HAWAIʻI STATE ENERGY OFFICE

What is Bioenergy?

Bioenergy uses organic material to produce electricity, heat, and fuel. This organic material is called **biomass, and it's full of stored energy from the sun**. Types of biomass include:

Crops

Wood

Grasses

Algae

Vegetable Oils & Animal Fats

Agricultural Waste

Biomass can be grown on purpose, which is called feedstock, or harvested from the natural environment. Sustainable agriculture practices and careful management are needed to reduce environmental impacts and make sure biomass isn't used faster than it's made.

Turning Biomass Energy Into Electricity

To turn biomass directly into electricity, the material is burned in a boiler to make steam. The steam is used to spin a turbine, which generates electricity.

Hawai'i's only operating plant-based biomass facility is the Green Energy Team Biomass Plant on Kaua'i, which burns woodchips from invasive trees to make electricity. In 2023, this project generated 7.8% of Kaua'i's electricity.

Turning Biomass Into Fuel

Biomass can also be processed to make liquid and gas fuels called biofuels. There are many different types of biofuels, each made using different processes and sources of biomass. Biofuels can be burned at a power plant to create electricity or used for transportation.

Ethanol

Renewable Diesel

Biodiesel

Renewable Natural Gas (RNG)

Pacific Biodiesel's Hawai'i Island refinery produces 6 million gallons of biodiesel per year, made from waste oils, which can be used in any diesel engine without modifications.

Hawai'i Gas operates the state's only RNG plant, located at the Honouliuli Wastewater Treatment Plant in Ewa Beach, O'ahu. It supplies less than 1% of all gas sold on O'ahu by Hawai'i Gas.

Waste-To-Energy

Waste-to-Energy (WTE) facilities make electricity by burning garbage waste, which includes some biomass. WTE facilities consistently need lots of waste to be economically viable, which is a challenge for each island.

Photo courtesy of the City & County of Honolulu

Hawai'i currently has one WTE facility: H-POWER at Campbell Industrial Park, which supplied 4.5% of O'ahu's electricity in 2024. H-POWER diverts nearly 90% of O'ahu's municipal solid waste from the Waimānalo Gulch Landfill.

Bioenergy: Key Takeaways

Renewable: The biomass used to generate bioenergy can be regrown, but careful and sustainable management is required.

Firm: Bioenergy produces reliable, consistent electricity available 24/7.

Resource-intensive: Growing biomass for burning or fuel can require lots of land, water, nutrients, and money.

Learn more about bioenergy at www.energy.hawaii.gov

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