

27th Annual Metropolitan Washington, DC

Solar & Green Home Tour

October 7-8, 2017

11am to 5pm



Sponsored by

Sierra Club

Mid Atlantic Solar Energy Society

American Solar Energy Society

www.solartour.org



EARTH HOME

100% SOLAR POWERED, HEALTHY LIVING

Live in an all-natural, healthy home with the security of never losing power and no utility bills

ENERGY EFFICIENCY

- Super insulated walls, floors, & roof
- Air-tight construction
- High performance windows
- Geothermal heat pump
- LED lighting
- Energy Star appliances

SOLAR POWER

- 100% solar (PV) power
- 2-3 day battery back-up
- Solar electric car charger



HEALTHY

- Non-toxic, natural materials, paint, & finishes
- Continuous fresh air ventilation (ERV)
- Water filtration

SECURE

- Whole house security system
- Video doorbell
- Battery back-up power
- Grid independent & self-reliant
- Real-time energy monitoring

FOR MORE INFORMATION, CONTACT SUSTAINABLE DESIGN GROUP



www.SustainableDesign.com

Get solar without installing solar equipment on your roof

Sign up for community solar power with Neighborhood Sun, your friendly, local solar company. We make it easy to join the solar revolution:

- No equipment or long term contracts to worry about
- Subscribe to a local solar project and get the same benefits as roof-top solar
- Lock in affordable rates for clean energy
- Work with a social enterprise that's right here in your community



To enroll or find out more go to www.NeighborhoodSun.Solar



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This passive and solar home in Vienna, Virginia is designed to be as efficient as possible without compromising on architecture and functionality.



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27th ANNUAL TOUR OF SOLAR AND GREEN HOMES

The tour is organized by a staff of dedicated volunteers to educate the public on the positive aspects of Solar Energy.

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The 28th ANNUAL TOUR OF SOLAR HOMES IS OCTOBER 6-7, 2018

Show your home on the 2018 Tour

To put your home in the tour send an email request to homes@solar tour.org. We'll be accepting home requests from October 4, 2017 to March 31, 2018 on a first come, first served basis.

Advertising Information

To advertise in the 2018 tour send an email request to advertising@solar tour.org

Deadline for ad submission is June 30, 2018. See www.solar tour.org/sponsors.html for ad specs.



**Welcome to the
27th Annual
Metro Washington, D.C.
Tour of Solar and
Green Homes,
Part of the American
Solar Energy Society's
National Solar Tour.**

Thank you for taking part in what we hope will be an exciting and informative tour of solar and environmentally friendly homes. This guide book is your ticket to see the homes and will provide you with information and directions to the homes that are showcased throughout the Washington DC Metropolitan area.

Because the homes are spread throughout a wide area, we suggest you plan your tour in advance to maximize the number of sites you will be able to see. We have included a handy map in the center of the guide. Our advertisers will be more than happy to help you with information on going solar.

We hope you will come away with an appreciation of how and why each of these buildings was developed and an understanding of their features. Consider incorporating these energy saving features in your present or future solar home.

2017 Tour Info

Over 40 solar and green homes on tour.

Tour days and times are October 7 and 8, from 11:00 am to 5:00 pm.

Plan your trip in advance with the centerfold map on page 14.

Consider ideas for your current home or future solar home.

Visit our website for the latest news on the tour and changes and last minute cancellations.

www.solartour.org/updates.html

Grants and Incentives

by Chip Gribben

FEDERAL

Investment Tax Credit

For solar photovoltaic (PV) and hot water, Congress has extended the federal solar tax credit, also known as the Investment Tax Credit (ITC), through 2021. The credit is 30% through 2019, 26% in 2020 and 22% in 2021. The ITC applies to both residential and commercial systems and there is no cap on its value. The legislation also allows homeowners to claim the credit as soon as construction begins as long as the system is placed in service on or after January 1, 2006 and on or before December 31, 2021. For solar hot water heating, at least half the energy used to heat the water must be from solar. The home served by the system does not need to be the taxpayer's principal residence.

There are some exemptions. If you sign a lease or Power Purchase Agreement (PPA) with a solar installer or are not the owner of the system, you cannot receive the tax credit. Also, pool and hot tub water-heating are exempt from the credit. For more information visit:

<https://energy.gov/savings/residential-renewable-energy-tax-credit>

MARYLAND

Increasing the amount of renewable energy is one of Maryland's key policy goals. The Maryland Energy Administration is tasked with achieving the state's Renewable Portfolio Standard (RPS). Currently, the RPS requires that 20% of energy sold in Maryland by 2022 come from qualified renewable energy resources, with 2% coming from qualified solar resources.

Residential Clean Energy Grant Program

This program will give homeowners up to \$500 toward the installation of a solar hot water heater, up to \$1,000 for PV panels and up to \$3000 for a geothermal system. The installed capacity limit is 20 kW for PV, 10 to 100 square feet for solar hot water and 1 to 10 tons for geothermal. The state has a similar grant program for commercial buildings and businesses with larger systems. To apply online visit:

<https://egov.maryland.gov/mea/CleanEnergy/>

Solar Renewable Energy Certificates (SREC)

Maryland's SREC program grants solar homeowners one SREC for each megawatt-hour (MWh) of clean energy their solar panels produce. The credits can then be sold on the SREC Market. The program has been so popular

there is an oversupply of SRECs which are trading at \$6 MWh down from \$150 in 2015.

WASHINGTON DC

The city council passed their RPS which requires Pepco to obtain a portion of energy from renewable energy. Rather than building its own solar projects, Pepco buys SRECs on an open market. People who install solar in the District can sell their SRECs into this market.

Solar Renewable Energy Certificates

D.C. residents can sell the SRECs that their panels generate for up to \$500 per megawatt-hour (MWh). What that means to you: One SREC is equivalent to 1000 kWh. If you install a 6 kilowatt (kW) system that generates 5 MWh per year, you could earn as much as \$3,000 annually by selling your certificates in the SREC market. Your solar installer can set you up with the DC Public Service Commission (PSC) to set up your SREC account.

Property Tax Exemptions

Thanks to the Solar Energy System and Cogeneration System Personal Property Tax Credit, you can also avoid paying any additional property taxes on the value you are adding to your house by installing solar. Visit: <https://energy.gov/savings/solar-energy-system-and-cogeneration-system-personal-property-tax-credit>

Low Income Residential Solar

The Solar Advantage Plus Program is a truly incredible and unique incentive for eligible low-income D.C. residents. This first-come, first-served rebate program provides qualified applications with up to \$10,000 to cover the full cost of a 3kW to 4kW solar system. Not only will participants own the system and the energy it produces, but they will also be able to cash in the SRECs discussed above. For more information visit: <https://doee.dc.gov/solar>

VIRGINIA

Virginia is not as generous with solar incentives. However, there are a few counties like Fairfax that offer property tax exemptions for solar equipment and the tax free holiday for energy efficient appliances.

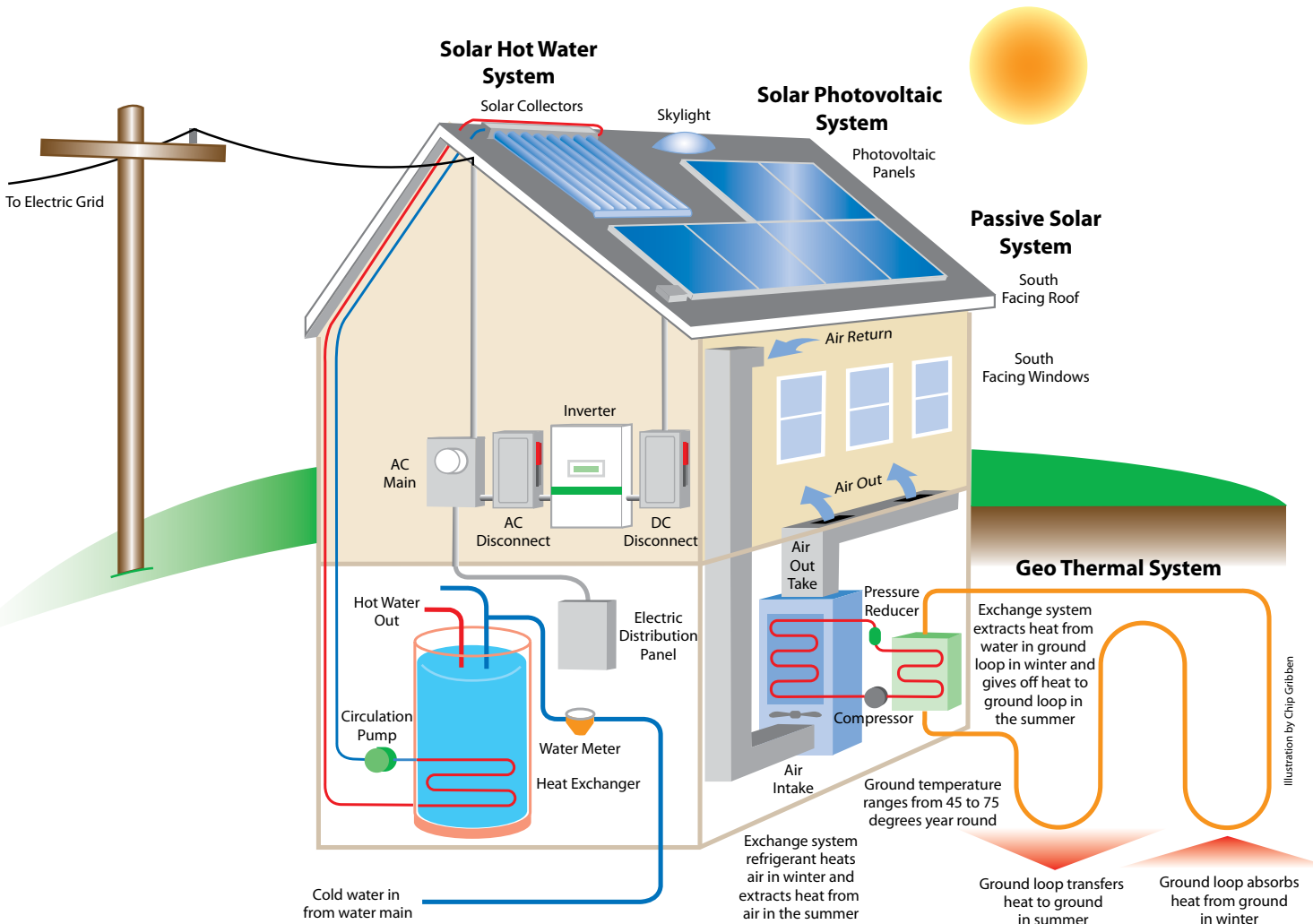
Virginia Sales Tax Holiday

The 3-day tax-free holiday is the first Friday in August

Continued on Page 22

Might Now be the Time to Go Green?

by Chip Gribben



It's a great time to consider going green by incorporating energy efficient technologies and solar into your home. As you take a drive through your community, proof that solar is becoming more popular will appear on many of your neighbor's roofs. Solar has also gained popularity among electric vehicle owners who take advantage of the sunlight to charge their vehicles, offsetting both carbon and gas car emissions.

