

BIOMASS JUNIOR

The vegetation that covers our planet is a natural storehouse of solar energy. In fact, through photosynthesis, with the help of energy from the Sun, plants transform inorganic compounds (carbon dioxide and water) into organic molecules essential for life (carbohydrates). In the chemical bonds of these molecules the same solar energy that activated photosynthesis is stored. The organic material of which vegetation is composed is called biomass (the word derives from the Greek word bios that means life). On burning biomass, the oxygen in the atmosphere combines with the carbon within it, carbon dioxide and water are released and heat is generated. The carbon dioxide returns to the atmosphere and is available once again to be reinserted in the process of photosynthesis and to produce new biomass. Hence biomass is a renewable source.

About 500,000 years ago our ancestors accidentally discovered fire, probably due to the chance ignition of wood. After that they discovered ways to light a fire and to keep it burning. This simple but essential source of energy allowed the first men to get warm, to cook their food, to defend themselves and to illuminate; in other words, it favoured the birth and development of civilisation. Today, in the field of energy sources, the term biomass indicates different products used to produce energy: agricultural and forest residues, wood industry waste such as shavings and sawdust, zootechnical waste, agro-industrial and food waste (residues from the cultivation of food crops for human or animal nourishment, such as straw), “energy crop cultivations”, i.e. those plants expressly grown for energy purposes, and organic biomass of other origin such as the green part of solid urban waste (organic matter) and other types of industrial waste with a heterogeneous composition.

The main applications of biomass are: the production of energy (biopower), the creation of fuels (biofuel) and products (bioproducts). It is mostly biomass resources such as wood and the sub-products of herbaceous, arboreal and forestall cultivations that are used to produce energy. They are used as fuel for domestic heating, for electric energy production and for industrial uses. Other sectors interested in the processing of this raw material are the industries involved in the production of paper, cellulose, chipboard panels, composite materials, animal feed and chemicals.

“Energy crop cultivations”, i.e. cultivations of high yielding crops, are generally utilised in the production of biofuels. From plants that produce vegetable oils and sugars, such as sunflower, sweet sorghum and sugar beet, bioethanol and biodiesel, similar to diesel oil, can be obtained. Biofuels are not only used as fuels but also to produce energy. Today the great need for energy, the possible depletion of fossil fuels and the pollution produced by their combustion have forced man to “rediscover” the advantages of wood and biomass as energy sources.