Welcome to the 28th

ASES NATIONAL SOLAR TOUR

October 6-8, 2023 | Across the U.S.

Know Your Solar: Community Resource Guide

We Thank Our 2023 National Solar Tour Sponsors

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ExactSolar

American Solar Energy Society, Fall 2023

The ASES National Solar Tour

October 6-8, 2023

Carly Rixham, Executive Director of the American Solar Energy Society (ASES)

Thousands of renewable energy and sustainability advocates are aligning across the country to participate in the 28th ASES National Solar Tour, the largest annual grassroots solar and sustainable living event in the U.S.! The National Solar Tour is held in most neighborhoods from October 6-8, but tours can be organized any time of year. Check out what tours are happening in your neck of the woods at nationalsolartour.org/map. We are excited to continue to have in-person, hybrid, and virtual tours available for people to share their experiences with installed renewable energy technologies, energy efficiency applications, sustainable living practices, and more. ASES hosts the National Solar Tour for free and open to the public; however, some individual tours may encourage a small donation of support.

This summer, the National Oceanic and Atmospheric Administration confirmed that July 2023 was the hottest recorded temperature on Earth in the last 174 years. With more severe weather changes and increased climate anxiety, it is essential to come together to disseminate and celebrate the current solar and sustainable living features to empower people and organizations to adopt these practices. The purpose of the National Solar Tour is to promote sustainability awareness and increase the adoption of renewable energy. The National Solar Tour centers around neighborhood discussions about solar, recommendations on installers, financing, local laws, and other considerations and hesitations around installing solar panels, purchasing electric vehicles, and instating energy efficiency upgrades. Our hybrid format empowers communities across the U.S. to learn from neighbors in a more casual and friendly setting.

This year, we are focussing on bringing the National Solar Tour to schools to enhance renewable energy and sustainability knowledge for students. The importance of raising solar-curious and solar-savvy young adults who understand their personal roles in working toward a clean energy future, being responsible for minimizing their own carbon footprint, and evangelizing for broader adoption of solar for everyone is paramount.

According to the Interstate Renewable Energy Council, there are now over 7,300 schools across the country with solar installations – that's only 5.5% of U.S. K-12 schools. These schools save money on electric bills, create healthier learning-productive classrooms, and ensure a brighter future for the next generation. A dramatic decline in the cost of solar panels combined with new financing options has now made solar widely accessible, creating tremendous untapped potential among the majority of U.S. schools still without solar. It is important to offer solar educational resources that address the full 'array' of solar and provide an opportunity for students to ignite a firestorm of discussion and action that drives solar adoption as a way to combat climate change.

Thank you for participating in this year's tour; we are excited you're here. Join us again next year for our 29th Annual National Solar Tour on October 4-6, 2024!

- All 2023 virtual tours will stay on the map (nationalsolartour.org/map) through January 15, 2024
- It's not too late to host a tour this year! Sign up at nationalsolatour.org/signup
- To get involved in the tour next year, be sure to check for updates on nationalsolatour.org on February 15, 2024

2023 Local Tour & Tour Site Highlights

Locate a local tour or tour site in your community at nationalsolartour.org

Alabama
Birmingham: UAB Solar House and Sustainable Community
Blountsville: Blount County Alabama Solar Home Tour

Arizona
Flagstaff: 2023 Sustainable Building Tour- The Diverse World of Sustainable Building

Arkansas
Fayetteville: NetWork Building Solar Site
Rogers: Holistically Green Living Education Center

California
Sacramento: "Solar Cookers International's Virtual Tour of the Benefits of Solar Cooking"
West Hills: Brian and Susan Jensen Home

Colorado
Boulder Super-Insulated Passive/Active Solar Home
Golden: Denver Metro Green Homes Tour
Jamestown: Jamestown Solar Tour
Longmont: Jack's Solar Garden
Montrose: Solar Net Zero Greenhouse

District of Columbia (DC)
U.S. Department of Energy Solar Decathlon Virtual Tour
The Festival Center's Solar and Electric-Only Training Kitchen

Florida
Cape Canaveral: City of Cape Canaveral Solar Tour
Lake Mary: Lake Mary Solar Home
Hollywood: Frisard-Menschner Residency
Jupiter: Solar HVAC Home
Nokomis: Lake Side Solar Home
Sarasota: Sarasota Home

Idaho
Boise: Solar + Geothermal Tour

Illinois
Grayslake: Illinois Solar Tour

Indiana
Sound Bend: Tiny Eco-House

Kansas
Lawrence: Heartland Renewable Energy Society Tour
Wichita: Solar Panel Array Site

Kentucky
Wilmore: Wilmore City Solar Tour

Louisiana
New Orleans: Faubourg St John Home

Maine
Jonesport: Downeast Alternative Design Solar
Wells: Wells ranch converted to net-zero & Solar Cottage tour