The cost to install solar has dropped 70 percent over the past 10 years and a large selection of financing options make it more affordable to go solar and go green.

Going solar can also insulate yourself from potential energy rate hikes and unreliable power. Investing in

solar, to provide electricity or hot water, will reduce your energy needs, which in turn, will help negate rising energy costs for 20-30 years.

Having an energy audit done on your home can reveal where energy is used or wasted. They supply you with information on how to lower your energy consumption and enable your solar installation to save more.

There are many ways to lower your electricity consumption (and bills) right away. Solar energy programs are gaining support as residential and commercial incentives decrease payback times and improve returns on investment. Similarly, energy efficiency programs that allow consumers and producers to share savings often

stimulate investment in new, efficient appliances and weatherization.

Photovoltaics

Photovoltaics (PV) are the solar panels that produce electricity from the sun's rays. If your system produces more electricity than you use, your meter will spin backwards, and your utility will credit your account for that much energy on your next bill. This is called Net Metering and it allows you to connect your solar PV system with the electric grid, making it a two-way street.

Solar cells are assembled into panels that are interconnected to form arrays. Arrays supply power first to your home, with any extra power flowing to the grid. In both cases, the electricity is passed through an inverter to match the voltage of your utility. If your home frequently loses power, a battery backup system can supply power during power outages. Solar PV systems are durable and can be designed to be integrated into your roofing.

Before purchasing and installing a PV system it is advisable to have efficient appliances so that the energy you get from the sun is not wasted. Though the system may only provide a fraction of your total electricity, it does so during the summer when the demand is at its peak, rates are highest and there are more hours of sunlight to be captured and converted into electricity.

Solar and electric vehicles (EVs) are a great way to drive sustainably. If you are considering an EV be sure to figure the charging into sizing your PV system.

Solar Water Heating

After a home's heating and cooling system, the water heater is the appliance that uses the most energy every month. Electric water heating costs typically exceed \$50 per month, while gas water heaters typically cost between \$30 and \$40. In homes with people that use a lot of hot water, more than 35% of energy costs can go to water heating. Solar water heating has the potential to reduce your reliance on electric or gas water heating and completely remove its costs from your budget.

Systems typically cost between \$7,000 and \$9,000, depending upon their size and method of collection. Two common types, flat plate and vacuum tube, work well in our region's climate. Flat plates commonly cost less than vacuum tubes, though the latter are slightly more ef-

ficient in cold weather. While flat plates last longer than vacuum tubes, the differing types have lifespans of 20 and 30 years, respectively.

Whatever method of solar water heating you choose, it is important to protect the storage tank from overheating. Most new controllers can "dump" excess heat that could damage the system over periods of inactivity.

Geothermal Systems

Geothermal heat pumps (GHPs) use a fluid that runs through pipes buried in the ground either horizontally or vertically. This fluid then absorbs heat from the ground. The Earth's heat is transferred through the pipes into the circulating fluid and then transferred again into the home. A 3-ton system installed in a new house in the DC Area often runs around \$30K+, including the Ground-Source Heat Pump (GSHP), ductwork, controls and wells. If in an area with lots of bedrock west of I-95, the wells alone can cost \$3500 per ton. Energy Star rated geothermal systems must have an energy efficiency rating (EER) of at least 14.1 to 16.2.

Financial Incentives

As the solar industry expands, the prices continue to drop. The 'crossover point' will occur when solar generation is more affordable than other forms of energy and is therefore the preferred energy source. Areas with high cost electricity, like New York and California, have already crossed the cross-over point. With incentives, solar is already cost effective.


























There are several incentive mechanisms in use in the region. Maryland and DC have also approved Renewable Portfolio Standards (RPS). An RPS creates an additional value for clean energy sources that include Tier 1, Tier 2 and solar Renewable Energy Credits (SRECs). The credits are a byproduct of electrical generation that embodies the beneficial attributes of each renewable energy source. The credits vary in value and are traded between generators, brokers and electricity providers.

The SREC value helps to reduce the upfront cost of solar if several years are sold at once. Aggregators are willing to buy these from homeowners and they often exceed the value of the electricity they are derived from.



Saturday Homes

FEATURED SOLAR/GREEN TECHNOLOGIES

-  Photovoltaic panels (PV)
-  PV panels with battery backup system
-  Solar hot water system
-  Passive solar home
-  Solar space heating
-  Radiant floor heating
-  Solar attic fan
-  Greenhouse
-  Green roof
-  Geothermal
-  Wind power
-  Strawbale construction
-  Low VOC paint and construction materials
-  Superinsulation
-  High efficient windows
-  Recycled building materials
-  Corn/wood stove
-  Energy efficient appliances
-  High efficient lighting
-  Low water consumption
-  Gray water storage system
-  Tankless water heater
-  Rainwater collection system
-  Rain garden/native plants
-  Composting
- Alternative energy vehicle

Home 26 on the Tour
 Can you count the 69 solar panels on this home? Come out to Jefferson, Maryland and see them for yourself as well as many other energy efficient features.



Home 20 on the Tour
 This passive and solar home in Vienna, Virginia is designed to be as efficient as possible without compromising on architecture and functionality.

Home 25 on the Tour
 The 2005 University of Maryland Solar Decathlon home has found a new home at Red Wiggler Farm.





334 Delight Meadows Rd, Reisterstown, MD



Victorian home with 2.8 kW roof mounted solar electric which provides 1/4 of electricity, grid tied battery backup. The rest is purchased as wind power from our local utility. Monthly electric bill for this 4000 square foot house including the fully used basement, is \$125. 16 batteries provide 24 hours of backup in any weather for garage, basement, kitchen & family room, virtually unlimited with sun shining. A 2 rack Thermomax evacuated tube solar hot water with 2-80 gallon tanks provides 80% of hot water from solar, rest by propane backup. Energy star appliances. 95% fluorescent bulbs. Low flow toilets and faucets. Grasstrac and grassblock permeable driveway. Detached air conditioned garage is straw bale load bearing construction, with green roof, solar radiant heat combined with passive solar garage door. Garage stays over 60 degrees for all but 5-10 days per winter. Backup heating/cooling with portable propane/AC unit. Also has Incinolet toilet and bio based spray foam insulation.

DIRECTIONS

From the Baltimore Beltway, I-695, take I-795 north to exit 7B, Franklin Blvd West. Go to the 2nd light and bear right onto Church Rd. Take the 2nd left onto Sunnyking Dr. Take the second left onto Sunnysdale Way. Take first left onto Sunlight Rd. Turn left at the dead end onto Bonnie Meadow Circle then at the dead-end turn right onto Delight Meadows Rd. Go 0.5 miles to right turn into driveway on right, with 3 mailboxes. The house is the back right home off the pan handle driveway.



4309 Windsor Avenue, Centreville, MD



At 420 square feet, this compact, passive solar natural house qualifies as a tiny home, but that is not the best part! The diminutive size allowed the owner to incorporate several natural building techniques in a self-built guest cottage. A rubble-trench foundation and reclaimed bricks minimize carbon released during concrete production. The 6-inch thick adobe floor soaks up passive solar energy in the wintertime and releases it after the sun sets. Embedded hot water tubes use radiant energy to warm occupants silently and without blowing air that defeats efforts to stay warm.

With no ducts, carpet or dreaded fiberglass insulation, the house is hypo-allergenic, and there is never any worry about what might be growing in the HVAC system. The super-insulated walls incorporate light straw clay infill, lime plaster, and clay plaster to mitigate temperature and humidity swings. Exterior material choices were made in expectation of a 50-year life-span before major replacements are needed. This will be a full-time residence until the lessons learned in this "Practice House" are incorporated into the main house, which is planned for a 2020 ground-breaking.

DIRECTIONS

Located in a quaint community on the Eastern Shore, take the Bay Bridge and drive east on Route 301 North, keeping left at the 50/301 split in Queenstown. Take the exit for Route 213 North toward Centreville and you will pass under the bridge and loop over the highway. Pass straight through one traffic light on the outskirts of town, and a second light in the town center. Turn Left on Broadway and follow it two blocks to the end. Turn right on Chesterfield Ave, then take an immediate left onto Glendale Ave. Follow to the end, turn left on Newnam Ave, and the next right is my driveway on Windsor Ave. Combine the trip with a bike ride, winery tour, or kayak. I am happy to give you some tips!



115 Old Farm Court, Glen Burnie, MD



Homemade southeast facing 8 kW 3-array ground mount solar system with added 8 kW southwest facing array sharing same inverters. Old house with new cast-iron radiator geothermal 6-ton heating system. Also heat-pump water heating. Three electric vehicles (EVs) and charging stations. Have reduced annual 3000 gallon equivalent of fossil fuel burning to less than 300 gallon per year (for Prius on trips). First solar-on-pier in the state. First ground-mount solar panels in the critical area. Solar boat.

DIRECTIONS

From MD Route 10 north, take Sun Valley exit. Then left at light onto Furnace Branch, then 2nd right onto Thomas, then 2nd block turn right onto Country Club and immediate right onto Old Farm Rd and then left onto Old Farm Ct. House at end of cul-de-sac.

