

LIVING with TECHNOLOGY

Green tech

25 ways you can go green

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While you can't discount fears about global warming, one of the key, if often unstated, factors driving the urge to go green is it's a lot easier than it used to be.

Performance of green products [is steadily improving](#), prices are going down, and tax breaks and subsidies are further helping erode financial barriers. You don't have to eat mashed yeast or wear itchy shirts to start cutting down on carbon.

"Being green has now become the best financial choice," says Ira Ehrenpreis, a venture capitalist at Technology Partners, based in Palo Alto, Calif.

Take solar panels. Installing a solar system on a house in California costs around \$19,000 after rebates, according to Gary Gerber, chief executive of [Sun Light and Power](#), a solar installer in Berkeley, Calif. The resulting reduction in energy costs is such that homeowners don't break even for 12 years or so, but the system will likely last three decades.

"The same household will spend \$60,000 to \$80,000 to rent their power from (regional utility company) PG&E over (the next) 30 years," Gerber said. "What you are going to do with a solar investment is prepay your electric bills for the rest of your life for less than \$20,000. Most likely it's a hugely good investment. And it will add to the resale value."

So where can you start? The following list addresses environmental priorities in four broad consumer categories--home, car, lifestyle, and the future--identifying issues that consumers will face and ways they can help reduce the greenhouse gases they produce, minimize the depletion of natural resources, and produce and conserve energy more efficiently.

Home

- **1. Think solar panels.** Consult with an installer about the costs and feasibility of outfitting your home with a solar energy system. In many cases, solar can save you money in the long run. Solar panels also are getting more attractive: solar tiles from [PowerLight](#) and others integrate their electricity-generating components into a roof, and [thin-film solar panels](#) will help hide solar-conversion equipment even more.
- **2. Or think solar water.** If you don't want to completely outfit your house with solar panels, you can deploy solar technology on an appliance-by-appliance basis. [Solar hot water heaters](#) cost about \$5,000 to \$7,000 and can provide most, or at least a good portion, of the hot water used in a home or a business. They can also be used in areas that don't get much sun because, unlike systems designed to convert sunlight to electricity, these heaters are far more efficient at extracting heat from sunlight.

"Two years ago, I was getting four inquiries a day. The other day, I got 109. There is a lot of interest," said Steve Elkin, director of marketing at Apricus Solar, a solar-water specialist in Connecticut.

- **3. Shop around for air-conditioners.** Air-conditioners are the bane of utilities and consumers everywhere. People flip them on in the afternoon, when electricity is the most expensive and demand for power is relatively high.

California's [Ice Energy](#) says it has an answer: its Ice Bear system makes ice at night when power is cheap, puts the ice in a cooler, and lets the chilly vapors cool the building in the day. (Israel's [Technion](#) cools its environmental science building the same way.) Another solar-tech specialist, [SolCool One](#), offers a solar-powered heating and air-conditioning system.

- **4. Let the utility control your thermostat.** It might sound creepy: a [network connection](#) to your home that lets the utility--or an energy-use specialist--automatically control your thermostat or pool heater. But these specialists point out that such monitoring-and-control systems can indeed trim your use of peak power and lead to lower bills. [EnerNoc and Comverge](#), two leading start-ups in this area, are seeing revenues climb. Both recently applied for IPOs.
- **5. Move, or remodel.** Making gypsum-based drywall generates a lot of carbon dioxide at the factory and consumes a lot of fuel. [Serious Materials](#), maker of a drywall called EcoRock, is coming out this year with a version of the product that requires a lot less cooking. And if you're buying a home, companies such as Michelle Kaufman Associates are starting to build modular, relatively upscale homes made from more ecofriendly materials. The homes also try to exploit natural light and cooling through their design. Vacationers looking for a green hotel, meanwhile, might consider the [Gaia Napa Valley Resort and Spa](#), whose construction and materials are environmentally friendly and energy-efficient.
- **6. Switch to ecofriendly clothes and furniture.** Along with the BioBag, a biodegradable shopping bag made of corn-based polymer components (many bags are made from petroleum-derived polyethylene), the number of products now available in this category is impressive. And their availability is no longer restricted to eco-specialty stores. Check out the options the next time you are at Target.

- **• Buy some new clothes.** It is true that garments made from organic Merino wool and "peace silk" that kills no worms remain rare, and controversy continues to rage over fabrics coming from biotech corn that may reduce pesticide use but may genetically "contaminate" nearby crops of corn intended for sale as food. But the range of products made with ecofriendly textiles is nonetheless impressive.

There is a booming market for textiles made from organic cotton, bamboo, soy, and plastic soda bottles, and demand for [fair-trade clothing](#) is on the rise. Once the purview of boutiques, green clothes are now found at [Gap](#), [H&M](#), [Nike](#), and [WalMart](#), which are [hawking organic cottonwear](#) (and implementing corporate environmental initiatives). Patagonia has for 14 years sold fleece garments made from recycled plastic, and now it even takes back patrons' old underwear for recycling.

