

All You Need to Know About Solar Panel Maintenance

By Corinne Lincoln-Pinheiro



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You finally decided to go solar and want to make the best decisions, so you're doing your homework. That's perfect because being well-prepared, especially when it comes to maintenance, is critical. A single malfunctioning panel can reduce your energy production by [25-percent or more](#).

So, what kind of maintenance do solar panels need? **If you don't clear obstructions that block sunlight or remove buildup from pollen, dirt, and grime, it will affect energy output. Maintenance also requires annual inspections, monitoring the system for solar performance changes, and repairing or replacing damaged and broken components.**

Did you know that the sun can generate power to [satisfy global energy needs for a year](#)? According to the International Energy Agency, solar energy is now [the world's fastest-growing source of power](#). And since panels last 25-30 years, and newer models are expected to [last about 50 years](#), taking care of them becomes paramount to their lifespan, but only if you care for them.

What Kind of Maintenance Do Solar Panels Need?

This guide will teach you how to maintain your solar system effectively and which tools and cleaning materials you should use. You'll also find a few DIY hacks and learn the cost of servicing panels. If you haven't installed them yet, we have tips on what to look for in warranties, the upfront costs of installation, which American companies make panels, and the tax credits you'll receive.

What Are Solar Panels and How Do They Work?

Solar cells are made of silicon and act like semiconductors. Multiple solar cells make up a solar panel. A series of panels are called modules, and when they are wired together, it forms a solar array. Panels are photovoltaic (PV), meaning it uses alternating current (AC) electricity (versus the direct current or DC electricity that power grids currently use).

The sun releases energy in the form of photons that travel 93 million miles (in 8.5 minutes) to reach the earth's atmosphere. When it makes contact with a solar panel, the cell captures the "energy" and extracts electrons. Conductors then transform it into an electrical circuit, and that generates electricity.

The more solar arrays you have, the more energy it generates. One advantage of solar (if offered by your utility company) is what's referred to as net metering. Any excess energy produced (that you don't use) converts to credits that can later be used to draw power from conventional grids when you need it.

Do Solar Panels Need to Be Maintained?

Modules are tilted towards the sun, and that works for and against the system. Most of the time, anything caught on panels usually blows away on its own because of the angle. However, **dirt, leaves, grime, and bird droppings can collect on modules over time**. Even small amounts of dirt can reduce energy production.

The loss of power can be as little as 1-4.7 percent. But research has found that long-term dirt buildup can reduce energy-yielding capabilities by as much as 20-percent. Some experts argue it's as much as 25-percent.

Hence, solar panels need to be cleaned, but it's relatively simple if done regularly. If you have ground panels (versus roof panels), it is easier to access, clean, inspect, and monitor. Even for a one-story home, cleaning is much easier than a two-story dwelling.

Let's take a closer look at what cleaning and maintenance entail and how to make your panels outlast the average lifespan.

What Should I Do to Keep My Solar Panels in Tip-top Shape?

Periodic maintenance checks and visual inspections should be done **at least 2-4 times a year**. If you stick to this schedule, the only maintenance you'll need to perform is to wash the dirt off with a garden hose or use a leaf blower to remove debris.

Of course, some of it depends on where you live. The only other time you might need more than a periodic cleaning is if you live in a desert area where it's dusty or during a prolonged dry season or

drought. Also, where there is a lot of smog, you may see reduced solar production over time. In these circumstances, it's **crucial to clean modules regularly**.

Tips for Maintaining Your Solar Panels in Any Climate

Usually, snow melts in a couple of days because of the sun's heat (and the angle). If, after an intense snowfall, a dense layer of snow remains, you can still use the same method of a leaf blower and garden hose to wash it off.

However, don't use hot water as the extreme temperature disparities will make them crack. If you decide to clean snow yourself, you can also invest in a snow roof rake designed for solar panels. It costs anywhere from \$30-150 and comes in fiberglass, polycarbonate, and aluminum.

