

Processed Biomass



Biomass refers to all organic matter derived from living or recently living organisms, plant and animal-based. Burning raw biomass usually has a high content of volatile matter and ash and lower density and energy values. Processing the biomass into compact, evenly sized pieces such as briquettes or pellets allows the biomass to burn more efficiently and evenly, increasing their energy density and transportability.

Briquettes are molds of compressed biomass and can be made into a variety of shapes and sizes depending on the feedstock, the level of compactness and mold used and are usually no smaller than 2cm. Briquettes can be carbonized, acting as a replacement for charcoal, or non-carbonized, often replacing firewood and raw biomass fuel. **Pellets** are smaller and denser, short roundish sticks of 6-12 mm diameter and are shaped by pressing dry biomass through a die with many holes. Both are made through a process called densification, by applying pressure, heat and a binding agent (such as starch) to loose biomass residues.

Resource Availability

Fuel briquettes and pellets can be made from a biomass byproducts such as saw dust, charcoal dust, grasses, straws, wood waste, husks, and other agricultural wastes which are abundant and otherwise unproductive in many developing areas.

Production/Processing

Carbonized fuel briquettes are made from waste materials that have undergone carbonization (the conversion of organic substances into carbon in the absence of oxygen). These are often made with a machine and include a heated drying step to get rid of the water to make the briquette strong enough to be used in the same burning capacity as charcoal. Non-carbonized briquettes are produced from waste materials that are partially decomposed and then dried and can be made manually by hand, with presses, or with a mechanized mold or extruder, and by mixing the feedstock with water and a binder and drying them. Pellets are produced by densifying the biomass using rollers (known as 'dies') that make smaller cylindrical pieces under intense pressure.

Distribution

Different distribution chains are appropriate for different briquette and pellet markets. Small producers will sometimes deliver the product to consumers by bicycle, handcart, wheelbarrow, by public transport if the distribution point is far away, sell through market outlets or set up a shop at a weekly market. Mid-range producers who may own a small factory sell to domestic users through an organized retail market.

Advantages of Processed Biomass

- **Environment and Health:** Biomass densification and processing can make productive fuel out of otherwise useless byproducts. Their consumption, if made from waste residues, does not contribute to deforestation and land degradation like traditional firewood consumption. Lab tests indicate that when used in an advanced stove, pelletized and briquette fuels may dramatically decrease emissions.¹
- **Gender/Livelihood:** Using non-forest collection sources to make briquettes alleviates the burden of having to collect wood or pay for charcoal in the market. There is also a role for both men and women to serve as entrepreneurs and the creation of employment opportunities in the collection of biomass and the production and distribution of briquettes and pellets, often in refugee situations.
- **Efficiency:** Briquettes and pellets are consistent in size and shape and ready to use upon purchase, so the same amount of energy is delivered during each use, unlike firewood which can vary in size, moisture content and temperature making it difficult to determine how much fuel is needed. Pellets have a larger surface area open to combustion, which means less smoke and more heat quickly.
- **Affordability:** Raw materials for briquetting are abundant in many developing regions, and productive use of them could save on the cost of waste disposal.²

Barriers to Adoption

- Lack of awareness among potential producers.
- Lack of appropriate financing mechanism for businesses.
- Lack of stable supply.
- Consumer bias in favor of traditional fuels.
- Costs associated with production, price of raw materials and equipment as compared to unprocessed wood or government subsidized fuels.
- Distribution in rural areas can be problematic.
- Perceived risk of investing in plants where briquetting is a new technology.³

Alliance Focus Country Opportunities

China – Approximately 700 million tons of biomass residue is produced in China every year. This amount could be sufficient to meet all of rural China’s cooking needs but the vast majority of this goes unprocessed and burnt, contributing to harmful emissions.

Biomass pellets are cleaner than coal and other solid fuels and so there remains a significant opportunity to improve China’s environment and local health issues. Through an MOU between the Alliance and key Ministries in China, the next few years for China’s cookstove and fuels sector will aim to foster the widespread adoption of clean stoves and fuels, such as pellets, for rural households in China in order to realize these benefits for local communities.

Kenya – Biomass fuels are one of the most important sources of household energy in Kenya. The demand for firewood and charcoal often outstrips supply because the resources are depleted faster than they are replenished. This is compounded by inefficient methods of charcoal production and consumption such as the use of biomass with basic cooking devices, combined with unsuitable cooking spaces, a leading cause of household air pollution.

Engaging and supporting the briquette, pellet and advanced biomass cookstoves sector in the region will be a key strategy in the next few years. Through a series of targeted workshops and capacity building support for local enterprises, the Alliance is helping to address the barriers that are inhibiting the expanded adoption and scale of cleaner processed biomass.

Alliance Partners

- GIZ
- SNV
- GVEP
- Practical Action
- UNHCR

FOR MORE INFORMATION:

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