Meanwhile, little labels such as [Simple Shoes](#) turn tired tires into sturdy soles, while [Vegan Shoes](#) serve the PETA crowd. For those on a tight budget, however, the cheapest and greenest option remains trolling for used and vintage threads at resale shops or on eBay.

- **• Redecorating in green.** What causes that new-furniture smell? The couch giving off formaldehyde and toxic flame retardants. The [Greenguard](#) database ranks furnishings unlikely to contribute to indoor air pollution, such as the Herman Miller Aeron chair. Specialty online green-furniture shops include [Green Culture](#), [Vivavi](#), and [Branch](#).

- **7. Use green cleaning supplies.** This is an important issue, but also one that's relatively easy to address. [Lots of options exist](#) to cut down on household use of volatile chemicals and toxic solvents that may end up in ground water and drinking-water supplies. Nanotechnological advances are likely to lead to stronger-scrubbing bubbles and degreasers without abrasive ecological side effects. In the pipeline: tougher dirt-dissolving enzymes and beefed-up friendly bacteria that gobble nasty germs.

Car

- **8. Buy a hybrid.** Although the tax breaks on these cars can rise and fall, [hybrids such as Toyota's Prius](#) continue to get good reviews from customers, and the cars get 60 miles a gallon.
- **9. Contemplate buying an electric car.** We use the word contemplate here because there really aren't a lot of electric cars to buy at the moment. You can order a [Tesla Roadster](#), but its \$92,000 price tag puts it out of the range of most drivers. The Zap Xebra costs a mere \$14,000, but it goes only 35 mph and can't be operated legally on freeways.

But starting later this year, the options will increase. Think, a Norwegian company, will soon release an [electric town car](#) and bring it to the states in 2008. Tesla will release a \$50,000 sedan called Whitestar in 2009. [Zap](#), an automaker based in Santa Rosa, Calif., offers an all-electric three-wheeler. Even giants like Nissan have all-electrics coming. [Altair Nanotechnologies](#) is also working to get businesses to adopt electrics as their fleet cars.

Electric cars aren't perfect. Most barely can go more than 120 miles before needing a recharge and they cost more than their gas-powered equivalents, but advocates say both factors will improve.

- **10. In the meantime, try a plug-in hybrid.** A plug-in hybrid is essentially a regular hybrid with bigger batteries that you can recharge through a wall socket. These cars can [get 100 miles a gallon](#) and generally pollute less. (The amount of pollution produced by recharging the car depends on [how much coal](#) your electricity-generating utility burns.) Converting now costs about \$10,000, but that price will decline.
- **11. In the Midwest, look into ethanol.** Although gas stations all over the country mix a little ethanol into their gas, only about 1 percent of the nation's gas stations sell ethanol. Most of them are in the middle of the country, in shopping-center parking lots. So check out the neighborhood before you buy.
- **12. Think diesel.** Biodiesel--made from vegetable oil or [drippings from the deep-fat fryer](#)--produces far less carbon dioxide than regular diesel. It can be put straight into conventional diesel cars. With few modifications, a diesel car can run entirely on vegetable oil. Used diesel cars are rising in price, with bidding wars breaking out on some auction sites. A new crop of clean diesels coming from Europe in the near future will help expand the supply of diesel cars.

Lifestyle

- **13. Swap the lightbulbs.** Only about 5 percent of the energy that goes into incandescent lightbulbs [turns into light](#). The rest turns into heat. Fluorescent-bulb manufacturers and [light-emitting diode \(LED\) bulb makers](#) say their products can produce as much light with far less energy. The cities of Beijing and Raleigh, N.C., are tinkering with use of [LEDs in public places](#). Some lighting specialists, meanwhile, are working on [systems that pipe in sunlight](#) and [employ optical cables as light sources](#) for businesses. Another near-future idea for a low-energy, high-brightness light source is covering entire walls with [organic light-emitting diodes, or OLEDs](#), the same stuff used to make cell phone screens.

- **14. Go organic in the garden.** Traditional fertilizers carry a lot of baggage. Many are made out of petroleum products and are being phased out by legislation due to concerns that they're causing health problems. So how do you kill garden pests without them? Companies such as [AgraQuest](#) have devised biopesticides, which kill fungi and other material with bacteria that's not harmful to humans. Meanwhile, [Novazone](#) has created a system for farmers that kills pests with ozone. Although conventional food processors use this type of technology too, it's more prevalent in the organic world.
- **15. Buy plastic forks selectively.** [Cereplast](#), among other bioplastic specialists, has come up with a fork made from cornstarch that dissolves in landfills. Plastic forks can biodegrade too, but it takes several decades. Also, look for foods and beverages [packaged in biodegradable plastic containers](#) rather than those made from petroleum-based compounds.
- **16. Chose your dry cleaner well.** [HangerNetwork](#) produces biodegradable hangers for use by dry cleaners. You just have to put up with ads in your closet: advertisers pay to have ads posted on the hangers, which are given to dry cleaners for free.
- **17. Look for the green personal computer.** More-restrictive laws in Europe and Asia are forcing manufacturers in those regions to remove toxic metals from their electronics sold around the globe.