Fortunately, solar panels are made of tempered glass, are durable, and can withstand most weather conditions. It also doesn't have moving parts (except for tracking mounts), so general cleaning tips are similar, regardless of where you live or how many panels you have. However, **using the wrong tools and soap will cause damage**.

Here are some general cleaning tips and do-it-yourself hacks.

Don't:

- Use an abrasive soap or sponge, pad, or powders as it will scratch the glass
- Use harsh materials when cleaning
- Use cleaning products such as RainX, car wax, rock salt, etc., (it will also compromise electrical components)
- Use hard or mineral-rich water because it will impair panels over time
- Touch electrical elements of the solar panel system at any time
- Never use hot water on modules

Do:

- Use a soft rag, squeegee, and brushes
- Use biodegradable soap
- Stay on the ground and use a long-handled wiper
- If you're on the roof, remember it can be slippery, so use safety precautions such as ropes, a harness for support, and other fall-protection equipment
- Turn off the system before you start cleaning
- Use a water-softening hose attachment, distilled water, or deionized water (if you have hard water)
- Clean early in the day or later in the evening when panels are cool (to avoid it drying too quickly from the heat and leaving smears)
- Use a high-pressure hose nozzle with attachment (for soap) on two-story homes but don't get too close to panels as the pressure may cause damage. Some experts discourage this because water will get in-between the frame and glass and deliver moisture to vulnerable areas.
- Rinse, spray soap, and quickly wash off with lukewarm water

Cleaning Kits and DIY Costs for Solar Panels

You can also purchase solar panel cleaning kits, which include biodegradable soap, a wiper, and brushes (with short and long handles). Other kits have extension poles, cleaning cloths, hose interconnections, and carrying bags.

The average soap costs \$30-\$50 and water-fed brushes \$80-\$175. Suppose you're considering an extended pole or water-feeding pole. In that case, they cost between **\$500-\$5,000**, depending on the length, flexibility, if it has adjustable necks, interchangeable or rotating brushes, and accessories such as spray jets. For example:

- 16" aluminum poles \$300
- 41" aluminum poles \$600
- 30" carbon fiber poles \$1,000
- 45" carbon fiber poles \$2000

Are you wondering about kits or which brushes and cleaning liquids to use? Check out the Mr. Long Arm brand, along with EquipMaxx and QWE brands.

Do Solar Panels Need Servicing?

You may not be the DIY kind of homeowner. Even if you are, cleaning, monitoring, and maintaining solar panels may not be your thing—no need to worry. There are services and equipment that can do the dirty work for you. Some homeowners also **purchase maintenance and cleaning agreements**, which lessens the annual fee.

You should also schedule **annual inspections** with a qualified technician who will check for:

- Overall efficiency and performance
- Visual examination of modules for fractures, corrosion, and moisture penetration
- Check the mounting system (framework and module clamps)
- Looks at the cabling that measures voltage levels and checks if inverters are damaged
- Check cable connections, the integrity of seals, functionality, and alignment

If your purchase agreement doesn't include service, the average cost of an annual inspection will cost \$150 to \$300. Any solar panel repair work will increase that cost to an average of \$650 to \$750.

Solar Panel Cleaning Robots and Cleaning Systems

Monitoring Systems

Suppose you integrate a solar panel monitoring system. In that case, it will track your solar system's electrical output daily and allow you to see what may be affecting performance. It senses panel malfunctions and damage, so you know **when to call for service**. By paying attention to changes, you can be proactive without having to trek up and down a ladder to check on modules.

Monitoring systems determine how much CO² your system is emitting and comes with a wall-mounted display. A green flashing light indicates inspection or repair (these are add-on purchases, however).

Solar Cleaning Systems

These automatic cleaners work as a sprinkler system. They are programmed to wash and rinse based on whatever timeline you desire. The nozzle is positioned every few panels, and there are no tools or other steps involved. The only work involved is refilling the soap and replacing the water filters. There is a one-time installation fee, but after that, everything else is automatic.

Solar sprinkler cleaning systems cost an average of \$2,260 (for 50 panels) but depend on your area and unique setup. [Heliotex](#) is a leader in this technology.

