

Biomass

Frequently Asked Questions

What is woody biomass?

Woody biomass is organic material derived from trees, shrubs and other plants. This material can include wood from the bole (trunk) of trees, limbs, tops, roots and even foliage. There are three general sources of woody biomass used in biopower generation: 1) residues from forest operations, 2) residues from industrial manufacturing and 3) urban wood residues.

Where does woody biomass come from?

The principal sources of woody biomass from forests have historically been: 1) trees killed or damaged by fire, insects, disease, drought or that have no other use, 2) trees grown specifically for energy production, 3) trees removed to reduce hazardous fuel accumulations or improve forest health and 4) material from forest operations unsuited to commercial manufacturing.

Woody biomass also includes: 1) wood waste from urban areas (e.g., clean demolition and construction wood, tree trimmings) and, 2) byproduct of forest product manufacturing such as lumber, paper (e.g., sawdust and bark).

What is renewable biomass energy?

There are three ways in which biomass resources can be utilized for electricity: 1) conversion of materials such as urban wood waste and sawmill byproducts, 2) dedicated energy crops (trees, shrubs and other plants) grown specifically for energy production, and

3) as a byproduct of forest management activities. For example, biomass can be produced from thinning forest stands to reduce hazardous fuel loads or improve forest health. Generally, the biomass material consists of small trees that are not useable for lumber or other purposes. Energy production from such sources is sustainable as long as forest management activities produce and replenish the forest and associated biomass.

Why is it renewable?

A renewable resource is one that naturally replenishes itself after it has been used or which is never depleted by use. Examples of renewable resources that are used to produce electricity include water, sunlight, wind, geothermal and woody biomass.

Renewable energy technologies harness the energy. In the cases of solar, wind, and hydroelectric power, use does not deplete the resource. Biomass resources can be replenished as trees can be propagated naturally or with the help of foresters.

What is a biomass power generation facility?

A biomass power plant utilizes woody biomass for the production of electricity and/or heat and steam.

How is power currently generated from wood?

The wood is combusted in boiler systems fitted with air emissions controls that create steam used to spin a turbine that produces electricity. Once steam is used to spin the turbine, it is extracted to provide heat for other uses (e.g., drying, heating). Wood can be used in combination with other fuels such as coal, to fire boilers and create electricity (also known as co-firing). In co-generation, the wood is used to generate electricity, heat and steam.

How big is a biomass power plant?

The intended end use of the energy and the availability of fuel/feedstock (woody biomass) determine the capacity of a biomass power plant to generate electricity. In the U.S., most biomass power plants are associated with forest product manufacturing facilities, such as sawmills. These facilities produce electricity and heat or steam using manufacturing byproduct (biomass in the form of sawdust and bark) from the sawmill operations. Electricity and heat or steam generated can be utilized within the sawmill.

Excess electricity can be sold to the electrical grid. Generally, biomass power plants are larger than 15 megawatts (one megawatt is enough to service about 1,000 households for a year), but can range from

less than one MW to over 50 MW. It takes about 8,000 bone dry tons (2 big trucks a day) of woody biomass to produce one MW of electricity on an annual basis.

How big is the proposed Grant PUD biomass facility?

Grant PUD's biomass facility is proposed to generate between 15 and 20 MW of renewable electricity, or enough to support 15,000 to 20,000 households.

What waste products are produced?

Biomass power plants produce wood ash (about 3 to 5 percent of the fuel input by weight). Depending on the source of biomass and the combustion process, power plant ash can be used as a soil amendment or in masonry and cement products.

Water used to create steam for electricity production can be recycled.

Does biomass power create air pollution?

Biomass power plants are designed with air pollution controls for minimizing discharges of regulated air pollutants.

Biomass power plants are subject to regulation by the U.S. Environmental Protection Agency, Washington Department of Ecology and local air quality management districts. Biomass power plants can eliminate 95 to 99 percent of pollutants that would otherwise be produced by open burning of that same biomass.

How would biomass power impact catastrophic wildfire?

