



Solar Guide for Apartment Building Owners

This guide will explore the following areas:

- Step 1: Understand Your Motivations – Understand Your Site**
- Step 2: Determine which Tenants will Go Solar & Building Energy Load**
- Step 3: Estimate System Size & Determine Solar Allocations**
- Step 4: Review Financing Options & Recoupment Methods**
- Step 5: Find a Contractor**
- Step 6: Install Your System**
- Step 7: Ongoing Monitoring & NEM-V Management**

Abstract

This guide is designed for use by apartment building owners in the City of West Hollywood. It can help a building owner explore the options for installing PV. The guide discusses certain site conditions, explains how a solar project fits into a building owner's decision making process, and provides information about solar benefit models for solar projects at apartments in West Hollywood. The primary laws governing the establishment and operation of rental agreements are city-specific. While some of the information provided herein may be applicable to apartment building owners considering installation of a solar photovoltaic (PV) system more generally, it should not be relied upon in jurisdictions outside of West Hollywood, California. This guide is for informational use only and does not constitute legal or financial advice.

Step 1: Understand Your Motivations – Understand Your Site

When first considering solar electric power, it's important to understand your project objectives. Whether your goal is to lower operating costs for your property, provide solar access to tenants, lower energy costs for tenants and common area loads or increase your property's value and appeal – all are achievable with solar.

Understanding your site is an important first step. System size, location and surrounding obstacles may affect the performance of a solar system, so you should start by assessing your site's viability for solar. Later, in Step 5, we discuss the process of identifying a knowledgeable contractor who will subsequently conduct a comprehensive site assessment. The **Solar Site Considerations** worksheet provides direction for conducting a preliminary self-assessment.

After determining that the building's roof gets adequate sunlight, you should review the age and condition of the roof. Check when the roof was last replaced and its suggested lifespan. Solar panels typically come with a 20–25 year performance warranty and many manufacturers offer a 10–12 year product warranty. The productive lifespan of panels can exceed both these warranties. Ideally, the remaining life of the roof will be equal to or greater than the lifetime of the PV system; otherwise, installing a solar system on the roof may create additional expense when roof replacement becomes necessary. If the building's roof must be replaced after a PV system is installed, doing so will require removing all the panels, replacing the roof, and reinstalling the panels. In that case, you should factor the cost of removing and reinstalling the solar panels into the economic analysis of the PV system or consider postponing your installation. In addition to rooftop installations, ground-mounted systems and carport systems also may be considered.

To determine the remaining lifetime of the roof and when replacement or major repairs are likely, you should:

1. Check the building's maintenance records.
2. Bring in a qualified roofer, building envelope consultant, or professional engineer to provide a condition report on the roof.

Roof Condition	Options
Remaining lifetime is less than 5 years	<ul style="list-style-type: none"> • Replace the roof now and install solar • Wait until end of roof life to install solar.
Remaining lifetime is 5–15 years	<ul style="list-style-type: none"> • Replace the roof now and then install solar • Wait until the end roof life to install solar • Repair the roof to extend its life (you want at least 15 years of remaining life) and then install solar • Install solar on the existing roof (factoring in future costs to remove and reinstall solar panels when you re-roof) and replace the roof later.
Remaining lifetime is greater than 15 years	The roof may be ready for solar. Proceed to the next step.

Many building owners have a roof warranty either with the contractor who installed the roof or with the roofing materials manufacturer. This warrant will define specific requirements the building owners must fulfill to keep the warranty in effect.

Anything placed on the roof or penetrating the roof generally has to be approved by the roofing contractor or the roofing materials manufacturer to maintain the roof warranty. Otherwise, the roof warranty may be voided, which would expose the building owner to additional risk and cost. The owner should review the language in the existing roof warranty to understand any specific limitations that could result from installing a solar system.

A roof-mounted PV system should not increase the rate of wear of a roof and may actually decrease it by offering protection from weather. Where roof penetrations are proposed to mount a solar system, you should have specific discussions with your solar contractor about preventing leaks and ask about any warranties the solar contractor may offer related to leaks or workmanship. Systems are available that do not penetrate the roof structure. For example, ballasted systems, which are systems that sit on a roof and are held down with weights, may pose less risk of roof damage.

Step 2: Determine which Tenants will Go Solar & Building Energy Load

A solar electric system can be sized to serve the entire building load or specific units/electric meters within a building.

