



The 2024 Solar Industry Survey

Released May 2024



Executive summary

For the second year in a row, the SolarReviews Solar Industry Survey, in partnership with the North American Board of Certified Energy Practitioners (NABCEP), has uncovered unique trends highlighting successes and challenges within the solar industry.

The survey aimed to identify evolving patterns in the solar industry from 2022 to 2023 and highlight respondents' outlooks on 2024 and beyond. A special emphasis was placed on gauging the impact of the Inflation Reduction Act (IRA) and other state and local policy shifts, as well as which brands are trusted most in the industry.

2023 stood out as a distinctive year for the U.S. economy and the solar industry in particular. Increased financing costs and the slow erosion of certain solar benefits led to hesitation from home and business owners to invest in solar. Despite the rocky year, the solar industry remains optimistic about its prospects in 2024 and beyond.

Key statistics

- The percentage of solar installations that use products manufactured in the United States increased to 56% from 34% last year, likely a direct result of IRA benefits.
- Qcells was named the top solar panel brand this year by installers, whereas Enphase inverters and batteries are the top picks in those respective categories.
- Financing solar panels is getting more expensive – 54% of installers say customers were less likely to take a solar loan this past year, and cash purchases of systems are up.
- There are discouraging trends to watch out for this year, from reduced net metering benefits to a lack of skilled workers, adding to the stress of higher financing costs for solar systems.
- Despite last year's difficulties, the industry remains resilient and optimistic. 54% of installers expect to sell more solar in 2024, and 35% of companies expect to grow in the coming year.

Important note: All percentages are rounded to the nearest whole number except when necessary to highlight important differences, such as ranking items in order. Any discrepancy in addition, such as a sum of greater or less than 100% in the charts, is due to rounding.

Please direct all questions to press@solarreviews.com

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"After a tumultuous year of changes in state solar policy and closures of high-profile solar installation companies, it's more important than ever that we get good data about the state of the industry. We're proud to partner with NABCEP and hear hundreds of companies' opinions to provide a snapshot of where the solar industry is in early 2024.

Resilient solar companies are still expecting good things to come in 2024, and we look forward to helping them build their success."

Andrew Sendy | President, SolarReviews

NABCEP[®]

Raising Standards. Promoting Confidence.

"We would like to thank SolarReviews for their hard work in putting together yet another comprehensive and significant Solar Industry Survey Report. For the second year of our partnership, SolarReviews has continued to provide essential information on a wide variety of topics ranging from the Inflation Reduction Act (IRA) to various policies in state and local governments. As a Certification Agency, NABCEP is thrilled to see the excellent progress the solar industry has made over the last decade while being mindful of how much work we still have to do in reaching the goals of the IRA. We will do all we can to fulfill our role in using this information to strengthen job growth in photovoltaics and renewable energy overall."

Shawn O'Brien | CEO & President, NABCEP

Methodology and respondent overview

The Survey was conducted through SurveyMonkey from February 6th to February 29th, 2024. Respondents were invited to participate via email and public social media posts from SolarReviews, NABCEP, CALSSA, COSSA, MSSIA, MNSEIA, Solar Insure, and Baywa.re.

The Survey used branching logic to ensure respondents were presented with questions relevant to them, with specific branches for residential/small commercial solar and energy storage installers. Installers were asked to report their total kilowatts (KW) of installed capacity in 2023. That data was normalized to remove outliers and then used to weight responses to other questions related to proportions, such as the percentage of various payment methods, customer demographics, and installation types. For some questions, respondents could select multiple answers, causing some answer totals to add to over 100%.

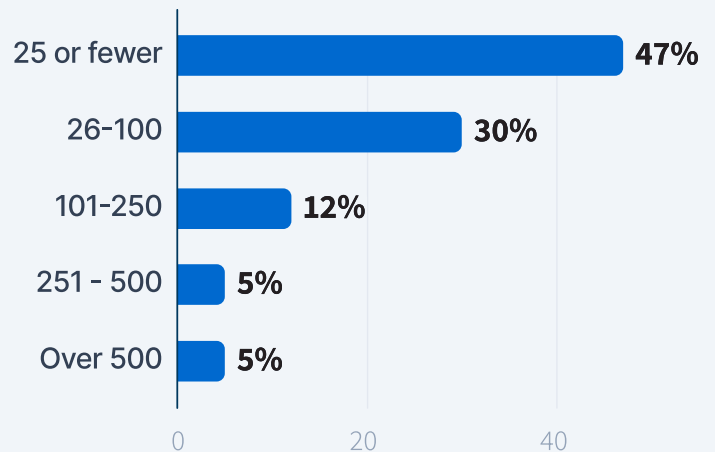
Responses were received from a diverse range of participants across the industry, categorized as follows by primary business activities:

Residential/small commercial solar installation	56%
Equipment manufacturer	6%
Commercial-only solar installation	5%
Utility-scale solar	5%
Electrician	4%
Solar & storage O&M	4%
Energy storage installation	3%
All others	17%

While 56% of respondents said they focus only on residential and small commercial installations, a total of 72% said they do at least some small-scale work.

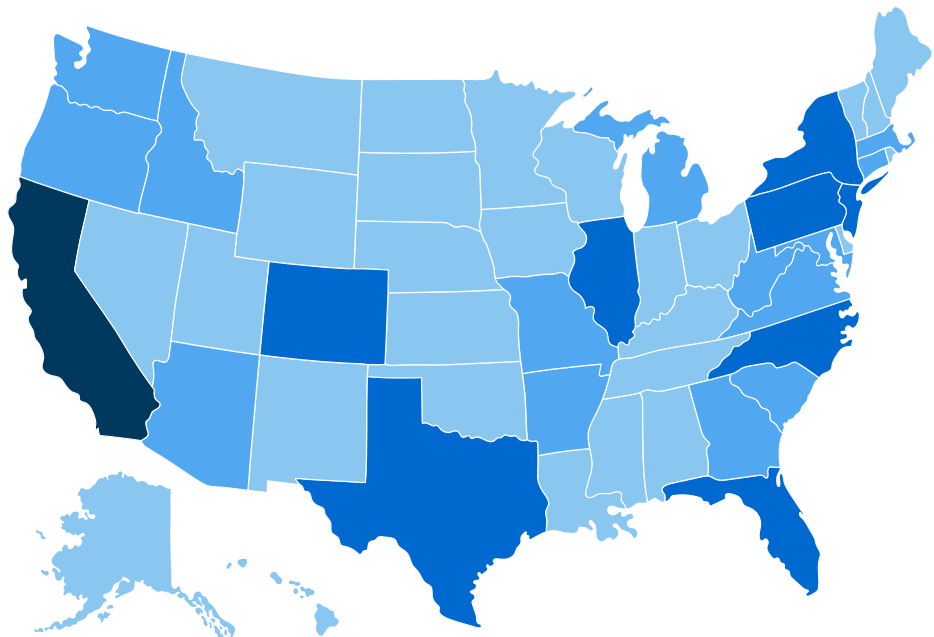
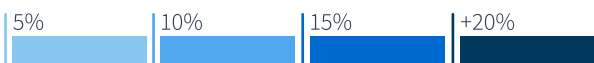
Respondents were mostly associated with smaller solar companies, meaning the results amplify an essential, but often overlooked, voice within the solar industry.

The number of employees working with or for respondents:



Responses came from companies all across the country, with the majority of respondents doing most of their business in just five states: California, Texas, New York, Florida, and Colorado.

At least one respondent reported operations in each of the 50 U.S. states, Washington D.C., and Puerto Rico.

