



# New York State Homeowner's Guide to Solar Leases, Loans, and Power Purchase Agreements

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## Introduction

Are you thinking about installing a solar electric system on your house and trying to figure out how to pay for it? Solar electric systems are also known as solar photovoltaic or PV systems. Perhaps you are debating whether to purchase the system outright or take advantage of a financing option. Perhaps you are still learning about the financing options available to you.

If you own a home and are thinking about going solar, there is good news. The price of a solar electric system has come down dramatically in recent years, and there are more ways to pay for it. But with so many solar financing options now available, the marketplace for these products has become increasingly complex. It can be hard to choose among the different packages and vendors. The differences between them may not be readily apparent. Some contracts are filled with confusing technical jargon, and key terms can be buried in the fine print of a customer contract.

### **This guide is designed to help homeowners make informed decisions about financing solar.**

This guide is designed to help homeowners make informed decisions and select the best option for your needs and finances. It describes three popular residential solar financing choices—leases, power purchase agreements or PPAs, and loans—and explains the advantages and disadvantages of each, as well as how they compare to a direct cash purchase. It attempts to clarify key solar financing terms and provides a list of questions you might consider before deciding if and how to proceed with installing a solar electric system. Finally, it provides a list of other resources to help you learn more about financing a solar electric system.

The guide does not cover technical considerations related to solar electric system siting, installation, and interconnection with the electricity grid, nor does it cover all of the particular local market considerations that may impact financing a solar electric system.



# Financing Options for Homeowners

The size of a residential solar electric system installation can vary dramatically but is generally between 2 and 20 kilowatts (kW) depending on a variety of factors, including the available roof space (or ground space if it is a ground-mounted system); site conditions such as roof orientation, azimuth, and shading; the electricity usage of the home; and available financing. To put these system sizes into context, a 7-kW system in New York State produces enough electricity for an average New York household in a year.

A system's size is also a key determinant of its cost. Although the price of systems varies considerably, a residential solar electric system usually costs between \$15,000 and \$35,000, roughly the same as a new car. But just as buying a car outright can be financially burdensome for many automobile customers, so too can paying upfront for a solar electric system. That's where solar financing comes into play.

## **Financing innovations have helped fuel the exponential growth of the solar market in the United States.**

Financing innovations have helped fuel the exponential growth of the solar market in the United States and fall into two broad categories based on ownership of the solar electric system: third-party ownership and homeowner ownership via a loan. A later section of this report explicitly compares the types of financing.

Some solar companies will arrange for the installation of a solar electric system and provide financing for it. These companies are often called full-service solar developers. In other cases, the installer is a different entity than the financial lender. A solar financing lender might be a bank, a solar company, a credit union, a public-private partnership, a green bank, or a utility.

Third-party ownership of residential solar electric systems allows homeowners to avoid high, upfront system costs and instead spread out their payments over time. It also often puts some or all of the responsibility for system operation and maintenance on the third-party owner. Currently, approximately 65 percent of homeowners in New York State who install solar take advantage of third-party ownership. The two most common third-party ownership arrangements are solar leases and power purchase agreements (PPAs).

Under a solar lease arrangement, a homeowner enters into a service contract to pay scheduled, pre-determined payments to a solar leasing company, which installs and owns the solar electric system on the homeowner's property. The homeowner consumes electricity produced by the leased solar electric system; however, if the system provides excess electricity to the grid, the homeowner may get credit for that generation from the electrical utility. As with all types of solar financing options, under a solar lease arrangement the homeowner pays the regular utility rate for any electricity consumed beyond what credits the solar electric system generates through excess production sent onto the grid.



**Solar leases can be attractive to homeowners because of their relative simplicity compared to PPAs.**

With a residential solar PPA, a homeowner contracts with a project developer who installs, owns, and operates a solar electric system on the homeowner's site. The developer agrees to provide all of the electricity produced by the system to the homeowner at a fixed per-kilowatt-hour rate, typically competitive with the homeowner's electric utility rate.