Solar Fact

When you buy solar panels, you're eligible for a 30% tax break from the federal government—you could get thousands of dollars back on your taxes and offset the initial cost. www.solarpowerauthority.com



351 Dubois Road, Annapolis, MD



Annapolis Friends Meeting is striving to be carbon neutral. We were the first Maryland non-profit solar system in the critical area. Our ground mount solar system by Solar City made us grid neutral and then we replaced propane heating with a heatpump and are now adding another 6 kW to compensate. We have four EV charging outlets, plus rain barrels, on demand water heating and gravel parking. Just a mile from downtown annapolis, our facility is a great solar powered non-carbon meeting place.

DIRECTIONS

Exit Route 50 onto Bestgate Avenue (Rowe Blvd exit) and go one block to St John Neumans Church and turn right on old Bestgate Road and one block and left on Dubois. We are at the end of the road.



6 Pinecrest Court, Greenbelt, MD



Our home has a 6.02 kW photovoltaic system leased from Solar City. There are 30 panels installed on two roof surfaces. The panels can withstand up to 130mph winds due to the manner in which they are installed. Each panel weighs slightly under 40 pounds which facilitated installation and meant that we did not have to reinforce our roof to support their weight. The panels are configured so that if any one panel is in shade, that panel no longer generates power, but the rest of the system continues to generate power. We drive a fully electric Nissan Leaf, two Toyota Prius hybrids, and are busy incorporating both edible plants into our landscape (blueberries, strawberries, asparagus, and herbs) and Maryland natives.



8 Pinecrest Court, Greenbelt, MD



This single family home has a 6.7 kW solar array on the roof that was installed in February this year. In the few months the system has been running it has produced more energy than has been used by the household.

DIRECTIONS

Walk next door from 6 Pinecrest Court.



2 Maplewood Court, Greenbelt, MD



Installed 2 kW grid-tied PV system with 48 BP Millennium MST-43MVI amorphous modules and Xantrex Sun Tie XR 2.5kW inverter in 2001, using \$3600 Maryland grant and 15% tax refund for total cost of \$3625. We added Solatube tubular skylights, and LED and compact fluorescent lamps (CFL) throughout for lighting. Ceiling fans, tree shade and opening/closing windows and shades keeps the house cool much of the summer. We increased insulation and added ridge vents and replaced most windows and patio doors with Andersen low-E units following an IR scan by Infrared Predictive Surveys, Inc. In 2011, we replaced a failing gas furnace and electric AC with a Ground Source Heat Pump (GSHP) geothermal system with two 225 foot wells and Bosch TA035 furnace. Price of \$20,825 minus \$1500 state grant, 30% federal credit, and \$5k county property credit for total of \$8077 is comparable to a regular (high efficiency) furnace and AC, and uses one quarter of the energy. In 2012, we contracted with Energy Services Group to perform an energy audit with blower door test, and then add attic insulation (R49) including around SolaTubes, attic door insulation, and seal and insulate the walls, around foundation and other leaks (R19) (\$3100-Pepco rebate \$1500 and 30% tax rebate). Also installed The Energy Detective (TED) energy monitoring display. Grid electricity is 100% wind from WGL via Groundswell.org. Also have water-efficient shower heads and Toto toilets, rain barrel and compost bins.

DIRECTIONS

From I-495, take exit 22 for Balt/Wash Pkwy toward Baltimore North, and shortly exit onto MD-193 West/Greenbelt Rd. Turn right onto Lakecrest Dr. at traffic light and turn right at stop sign onto Lakeside Dr. Take 3rd left onto Maplewood Ct. Destination immediately on the right.

**45 Lakeside Drive, Greenbelt, MD**

The owners installed a small PV system in 2002 with a grant from the state of Maryland. Solar tube skylights decrease the need for lights in the central bathroom and kitchen. High efficiency LED bulbs replaced most CFLs in light fixtures and lamps. Ceiling fans have energy-saving blades with dimmable fluorescent bulbs. Insulated window quilts and Roman shades protect the home from air infiltration, and automatic sensor-activated faucets help conserve water. Four high efficiency ductless heat pumps dehumidify the downstairs and air condition the upstairs in the summer, and heat both floors in the winter. A heat pump water heater provides hot water efficiently. Cooking outside with a portable solar oven on summer days, or the chimney-style charcoal grill decreases the load on hot summer days. An electric vehicle charging station on the exterior wall charges the Ford C-Max energi plug-in hybrid vehicle. Compost bins convert the household's food scraps into good soil. The front lawn is being turned into edible landscaping consisting so far of blueberry, raspberry, elderberry and wild blackberry bushes. In the works: refurbish the deck with composite decking and installing rain barrels, innovative Sense home energy and solar monitor, and Nebia Shower System that blends a steam room experience with a traditional shower, achieving 70% water savings.

DIRECTIONS

From the Beltway, take MD-201/Kenilworth Ave exit (exit 23) toward Greenbelt/Bladensburg. (Go 0.34 miles). Veer to the right, taking the ramp toward Bladensburg. Merge onto 201 S. & take the immediate ramp on the right toward MD-193/Greenbelt Rd. (0.16 miles). Turn left onto Greenbelt Rd.. After the next light, go under overpass and into left turn lane. Turn left onto Lakecrest Dr. Turn right at stop sign onto Lakeside Dr. 45 Lakeside is half-mile on the right.

**58 Lakeside Drive, Greenbelt, MD**

This ranch-style brick home was built in the late 50s. Solar City installed a 10 kW DC (8.9 kW AC) PV system on the E/SE facing slopes of the roof in early 2014 and it began generating electricity in November; there were no upfront costs. A 640-gallon cistern, manufactured in Australia, is installed under a second-story porch and is attached to a soaker hose that runs through an extensive garden with a large fish pond and waterfall. My property slopes steeply toward Greenbelt Lake and water runoff from neighbors has sometimes been a severe problem. Patuxent Nursery custom landscape designed and constructed a dry riverbed ending in a rain garden/bowl backed by large boulders to funnel and capture stormwater runoff. The next year we expanded on this system.

DIRECTIONS

Follow directions for 45 Lakeside Drive and it's almost across the street.

**167 Research Road, Greenbelt, MD**

We had our home built in 1992. No unusual energy conservation features were built into the house at that time. In 2015, we attended a meeting given by MD SUN, a nonprofit organization that provides technical assistance and helps organize groups of homeowners to buy solar panels and installation at a discount. Our solar panels were installed at the end of May, 2016. Recently we bought an electric car. Both purchases are eligible for Federal and State tax credits.

DIRECTIONS

From the Beltway, take MD-201/Kenilworth Ave exit (exit 23) and head north on Kenilworth Ave. Take first right (about 500 feet) onto Crescent Rd. (Go 0.3 mi). Turn Left onto Lastner Lane (Go 0.5 mi). Turn Right onto Ridge Road (Go 0.3 mi.). Turn Left onto Research Road. (Go 0.1 mi.) approx 1-mile walk and 2-mile drive from Lakeside Drive homes.]

**14805 Carson Drive, Burtonsville, MD**

Owner designed and built. Passive solar geothermal. earth-sheltered, shaped like a truncated isosceles triangle. 445 sq ft south glazing with movable insulation. 12 in thick concrete walls extend 6 ft below floor. Thermal mass consists of 684,000 lbs of concrete, 536,000 lbs of rock, 200,000 lbs of earth (722 tons of thermal mass total), and 24,500 lbs rebar from recycled automobiles. Wood stoves provide backup heat. Summer cooling by passive thermal conduction to earth and dehumidification by conventional window air conditioner. Rock bin is outside of the house and under the berm providing 2,000 sq ft contact area with adjoining earth. R 35 walls, R 38 + R 50 ceiling insulation. Low pollution design by selection of building materials and by low pollution heating and cooling. 4 to 6 ft of earth buffer weather conditions 4 to 6 months out of phase. Air wells are used to harvest early fall ambient heat and early spring ambient coolness by pumping air into rock bin. Low plastic, low formaldehyde house. Putting earth over the roof for insulation did not make economic sense, so the earth sheltering is done without earth over the roof. 100% battery electric car. Solar hot water heating is via evacuated tubes. No surface water discharge from site.

DIRECTIONS

From I-495, go north on Rt 29 Colesville Rd, left on Greencastle, right on Carson Drive. From Baltimore, go south on I-95, right on Rt. 32, left on Rt 29, right on Greencastle, right on Carson Drive, park on Carson drive.

2017 Saturday Homes



The owners have a 33 panel photovoltaic array, and dual geothermal heat pumps. The home also has an array of solar windows in the great room, (totaling almost 12 feet high and 30 feet across), with stone (slate) floors for thermal mass to radiate heat back into the home once the sun sets, and an energy-saving metal roof. All appliances are low energy, CFL lighting where possible. Porous driveway minimizes runoff. Window quilts over the solar windows prevent heat loss in winter at night, shades great room. This home is custom designed by Ruhsam Building and Design and was completed in May 2012. It has stonework inside and out for added thermal mass. The great room stone floor remains warm overnight. The PV system generates more power than is used some months. An LP gas generator provides power during outages. Dual geothermal systems mitigates weather temperature extremes, lowers heating and cooling costs and provides hot water to the residence.

DIRECTIONS

From DC Rt 29N from the beltway for 2 miles, then New Hampshire (650) N for 7 miles, right on Ednor Rd at the light for 0.7 miles, right on Clear Creek at the Ednor Park sign. Straight down Clear Creek, we are on the left, stone tower.



We are building an urban homestead, meeting most of our energy needs from local solar power. We generate 100% of our electricity using 4.4 kW solar panels, and using energy efficient lighting and appliances. We heat our house nearly 100% with our high efficiency Vermont Castings catalytic wood stove with salvaged local wood. With nearly 450 gallons of rainwater catchment capacity in 3 rain barrels, we are able to keep water usage low. We eat fresh produce from our property, harvesting fruit from our persimmon, plum, cherry, pear and fig trees, blueberry bushes, hardy kiwi and raspberry, concord grapes, and an organic vegetable garden.

DIRECTIONS

From the Takoma Metro Station, from the parking lot walk down Holly Ave about 3/4th of a mile and turn right on Grant Ave. From the Beltway, take Colesville Rd. south towards Silver Spring, Turn left on Dale Ave., and then right on Piney Branch Ave., and left onto Grant Ave. just past the middle school on your left.



This home is one of the greenest in Washington, D.C. with environmental features in energy efficiency, solar generation, food composting, waste reduction, storm-water runoff mitigation, clean transportation, and habitat conservation.

