

Analysis Report of Pellet Processing & Utilization in Vietnam

Abstract

The main ideal of this report shows that there are many biomass fuel in Vietnam, such as rice husk, bagasse, coffee waste and coconut. these biomass fuel can be processed into different types of pellets, therefore numbers plants occurred in Vietnam which brought great business to them. The pellet processing technology is also analyzed in this report, especially the wood pellet technology. Usually the biomass fuel is used for heat and power generation, because they need them to do other necessary life things like :cooking, drying and warming. However, we also should notice some problems appeared in utilization.

1. Types of Biomass Pellets

Pellet fuels are heating fuels made from compressed biomass. Pellets usually include wood pellets and biomass pellets. Wood pellets are the most common type. A form of wood fuel, wood pellets are generally made from compacted sawdust or other wastes from sawmilling and other wood products manufacture, Other woody biomass sources include palm kernel shell, coconut shell, and whole-tree removal or tree tops and branches leftover after logging and which otherwise help replenish soil nutrients. As well grasses can also be pelletized, creating grass pellets. Pellets are manufactured in several types and grades as fuels for electric power plants, homes, and other applications in between. Pellets are extremely dense and can be produced with a low moisture content (below 10%) that allows them to be burned with a very high combustion efficiency.

There are some main biomass pellet fuels in Vietnam such as rice husk, bagasse and coconut .

Rice Husk

While we had to conclude that rice husk is in Vietnam on a larger scale already utilized, the practical availability is small, and mainly scattered. Nevertheless with the large amounts of rice produced, especially in the Mekong area, it still is a good source for pelleting..

Sugar Cane Bagasse

In 2010 the production of sugar cane bagasse was 24million tons. In Vietnam the production of bagasse is 12.5~15.0 tons per ha. The area of the cultivation in Vietnam in 2002~2003 was 315000 ha. These bagasse can be used to supply electricity and heat.

Coffee waste

Coffee waste from either wet processing or dry processing is not fully utilized. At the same time coffee processing is an industry with a high energy demand. In Vietnam mainly diesel is used to fulfill this demand. The use of coffee waste for bio gas production (wet processing) or direct combustion should be further explored.

Coconut

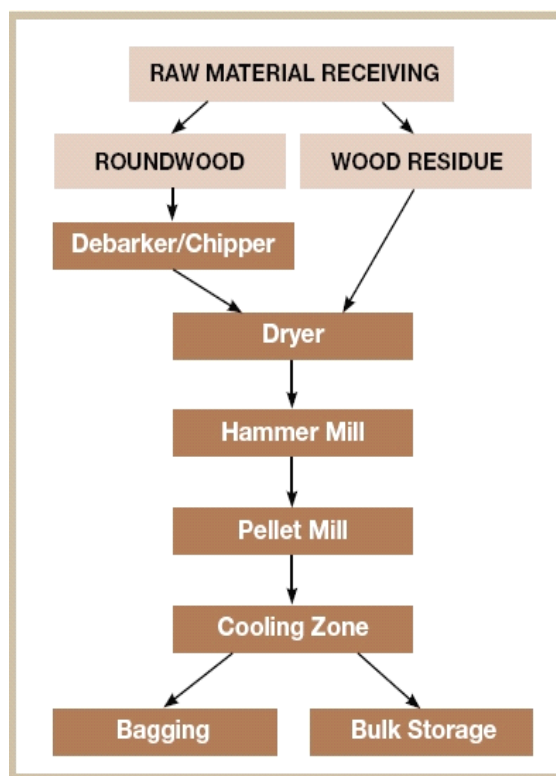
Vietnam has 130,000 hectares of coconut plantations and harvests around 700 million of nuts yearly. Vietnam is the largest international exporter of coconuts for fresh consumption, with high demand coming from China. Coconut oil production is less attractive due to significant price

volatility and a highly competitive market driven by palm oil. Consequently copra production is low and this by-product of coconut oil production is imported from the Philippines for animal feed. Coconut cultivation is concentrated in the Mekong Delta area of southern Vietnam, which generates 84% of the nation's total production. Ben Tre province has the highest concentration of plantations and produces 30% of the national harvest. Infrastructure and the export business environment in the Mekong Delta have continued to improve in recent years in support of the industry.

2. The Pelleting Process and Some Plants in Vietnam

2.1 Pellet process

The process of manufacturing fuel pellets involves placing ground biomass under high pressure and forcing it through a round opening called a “die.” When exposed to the appropriate conditions, the biomass “fuses” together, forming a solid mass. This process is known as “extrusion.” Some biomass (primarily wood) naturally forms high-quality fuel pellets, while other types of biomass may need additives to serve as a “binder” that holds the pellet together. However, the creation of the pellets is only a small step in the overall process of manufacturing fuel pellets. These steps involve feed stock grinding, moisture control, extrusion, cooling, and packaging. Each step must be carried out with care if the final product is to be of acceptable quality.



