



RENEWABLE ENERGY

a series on alternative energy sources

Introduction to the Renewable Energy Series

In recent years there has been a shift in the way we look at energy production and consumption. Rising fuel costs, environmental impacts, and economics have resulted in a greater emphasis on finding alternative energy solutions. Similar to others, many Montgomery County residents are investigating alternatives to meet their energy needs. Municipalities are also being challenged to find energy solutions for their own needs and to understand the regulatory issues pertaining to energy alternatives. The Renewable Energy series was created to educate the reader about alternative energy resources that are practical in Montgomery County. The series will provide educational background about the technologies and techniques, the associated benefits and challenges, and also regulatory issues relating to alternative energy. Hopefully these publications will help the reader understand the issues and inspire more in-depth exploration of alternative energy possibilities.



Commercial sized wind turbines in the Midwest.



The Need for Alternative Energy in Montgomery County

Fuel costs, utility costs, and environmental impacts all factor into the need for alternative energy in Montgomery County. Since 2000, gasoline and oil prices have increased by approximately 200 percent, natural gas prices by 300 percent, and coal prices by 150 percent. Despite some short-term fluctuations, fuel prices will continue to rise. The cost of electricity, using traditional methods of production, is also projected to rise. Electrical utility rate caps in Pennsylvania have begun to expire for certain electricity providers and will continue to expire through 2010. The rate caps were part of a utility agreement in 1996 to transition the state into competitive market generation. Each utility made its own agreement and therefore has a different rate cap expiration date and structure for raising prices. The effects of the rate cap expiration in Montgomery County are unknown, but it is estimated that cost increases may rise upwards of 30 percent in parts of the county.

In addition to the monetary costs, traditional energy production can cause negative environmental impacts. Emissions and pollution generated by energy production and use are taking a costly toll on the environment. Traditional methods of producing and using energy consume our natural resources, emit greenhouse gasses, and can cause air and water pollution and degradation of our natural areas. In response to this situation, Montgomery County created Greenprint: A Climate Change Action Plan for Montgomery County. This plan examines Montgomery County's greenhouse gas emissions and recommends ways to reduce the county's impact.

Top photo: The Gardner Athletic Center at Haverford College. A LEED Gold Certified building

Middle Photo: Photovoltaic panels.

Bottom Photo: An outdoor wood-fired boiler.



Benefits and Challenges of Alternative Energy Sources

The appeal of finding one solution for our energy needs is a strong one, but a single answer is unlikely. It is important to think holistically about alternative energy use and consumption. Each alternative has benefits, either in cost savings, to the environment or both. When multiple techniques and technologies are combined, maximum benefits can be achieved. Energy conservation should be an important consideration in any mix of energy alternatives, as this is one of the most effective means of reducing energy impacts, including costs. Conservation includes making buildings more energy efficient and examining how we design sites to take advantage of energy conservation techniques. Alternative energy technologies are much more effective when energy conservation techniques are applied.



Alternative energy sources can provide many benefits. They promote a sustainable economy by employing green jobs and the responsible use of resources. They may reduce energy costs, decrease dependence on foreign oil, reduce carbon emissions and pollution, place less pressure on the area electricity grid, and can enhance the disaster resiliency of community and individual structures. These benefits can outweigh some of the challenges associated with alternative energy sources. As with any new technology, initial costs can be high, and there could be long payback periods for some alternatives. Some alternative technologies take longer than others to recoup the initial investment costs. It can also be a challenge to find appropriate sites to implement the technologies and techniques. Municipalities will need to consider regulatory issues (public safety, use in areas of historic character, zoning issues, incentivizing, etc.), and public education and promotion will be crucial.



The Technologies and Techniques

Solar. There are variations of solar energy technology, but all harness the power of sunlight to heat a building or produce electricity. Solar energy systems range from relatively inexpensive flat plate collectors to more expensive photovoltaics. The energy produced depends on several factors, including the amount of sunlight that hits the system. The cost can be offset by grants, excess power can be sold to the utility, and the energy production generates no carbon emissions.

Wind. Small wind turbines use the wind to power a turbine, which creates energy for residential or commercial use. Wind energy produces no carbon emissions or pollution, is a renewable and domestic resource, and can be produced at a cost of 4 to 6 cents per kilowatt hour. The challenges facing wind turbine use are high initial costs, regulatory challenges, aesthetic and ecological impact, and the intermittent nature of wind.

Top photo: A view from the base of a horizontal axis wind turbine.

*Middle Photo: Geothermal trenches being dug
Courtesy of Ace Geothermal, LLC of Collegeville, PA.*

*Bottom Photo: A historic residence with solar panels installed by
SunPower Builders of Collegeville, PA.*

Outdoor wood-fired boilers. Outdoor wood-fired boilers typically burn wood to heat a liquid such as water, or a safe antifreeze-based liquid, that is piped into a building to provide heat and hot water. Outdoor wood-fired boilers can offset heating costs and provide energy independence for a building. Considerations include the initial costs and the risk of pollution and carbon emissions.

Geothermal. Geothermal systems harness the heat generated by the earth to heat and cool a building. There are a variety of system types and all involve a system of wells containing a fluid that will enable heat exchange. While geothermal is a costly initial investment; the payback period can be short, the energy can be practically free of emissions, and there is a constant supply of domestic power.

Energy Conservation Design & Building Conservation Techniques. An important aspect of the alternative energy discussion is the need for energy conservation. There are many actions that can be implemented during site design, in a household and at the community level to successfully reduce environmental impacts and costs in a community. These actions can include reducing heating and cooling loss in a building, improving appliances and fixtures, and changing building occupant behavior. Most of these actions can be relatively inexpensive and will help ensure the maximum benefit from any other course of action.

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For more information, please contact the Montgomery County Planning Commission at 610.278.3722 or visit our site online at www.planning.montcopa.org to see the complete renewable energy series and other resources.



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