DIRECTIONS

Take the Red Line to Brentwood/Rhode Island Station and walk east through the Brentwood Shopping Center toward W St NE. The house is on the 1300 block of W St NE.



The solar electricity solution was designed and installed by Astrum Solar (Now "Direct Energy Solar"). The project was funded as a 20 year lease, with a single upfront payment and upfront pass through of various tax incentives and energy credits to the home owner. System health and power generation can be monitored in real time through an Enphase PC or mobile phone app. The installed solution can be viewed using Google Earth. The solar electricity solution incorporates 29 Solar World 240 Watt panels, with power gathered through M215 Enphase Energy microinverters located on each panel. The panels are have a zero degree incline, to assure approval of the Georgetown and Washington DC approval authorities. The solution provides more than half of the household annual electricity needs - and does make the meter run backward two months a year.

DIRECTIONS

3023 O Street is the white house with black shutters, located on O Street NW, between 30th and 31st Streets in the East village of Georgetown.



This three story brick colonial was built in 1959 with minimal insulation (brick over cinder block), forced air gas furnace, and

central AC. The upper stories were uncomfortably warm in summer months. In recent years, we added PV panels on the south-facing roof and supplemented it with “thin-film” solar strips on north roof. At the same time, we replaced old shingle roof with standing-seam steel roof with underlying closed-cell insulation (federal tax credit for both). The PV panels also shade the steel roof, reducing our air conditioning need. With the electricity generation, our hybrid car mileage is 70 MPG. We put in eight large rain barrels to capture roof runoff and reduce river pollution. The windows were replaced with insulated, double pane windows, along with HVAC ductwork sealing. We made indoor air quality a priority by using an indoor air filter.

DIRECTIONS

One block off MacArthur Blvd in Palisades neighborhood, west of Georgetown.



1713 N. Bryan Street, Arlington, VA



The house is a 1926 Sears and Roebuck bungalow with a second story addition designed by the Owner/Architect. Grid tied solar panels are located on the high roof. A stand-alone system powers the porch using PV panels, a pair of deep-cycle batteries, and a controller. This off-grid arrangement furnishes light for the porch, refrigeration for cold drinks and power to pump water from a 300 gallon rainwater harvest cistern.

DIRECTIONS

3 blocks from Courthouse Metro(walking) from the intersection of Veitch and Wilson, leave Dunkin Donuts on your right. Follow to intersection of Bryan and Key. (driving) Wilson Blvd. North on Bryan (near Whole Foods) just north of intersection of Key and Bryan, next to the church.



4958 Ashby Street NW, Washington, DC



Current owners of a custom, contemporary shed style, stick-frame home built in 1978 have worked to reduce their carbon footprint. Ideas and examples for any homeowner, from DIY to fully-engineered, professionally-installed solutions. Utilizing techniques such as air sealing and insulating, moving from storage to instantaneous water heating, efficient appliances and LED lighting, installation of an award-winning Hybrid Photovoltaic and Solar Thermal system that provides full HVAC services, DHW, and complete digital diagnostics, monitoring, and logging, and a plug-in hybrid vehicle. Run-off is minimized and managed, to ensure that impacts to the environment are mitigated as much as possible along with the use of native and edible plantings.

DIRECTIONS

The 4900 block of Ashby Street Northwest is bisected by MacArthur Boulevard. The home is located to the west, downhill from MacArthur Boulevard.

Solar Fact

In order to power the entire earth on renewable energy, we would need to install solar panels on over 191,000 square miles. Considering there are over 57million square miles of land on earth, we have room to spare.
www.solarpowerauthority.com



6209 Kersey Ct, Burke, VA



Home of the DIY. The early pioneering energy efficiency progression of this house has attracted much attention, from the gas company (is your meter broken?), to newspaper articles on the super insulation, to Fairfax county inspectors to a half hour TV program. The owners who live in ultra comfort refused to move to a newly built but less efficient home upon retirement. The house sported an Energy Star Rating of 9.8 even before the Solar Electricity was installed. The

2017 Saturday Homes

house was 3 years old when purchased in 1975. The homeowners immediately began to retrofit with super insulation. Insulation was completed in 1983 at which time the furnace was turned OFF. Furnace not needed until 1990 when they became Empty Nesters. The problem is no central furnace OR AC made, even apartment size, is small enough. 2006 Solar Hot Water. 2012 - Solar Electric. Annual energy bills \$550 - \$600. We will make presentations at 10 AM, 1 PM & 3 PM. After giving presentations for over 20 years, we have met and exchanged information with various professionals in this field.

DIRECTIONS

Take the Fairfax County Parkway to Old Keene Mill Rd. (Old Keene Mill Rd ends at the Parkway) Turn on Shiplett (Shiplett ends at Old Keene Mill Rd) to Andromeda (Andromeda ends at Shiplett) and turn on Kersey Ct.



8396 Idlywood Road, Vienna, VA



Originally constructed in 2007 with an addition by Windmill Hill in 2014, the house is designed to be as efficient and environmentally friendly as possible without compromising on architecture or functionality. The concrete slab with SIP construction and the triple pane windows enable effective passive and active solar heating of the home. The narrow footprint of the home is designed for air movement, and the owners have used wood milled from the property, salvaged architectural pieces, recycled components and other environmentally friendly finishes. Outside the environmentally friendly features include a living roof, a native species yard, Audubon at home certification, a rain garden, and a hybrid car. The result is a beautiful home with many advanced technologies that keep the environmental footprint low. The addition was designed by Peter Henry with passive house standards in mind.

DIRECTIONS

From I-66 exit at route 7 west. Take the first left onto Idlywood Rd. and go 2 miles. 8396 Idlywood is between Cedar Lane and Williams Ave.

Solar Fact

The average monthly electricity bill in America is about \$110, as of 2013. Annually, we spend over \$1,300 per household just on electricity. Depending on how much energy your solar panels produce (and how much you consume), your system could pay for itself in a matter of years.
www.solarpowerauthority.com



213 Ayr Hill Avenue. NE, Vienna, VA



Home originally built in the 1960s. Second story added in 2000 by current owner. Solar panels installed in October 2015. Energy efficiency upgrades through out. Recently remodeled basement with cork flooring and with energy efficiency at the forefront of the plan. Native plants and an extensive vegetable garden. Rain barrels.

DIRECTIONS

In the heart of the Town of Vienna near the intersection of Maple Ave. and Park Street NE. From the intersection of Maple and Park NE head west on Park Street to the second right which is Ayr Hill Ave. NE. First house on the right. Dutch Colonial with a garden and white fence.



20437 Winfield Place, Sterling, VA



This brick-front colonial style house was built around 1993. In May 2013 the homeowner had a 10 kW grid-tied PV system (LG Mono-X panels and Enphase inverters) installed. The home is in an HOA-controlled community that is solar friendly. Locating the panels on the back of the roof also made approval easier.

DIRECTIONS

From Cascades Pkwy turn right onto Algonkian Pkwy. Then 2nd left onto Quarterpath Trace Circle, then first right onto Winfield Pl. House is on the right.



18125 Silcott Springs Rd, Purcellville, VA



The pole-mounted PV array uses both net-metering and battery backup. Solar thermal blinds and very efficient interior storm windows. Kitchen floorboards are repurposed oak from a barn which are cleaned and treated with a wax mixture that avoids traditional polyurethane coating. A wood burning stove produces heat and some wonderful cooked items. The solar thermal system is designed so that the domestic hot water is supplied by solar using a multi energy tank. The excess heat is pumped back into the pool extending the pool season. The owners enjoy their Nissan Leaf.

DIRECTIONS

1.7 miles South of Main St. (business Rt. 7 west) The home is on 690 South (Silcott Springs Rd) between A St.(Hirst Farm development) and North Shore Drive (Woodmar Farm development) Stone house set back from the road surrounded by out buildings.



24 11201-03 Neelsville Church Road, Germantown, MD

Grace, beauty, and ecological integrity. These are the principles embodied in the Earth Ministry Simple Gifts project at Dayspring. There are 2 small staff cottages and a solar strawbale greenhouse. Each cottage is 1250 square feet and is designed to provide a well-crafted and energy-efficient home. The cottages accomplished this in different ways including passive solar heating and cooling, well-insulated walls and roof, top energy-efficient windows and appliances, insulating window shades, living roof, FSC-certified framing lumber, geothermal/radiant heating and cooling, grid-tied and grid-independent PV, solar hot water, masonry heater, oak and cherry trim from trees on the land, earth plaster and milk paint wall finishes, stained concrete slab floors, bamboo and linoleum floors, fiber-cement composite siding and trim, roof water collection, and landscaping with native plants.

DIRECTIONS

From I-270 Northbound take exit 15A, (Southbound #15) route 118 East toward MD355. Continue on 118 across MD355. At first stop sign (Scenery Drive) turn left and go three blocks to Neelsville Church Road. Turn left, and the first gravel driveway to your right will take you into the Simple Gifts cottage site.



25 23340 Ridge Rd, Germantown, MD

The 21st century farm house at Red Wiggler Community Farm was the UMD Solar Decathlon entry in 2005. Installed on the Ovid Hazen Wells Park in 2008, the 51 panels on the Solar House have generated more power than it uses year after year while being lived in continuously. As a result Red Wiggler, a certified Organic farm, converted one of its low horse power tractors to electric to use some of the excess power. The 1947 Allis Chalmers G with its new electric motor is now a working example of scale appropriate technology powered by the sun. The home also features solar water heating, triple-pane windows and doors, radiant in-floor heating, and used sustainably harvested wood and bamboo in the construction. The home was designed by an interdisciplinary team of University of Maryland students in architecture, engineering and related fields, and built by students and partners. The home took the “People’s Choice” Award at the 2005 Decathlon and was donated to Red Wiggler by UMD. The house is now a full-time residence for farm staff.

DIRECTIONS

From 270 take exit #16 towards Damascus on Ridge Rd/Rt 27.Go a little more than 3 miles past Frederick Road (Route 355). 23340 Ridge Rd is on the west side of the road across from Davis Mill Road.



