



Biomass A Renewable Energy Source

Biomass energy – energy generated by using organic materials – has been utilized since humans learned to heat and cook with fire. However, in modern times it has been replaced as a primary fuel source on a global scale by fossil fuels like coal and natural gas.

As policymakers and businesses take steps to fight global climate change, energy derived from biomass deserves our immediate attention as we strive to reduce greenhouse gases and increase sources of renewable energy.

Renewable and Clean Energy that Helps Combat Climate Change

Why biomass? Efficient combustion of biomass is a cleaner energy solution than burning fossil fuels. It also reduces demand for coal, oil and natural gas and prevents additional carbon from being released into the atmosphere. Considered carbon neutral, the production of energy from biomass sources releases only the same amount of carbon as the plant or tree absorbed from the atmosphere when it was growing. In contrast, energy from fossil fuels actually increases greenhouse gas emissions.¹

We can look to our forests to help reduce greenhouse gas emissions that contribute to climate change.

We plant and harvest trees which absorb carbon through photosynthesis and then produce wood products that continue to store carbon once absorbed by trees. In addition, clean energy can be created from the small trees and wood residue found in the forest. As a result, our actively managed forests and forest products companies are uniquely positioned to reduce the effects of greenhouse gas emissions.

How Biomass Energy Works

Biomass energy is created through the controlled combustion of wood in a power boiler. This combustion produces steam, driving a turbine that turns a generator producing electricity.

Energy from biomass has been widely used for years by our nation's forest products companies to power their mills and meet other power needs. Some biomass plants also supply excess power back to the grid.

On some sustainable private forestlands, small trees, brush, and wood chips are gathered and transported to the mill and used to generate power. Mill waste, including bark and sawdust, is used to generate power as well. Each ton of biomass burned to generate electricity prevents the emission of 0.4 tons of carbon dioxide (CO₂) into the atmosphere from natural gas-fired power plants.²

Unleashing the Power of Wood From Forests to Electricity



Benefits of Biomass Energy

- Provides reliable energy from a renewable resource
- Reduces greenhouse gas emissions
- Reduces dependence on imported fossil fuels
- Improves the health of overcrowded forests
- Protects people, wildlife, air quality, and watersheds by reducing fuels that cause wildfires
- Provides rural employment and economic development
- Provides energy diversity and security
- Reduces landfill

“Californians would get safer forests, reliable energy from a renewable resource, reductions in greenhouse gas emissions and more.”

*–Dr. Gregg Morris, Ph.D.,
Green Power Institute*



Status of Biomass Energy Production in California

In the late 1980's, California hosted 63 biomass power plants producing more than 900 megawatts. Since 1992 the industry has declined 40 percent, with just 28 operating plants producing about 550 megawatts annually. (One megawatt can meet the power needs of about 1,000 homes.)

Governor Schwarzenegger's Executive Order S-06-06 and accompanying Bioenergy Action Plan envisions approximately 2,500 megawatts from biomass each year.

A report by the California Biomass Collaborative for the California Energy Commission estimates that biomass from forests alone could generate 4 percent of the state's total electricity needs.

Transportation costs have been an obstacle to broader development of biomass energy. Biomass contains less energy for a given weight than fossil fuel, so production, handling, and transportation are more expensive. This means we cannot capture the economies of scale typical of fossil fuel generating facilities. Even so, we can disperse small biomass energy facilities in areas where wildfires threaten communities and fuel reduction is critical.³ This would not only reduce transportation costs, but it also would help improve forest health, protect people from wildfires, and reduce greenhouse gas emissions from wildfires and fossil fuels.

There is plenty of biomass material available from forests. But opposition to harvesting and thinning on public lands is a major obstacle to biomass energy production.

Removal of materials from our overgrown public forests on a broader scale can help make biomass energy economically feasible.⁴

In addition, California should work at the federal level to promote biomass energy as part of the Production Tax Credit contained in IRS regulations. Parity should be achieved with wind and geothermal technologies in credit level. This would help expand the uncompensated environmental and social benefits that biomass energy provides Californians.⁵

Why Biomass Energy?

There is no net production of CO₂ from wood combustion. Biomass energy is produced in a controlled, closed environment.

Currently, California's biomass energy producers generate 1.5 – 2 percent of California's electricity while consuming more than 4.6 million bone dry tons of biomass waste annually.⁶ But so much more can be done.

Benefits of Biomass Energy to Forests

If left in overgrown forests, excess biomass fuels reduce forest health and increase the threat of catastrophic wildfires that harm people, wildlife, watersheds, air quality, and local economies.

Harvesting on public forestlands is down nearly 90 percent since 1990 – while firefighting costs are dramatically up. The California Department of Forestry also has spent more than \$852 million in emergency funds fighting fires in the last five years.

The key to preventing catastrophic wildfires and reducing economic losses is removing excess wood from forests before it burns. Managed forests burn less intensely than overcrowded forests, more trees survive a fire, and less carbon is released into the atmosphere. The excess wood can then be turned into wood products that store carbon and renewable energy to replace fossil fuels.

“Not only can removing accumulated fuels from the forest floor reduce catastrophic fires and the emissions they produce, but using that fuel to increase the production of biomass energy can reduce the need to burn fossil fuels for energy.”

*– John Kadyszewski,
Winrock International and U.S. Dept.
of Energy West Coast Carbon
Sequestration Partnership*

Steps Needed to Increase Biomass Energy Production

- Establish marketplace incentives to expand energy production from biomass.
- Establish credits for environmental and social benefits provided by the biomass industry.
- Accelerate the careful removal of excess fuels from public forestlands.
- Restore the balance in federal tax credits. For example, wind power generation receives two to four times more federal tax production credits than California power plants fueled by biomass.



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Footnotes: 1. U.S. Dept. of Energy National Renewable Energy Laboratory, www.nrel.gov/learning/re_biomass.html 2. Biomass in California: Challenges, Opportunities and Potentials for Sustainable Management and Development. June 2005. California Biomass Collaborative (CEC #500-01-016) p.4. 3. G. Morris, "The Value of the Benefits of U.S. Biomass Power," Executive Summary, National Renewable Energy Laboratory (1999), iii. 4. Gregg Morris, Ph.D., "Up in Smoke," California Forests Fall 2006: 18-19 5. Western Governors Association Biomass Taskforce Report. January 2006. 6. Biomass in California. pp xiii-xiv