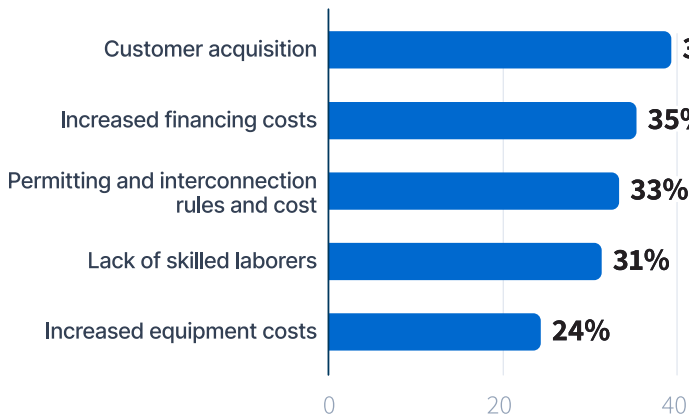


Industry-wide takeaways

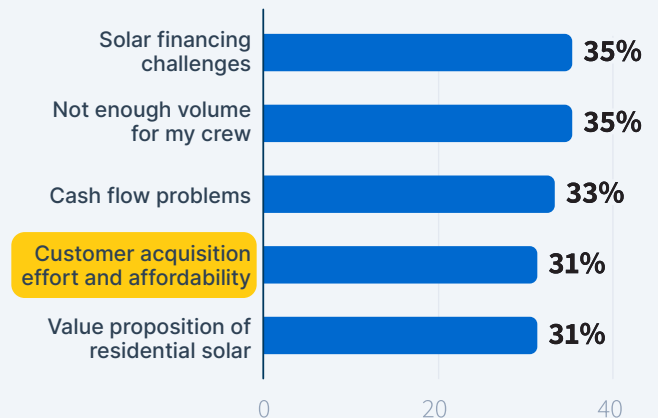
The solar industry has faced widespread challenges due to major policy shifts and economic pressures, such as rising interest rates. These factors may have negatively impacted consumer interest in solar, as 39% of respondents listed customer acquisition as their biggest barrier to success, followed closely by increased financing costs.

Barriers to success

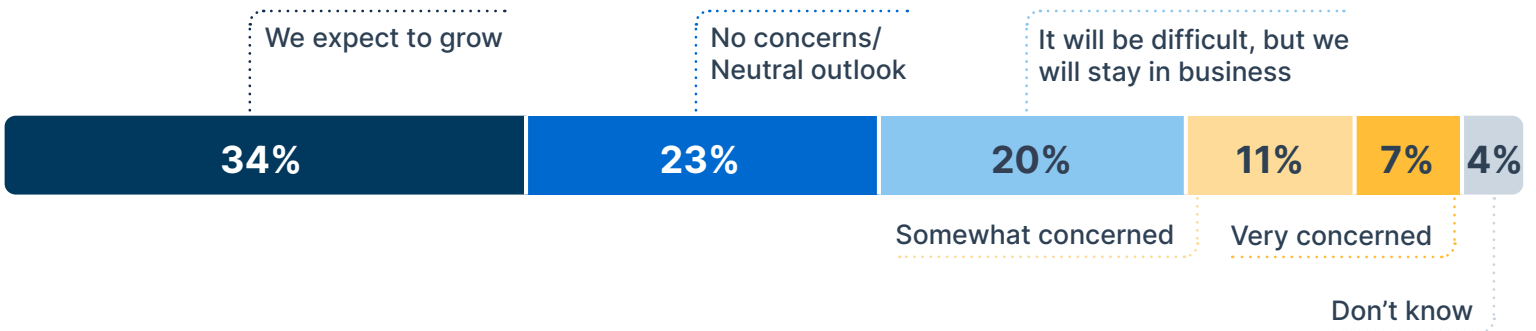
What are your company's primary barriers to success?



When you think of 2024, what are you most afraid of?



How concerned are you about your ability to stay in business in the next six months?



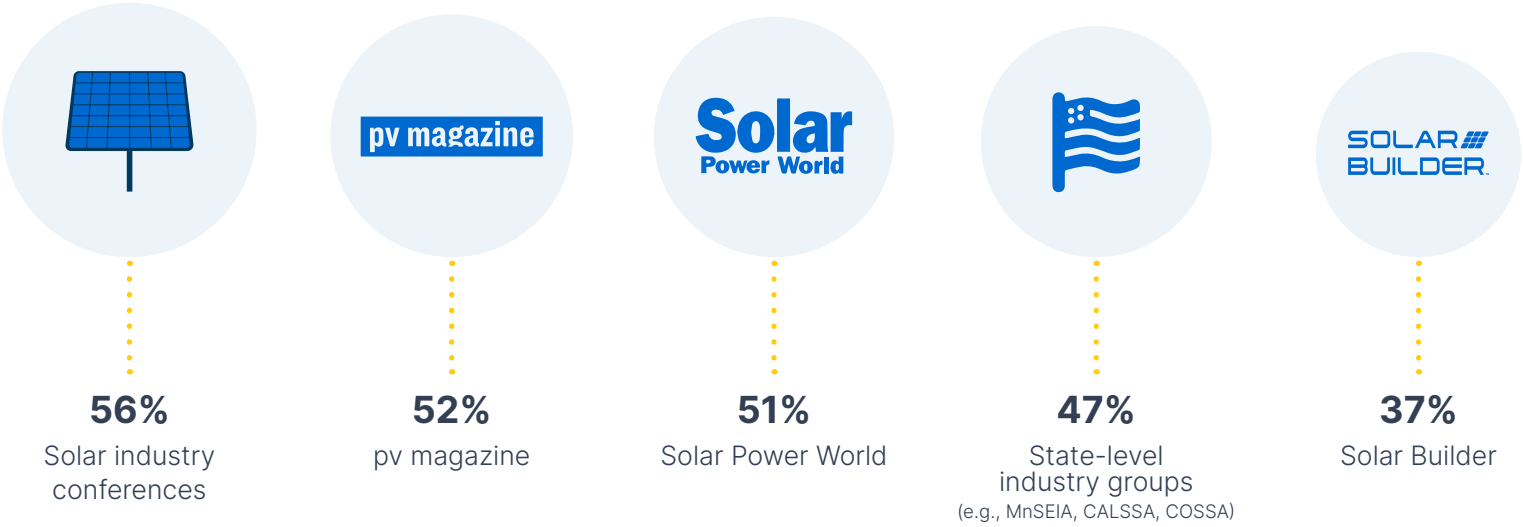
Overall, there is faith in the solar industry, with **77%** of respondents expressing confidence in their ability to stay in business over the next 6 months.

Industry-wide takeaways

During uncertain times for the solar industry, people turned to more news sources than ever to understand the business. When asked which news sources they use to get solar news, respondents replied with an average of 4.3 news sources, up from 3.2 the year before.

Here are the industry's most used news sources, along with the percentage of respondents that use each:

Top 5 solar news sources



Honorable mentions

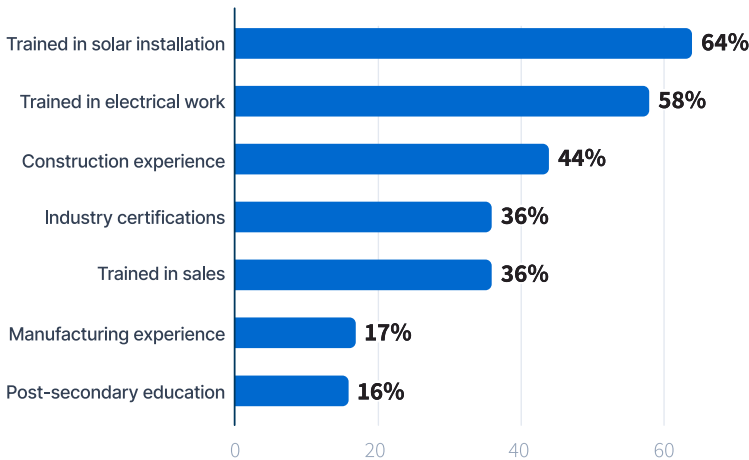
Social media	36%
Energy Storage News	30%
PVtech	29%
Local solar non-profit sites	17%
YouTube	16%
SolarReviews blog	14%
Reddit	10%
Lawmakers	7%

Solar workforce development and training

Despite the challenges that the industry faces, workers are still in high demand.