26 4112 Old Bridge Lane, Jefferson, MD

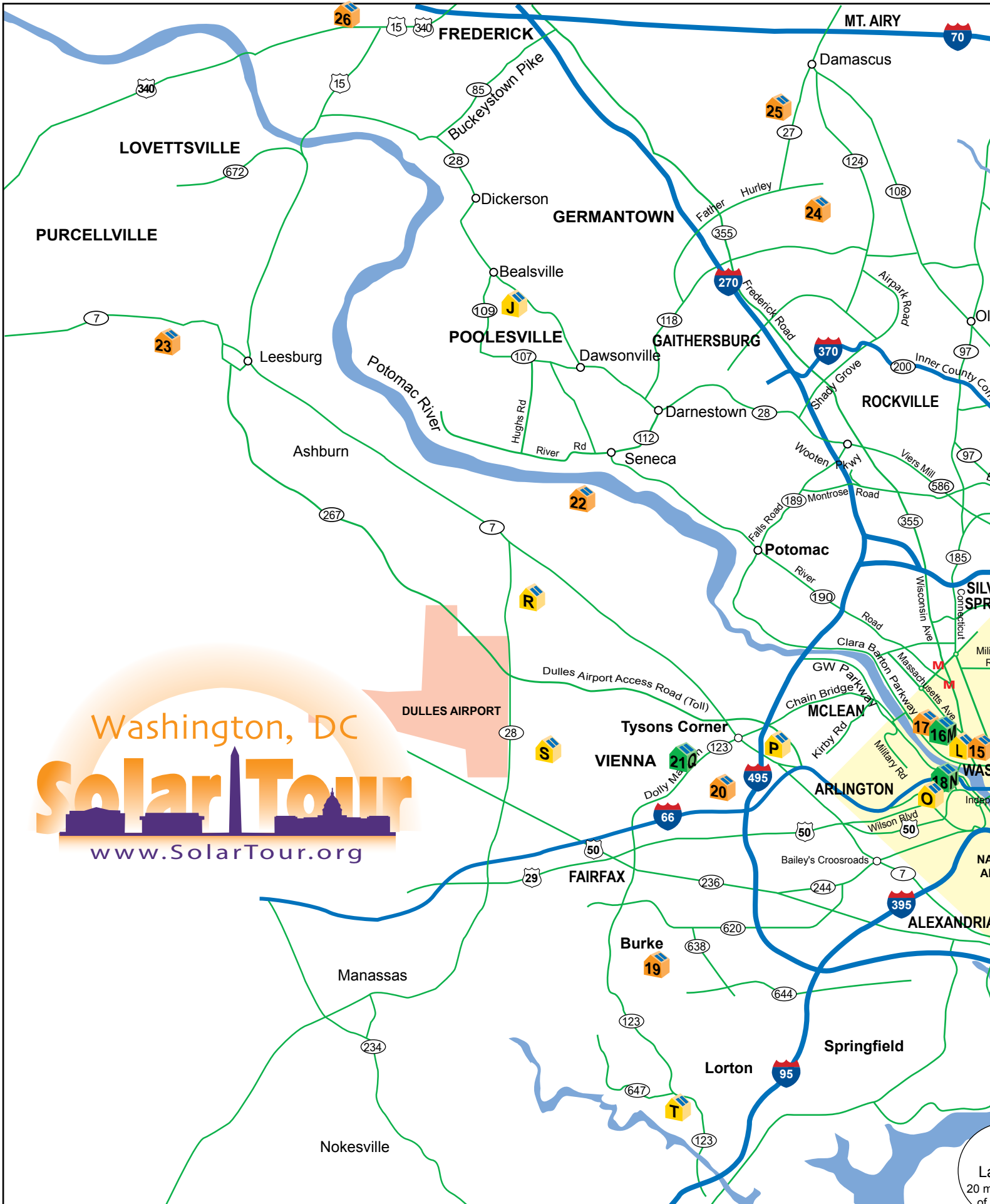
Built in the early 1990’s, this single family home was upgraded with a 6.845 kW grid-tied solar array in late 2010. During the summer of 2013 an expansion of the solar system increased the size of the solar array to a 15.1 kW system. Both systems use Enphase microinverters and feature web-based monitoring. In 2012 a Geothermal system was added to provide heating and cooling. The system produces all of the electricity needed for the home plus additional electricity to support an electric car. The owner has extensive data on energy usage and generation over time, plus information on efficiency and reduction of energy usage.

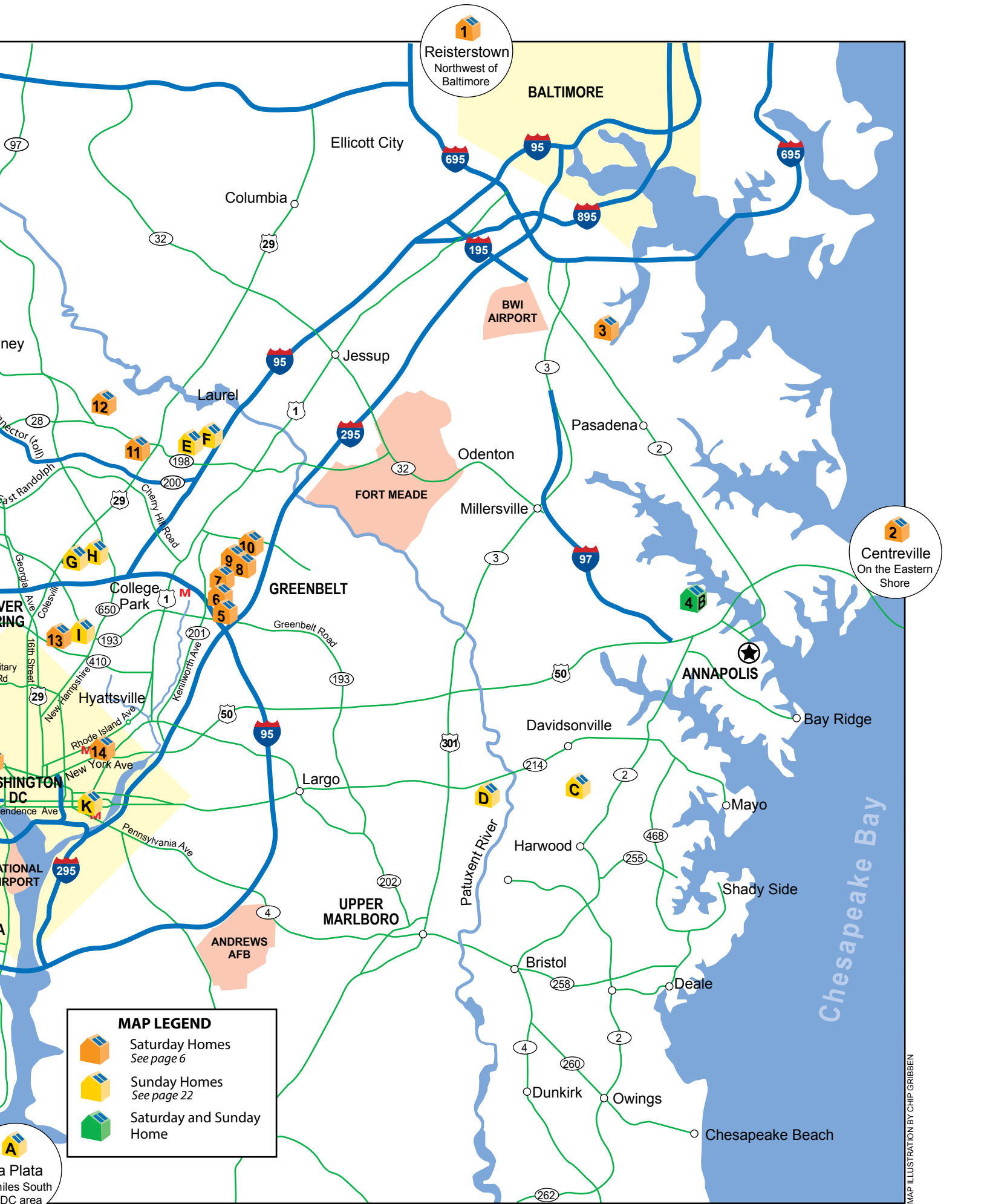
DIRECTIONS

From Frederick, MD - Go west on US-340 towards Harpers Ferry, WV. Take the Jefferson, MD / Lander Rd exit (house is less than 1 mile from this exit). After a light Lander Rd becomes Holter Rd. Turn left onto Camden Dr, then 1st right onto Sturbridge Ct. Next turn left onto Old Bridge Lane. The house is the third one on the right.

Solar Fact

In 2016, there was a new solar installation every 84 seconds.








1
Reisterstown
Northwest of Baltimore

2
Centreville
On the Eastern Shore

MAP LEGEND

-  Saturday Homes
See page 6
-  Sunday Homes
See page 22
-  Saturday and Sunday Home

A
La Plata
15 miles South
of DC area



Sunday Homes

Home P on the Tour

This Falls Church, Virginia solar house was designed and constructed in 2013 to meet the Passive House standard.



Home J on the Tour
























This sustainably energetic family in Poolesville, Maryland has a solar home that charges their EV and plug-in hybrid.



Home O on the Tour

This 1920's Sears Kit home in Arlington, Virginia has a little bit of everything from solar panels to a wind turbine.

FEATURED SOLAR/GREEN TECHNOLOGIES

-  Photovoltaic panels (PV)
-  PV panels with battery backup system
-  Solar hot water system
-  Passive solar home
-  Solar space heating
-  Radiant floor heating
-  Solar attic fan
-  Greenhouse
-  Green roof
-  Geothermal
-  Wind power
-  Strawbale construction
-  Low VOC paint and construction materials
-  Superinsulation
-  High efficient windows
-  Recycled building materials
-  Corn/wood stove
-  Energy efficient appliances
-  High efficient lighting
-  Low water consumption
-  Gray water storage system
-  Tankless water heater
-  Rainwater collection system
- Rain garden/native plants
- Composting
- Alternative energy vehicle



1 Mustang Drive, La Plata, MD



The home has 20 315 watt high efficiency mono-crystalline PV modules (LG315N1C-G4 rectangular array) on southwest facing roof. The array provides >100% electricity consumption offset (net-metered). LED lighting. SolarEdge inverter is compatible with energy storage system, planned for purchase in 2019 alongside EV. pickmysolar.com

DIRECTIONS

From the Beltway I-495 take exit 7A-7B for MD-5 South toward Waldorf. Follow MD-5 South /US-301 South for 24 miles. Make a right onto Catalpa Drive. Catalpa becomes Buckeye Circle. At the end of the street continue on Buckeye Circle by turning left. Turn right onto Steeplechase Drive. The house is on the corner of Mustang and Steeplechase Drive.



