Formula and Exceptions Related to Residential Rooftop Solar Energy System Requirements in the California Energy Code; and Financing Options

Formula and Exceptions:

2019 California Energy Code Section 150.1(c)14:

"14. Photovoltaic Requirements. All low-rise residential buildings shall have a photovoltaic (PV) system meeting the minimum qualification requirements as specified in Joint Appendix JA11, with annual electrical output equal to or greater than the dwelling's annual electrical usage as determined by Equation 150.1-C:

EQUATION 150.1-C ANNUAL PHOTOVOLTAIC ELECTRICAL OUTPUT

kW_{PV} = (CFA x A)/1000 +(NDwell x B)

WHERE:

kW_{PV} = kWdc size of the PV system
CFA = Conditioned floor area
NDwell = Number of dwelling units
A = Adjustment factor from Table 150.1-C
B = Dwelling adjustment factor from Table 150.1-C

Table 150.1-C
CFA and Dwelling adjustment Factors

Climate Zone	A – CFA	B – Dwelling Units
3	0.628	1.12

EXCEPTION 1 to Section 150.1(c)14: No PV is required if the effective annual solar access is restricted to less than 80 contiguous square feet by shading from existing permanent natural or manmade barriers external to the dwelling, including but not limited to trees, hills, and adjacent structures. The effective annual solar access shall be 70 percent or greater of the output of an unshaded PV array on an annual basis.

EXCEPTION 2 to Section 150.1(c)14:(does not apply to our climate zone)

EXCEPTION 3 to Section 150.1(c)14: In all climate zones, for dwelling units with two habitable stories, the PV size shall be the smaller of a size that can be accommodated by the effective annual solar access or a
PV size required by the Equation 150.1-C, but no less than 1.0 Watt DC per square foot of conditioned floor area

EXCEPTION 4 to Section 150.1(c)14: In all climate zones, for low-rise residential dwellings with three habitable stories and single family dwellings with three or more habitable stories, the

PV size shall be the smaller of a size that can be accommodated by the effective annual solar access or a PV size required by the Equation 150.1-C, but no less than 0.8 Watt DC per square foot of conditioned floor area.

EXCEPTION 5 to Section 150.1(c)14: For a dwelling unit plan that is approved by the planning department prior to January 1, 2020 with available solar ready zone between 80 and 200 square feet, the PV size is limited to the lesser of the size that can be accommodated by the effective annual solar access or a size that is required by the Equation 150.1-C.

EXCEPTION 6 to Section 150.1(c)14: PV sizes from Equation 150.1-C may be reduced by 25 percent if installed in conjunction with a battery storage system. The battery storage system shall meet the qualification requirements specified in Joint Appendix JA12 and have a minimum capacity of 7.5 kWh."

Financing Options for Residential Rooftop Solar Energy Systems

There are several ways to finance the installation of a PV system. The homeowner can pay cash for the system. An average system is in the $15,000- $25,000 range before tax credits.

Homeowners who install solar panels can currently use the Federal Tax Credit to recover about 20% of the cost of purchasing and installing solar panels. Usually the systems are sized and priced so the system pays for itself in 7 - 10 years.

Other financing options include:

1. Programs in which the solar company will lease solar system to the owner of the home on which it is installed.
2. Programs in which the solar company owns and maintains the PV system but sells the power to the homeowner for a flat fee -- called a Power Purchase Agreement (PPA).

Both the PPA and lease arrangements will also save homeowners money on energy. Neither of these options is as cost effective as the purchase of a solar energy system, but they have the benefit of avoiding the large upfront cost of solar panels.