



Your Self-Guided Energy Audit

There are many things you can do to lower your energy bills and carbon footprint. This document provides action steps that you and your family can incorporate into your lifestyle. Start with one thing at a time and eventually you will turn your home into a greener, healthier, less expensive, therefore more sustainable environment.

What are you currently consuming?

Take a look at your latest SCE bill to determine your average daily load. This will be in kWh (kilowatt hours). Average daily usages are between 10 kWh and 20 kWh. If yours is higher, there may be some big energy users that should be addressed. To address specific electricity loads, devices like a [Kill-a-Watt](#) may be helpful.

Action Steps

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Lighting

The lowest cost and most effective efficiency recommendation that Solar Santa Monica can make is that you reduce the use of incandescent light bulbs by switching to compact fluorescent lamps (CFLs) or the brand new wave of LEDs (light emitting diodes). In the average home, lighting accounts for 15% of the total electric bill. Examine the wattage size of the light bulbs in your house, then replace with equivalent CFL or LED wattage bulbs. You'll get the same amount of light, but use only 15-25% as much energy! You might begin with replacing lights that have a high "duty factor," in other words, lights that are on for more than three hours per day. These will give you the most savings and the best return on your investment. Examples may include porch lights and hallway lights.

Appliances

Every product that uses electricity has two costs: the one on the price tag and the one on the utility bill. For some energy-wasting products, the cost to run the product may be many times greater than the cost to

purchase it. Although some energy-efficient products may have a higher price tag, they often pay for themselves in energy savings.

Learn more below by clicking on these links to California's Flex Your Power website:

-  [Furnaces](#)
-  [Refrigerators](#)
-  [Water Heaters](#)

-  [Clothes Washers](#)
-  [Clothes Dryers](#)
-  [Dishwashers](#)

Water-Savings

California's main water sources have been severely impacted by record dry conditions. And we're already using our reserves to supply our everyday water. Our water situation is serious. But here's how you can help...

How much you can save indoors:

Install aerators to all sink faucets (\$2 each)

Reduce water usage by 10%

Turn off the water when you brush your teeth.

3 gallons per day

Shorten your showers by one or two minutes.

5 gallons per day

Fix leaky faucets

20 gallons per day

Wash only full loads of laundry and only use cold water

15 to 50 gallons per load

Talk to your family and friends about saving water. If everyone does a little, we all benefit a lot.

How much you can save outdoors:

Water your yard only before 8 a.m. to reduce evaporation and interference from wind.

25 gallons per day

Install a smart sprinkler controller.
Use a broom instead of a hose to clean driveways and sidewalks.

40 gallons per day
150 gallons each time

Check your sprinkler system for leaks, overspray and broken sprinkler heads.

500 gallons a month

[Home Tour to investigate water savings](#)

Weatherization

One of the common building envelope issues that we find in Santa Monica is doors and windows that do not seal completely. Building envelope issues may be less important in a temperate climate than in a more extreme cooling or heating climate, but tightening the shell of your home can save money and increase comfort.

Locating Air Leaks

First, make a list of obvious air leaks (drafts). The potential energy savings from reducing drafts in a home may range from 5% to 30% per year, and the home is generally much more comfortable afterward. Check for indoor air leaks, such as gaps along the baseboard or edge of the flooring and at junctures of the walls and ceiling.

Windows and Doors

Inspect windows and doors for air leaks. See if you can rattle them, since movement means possible air leaks. If you can see daylight around a door or window frame, then the door or window leaks. You can usually seal these leaks by caulking or weather-stripping them. Also, check the exterior caulking around doors and windows, and see whether exterior storm doors and primary doors seal tightly. You may also wish to consider replacing your old windows and doors with newer, high-performance ones. If new factory-made doors or windows are too costly, you can install low-cost plastic sheets over the windows.

- **Caulking and Sealing**
 - Caulks are airtight compounds (usually latex or silicone) that fill cracks and holes. New caulk should be applied to all joints in the window frame and the joint between the frame and the wall. The best time to apply caulk is during dry weather when the outdoor temperature is above 45° F. Warm temperatures help the caulk to set properly and adhere to the surface.
- **Non-expanding foams**
 - Non-expanding aerosol foams are also now available. These foams are placed around windows, in holes and into cracks to prevent air leaks. These foams serve the same basic functions as caulking but may be a lot easier to apply, particularly underneath sinks and around pipes.
- **Weatherstripping**
 - Weatherstripping is a narrow piece of metal, vinyl, rubber, felt, or foam that seals the contact area between the fixed and movable sections of a window joint. It should be

present between the sash and the frame. Properly applied, it should not interfere with the operation of the window.

