

Additives: Chemicals added to fuel in very small quantities to improve and maintain fuel quality. Detergents and corrosion inhibitors are examples of gasoline additives.

Acid hydrolysis: A chemical process in which acid is used to convert cellulose or starch to sugars.

Alcohols: Organic compounds that are distinguished from hydrocarbons by the inclusion of a hydroxyl group. The two simplest alcohols are methanol and ethanol.

Alternative Fuel: As defined pursuant to the Energy Policy Act '92 (EPACT), methanol, denatured ethanol, and other alcohols, separately or in mixtures of 10 percent by volume or more with gasoline or other fuels; compressed natural gas (CNG); liquified natural gas (LNG); liquified propane gas (LPG); hydrogen; coal derived liquid fuels; fuels other than alcohols derived from biological materials; electricity; biodiesel; or any other fuel determined to be substantially not petroleum and yielding potential energy security benefits and substantial environmental benefits.

Anaerobic Digestion: A biochemical process by which organic matter is decomposed by bacteria in the absence of oxygen, producing methane and other by-products.

Biochemical Conversion: The use of living organisms or their products, such as enzymes, to convert organic material to fuels, chemicals or other products.

Biodiesel: A biodegradable transportation fuel produced from oils or fats for use in diesel engines.

Bioenergy: Renewable energy produced from organic matter. The conversion of the complex carbohydrates in organic matter to energy. Organic matter may be used either directly as a fuel or processed into liquids and gases.

Biofuels: Fuels made from cellulosic biomass resources. Biofuels include ethanol, biodiesel, and methanol.

Biogas: A combustible gas derived from decomposing biological waste. Biogas normally consists of 50 to 60 percent methane (see Anaerobic Digestion).

Biomass: Renewable organic matter such as energy crops, crop-waste residues, wood, animal and municipal wastes, aquatic plants, etc., used for the production of energy.

Carbon Dioxide (CO₂): A product of combustion that has become an environmental concern in recent years. CO₂ does not directly impair human health but is a "greenhouse gas" that traps the earth's heat and contributes to the potential for global warming.

Carbon Monoxide (CO): A colorless, odorless gas produced by the incomplete combustion of fuels, as in automobile engines. CO is poisonous if inhaled, entering the bloodstream through the lungs and forming a compound that inhibits the blood's capacity to carry oxygen to organs and tissues. CO can impair exercise capacity, visual perception, manual dexterity, learning functions, and may, in high concentrations, cause death.

Cellulase: Refers to a family of enzymes (enzyme complex) which acts to degrade (hydrolyze) cellulose. Cellulases are produced most commonly by fungal and microbial organisms. The fungi *Trichoderma reesei* and *Trichoderma viride* are often used for the production of cellulase. *Trichoderma reesei* has three distinct enzymes that convert crystalline, amorphous, and chemically derived celluloses to glucose.

Cellulose: A polymer of the simple sugar glucose. It is an insoluble complex carbohydrate that forms the skeletal structure of plant cells, and is the main carbohydrate in living plants. The general formula for cellulose is (C₆H₁₀O₅)_n, where n is the number of glucose units in the polymer molecule.

Cetane: Ignition performance rating of diesel fuel. Diesel unit of measure similar to gasoline octane.

Clean Diesel: An evolving definition of diesel fuel with lower emission specifications, which strictly limit sulfur content to 0.05 weight percent.

Compressed Natural Gas (CNG): Natural gas that has been compressed under high pressures, typically between 2,000 and 3,600 psi, held in a container. The gas expands when released for use as a fuel.

Corn Stover: Residue materials from the corn plant obtained after harvesting, consisting of the cob, leaves, and stalk.

E-Fuels: Ethanol/gasoline mixtures containing from 10 percent denatured ethanol and 90 percent gasoline (E10 or gasohol) to 95 percent denatured ethanol and 5 percent gasoline (E95)

Energy Crops: Crops grown specifically for their fuel value. These include food crops such as corn and sugarcane, and nonfood crops such as poplar trees and switchgrass. Currently, two energy crops are under development: short-rotation woody crops, which are fast-growing hardwood trees harvested in 5 to 8 years, and herbaceous energy crops, such as perennial grasses, which are harvested annually after taking 2 to 3 years to reach full productivity.

Enzymatic Hydrolysis: A process by which enzymes (biological catalysts) are used to break down starch or cellulose into sugar.

Ethanol (aka Ethyl Alcohol, Grain Alcohol, CH₃CH₂OH): Can be produced chemically from ethylene or biologically from the fermentation of various sugars from carbohydrates found in agricultural crops and cellulosic residues from crops or wood. Used in the United States as a gasoline octane enhancer and oxygenate, it increases octane 2.4 to 3.0 numbers at 10 percent concentration. Ethanol can be either hydrous (containing water) or anhydrous (without water)

Ethyl Tertiary Butyl Ether (ETBE): An aliphatic ether similar to MTBE. This fuel oxygenate is manufactured by reacting isobutylene with ethanol. Having high octane and low volatility characteristics, ETBE can be added to gasoline up to a level of approximately 17 percent by volume.

Feedstock: Any material converted to another form of fuel or energy product. For example, corn starch can be used as a feedstock for ethanol production.

Flexible-Fuel Vehicles (FFV): Vehicles with a single fuel tank designed to run on varying blends of unleaded gasoline with either ethanol or methanol.

Fuel Cell: An electrochemical engine (essentially a battery) that converts the chemical energy of a fuel, such as hydrogen, and an oxidant, such as oxygen, directly to electricity.

Gasification: Any chemical or heat process used to convert a solid feedstock to a gaseous fuel. This process is conducted in devices called gasifiers.

Lignin: An amorphous polymer that together with cellulose forms the cell walls of woody plants and acts as the bonding agent between cells.

Low-Emission Vehicle (LEV): Describes vehicles meeting either EPA's CFV LEV standards or the California Air Quality Board's Low Emission Vehicle Program standards.

M85: 85 percent methanol and 15 percent unleaded gasoline by volume, used as a motor fuel in FFVs.

M100: 100 percent (neat) methanol.

Methanol (aka Methyl Alcohol, Wood Alcohol, CH₃OH): A liquid fuel formed by catalytically combining CO with hydrogen. Commercially, it is typically manufactured by steam reforming natural gas. Also formed in the destructive distillation of wood.

Methyl Tertiary Butyl Ether (MTBE): An ether manufactured by reacting methanol and isobutylene that has high octane and low volatility. MTBE is a fuel oxygenate and is permitted in unleaded gasoline up to a level of 15 percent by volume.

Neat Fuel: Fuel that is free from admixture or dilution with other fuels.

Octane Enhancer: Any substance, such as MTBE or ETBE, that is added to gasoline to increase octane.

Oxygenated Gasoline: Gasoline containing an oxygenate such as ethanol or MTBE. The increased oxygen content promotes more complete combustion, thereby reducing tailpipe emissions of CO.

Pyrolysis: The thermal decomposition of solid organic material, including biomass at temperatures higher than 400°F, or 200°C in the absence of air. Also called destructive distillation. Produces a mixture of solids, liquids, and gases.

Reformulated Gasoline (RFG): Gasolines that have had their compositions and/or characteristics altered to reduce vehicular emissions of pollutants, particularly pursuant to EPA regulations under the Clean Air Act.