

What is biomass and how can we use it?

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Abstract

It tells you how biomass energy is formed and how agriculture is involved.

Keywords: agriculture, biomass, energy.

Анотація

Розглянемо питання утворення біомаси та як у цьому процесі задіяне сільське господарство.

Ключові слова: біомаса, агрогосподарство, енергія.

Introduction

People have used biomass energy – energy from living things – since the earliest “cave men” first made wood fires for cooking or keeping warm. Today, biomass is used to fuel electric generators and other machinery.

Process

Biomass energy is energy generated or produced by living or once-living organisms. The most common biomass materials used for energy are plants, such as corn and soy, above. The energy from these organisms can be burned to create heat or converted into electricity.

Biomass is organic, meaning it is made of material that comes from living organisms, such as plants and animals. The most common biomass materials used for energy are plants, wood, and waste. These are called biomass feedstocks. Biomass energy can also be a non-renewable energy source.

Biomass is the only renewable energy source that can be converted into liquid biofuels such as ethanol and biodiesel. Biofuel is used to power vehicles, and is being produced by gasification in countries such as Sweden, Austria, and the United States. Biofuels do not operate as efficiently as gasoline. However, they can be blended with gasoline to efficiently power vehicles and machinery, and do not release the emissions associated with fossil fuels. Ethanol requires acres of farmland to grow biocrops (usually corn). About 1,515 liters (400 gallons) of ethanol is produced by an acre of corn. But this acreage is then unavailable for growing crops for food or other uses. Growing enough corn for ethanol also creates a strain on the environment because of the lack of variation in planting, and the high use of pesticides. Ethanol has become a popular substitute for wood in residential fireplaces. When it is burned, it gives off heat in the form of flames, and water vapor instead of smoke.

Advantages

Biomass is a clean, renewable energy source. Its initial energy comes from the sun, and plants or algae biomass can regrow in a relatively short amount of time. Trees, crops, and municipal solid waste are consistently available and can be managed sustainably.

If trees and crops are sustainably farmed, they can offset carbon emissions when they absorb carbon dioxide through respiration. In some bioenergy processes, the amount of carbon that is re-absorbed even exceeds the carbon emissions that are released during fuel processing or usage.

Many biomass feedstocks, such as switchgrass, can be harvested on marginal lands or pastures, where they do not compete with food crops.

Unlike other renewable energy sources, such as wind or solar, biomass energy is stored within the organism, and can be harvested when it is needed.

Disadvantages

If biomass feedstocks are not replenished as quickly as they are used, they can become non-renewable. A forest, for instance, can take hundreds of years to re-establish itself. This is still a much, much shorter

time period than a fossil fuel such as peat. It can take 900 years for just a meter (3 feet) of peat to replenish itself.

Most biomass requires arable land to develop. This means that land used for biofuel crops such as corn and soybeans are unavailable to grow food or provide natural habitats.

Forested areas that have matured for decades (so-called “old-growth forests”) are able to sequester more carbon than newly planted areas. Therefore, if forested areas are not sustainably cut, re-planted, and given time to grow and sequester carbon, the advantages of using the wood for fuel are not offset by the trees’ regrowth.

Most biomass plants require fossil fuels to be economically efficient. An enormous plant under construction near Port Talbot, Wales, for instance, will require fossil fuels imported from North America, offsetting some of the sustainability of the enterprise.

Biomass has a lower “energy density” than fossil fuels. As much as 50% of biomass is water, which is lost in the energy conversion process. Scientists and engineers estimate that it is not economically efficient to transport biomass more than 160 kilometers (100 miles) from where it is processed. However, converting biomass into pellets (as opposed to wood chips or larger briquettes) can increase the fuel’s energy density and make it more advantageous to ship.

Burning biomass releases carbon monoxide, carbon dioxide, nitrogen oxides, and other pollutants and particulates. If these pollutants are not captured and recycled, burning biomass can create smog and even exceed the number of pollutants released by fossil fuels.

Conclusion

Biomass is a clean, renewable energy source. Its initial energy comes from the sun, and plants or algal biomass can recover in a relatively short period of time. For example: Ukraine is an agrarian country, and it would be advisable to install biomass power plants here. There are also many fertile lands in our country, which will be very helpful in creating biofuels for biogas plants.

REFERENCES

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