



Glossary (online at bcapcodes.org/sunshot)

Alternating Current (AC): A type of electrical current, the direction of which is reversed at regular intervals or cycles. In the United States, the standard is 120 reversals or 60 cycles per second. Electricity transmission networks use AC because voltage can be controlled with relative ease.

Alternative Energy Storage (AES): The capture and containment of energy from alternative sources, produced at one time for use at a later time.

Amps: Electrical current. A measure of the quantity of electricity flowing in a circuit.

Ballasted PV system: A PV system held in place by weight that can only be used with flat or low-slope roofs. To reduce wind loads, ballasted systems can only be used if solar collectors are at a low tilt angle—usually a 10-degree tilt and limited to no more than 20 degrees. Such a low tilt angle is a minor penalty on annual energy delivery depending on latitude, but allows more kW per square foot of roof area and delivers more in summer, when utility rates are higher.

Building Integrated Photovoltaics (BIPV) Photovoltaic products used in the construction of buildings that replace standard building materials, such as the roof, walkways, windows, and awnings.

Carbon-Neutral Using no fossil fuel GHG-emitting energy to operate.

Commercial Building Sector Commercial buildings are those profit-seeking and nonprofit enterprises engaged in commercial-scale activity (often called the service sector); energy is consumed by heating and cooling systems, lights, refrigerators, computers, and other equipment in the buildings where businesses, institutions, and other organizations are located. Examples of commercial sector buildings include retail stores, office buildings, government buildings, restaurants, hotels, schools, hospitals, and leisure and recreational facilities.

Commissioning A process that verifies and documents that the selected building and site systems have been designed, installed and function in accordance with the owner's project requirements and construction documents, and minimum code requirements.

Community Solar Community Solar is defined as a solar-electric system that, through a voluntary program, provides power and/or financial benefit to, or is owned by, multiple community members.

Crystalline silicon Crystalline Silicon semiconductors dominate the world PV market, accounting for nearly 90 percent in 2013. Although single crystalline cells account for the majority of PV panels, there are a few types of silicon PV technologies on the market today — single crystalline silicon (c-Si), multicrystalline (mc-Si), and silicon heterostructures.

Dead load: The weight of all materials of construction incorporated into the building, including but not limited to walls, floors, roofs, ceilings, stairways, built-in partitions, finishes, cladding and other similarly incorporated architectural and structural items and the weight of fixed service equipment. Solar PV system dead load includes collectors and mounting materials.

Depreciation deduction: Depreciation is an income tax deduction that allows a taxpayer to recover the cost or other basis of certain property. It is an annual allowance for the wear and tear, deterioration, or obsolescence of the property.

Direct Current (DC): A type of electricity transmission and distribution by which electricity flows in one direction through the conductor, usually relatively low voltage and high current. To be used for typical 120 volt or 220 volt household appliances, DC must be converted to alternating current, its opposite.

Federal Investment Tax Credit (ITC) Commonly referred to as the solar tax credit, the ITC effectively reduces the total cost of your solar energy system by 30 percent with a credit to your federal taxes. It is regarded as the most significant financial incentive for solar in the U.S.

Flush-mounted PV System Flush mounted panels are installed parallel to, and relatively close to, the roof surface.

Greenhouse Gasses Those gases, such as water vapor, carbon dioxide, nitrous oxide, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride, that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving the Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.

Grid-connected system: A solar electric or PV system in which the PV array acts like a central generating plant, supplying power to the electric utility grid.

Ground-mounted PV system: There are two basic types of ground mounted solar panel systems: **Standard ground mounts:** use metal framing driven into the ground to hold your solar panels up at a fixed angle. Some standard ground mounted solar panel systems can be manually adjusted a few times a year to account for seasonal shifts of the sun. **Pole mounts:** support multiple solar panels on a single pole, and elevate panels higher off the ground than a standard ground mount. Pole mounts often incorporate tracking systems, which automatically tilt the solar panels to capture the optimal amount of sunshine.

Insolation: The solar power density incident on a surface of stated area and orientation, usually expressed as watts per square meter or Btu per square foot per hour.

International Building Code (IBC): the foundation of the complete Family of International Codes®. It is a tool to preserve public health and safety that provides safeguards from hazards associated with the built environment. It addresses design and installation of innovative materials that meet or exceed public health and safety goals.