Massachusetts
Pelham: Home Energy Makeover
Centerville: Cape Cod Kettle Pond Home

Michigan
East Lansing: Michigan Virtual Solar Home Tour

Minnesota
Albertville: Large System - Rambler
Minneapolis: Minnesota Sustainability Tour
Orr: Ban Lake off the Grid Solar Cabin
Pine River: Balsam Moon Preserve Solar & Sustainable Site

New Jersey
Alfred: Alfred University Tiny House
Lafayette: Helios Net Zero Energy Home
Madison: Home & Office in Town

Ohio
Beavercreek: Byrd Residence with Solar Gazebo
Chagrin Falls: Curran-Tuskes residence
Mentor: OHIO "Wish You Were Here" tour
Wooster: Wayne County Green Energy Tour

Oregon
Salem: Grainey Family Home

Pennsylvania
Langhorne: Turner Home
Malvern: Light Haven Site
Pittsburgh: SpohnHome @SunnyField

Tennesee
Kingsport: In Town Solar

Texas
The Byrom House
Bastrop: Bluebonnet's Energy Expo
Greenville: Rural Solar Site with Battery Backup

Virginia
Arlington: Two Self-Powered Buildings: Home & Office
Blacksburg: Warm Hearth Village Solar Tour

Washington
Duvall: Solar Dream Home
Seattle: Solar Panels on Home Roof
Sequim: Sequim Energy Demonstration House

Wisconsin
Appleton: Appleton Solar - Home Office
La Crosse: Solar La Crosse Tour
Tempealeau: TOUR TREMPEALEAU and Meet the TREMPs!

Inflation Reduction Act

Clean Energy Overview and Highlights

The Inflation Reduction Act (IRA) is the largest climate bill in U.S. history. A main policy focus of the IRA is supporting tax credits and rebates for **clean energy, electric vehicles and efficiency updates**. Below are some highlights of how this bill can benefit you and/or your business.

RESIDENTIAL CLEAN ENERGY CREDIT

30% Tax Credit

for residential installations of clean energy (including solar, storage, etc.), offered through the end of 2034

HOMES REBATE PROGRAM

Allocates **$4.3B** for state-level rebates for energy-saving residential retrofits offered through the end of 2031

HIGH-EFFICIENCY ELECTRIC HOME REBATE PROGRAM

Allocates **$4.5B** for state-level rebates for home electrification investments, specifically for low-and moderate-income households

ENERGY EFFICIENT HOME IMPROVEMENT CREDIT

30% Tax Credit

for residential efficiency investments (including home energy audits, windows, heating/cooling appliances, etc.) offered through the end of 2032

CLEAN-VEHICLE CREDIT

$7,500 Tax Credit

for the purchase of new electric vehicles offered through the end of 2032

PREVIOUSLY-OWNED CLEAN-VEHICLE CREDIT

$4,000 Tax Credit

for the purchase of used electric vehicles

All of these policy incentives are projected to increase the deployment of clean energy, electric vehicles, and energy efficiency investments. This is an unprecedented level of policy support from the U.S. federal government.

Please note that not all households are eligible for all credits and rebates. Consult with state-specific program specialists, tax accountants and energy professionals about potential savings for your household.

For more information, please see the "By the Numbers: The Inflation Reduction Act" press release from the White House and the "What the Inflation Reduction Act Does for Green Energy" article by PBS.

For further questions, please post on the Ask a Renewable Energy Expert forum at **community.ases.org**.

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Become a Solar Advocate Today

WHY CHOOSE SOLAR ENERGY?

- Provides fast return on investment
- Guarantees reliable electric power
- Fights climate change and bad air quality

WHAT IS A SOLAR ADVOCATE?

Anyone who supports renewable energy and sustainable living!

HERE ARE SOME WAYS YOU CAN BE A SOLAR ADVOCATE:

INDIVIDUAL LEVEL

- Keep updated on solar and sustainable practices, policies, and events
- Conserve energy through efficiency and wise use
- Support goods and services that are sustainable

COMMUNITY LEVEL

- Engage family, friends, and others on going solar and being sustainable
- Host or be part of promotional events and activities
- Join campaigns supporting solar policy and vote

SOLAR FUTURE – ADVOCATES ARE MAKING A DIFFERENCE

Rapid increases projected for:

- Annual solar energy generation
- Buildings with installed solar
- Solar products production and distribution

