

# RENEWABLE RESOURCES: A GUIDE

**There's something in** the news every day about harnessing energy from the wind, the waves, the sun, or some other renewable source. Are these the energy resources of tomorrow, or are they pipe dreams? How close are we to new and exciting energy options? The answers may surprise you.

## What are Renewable Energy Sources?

Renewable energy sources are sources that can theoretically provide an unlimited energy supply, because the energy source can be replenished, or never runs out. Unlike fossil fuels like oil and natural gas, which exist in limited amounts, sources such as the wind and sun can be tapped indefinitely, and others, like biomass, are constantly replenished. Some examples:

**Wind power** harnesses the wind to generate electricity.

Wind turbines produce electricity when the wind turns turbine blades, which are connected to a generator. Wind power is growing in New England and there are several "wind farm" proposals in the works, but it has its pros and cons. Wind blows stronger in some areas than others — and sometimes it doesn't blow at all. Tall windmill towers create "visual pollution," and the noise from wind turbines remains a factor. Wind is a free fuel with lower operating costs than before, but upfront costs remain high, and the overall economics still depend on consistent wind flow.

**Biomass** uses wood and agricultural crops that can be burned or converted to gas to produce energy. It is the second largest renewable energy source for electricity production in New England today, behind hydropower. Wood chips are the primary form of biomass here. If wood harvesting is done with good, long-term forestry management practices, and if the combustion is done with good emission controls, the result can be truly "green" and "sustainable." Construction waste or municipal waste may also be biomass fuel sources, although there are concerns about environmental impacts. On the other hand, methane gas produced from garbage landfills can provide useful energy and help "clean up" the environment.

**Solar energy**, the ultimate renewable energy source, can be used to heat building spaces or water, or can be converted to electricity using "solar cells" or "photovoltaics." Solar energy applications are generally limited to a particular building or location. Although solar panels and the associated equipment are expensive, some people envision a future with solar panels on every rooftop.

**Hydropower** uses the flow of running water to turn a turbine-generator for electricity, or sometimes to power machinery.

Hydropower has been around a long time, and was the backbone for early industry in New England. Today, hydropower is primarily tapped for electricity, and at 80,000 megawatts of installed generating capacity, it is by far the nation's largest renewable energy resource today. Water is a renewable, clean, fuel, but hydropower does have problems. These include the risk of drought, the environmental impacts of dams and turbines, high up-front costs, and public opposition. Major hydro projects are unlikely in New England, although tidal or wave power along our coastlines is being discussed.

## What are the pros and cons?

The pros of renewable energy are easy: low (or no) fuel cost; environmental benefits; an alternative to imported energy; good for the local economy; and long-term sustainability.

The cons are significant. Renewable technologies are still relatively expensive. They tend to require high up-front investments, which get offset by "free fuel" over a very long time. Each form of renewable energy has its own set of environmental problems or limitations.

Significantly, renewable technology relies on energy sources that are spread out and hard to collect (think wind and solar). For the past 100 years, our economy has been fueled by large, centralized generating stations. These stations use fossil fuels which are easy to transport. Renewable energy sources will require an entirely new approach if they are to support a large number of customers.

*(Resources cont. on p. 2)*



(Resources cont. from p. 1)

## How does using renewable resources affect me?

The use of renewable energy sources, in the long run, will mean lower energy prices for all of us. The technology and effort needed to retrieve fossil fuels from the earth is becoming ever more costly, as we have to dig deeper, and explore more difficult terrain. Scarce supply and high demand means higher prices are passed on to you. Importing fossil fuels, such as oil, also comes at a high price. By adding more renewable sources to our energy mix, these costs are reduced or even eliminated. Also, some of these renewable sources can be produced virtually in our own backyard (see sidebar). This keeps the money you pay for energy in the local economy, where it creates jobs and business opportunities.

The State of Massachusetts supports renewable energy development in a variety of ways. It also gives an income tax credit to anyone installing a renewable energy system, such as solar or wind power, at their home.

## Power from Pinetree Station

Located in Fitchburg, MA, is the Pinetree Generating Station, a 17-megawatt wood-burning plant, which produces electricity equal to one-third of the city's electrical needs. The plant opened in 1992, and employs 24 people. The wood comes from a 60-mile radius, and is stored about a half-mile from the plant until needed. Once at the plant, the wood (now in chip form) is burned in a boiler at 1,800 degrees, creating the steam to drive a turbine generator. The electricity produced is delivered through underground lines to Unitil's system, and

## What is the "big picture?"

The United States needs to reduce its dependence on foreign oil. The "black gold" of the Middle East comes with a high price tag in both literal terms and risk factors. The use of fossil fuels in our energy mix also needs to be reduced. Our nation must turn its attention to energy sources over which we have some control, which have greater sustainability, and which contribute to restoring the health of our planet.

Closer to home, the energy market in New England currently relies heavily on natural gas as an energy source. This heavy reliance on a single source of energy for generating electricity has hurt consumers. In addition, most of the region is served by fuel sources from outside New England, adding to transportation costs. By using more cost-effective local energy sources, such as renewables, we can lower the impact of high energy costs, thereby encouraging industry and improving the economy overall.

is counted as part of the overall New England energy supply. Pinetree also uses methane gas produced by the nearby Fitchburg landfill as a secondary source of generating electricity.

Some of the wood that comes to the plant is in the form of pallets, which contain nails. The nails are removed via a magnet and sold to a metal recycling company. The ash produced by the plant is used by a landscaping company, which compares it to lime in alkalinity. The landscaping firm uses the ash, and sells it, saying it's perfect for balancing our acidic New England soil.

## Community Corner National Volunteer Month

**April is National Volunteer Month**, a great opportunity to recognize the efforts, and valuable results, of community projects. It is also your chance to get involved. At Unitil, we encourage employees to make a difference in their communities. We coordinate efforts for projects such as United Way of North Central Massachusetts' Day of Caring and the Fitchburg Longsjo Classic.

We also support our employees' personal volunteer interests. An operations support staffer in Fitchburg became involved with NEADS, an internationally-known organization that supplies assistance dogs to the disabled.



She coordinated a project to dry wall a room in their training facility, organized the donation of a van, and convinced Unitil to sponsor a puppy-in-training.

We will offer plenty of other volunteer opportunities in 2007. The United Way Day of Caring, the Fitchburg Longsjo Classic, the Salvation Army's Annual Holiday Bell Ringing Drive, and more.

How do you want to get involved? To see how you can make a difference, check for volunteer opportunities at [www.volunteer-builders.net](http://www.volunteer-builders.net) or ask at local agencies in your area.



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