Solar Cleaning Robots

Robots wash your panels daily, and some run on tracks. They are autonomous, and many use solar energy (each robot has a panel). It can do the job with or without water and uses microfiber brushes, so panels aren't damaged.

Solar Panels Cleaning Service Costs

If you **hire a company to clean your modules**, Fixr says the average national cost for a solar PV system with ten panels is **\$150-\$300**. For 20 panels, it's between \$300-430, and cleaning and repair cost \$500-750. Some cleaning companies charge \$15-35 per panel or offer a flat rate. (These prices are also based on the wattage capacity of panels).

According to Home Advisor, typical solar panel cleaning ranges from \$100 to **\$350**, with an average of \$150. According to their data, some companies charge as little as \$3 and \$10 per panel or between \$120 and \$160 for cleaning alone. Some offer a flat rate between \$150-\$350. The annual inspection cost is also separate from the cost of cleaning.

It's worth noting that some contractors charge for their time and equipment costs regardless of how many solar panels you have. Hence, expect to pay at least \$100 for cleaning.

Prices may be substantially higher depending on the several factors:

- **Location:** Where your panels are positioned (ground or roof)
- **Distance:** How far contractors have to travel to your residence (a 20-mile radius typically pays a lower fee)
- **Slope:** Angle of your rooftop (requires more time and labor)
- **Height:** If it's a two-story home or three-story dwelling
- **Size:** The volume of your solar array – larger ones cost more, but there may still be a minimum fee for small arrays to cover contractor costs
- **Buildup:** How much cleaning needs to be performed (if it's grimy and hasn't been cleaned in years, it will cost more in labor, time, and materials)
- **Agreements:** if you bundle a cleaning and maintenance agreement upon purchase, it will lower your annual fee

So, what are you paying for? Essentially, professional cleaning of your panels reduces the risk of damage due to handling and materials used. The technician can also provide feedback on the state of your

modules and what may need replacing or repairing. Not to mention, there is no physical risk – you don't have to climb your roof (at an angle) or watch out for live wiring.

A professional cleaner will:

- First using a soft brush to remove dust
- Using a clean cloth and sponge to gently clean panels
- Bring non-abrasive detergents, chemicals, and materials, so you don't have to buy them
- Bring poles and attachments and may use your garden hose
- Use a soft dry cloth to wipe panels down and remove any leftover residue after rinsing them off

Are Solar Panels Expensive to Maintain?

Unforeseen costs include roof repairs, i.e., removal of panels, tile repairs, and reinstallation of your solar array. It can cost anywhere from \$1,500 or more, depending on where you live and how vast your array is.

However, the bulk of your annual costs will come from maintenance, cleaning, and repairs or replacements.

Solar Panel Warranties, Repairs, and Replacement

Although solar panels can handle most weather conditions, they will freeze when temperatures drop below 32-degrees. Solar thermal heating systems use antifreeze to regulate temperature (though most still use water). Of course, this option comes at an additional cost.

Also, beyond 90 degrees, solar modules lose efficiency (roughly 1-percent per degree). If panels have air circulation, energy production goes up, and panels remain cool.

Modules have held up in a hailstorm, hurricane, and windstorms. They will suffer damage in tornadoes and lightning strikes, however. A **good homeowners' policy and a sound warranty** will cover maintenance, cleaning, repairs, and replacements.

Warranties

Some solar providers bundle **annual inspection and maintenance agreements** where technicians do all required to keep modules operating at optimum levels. If you don't have a contract, experts recommend doing visual inspections ever so often. Also, monitor your bill for any noticeable drop in energy production (it may be related to a lack of cleaning). A standard warranty plan will also **check your panel efficiency**.

A good power outage warranty should guarantee your peak power output **wouldn't fall below 85-percent**. Some might add a clause guaranteeing it for **25-years**, while other secondary warranties stipulate 90-percent over the first ten years.