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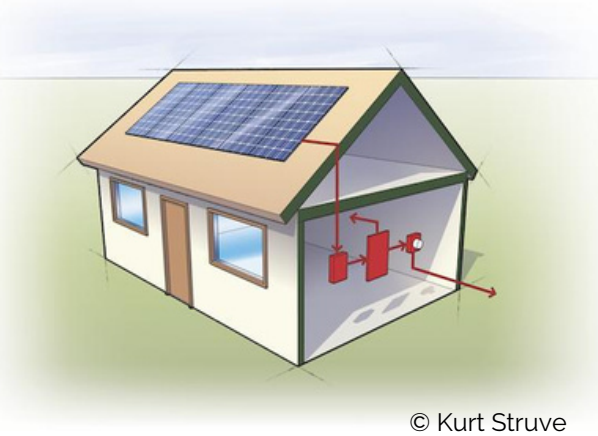
Solar Home Basics

Solar Electric Systems

Photovoltaics (PV) is a mature technology, first invented by Alexandre-Edmond Becquerel in 1839 and initially commercialized at Bell Labs in the 1950s. For residential application, PV falls into two main categories. First is grid-tied, where the home generates its own electricity but can also draw power from the utility company at night. Some systems are grid-tied with battery backup and batteries can usually be added after a complete solar installation.



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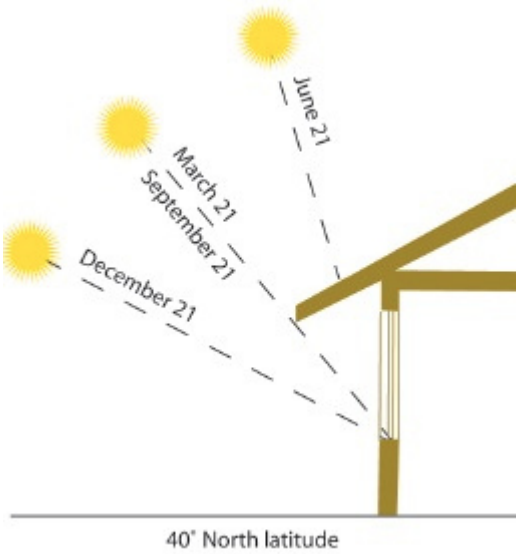
The second is off-grid, where the home must generate its own power, storing energy in batteries for use at night. A basic home PV system consists of PV cells connected and packaged together in weather-protected modules, which are fastened side-by-side on a racking system to form an array. The PV modules produce direct current (DC), which in a grid-tied system flows to a grid-interactive inverter. An inverter changes DC voltage to the alternating current (AC) for the household electric circuit powering wall outlets and all AC appliances.

Excess power from the inverter may flow out of the house through the utility company's electric meter, into the city-wide grid. When this happens, the meter may run backward, and the utility will credit the outflowing electricity against electricity purchased from the grid at other times, like at night. This process is called net-metering.

In an off-grid system, DC power flows from the modules through a charge controller (also called a regulator), which is an electronic device that produces a smooth flow of current at the desired voltage. From the charge controller, the power can go to a set of storage batteries and then on to the inverter, as needed.

Today's commercially available PV panels come in three versions:

1. Single-crystal (or monocrystalline) modules are currently the most efficient — that is, 1 square meter produces the most electric power. They must be mounted in a rigid frame.
2. Multicrystalline (or polycrystalline) modules are made of cells cut from multiple crystals, grown together in an ingot. They are slightly less efficient than single-crystal.
3. Thin-film modules are made by depositing thin layers of materials on glass, metal or plastic substrates. They're considerably less efficient so you may need more space to generate the same amount of power, but depending on the substrate, can be very robust and flexible. One practical use is to glue a flexible thin-film module directly to a metal roof.



Passive Solar

Many of the renewable energy devices described are often "active" systems. That is, they use mechanical devices to gather energy from the environment. Passive design however relies on natural energy flow through the building with a minimum of moving parts.

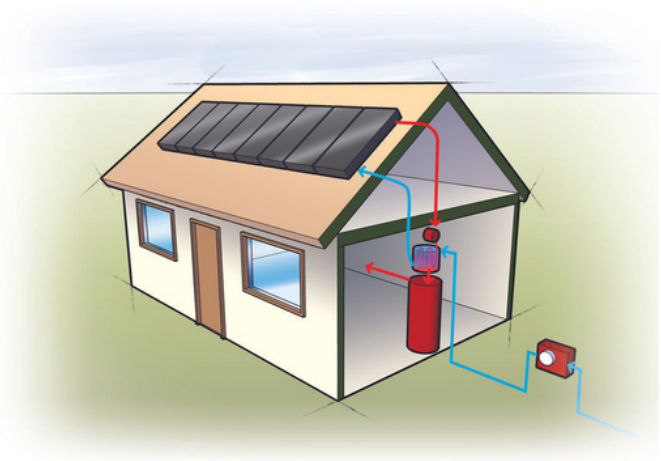
Passive design uses architectural form to gather energy from on-site sources (chiefly the sun) and also to store and dissipate it (for instance, by letting in cool night air).

