

Today's Biopower



Much of our planet teems with biomass. Trees, grasses, flowers, weeds, and seaweeds—if it's vegetation, it's biomass. And biomass has inherent energy that can be converted to power. Humans have been using and benefiting from biomass fuel for thousands of years.

These days, we're miles beyond using biomass only to heat dwellings and cook food. We're adding new technologies to convert biomass to energy. For example, we're generating electricity by cofiring biomass with fossil fuels—which helps clean up emissions. Using biomass fuels also helps the environment by reclaiming residue materials from industries such as forestry and agriculture, that would otherwise contribute to burgeoning landfills.

Today we're processing biomass to make fuel gas, called biogas, to concentrate the energy content and convert biomass to a substance that's broadly usable in a variety of applications. And we're doing this with greater and greater efficiency—capturing more of the energy—all the time.



Warren Greitz, NREL/PX08368

Dedicated crops of fast-growing trees, like these poplars, can be mechanically harvested every few years for a ready supply of biomass to generate electricity.

We're beginning to plant thousands of acres of marginal land with dedicated energy crops. These fast-growing grasses and trees provide fuel to feed power plants. Energy crops anchor the soil and protect against erosion because they stay in the ground for a long time—5 to 30 years. During their growth phase, they absorb carbon dioxide, a gas implicated in global climate change, then release it in equal measure when they are converted to energy.

And, we're working with a broad-based biomass constituency. This is a group of dedicated individuals at companies in the private sector who have joined forces with like-minded people in local, state, and national governments to share the risks and rewards that come with taking new energy technologies from the research laboratory to the field.

The Biopower Program

In 1991, the U.S. Department of Energy (DOE) chartered the National Biomass Power Program, now called the Biopower Program, to further the use of biomass as a power source.

The original goal of the Biomass Power Program remains the same in the Biopower Program—to help establish a sustainable option to contribute to the 600 gigawatts of new electric generating capacity projected to be needed globally over the next 10 years. The program revolves around investigating new technology pathways, working with industry to scale up the most promising ones, and finding ways to continually pare down the costs of biomass power as it becomes more economically competitive with fossil fuel power. The program's activities include:

Technology Development

- Support the development of advanced conversion technologies integrated with dedicated biomass fuel supply systems.
- Facilitate the commercialization of environmentally friendly biomass fuel supplies.
- Cost-share first-of-a-kind demonstrations.
- Support efforts to develop gasification technologies for multiple uses.

Environmental Values

- Assess and communicate the environmental benefits of biomass power production, crop production, and crop residue use.

- Establish criteria for an environmentally responsible fuel supply and biomass power production.
- Gather and disseminate information on the links between incentives for biopower production and improvements in air quality, water quality, soil conservation, nutrient management, and the rural economy.

Outreach and Education

- Support a variety of forums for stakeholders to exchange information directly or indirectly associated with biomass.
- Expand education efforts to acquaint the public, electricity providers, regulators, the media, and interested organizations with the benefits and issues surrounding biopower. These include sustainability, biodiversity, air emissions, water emissions, and economic development.
- Support and encourage partnerships among stakeholders in government and the private sector.

A Natural Advantage

Biomass fuels take care of their own carbon dioxide emissions. They mitigate acid rain because they produce virtually no sulfur emissions. And they have other advantages over fossil fuels. Biomass is constantly being replenished with new growth; fossil fuels are finite. Also, biomass can be harvested in environmentally friendly and sustainable ways.

Biomass power has a natural economic advantage, too. Most regions of the United States are well endowed with the resources for biomass power, or have ample land available for planting energy crops. Developing, harvesting, and using these resources build up a region's economic base, rather than depleting its economy by importing energy supplies. Powering up with local resources and workers powers up the local economy. Beyond this, developing and commercializing these biomass feedstock systems and conversion technologies gives the United States something to proudly—and profitably—export to the world.

A Major Renewable Generation Resource

Today, biomass is a major renewable generation resource with more than 7,000 megawatts of capacity nationally, supplied by a diverse range of companies in the pulp and paper industry, electric utilities, and independent power



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The Battelle gasifier in Burlington, Vermont, provides a clean gas fuel for modern power systems that can achieve efficiencies double those of today's biopower industry.

producers. Biopower also offers cost-effective, near-term opportunities to reduce emissions of many types and increase industrial efficiency. Although there are market opportunities such as green power, the substantial and diverse benefits are not universally recognized. The DOE Biopower Program is working to overcome these technical and institutional barriers so biomass will grow as a valuable part of our nation's energy supply.

Building toward a future of clean energy, bridging the gap from here to there, frames the work of the Biopower Program. Biopower could well become an everyday commodity in a cleaner, better future—a workhorse in the world of electricity production. Farmers will have acreage planted in a range of crops, including those for both food and energy, with stable markets for every bit of plant material that's produced and nothing left over for the landfill. This sustainable future will be a time when the clean efficiency of biomass power lights the way across the nation and around the world.

For More Information

Visit the Biopower Web Site:

<http://www.eren.doe.gov/biopower>

For copies of print documents on renewable energy, call DOE's Energy Efficiency and Renewable Energy Clearinghouse (EREC) 1-800-DOE-EREC (1-800-363-3732)