International Energy Conservation Code (IECC): an up-to-date energy conservation code addressing the design of energy-efficient building envelopes and installation of energy-efficient mechanical, lighting and power systems through requirements emphasizing performance. Designed to meet these needs through model code regulations that will result in the optimal utilization of fossil fuel and nondepletable resources.

International Fire Code (IFC): addresses conditions hazardous to life and property from fire, explosion, handling or use of hazardous materials and the use and occupancy of buildings and premises. It establishes minimum regulations for fire prevention and fire protection systems using prescriptive and performance-related provisions.

International Mechanical Code (IMC): Establishes minimum regulations for building's mechanical systems using prescriptive and performance-related provisions.

International Plumbing Code (IPC): Provides minimum regulations for plumbing facilities in terms of both performance and prescriptive objectives, and provides for the acceptance of new innovative products, materials, and systems.

International Residential Code (IRC): addresses the design and construction of one and two-family dwellings and townhouses not more than three stories above grade; designed to meet these needs through model code regulations that safeguard the public health and safety in all communities, large and small. The comprehensive, stand-alone residential code includes provisions for all aspects of residential construction including: Building; Energy Conservation; Plumbing; Mechanical; Fuel gas; and Electrical provisions from the 2014 National Electrical Code® (NFPA 70).

Inverter: A device that converts direct current electricity to alternating current either for stand-alone systems or to supply power to an electricity grid.

Kilowatt (KW): A standard unit of electrical power equal to one thousand watts, or to the energy consumption at a rate of 1000 joules per second.

Kilowatt hour (kWh): 1,000 thousand watts acting over a period of 1 hour. The kWh is a unit of energy.

Live load: Those loads produced by the use and occupancy of the building or other structure and do not include construction or environmental loads such as wind load, snow load, rain load, earthquake load, flood load or dead load.

Micro inverter: A complete small inverter (typically 200 to 300 watts) that's attached to the frame or rack-mount hardware of a photovoltaic module. Micro-inverters connect to the existing DC wiring of a photovoltaic module, and by requirement of the National Electric Code and Underwriters Laboratories Safety Standards, must contain ground-fault detection circuits that disable the micro-inverter in the event of a detected DC-side ground fault.

Module: The smallest self-contained, environmentally protected structure housing interconnected photovoltaic cells and providing a single dc electrical output; also called a panel.

National Electric Code (NEC): Contains guidelines for all types of electrical installations. The 1984 and later editions of the NEC contain Article 690, "Solar Photovoltaic Systems" which should be followed when installing a PV system.

Net metering/net energy metering (NEM): The practice of using a single meter to measure consumption and generation of electricity by a small generation facility (such as a house with a wind or solar photovoltaic system). The net energy produced or consumed is purchased from or sold to the power provider, respectively.

Open Circuit Voltage (VOC): The maximum possible voltage across a photovoltaic cell; the voltage across the cell in sunlight when no current is flowing.

Orientation: Placement with respect to the cardinal directions, N, S, E, W; azimuth is the measure of orientation from north.

Panel: Often used interchangeably with PV module (especially in one-module systems), but more accurately used to refer to a physically connected collection of modules (i.e., a laminate string of modules used to achieve a required voltage and current).

Perovskite solar cell: Perovskites are a wide-ranging class of materials made mostly of carbon and hydrogen which provide lighter weight and less expensive panels that require less energy to manufacture than the silicon panels that dominate the world market today. (Silicon panels are made from a material that is rarely found in nature in the form needed, requiring a tremendous amount of energy to convert it for use; result in large, heavy panels, and (3) don't convert sunlight to electricity as efficiently as perovskite cells (silicon cell conversion rate is about 25%; perovskite cells show greater promise). Perovskite solar cells are now commercially competitive with silicon.

Photovoltaic (PV): Devices or systems that convert light into electric power directly through the photovoltaic effect. Photovoltaics are the fastest-growing and most widely deployed solar electric technology in the world today.

Power Purchase Agreement (PPA): Contract with a solar company to have a solar energy system installed on your roof. With a solar PPA, you agree to pay the company a per kilowatt-hour rate for the electricity produced by the solar panels.

Primary Energy : in the form that it is first accounted for in a statistical energy balance, before any transformation to secondary or tertiary forms of energy. For example, coal can be converted to synthetic gas, which can be converted to electricity; in this example, coal is primary energy, synthetic gas is secondary energy, and electricity is tertiary energy.