Loan financing is becoming another popular way for homeowners to pay for solar. Similar to leases and PPAs, solar loans allow customers to spread the system's cost over time, but they enable customers to retain ownership of the system, thereby repaying greater benefits over the lifetime of the system. Solar loans have the same basic structure as other kinds of loans and are being offered by an increasing number of lending institutions—from banks and credit unions to utilities, solar manufacturers, state green banks and financing programs, housing investment funds, and utilities. Unlike third-party solar ownership, a solar loan arrangement enables a customer to own a solar electric system outright and benefit directly from state and federal incentives. However, the customer also incurs the liabilities associated with ownership.

## What You Need to Know about Solar Leases, PPAs, and Loans

First, you should be aware that solar purchase agreements, solar leases, power purchase agreements and solar loans are all legally binding documents. It is recommended that you have any agreement reviewed by an attorney with experience in the solar marketplace before you sign.

### **Solar Leases**

**A solar lease involves a scheduled payment, which is usually monthly. With a solar lease, a developer installs and owns the solar electric system on the home. In return, the homeowner pays a series of scheduled lease payments to the developer. A typical lease term is 15-20 years.**

Because a lease agreement can deal with system maintenance in a variety of ways, it is important to clarify who is responsible for maintenance costs as a solar electric system may require maintenance or replacement of parts during the lease contract term. Most solar leases cover maintenance, but may not cover the cost of replacing equipment such as the inverter. One common option for the homeowner is to make a single payment toward operations and maintenance upfront. That approach could reduce the third-party owner's incentive to provide good maintenance service. The maintenance risk can be reduced if the solar lease contains a minimum performance guarantee or the contract clearly states that operations and maintenance are covered by the third party. Such guarantees help ensure that the third-party owner properly maintains the system.

**In New York, for leases and PPAs, any applicable state personal tax credits go to the homeowner. However, under a lease or PPA arrangement you would not own the system, and any applicable federal tax credits would go to the system owner.**



The benefits of a solar lease include elimination of most or all of the upfront cost of a system and, if indicated in the contract, transferring operations and maintenance responsibilities to a qualified third-party owner. Although homeowners who enter into a lease pay a set price for the equipment (and sometimes maintenance), they do not know for sure how much electricity the solar panels will produce, so cannot know exactly how much money they will save on their electric bills. Ideally, monthly electric bill savings will be greater than the lease payments, making for a cash-positive transaction. Many solar leases come with an escalating (meaning increasing) payment schedule, described in more detail below. Homeowners should thoroughly scrutinize escalating payment schedules when assessing the desirability of a particular lease.

The Solar Access to Public Capital (SAPC) working group, convened by the National Renewable Energy Laboratory, has developed a standardized solar lease template ([https://financere.nrel.gov/finance/solar\\_securitization\\_public\\_capital\\_finance](https://financere.nrel.gov/finance/solar_securitization_public_capital_finance)). This template can be modified to include different terms and has not been adopted by all solar developers. You should closely examine a solar lease contract before executing it or consider having a lawyer read it before you sign it because terms vary.

### **Solar Power Purchase Agreements (PPAs)**

**Under a residential solar PPA, a solar financing company buys, installs, and maintains a solar electric system on a homeowner's property. The homeowner purchases the energy generated by the system on a per-kilowatt-hour basis through a long-term contract at rates competitive with the local retail electricity rate. This allows the homeowner to use solar energy at a prescribed per-kilowatt-hour rate while avoiding the upfront cost of the solar electric system and steering clear of system operations and maintenance responsibilities. Because the homeowner knows how much the solar electricity will cost for the entire term of the PPA, the homeowner is insulated from possible increases in utility electricity rates. However, it is also notable that if the electricity rates go down, the homeowner may lose some of the savings.**

Ideally, a homeowner's PPA per-kilowatt-hour payments will be less than the retail electricity rate, making the transaction cash-flow positive from day one. If you consider this option, you should look carefully at your electricity bill to see how your current rate compares with the rate proposed by the company offering the PPA. You can ask your contractor to calculate the projected per-kilowatt-hour rate and annual savings. For PPAs with an escalating rate, you should consider how any increase in local electricity rates would change your payment.

Visit [https://financere.nrel.gov/finance/solar\\_securitization\\_public\\_capital\\_finance](https://financere.nrel.gov/finance/solar_securitization_public_capital_finance) for a SAPC working group standardized PPA contract. As with all solar financing contracts, you should closely scrutinize a PPA contract before executing it or have a lawyer read it before you sign it because terms vary.