As the property owner, you will decide which meters are to receive a portion of the solar electricity credit, allowing the benefit of reduced utility bills for those tenant units and common areas.

Use this [Flow Chart](#) to help you determine what scenario is most appealing to you.

Once you have decided which units and accounts will be included, you will need to understand the annual consumption in kilowatt-hours (kWh) of those units and determine what percentage will be offset with solar.

Determine Building Energy Load

There are multiple ways of identifying tenant annual energy consumption information in a multi-metered building:

1. **Ask tenants for the information:** Each tenant can identify their unit's annual consumption (kWh) from the local utility. They may use their online utility account or simply call to get information.

Southern California Edison Online: <https://www.sce.com>

Southern California Edison Phone: 1-800-655-4555

2. **Do it yourself:** Have participating tenants sign a release form, which will allow a designated representative to have access to past kWh consumption levels from the utility. Release forms are available from Southern California Edison. [SCE Release Form](#)
3. If you are the landlord/property owner and you pay the electric bills for the tenants and there are five or more units in the building, you can ask the utility for whole-building data. Email the following contact with this request (SCE) benchmarking@sce.com

Use the [Solar Participation Worksheet](#) to track each unit's annual kWh consumption, which will assist with the Step 3 exercise of determining the approximate system size.

Virtual net metering (NEM-V)

NEM-V is an optional utility rate structure designed for multitenant, multi-metered properties that allows numerous tenants to share a single photovoltaic (PV) system and receive direct on-bill utility savings. Arranging for solar with NEM-V entails knowing the annual consumption in kilowatt-hours (kWh) of participating residences.

Step 3: Estimate System Size & Determine Solar Allocations

Use the [Unit Allocation Tracking Spreadsheet](#) to record each unit's expected monthly solar allocation.

Estimating System Size

Once the participation structure and associated annual energy consumption data have been determined, you can translate that information into an approximate system size needed and calculate the percentage of the total kWh production that will be applied to each unit or "benefitting account."

Remember that you do not have to offset 100% of the consumption of your building. Offsetting any portion can be beneficial and a good way to get started with solar. A rule of thumb is to divide your annual consumption (kWh) by 1,700 kWh (this is because 1 kW of solar will generate about 1,700 kWh/year). This will give you an approximate system size to base your design on.

Contractors may use supplemental formulas and calculators to determine the approximate production of their proposed system. For an initial understanding of your site's needs prior to contacting a contractor, the general rule of thumb method can be used.

