

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.

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Historic Hydro Power

Hydro (water) power has been a renewable energy source in New Hampshire for a long time. While most of the old mills that relied on hydro power are gone or rehabbed to other purposes, there are still a number of larger hydro facilities on the Connecticut and Merrimack Rivers. Smaller scale facilities are still doing their part as well, including three plants located right in Concord. Briar Hydro Associates operates Penacook Lower Falls, put in service in 1983 and producing 4.6 megawatts; Penacook Upper Falls which began operating in 1986 at 3.4 megawatts; and Rolfe Canal Hydro, in service since 1987 and producing 4.3 megawatts.

According to the Granite State Hydropower Association (GSHA), the trade association for the independent hydroelectric power industry in New Hampshire, these three plants are just a few of the approximately 50 small-scale hydroelectric projects located throughout New Hampshire. GSHA plants have a total installed electric capacity of approximately 50 megawatts and produce some 200 million kilowatt-hours of electricity each year, which represents a savings of about 503,000 barrels of oil per year. GSHA is a volunteer association made up of owners and other individuals and organizations representing the small hydropower industry in New Hampshire. All GSHA projects are "run of river" projects; that is, they do not store water, but use river flow when available. These plants provide significant environmental benefits through the operation of fish ways, recreation facilities, and removal of trash from New Hampshire's rivers. The electrical output of GSHA member plants is absolutely emissions-free.

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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 can be 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.

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, as we need to turn our attention to energy sources over which we have some control. We must also face the fact that our reserves of fossil fuels are limited, and the sources remaining will come at a high price.

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. This not only creates high transportation costs (which again, affect customers), but also has led many industries to locate outside the region.

By using more cost-effective, local sources of energy, such as renewables, we can lower the impact of high energy costs. This will encourage industry and improve the economy, overall.

The New Hampshire legislature is considering proposals to encourage renewable energy development, and Unitil is supporting those proposals. Proponents note that a successful renewable energy industry in New Hampshire will provide the long-term benefits of a more secure energy supply, reduced environmental impacts, ultimately lower energy prices to consumers, and economic development for the local economy. Unitil is actively supporting these proposals.

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 planting flowers at Seacoast Hospice, clearing trails for the Society for the Protection of New Hampshire Forests, and holding a holiday food drive.

We also support our employees' personal volunteer efforts. One Capital Area employee is a committed volunteer with Live and Let Live Farm, a sanctuary for abused horses and other animals. In 2006, he organized fellow employees to spend a day setting utility poles and installing anchors for future electric line extensions. The year before, they ran cable for watering trough heaters. In the Seacoast Area, another employee led 35 others to sign up for the 2006 Seacoast New Hampshire Heart Walk. They raised over \$7,500 in pledges and matching gifts and earned the "Top Team" award.

We will offer plenty of other volunteer opportunities for 2007: The United Way Day of Caring, American Heart Association Seacoast Heart Walk, helping at a food pantry, and more. How do you want to get involved? Check with the United Way or local agencies in your area to see what a difference you can make by volunteering.



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