## Solar Loans

**Solar loans allow customers to borrow money from a lender or solar developer to install a solar electric system. With this approach, the homeowner owns the installed system. A wide variety of loan offerings are available with different monthly payment amounts, interest rates, lengths, credit requirements, and security mechanisms. Some solar loan products offer bundling of energy efficiency improvements along with the solar electric installation or allow for inclusion of roof replacement or energy-related improvements.**

Some loans require an asset to serve as collateral to secure the loan. When the lender takes a security interest in the solar customer's home, it is called a home equity loan. Unsecured loans do not require an asset to collateralize the loan other than perhaps the solar electric system itself.

With many solar loans, the solar electric system can start saving the homeowner money right away by structuring the repayment terms so that the monthly loan payments are less than the resulting reduction in the amount on your home electricity bill. Alternatively, paying off the loan sooner and over a shorter duration may delay immediate positive cash flow, but will shorten the time needed to enter the post-loan period when monthly savings will be much greater.

Lenders for solar loans can be banks, credit unions, state programs, utilities, solar developers, or other private solar financing companies. In New York State, NYSERDA's Green Jobs – Green New York loan program offers both a Smart Energy Loan and an On-Bill Recovery Loan. More information on the loans offered, as well as current interest rates, can be found at <http://www.nyseda.ny.gov/All-Programs/Programs/NY-Sun/Customers/Solar-Financing-Options>. Private loans that cover solar may also be available.

# Common Terms in Solar Financing

It is important to scrutinize the contractual elements in a solar lease, PPA, or loan. Here are explanations of some common contract terms.

## **Buyout Options:**

Many third-party financing contracts allow the homeowner to buy out or pay off the remainder of the payments in one lump sum at any time after a designated period of time. Some contracts provide for an option to buy out at the fair market value of the system. Look to see if there is a buyout option in the contract, under what circumstances a homeowner can buy out of a contract, and how the buyout price is calculated. Contracts may differ in how they approach this issue, and methods of calculating buyout prices can vary. If a clear buyout option is not included in the offer, the homeowner can always try to request one.

## **Contract Term:**

Contract term, duration, and payback period all refer to the period of time under which a homeowner's solar financing agreement is operative. Most residential financing contracts last for between 5 and 20 years, and some last even longer. By way of comparison, solar panels typically come with a 20- to 25-year warranty and their productive lifespan can exceed that period. Inverters have separate warranties, which are typically 5-10 years, though some are longer. At the end of a solar lease or PPA term, the homeowner will often have several options: 1) renew the contract and continue the monthly payments, 2) purchase the system at a designated price or the fair market value of the system, which may or may not be negligible after the term of a contract, or 3) have the third-party lender arrange for system removal. In the case of a solar loan, the homeowner will continue to own the system after the contract term concludes and the loan is fully paid off.

## **Credit Requirement:**

As a prerequisite to entering into most third-party financing contracts, third-party lenders require a credit (or FICO) score. Many third-party financing arrangements are only available to homeowners who have a credit score of 680 or higher. Some financing arrangements may be available to homeowners with credit scores lower than 680, but they may come with higher interest rates. Knowing a credit score at the outset can be a useful way to determine eligibility for third-party financing.

A credit score below 650 will preclude most homeowners from most third-party financing options. Some states have developed special loan programs for lower income or lower FICO score customers. Solar loan programs and other state solar incentive programs can be found on the DSIRE website at [www.dsireusa.org](http://www.dsireusa.org), or by checking with NYSERDA.

## **Down Payment:**

Many third-party lenders offer options for initial customer down payments. Generally, initial down payments range from zero dollars to \$3,000. By putting some money down upfront toward the cost of a solar electric system, the homeowner will likely receive a lower monthly payment, a shorter duration contract term (in the case of a solar lease or loan), or get a lower per-kilowatt-hour rate (in the case of a PPA). With a down payment, some third-party lenders will waive or reduce the escalation clause.