Throughout the western U.S., a large potential source of biomass for power production is fire hazard reduction projects. Removing unnaturally high accumulations of biomass from the forest during the course of fuel reduction treatment activities will reduce the threat from wildfire, improve fire suppression options and decrease the area burned in catastrophic fires. Properly executed fire hazard reduction projects can also improve forest health making the forest less susceptible to drought, insect attacks and disease. Utilizing biomass for energy production will make fuel treatments more economically feasible by creating a market for such biomass material that currently has little or no value.

Will biomass power impact our forests?

Biomass power plants pose little or no risk to forests from over-cutting and actually can contribute to improvements in forest health and reduced fire hazard by providing an outlet for material that would otherwise be disposed of by burning.

How is it renewable energy if it emits greenhouse gases?

A biomass power plant does produce carbon dioxide (CO₂), a greenhouse gas. However, if the fuel supply is obtained as a byproduct of reducing fire hazard in natural forests, the plant emissions may be offset by the reduced emissions that would have occurred if the forest burned. Wildfires are significant sources of greenhouse gas emissions.

By utilizing fuels derived from forest activities that reduce fuel for wildfire, and

considering the natural growth patterns of biomass, a biomass power plant can be considered “carbon neutral.” Biomass is a unique fuel in that it is derived from a resource that is naturally replenished by taking in carbon from the atmosphere. Also, using biomass for electricity production may offset the use of fossil fuels, further reducing greenhouse gas production.

Will biomass use cause an increase in lumber prices?

Sources of wood for biomass power generation do not have “higher and better” uses such as conversion to lumber. They consist primarily of materials that would not otherwise be used, such as residues (e.g., small stems, brush) from fire hazard reduction. Consequently, there would be no impact on lumber prices.

Will any food crops be impacted (like corn due to ethanol production)?

Unlike activities such as biofuels production (e.g., ethanol) that currently consume biomass useable for food (such as corn), production of electricity from woody biomass would not have an impact on food supply or prices.

Is biomass power more expensive than other power generation?

When compared to the direct monetary costs of power production from fossil fuels and hydroelectric power, biomass power is currently more expensive. Biomass power requires fuel that has considerable collection, processing and handling costs. However, rising coal and natural gas costs, which in turn drive up the price of

electricity, are allowing biomass energy production to become more competitive. In addition, when the currently non-monetized societal benefits of biomass use, such as reduced catastrophic wildfire, improved air quality, forest health, enhanced watershed health, reduction of greenhouse gases and renewed rural community development (including jobs) are factored in, biomass-based electricity provides significant benefits over fossil fuel-based electricity.

Can biomass be used to make liquid or gas fuels? What about transportation fuels?

Scientific and technical processes are being developed in order to convert the cellulosic material of woody biomass into useable fuels. Significant research and development is currently underway to make such conversion processes technically and economically viable. However, conversion technologies are not yet considered economical and are not used on an industrial scale (e.g., corn to ethanol).

Synthetic gas fuels (syngas – similar to natural gas) and liquid fuels (ethanol and synthetic diesel) have been created in pilot-scale facilities in Europe and in limited quantities in the United States. The primary challenge of developing liquid or gas fuels from woody biomass is breaking down the complex cellulosic structure of wood into simple hydrocarbons and sugars that can be converted into liquid fuels.

Because of the promise that biofuels may have for reducing America's dependence on foreign oil, significant private and public sector resources are being devoted to support research, development and commercial deployment of biomass to liquid fuels conversion technologies.

What is a Renewable Portfolio Standard?

Renewable Portfolio Standards (RPS) are policies created by state legislatures requiring qualifying utilities to generate a designated percent of electricity from renewable sources. Today there are approximately 30 states, including Washington that have some form of an RPS.

Does the State of Washington have a Renewable Portfolio Standard?

Yes. With the passage of Initiative 937 in 2006, Washington became the second state in the nation to pass a renewable energy standard by ballot initiative. Electric utilities serving more than 25,000 customers must have at least 3 percent of their generation serving retail customers available from renewable resources by year 2012, 9 percent by 2016 through 2019 and at least 15 percent by 2020.