According to respondents, the most crucial skills for solar workers are previous solar installation training and electrical and construction experience.

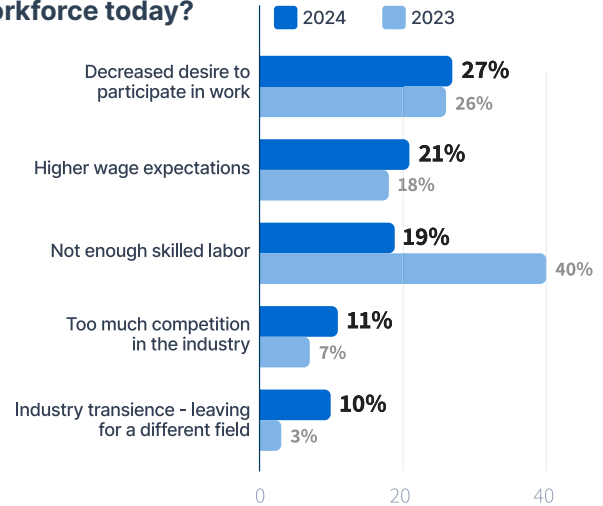
What is the most important skill for workers?



Solar workers who hold qualifications are an asset to solar crews. Respondents reported that 30% – up from 11% last year – of their employees were NABCEP certified. Certifications through the North American Board of Certified Energy Practitioners® (NABCEP) are among the most trusted by solar industry professionals and homeowners.

Respondents say that a lack of skilled workers isn't necessarily the workforce's primary weakness. Instead, respondents pointed to lower work ethic and higher wage expectations as pain points.

What is the most prominent weakness you see in the workforce today?



Up to **55%** of installation/solar companies said they require installation workers to obtain **Continuing Education Units (CEUs)** each year, and **70%** of installation/solar companies **cover the costs of CEUs** for their installer workforce, highlighting the importance of these certifications within the solar industry.

The Inflation Reduction Act

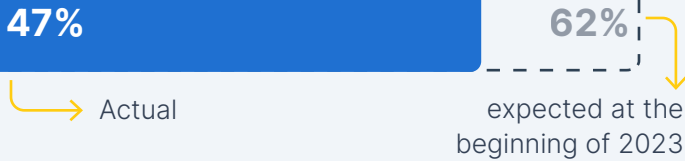
The Inflation Reduction Act, a historic investment in infrastructure and renewable technologies, gave the solar industry the kickstart it needed in the post-COVID era. Some key solar incentives included in the IRA are:

- The extension of the Section 48 ITC and 25D solar tax credits, equal to 30% of the cost of a solar installation.
- ITC adders for using domestic products and installing in certain low-income and energy communities.
- Incentives for manufacturers to build modules and other solar equipment within the U.S.

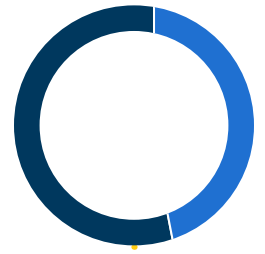
Despite the opportunities the IRA presents, its impact has yet to be fully realized.

Last year, 62% of survey respondents believed the IRA would expand their business – a year later, **only 47% of those surveyed expanded their operations** as a result of the IRA. We believe this ties into data we found about financing, highlighted [later in this report](#).

Expectation vs. reality on expansion due to IRA

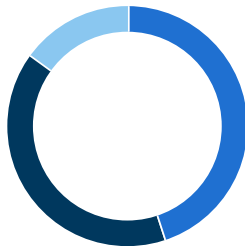
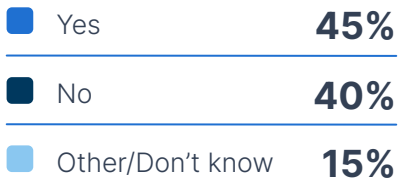


Has your business expanded due to the IRA?

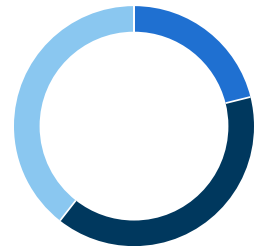
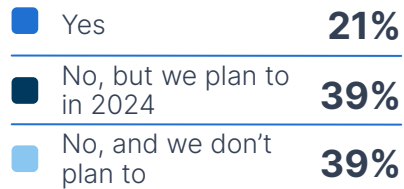


71% of companies in Florida and **64% in New York** say their *business has expanded*, while only **20% of Texas** and **29% of Colorado** companies have *expanded due to the IRA*.

Do you feel the IRA did enough to help solar installation companies?



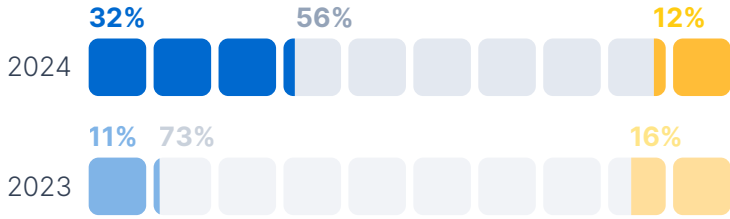
Has your business expanded into low-income areas because of the IRA tax credit adders?



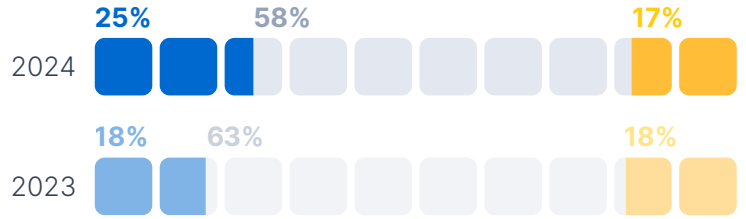
How do you anticipate the IRA will affect your business in the following categories in the next 12 months?

■ Improve
 ■ Stay the same
 ■ Worsen

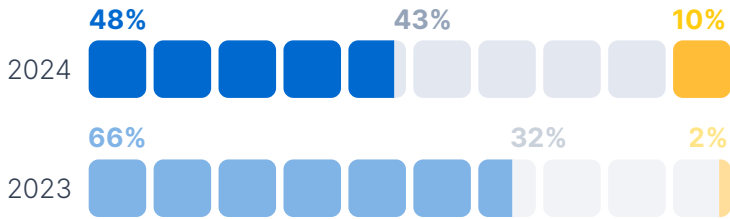
Soft costs



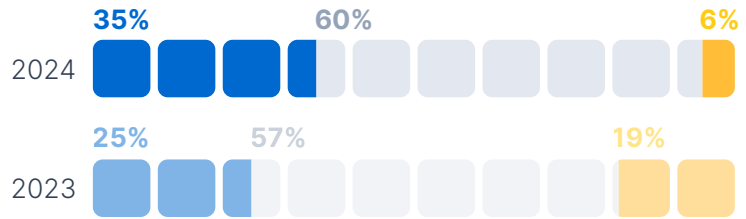
Ability to find workers



Customer interest in solar



Ability to source equipment



Overall, feelings about the IRA lean **neutral**, with respondents expecting some **slight improvements** in soft costs, perceived customer interest in solar, and the ability to find workers and source equipment in the near future.

Solar policy

Expanding solar-friendly policies can potentially increase solar adoption across residential, commercial, and utility-scale markets. Respondents identified statewide tax credits for solar customers as the most beneficial policy initiative, followed by energy storage and solar rebate programs.



