# International Trade in Wood Pellets: Current Trends and Future Prospects

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*International trade in wood pellets* (HS code 4401.31)*, which is heavily influenced by European Union (EU) climate change regulations, emerged in the late 2000s and has grown rapidly. The United States is the world's largest exporter of wood pellets, most of which are destined for the EU. This briefing analyzes current trends as well as factors related to the sustainability of wood pellet trade.*

## Production and Consumption of Wood Pellets

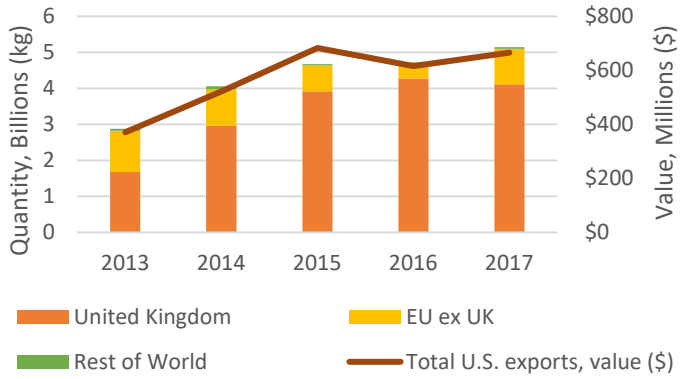
Wood pellets are a biomass product that generate energy when burned and are manufactured from various sources, including forestry residue, wood waste, thinnings, and additional harvesting of mature trees. Once collected, the feedstock is dried, ground, compressed, and extruded into wood pellets of a consistent size. The wood pellets are then cooled, packaged, and transported to a final destination for energy generation. To generate heat, steam, or electricity, wood pellets are burned in boilers or stoves.

## U.S. Production and Exports of Wood Pellets

Most U.S. wood pellets are produced in the U.S. Southeast, a region which has long been a big supplier of wood to the lumber, pulp, and paper industries. In 2017, by quantity, the United States exported 73.3 percent of its wood pellet and other densified biomass production and consumed 26.7 percent domestically. U.S. wood pellet exports totaled 5.1 billion kg with a value of $666 million in 2017; this was an increase of 78.4 percent by quantity and 79.6 percent by value from its exports in 2013. Of the U.S. wood pellet exports in 2017, 99.1 percent by quantity went to the EU (figure 1), predominantly the United Kingdom (80.0 percent), Belgium (10.5 percent), and Denmark (7.3 percent). U.S. wood pellet exports are shipped almost exclusively to Europe rather than Asia, likely for two reasons. First, transportation to Europe (relative to Asia) is faster and cheaper from the U.S. Southeast where most mills are located. Second, there is greater demand for U.S.-produced wood pellets in Europe as much of Asian demand is more locally sourced.

**Figure 1: U.S. wood pellet export destinations by quantity (kg) & total exports by value ($) 2013-2017**

Source: U.S. Department of Commerce




## International Demand and Trade in Wood Pellets

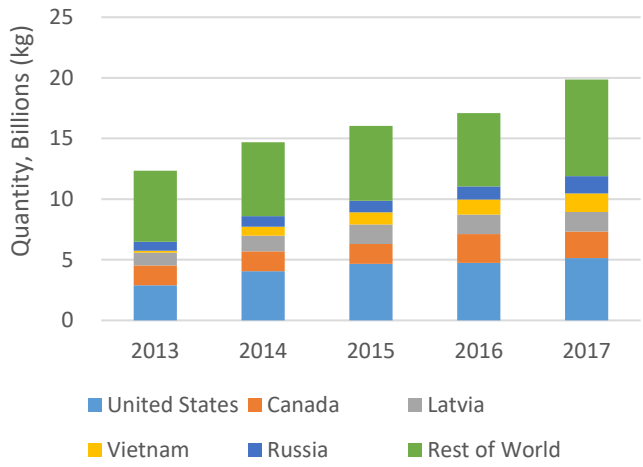
In Europe, the growth in wood pellet consumption has been heavily influenced by the EU's Renewable Energy Directive (RED) requirements[1] and the EU's decision to designate biomass as a low-carbon renewable energy. Additionally, some EU member states reportedly are providing financial assistance to support the use of wood pellets. The proportion of biomass in the EU energy supply has subsequently been increasing.[2] In Asia, also driven by national climate policies, there has been sizable growth in wood pellet production, trade, and consumption. Canada, like the United States, exports most of its wood pellet production to the United Kingdom and consumes a modest amount.