Insulation

Heat loss through the ceiling and walls in your home could be very large if the insulation levels are less than the recommended minimum. When your house was built, the builder likely installed the amount of insulation recommended at that time. Given today's energy prices (and future prices that will probably be higher), the insulation level might be inadequate, especially if you have an older home.

Inspect the Attic

If the attic hatch is located above a conditioned space, check to see if it is at least as heavily insulated as the attic, is weather stripped, and closes tightly. In the attic, determine whether openings for items such as pipes, ductwork, and chimneys are sealed. Seal any gaps with an expanding foam caulk or some other permanent sealant.

While you are inspecting the attic, check to see if there is a vapor barrier under the attic insulation. The vapor barrier might be tarpaper or a plastic sheet. If there does not appear to be a vapor barrier, you might consider painting the interior ceilings with vapor barrier paint. This reduces the amount of water vapor that can pass through the ceiling. Large amounts of moisture can reduce the effectiveness of insulation and promote structural damage.

Make sure that the attic vents are not blocked by insulation. You also should seal any electrical boxes in the ceiling with flexible caulk (from the living room side or attic side) and cover the entire attic floor with at least the current recommended amount of insulation.

HVAC (Heating, Ventilation, & Air Conditioning)

Inspect heating and cooling equipment annually, or as recommended by the manufacturer. If you have a forced-air furnace, check your filters and replace them as needed. Generally, you should change them about once every month or two, especially during periods of high usage. Have a professional check and clean your equipment once a year.

If the unit is more than 15 years old, you should consider replacing your system with one of the newer, energy-efficient units. A new unit would greatly reduce your energy consumption, especially if the existing equipment is in poor condition. Check your ductwork for dirt streaks, especially near seams. These indicate air leaks, and they should be sealed with duct mastic. Insulate any ducts or pipes that travel through unheated spaces. An insulation R-value of 6 is the recommended minimum.

Judicious programming of your thermostat can avoid unintended costs for heating and cooling.

Phantom Load

Phantom load, vampire power, or standby power as it is sometimes called is the leaking of electricity or the power consumed by any device while it is switched off. This is a common problem for all households and that is why we include it here. Phantom load consumption for most devices is small – typically ranging from 0.5 to 10 watts—but the number of devices drawing standby power is large.

- Devices like the [Kill-a-Watt](#) can point you to devices that attract the largest load. A "smart" power strip like the [Wattstopper Plug Load Control](#) and **Smart Strip Power Strip** cut the power when your devices are off.

Equipment in your home office can add measurably to your electricity bill. Among the biggest users: a coffee maker, copy machine, and desktop computer. Energy Star appliances do have a sleep or hibernation mode that can be effective for managing use – but only as long as the sleep mode is activated. For example:

- A personal desktop computer uses 120 watts while in use, and only about 30 watts when asleep.
- A traditional CRT monitor uses about 150 watts when in use, and only about 30 watts – or less -- when asleep.
- A color LCD monitor uses only 10% to 20% of the power as a similar-sized color CRT monitor!
- Fax machines can use a lot of energy because they are generally left on constantly. If you don't expect a fax, consider shutting your machine off.

Renewable Power

Generating your own reusable power is an exciting opportunity that you may have. Depending on the size and orientation of your roof, solar photovoltaics (PV) (electricity producer) or solar thermal (water heating) systems may be a great option to give you energy independence.

[Solar Contractors on Solar Santa Monica's list](#) have agreed to certain [terms and responsibilities](#) that make your solar learning/installation process as easy as possible for you, including a personal site visit to a home or business in order to offer a proposal. We recommend you call at least 2 contractors once you have decided to receive a professional bid. To better prepare yourself for a solar assessment, read the ["Questions to ask your Potential Solar Contractor"](#) document.

Solar PV

The table below will give you an approximate estimate of costs and 25-year savings based on your electricity usage. First, find your average daily, monthly, or annual usage on the left. Then follow the row to the right to determine the PV system needed to offset 99% of your electric bill.

