



## Accelerating clean energy in Massachusetts

Dedicated to innovation, investment, workforce development, and net zero goals.

[Our Impact](#)

# 2022 MASSACHUSETTS CLEAN ENERGY INDUSTRY REPORT

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The 2022 Massachusetts Clean Energy Industry Report shows that the clean energy sector continued to grow through the end of calendar year 2021, with over 104,000 clean energy workers in Massachusetts, 3% of the workforce.

In 2021, the industry contributed over \$14.2 billion to Massachusetts' Gross State Product. Clean energy employment has grown 73%, or over 44,000 jobs, since 2010. While COVID-19 led to a loss of 19,800 clean energy jobs at the height of the pandemic in June 2020, an estimated 65% have been recovered as of September 2022.

**When you hover over the report, the viewing controls will appear on the bottom right.**

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# OUR FOCUS

MassCEC funds climate solution innovation to meet Massachusetts emission reduction goals while growing the state's clean energy economy.



## High-Performance Buildings



## Net-Zero Grid



## Clean Transportation



## Offshore Wind

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# COME TO MASSACHUSETTS

You may be aware that Massachusetts is home to top-notch universities, a vibrant economy, and championship sports teams. Did you know that we also have the highest percentage of clean energy workers per capita in the U.S. and our clean energy community includes the [largest cleantech incubator in the country](#).

Thirty-two hundred (3,200) MW of offshore wind will be built off our coast starting in 2023, with at least 2,400 MW more coming, and we're training workers of all skill levels and ages for these exciting new jobs while expanding our busy Wind Technology Testing Center and New Bedford Marine Commerce Terminal. We're committed to leading the clean energy transition and we welcome you, your company, your great ideas, and your passion for creating a better world into our supportive network of researchers, entrepreneurs, and investors. Come to Massachusetts, we can't wait to work with you!

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# WORKFORCE



## Students

Find jobs and internships, post your resume and much more.



## Employers

Post jobs and internships, review resumes and grow your team.



## Adult Learners

Build on your existing skills in a fulfilling and financially rewarding clean energy career.



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## Training

Access training, education resources and learning initiatives.

Work and Hire

# UPCOMING EVENTS

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**JAN  
11**

## "Preventing Outages and Enhancing the Resilience of the Electric Grid" IIJA Section 40101(D) Public Meeting

2:00pm – 3:00pm

Zoom

**JAN  
19**

## NEC Training

8:30 AM – 5:00 PM ET

DoubleTree Hotel, Westborough, MA

**JAN**

## Equity Workforce Training

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19

## Implementation Grants Pre-Application Webinar – 2

03:00 – 04:00 PM EST

Virtual Event

# LATEST NEWS

### PRESS RELEASE

[Baker-Polito Administration Announces Over \\$100M Commitment to Clean Energy and Transportation](#)

December 23, 2022

### PRESS RELEASE

[Baker-Polito Administration Announces \\$180M in Funding Through the Offshore Wind Ports Infrastructure Investment Challenge and Administration Releases the 2022 Clean Energy Industry Report](#)

December 22, 2022

### PRESS RELEASE

[Baker-Polito Administration Launches New \\$50M Venture Fund Focused on ClimateTech](#)

December 7, 2022

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**THE HOME YOU OWN**

# What you need to know about installing solar panels on your home

Looking to reduce your dependence on traditional power sources? Here's how to figure out whether solar is for you.

By Laura Daily

October 3, 2021 at 7:00 a.m. EDT

If you've been thinking about adding a solar power system to your home, you aren't alone. Some 3 million systems sit atop American roofs, including about 400,000 that were installed each year in 2019 and 2020, according to Becca Jones-Albertus, director of the Solar Energy Technologies Office at the U.S. Energy Department.

For many homeowners, the decision to go solar is a two-part process. The first is the financial side: Will the investment ultimately pay for itself and reduce or eliminate electric bills? Assuming the answer is yes, then you are ready to dive into the second — and more practical — part of the process: How do I get quality solar photovoltaic panels installed at my home by trustworthy professionals? Here are answers to some basic questions to get you started.



## WHAT TO KNOW

- How does solar work?
- Is my roof good for solar?
- My roof is kind of old. Does that matter?
- Are all solar panels alike?
- What is degradation?
- Do panels work in all climates?

**Show all questions**

## How does solar work?

Multiple panels are wired together into a solar array. When sunlight hits the panels, the energy is converted into usable electricity. Your home consumes the electricity produced by the system. The solar array connects to the local grid, so you receive electricity when panels aren't producing enough or any electricity. The grid also stores any excess solar energy you produce and, through "net metering," ensures you get credit for all of the electricity your system creates, whether you consume it immediately or send it to the grid and use it later.

## Is my roof good for solar?

Adequate sunlight is key. Solar panels won't work for rooftops heavily shaded by trees or adjacent structures, says Jason Gonos, co-owner of Power Production Management in Gainesville, Fla. Other roadblocks include insufficient roof space, a complex roof design, or the age and slope of your roof. Typically, solar panels perform best on south-facing roofs with a slope between 15 and 40 degrees. However, east- and west-facing roofs also work. A good starting point is the website of real estate company [Zillow](#), Jones-Albertus says. Type in your address and look for the Sun Number score. The Sun Number ranks the suitability of a structure's rooftop on a scale of one to 100. The higher the number, the better suited a home is for solar.