Using massive materials that stabilize interior temperatures, like masonry trombe walls, water tanks, and phase change products allow the building to be the energy system. In temperate climates, a small building — a house for instance — loses and gains heat through its skin and usually has a relatively equal heating and cooling requirement. Its size also makes it easy to ventilate and daylight naturally.

By contrast, large buildings — commercial and office blocks — have a smaller ratio of skin to volume, so they tend to be dominated by their internal loads. Therefore heating becomes less important than cooling. Providing ventilation and natural lighting becomes more complicated.

Solar Thermal

Solar thermal technologies use solar energy to directly heat water or other liquids using sunlight. Solar hot water systems come in two flavors: passive and active. In warm climates, a simple passive system can provide plenty of hot water. Passive systems are installed in areas where freeze protection is not an issue. The most common types are integral collector storage (ICS) and thermosiphon systems.



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Active systems use an electric pump to circulate water through the collector. In warm climates, a direct (or open-loop) system is practical: City water goes into an insulated storage tank. A pump draws water out of the storage tank to pass through the solar collector and go back into the tank. Hot water for household use is drawn from the top of the storage tank, sometimes passing through a booster heater. An automatic control system starts the pump whenever the collector is warmer than the storage tank.

For more information, please go to ases.org/resources/renewable-energy-home-basics

Higher Performing, Higher Value:

The Story of Selling a High-performing Home

This is how homeowners, real estate agents, appraisers, and lenders can work together to make the value of energy efficient and solar homes – high-performing homes – visible in the real estate market.

Claire is moving and is getting ready to sell her high-performing home.

The house has solar panels and energy efficient upgrades, so she looks for a real estate agent with experience listing and marketing these homes.

Claire decides to work with Angela, a real estate agent with a track record for selling high-performing homes at a higher price.

Angela has taken courses on selling solar and energy efficient homes[1], and shows Claire a detailed marketing plan for showcasing her home.

Together, Claire and Angela collect paperwork and information about Claire's solar system and energy efficiency upgrades to include in the home listing.

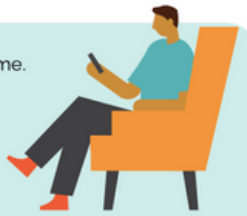
- Solar system ownership, size, and number of panels
- Dates of installation
- Warranties
- Installation information
- Performance monitoring reports
- Up to 12 months of utility bills
- Energy reports (third party certification of the home's energy features[2])
- Completed Residential Green and Energy Efficient Addendum[3]

Real estate agent Angela enters the information into the Multiple Listing Service (MLS) so that it becomes public data searchable by other real estate agents.

This helps communicate the benefits of the home to more people.

Gabriel is looking to buy a new home.

When he sees the listing of Claire's home with all the details of its solar system and expected energy savings, he's excited about the prospect of owning a high-performing home. Gabriel puts in an offer for the home.



After Gabriel's offer is accepted, Angela reaches out to Gabriel's agent to ensure that the lender:

a) understands that this is a solar home,
b) has received a copy of the home's energy reports, and
c) will select an appraiser with experience appraising high-performing homes.

The lender assigns Kelly to appraise the value of the home. Angela reaches out to Kelly to schedule an appointment to visit the home.

Before making the appointment, Angela vets Kelly to ensure she is educated about high-performing homes and will take the solar system and energy efficiency upgrades into account during the appraisal.

Angela also confirms that Kelly has all the documents and information about these upgrades.

If real estate agent Angela doesn't think appraiser Kelly is qualified, she can let Gabriel's agent and lender know that an appraiser educated in solar value must be assigned to appraise this home.

As an appraiser, Kelly can take data about the solar system from the production report or the Residential Green and Energy Efficient Addendum and enter it into an online solar calculator[4] to determine the solar system's value.

If Claire has a third-party report that has already calculated this number, Kelly can double-check the numbers in the report.

Appraiser Kelly submits her appraisal for Claire's solar home.

Home buyer Gabriel's lender approves the loan amount supported by the appraisal, which may be more money than comparable homes on the block because of its high-performing features.

This is how people can work together to make the value of energy efficient and solar homes – high-performing homes – visible in the real estate market.

Resources

1. Real estate agent education
2. Third-party certification
3. Residential Green and Energy Efficient Addendum
4. Online solar value calculators:
   - PV Value
   - Pearl Solar Equity Calculator

Share this with your friends & family!

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Learn how homeowners, real estate agents, appraisers, and lenders can work together to make the value of energy-efficient and solar homes – high-performing homes – visible in the real estate market at ases.org/real-estate-education.