[1] The EU RED (2009) originally mandated a target of a 20 percent share of energy from renewable sources in overall EU energy consumption by 2020. The EU's current target is 32 percent by 2030.

[2] In the United Kingdom, for example, bioenergy rose from 3.7 percent in 2013 to 6.4 percent in 2017 of the primary energy supply; wind and solar combined rose from 1.3 percent in 2013 to 2.7 percent in 2017.

After the United States, the next largest wood pellet exporters by quantity in 2017 were Canada, Latvia, Vietnam, and Russia (figure 2). All of these countries have sizeable forest resources. The five largest global wood pellet importers by quantity in 2017 were the United Kingdom (35.5 percent), Denmark (15.9 percent), South Korea (12.5 percent), Italy (9.2 percent), and Belgium (5.6 percent). For the three largest importing countries, each had a different dominant regional source. The UK imports came chiefly from North America (80.3 percent), Denmark's imports came chiefly from Europe (86.0 percent), and South Korea's imports came chiefly from Asia (94.1 percent).

**Figure 2: Global wood pellet exports by quantity (kg), 2013-2017**
Source: Global Trade Atlas




**Future Prospects**

Because the wood pellet industry's emergence and growth has been largely influenced by EU climate regulations, its future trajectory is subject to changes in those regulations based on scientific analysis, debate, and policymaking. The focal issue is the EU's continued designation of wood pellets as a low-carbon energy source. During combustion, wood pellets generally emit more carbon dioxide ($CO_2$) than fossil fuels per unit of energy produced, and release other gases and substances including nitrogen oxides, sulfur dioxide, methane, carbon monoxide, and particulate matters. Thus, over the short-term, wood pellet production and consumption add $CO_2$ to the atmosphere.[3] Over the long-term, however, some, most, or all of the added atmospheric $CO_2$ is absorbed by intentional reforestation. In particular, the proportion of biomass production that uses forestry residue and small thinnings, versus the proportion that uses additional harvesting, is a vital part of the product's $CO_2$ accounting. Notably, a 2018 report by Forest Research (the research agency of the UK Forestry Commission) concluded that the former has low risks and should lead to low $CO_2$ emissions, while the latter can have significant risks of high $CO_2$ emissions. Although a tightening of EU rules on biomass could potentially dampen U.S. wood pellet exports, a June 2018 EU agreement largely maintained the status quo, for now. Further, although it is unclear what impact Brexit may have on the UK's continued adherence to the EU RED, the UK has its own national and international goals which likely mean continued demand for U.S. wood pellets.

**Data sources:** Global Trade Atlas; UK Government; U.S. Department of Commerce; U.S. Energy Information Administration. **Other sources**: Aguilar *et al.* "Assessment of Global Wood-Based Bioenergy" in Hansen *et al.* "The Global Forest Sector: Changes, Practices, and Prospects." 2017. Ciolkosz, D. "Manufacturing Fuel Pellets from Biomass." Penn State University, College of Agricultural Sciences. 2009. Cornwall, W. "Is wood a green source of energy? Scientists are divided." *Science*. 2017. European Academies' Science Advisory Council. "Multi-functionality and sustainability in the European Union's forests." 2017. European Commission. "Environmental implications of increased reliance of the EU on biomass from the South East US." 2016. U.S. International Trade Administration. "Biomass Wood Pellets." 2016. Matthews, R. et al. "Carbon impacts of biomass consumed in the EU: Supplementary analysis and interpretation for the European Climate Foundation." *Forest Research* (The Research Agency of the UK Forestry Commission). 2018. UK Department for Business, Energy & Industrial Strategy. "UK Energy in Brief 2018." 2018. Washington State Department of Natural Resources. "Forest Biomass and Air Emissions." 2010.

[3] Includes $CO_2$ emissions from harvest (if any), collection, and transport of wood feedstock, as well as manufacture, transport, and combustion of wood pellets.