## My roof is kind of old. Does that matter?

Yes. Your roof should be less than 10 years old or, if it's a roof with a longer-lasting material, such as tile or slate, have at least 10 years of life left. It should also be in good to excellent condition. Why? "Because if you have to replace your roof for any reason other than insured storm damage, it is expensive to uninstall and then reinstall the panels and frames," Gonos says.

## Are all solar panels alike?

Although panels operate similarly, the key difference is efficiency: how much sunlight they convert into energy. Typically, high-efficiency panels come with a higher price tag but produce more electricity over the life of the system. If you have a smaller roof, you may opt for more efficient panels. Those with a larger roof may also choose high-efficiency panels to use fewer of them overall, says Peter Faricy, chief executive of SunPower, a leading residential and commercial solar company based in San Jose. "Be sure to ask any potential installer if the suggested panels are the most efficient you can buy. Consumers should look for panels that are 20 percent efficient or more," he says.

## What is degradation?

Degradation is a measurement of how much efficiency is lost over time. Faricy says panels should retain 80 to 90 percent of their efficiency over 25 years.

## Do panels work in all climates?

You don't have to live in famously sunny California or Arizona to go solar. In fact, one of the largest adopters of solar is Vermont, Jones-Albertus says. Of course, panels produce more energy on clear, sunny days in the spring, summer and fall, but even on winter's shortest days or during rainstorms, the panels will generate some electricity. Although a snow-covered panel can't generate electricity, snow doesn't stick too long to the steep, slick panels.

## Are solar panels easily damaged?

They are built to withstand wind, hail, snow and torrential rain. According to Gonos, at minimum, a solar panel can take a pummeling by up to one-inch hailstones. Any weather event that will break panels will probably damage your roof first. “In fact, the biggest problem is not hail or storms. It’s squirrels that chew the wires,” says Ben Delman, spokesperson for Solar United Neighbors, a nonprofit that helps people go solar.

## How do I find an installer?

Ask friends, neighbors and family who have gone solar about their experiences. Check review websites such as EnergySage, SolarReviews, ConsumerAffairs and Verified Reviews. When looking at reviews, make sure you are comparing your roof with ones of a similar material (slate, tile, shingle).

## What am I looking for?

You want a company that has been in the business for a long time and is going to see the process through from beginning to end. Avoid those selling solar energy systems installed by a third party. These are intermediaries who hire contractors and bear no responsibility for installation quality or performance. “You want one that sweats the details,” Faricy says. For example, the installer should discreetly hide the conduit from the panels on the roof to the battery storage unit in the garage to maintain your home’s aesthetic qualities. Gonos is a proponent of local companies. “I like that I can walk into their office or showroom,” he says.

## How do I get started?

Once you have a list of companies you want to consider, invite at least three to your home. Typically, each will do an on-site inspection and roof review using satellite images, then give you a proposal. A good company will be honest about your roof’s condition and other issues, Gonos says. Ask if you can see the company’s work and visit homeowners from previous jobs.

## What questions should I ask?

- How long have you been in business?
- Do you carry insurance, contractor liability and workers' compensation?
- If there's damage during installation, who does the repairs?
- Are there other fees, such as permitting or connecting to the electrical grid, or is this turnkey pricing?
- When is the price final?

## Will I hear false claims?

Hopefully not, but be wary (or just walk away) when you hear these types of statements: "Your system will offset 100 percent of your electric bill." "The government is going to pay for all of it." "You'll get paid to go solar." "We don't represent one particular company or product. We work to get the best product for you."

## How do I make sure companies are legitimate?

Verify certifications and state and local licensing. Check with that licensing board for complaints. See whether companies belong to the [Solar Energy Industries Association](#). Are they certified? Certified installers must have a background in energy-efficient technologies, have installation training and have been part of the decision-making process for a variety of installation projects before applying for the North American Board of Certified Energy Practitioners PV Installer Specialist exam. "Make sure it is someone who you like and feels trustworthy, then verify the information they gave you," Gonos says.

## How long is the process?

Typically from the time you agree on terms to the installation is two to three months, Delman says. Installation takes one to three days, depending on the size of your home and whether you opt to add battery storage and/or an electric vehicle (EV) charger. After your panels are installed, there may be a post-installation inspection, then the utility company will connect you to the grid.

## What kind of warranties come with my system?

Your installation should come with three warranties: product, performance and labor. Product warranties cover potential defects in your equipment. Performance warranties guarantee that your panels won't degrade by more than a certain percentage per year and will still produce a minimum percentage of their initial rated capacity for a set number of years. Both of these warranties should be for 25 to 30 years. A labor warranty covers the installer's work, including electrical wiring and roof damage. These typically run three to 10 years. "In general," Gonos says, "a well-known manufacturer that has been in business a long time will be able to honor a warranty."