State-level policies ranked by how helpful they are or would be for solar business

- 1st** Statewide tax credit for solar customers
- 2nd** Energy storage rebate program
- 3rd** Solar rebate program
- 4th** State-backed green bank offering low-interest loans to individual consumers
- 5th** Demand response battery program
- 6th** SRECs
- 7th** Community solar gardens

Despite accounting for 8% of home solar installation costs¹, permitting and interconnection are often overlooked challenges for the solar industry. As many as 46% of respondents agree permitting rules are too complicated, and 28% say inconsistent rules between jurisdictions are one of the largest permitting issues.

46% of respondents live in jurisdictions that use *SolarAPP+*, and of those who use it, **85%** say it makes permitting significantly easier.

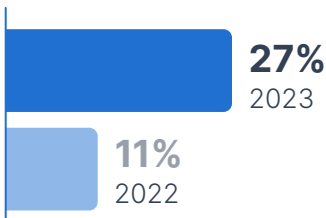
While industry advocates push for the adoption of new programs to expand solar, utilities are equally determined to diminish solar benefits. Some respondents specifically drew attention to rural electric cooperatives for anti-solar efforts, even though their service territories are among those that can benefit the most from solar.

¹National Renewable Energy Laboratory, U.S. Solar Photovoltaic System Cost Benchmark: Q1 2021

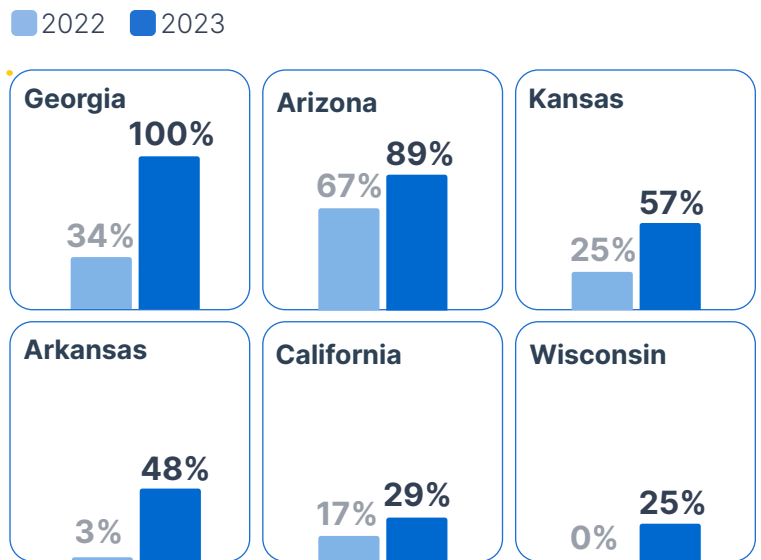
Net metering

2023 saw major changes in several state net metering policies. California, Hawaii, North Carolina, Arkansas, and Indiana all changed how excess solar generation is compensated.

Our Survey revealed that 27% of solar installations in 2023 took place in areas without full-retail net metering compensation available. In 2022, that number was 11%.



States with large increases in the proportion of solar installations not covered by net metering include:

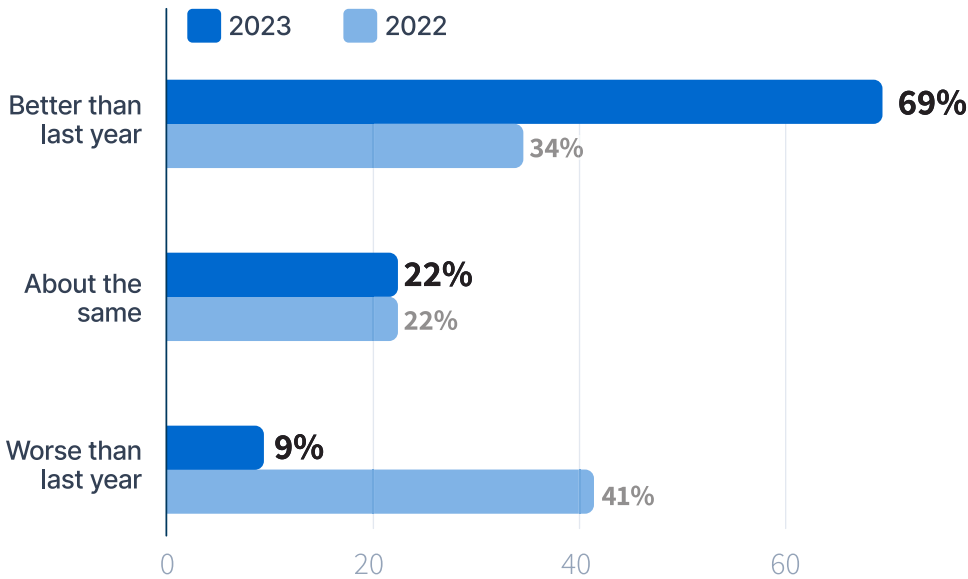


In 2024, we expect these numbers to **continue to increase**, especially in California, where installers are running out of NEM 2 jobs to complete.

Supply chain

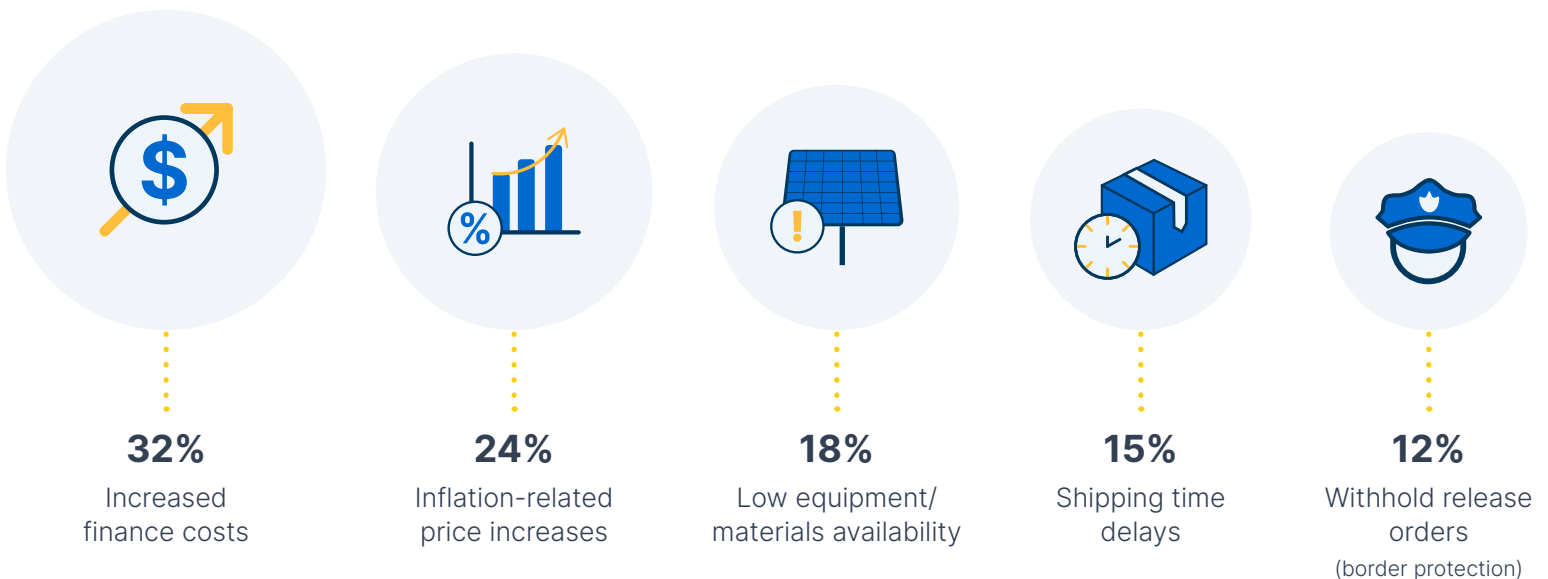
In 2023, manufacturing and shipping processes stabilized, and the year ended with a global oversupply of solar modules. Unsurprisingly, respondents reported that the solar supply chain had improved.