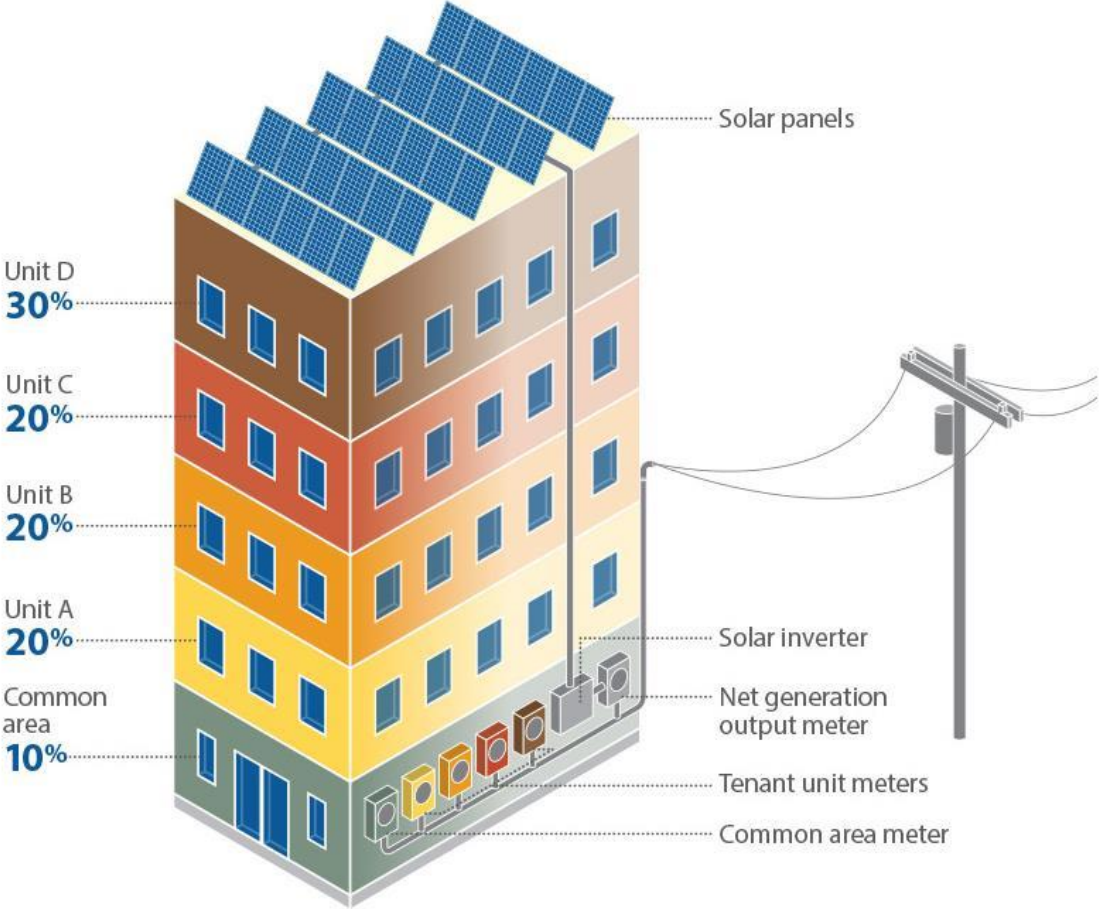
Sample Scenario				
Unit Number	Annual kWh Consumption	Desired Offset of Total Consumption	Annual Solar kWh Needed for Desired Offset	System Size
Common Area	1,000 kWh	100%	1,000 kWh	0.5 kW
Unit A	5,500 kWh	100%	5,500 kWh	2.75 kW
Unit B	6,500 kWh	100%	6,500 kWh	3.25 kW
Unit C	7,000 kWh	100%	7,000 kWh	3.5 kW
Unit D	7,000 kWh	100%	7,000 kWh	4 kW
TOTAL	28,000 kWh	100%	28,000 kWh	16.47 kW

Sample Scenario				
Unit Number	Annual kWh Consumption	Desired Offset of Total Consumption	Annual Solar kWh Needed for Desired Offset	System Size
28,000 kWh/1,700 kWh = 16.47 kW solar electric system				

Determining Unit Allocations (an exercise if utilizing Virtual Net Metering “NEM-V”)

Each benefitting account will need to be assigned a percentage of the total monthly kWh production that will be credited to their utility account ("unit allocations").

Virtual Net Energy Metering



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There are a number of methods to determine unit allocations, such as using historical consumption data to determine the respective percentage (Example 1) or a more generic allocation, based on the number of bedrooms or square footage (Example 2).

Example 1		Example 2	
Benefitting Account	Percent Allocation	Benefitting Account	Percent Allocation
Common area	3.57%	Common area	10%
Unit A (1br/1ba)	19.64%	Unit A (1br/1ba)	20%
Unit B (1br/1ba)	23.21%	Unit B (1br/1ba)	20%
Unit C (2br/2ba)	25.01%	Unit C (2br/2ba)	25%
Unit D (2br/2ba)	28.57%	Unit D (2br/2ba)	25%
Total	100%	Total	100%

Step 4: Review Financing Options & Recoupment Methods

The cost of solar in California ranges from \$3 – \$5 per watt (AC).^[1] Remember, 1 KW is equal to 1,000 watts.

As an apartment building owner, you have access to a variety of financing methods for installing a solar electric system. When reviewing the typical financing products available, keep in mind personal considerations such as existing capital, federal tax repercussions, property value and other items.

The 30% Federal Tax Credit is available for systems placed in service through December 31, 2019. The credit drops to 26% through the end of 2020, then 22% through 2021 before dropping to zero by the end of 2021.

If the solar system is designed to benefit tenant accounts, you also will need to determine your method of recouping your investment from tenants, while still allowing them to see an overall net savings each month.

Example: If the tenant will save around \$100 each month on their utility bill due to the solar bill credits, the property owner could consider raising the monthly rent by \$75. This allows the property owner to recoup the investment incrementally each month, while still allowing for the tenant to see a 25% net savings. For rent controlled properties, an “Added Housing Service” form may be signed by landlord and tenant agreeing on the extra energy fee to be charged in return for solar kWh credits on the tenant’s electric bill.