## **Escalation Clause:**

Many third-party financing options contain a clause that increases a homeowner's monthly payment on an annual basis to account for inflation and projected annual increases in electricity rates. This concept is often referred to as an annual "escalation clause," "escalator clause," or simply an "escalator." In many solar lease and PPA contracts, payments escalate at an annual rate between 1-3 percent. Escalation clauses are not problematic per se—keep in mind that the average annual increase in U.S. residential electricity rates over the past decades was over 3 percent and the average annual rate of inflation was 2.4 percent—but they should be understood and closely examined for reasonableness. The escalator is a compounding rate, meaning that it applies not just to the initial payment rate but to the increases added after each year due to the escalation charges. For example, if the payment rate for a PPA is 12 cents per kilowatt hour in the first year, with an annual escalator of 3 percent, the customer will be paying 18.2 cents per kilowatt hour in year 15. But if the escalator is only 1 percent, the customer will only be paying 13.8 cents in year 15. It is good to calculate or ask for a table of what each year's payment rate will be.



### **Homeownership Transfer Provisions:**

It is important to look for contract terms that clarify the allocation of obligations in the case of a transfer of home ownership. Under a third-party ownership model, the homeowner can usually transfer the solar lease or PPA to the next home owner for the remainder of the contract term, provided the new owner is approved (usually a credit score qualifying a person for a mortgage also meets the criteria to take over the third-party lending agreement obligations). Solar panels can add significant value to a home, but third-party solar ownership can also be a complicating factor during the sale of a home. Some homebuyers may be wary of purchasing a house with a solar electric system. If a solar electric system is third-party owned, a seller may have to buy the system outright before transferring the home, so the system can be removed upon transfer. With a relatively scant history of solar home sales data, it can be difficult to calculate the value of a residential solar electric system during the home sales process, especially when a system is third-party owned and the buyer would like to assume the remaining lease or PPA payments. Examine the provisions of a contract that relate to ownership transfer to determine what the options would be if the home is sold before the end of the contract term, and have a clear understanding of those conditions with the installer.

### **Minimum Production Guarantees:**

Many lease and PPA arrangements offer solar production or output guarantees, usually in terms of a certain number of kilowatt-hours of electricity produced per year. With such a guarantee, if an installed system fails to meet the minimum level of production output guaranteed, the third-party owner will compensate the homeowner on a per-kilowatt-hour basis for the electricity production shortfall. Prospective solar lease or PPA homeowners should check to see if a minimum production guarantee is included in the terms of their contract and what accommodations are provided in the case of a production shortfall, including whether compensation is based on a wholesale or retail per-kilowatt-hour price. When a homeowner directly owns a solar electric system, production shortfall risks are incurred by the owner. In this case, no production guarantees are provided unless offered by a panel manufacturer or installer.

### **Net Metering:**

Net metering, sometimes referred to as “net energy metering,” enables solar electric system owners to use their solar electricity generation to offset their electricity consumption. Simply put, the customer’s meter runs backward for the amount of solar electricity produced by the solar electric system and added to the grid. In some cases, homeowners can receive a credit on their

electric bills from the utility for the excess electricity they produce and add to the grid over the course of a certain billing period. It is important to note that a residential, grid-tied solar electric system will not function in the case of an electricity outage unless the home has an accompanying electricity storage system and the ability to “island” (disconnect from the grid). The reason is that stand-alone solar electric systems are designed to shut down when the grid goes down, to prevent the system from feeding power back into the grid and causing injury to utility employees working on the power lines. Visit [nysersda.ny.gov/Cleantech-and-Innovation/Power-Generation/Net-Metering-Interconnection](https://nysersda.ny.gov/Cleantech-and-Innovation/Power-Generation/Net-Metering-Interconnection) for more information on net metering.

### **Shared Solar:**

A shared solar project, also known as community distributed generation (CDG), allows multiple residences and/or businesses to jointly benefit from one solar electric installation. Shared solar offers an alternative for people who cannot install solar on their property. A shared solar project is hosted by a sponsor with a suitable roof or parcel of land, who is responsible for the installation and operation of the system. Participants, also known as members or subscribers, purchase the electricity generated in the form of net metering credits which are assigned to their utility bill, offsetting their electricity usage.

If you chose to participate in a shared solar project, you would enter into an agreement with the system owner and would pay the system owner for the net metering credits received. Similar to a PPA for rooftop solar, the price you pay for the net metering credits should be lower than the price you pay per kwh to your utility. Visit [nysersda.ny.gov/All-Programs/Programs/NY-Sun/Communities/Shared-Solar](https://nysersda.ny.gov/All-Programs/Programs/NY-Sun/Communities/Shared-Solar) for more information about shared solar in New York State.

