Editorial

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The Classification of Biomass Resources

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Description

Biomass resources that are available on a renewable basis and are used both directly as fuel or transformed to any other form of energy production are usually stated as “feedstocks.”

Dedicated energy crops are non-food crops that may be grown on marginal land (land not suitable for traditional crops like corn and soybeans) in particular to provide biomass. These break down into standard categories: herbaceous and woody. Herbaceous energy crops are perennials (plants that stay for more than 2 years) grasses that are harvested yearly after taking two to three years to reach complete productivity. These include switchgrass, miscanthus, bamboo, candy sorghum, tall fescue, Kochia, wheatgrass, and others. Short-rotation woody crops are fast-growing hardwood trees that are harvested within five to eight years of planting. These include hybrid poplar, hybrid willow, silver maple, eastern cottonwood, green ash, black walnut, sweetgum, and sycamore. Many of those species can assist improve water and soil quality, enhance wildlife habitat relative to annual crops, diversify assets or income, and enhance overall farm productivity.

There are numerous kinds of biomass resources like Agricultural Crop Residue, Forestry Residues, Algae, Wood Processing Residues, Sorted Municipal Waste, and Wet Waste.

There are many possibilities to leverage agricultural resources on existing lands without interfering with the production of food, feed, fiber, or forest products. Agricultural crop residues, which consist of stalks and leaves, are abundant, diverse, and broadly dispersed across the United States. The sale of those residues to a nearby biorefinery also represents a possibility for farmers to generate additional income.

Forest biomass feedstocks fall into one of the forest residues left after logging timber (which includes limbs, tops, and culled trees and tree components that could be otherwise unmerchantable) or whole-tree biomass harvested explicitly for biomass. Dead, diseased, poorly formed, and other unmerchantable trees are often left in the woods following timber harvest. This woody particle may be gathered to be used in bioenergy while leaving enough behind to provide habitat and keep the right nutrient and hydrologic features. There also are possibilities to make use of extra biomass on millions of acres of forests. Harvesting immoderate woody biomass can reduce the chance of fire and pests, in addition to resources in forest restoration, productivity, vitality, and resilience. This biomass may be harvested for bioenergy without negatively impacting the health and stability of forest ecological structure and function.

Algae as feedstocks for bioenergy refer to various organizations of incredibly productive organisms that consist of microalgae, macroalgae (seaweed), and cyanobacteria (previously known as “blue-green algae”). Many use sunlight and nutrients to create biomass, which includes key components-which include lipids, proteins, and carbohydrates-that may be transformed and upgraded to lots of biofuels and products. Depending on the strain, algae can develop through using fresh, saline, or brackish water from surface water sources, groundwater, or seawater. Additionally, they could grow in water from second-use sources, such as dealing with industrial wastewater; municipal, agricultural, or aquaculture wastewater; or produced water generated from oil and fuel line drilling operations.

Wood processing yields by-products and waste streams which are together known as timber processing residues and have huge energy potential. For example, the processing of wood for products or pulp produces unused sawdust, bark, branches, and leaves/needles. These residues can then be transformed into biofuels or bioproducts. Because those residues are already collected on the point of processing, they may be convenient and relatively less expensive assets of biomass for energy.

MSW resources consist of blended commercial and residential garbage, which includes backyard trimmings, paper and paperboard, plastics, rubber, leather, textiles, and food wastes. MSW for bioenergy additionally represents a possibility to reduce residential and commercial waste through diverting large volumes from landfills to the refinery.

Wet waste feedstocks consist of commercial, institutional, and residential food wastes (specifically those presently disposed of in landfills); organic-rich biosolids (handled sewage sludge from municipal wastewater); manure slurries from concentrated farm animals operations; organic wastes from commercial operations; and biogas (the gaseous product of the decomposition of organic matter in the absence of oxygen) derived from any of the above feedstock streams. Transforming those “waste streams” into energy can help create additional revenue for rural economies and solve waste-disposal problems.