

TIMELY INFORMATION

Agriculture & Natural Resources

Alabama Home Energy Options

Mark Hall

Extension Renewable Energy Specialist

Home energy costs represent a significant portion of most Alabama household budgets. Some energy saving options are easy and do not cost much to implement. Other energy options are complicated and may require a long term investment.

The first step in easing your home's demand for energy is conservation. You will save money immediately by simply turning off lights, TVs or computers that you are not using. You should clean or replace your air conditioner filter every month, and set your thermostat to the highest comfortable setting in the summer and lowest comfortable setting in the winter. Dressing appropriately increases this comfort range, as will using fans to supplement your air conditioner. Also, set your hot water heater to no more than 120 degrees and make sure your hot water tank is well insulated. These simple changes do not cost anything to implement but will reduce your energy usage and put money back into your pocket.

“Spend a little to save a lot” is a good way to describe the longer term energy conservation investments you might choose to make.

You might start by minimizing the amount of air you have to heat and cool by weather stripping your doors and caulking around your windows. Tightly seal any cracks or holes that might allow outside air to come into your house.

If your house has less than 6 inches of insulation in the attic you will likely benefit by adding more. If your home has only single pane windows, you could add storm windows or you might choose to replace your current windows with more energy efficient windows.

Upgrade your appliances, water heater and air conditioner to the most energy efficient models available. Your energy savings alone will probably not justify buying new household equipment, but when it is time to replace these items keep in mind those investments essentially have two costs: “purchase price” and “lifetime energy cost”. The most energy efficient product will likely save you money over its useful lifespan. This is especially true with your home's energy demanding water heater and air conditioner, which should ideally have a seasonal energy efficiency rating of 13 or higher.

Replace your incandescent light bulbs with compact fluorescent bulbs. These light bulbs use up to two-thirds less energy, and can last up to 10 times longer than incandescent bulbs.

Landscaping can be a major energy saver in Alabama's hot humid summers. Planting trees that lose their leaves in the fall on the southern, southwestern, and western sides of your house can have a positive influence on your home's energy demands. These trees will help block the summer sun, but will allow the winter's warming sun to still get in.

Solar energy might be a viable alternative for your house. Consider the following aspects of solar energy that might prove to be economically viable for an Alabama home owner:

Solar clothes dryer, also known as a clothes line is a time proven way to save money on your energy bill. Tie a cord between two poles high enough to keep your laundry off the ground. Spread your laundry out to maximize air and sun exposure. On most days in Alabama drying will not take more than a couple of hours.

Solar water heaters can be a cost effective way to generate hot water in Alabama. These systems include storage tanks and solar collectors. Active systems have circulating pumps and controls, while passive systems do not. Passive systems are almost always easier to install and maintain.

Solar water heaters require a well-insulated storage tank. Solar storage tanks have an additional outlet and inlet hooked up to and from the collector. In a two-tank system, the solar water heater preheats water before it enters the conventional water heater.

There are three types of solar collectors are for residential application:

Flat plate collectors are insulated, weatherproofed boxes that contain a dark "absorber plate" under at least one glass, or plastic, cover.

Integral collector storage systems have one or more black tanks or tubes in an insulated box. Cold water is heated as it passes through the solar collector. The water then continues on to the conventional backup water heater. Freezing pipes could be a problem for this system in North Alabama.

Evacuated tube solar collectors have parallel rows of clear glass tubes. Each tube contains a glass outer tube and metal absorber tube attached to a fin. The fin's coating absorbs solar energy but inhibits radioactive heat loss.

In Alabama your home's solar water heating system will most likely require a backup system for cloudy days, and for times of increased demand.

Another option is passive solar home design, which is another way to harness the sun's energy. Sunrooms are one example of passive solar design. In Alabama the benefit of lower heating cost in the winter may be offset by higher cooling cost in the summer.

There are a few basic principles involved in passive solar home design. Heat moves from “warmer” materials to “cooler” ones until there is no longer a temperature difference between the two materials. Warmer air rises because it is lighter than cold air, which in turn sinks. That is one reason why the second floor of a house is almost always hotter and the basement is almost always cooler.

Darker colors absorb more solar radiation than lighter colors.

Clear glass transmits 80% - 90% of solar radiation. After solar radiation is transmitted through the glass and absorbed by the home, it is radiated again from the interior surfaces. Glass will help trap solar heat that enters the home.

A material's ability to store heat is called its “thermal mass”. The material stores heat by changing its temperature. It can store heat by converting direct solar radiation into heat. The more thermal mass a material has the more heat it can store for each degree rise in its temperature. Also the more thermal mass a material has, the less its temperature variation will be during the day and night. It cools slowly at night and warms slowly during the day. Masonry materials such as concrete, brick, stone, and tile are valued for their thermal mass properties in passive solar homes.

A small solar electric system can be a pollution free producer of electricity for your home. These systems are known as “photovoltaic (PV) systems”.

A PV system converts sunlight into electricity by using solar cells that consist of semiconductor materials. According to the U.S. Department of Energy, when sunlight is absorbed by these materials, the solar energy knocks electrons loose from their atoms. This is called the “photoelectric effect”. These “free electrons” then travel into a circuit built into the solar cell to produce electrical current. Only sunlight of certain wavelengths will work efficiently to create electricity. It is possible for PV systems to produce electricity on cloudy days, but not as well as on a sunny day.

PV arrays can be mounted at a fixed angle facing south, or they can be mounted on a tracking device that follows the sun, allowing them to capture the most sunlight over the course of a day.

If you live in the area of North Alabama that has electricity provided by the Tennessee Valley Authority (TVA), you may be able to connect your PV system to the electric distribution system and receive payment for your renewable energy. TVA's website www.greenpowerswitch.com has information about how to participate in their “Generation Partners Program”. This website also has links to the other topics that may be of interest to you, including tax credit information.

Another home energy option that is well suited to Alabama is geothermal heat pumps (GHP). A GHP uses the constant temperature of the earth as the exchange medium instead of the outside air temperature. This ground temperature is warmer than the outside air during the winter months and cooler in the summer. The GHP takes advantage of this by exchanging heat with the earth through a “ground heat exchanger”. Compared to air-source heat pumps, they are quieter, last longer, and need little maintenance.

A GHP is a long term investment. It will cost a lot more to purchase and install, but it will likely result in significant energy savings. This system's life is estimated at 25 years for inside components, and 50+ years for the ground loop.

Another energy option that is making an increasingly significant contribution to America's energy resource base is wind. Wind turbines are up and working in Alabama, but the state's wind resources are very limited. As a homeowner you would need to know what your wind resource is before investing in this technology. The U.S. Department of Energy's "Wind Powering America" program has wind resource maps listed by state. Airport wind speed data is available for many locations throughout Alabama. When estimating your site's wind resource, keep in mind that wind can vary greatly in areas just a few miles apart due to difference in local terrain.

In conclusion, Alabama homeowners who are motivated by saving money, improving the environment, and increasing their energy security have many options at their disposal. Renewable energy and energy conservation technologies are constantly improving, as are the costs associated with them. Considering the tax incentives that may be available to you, you may find that now is the right time to begin your own "home energy project".