

A growing role for alternative energy sources

Energy 101 - but the funding wind and solar power is throwing money at the margins

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As sun streams through the windows into Jenny Garmon's chilly townhouse, she goes about her morning routine dressed in a fleece jacket, long-sleeve shirt, jeans and slippers.

When the bill from Baltimore Gas and Electric hit \$150 in January, the Piney Orchard woman and her husband, Chris, cringed and pledged to keep the thermostat around 65. "It's a new house, so it's relatively efficient," Mrs. Garmon said. "(But) it's cold. You can't heat the house the way we like it."

The couple's bill for gas heat is up 50 percent this season, and if forecasts are right, the electricity tab will jump 72 percent this summer when deregulation of the electrical market for homeowners takes effect. **Ed: Better value than an SUV for going to the mall.**

The Garmons are at the paying end of a long energy supply chain stretching to distant parts of the state, nation and world -- hundreds of electrical substations, thousands of miles of distribution lines and gas mains, a network of power plants, transmission grids, natural gas terminals and pipelines.

But as Mr. and Mrs. Garmon look at their nearly 3-year-old son, Roger, they wonder what his energy bills will be like 50 years from now.

Suddenly, everyone is thinking about the future and a solution. Even Gov. Robert L. Ehrlich Jr. wants to be seen as a friend of alternative energy sources. This year he proposed \$2.5 million for a grant program, which only had \$75,000 earmarked for it last year. To promote that funding, he visited Tom and Frances Yuhas on Thursday. The Pasadena couple spent \$30,000 to install a solar system that uses photovoltaic cells to generate power.

With enough sunny days, it can generate 17 kilowatt hours a month, enough to cut around \$30 from their power bill. "I know these initiatives impact real people in the real world," he said.

People who study energy and think about what lies ahead say there is reason to be hopeful for change.

When it comes to electricity in Maryland today, coal is king. It fuels 58 percent of our needs and is used at plants such as Constellation Energy's Brandon Shores and H.A. Wagner plants in Pasadena. Behind coal is nuclear power from Calvert Cliffs in Lusby, which satisfies another 26 percent of the state's needs. Oil is used to generate 7 percent, natural gas just 2 percent. The rest comes from minor alternative sources.

- 58% coal
- 26% nuclear
- 7 % oil
- 2% natural gas
- 7% the rest

In 50 years, coal is still likely to dominate, but the role of nuclear power could double – and solar and wind power may play a big role too. But the biggest savings are likely to come from an old standby touted since Jimmy Carter donned a cardigan 30 years ago to urge Americans to turn down their thermostats: conservation and efficiency.

Joseph Coates, a consulting futurist whose clients have included the University of Maryland, said many of the changes will be subtle, and made mostly by the building industry and companies like Baltimore Gas and Electric that supply energy.

"Double-paned windows will be required by law," he said. "You'll only use air conditioning when you need it ... The changes that occur will be invisible but real."

A bright future

Maryland is a center of the growing solar energy industry, though it's hard to see it from Annapolis.

BP Solar, a worldwide leader in solar power, has corporate offices in Linthicum and operates one of its largest manufacturing entities in Frederick.

But Bill Rever, senior manager of business development for BP Solar, said the majority of his company's products are shipped outside the state, often overseas. Even the states with a long history of encouraging solar investment are years behind overseas efforts.

"The U.S. market is still so embryonic, even in California," Mr. Rever said.

If solar energy is to play a big role in Maryland, the state will have to step in and make it cheaper and easier to use, Mr. Rever and others say. To do that, Mr. Ehrlich has proposed expanding the state's Solar Energy Grant Program.

Last year, just \$75,000 in grants were available to reimburse part of the cost of a solar systems. If the \$2.5 million boost is approved, grants up to \$20,000 would be available. Other bills working their way through the General Assembly also would increase the amount, and a new federal tax credit is available for adding solar energy panels or solar water heating equipment.

Upping the program amounts could set the stage for significant growth. BP Solar, a subsidiary of the multinational oil company, has already doubled its capacity to make solar products over the last two years.

"This industry has a 30 percent growth rate over 10 years," Mr. Rever said. "The future is very bright. We think the technology is possible. The question now becomes policy."

