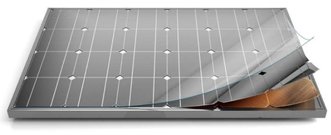
How Long Do Solar Panels Last After Installation?

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Solar panels won't last forever, but their lifespan might be longer than you think

Imagine this scene: your house is glowing with a halo of warm light in the darkness. It's still daylight and your roof is covered in solar panels that are providing you with energy, despite an unpredictable blackout, devastating hurricane, or raging wildfire. In your garage, your battery is collecting the excess energy your solar panels are producing, as it prepares to power your home with clean energy once the sun goes down. The grid is off, but **your lights are on**.

Beyond the environmental benefits solar electric (**photovoltaic** or **PV**) energy provides—like reducing your fossil fuel dependency—solar panels can also lower your monthly energy bills and offset your electricity use for decades. When you own a solar system outright (through a cash purchase or financed with a solar loan), you may even be eligible for additional federal tax credits and

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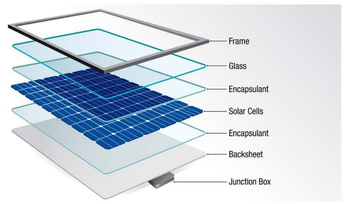
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Before you start shopping for solar panels, however, it's important to understand the **productive lifespan** of your home system, including what solar panels are made of, how long your panels will last, why solar panels degrade, and how the solar industry is developing.

What Are Solar Panels Made of?

Knowing the inner workings of a solar panel will help you better understand their expected solar panel lifespan.

Scientifically speaking, solar panels, known as "photovoltaic panels," are made of a thin film of silicon with a mix of chemicals (usually silicon, boron and phosphorus) that convert sunlight into electricity. The panels' metal casing and wiring capture this energy for use in your home. Naturally, there are many different configurations of panels in use today.



Solar Panel Life Expectancy

As the cost of traditional energy methods continues to rise, solar energy continues to outshine the rest.

Reported as the fastest growing industry in new global energy by the **IREA** (International Renewable Energy Agency), PV systems continue to break records in renewable markets — despite two years of pandemic-related supply chain issues — as the total worldwide solar electric installed capacity reached a minimum of **942 GW** at the end of 2021.[1]

Unfortunately, the sun does set on solar panels (both literally and figuratively). Although their life expectancy is more than two decades, solar panels aren't immortal. Fortunately, Sunnova offers Sunnova Protect®, a **25-year limited warranty** and system plus battery storage protection plan, to provide you with sustainable, affordable, and reliable solar production.

Solar Panel Degradation: Do Solar Panels Wear Out?

In order to benefit from the long-term investment of your home photovoltaic system, it's essential for consumers, manufacturers, and data analysts alike to understand how long they can expect panels to last.

Like most electronic equipment, solar panels degrade, or **decrease power output over time**. This means that as solar panels age, their ability to absorb and convert sunlight into electricity declines, resulting in a reduced number of KW hours produced.

Why Do Solar Panels Degrade?

There are several factors that can impact solar panel degradation rates, including:

- **Climate** – Solar panels can struggle in extreme temperatures, and prolonged exposure to ice storms and heat waves may lead to panel degradation. For instance, soaring temperatures can cause a PV panel's electrons to bounce around excessively, which can reduce the voltage and impact the panel's production over time.[1]
- **Quality** – The grade of materials used in manufacturing can impact solar panel efficiency and reduce its useful lifespan. For example, anti-reflection textures or films help panels prevent the loss of valuable photons.[2]
- **Installation** – The PV system's racking, or framing, affects the amount of power output of the solar cells. This framework or array of modules should allow several inches of space between the panels and your roof for optimal airflow.[3]
- **Maintenance** - The glass panels can degrade more quickly if they are dirty or covered with detritus that prevents a sufficient amount of photons from passing over the semiconductors, effectively reducing your panel's absorption efficiency.[4]

Additionally, strain on solar panels can create microcracks, which ultimately cause the electrical connections to deteriorate.

Which Solar Panels Last the Longest?

At Sunnova, we exclusively use "Tier 1 and Bankable" equipment which is the highest classification for residential solar panels and has been heavily vetted by the major banks.

As with all things, solar panels will lose some efficiency over time, but fortunately, the degradation is minor.

The maximum possible output of solar panels only reduces by approximately 0.30% per year, according to data from the National Renewable Energy Laboratory (NREL). At that rate, solar panels are capable of producing up to 93% of their original output even after 25 years!

Note that Tier 2 and Tier 3 solar panels (the kind we do NOT use at Sunnova), degrade at a much faster rate, reducing their efficiency over time by 11.3% and 17.6% respectively over the same 25 years.[4]

This means, when you choose Sunnova as your solar energy provider, by year 20, your panels should still generate more than 90% of the electricity they produced in year one.

Tier 1 Solar Panels	Tier 2 Solar Panels	Tier 3 Solar Panels
Degradation Rate 0.3%	**Degradation Rate** 0.5% ↓	**Degradation Rate** 0.80% ↓
Reduction Over 25 Years 6.7%	**Reduction Over 25 Years** 11.3% ↓	**Reduction Over 25 Years** 17.53% ↓
Amount of Original Output After 25 Years 93%	**Amount of Original Output After 25 Years** 88.7% ↓	**Amount of Original Output After 25 Years** 82.47% ↓

What Happens to Solar Panels at the End of Their Life?

At the end of their **useful lives** solar panels can still produce power, just at a lower efficiency. While solar technology continues to improve, it's unfortunately impossible to avoid degradation.

Fortunately, **solar technology is evolving** exponentially.

How is the Solar Energy Industry Developing?

In addition to the opportunity to recover **valuable raw materials** (including aluminum, tin, tellurium, and copper) from end-of-life panels—and create beneficial jobs to do so—research is currently being examined on how **panel recycling** and secondary use can be achieved on a commercial scale.[2]

Advancements in PV efficiency include cutting edge innovations like "doping," or chemically treating the panels with phosphorus, which prevents panels from light-induced degradation and expands the spectrum of light a solar cell can receive.[2]

How Can I Make My Solar Panels Last Longer?

Beyond keeping your panels clear of fallen tree branches and other debris, you can ensure a high return on your solar investment by working with a trusted solar company like **Sunnova**.

Our professional service technicians ensure safe operation and maintenance of your PV system, which ultimately extends your home solar electric systems' lifespan. Be sure to contact a Sunnova Service Technician if your system isn't performing optimally.

For more information, and your free quote, visit

Get a Solar Quote today!

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