The method you choose to recoup your investment from tenants may vary based on the financing product you choose to use. The most common financing options include cash purchase, solar lease or a power purchase agreement (PPA).

[1] <https://www.californiasolarstatistics.ca.gov/>

Table 1: Cash System

A cash purchase can be made using existing capital or by taking out a loan. Some loan options include Home Equity Line of Credit (HELOC) loans, solar loans and [PACE](#). Visit EnergySage to learn more about [loan options](#).

Ownership of system?	Yes
Access to federal investment tax credit?	Yes
Methods for recouping cash investment	<ul style="list-style-type: none"> • Increase rent by a portion of utility savings • Separate monthly "energy" fee
Other considerations	<ul style="list-style-type: none"> • Can use upfront capital or loan • System owner responsible for O&M • Potential for increased property value

Table 2: Leased System

A lease arrangement entails a fixed monthly payment. This monthly payment would ideally be less than the current monthly utility electric bill. Visit EnergySage to learn more about [solar leases](#).

Ownership of system?	No
Access to federal investment tax credit?	No
Methods for recouping investment/paying lease	<ul style="list-style-type: none"> • Increase rent proportionally • Separate monthly "energy" fee
Other considerations	<ul style="list-style-type: none"> • Typically 20-year lease duration • In general, little or no upfront costs • Not responsible for O&M • Possible performance guarantees

Table 3: PPA System

A power purchase agreement entails a fixed price per kWh produced paid monthly. This price per kWh should be less expensive than the price per kWh paid to the utility. PPA providers typically finance systems 200 kW or larger. Visit EnergySage to learn more about [solar PPAs](#).

Ownership of system?	No
Access to federal investment tax credit?	No
Methods for recouping investment/paying PPA	Separate monthly kWh fee
Other considerations	<ul style="list-style-type: none"> • Typically 20-year PPA duration • Not responsible for O&M • Performance guarantees • Systems < 250 kW may have difficulty finding PPA providers

Visit EnergySage to [compare solar loans vs. solar leases](#).

Step 5: Find a Contractor

Locating a reputable, knowledgeable contractor can be a daunting task for any home improvement project. The City of West Hollywood has partnered with EnergySage to develop an online solar marketplace specifically designed for West Hollywood property owners. Visit the site below to request and receive multifamily solar bids directly and easily through the online platform. High-quality, prescreened solar installers will compete for your business.

EnergySage Solar Marketplace: www.gosolarwesthollywood.org

Other general resources include:

[CALSEIA Member Directory](#) – This directory includes contractors and industry professionals who are members of the California Solar Energy Industries Association. Members abide by the CALSEIA [Code of Ethics](#) and have been vetted by the organization.

[Go Solar California](#) - This database includes all solar contractors who have submitted a net metering application within SCE, SDG&E or PG&E service territories.

Referrals from neighbors or other solar customers are always a great way to choose a contractor.

Vetting the Contractor

- Do they have an active license?
 - [Contractors State License Board](#) – Use this state agency page to see the type and current status of a contractor's license. It also includes bond and workers compensation information and, if applicable, any consumer complaints or disputes along with the resolution.
- Do they have references and a good reputation within the community?
- Do they have experience with designing solar projects for multifamily dwellings? If not, what are the reasons they feel confident taking on this project?
- What is the cost/watt (AC) they have proposed?
 - Does this fall within the average cost for solar? (See Step 4.) If not, what are the reasons for under/over bidding?
- [Better Business Bureau](#) – Reference the BBB for public complaints or comments about a specific contractor.
- [Go Solar CA Consumer Warning](#) – Visit this site for additional consumer awareness information.

We encourage you to obtain at least three bids. Use the [Bid Comparison Worksheet](#) to help make your determination.

