Introduction

Wood pellet is one of the largest internationally traded solid biomass commodities used for energy purposes. They have a low moisture content and relatively high energy density. There are several transportation methods including rail, truck, and seaway. The cost of those methods varies depending on the pellet volume, transportation distance, and availability of infrastructure.

The transportation and logistics of wood pellets are important, as the process can influence the final price of the product. In the whole business chain, transportation cost accounts for about 10% of the total production cost. This implies that the cost of transportation will reflect in the final selling price.

Wood Pellet Production

Raw material sourcing of wood pellets is very flexible; for example, roundwood, mill wastes, harvest residuals, and urban clearing are all possible feedstocks for wood pellet production at different prices.

Pellets are packaged in three ways: small consumer bags that hold about 15-25kg; jumbo bags carry about a ton, or are stored loosely in large containers.

Pellets that aren’t ready to be shipped or distributed are stored in well-designed silos and flat storage buildings under controlled environmental conditions.
Wood Pellet Distribution

Pellet transportation mainly involves three methods: trucks, trains, or ships.

- Trucks
  Trucks are popular for small amount pellets transportation to end customers which have high carbon costs compared to trains or ships.

- Trains
  Trains are mainly used for medium-distance transportation from producers or loading facilities.

- Vessels
  Vessels are the most widely-used transportation tool for wood pellets, which accounts for 66% of the worldwide pellet trade. Vessels are used for long-distance transportation via ocean with environmentally-friendly and economically attractive features.

Potential Challenges

Damages can add significant cost and waste to the supply chain. When pellets are damaged during transportation, it is hard to repair or replace them.

- Moisture content
  High moisture content leads to mold growth, pellets split and turn into sawdust, and energy inside will dissipate.

- Self-heating
  Self-heating of biomass may occur in two ways, chemical oxidation and microbiological decay. That means the fresher the wood pellets, or the higher moisture content the wood pellets, the greater the risk of self-heating.

- Off-gas emission
  The rate of gas emission is related to the storage temperature, relative humidity, and the volume of headspace.

Safety

- Closed storage spaces must be ventilated and tested for the presence of CO.
- Electrical equipment is grounded to prevent static discharge.
- Ideally, wood pellets should be stored below 30ºC with temperature sensors connected to alarm system.

Handling

- To prevent the formation of fines and dust, handling should be as gentle as possible. The more handling steps the more they break up and the greater the fiber loss.
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- All conveying systems should avoid actions of rubbing, wedging or grinding.
References


https://www.ecowoodpellets.co.uk/author/sqb-brookridge/


https://www.pellet.org/wpac-news/proper-handling-of-wood-pellets