How would you characterize the severity of supply chain issues in 2023?



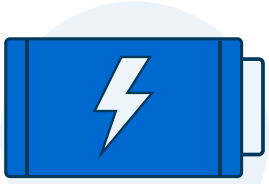
Despite overall improvements, companies still face some supply chain-related issues. Varying numbers of survey respondents reported the following issues were of major significance:

Supply chain issues (and % of respondents reporting the issue as having “major significance”)



Residential solar takeaways

Like last year, installing solar panels was not the only job installation companies focused on. Some bolster their business by offering electric vehicle charger installations, while others “stick to the basics,” offering electrical services. The percentage of installers that provide these additional services remained relatively consistent between 2022 and 2023.



74%

offer **energy storage** installation

A slight decrease compared to last year's 81%.



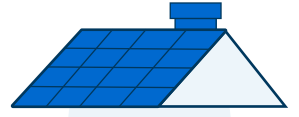
64%

offer **EV charger** installation



40%

offer **electrician** service



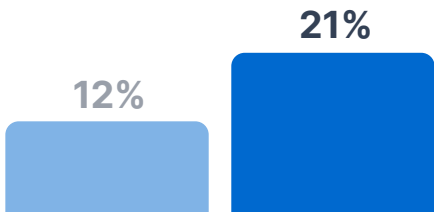
26%

say they can also do **roofing work**

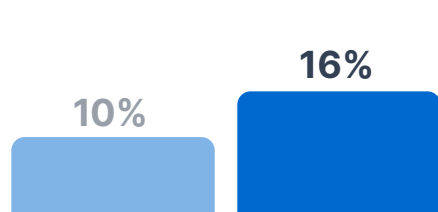
Expanding beyond solar-only installations is gaining popularity across the residential sector.

■ 2022 ■ 2023

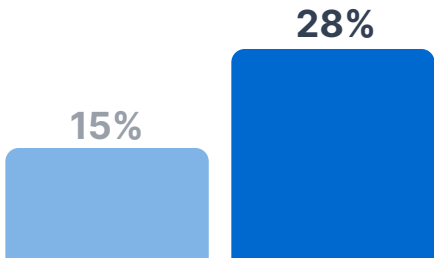
Installations that include roofing upgrades or replacements



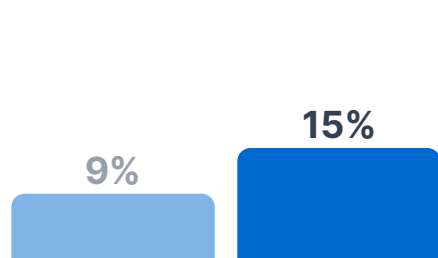
Installations that include EV chargers



Systems that are oversized to prep for EV charging



Previous customers that request additional panels for EV charging

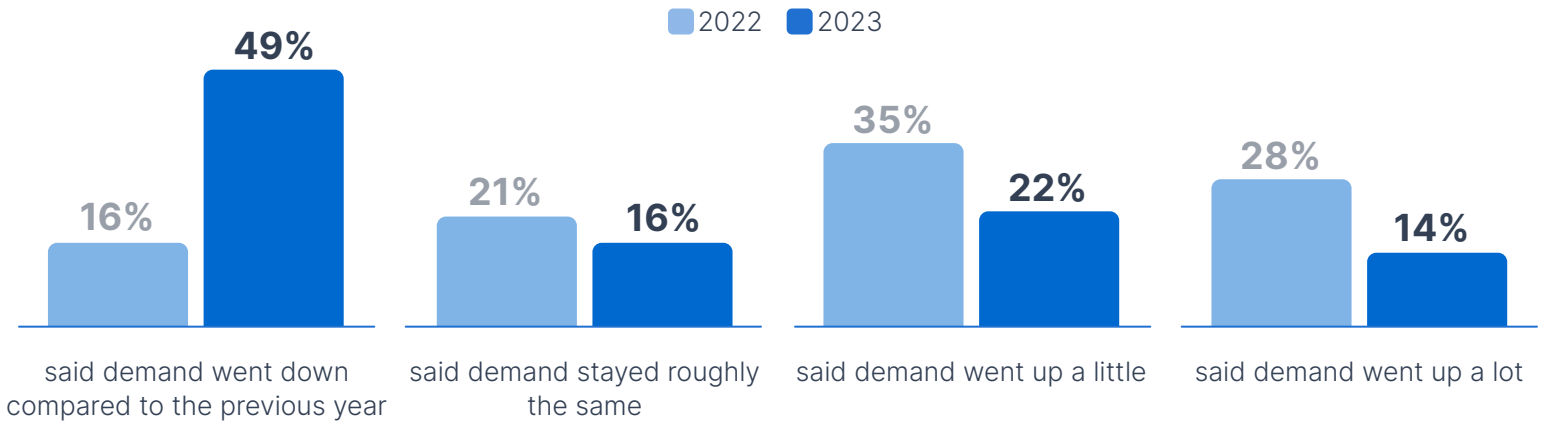


Residential solar demand

When it comes to the homeowners who are investing in these products, a few trends stick out.

2023 was a tumultuous year for the industry because economic factors and policy changes diminished the appeal of solar investments for homeowners. Our findings, which indicated a notable decline in consumer interest, reflect this shift.

Residential solar demand in 2023 vs. 2022

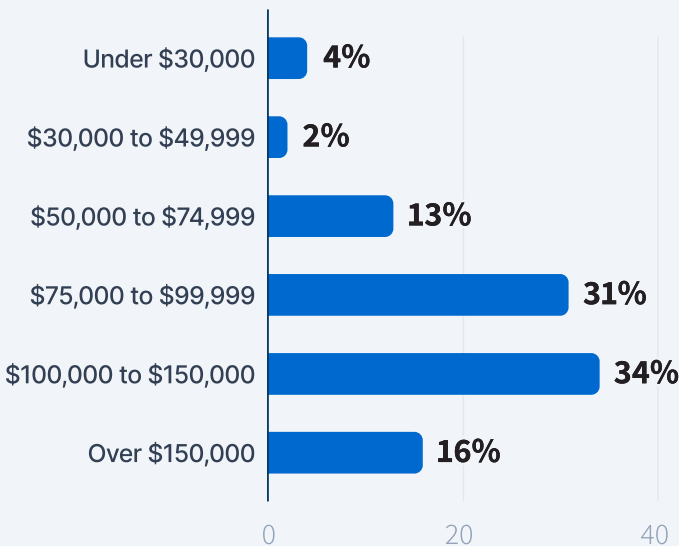


Customer demographics

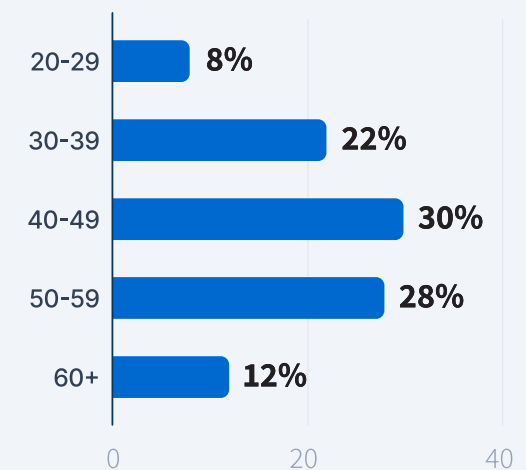
It remains true that a significant number of homeowners opting for solar installations belong to higher income brackets. While there are local low-income solar programs and provisions in the IRA for companies to expand to low-income communities, adoption among these groups remains low, suggesting possible limited awareness and access to solar services.