## Any add-ons I should consider?

Farcy says that, with the instability of the power grid, more consumers are worried about power outages. "About 80 to 90 percent of our customers are asking about battery storage as a way to generate and save their own power," he says. The right-size solar system will recharge your batteries every day. At sundown, the batteries then power your home, drawing less electricity from your power company. And should the utility grid go down, solar continues to work, so you can use your battery to power your basic home electrical needs, such as lights, refrigerator or designated outlets.

## Do solar panels require much maintenance?

Not really. They don't need to be washed; rain and snow will do the job. If you live in a dry and dusty area, an occasional professional cleaning may improve performance.

## Where can I find more unbiased information?

Both Solar United Neighbors and the U.S. Energy Department offer helpful guides and fact sheets. SUN's [Go Solar Guide](#) and the Energy Department's [Homeowner's Guide to Going Solar](#) offer an intro to what people should know as they start researching. The [Solar Owner's Manual](#) offers in-depth information for prospective and current solar owners. For a deeper dive, read about [solar panel basics](#) and [how solar works](#). SUN's [Battery Storage Guide](#) is a comprehensive review of battery technology and economics.



**THE HOME YOU OWN**

# How to finance solar panels and evaluate their tax benefits and energy savings

Lease or own? A look at the choices depending on your goals.

By Michele Lerner

October 4, 2021 at 7:30 a.m. EDT

## **CORRECTION**

A previous version of this article incorrectly said the company Go Solar was in Glendale, Calif. It is located in Salt Lake City. This article has been corrected.

In recent years, concern over rising energy costs and power outages has increased demand for solar panels. Solar companies installed a record 19.2 gigawatts of capacity in 2020, an increase of 43 percent over 2019, according to a report by Wood Mackenzie and the Solar Energy Industries Association.

Solar panel costs vary according to your location and the size of the system, which depends on your energy use and your roof space. Installing solar panels and an inverter costs between \$15,000 and \$25,000 on a 3,000-square-foot home with two adults and two kids, says Scott Cramer, CEO of Go Solar in Salt Lake City.

Battery storage for the electricity your panels produce costs about \$10,000 to \$15,000, says Arno Aghamalian, CEO of Solar Optimum in Glendale, Calif.

With such steep costs, few consumers likely will be able to pay cash for their panels. Here's a look at how you can finance them:

## **Lease or loan**

Homeowners can finance solar panels with a lease or a loan. About 80 percent of homeowners purchase their solar panels, says Cramer.

Most homeowners finance their solar energy with a home improvement loan, a home equity line of credit or a solar-specific loan, according to Cramer.

“Solar financing is typically a 25-year loan with a low interest rate, currently around 2.99 percent,” says Pablo Diaz, CEO of USA Solar Networks in Phoenix. “Most people want to buy their solar panels so they can take advantage of tax breaks for solar energy, but if someone doesn’t have much taxable income, a lease may be a good option.”

Some people prefer to lease to avoid debt, says Diaz. Solar financing is an unsecured loan without a lien on your property, but it will appear on your credit report, he says.

A few companies offer a hybrid arrangement in which they install the equipment for homeowners without upfront cash or ongoing payments in exchange for the solar credits the panels generate. The rules governing them can be complicated, so be sure you understand them before signing an agreement.

If you sell your home, a lease can be transferred to your buyer as long as they qualify for the payments, says Aghamalian.

Solar energy loans are not assumable by a buyer, so home sellers must pay off the loan or continue making payments until the loan is paid in full, says Diaz.

“Home sellers typically increase their listing price to pay off the solar financing,” Diaz says.

### **Tax benefits**

Homeowners who install a solar energy system are eligible for a 26 percent federal income tax credit for systems installed in 2021 and 2022 and a 22 percent tax credit for systems installed in 2023. The federal tax credit expires at the end of 2023 unless Congress chooses to extend it. A tax credit, unlike a deduction, allows you to directly subtract the amount of your credit from your federal income tax bill.

For example, if you spend \$30,000 installing solar panels and battery storage, you may be eligible for a tax credit of \$7,800.

State and local jurisdictions also offer incentives for solar energy. Most solar energy installers also provide information to their customers, Diaz says.

### **Tracking your solar savings**

While every utility company is different, many offer “net metering” that tracks the electricity produced by your solar panels and your energy use. Any excess electricity is either stored in your battery or goes onto the grid, says Cramer.

“Some companies credit you one kilowatt for every kilowatt you produce above what you use, while others base your credits on a wholesale rate instead of the retail rate that customers pay,” says Aghamalian.

Some utility companies carry over credits from one month to another, while others pay customers for excess electricity monthly, says Cramer.

“Some utilities pay wholesale rate for all the power generated by homeowner’s solar panels and then have the homeowner purchase the power back at retail rates,” says Cramer.

Many solar installers provide an app so homeowners can monitor their production levels to compare with their utility bills.

Solar panels typically have a 25- to 30-year warranty, with a 20-year warranty on the inverter and a 15- to 20-year warranty for the racking system, says Diaz.