One way to find green computing gear is to consult the nonprofit Green Electronics Council's [EPEAT](#) ratings, which give high marks to computers and monitors that can be easily recycled and contain fewer hazardous substances. Green geeks can find stringent guidelines for gadget shopping and recycling tips on the [Silicon Valley Toxics Coalition's](#) map of [recycling centers](#), which manage e-waste [without shipping it](#) overseas for unsafe dismantling.

- **18. Cut down on vampire-power gadgets.** PCs, DVD players, [televisions \(especially some flat-panel models\)](#), and other devices can suck a lot of power, even in sleep mode, so unplug when you can. Tech toys and household appliances built for frugal power consumption brandish the government's [Energy Star label](#), and the standards [were recently upgraded](#). Tools that can reduce [phantom power waste](#) include the [Watt Stopper](#) lighting-control devices.
- **19. Buy carbon offsets.** These arrangements are designed to allow individuals and organizations to reduce emissions directly or by participating in programs that, through various energy-conservation techniques and emissions-trading initiatives, attempt to achieve a net reduction in greenhouse gases.

Carbon offsets can sound complex, but they're essentially giving to charity. Buy a plane ticket, and then donate to a foundation that will plant trees that will suck up the carbon dioxide produced by putting an extra passenger on a plane. The math for these arrangement is indeed a bit fuzzy, however. For example, in a tree-planting program run by computer maker Dell with help from [The Conservation Fund](#), an environmental nonprofit, people buying a Dell PC can donate \$2 to \$6 to plant trees. It will take the trees 70 years, though, to offset the carbon dioxide produced by utility companies that produce the electricity used by the PCs. (The PCs themselves don't spew emissions.) Still, some extra help can't hurt.

The future

Not everything will be easy when it comes to alternative energy. Here's a quick list of some other emerging technologies and issues that will likely become more prominent in the future.

- **20. Consider clean coal.** Black lung disease, mining accidents, environmental poisoning: these are just some of the associations Americans have with coal. Several companies, however, say they have come up ways to [burn coal more cleanly in power plants](#) or even make a [liquid car fuel](#) out of coal. Scientists at [MIT](#), meanwhile, say

carbon dioxide from clean coal production can be sequestered in underground reservoirs.

Coal may never be as clean as solar power, but advocates point out the infrastructure already exists to adopt it. In any event, phasing out coal will take years, so cleaner coal-burning technologies may as well be adopted. And the U.S. has lots of coal: recoverable estimates are close to 267 billion tons, according to Dave Edwards, a senior research analyst who covers the alternative-energy business for ThinkEquity Partners.

- **21. Second--and third--thoughts on genetically modified crops.** Corn, soy, sugar, and other crops that now get converted to ethanol or biodiesel have one thing in common: they were originally bred for food. To boost fuel production, these crops will likely need to be [genetically enhanced](#). Farmers and fuel producers will also likely need to experiment with growing [switchgrass](#) and other plants that currently don't get raised as crops. Polls show that the public is often uncomfortable with how experiments such as these might affect existing agriculture.

Several companies also are [genetically enhancing microorganisms](#) or reproducing biological processes in the lab through synthetic biology to help convert vegetable matter into fuel.

- **22. Give up some open space.** [Nevada Solar One](#), a solar power plant outside of Las Vegas, takes up 300 acres and provides 64 megawatts of power, enough for about 15,000 homes. While impressive, that's less than 1 percent of the city's population. Providing solar power on a broad scale will require dedicating lots of land to power generation. Similarly, wind power often means placing large fields of turbines in the ocean. Expect nasty land disputes.
- **23. Going nuclear.** "I believe the majority of environmental activists, including those at Greenpeace, have now become so blinded by their extremism that they fail to consider the enormous and obvious benefits of harnessing nuclear power to meet and secure America's growing energy needs." Who said that? Patrick Moore, a Greenpeace founder. Moore also founded [Greenspirit](#), an environmental group that supports nuclear power. Like it or not, the nuclear issue is back on the table and will be one of many topics that governments will address when it comes to energy security.
- **24. Recycled water on tap.** Water shortages will likely be the [first major impact humans feel when it comes to global warming](#). China, [Australia](#), and India already face significant challenges.

To alleviate the problem, several countries are increasing investments in [desalination technologies](#) and purification systems for turning [sewage water into drinking water](#). Singapore's [NEWater project](#) uses filtration, reverse-osmosis and ultraviolet technologies to produce potable water from recovered sewage water.

- **25. High taxes.** For the next decade and beyond, developing green technologies and getting them into the market will require billions of dollars in grants, subsidies, and tax cuts that will often go to green-tech companies--many of them backed and run by wealthy businessmen--and to upper-middle-class consumers who can afford their products. Voters often view these programs skeptically. But Herman Scheer, a member of the German parliament who was instrumental in putting together that country's massive solar program, says you have to take an organic view of expenses. Clean energy might require direct subsidies, but health care costs and the need for often-costly toxic-waste cleanups will decline.

CNET.com's associate editor Elsa Wenzel contributed to this feature.

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