Step 6: Install Your System

Typical Installation Process		Role	Associated Fees
1	Analyze structure/roof, design system components/ modules/inverter(s), racking, electrical panel/interconnection	Contractor	Contract cost
2	Apply for building permit with appropriate city or county agency	Contractor	Check with your city or county for solar permitting fees
3	Submit interconnection and virtual net metering application to the utility	Contractor	One-time origination fee and interconnection application fee ranging from \$75-\$150 (based on utility)
4	Install the solar PV system	Contractor	Contract cost
5	City/county onsite system inspection; submit approval to utility	City/county	-
6	Utility onsite interconnection/meter inspection	Utility	For virtual net metered systems, an additional utility "net generation output" meter (NGOM) is required (prices below)
7	Turn system on upon written permission to operate	Contractor/ customer	-
8	Receive first utility bill post-installation under virtual net metering with solar bill credits	Customer	-

Solar Electric (PV) System Components

- PV System Components: The US [Department of Energy](#) offers a detailed description of the equipment and technology that makes up a PV system.
- EnergySage [Solar 101](#): Learn more about solar energy equipment and how it works.
- EnergySage's [Top 10 Things to Know about Solar](#)

Table 4: NGO (Net Generation Output) Meter Price Ranges per Utility for NEM-V

Only when pursuing NEM-V is an NGO meter installed at the owners expense to track system output. The NGO meter type and cost will depend on your building characteristics and utility service territory.

Utility	One-time Origination Fee	NGOM Price Ranges
Southern California Edison (SCE)	\$25	\$861 - \$13,535
Contact SCE for more information		

Municipal Building Permitting and Interconnection Application

Your solar contractor should be responsible for submitting all paperwork necessary to start construction. This includes obtaining building and wiring permits from your municipality, and submitting an application to your electric utility for interconnection approval. The cost for obtaining building and wiring permits and any interconnection fees for the project should be included in the construction contract.

Your contractor will coordinate the completion of the necessary paperwork. For the interconnection application, the contractor will want information about the applicable utility electric account(s).

Construction

The contractor and the project owner(s) should have meetings during which the contractor provides updates on construction progress. Periodic roof assessments during and after construction may be worthwhile. A construction schedule should have been included in the project contract. The contractor should be responsible for adhering to the construction schedule, and the project owner(s) should formally approve any changes to the schedule.

Municipal Inspections and Interconnection

The contract should provide that the contractor's work will not be deemed complete until the municipality inspects the system and confirms that all aspects of the installation conform to

California building and electrical codes. The project will require a final wiring inspection, followed by a final building inspection. The contractor should coordinate these inspections.

Inspections can be scheduled through the Building and Safety Division's automated inspection request line at (323) 848-6335. Requests received within the business hours of 8:00AM to 6:00PM will be typically scheduled for the next business day.

After the inspections are successfully completed, the contractor should notify the participating utility. The utility must then agree that the PV system can interconnect to the power grid. The contractor should coordinate the final interconnection approval. The contractor can begin the interconnection approval process prior to obtaining to municipal permits.

When all these approvals are secured, the system can be turned on so it will produce electricity.

Project Closeout

With the project complete, the building's new PV system should now produce electricity. Before making a final payment, you should confirm that the contractor has adequately completed all contractual responsibilities. As part of the project closeout process, the contractor should provide copies of technical manuals, equipment specification sheets, as-built design drawings, and warranties. The contractor should also provide training to the project owner(s) or interested parties about safety, and if applicable, system operations and maintenance.

Step 7: Ongoing Monitoring & NEM-V Management

After the installation is complete, there are ongoing management activities that should be tracked.

System performance monitoring is important for ensuring that the system is producing electricity consistently, as well as understanding if the system is producing above or below original expectations.

In an instance of low performance or system failure, identifying the problem quickly, in addition to timely troubleshooting, will be important for maximizing tenant and common load savings, and also for avoiding customer complaints due to higher utility bills.

Specific system monitoring packages may be included in your system design and, in general, can be monitored online. Ask your contractor about system performance monitoring packages that would work best with your system.

Use the [Solar Performance Tracking Worksheet](#) to compare and track monthly production and allocations. This resource will be useful for tenant inquires or billing disputes.

If the system is set up to benefit tenant units, tenant turnover and unit vacancy also are aspects of a project's post installation management. Generally, the solar allocations associated with a vacant unit will be assigned to the common load meter during the time of vacancy. This default account is defined on the unit allocation spreadsheet submitted to the utility.

The City of West Hollywood, EnergySage, and EcoMotion are ready to support your solar exploration!



For information on Energy Efficiency, Electric Vehicle Charging, or Battery Energy Storage, visit www.weho.org/residents/go-green