### **Operations and Maintenance:**

If the homeowner chooses a lease or PPA model, the third-party owner owns the solar electric system and will likely cover operations and maintenance over the course of the contract term. It is important to check your contract because some lease contracts may divvy up responsibilities differently. Under most third-party ownership arrangements, the third-party owner also incurs accidental risks associated with panel ownership, including unforeseen destructive events or panel malfunction. Under the solar loan model, the homeowner owns the system directly and therefore incurs the liabilities associated with such ownership. A homeowner who owns a solar electric system outright or finances through a loan may be responsible for insuring the solar electric system, which could be added to homeowner’s insurance or an existing property policy.

Because large, third-party financing entities have established relationships with insurance companies, they often receive more favorable rates than do residential customers looking for solar property insurance. In some cases, solar leases or PPAs may require homeowners to increase their homeowner's insurance to cover risks associated with the system.

Another way to mitigate risk is to purchase an extended warranty. Solar panels may come with a manufacturer's production warranty guaranteeing at least 80 percent system performance for 20-25 years. However, homeowners who directly purchase or finance their system through a loan may want to seek additional protection. Although panel manufacturers usually offer extended performance guarantees, other system components such as disconnects, inverters, racking, and wires may come with relatively short warranties or no warranties at all. Homeowners may want to purchase an extended warranty to cover replacement or repair of these components, system installation workmanship defects, or the risk that a panel manufacturer will have undergone bankruptcy by the time a homeowner pursues a manufacturer's warranty claim.

#### **Pre-Payment:**

A pre-payment option can be similar to a buyout option and allows homeowners to pay some or all of the payments for a solar electric system before the payments become due. Pre-payment can range from zero to full pre-payment. Full, upfront pre-payment can allow a homeowner to reap some of the benefits of third-party ownership, such as maintenance coverage, while avoiding ongoing interest payments.

#### **Production Estimates:**

Residential solar electric systems usually come with electricity production or output estimates. System underperformance of a production estimate can be costly for a solar homeowner. Under the lease model, system underperformance can be particularly problematic because a homeowner owes the solar developer a fixed payment regardless of the amount of electricity produced by the leased system. On the other hand, the homeowner gains if the leased solar electric system overproduces. Under a PPA model, the homeowner only pays for the amount of electricity actually produced by the solar electric system. Thus, when actual system output falls below the production estimate, homeowners leasing their solar electric system may be economically disadvantaged compared to PPA customers.

#### **Solar Incentives:**

The federal government provides a 30 percent federal investment tax credit (ITC) for the purchase of residential solar electric systems. States, too, often offer incentives for going solar. In New York State, a 25 percent state personal tax credit is available in addition to the federal investment tax credit. New York City has a Real Property Tax Abatement Program through the NYC Department of Buildings. Visit [www.nyc.gov/html/gbee/html/incentives/solar.shtml](http://www.nyc.gov/html/gbee/html/incentives/solar.shtml) to find the instructions and forms. NYSERDA also provides direct financial incentives for the installation of a solar electric system by an approved contractor. Visit [nyserdera.ny.gov/All-Programs/Programs/NY-Sun/Customers/Available-Incentives](http://nyserdera.ny.gov/All-Programs/Programs/NY-Sun/Customers/Available-Incentives) for information on how to find a contractor and current incentives.

It is important to note that the 30 percent ITC is only available to the owners or purchasers of a solar electric system. In other words, if the homeowner agreed to a solar lease or PPA with a third-party system owner, the homeowner will be unable to take advantage of this tax credit. Instead, the third-party owner will realize the tax benefits. However, the 25 percent New York State personal tax credit is available for the homeowner and NYSERDA incentives for leases or PPAs are required to be reflected in the lease or PPA agreement. Under a loan arrangement where a solar customer owns the solar electric system, the solar customer will be able to take direct ownership of most incentives. Solar installers should be able to provide an estimate of the payback period for a direct purchase, taking into account all of the available incentives. Make sure they explain all of the payback calculation assumptions. Interest paid on solar loans that are secured through a home equity loan may also be tax deductible. It is important to consider the impact of the available incentives on the economic benefits based on the homeowner's tax bracket before deciding whether third-party ownership (such as a solar lease or PPA) or direct ownership (either through a loan arrangement or through outright purchasing) makes more sense.