And David Pearce Snyder, a Bethesda-based editor for Futurist magazine, predicted that energy generated from wind, solar and tidal sources could reach 35 to 40 percent 25 years from now. "In 34 to 35 months the Danes or the American wind manufacturers will come up with something that generates electricity as cheaply as traditional suppliers," he said.

A new breeze

The idea behind wind energy is that Chesapeake Bay breezes could one day be harnessed to generate electricity for the homes and workplaces of the future. Wind

turbines convert the kinetic energy in wind to mechanical power, producing clean energy.

Heather Rhoads-Weaver, a consultant with the American Wind Energy Association, said homeowners who want to put up a wind turbine should have about an acre of land, and permission to build a tall tower.

The blades of the turbine are recommended to be 30 feet above a tree or roof line, and be 300 feet from anything. A typical 10-kilowatt system for a home now costs around \$40,500.

"It's obviously best if you have a real steady wind," Ms. Rhoads-Weaver said. "But if you're grid-connected, you can use the utility as your 'bank.' When the wind is blowing, you're turning the meter backward."

Many of the solar grant bills being debated in Annapolis also would expand it to include small wind generators.

But small-scale production isn't the prize for the biggest advocates of wind power.

Synergics Energy Development of Annapolis is one of several companies working on a proposal to put up a wind farm in Western Maryland.

Its proposal to build 17 turbines on Backbone Mountain in Garrett County has been scaled back from 24 after the Department of Natural Resources said a state-endangered bird and plants would be harmed.

The Synergics turbines would sit next to an existing coal mine, and would feed electricity power back into the PJM Interconnection Grid, which coordinates electricity though much of the Midwest and Mid-Atlantic. "Really, we in Maryland benefit the most (from the turbines)," said Wayne Rogers, president of Synergics. "The electricity goes into the grid, and it benefits the air in Maryland."

A state law passed in 2004 requires electricity suppliers to pursue wind as a power source, making it part of their generating mix starting this year. By 2019, at least 7.5 percent of the company's portfolio will have to be from a list that includes wind and solar power. Constellation Energy, parent company of BGE, will most likely reach that goal through its merger with FPL Group Inc. One of the major players in the wind industry, FPL is building a system in West Virginia.

Mr. Snyder, the Futurist editor, predicted when demand grows to create a crisis, that's the "magic moment" when windmills will come into their own. "That's when we start putting windmills in our back yards," Mr. Snyder said. "Like (the proverb) said, 'Necessity is the mother of invention.' "

Conservation

A hint at the future of conservation's role can be seen in the offices of Chesapeake Wind & Solar Inc. in Jessup.

The 5,000-square-foot Enviro-Center is a 1905 farmhouse converted to offices for "green" firms and the nonprofit Green Building Institute. Inside are "sun tubes" instead of traditional lamps and solar panels on the roof that heat the water for the building. Natural light streams in everywhere.

But partner Jeff Gilbert said energy preservation can also be as simple as turning off the lights when you leave a room, or companies investing in more efficient motors or using natural daylight in buildings. He has no doubt a local and national energy crisis is near. "We will either become sustainable as a nation, or we will extinct ourselves," Mr. Gilbert said.

He compared it to cooking a frog – if you put a frog in boiling water, he'll immediately jump out because he knows time is running out. But if you put him in cool water, then turn on the stove, he'll boil himself to death because he doesn't realize what is happening.

That's what consumers are doing to themselves when it comes to energy, Mr. Gilbert said – slowly killing themselves.

According to the U.S. Department of Energy, around 44 percent of home heating costs go towards heating and cooling systems, meaning it also may be well worth the money to insulate floors and the attic. Other changes consumers can make include:

- Replacing air filters on heating and cooling systems.
- Using compact florescent bulbs.
- Choosing lighter colored blinds and drapes.
- Caulking hidden air leaks less than 1/4 inch wide in window moldings, attic access hatches and electrical outlets. Use expanding foam sealant to close larger cracks and holes that are protected from sunlight and moisture.
- Buying washers, dryers or refrigerators with an "Energy Star" label.

Over time, these purchases can help consumers save money by conservation, rather than relying on market rates to go back down and BGE to charge less.

Think of Mrs. Garmon as a particularly smart frog in hot water. The family is considering moving and will look for energy-efficient appliances in their next home. "It's really important to me," she said. "I worry about (Roger) with energy and the environment."