Solar Estimation Table

Energy Usage (kWh) and Costs						PV System Needed to Offset 99% of Bill						
<u>Daily</u>	<u>Monthly</u>	<u>Annually</u>	<u>Monthly Bill</u>	<u>Yearly Bill</u>	<u>25 Year SCE Cost ^</u>	<u>KW System</u>	<u># of Panels</u>	<u>Min. SqFt*</u>	<u>Max. SqFt*</u>	<u>KWh Generated Annually.</u>	<u>Net Cost**</u>	<u>25 Year Savings**</u>
8.5	258.5	3,102.5	\$35	\$420	\$22,003	1.8	10	140	170	3,029	\$9,510	\$17,304.0
13	395.4	4,745.0	\$55	\$660	\$34,576	2.8	15	210	255	4,544	\$13,682	\$27,369.0
17	517.1	6,205.0	\$83	\$996	\$52,179	3.7	20	280	340	6,059	\$18,242	\$43,187.0
21	595.0	7,665.0	\$100	\$1,200	\$65,837	4.3	23	322	391	7,574	\$20,979	\$53,127.0
22.7	690.0	8,280.0	\$125	\$1,500	\$82,297	5	27	378	459	8,179	\$24,278	\$67,670.0
25.7	783.0	9,396.0	\$150	\$1,800	\$98,756	5.8	31	434	527	9,391	\$27,874	\$81,939.0
29	875.0	10,500.0	\$175	\$2,100	\$115,215	6.3	34	476	578	10,300	\$30,572	\$95,541.0
31.6	963.0	11,556.0	\$200	\$2,400	\$131,675	7.03	38	532	646	11,512	\$34,168	\$110,582.0
34.8	1,044.0	12,528.0	\$225	\$2,700	\$148,134	7.5	41	574	697	12,421	\$37,397	\$124,953.0
39.6	1,204.5	14,454.0	\$275	\$3,300	\$181,053	8.7	47	658	799	14,238	\$42,261	\$152,841.0
42.3	1,286.0	15,432.0	\$300	\$3,600	\$197,512	9.2	50	700	850	15,147	\$44,958	\$167,003.0
47.6	1,448.0	17,376.0	\$350	\$4,200	\$230,431	10.5	57	798	969	17,268	\$50,514	\$196,960.0
53	1,610.0	19,320.0	\$400	\$4,800	\$263,350	11.6	63	882	1,071	19,085	\$55,832	\$225,076.0
68.8	1,932.0	25,112.0	\$500	\$6,000	\$329,187	14	76	1,064	1,292	23,024	\$67,353	\$282,843.0

^ Escalating at a conservative 6%

*Minimum square footage based on 14 square foot panels. Maximum based on 17 square foot panels.

**Price after \$2.20/watt CSI rebate and 30% federal tax credit

***After 1 inverter replacement and .25% for maintenance

Solar Thermal

Solar Hot Water Heating

Solar thermal systems can be very cost effective. Naturally systems vary considerably based on your existing water heater, your demand for hot water, and the layout of the house. Generally, these systems have a relatively small footprint on your roof and serve to pre-heat water, although in Santa Monica’s moderate climate a solar thermal system can often provide all the hot water you need over the summer months. If you are considering both a tankless system and a solar thermal system, make sure the brand of the tankless system is compatible with the type of solar thermal system.

Cost Estimates:

1-2 Occupants: You will need 1 panel plus a new storage tank; piping, pumps and controller that will cost about \$6,625.

3-6 Occupants: Solar Santa Monica estimates that a solar thermal system including panels, a new storage tank; piping, pumps, and controller will cost anywhere from \$7,400 – \$8,400.

Pool Opportunities

Pool Cover

The [U.S. Department of Energy](#) states that the most cost-effective and efficient means of reducing pool heating costs is through use of a pool cover. Pool covers can reduce heat loss from evaporation by 10 –

15% and can ultimately reduce the size of a solar heating system needed to improve the pool's usage. You may consider purchasing a low-cost bubble cover or vinyl cover with a longer life expectancy. Other benefits gained by pool covers include: water conservation, reduction of the pool's chemical consumption, and reduced cleaning time.

Solar Pool Heating

If you have the roof space, a solar pool heating system would greatly add to your ability to use your pool and probably even double your swimming season without using fossil fuels or electricity to heat! A well designed system could even integrate with your existing equipment for pool heating and for domestic hot water use.

There are no incentives available for solar pool heating, but these systems are often an excellent solar investment. If you currently heat your pool with natural gas or electricity, then the solar system will pay for itself within two or three seasons. These systems will also last between 10 – 20 years with little maintenance.

In Santa Monica it is recommended that you need 80-100% of the surface area of the pool, in panels on the roof. For example, if your pool is 600 sq ft, you need 480-600 sq ft of solar collectors. A system this size would cost approximately \$2,200 for flat black panels.

Now get to it!

Thank you for the opportunity to provide you with this energy saving information. Now that you are armed with action items, get to it! If you have any questions, please feel free to [contact us](#).