# Weighing the Benefits of Direct Home Ownership vs. Third-Party Financing

A direct, upfront, cash purchase of a residential solar electric system is typically the least expensive option in terms of total dollars spent, because no interest costs or finance fees are incurred. In many cases, however, a homeowner will not have the cash available to pay for a system outright. And, even when a homeowner does have enough cash to pay for a solar electric system, it may still be financially advantageous to finance the solar electric system and invest the cash elsewhere.

It is important to note that with a lease, PPA, or loan, homeowners will have an additional monthly bill to pay beyond their regular monthly electric utility bill. However, the utility electric bill should be greatly reduced.

## **A homeowner who is financing solar through a lease or PPA generally will have fewer concerns about maintenance and operation of the system.**

A homeowner who is financing solar through a lease or PPA generally will have fewer concerns about maintenance and operation of the system. Maintenance, monitoring, insurance, and warranties are usually provided through a solar lease or PPA arrangement. For example, the replacement of most system parts to maintain a solar electric system's production performance will be covered by the third-party developer over the term of the contract under a lease or PPA arrangement. Some homeowners may feel more comfortable knowing that they do not bear these maintenance and operation responsibilities. Others may prefer to control and manage a system sited on their property.

Solar electric systems generally require little maintenance. They should be inspected periodically and may need to be cleaned for optimized performance. If a homeowner lives in an area where snow buildup occurs, the panels may need to be cleared of snow from time to time. Other maintenance issues which can occur over the lifetime of a system may include loose wiring connections, loss of inverter function, or breaking or cracking of the panels themselves.

When a homeowner directly owns the solar electric system, either through upfront cash purchase or a solar loan, and the system is not covered under any other insurance policy or covered under a warranty, the homeowner will bear the risk of system malfunctions, accidents or any other unforeseen circumstances that result in the loss or curtailment of the solar electric system's output. Under a solar lease or PPA arrangement, these risks are borne by the third-party owner rather than the homeowner.

On the other hand, when a homeowner finances his or her solar purchase through a lease or PPA, the financing contract may limit the homeowner’s ability to alter the property if doing so would negatively impact solar access or solar electric system performance. For example, construction of a chimney could pose a problem if it would cast a shadow on the solar electric system. When homeowners directly own their solar electric system, they are not bound by a third-party owner’s restrictions.

As noted above, with a third-party ownership arrangement (lease or PPA), a homeowner will not be able to take advantage of federal incentives such as the ITC and state incentives such as Solar Renewable Energy Certificates (SRECs), where available. However, the fact that the third-party company will receive these valuable incentive credits should allow it to offer more favorable financing arrangements to the homeowner than would otherwise be the case. Under the direct-ownership model, whether a system is financed through a loan or purchased outright, the homeowner will be able to realize these incentives directly.

Table 1 summarizes the similarities and differences between the different arrangements.

**Table 1.**  
**Comparing Residential Solar PPAs, Solar Leases, and Solar Loans/Direct Purchases**

	Solar Leases	Residential Solar PPAs	Solar Loans/Direct Purchase
<b>Who buys the system?</b>	Third-party developer		Homeowner
<b>Who owns the system?</b>	Third-party developer		Homeowner
<b>Who takes advantage of the federal investment tax credit for solar?</b>	Third-party developer		Homeowner
<b>Who takes advantage of the state personal tax credit?</b>	Homeowner		
<b>Who takes advantage of NYSERDA incentive?</b>	Although the incentive goes directly to contractor, the homeowner may benefit through reduced costs on the lease agreement.	Although the incentive goes directly to contractor, the homeowner may benefit through reduced costs on the PPA agreement.	Homeowner
<b>Who is responsible for operations and maintenance of the solar electric system?</b>	Usually the third-party developer	Third-party developer	Homeowner, though some state incentive programs require installers to provide a workmanship warranty for a set period of time such as five years, thereby reducing the risk of immediate issues related to improper installation.
<b>Who incurs the risk of damage or destruction</b>	Third-party developer		Homeowner
<b>What happens if the homeowner sells the home where the solar electric system is located?</b>	Depends on the contract		If the homeowner finances the system through a loan, the homeowner remains responsible for loan payments after the transfer unless negotiated with the buyer.

