



Home Energy Q&A

Q: I just read about a solar-powered boat in England that is totally powered by solar cells and even sends its excess electricity back into the country's transmission grid. If solar energy really can work so well, why isn't it more available for use in our houses?

A: The dream of cutting the line from your electric company and using solar cells to power our homes is certainly something that sounds terrific, but for most people the cost of the solar systems is what is keeping it from becoming more of a reality today. As prices drop from manufacturing improvements and material development while prices go up for competing fossil-fuel based power, that dream is going to become much more real in the future.

If you've read about photovoltaics (solar cells) in the past couple of years, then you know that their costs have been dropping significantly while interest in using them has grown at a huge pace.

Right now, just about every company that makes solar electric systems is working overtime to meet the huge demand. Last year, in fact, the shipments of U.S.-manufactured solar cells and equipment grew to

record levels, though most of the market for these products today is outside of the United States where there is not a reliable power grid (or through much of the developing world where electricity is totally unavailable).

It's nice that solar is used to power things like boats (or airplanes or other products), but I think the real value is when we use all that sunshine that falls on our homes to power our everyday needs. There actually are thousands of people in the United States today who have complete solar electric systems on their roofs that allow them to get all their power needs from the sun while not sacrificing their lifestyles. Most of these people live in remote areas away from the power grid where it is actually cheaper to spend \$20,000 or \$30,000 or so to provide the solar system rather than pay to have the grid run to their homes (and then to pay for the electricity every month).

Others just have the discretionary spending power to make their lives more self-sufficient. And many thousands of other Americans use solar electric systems to provide some of the power they need while their electric company keeps providing the rest of it.

Check out some of the Web sites on photovoltaics and you'll find dozens of companies right here in the United States that make and install systems of all sizes. As the costs of making this equipment keep coming down and the rates we pay for electricity, gas and other fossil fuels keep increasing, these systems will get more economical. We know from many years of use in the space program and in hundreds of remote applications (like lighting for remote highway signs or off-shore navigational aids or even calculators and watches) that the technology works and works well.

Q: Do houses with cathedral ceilings cost more to heat and cool?

A: As you might imagine, they do. My first thought is that a house with a cathedral ceiling will have more wall area on the outside than the same home with an 8-foot ceiling, so this will have at least a small impact on heating and cooling energy. But the bigger concern is that the "non-attic" roof sections with cathedral ceilings are not ventilated

and usually have lower levels of insulation as well. In hot weather, this can increase cooling costs by as much as 5 percent, for example.

Let me urge you not to avoid buying or building a house with this feature, though. My advice to all homeowners is to look for trade-offs so that energy efficiency doesn't involve making sacrifices in your lifestyle. If you want that cathedral ceiling, talk to your builder or remodeler about other energy-saving features (maybe installing better windows with some of the new energy-saving features or providing shade on east and west walls or adding some passive design strategies) that will offset the higher energy costs of this type of ceiling.



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Site Grading

penetration occurs because its major causes (rain water from the roof and surface water) are not attended to and water accumulates around the perimeter of the house and eventually seeps in.

The causes of water penetration are most often minor, readily apparent and fairly easily corrected but, in a few cases, they can be serious.

How can a homeowner determine the causes of water seepage? It's recommended that you bundle up on a rainy day and walk around your property after it's been raining heavily for several hours. At this point, you should be able to see what's happening to the foundation around your house as the rain comes down. You should notice one of two things: Rain water funneling down downspouts exits at the foundation causing a buildup and seepage through cracks in walls, doorways and windows. This water coming off your roof and down your downspouts should be diverted away from your property. The other thing you should notice is the flow of surface water around your house. If the grading of your property is toward your house or down your driveway, then there is just no question that you will be noticing an accumulation of

water around your home. Armed with this knowledge, the average homeowner can attack both causes of these water problems.

Solutions

With rainwater coming from the roof, it is important that your gutters operate properly and not overflow. If they are pitched properly, the water should flow down the gutter to your downspouts and then down the downspout to the base of your foundation. The water there should be diverted away by means of splash blocks or underground piping so that there is no accumulation of roof water around your foundation.

With regard to the soil around the foundation, raise the grade adjacent to the house (but not over or too close to siding) to a slope of 3 inches per foot for about three feet. It's good to see at least a 15-degree positive slope away from the foundation, so that there is no opportunity for water to accumulate at that juncture. Many homes have negative slopes (ground sloping toward their foundations) and this creates a built-in water reservoir around the foundation. In general, it's suggested that surface water be diverted away

from your house. This can also be done by installing swales, which are channels built into the property, to alter the flow of water around your foundation.

Why is it so important to divert this water away from your foundation? Well, with regard to a basement, the answer is fairly obvious since you wouldn't want water ponding on the basement floor causing damage to mechanical equipment and personal belongings.

In houses built on crawl spaces, the water seeping usually goes undetected. This will result in damp crawl space conditions possibly leading to mildew and fungus growth, as well as being an invitation to termites and other wood destroying insects and organisms. The least expensive solution is to adjust the site grading for a minimal cost now than to suffer the more costly consequences later.

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By Richard Grunder

Site grading is a very important consideration when people are trying to remedy a moisture problem in the lower areas of their home. Most water conditions are caused by the mishandling or the lack of handling of roof water and surface water.

Most wet or damp basement, crawl space, garage and lower level conditions could be alleviated with minimum effort and expense. This is due to the fact that most water