



GLOSSARY OF TERMS

Bagasse: Residue remaining after extracting a sugar-containing juice from plants like sugar cane.

Biomass: Any plant-derived organic matter used to generate sustainable energy, including herbaceous and woody energy crops, agricultural food and feed crops, agricultural crop wastes and residues, wood wastes and residues, aquatic plants and other waste materials.

Biomass energy (or “biopower”): The use of natural materials like tree trimmings, harvest waste, scrap lumber and other organic materials to generate electricity.

Bone-dry-unit (BDU): 2400 pounds of moisture-free wood, unless otherwise stated.

Carbon dioxide (CO₂): A colorless, odorless gas produced by respiration and combustion of carbon-containing fuels. Plants use it as a food in the photosynthesis process.

Carbon monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete combustion.

Carbon neutral: Achieving net zero carbon emissions by balancing the amount of carbon released with an equivalent amount offset or prevented.

Chips: Small fragments of wood chopped or broken by mechanical equipment. “Total tree chips” include wood, bark and foliage. “Pulp chips” or “clean chips” are free of bark and foliage.

Closed loop: Crops grown in a sustainable manner to optimize their value for bioenergy and bioproduct uses. Includes annual crops such as maize and wheat, perennial crops such as trees and shrubs, and grasses such as switchgrass.

Co-firing: The use of a mixture of two fuels within the same combustion chamber.

Co-generation: The technology of producing electric energy and another form of useful energy (usually thermal) for industrial, commercial or domestic heating or cooling purposes through the sequential use of the energy source.

Combustion: A chemical reaction between a fuel and oxygen that produces heat and usually light.

Combustion air: The air fed to a fire to provide oxygen for fuel combustion.

Corn stover: The refuse of a corn crop after the grain is harvested.

Dry ton: 2000 pounds of moisture-free biomass.

Energy crop: A crop grown specifically for its fuel value. Include food crops such as corn and sugar cane, and nonfood crops such as poplar trees and switchgrass.

Feedstock: Any material used directly as a fuel or converted to another form of fuel or energy product.

Fixed bed: A bed of closely spaced particles through which gases move up or down for purposes of gasification or combustion.

Fixed carbon: The carbon remaining after heating in a prescribed manner to decompose thermally unstable components and distill volatiles. Part of the proximate analysis group.

Fluidized bed: A gasifier or combustor design in which feedstock particles are kept in suspension by a bed of solids kept in motion by a rising column of gas. The fluidized bed produces isothermal conditions with high heat transfer between the particles and gases.

Fly ash: Small particles of ash suspended in combustion products.

Forestry residues: Includes tops, limbs and other woody material not removed in forest harvesting operations in commercial hardwood and softwood stands, as well as woody material resulting from forest management operations such as pre-commercial thinning and removal of dead and dying trees.

Fossil fuel: A carbon or hydrocarbon fuel formed in the ground from the remains of dead plants and animals, in a process taking millions of years. Oil, natural gas and coal are fossil fuels.

Gasification: Any chemical or heat process used to convert a feedstock to a gaseous fuel.

Gas turbine: Sometimes called a combustion turbine; a gas turbine converts the energy of hot compressed gases (produced by burning fuel in compressed air) into mechanical power, which can be used to generate electricity.

Greenhouse gas: A gas, such as water vapor, carbon dioxide, tropospheric ozone, methane and low level ozone, which contributes to the greenhouse effect.

Grid: An electric utility's system for distributing power.

Herbaceous plants: Non-woody species of vegetation, usually of low lignin content such as grasses.

Herbaceous energy crops: Perennial non-woody crops that are harvested annually, though they may take two to three years to reach full productivity. Examples include switchgrass (*panicum virgatum*), reed canarygrass (*phalaris arundinacea*), miscanthus (*miscanthus x giganteus*), and giant reed (*arundo donax*).

Hydrocarbon: An organic compound that contains only hydrogen and carbon. In vehicle emissions, these are usually vapors created from incomplete combustion or from vaporization of liquid gasoline. Emissions of hydrocarbons contribute to ground level ozone.

Landfill gas: Biogas produced from the natural decomposition of organic material in landfills.

Methane (CH₄): The major component of natural gas. It can be formed by anaerobic digestion of biomass or gasification of coal or biomass.

Moisture: The amount of water and other components present in a biomass sample that are volatilized at 105°C. (Source: Ehrman, T. Standard Method for Determination of Total Solids in Biomass. NREL-LAP-001. Golden, CO: National Renewable Energy Laboratory, October 28, 1994) See also “moisture free basis”

Moisture free basis: Biomass composition and chemical analysis data is typically reported on a moisture free or dry weight basis. Moisture (and some volatile matter) is removed prior to analytical testing by heating the sample at 105°C to constant weight. By definition, samples dried in this manner are considered moisture free.

Nitrogen oxides (NO_x): The major component of photochemical smog, the product of photochemical reactions of nitric oxide in ambient air

Non-renewable resource: An energy resource that cannot be replaced after being used to generate power. Although fossil fuels are in fact fossilized biomass resources, they form at such a slow rate that, in practice, they are non-renewable.

Open burning: Open burning is any fire or smoldering (burning without flame, just smoke) where any material is burned in the outdoor air, or in a receptacle other than a furnace or other equipment connected to a stack or chimney. Examples include campfires and bonfires.

Open loop: Biomass that can be used to produce energy and bioproducts even though it was not grown specifically for this purpose. Examples include agricultural livestock waste and residues from forest harvesting operations and crop harvesting.

Organic compound: An organic compound contains carbon chemically bound to hydrogen. Organic compounds often contain other elements (particularly oxygen, nitrogen, halogens or sulfur.

Oven dry ton: An amount of wood that weighs 2000 pounds at 0% moisture content.

Ozone: A compound that is formed when oxygen and other compounds react in sunlight. In the upper atmosphere, ozone protects the earth from the sun's ultraviolet rays. Though beneficial in the upper atmosphere, at ground level, ozone is called photochemical smog, and considered a pollutant and respiratory irritant.

Particulates: A fine liquid or solid particle such as dust, smoke, mist, fumes or smog, found in air or emissions.

Renewable energy resource: An energy resource that can be replaced as it is used. Renewable energy resources include solar, wind, geothermal, hydro and biomass. Municipal solid waste (MSW) is also considered a renewable energy resource.

Residues, biomass: Byproducts from processing all forms of biomass that have significant energy potential. For example, making solid wood products and pulp from logs produces bark, shavings, sawdust and pulping liquors — residues that can be convenient and relatively inexpensive sources of biomass for energy.

RPS (renewable portfolio standard): The requirement that an electric power provider generate or purchase a specified percentage of the power it supplies and/or sells from renewable energy resources, thereby guaranteeing a market for electricity generated from renewable energy resources.

Sales generating plants: Power plants that sell into the national electricity grid. See also “self-generating plants”

Scrubber: An air pollution control device that uses a liquid or solid to remove pollutants from a gas stream by adsorption or chemical reaction.

Self-generating plants: Power plants that use their power internally rather than selling into the grid. See also “sales generating plants”

Wet scrubber: An air pollution control device used to remove pollutants by bringing a gas stream into contact with a liquid.

Whole tree chips: Wood chips produced by chipping whole trees, usually in the forest, which results in chips containing both bark and wood. Frequently produced from the low-quality trees or from tops, limbs and other logging residues.

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