The three types of warranties typically include:

- **Performance:** check that your system is working efficiently

- **Workmanship:** covers equipment if it's not installed properly
- **Equipment:** covers PV system components, panels, and parts if they fail

There are also **comprehensive warranties** that cover the life of your products. If you have one, ask your installer for recommendations on the best tools and materials for cleaning and maintenance so you don't void the warranty.

Solar Insurance

If you are leasing solar panels, the company is responsible for all repairs and maintenance. If you own them outright, don't be surprised if your agreement doesn't include cleaning and inspection because they are usually covered in a warranty (unless it's bundled).

Homeowners' insurance doesn't usually cover maintenance and cleaning. But homeowner policies will cover damage, repairs, and replacements, especially due to foul weather. You might want to increase coverage limits once it's installed, too. Be sure to read the policy for any exclusions, stipulations, or deductibles.

Repairs and Replacements

The difference between repair and replacement depends on whether the panel is broken beyond repair, physically damaged by debris or environmental factors, and if the panel efficiency declines in output energy levels. According to Home Advisor, it costs an **average of \$650 for solar panel repairs**.

The most typical repairs technicians find:

- **Corrosion** (replacing oxidized parts costs \$150-\$350)
- **Cracked panels** (\$100-300 to repair edges or replace a panel)
- **Broken glass** (laminating materials or replacing glass, \$20-\$400)
- **Loose wiring** (repair cells and replace wiring, \$100 per hour)
- **Loose or damaged roof tiles** (removing, fixing, and replacing panels, \$100-\$500)
- **Inverter issues** (replacing or repairing a microinverter or string inverter, \$1,000-\$2,000)
- **Tree trimming** (removing vegetation \$50-200)

What Are the Top Solar Panel Manufacturers?

The top three global companies are [Jinko Solar](#), [JA Solar](#), and [Trina Solar](#), and they are all based in China. The biggest U.S. installation companies for solar are **Sunrun** and **Vivint Solar**, and the **top ten American** manufacturers headquartered here are:

- Auxin Solar
- Certainteed Solar
- First Solar
- Global Solar
- GreenBrilliance
- Lumos Solar
- Prism Solar

- Seraphim Solar
- Solar Electric America
- Solaria
- SolarTech Universal
- SolSuntech
- SunPower
- SunSpark
- Tesla/Panasonic

According to Energy Sage, these rankings don't mean the listed companies offer the highest quality panel. It's based on the volume of shipments and other factors of far less interest to buyers than cost and quality. It does indicate, to some degree, brand credibility. However, these larger companies may have higher prices – \$2,000 to \$5,000 more expensive than smaller solar companies.

Most people are looking for energy independence, so consider your solar options when taking bids and quotes from installers. Also, look at what their **packages** include, what kind of **warranties** they offer, and the types of **equipment** they have available (larger companies often have few options).

Take into consideration, too, the testimonials and reviews of clients and what they have to say about everything from customer service to follow-up care. If the company has **financing**, that can be a deal-breaker as some upfront expenses can be costly.

How Much Will I Have to Pay to Install Solar Panels?

Costs depend on several factors, but the typical homeowner should expect to pay approximately **\$3 per watt**. Most residential homes benefit from a **5-kilowatt capacity**. For example, you will need twenty 250-watts panels to reach 5-kilowatts, for a total of **\$15,000**. With a **federal tax credit** of 30-percent, the price is reduced to \$10,500 (excludes any installer rebates, sales tax incentives, and state tax credits).

Note that In 2020, the tax credit will also be reduced to 26-percent. In 2021, it will be 22-percent, and **by 2022 there will be no more federal tax credits for residential solar panels**. Also, tax exemptions may reduce solar ownership costs, but tax credits don't directly reduce installation costs. It helps you deduct a percentage on taxes.

Finally, a solar system costs more than just the individual panels, which some manufacturers have reduced to as little as **\$.30 per watt**. The total cost of installing a solar system includes:

- Special racking to hold the panels on the roof
- Specific wiring to attach the panels and collect energy
- The cost of DC electricity and an inverter
- Special brackets for modules
- The fuse box setup and wiring
- Installation and delivery costs