Property Assessed Clean Energy (PACE): The property-assessed clean energy model is an innovative mechanism for financing energy efficiency and renewable energy improvements on private property. PACE programs allow local governments, state governments, or other inter-jurisdictional authorities, when authorized by state law, to fund the up-front cost of energy improvements on commercial and residential properties, which are paid back over time by the property owners.

Public Utility Regulatory Policies Act of 1978 (PURPA): A law that requires electric utilities to purchase electricity produced from qualifying power producers that use renewable energy resources or are cogenerators. Power providers are required to purchase power at a rate equal to the avoided cost of generating the power themselves.

Racking support system / Rack mounted PV system: Mechanical structures "racks" that attach a PV or other solar energy array to the roof of a building, or to the ground.

Renewable Portfolio Standard (RPS): The requirement that an electric power provider generate or purchase a specified percentage of the power it supplies/sells from renewable energy resources, and thereby guarantee a market for electricity generated from renewable energy resources.

Self-shading: Where neighboring modules within the array shade each other.

Shade structures: A structure that provides both a good location to capture solar energy, and usable shading to the space below. For example, parking lot canopies and garage rooftops.

Soft costs: Non-hardware costs related to PV systems, such as financing, permitting, installation, interconnection, and inspection.

Solar array: A group of solar collectors or solar modules connected together.

Solar cell: Treated semiconductor material that converts solar irradiance to electricity.

Solar photovoltaics: See “Photovoltaics (PV)” above

Solar ready: Describes a building where the eventual installation of a solar photovoltaic and/or solar thermal system has been planned for during design and construction.

Solar Renewable Energy Credit (SREC): For every unit of electricity that a solar panel system generates, an associated SREC is also created. In some states, you can sell your SRECs for additional revenue.

Solar resource: The amount of solar insolation a site receives, usually measured in kWh/m²/day, which is equivalent to the number of peak sun hours.

Solar thermal systems: Solar energy systems that collect or absorb solar energy for useful purposes. Can be used to generate high temperature heat (for electricity production and/or process heat), medium temperature heat (for process and space/water heating and electricity generation), and low temperature heat (for water and space heating and cooling).

String inverter: A single inverter is used to connect your entire array of solar panels to your electrical panel. String inverters are the least expensive inverter option, and cost less than micro-inverters. However, if one of the panels stops producing electricity, even due to temporary shading, it can bring down the performance of the whole system.

SunShot Initiative: A DOE Solar Energy Technologies Office (SETO) initiative that seeks to make solar energy cost-competitive with other forms of electricity by 2020.

System Advisor Model (SAM): A performance and financial model designed to facilitate decision making for people involved in the renewable energy industry.

Thin film: Thin film technologies —Thin film cells are more flexible and weigh less than crystalline silicon technologies. They can be integrated into buildings, including as PV material laminated onto windows. Thin film solar panels within panes of glass are used in some of the largest PV power plants. Some thin film cell technologies include: amorphous silicon (a-Si); cadmium telluride (CdTe); copper indium gallium deselenide (CIS or CIGS); dye-sensitized solar cells (DSC); and single crystalline gallium arsenide (GaAs).

Tilt angle: The angle at which a photovoltaic array is set to face the sun relative to a horizontal position. It can be set or adjusted to maximize seasonal or annual energy collection.

Tracking array: A photovoltaic (PV) array that follows the path of the sun to maximize the solar radiation incident on the PV surface. The two most common orientations are: (1) one axis where the array tracks the sun east to west; and (2) two-axis tracking where the array points directly at the sun at all times. Tracking arrays use both direct and diffuse sunlight. Two-axis tracking arrays capture the maximum possible daily energy.

Utility-scale solar: A utility-scale solar facility is one which generates solar power and feeds it into the grid, supplying a utility with energy. Virtually every utility-scale solar facility has a power purchase Agreement with a utility, guaranteeing a market for its energy for a fixed term of time. Utility-scale systems generally have capacities measured in megawatts (one million watts).

Value of solar tariff (VoST): A value-of-solar (VOS) tariff is a rate design policy that gives customers with solar installations credit for the electricity generated by a photovoltaic system.

Zero energy building: An energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy.

* See *Glossary* online for sources of definitions.