quality, will carry either a five-year warranty that can be extended to 10 years or, they will have a ten-year warranty. However, a warranty is only as good as the company standing behind it. Many lesser inverter companies offer similar warranties but, actually getting them to live up to the warranty, can be next to impossible. Here is the real issue for you. If there is a problem with your inverter and the company that made it is in China and refuses to correct/fix/or replace the product, what can you do? Your installer (in most cases) only offers the manufactures warranty. By saving a few pesos up front you can easily pay far more in the long term.

Enphase micro-inverters have a standard 10-year warranty. In fact, they are so sure of their product that the warranty is 25 years in the US and Canada, and if you buy through Emerald Coast Solar, we have a program to extend the warranty up to 25 years.

It is important to understand the various components of the solar system as they all have different warranty periods. When you ask some companies what the warranty is, they will give you a short answer of twenty-five years. This is false. Only panel production is warranted for 25 years. In many cases, when buying a lower class of inverter, you can expect to replace it (out of warranty) four times before your panels are finished their production warranty. Factor that cost against a warranty as long as the panels.

4) What is the starting voltage for the inverter?

It does not sound like an issue; however, a high starting voltage can rob you of valuable operating time. The longer a system is in operation per day, the more power it produces. The Kaco string inverter for example, does not start operating until the panels are feeding 150 volts into the inverter. With only a few panels connected, this could delay when the inverter starts working. On the other hand, Enphase micro-inverters only need 1 volt in order to start processing power.

5) This is a techy question. How many MPPT's does the inverter have?

String inverters have inputs for the cables from the solar panels. These are called MPPT's. Each MPPT will take the string of a number of panels. Why are MPPT's important? They are important

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because a string inverter processes all the power from every panel in a string (all connected together) as one chunk of power. Here is the issue: the string inverter will only process power based on the least producing panel in the string. If, for example, you have 12 panels connected to an inverter with 1 MPPT and one of the panels is producing 10% less power, all the panels will produce 10% less power. On the other hand, if there are 12 panels on 2 MPPT's (6 and 6) one panel will reduce the power for only six panels. The more MPPT's the better to a point. Unfortunately, with too many MPPTs, you can have the problem detailed in 4 above or worse, the system will not turn on at all.

Micro-inverter systems do not use MPPT's the same way. They process the power directly at each panel and therefore have no issues with differing production levels for the panels.

6) What are the cut-out voltages for the inverter?

In order for an inverter to work, it needs to communicate with the power grid from CFE. It does this by reading the voltage sent from CFE to your house. If the voltage is too high or too low, the inverter will shut down. In many areas of the beach, the voltage is undependable. It is supposed to be 240 volts +/- 5%. However, in many cases, it is much higher than this. If the inverter cannot be adjusted to allow for a greater range of voltage from CFE, it will not work properly. Generally, a wall mount inverter can be adjusted less than micro-inverters and therefore, the micro-inverters can handle greater highs and lows from CFE and continue to function properly.

7) What happens if the inverter fails?

This is important when deciding on the type of inverter you want. When a string inverter fails, your entire solar system does not work. It will not work until the inverter is either fixed or replaced.

If a micro-inverter fails, only that panel stops working. The rest of the system remains in operation as normal.

8) Is there any other equipment necessary for a correct installation of the inverter?

String inverters require special wiring using photovoltaic cables, as well as a manual shut off to disconnect them from the rest of the electrical system. In addition, they require a fuse or breaker to prevent excessive voltage from entering the home electrical system. It is also required that they be grounded with a separate ground rod and ground cable connected to the panels and that the panels be interconnected for grounding.

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The Enphase micro-inverters require a special cable to connect the inverters to the home electrical system. This cable is run between each inverter and is then fed into a junction box where it connects to normal household cable, that can be run directly to the breaker panel for the home. All the safety features that are add-ons to the string inverter system, are built into the Enphase micro-inverters.

9) How is system monitoring handled?

String inverter or micro-inverter you want to be able to monitor your production simply and easily. Most string inverters have the ability to remotely monitor the system production. However, they do require the additional expense of added equipment in order to connect to wi/fi. As well, the system can only monitor the power as a whole or, at best, the power delivered on each MPPT (see 5 above). They also do not have the ability to monitor the power you use, only what the solar system produces.

Enphase micro-inverters come with the remote monitoring system, built in. In fact, Enphase micro-inverters have the best monitoring system available. Not only do they monitor the power produced (by the entire system and at each panel individually), they also have the ability, to monitor power consumption. As well, they have a two-level monitoring system that allows the installer/maintenance technician to remotely monitor your system and affect repairs/upgrades and diagnostics without having to make a house call.

10) What is the expandability of the inverter?

The system you install today, may not be the system you need in a year or 3 or 5. It is important to look at expandability for 2 reasons:

- 1) Your power needs may increase in the future and,
- 2) As your panels age, they will produce less power.

Given these two conditions, it is important to ensure you get a system that can be expanded as your needs require. String inverters are restricted in their ability to be expanded. String inverters are based on total power and are scaled on a kilowatt basis. You can buy a 2,3,4,5 or higher kilowatt inverter, however once it reaches maximum power load, you need to either buy a second, string inverter, or replace the one you have with a bigger one.

Micro-inverters do not have this issue. The expandability of a micro-inverter system is almost

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unlimited. As many as 330 micro-inverters can be connected to one monitor. You will run out of roof space before you run out of expandability, with a micro-inverter system.

This was the third article in our educational series on solar systems. You can find the previous articles - Questions for any company you are considering as your solar installation team and 10 questions to ask about solar panels – on our web site at www.ecsolarmx.com.

Please watch for our article on 5 questions to ask about solar system support structures.

Thank you for taking the time to read this. We hope you will consider Emerald Coast Solar when deciding on a company to install solar on your home or business. For more information please contact:

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