Of installers that know their customers' average income and ages, here's the breakdown:

Solar customers' average income



Solar customers' average age group



California case study

Approximately 25% of all Survey respondents reported doing business in California. Demand for behind-the-meter solar in the state plummeted in 2023 after the April 15th implementation of Net Billing. Here's what installers had to say about their experiences:

NEM 2 projects

32%

of California installers no longer have NEM 2 projects booked

55%

said they will complete their booked projects by the end of Q3 2024

Sales of residential systems

69%

of California installers report lower sales in 2023 vs. 2022

14%

said sales were about the same

18%

said sales increased

Layoffs in Q4 2023



The average California installation company laid off 5 workers in Q4 2023



Medium-sized installers in California (26-100 employees) reported an average of 13 people laid off

Concern about cash flow in 2024

76%

of companies are concerned about their ability to meet cash flow requirements before the end of Q3 2024

System payback time under Net Billing



Installers report a median payback time of 8 years for systems with a solar battery



and a 10 year payback period for systems without storage

NEM 3 system stats



Installers report that **68%** of CA customers on Net Billing choose to add a battery

2x

This is about double the national average of installations with a battery

Best battery brands for Net Billing

36%

of installers say Enphase batteries are best suited to handle Net Billing

18%

say FranklinWH

14%

say Tesla

All numbers apply to installation companies that work in investor-owned utility (IOU) territory

“

“Solar companies are working harder than ever to stay afloat, but our market has been set back 10 years, and the state continues to throw up obstacle after obstacle to the adoption of solar and storage. It's like a Bizzaro World out here.”

Bernadette Del Chiaro | Executive Director, CALSSA

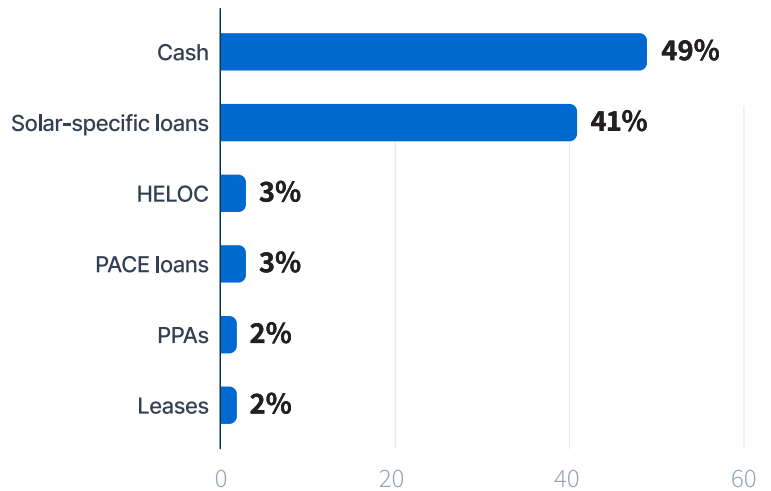


Home solar financing

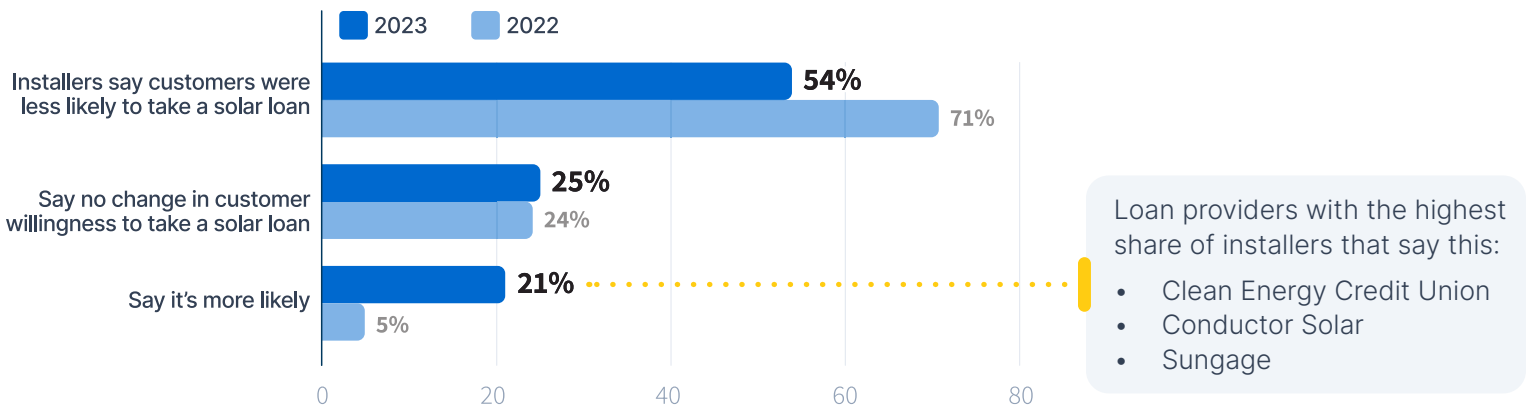
Financing is critical to residential solar adoption, as the upfront cost of a solar installation is beyond the reach of many. However, throughout 2023, interest rates for fee-free residential solar loans remained at about 10%, and those with dealer fees tacked on an additional 19% to the principal, making consumers less willing to take out a loan to pay for solar.

Yet, 77% of installers surveyed continue to offer financing, recognizing it as an essential service.

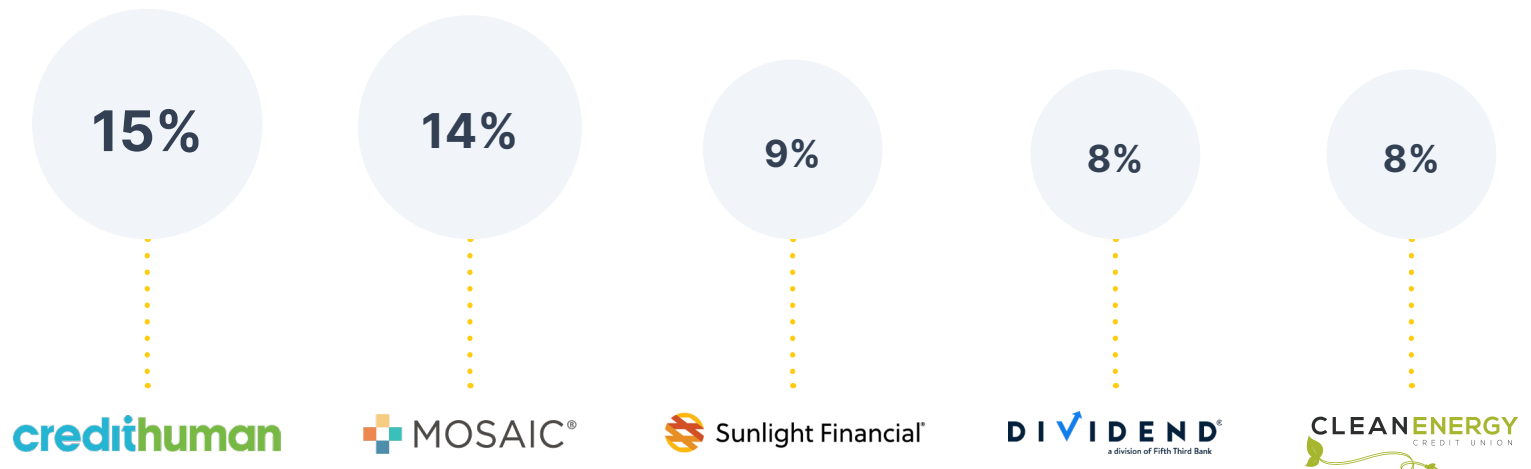
Type of solar sales reported



Customer willingness to take a loan






Top 5 solar financing companies






We wanted to hear from installers about the best financing options that are currently available to them, and here is the round-up:



Loans with dealer fees range

From:	To:
 A 15 -year loan with	A 30 -year loan with
 3.49% interest and	6% interest and
 26% dealer fee	15% dealer fee

Access to fee-free loans

From:	To:
 A 15 -year loan with	A 30 -year loan with
 7% interest and	9.99% interest and
 0% dealer fee	0% dealer fee

Loans with dealer fees range



From:	To:
 A 25 -year loan with	A 25 -year loan with
 6.73% interest and	9.99% interest and
 19% dealer fee	0% dealer fee

For a typical 6-kW system with an \$18,000 cash price

Loans with dealer fees range

 \$87 — \$113 monthly payment
 \$20,000 to \$31,000 lifetime cost

Installers with access to fee-free loans

 \$110 — \$113 monthly payment
 \$20,000 to \$40,000 lifetime cost

25-year loan (most commonly reported)

 \$103 — \$113 monthly payment
 \$31,000 to \$34,000 lifetime cost

Top brands in residential solar

Finding the best installation equipment is crucial for a successful solar company. These are the top five qualities respondents look for in choosing a module brand:

Top 5 factors installers consider when choosing a module brand

- 1st** Performance/quality
- 2nd** Brand name/reputation
- 3rd** Product warranty
- 4th** Pricing
- 5th** Product availability from distributor

Solar companies, pay attention!

There's an uptick in consumer brand awareness in the residential solar market. In 2023, 29% of customers requested specific solar panel or inverter brands, marking an 11 point increase from the previous year.

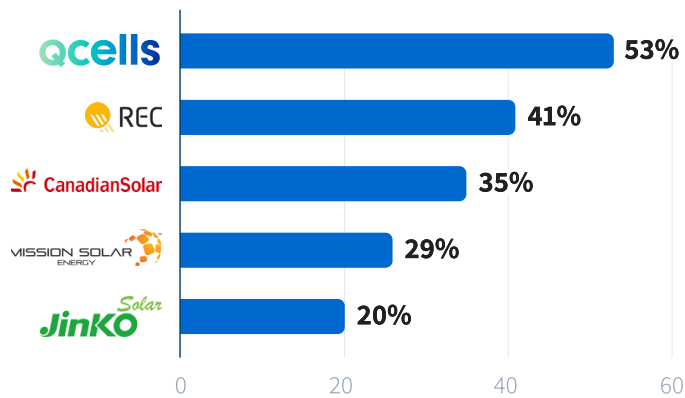
54% of installers say the price they paid for solar panels *went down* in 2023

Based on SolarReviews research, the brand that represents the best mixture of all of these criteria is Qcells, and according to this survey, installers agree.

Top solar panel brands

The top brand that fit respondent criteria was Qcells, with 53% of installers using its modules.

Top 5 most-used solar panel brands (and % of installers that use them)



Qcells

SolarReviews agrees! Qcells has been **#1** on our top solar panel brands list for two years in a row. It has an estimated 35% share of U.S. residential and commercial solar markets.



"From our first-class performing solar and battery storage technologies to our end-to-end clean energy solutions, Qcells is proud to lead this critical industry"

"As Qcells continues to invest in the U.S. market and domestic solar manufacturing, we look forward to continuing strong relationships with our partners and providing high quality, reliable and sustainable clean energy solutions for homes and businesses alike."

David Shin | President, Qcells North America

Most common solar panel brand pairings

28% of installers offer both



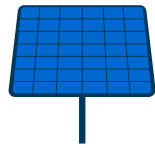
18% of installers offer both



19% of installers only offer a single brand, but the majority provide customers with alternative panel options to find what best fits their needs.

Percentage of equipment sourced directly through a manufacturer

These results fall in line with SolarReviews' solar panel brand ranking criteria, which value performance, brand reputation and financial strength, warranty terms, pricing, and availability. Those criteria also translate to sourcing materials.



27%

Solar panels



23%

Solar inverters



30%

Energy storage products

These results show that distributors remain incredibly important to the industry. We asked installers to rank the qualities they seek in a distributor, which produced the following aggregate list:

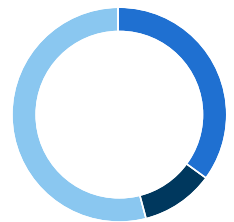
1. Reputation	2. Product pricing	3. Longevity
4. Leadership	5. Financial stability	6. Business support
7. Customer support	8. Relationship-focused	9. Credit and payment terms

Top inverter brands

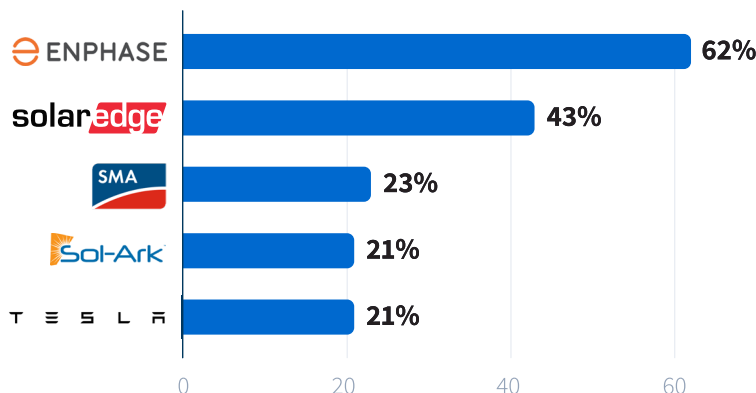
For the second year in a row, Enphase won out as the top inverter brand chosen by installers, with SolarEdge coming in second.

This year, Tesla appears on the list, beating out Fronius and Generac, two favorites from last year. The Tesla inverter's integration with the brand's ecosystem and its four Maximum Power Point Trackers (MPPTs) could contribute to its popularity among installers.

21% of installers only carry a single inverter brand



Top 5 most-used inverter brands
(and % of installers that use them)



ENPHASE
75% positive comments
25% negative comments

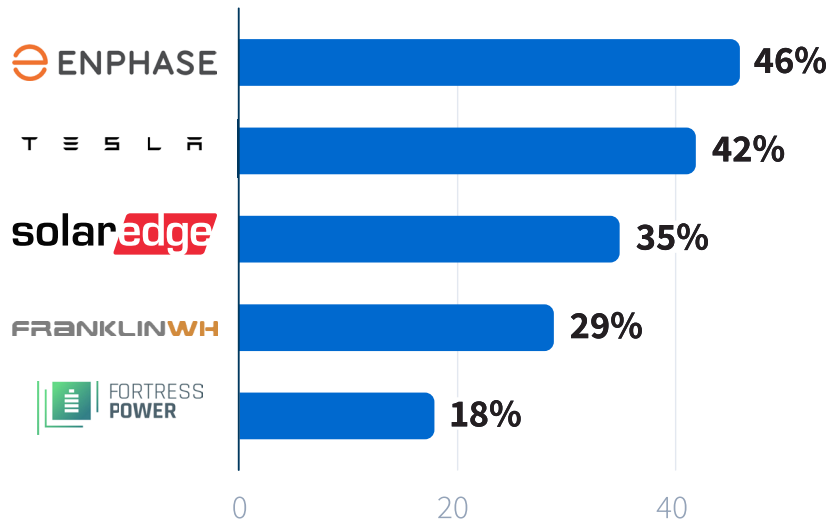
solar edge
16% of residential installers said they avoid this brand

GENERAC
6% of residential installers said they avoid this brand

Top energy storage brands

Energy storage is becoming increasingly popular among homeowners, with 35% of new home solar installations paired with battery systems. Respondents gave insight into the storage brands that they use the most:

Top 5 most-used energy storage brands (and % of installers that use them/plan to use them in 2024)



Honorable mentions

SunPower	16%
Generac	15%
LG Energy Solution	15%
HomeGrid	13%
BYD	9%
SimpliPhi (Briggs & Stratton)	9%

Interestingly, although Enphase was the most popular brand used, it wasn't hailed as the easiest to install. That title goes to Tesla, with 25% of respondents praising the Powerwall for its straightforward setup.