420 Dodon Road, Davidsonville, MD



Strawbale house completed in 2010. Strawbale construction in three walls with deep overhangs to protect lime plaster from the elements. The south wall is insulated passive solar design with blown in cellulose insulation. Earthen plaster interior finished with homemade (zero VOC) clay paints. Site harvested trees create primary exposed support columns and beams. Extensive use of site harvested/milled timber used for both structural and trim features. Concrete countertops. Wood burning stove. Geothermal system for heating, cooling, and domestic hot water. Acid-stained concrete slab on ground floor for radiant floor heating and thermal mass for passive solar heat. House-mounted trellis keeps summer sun from reaching concrete slab. A remote 3.5 kW photovoltaic system is grid-tied with battery backup system. Permaculture landscaping with multi-fruit orchard, mushroom cultivation. Sculpture garden with 45 works by artist Pat Monk. Farm in Agricultural Preservation program. Chickens and goats.

DIRECTIONS

From Rt 50 east of Capital Beltway exit onto Rt 424/Davidsonville Rd south toward Davidsonville. Proceed past Central Ave (Rt 214) for 1.9 miles to Dodon Rd. Turn right onto Dodon Rd. Take second driveway on left (about a half mile). Follow driveway 1/3 mile into woods. House and driveway circle are on left.



351 Dubois Road, Annapolis, MD



Annapolis Friends Meeting is striving to be carbon neutral. We were the first Maryland non-profit solar system in the critical area. Our ground mount solar system by Solar City made us grid neutral and then we replaced propane heating with a heatpump and are now adding another 6 kW to compensate. We have four EV charging outlets, plus rain barrels, on demand water heating and gravel parking. Just a mile from downtown annapolis, our facility is a great solar powered non-carbon meeting place.

DIRECTIONS

Exit Route 50 onto Bestgate Avenue (Rowe Blvd exit) and go one block to St John Neumans Church and turn right on old Bestgate Road and one block and left on Dubois. We are at the end of the road.

Solar Fact

A household rooftop solar panel system can reduce pollution by 100 tons of CO2 carbon dioxide in its lifetime—and this includes the energy it took to manufacture the solar panels. Solar panels can improve future air quality for humans as well as the millions of birds, fish, and mammals that are negatively affected by pollution each year. www.solarpowerauthority.com



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2017 Sunday Homes



102 Queen Anne Bridge Road, Upper Marlboro, MD



Original 1920s gable frame house was gutted and retrofit with strawbales. A timberframe addition was added to one end of the house and infilled with strawbales for insulation. A small loadbearing strawbale guesthouse was built by Builders Without Borders using lime and earth plasters and as featured outside the Capital building for almost a year. A small studio using a modified infill system was built and finished in local clay plasters. A variety of strawbale and plastering techniques were used in the structures from low to high-end. Boards, timbers and posts were obtained locally and milled using our sawmill or chainsaw. Lots of experiments in local reused materials, and timbers, trees, and found objects. Key themes are local natural materials, do it your self, low cost, and non-manufactured.

DIRECTIONS

Take Rt. 50 east. Exit on Rt. 301 south. Exit onto Rt. 214 east. Proceed 2 miles and turn right on Queen Anne Bridge Rd. Proceed 1/2 mi to stop sign. Turn left into driveway at stop sign. Note: Do not turn onto Queen Anne Bridge Rd. when you first see it crossing Rt. 301 south.



5804 Holger Court, Laurel, MD



3.7 kW solar panels are installed on the front roof of the house. The garage has two charge ports for Plug-in Hybrids.

DIRECTIONS

Take I-95 to Exit 33B, Rt 198 West towards Burtonsville. At seoncd light turn right onto Bond Mill Road. Get into the left lane and make an immediate left onto Clayburn Drive. Take the second right onto Holger Ct, 5804 will be on the left between two other solar homes.



5809 Holger Ct., Laurel, MD



Our roof's 5.8 kW PV was installed in April 2012 and provides, on average, 60 to 80 percent of the electricity for the house. On some days, producing more than we use. Home features energy saving appliances, CFL lighting and super insulation in the attic. Other alt fuel features include a Prius, a 144 volt electric Ford Escort, electric powered dragster and a GE Elec-Trak garden tractor.

DIRECTIONS

Take I-95 to Exit 33B, Rt 198 West towards Burtonsville. At seoncd light turn right onto Bond Mill Road. Get into the left lane and make an immediate left onto Clayburn Drive. Take the second right onto Holger Ct, 5809 will be the fifth house on the right.



211 Williamsburg Drive, Silver Spring, MD



The home features a number of energy-saving measures, solar panels, and organic gardening practices in place. During the tour, you'll see rain barrels and rain water diversion, a compost station,

and several cold frames for growing food during colder months. The property is surrounded by organic gardening beds, including strawberries as ground cover, and blueberries as a fence. The homeowner also diverts rain from the gutters into a garden, to minimize the need for watering with municipal water. The house features 17 solar panels and a 14Kw natural gas generator. During the last roof repair conducted at the property, the owner elected to have foam insulation installed in the roof, which cuts down on noise, and keeps the house warm in winter, and cool in summer. The yard is planted with zoisa grass, which is drought tolerant and stays green during the hottest months. Finally, the homeowner completely upgraded the property with energy efficient windows. All in all, this property features a practical, fun, and simple combination of energy saving solutions, including solar panels, energy efficient upgrades, and organic gardening and landscaping practices that blend harmoniously with modern suburban living.

DIRECTIONS

Take University Blvd, 193 East to Williamsburg Drive which is a divided road. 211 is on the left.



8 PV panels leased from Solar City NEST thermostat free from Solar City. Had to have a large tree cut down. It was dying. System installed in January 2017. 20% of energy from the sun. Terraced yard gardens aplenty. Channel and collect water to water barrel. Andersen windows, double pane for efficiency. On the PEPCO 75% savings for powering down during peak periods.

DIRECTIONS

From House H on Williamsburg, turn right at the fork after the stop sign.



This 5-unit apartment house has a solar water heater consisting of 4 panels and 2 80-gallon storage tanks. The system preheats the conventional electric water heater saving significant energy costs. All common area lighting uses efficient fluorescent lights. An ultrasonic switch in the main hall turns on automatically when people enter and turns off 5 minutes after sensing no movement in the room. A garage light is also automatic. 2 solar powered roof vents remove heat from the attic, reducing the air-conditioning load. These improvements have lowered electric usage from 800 kWh to 300 kWh per month.

DIRECTIONS

From Rt 29 inside the Beltway. Take 29 south and make a left at Franklin. Turn right onto Flower Avenue, cross Piney Branch, head for 5 blocks and make a right at Kennebec.

Solar Fact

The cost of solar panels has dropped by 80% since 2008,5 and it is expected to keep falling. www.solarpowerauthority.com



Built in 2000, this single family home has been upgraded over the past 8 years, starting with an energy audit, and includes the following: attic insulation upgraded to DoE recommended R49, recessed light sealing, along with high efficiency AC upgrade. Lighting upgraded to 95% LED. 2200+ sq ft of strand bamboo flooring. Energy Star appliance replacements installed as needed and automatic lighting controls help ensure lights are off when not in use. Finished basement multi-purpose room & bath showcases energy & water efficient fixtures with sustainably sourced materials throughout. The home boasts a 69 panel net-positive solar installation handling over 100% of the household & Electric Vehicle needs. The installation consists of two solar panel arrays: a 12.5kW 52 panel array leased in 2013 and a 4.2kW 17 panel array bought in 2014, both grid-tied. A Nissan LEAF Electric Car and a Chevy Volt Extended Range Electric Car complete the picture. The homeowners have been driving electric since 2011. Extensive data collection on the solar array energy production and electric car usage is available for review.

DIRECTIONS

From DC: Take I270 North, Exit 6B MD-28 W/Darnestown Rd, go 24.1 miles, Turn Left on Jerusalem Rd & go 1.1 miles, Turn Left on Cissel Manor Rd, Turn Left on McKernon Way, House is on left at the corner of Hackett Ct & McKernon Way. From Frederick: Take I270 to MD-85 S/ Buckeystown Pike. Go 10 miles and continue straight onto MD-28 E/ Dickerson Rd, go 8.1 miles, Turn Right on Jerusalem Rd & go 1.1 miles, Turn Left on Cissel Manor Rd, Turn Left on McKernon Way, House is on left at the corner of Hackett Ct & McKernon Way.



I have been greening my home for several years and will have been off the grid since March 2016. Other features -- novel uses of pilot lights to recover energy for heating water and dehydrating food, Tempcast masonry stove, SunDanzer refrigerator and freezer, inflector panels on some windows and on 2 skylights, a manual grey water recovery system for dish washing, one window quilt, mini-split AC in 4 areas, passive ventilation with venting skylights.

DIRECTIONS

Nearest Potomac Ave. Metro, just north of Pennsylvania Ave. on 13th Steet SE. Parking within a block is usually easy.

2017 Sunday Homes



2112 Huidekoper Place NW, Washington, DC



Rooftop system on a row house, 15 panels, 250 kw each. Happy to talk numbers.

DIRECTIONS

Glover Park near Whole Foods on Wisconsin Avenue.



4815 V Street, NW, Washington, DC



This three story brick colonial was built in 1959 with minimal insulation (brick over cinder block), forced air gas furnace, and central AC. The upper stories were uncomfortably warm in summer months. In recent years, we added PV panels on the south-facing roof and supplemented it with "thin-film" solar strips on north roof. At the same time, we replaced old shingle roof with standing-seam steel roof with underlying closed-cell insulation (federal tax credit for both). The PV panels also shade the steel roof, reducing our air conditioning need. With our own electricity generation, our hybrid car mileage is 70 MPG. We put in eight large rain barrels to capture roof runoff and reduce river pollution. The windows were replaced with insulated, double pane windows, along with HVAC ductwork sealing and repair. Indoor air quality is a priority with an air filter.