Pellet process

2.2 Plants in Vietnam

There are numbers of plants installed in Vietnam. Forty bagasse co generation plants installed in 40 sugar mills. Five co generation systems selling extra electricity to national grid . One rice husk fired power plant in the first phase installed one boiler and selling steam in industrial zone. Ten rice husk fired power projects under documents. Also there are some supply system in Vietnam

such as Dinh Hai rice husk steam power plant in Can Tho city, bagasse fired power plant in Ben Tre sugar plant, coconut shell and rice husk fired steam boiler in Ben Tre province, bagasse pellet boiler in Ben Tre province and Wood processing plants. There are still more and more plants occurring in Vietnam.

3. Wood Pellets Process Technology in Vietnam

In the wood processing sector, the rate of wood residue depends very much on the processing technology, the type of input material and the type of products that are made. However, due to the old fashion techniques used in Vietnam it is known that only a small volume of wood material is utilized as final product by the wood manufactures, about 40% of the timber (Figure 7). Therefore, wood waste volume is large (about 60% of input material). Wood chips after wood processing is various in sizes and types. Therefore, it requires separation for treatment and processing, something that not all factories are willing to do. Nevertheless homogeneous waste products have higher market prices. When the wood chips are sorted they can be used to make particle boards, fiber boards (MDF) and wood-wool – it could also be used to fuel to processes if heat is required in the wood processing industry itself (drying - mainly in the large industries).

The pellet of biomass such as sawdust, shavings from wood processing industry or from forest residues, helps solving the relative low -density problem of wood wastes. Wood pellet is a type of bio fuel made by compressing woody sawdust (from saw mills / wood processing factories) as small pellets with diameter of about 4mm and moisture of lower 10%, which makes it a very efficient for combustion. Vietnam has limited experienced with pellet technology and imports wood pelleting technology (i.e from Japan, German or Taiwan). Some domestic companies and research centers have started studying and developing woody pelleting machines to adopt to Vietnamese condition such as Vietnam Institute of Agriculture Engineering and Post harvest Technology (VIAEP) and Vietnam Energy of Institute. In most cases the raw materials are collected from surrounding households, sawmills and processors as input materials for the production processes.

4.Utilization of Biomass Fuel in Vietnam

For heat and power generation

Vietnam has a large scale demand of heat for drying purposes, this can be in the wood processing industry but also in many other sectors like the agricultural sector, brick making, cement industry, beer breweries, pottery etc. Traditionally often inefficient furnaces are being used, resulting in steam and/or hot air used to dry the agricultural or other products such as firewood fired furnaces or co-firing coal and firewood are used to provide the hot air for drying green tea. In new installations constructed over the last 5 years, it is observed that the popular boiler technology applied for steam generation using biomass wastes are Fluidized Bed Combustion (FBC) and produced locally by Vietnamese mechanical companies. Generating electricity based on woody biomass sources is not common in Vietnam and does not draw attention from investors in this regard due to a lack of feed-in-tariff mechanism. In fact, the wood processing industry has demand of both heat for drying wood and electricity for its process. Moreover, Vietnam has no incentive policies for utilization for energy generation to attract potential investors. Currently, a draft version of feed-in-tariff incentives for biomass based power generation projects have been under

development and discussion, but has not been concluded yet. However, the proposed tariff of 5.6\$cent/kWh is quite low and potential project developers indicate that it is unattractive to develop woody biomass fired power plants.

5. Problems in Fuel Pellet Utilization

- pellet resources are scattered around the country which causes difficulties for management, collection and transportation (In the mountainous areas mainly fuel wood, in the Mekong delta and Song Hong Delta mainly agricultural residues).
- Biomass and biomass energy have not been commercial in Vietnam.
- Lack of finance for advanced technologies of biomass Energy applications.
- Bad habit of using fuel pellet.
- Lack of incentive policy for the utilization of the production from biomass pellet (bio fuel, biomass energy).
- The fuel pellet and bio fuel energy development have not been paid as much as other social–economical problems such as hunger-eradication and poverty-alleviation.
- Lack of technologies and equipment for biomass pellet production improvement, biomass material handling and biomass energy applications: bio fuels, bio power, bio products.
- Lack of experience and experts to carried out different researches on technologies and equipment developments of biomass pellet utilization.