Tesla also emerged as the preferred option for installers who only offer a single brand of battery.

#1

TESLA

Easiest battery storage system to commission according to installers.

For installers that only use a single brand, these were the top choices after Tesla



Homeowners are often drawn to solar energy because of its financial benefits, but this trend doesn't seem to extend to energy storage. The **primary motivation** for installing home batteries is driven significantly by the desire for **backup power**, as 54% of survey participants indicated. In contrast, financial considerations were only a priority for 30% of homeowners when deciding to get batteries.

Most popular reasons homeowners install batteries

Electricity backup	54%
To offset decreased net metering benefits	16%
To offset time-of-use rates	14%
Daily cycling/self-consumption	4%
All others	12%

Residential solar maintenance and repairs

The solar industry has to grapple with installers of all sizes going out of business and leaving homeowners with no one to call when their system needs an upgrade.

46%

of active solar companies receive daily or weekly calls from customers looking for solar panel service

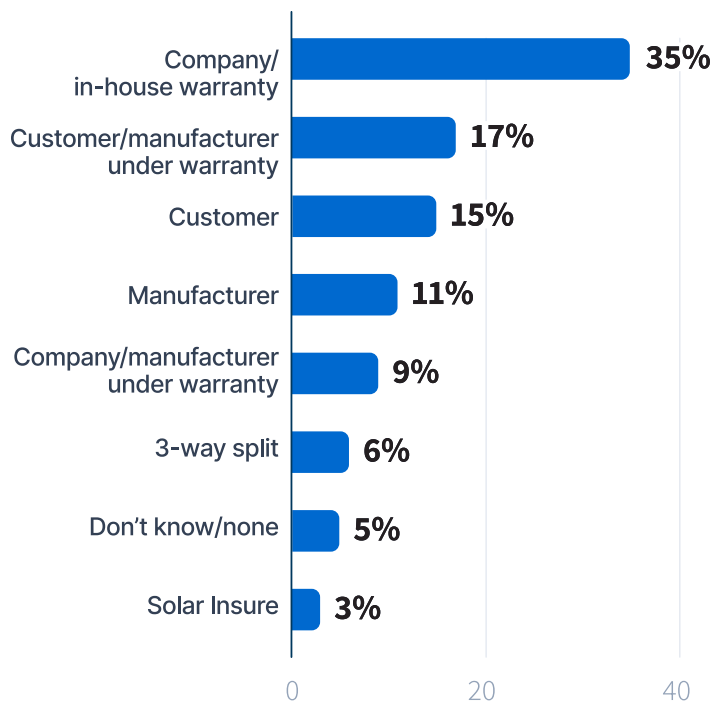
7%

say they only get calls from customers whose original solar installer went out of business

The good news is that repairs are typically covered by warranties.

A warranty or third-party insurance through companies like Solar Insure can help homeowners avoid losing out on covered repairs if an installer goes out of business.

Who covers the cost of necessary repairs to solar installations you service?



“

“The tumultuous obstacles of 2023 resulted in a challenging year for many solar companies, leading to a surge of solar company insolvencies, which left homeowners without protection for their solar energy investment. With over a decade of experience in the industry, Solar Insure understands the gravity of the “solar coaster” and its impact on homeowners and the industry. Our goal is to collaborate closely with installers to provide homeowners with reassurance that their installation team will have the bankable entity of Solar Insure behind them for years to come.”

Ara Agopian | CEO and Founder, Solar Insure

Most common after-installation repairs



Given that solar is a 25-year investment, **post-installation services** are an important consideration for homeowners. Software-related issues are more frequent than equipment failures, which are notably uncommon.

1. Inverter hardware failure/replacement	2. Inverter software/setup issues
3. Battery software/setup issues	4. Communications/monitoring
5. Roof leaks	6. Battery hardware failure/replacement
7. Wiring issues	8. Broken/underperforming panels

Many companies are monitoring solar systems to either prevent issues from arising or to fix any that occur quickly.

96%

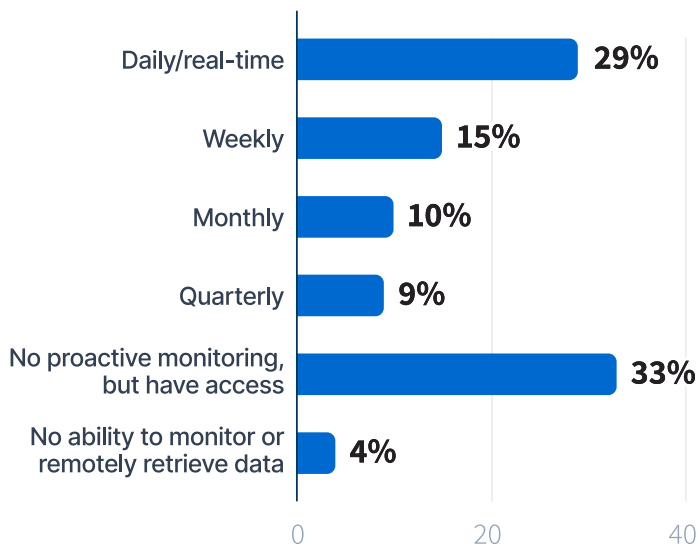
of installers say they have at least partial access to system monitoring

63%

say they proactively check their customers' installations at least once per quarter to ensure they are working.

Fortunately, when issues do occur, they are often covered by some type of warranty, leaving only 15% of cases where the customer is responsible for repair costs.

With what frequency (if any) do you proactively monitor your customers' installations?



The solar industry has had to grapple with installers going out of business and abandoning their customers, with 7% of installers saying they only get calls from customers whose solar installers went out of business. Often dubbed "solar orphans," these homeowners have no one to call when their system requires repairs.

Solar Insure is working to fix this by providing enhanced warranty coverage and access to a network of partners that service abandoned systems.

Looking forward

2024 is almost halfway over, but we can speculate what the remainder of the year holds.

Some solar businesses are still reeling from the events of 2023. 22% of solar businesses say they have concerns that make them unsure whether they can stay in business in the coming six months. 20% indicated that they believed it would be difficult, but they expect to remain in business.

But overall, residential installers seem to have a rosy outlook. 54% of installers surveyed say they expect to sell more solar in the coming year. Industry-wide, 35% of companies expect their business to grow in 2024, and an additional 23% think they will at least be able to maintain the same level of business as last year.



About SolarReviews

SolarReviews is America's leading independent website for solar leads for installers, consumer reviews, and comparisons of solar panel installation companies and residential solar panel brands for homeowners. They offer consumer and expert reviews, specifications and warranty details, panel prices, and quote comparison tools that streamline the solar installation process and make it easy for homeowners.

For more information, visit www.solarreviews.com.



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About NABCEP

The North American Board of Certified Energy Practitioners® (NABCEP®) is the most respected, well-established, and widely recognized certification organization for professionals in the field of renewable energy. NABCEP offers certifications and credentials for skilled professionals, specialists, and those new to working in the areas of photovoltaics, solar heating, and small wind technologies. The first NABCEP Solar PV Installer certification exam (now called PV Installation Professional) was administered in 2003. Since then, NABCEP has launched and maintained 8 Board Certification Programs and 3 Associate credentials.

For more information, visit www.nabcep.org

Thank you to our partners for sharing the survey with your networks