	Solar Leases	Residential Solar PPAs	Solar Loans/Direct Purchase
<b>Are financing payments fixed?</b>	Yes, payments are pre-set but may include an annual escalator, increasing payments each year.	No. Payments to the third-party developer/owner are on a per kilowatt-hour basis based on electricity generated by the solar array. Per kilowatt-hour payments may include an annual escalator.	If the homeowner finances the system through a loan, the loan payments will be fixed. If the homeowner decides to purchase a system outright, a contractor may sometimes offer several payment installments instead of one lump sum.
<b>What contract duration terms are available?</b>	Terms can vary.	Terms can vary, but often in the range of ~20 years.	If the homeowner finances the system through a loan, the loan terms can vary.
<b>Does this type of financing arrangement require a down payment?</b>	Not necessarily; down payment requirements vary.		If the homeowner finances the system through a loan, down payment requirements can vary.
<b>Do contracts provide minimum production guarantees?</b>	Yes, usually. Solar lease providers commonly provide minimum production guarantees.	Yes, usually. PPA providers commonly provide minimum production guarantees.	A loan contract does not include production guarantees. However, a solar panel manufacturer or developer/installer may provide a production guarantee.
<b>Are there escalator clauses in the contracts?</b>	Sometimes. Check the contract for specific terms.		If the homeowner finances the system through a loan, interest rates may increase over time depending upon the specific terms of the loan.
<b>Is insurance coverage provided?</b>	Yes		No. Homeowners who directly own their solar electric system and want to be covered will need to find coverage either through a homeowner's existing insurance policy or through the purchase of a new or expanded policy. Homeowners may decide to forgo insurance coverage altogether and bear the risks of solar electric system ownership. Some state incentive programs require installers to provide a workmanship warranty for a set period of time such as five years, thereby reducing the risk of immediate issues related to improper installation.

# Questions to Ask

As you go through the process of deciding whether to purchase or finance solar panels, listed below are some questions to ask yourself and the companies you are interviewing. Going solar is an exciting option and one that can give you many years of satisfaction.

## Questions Related to Making the Decision to Go Solar

- Have you received quotes from at least three solar installation companies?
- Will the solar developer install the system directly or will that be done by a sub-contracted installer?
- How long has the solar developer and/or installer been in business? What is the solar developer/installer's reputation and financial standing? Do you know anyone who has used this solar developer/installer before? Have you received references?
- Does the solar installer have the proper state certifications and licenses, if required?
- Will an on-site visit be performed to assess whether your house is a viable site for a solar electric system?
- Will you be able to monitor the electrical production of your solar electric system once it is installed?
- Will the electricity produced by your system cover all of your electrical needs at home? On average, will your system produce excess electricity? How much will you be compensated for excess electricity production if your state has net metering in place?

## Questions Related to Financing

- Have you asked the solar developer to calculate the payback and walk you through the contract and any assumptions?
- Given your personal tax situation, does it make more sense to own (through a loan or direct purchase) your solar electric system to take advantage of all the federal and state tax incentives?
- What is the interest rate and duration (in years) of the financing agreement? Have you shopped around to compare other financing packages?
- Will you have to make a down payment? Do you have the option to make a down payment to reduce monthly fixed payments (lease) or kilowatt-hour rate (PPA)?





- Will your monthly loan payments be equal to or less than the savings on your electric bill? (You will want to factor in how much of your electricity needs will be met by your solar electric system as that will impact the reduction of your electric bill. If the system doesn't cover a significant portion of your electricity needs, then your savings may not be substantial enough to justify the payments for your solar electric system.)
- Is there an escalation clause included in the financing agreement? If so, what is the annual escalation rate?
- If you are financing through a PPA, is the electricity rate you are being offered lower than what you are currently paying?
- If you are financing through a lease or PPA, is there a pre-payment option under which you can pay some or all of your lease or PPA payments before they become due?
- If you are financing your system through a lease or PPA, what happens at the end of the contract term? Does the contract require you to buy the system at the end of your term? If so, how is the buyout amount determined?
- Can you buy out your financing contract? Under what circumstances? At what rate? At what point? How is that rate calculated?
- What happens if you sell your home before the end of your solar contract term? For instance, what happens if the buyer does not qualify to assume your solar lease or PPA? What if the buyer does not want the solar electric system included in the property sale?
- If you are financing your system through a lease or PPA, what happens if you need to replace the roof during the contract term?
- Could the system be removed or repossessed if the lender goes out of business or gets into financial trouble?
- Can the lender sell the contract to a new entity? Will you be notified if that happens?