DIRECTIONS

One block off MacArthur Blvd in Palisades neighborhood, west of Georgetown.



1713 N. Bryan Street, Arlington, VA



The house is a 1926 Sears and Roebuck bungalow with a second story addition designed by the Owner/Architect. Grid tied solar panels are located on the high roof. A stand-alone system powers the porch using PV panels, a pair of deep-cycle batteries, and a controller. This off-grid arrangement furnishes light for the porch,

refrigeration for cold drinks and power to pump water from a 300 gallon rainwater harvest cistern.

DIRECTIONS

3 blocks from Courthouse Metro(walking) from the intersection of Veitch and Wilson, leave Dunkin Donuts on your right. Follow to intersection of Bryan and Key. (driving) Wilson Blvd. North on Bryan (near Whole Foods) north of intersection of Key and Bryan, next to the church



706 North Ivy Street, Arlington, VA



The house is a 1926 Sears and Roebuck bungalow with a second story addition designed by the Owner/Architect. Grid tied solar panels are located on the high roof. A stand-alone system powers the porch using PV panels, a pair of deep-cycle batteries, and a controller. This off-grid arrangement furnishes light for the porch, refrigeration for cold drinks and power to pump water from a 300 gallon rainwater harvest cistern.

DIRECTIONS

From Washington take Rt. 50 west to the 10th St. exit, turn left onto N. Ivy St., and proceed to 706. This home is 2-1/2 blocks from the Clarendon Metro stop.

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P **7619 Leonard Drive, Falls Church, VA**

Net Zero Passive House. This house was designed and constructed in 2013 to meet the Passive House standard. The result was an all-electric house with very low energy requirements. The addition of 18 solar PV panels provides more than the total annual energy used for heating, cooling and electrical use. The shell of the house is very air-tight (0.55 ach50 blower door test result) and the walls are insulated with dense-packed cellulose insulation to R-40 and the attic is insulated to R-90. The house uses so little energy that it is heated and cooled with a small heat pump which is designed to heat and cool one room in a standard house but heats and cools all of this home's 3400 sf. The home's focus is a passive solar 2 story dining room. Extremely modern in construction but with a classic character, the space's natural lighting is superb. Fresh air is continually provided through an energy efficient ERV. Windows and doors are triple glazed and have multipoint locks to maintain a tight seal. South side shading has been designed to take advantage of solar gain in the cool seasons and to exclude it when hot. The hot water is provided by a GE heat pump water heater. All lights are LED. Appliances are all Energy-Star efficient.

DIRECTIONS

Located just inside the Beltway near Tysons Corner, Exit 47 to Rt 7 East, Leesburg Pike. At first light turn right onto Ramada Road. Find a safe & legal turnaround. Go straight across Rt 7 at light and continue straight on Lisle Ave. At first stop sign take a right onto Fisher Drive then next left onto Leonard Drive. House is 4th on the right.

Solar Fact

A residential solar energy system typically costs about \$3-4 per Watt. Where government incentive programs exist, together with lower prices secured through volume purchases, installed costs as low as \$2 watt - or some 10-12 cents per kilowatt hour can be achieved. Without incentive programs, solar energy costs (in an average sunny climate) range between 22-40 cents/kWh for very large PV systems. www.solarpowerauthority.com



Q **213 Ayr Hill Avenue, NE, Vienna, VA**

Home originally built in the 1960s. Second story added in 2000 by current owner. Solar panels installed in October 2015. Energy efficiency upgrades throughout. Recently remodeled basement with cork flooring and with energy efficiency at the forefront of the plan. Native plants and an extensive vegetable garden and rain barrels.

DIRECTIONS

In Vienna near the intersection of Maple Ave. and Park Street NE. From the intersection of Maple and Park NE head west on Park Street to the second right which is Ayr Hill Ave. NE. 213 Ayr Hill Ave. NE is the first house on the right. The home is a Dutch Colonial with a garden on the left side yard, white picket fence and arched entry to the garden.



R **904 West Maple Avenue, Sterling, VA**

This passive-solar house was completed in 1986. Green Brilliance installed the solar hot water system followed by the solar photovoltaic system in 2009. Eight more PV panels were added to a shed in 2013. The home features south-facing windows, a masonry wall to absorb and store heat, 2X6 exterior wall construction and water-saving appliances. Since 2013 we received over \$7,000 in SRECs – enough to offset all our electricity and gas bills, plus the cost of charging our 2012 Prius Plug-In hybrid. The home also has a rain collection system, sustainable gardens and composting.

2017 Sunday Homes

DIRECTIONS

Take Rt 7 west and make a right onto North Sterling Blvd (Rt 846). Take North Sterling Blvd for 1.7 miles and make a right onto West Maple Avenue. Take West Maple for .9 miles and 904 will be on the right.



3021 Summershade Court, Herndon, VA



This 2250 sq. ft Ryan home built in 1981, has achieved a carbon-neutral footprint with a combination of a 13.3 kW PV system, solar heated water, geothermal heat pump, Energy Star appliances, LED and CFL lighting, Tesla Model S EV, and upgraded insulation. The original 1850 sq ft home sports a 2011 addition with high efficiency windows, 2x6 R-27 walls and R-63 ceiling.

DIRECTIONS

From the Dulles Toll Road, take exit 11 (Fairfax County Parkway) south. Take a left onto Rt 608 (W. Ox Rd), right onto Ashdown Forest Dr., right onto Burchlawn St., and left onto Summershade Ct.



9200 Denali Way, Lorton, VA



This contemporary, 2950 square feet, frame structure has 83% south-facing windows and skylights. A solar-powered greenhouse fan distributes heat into the house in winter and exhausts heat in summer. A vertical closed-loop geothermal system and a high velocity air-to-air system provide heating and cooling. An efficient Finnish fireplace allows the owners to enjoy a fire. Insulation includes R19 fiberglass bats in the 6 inch walls, R13 fiberglass bats with R3.8 polystyrene in the 4 inch walls, and R30 fiberglass bats in the ceilings. An air-lock foyer entry, Tyvek wrap, and foam caulking reduce air infiltration. Windows are of low-E thermopane glass. Skylights and a Solatube provide daylighting, and the electric lighting is fluorescent. Clerestory windows allow natural ventilation. Other energy-savers include a timer on the water heater and low-flow shower heads. The house is currently on the market.

DIRECTIONS

Head south on I-95 to the Lorton exit. Turn right onto Lorton Rd. and go to end (approx 2 miles). Turn right onto Route 123 (Ox Road) and proceed approx 1.1 miles to traffic light (Giant Food on right). Turn left onto Palmer Road and proceed to end (0.4 mi). Turn right onto Elk Horn Road and go 0.25 miles. Turn left onto Denali Way; then take first driveway on right.

Grants and Incentives continued from Page 3

for EnergyStar and WaterSense appliances for noncommercial home or personal use - \$2500 or under. The 3-day sales tax holiday starts the first Friday in August at 12:01 am and ends the following Sunday at 11:59 pm.

Fairfax County

The county has a tax exemption for solar equipment that spans 5 years. The list of qualifying equipment is impressive including solar heating and hot water systems, passive solar energy systems, south facing windows used as solar collectors, trombe walls, greenhouses integrated into the heating system of the structure, thermal storage systems, movable insulation, and shading devices designed primarily for shading windows to assist in summer cooling.

For a \$12,000 system (\$8,000 for equipment and \$4,000 for installation) based on a household tax rate of \$1.09, the exemption value of \$12,000 is divided by 100 and multiplied by \$1.09 for a tax credit of \$130.80. This tax credit and deducted from the property's tax bill every year for 5 years.

For more information on Fairfax County's program and an application visit:

http://www.fairfaxcounty.gov/dpwes/forms/solarenergy_overview.htm

<http://www.fairfaxcounty.gov/dpwes/forms/solarenergy.pdf>

SRECs

If you are a Virginia resident you can sell your solar and wind SRECs. The value of SRECs is coming down due to the popularity but they are still a way to achieve some payback on your system.

If you're not fortunate to be in Fairfax County keep pushing your local and county governments for more incentives. Also consult your installer who is up-to-date on local incentives and programs.

WEBSITES

Federal

<http://energy.gov/savings/residential-renewable-energy-tax-credit>

Maryland

<http://energy.maryland.gov/>

DC

<http://green.dc.gov/green/site/>

Virginia

<http://www.dmme.virginia.gov/>

<http://www.dsireusa.org> for more details

Environmental Harmony

by Bob Bruniga

Annapolis Friends Meeting Church Building Solar Project

Quakers have a tradition of simplicity and a testimony for the stewardship of the Earth. We are committed to living in harmony with our environment. After supporting Electric Vehicle charging to reduce the use of gasoline burning during trips to meeting, in 2010 we began to consider our options for solar and completed our Solar System in January 2014 via a fully pre-paid up-front 20 year lease from Solar City. A lease allowed us to get the system for about half of the purchase cost because the leasing company could take all the 50% or so federal, and state tax advantages that the church could not. Unfortunately, Solar City says they will no longer do systems for non-profits.



Solar power does not just reduce our electric bills to zero and reduce our dependence on fossil fuels, but each individual solar panel (by replacing coal generated electricity) eliminates the same amount of carbon and pollution contaminants that it takes 8 mature trees to absorb. Our solar array is equivalent to the environment to planting nearly 3 acres of trees!

AFM began to explore the addition of solar panels to our property back in 2011 to eliminate our demand for coal-generated electricity and resulting carbon emissions. The ground-mounted solar array we ended up with mounted in our front yard was ideally sited with a good southern exposure and out of our way for any future building expansion. The design will produce close to 90% of our electricity needs. (That is, until we switch from burning

Propane for heat to a ground source heat pump). In 2011 the cost of solar became equal to the retail cost of coal-fired electricity and since 2012, solar has been cheaper than normal Baltimore Gas and Electric rates by almost half when considered over the next 20 years. Our amortized cost will be about 7 cents/kWh compared to today's BG&E rate of about 14 cents/kWh.