## **Questions Related to the Operations of the Solar Electric System**

- Who will perform operations and maintenance on the system? If the third-party owner performs operation and maintenance, who specifically would you contact if there is a problem? Are you obligated to notify someone within a certain timeframe if there is a problem? How quickly will that person respond to your request for help? Will there be any charges for parts and labor? What services does the operations and maintenance contract cover?
- Does the contract contain minimum production guarantees? If so, what accommodations are provided in the case of a production shortfall? Will shortfall compensation be based on a wholesale or retail per-kilowatt-hour price?
- What are the insurance requirements? Who insures the system? Do you have to pay for any damage? Are there damage reporting requirements? Is there a minimum insurance coverage requirement for the house in order to install a solar electric system on it? What will your current home insurance policy cover with respect to your solar electric system?
- Who is responsible for warranting the system? If there is a warranty, is it with you or the solar company? Will you receive a copy of the warranty agreement?

# Solar Financing Resources for Homeowners

- Financing Options for NY-Sun Incentive Program:  
<http://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Customers/Solar-Financing-Options>
- Private Sector Lenders for Solar Projects:  
<http://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Customers/Solar-Financing-Options/Residential-Lenders>
- Financing Your Solar Electric System, EnergySage: [www.energysage.com/solar/financing](http://www.energysage.com/solar/financing)  
EnergySage, an online marketplace that provides price quotes from multiple PV installers, has a webpage dedicated to solar financing. This webpage provides information homeowners navigate their solar financing options.
- Homeowners Guide to Financing a Grid-Connected Solar Electric System U.S. Department of Energy (DOE) Guide:  
[www1.eere.energy.gov/solar/pdfs/48969.pdf](http://www1.eere.energy.gov/solar/pdfs/48969.pdf)  
DOE's Homeowners Guide to Financing a Grid-Connected Solar Electric System provides an overview of the financing options that may be available to homeowners who are considering installing a solar electric system on their house. It explains the benefits of a solar electric system, key terms, and various options for homeowners financing a solar electric system.
- Introduction to Solar Project Finance Solar Outreach Partnership Solar Training Video:  
[www.youtube.com/watch?v=fojwEO3zpH8](http://www.youtube.com/watch?v=fojwEO3zpH8)  
Under the U.S. Department of Energy's SunShot Solar Outreach Partnership, the International City/County Management Association, and Meister Consultants Group produced a video series for local government officials covering many aspects of installing solar. One of the videos covers the basics of solar project financing, which may be useful for homeowners interested in financing a residential solar electric system.
- Solar Leasing for Residential Photovoltaic Systems National Renewable Energy Laboratory (NREL) guide:  
<http://www.nrel.gov/docs/fy09osti/43572.pdf>  
NREL's Solar Leasing for Residential Photovoltaic Systems guide examines the solar lease option for residential solar electric systems. It also describes two lease programs: the Connecticut Solar Lease Program and SolarCity's program.
- Solar Checklist, Interstate Renewable Energy Council (IREC):  
<http://www.irecusa.org/consumer-protection/consumer-checklist/>  
IREC provides a checklist for residential consumers considering solar energy, including preliminary questions and tips for yourself, safety considerations to ask your contractor, and what to look for in a contract between you and your contractor.
- Additional solar information and resources, IREC:  
<http://www.irecusa.org/consumer-protection/consumer-resources/>



New York State Energy Research and Development Authority (NYSERDA), a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975. To learn more about NYSERDA's programs, visit [nyserdera.ny.gov](http://nyserdera.ny.gov) or follow us on Twitter, Facebook, YouTube, or Instagram.

**State of New York** Andrew M. Cuomo, Governor

**New York State Energy Research and Development Authority**

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