Financial Summary: So, to sum up the financing in our case, here are the numbers for our 9 kW system:

- Avg annual Electric Consumption: 14,300 kWh
- Utility cost of electricity: 14 cents/kWh (10 cents list price, but 4 cents of add-ons)
- Annual electric Bill from BGE: \$2000
- Annual estimated Solar Energy: 13,000 kWh
- Annual Value of Solar Energy: \$1820
- Total System cost \$20,000 (fully pre-paid lease)
- Return on Investment $\$1820/\$20,000 = 9\%$
- One cannot beat a 9% ROI from any bank or market (and it will only go up as rates go up)

Annapolis Friends Meeting is on the tour Saturday and Sunday. Visit their website at:
<http://aprs.org/AFM-solar.html>



Solar United Neighbors Launches to Help Everyone Go Solar

by Ben Delman



It started more than a decade ago with a simple question, “Mom, can we go solar?”. This led Anya Schoolman to research what it would take for her family to put solar panels on their roof. Anya found the process to be daunting, complicated, and expensive. She quickly realized that it would be easier if she worked with her neighbors to go solar as a group. Her son Walter and his friend Diego canvassed their neighborhood. They got more than 50 neighbors to sign up to go solar together. Word about their success spread across Washington, D.C. and other neighborhoods started solar co-ops as well. And so, DC SUN was born.

Building on the success of DC SUN, similar programs started in Maryland, Virginia, West Virginia, Ohio, Florida and Minnesota. Together, these programs are now called Solar United Neighbors. Every year we help thousands of people go solar.

Changing our name to Solar United Neighbors reflects our community’s desire to both help people go solar and build a nationwide force of solar supporters to fight for our energy rights. Working locally, we’ll continue to

educate more people about the benefits of solar so that they feel confident to go solar themselves. And, we’re creating a powerful organization that can stand up to monopoly utilities and protect our solar rights in state legislatures and public service commissions across the country.

We’re also launching a membership program with services that help people go solar and provide support to protect their investment for the life of their system. For prospective solar owners, the membership provides personalized support to help you decide if going solar is right for you. We’ll examine your roof to see if it is a good fit for solar. We’ll provide you with educational materials so you understand the costs and benefits of going solar. And, we’ll help you review the proposals you receive from installers so that you feel confident about your decision to go solar.

Our support stays with you after you go solar. We keep you up to date on emerging technologies and you’ll be

Continued on Page 27

Take the guesswork out of going solar

With expert, unbiased help from nonprofit Solar United Neighbors

Become a member today!

Download our free going solar guide

Our installer-neutral guide gives you an introduction to the solar process – without sales tactics.

Save money going solar in a group

Our co-ops use the power of group purchasing to save money while ensuring the right system, a strong warranty and quality installation.

Or get individual advice

Our members get one-on-one help every step of the way – from sizing a system to reviewing bids.

Ongoing support maximizes your investment

We keep you up-to-date on emerging solar policies, technologies and incentives. We're the only organization that represents individual energy producers as we fight for solar-friendly policies.



SolarUnitedNeighbors.org

DC SUN and MD SUN are now Solar United Neighbors! Changing our name reflects our community's desire to help people go solar and build a nationwide force of solar supporters to fight for our energy rights.



Electric Vehicles Pair with Clean Energy

by Charlie Garlow
EVA/DC

2017 is an exciting year to be excited about electric vehicles (EVs). Not only are EVs in the press a lot [Tesla Model 3 versus Chevy Bolt - both getting over 200 miles range at a reasonable price of \$35,000 or so, before tax credits], but there are more and more models to choose from at the dealers' lots. This year you can choose from 23 models of all battery cars like the Nissan LEAF and the Tesla Model S and X and 23 models of plug-in hybrids like the Chevy Volt or Ford and BMW offerings.



Charlie Garlow showing his electric Porsche to students at a local school

Volvo just announced that by 2019 they will stop offering gasoline only standard cars, but will instead sell all-electric battery cars or hybrids.

And how about all the chatter on self-driving cars, all of which use electric models? And over-the air updates to your software in the car??

Still, only 1% of the 17.5 million+ cars sold in the US in 2016 were electric. We have much to do to get more EVs on the road.

Go to evadc.org for more info on promoting EVs.

The logo for MOM's Organic Market features the word "MOM" in a stylized red font where the letter 'O' is replaced by a red apple with a green leaf. To the right of the logo are three blue wind turbines. Below the logo is a green banner with the text "MOM's Organic Market" in white. At the bottom of the banner is the text "Our Purpose is to protect and restore the environment." in white.

MOM's Organic Market

Our Purpose is to protect and restore the environment.

Bowie • College Park • Frederick • Hampden • Jessup • Rockville • Timonium
Waldorf • Alexandria • Arlington • Herndon • Merrifield • Woodbridge • Ivy City

momsorganicmarket.com

Solar United Neighbors continued from Page 24

the first to know about new incentives that can help improve your energy efficiency. We have developed a Solar Help Desk, a real-time hotline for solar questions and technical support. This helps members ensure the *Solar United Neighbors* value of their investment into solar.

All members will have access to directory of businesses that have gone solar. From wineries to architecture firms, members learn about local businesses are being powered by the sun! Members will also receive discounts and coupons at participating businesses.

The membership program will help Solar United Neighbors create a rally point for people who want to take control of where their energy comes from. Our community of solar supporters is a place to unite together,

Solar Resources

Magazines

Home Power Magazine, The Hands-on Journal of Home Made Power. This magazine covers various energy topics: solar, wind, PV systems, electric vehicles, batteries, hydrogen, domestic solar hot water, etc. 1 Year Digital Subscription (6 issues) - \$14.95. Half the price of the print edition. www.homepower.com

Mother Earth News, \$19.95 per year. The guide to living wisely features renewable energy projects and helpful sustainable living articles. Published bimonthly. www.motherearthnews.com

Solar Today, The magazine of the American Solar Energy Society. Available through The American Solar Energy Society at www.ases.org

Books

Solar Electricity Handbook: 2016 Edition: A simple, practical guide to solar energy - designing and installing solar PV systems Kindle Edition by Michael Boxwell. Available on *Amazon.com*

Real Goods 14th Edition Solar Living Sourcebook, \$19.95. The Sourcebook provides the technical details you need to harness the sun, wind, or water for your home power generation. 600 pages. www.realgoods.com

learn from each other and celebrate our successes. Together we are a loud, powerful organization fighting for policies that support solar. We're excited to extend our track-record of success across the country to fight for policies that support solar.

Our goal is ensure the answer to the question "can we go solar?" is always: "Yes!".

For more information visit the website at: SolarUnitedNeighbors.org.



Websites

American Council for Energy Efficient Economy - www.aceee.org

American Solar Energy Society - www.ases.org

Database of State Incentives for Renewables & Efficiency - www.dsireusa.org

Interstate Renewables Council - www.irecusa.org

Let's Go Solar! - www.letsgosolar.com

MD-DC-VA Solar Energy Industries Association - www.mdv-seia.org

Renewable Energy and Electric Vehicle Association - www.reevadiy.org

Mid Atlantic Solar Energy Society - www.mases.org

Solar Energy Industries Association - www.seia.org

Solar Electric Power Association - www.solarelectricpower.org

US Department of Energy
Energy Efficiency and Renewable Energy - www.eere.energy.gov

Conservation Tips

1. Seal around fireplace trim, window trim and baseboards
2. Seal between sheathing and foundation on the outside
3. Weather-strip windows, doors, and joints
4. Insulate band joists area
5. Install switch plate and outlet plate insulators
6. Seal basement crawlspace, ceilings and walls
7. Install doorsweeps and new thresholds
8. Caulk and insulate all primary and secondary duct joints, except return duct joints
9. Weather-strip/insulate scuttle hole or attic access doors
10. Weather-strip vertical joints of exterior sliding doors and window air conditioners
11. Weather-strip top, bottom, and sides of garage doors
12. Install radiator reflectors
13. Install air filter alarm; clean and replace regularly
14. Insulate all accessible water heating and hot water pipes
15. Insulate the first 6 feet of cold water pipes leading into water heater
16. Insulate air-conditioner pipes and tubing
17. Install heating/cooling monitors
18. Install setback thermostat
19. Install water miser for toilet tanks, shower and faucets
20. Install hot water tank jacket and insulate with reflective foil
21. Seal around soil vent stacks in attic floor, and around all plumbing access doors
22. Seal mail chutes
23. Install temperature-controlled attic exhaust fans
24. Install dryer vent diverters (electric dryer only)
25. Set thermostat to 68°F in Winter, 78°F in Summer
26. Install automatic foundation vents
27. Install Plug-Itt in fireplaces
28. Install Cap-Itt over pull-down stairs
29. Install pulley plugs over pulleys of double hung windows
30. Reduce hot water temperature to 120°F and periodically drain tank sediment
31. Reduce boiler temperature
32. Reduce low-limit cutoff in the furnace
33. Replace incandescent bulbs with compact fluorescent, cold compact fluorescent or led bulbs
34. Add humidifiers for greater winter comfort at low temps
35. Clean air-conditioner exterior condenser unit
36. Open shades on south-facing windows on sunny days in the winter
37. Minimize use of exhaust fans when A/C or heat is in use
38. Use motion detectors with halogen lamps for outdoor lighting
39. Purchase high-efficiency appliances
40. Use "cool dry" cycle or allow dishes to air dry when using a dishwasher
41. Hang laundry outside to dry on nice days
42. Install ceiling fans to circulate air
43. Check electrical usage of your appliances with a plug-in kilowatt hour meter.
44. Reduce "vampire loads" by plugging-in your computer and devices to a single power strip and turning it off when you are done with your computer.



ASES SOLAR 2017

Building a 100% Renewable Energy Community



46th Annual National Solar Conference



DENVER
October 9-12

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 - FREE lectures & webinars on solar, energy efficiency & zero-net-energy **
 - Discounts on Workshops, Training, Conferences, Special Events & more.
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 - FREE *Kill-A-Watt* power meter with 2-year memberships and renewals.
- ** Continuing Education Credits available for Professional Members.**

**Help save Earth:
Volunteer today!**

www.mases.org

**Internships
Available Now!**

Mid Atlantic Solar Energy Society is a 501(c)3 not-for-profit organization. Donations welcome!

High electricity bills?



Take control of your energy costs!

SolarCity lets you generate your own clean, more affordable solar energy. You can lock in a low, predictable energy cost that's less than you currently pay. Please contact your local representative for a free consultation.

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dhuffman@solarcity.com

