

# Transboundary flows of woody biomass waste streams in Europe

## Summary Series

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**Authors:** Prof. Dr. Martin Junginger, Utrecht University; Dr. Mika Järvinen, Aalto University; Dr. Olle Olsson, Swedish Environmental Institute; Christiane Hennig, German Biomass Research Centre; Pranav Dadhich, Aalto University

**Edited by:** Martin Junginger, Thuy Mai-Moulin, Mar Edo and Inge Johansson

## Introduction

The world is facing one of its major waste management problem in the 21st century. According to International Solid Waste Association (ISWA), the global urban waste generation levels are increasing every year at 7 to 10 billion tons per year. The maturity of the waste management systems differs significantly between different countries, where some countries lack collection and treatment of waste at the same time as others have moved ahead from the traditional waste management systems to consider a transition towards a circular economy. In a circular economy the aim is to reduce and ultimately eliminate the concept of waste and keep all materials as much in a closed-loop as possible. That concept though will take time to implement and it needs drastic changes throughout the value chain - converting the chain into a cycle/loop. For the time being, the combustion of waste with energy recovery remains an important end-of-life option, also contributing to the production of renewable energy. Strong legislative bodies and regulations are also helping to curb the problem related to waste generation, especially in the European Union (EU).

An important factor in a sound and secure waste management system is proper quantification of data regarding the generation, trade as well as disposal methods of the waste. The Basel Convention requires the member countries to provide yearly national reports for the trans boundary shipment of waste. Despite that, there lacks a consolidated approach towards a holistic picture of shipment of waste in the world. Especially wood waste is being increasingly used as a feedstock for energy purposes, next to traditional fuel types as well as other biomass sources. Hence, a proper quantification of solid biomass waste would be beneficial for industries as well as countries to assess the potential for renewable energy (currently heat and electricity, but in the future possibly also transport fuels) and recycling options for proper and faster disposal. This report aims at quantifying the existing data on the trans boundary shipment of solid woody biomass waste in north-western Europe during the years 2010 till 2016 in the form of trade maps and analyze the underlying key drivers behind the shipment of waste.



## Results

Non-hazardous wood waste is a rather cheap fuel in comparison to other solid biomass resources and hence is used in some countries for bioenergy production on a significant scale. Also, large amounts of hazardous wood waste are traded, but an overview of these trade flows is so far lacking in literature. An analysis of its trans boundary shipment can be helpful for the national plans of the countries involved as well as the industries and organizations. The study chose the European Waste Codes (EWC) to shortlist the type of wood waste. The EWC were narrowed down to mainly 191206\* (hazardous wood waste) and 191207 (non-hazardous wood waste) which have considerable trade flows in Europe. Next to the valorisation as material, wood waste is being used for producing energy in modern bioenergy plants in Germany, The Netherlands and Sweden. The main importers of both hazardous and non-hazardous wood waste are Germany and Sweden with a yearly import of 600+ kilotonnes (KT). The Netherlands also imports non-hazardous wood waste from UK and Belgium for the feedstock of its bioenergy plants. The main exporters of non-hazardous wood waste are UK, The Netherlands and Norway. The combined exports exceed 1200 KT in recent years. The major exporter for hazardous wood waste is The Netherlands with a yearly average of 100 KT to Germany.

The general trend of total shipment of non-hazardous wood waste is increasing every year since 2010. The non-hazardous wood waste is in demand because of its industrial grade nature and cheaper price than other biomass resources. The hazardous wood waste shipments are generally declining since 2010 due to stricter legislation that requires the countries to take responsibility of the hazardous waste that it is producing.

The key driver for both hazardous and non-hazardous wood waste utilization is legislation and policies, which differ between the countries investigated in this report. The support provided by legislation and policies of a country can pave way for a better capacity to deal with hazardous as well as non-hazardous wood waste. This is the case in Germany, where a detailed legislation regarding waste management was setup in 1990 regarding waste management. In the following years additional legislation and policies were introduced on the subjects of trans boundary shipment of waste, the circular economy of waste and management of wood waste as well as supporting the use of biomass including wood waste for energy purposes. The latter induced the

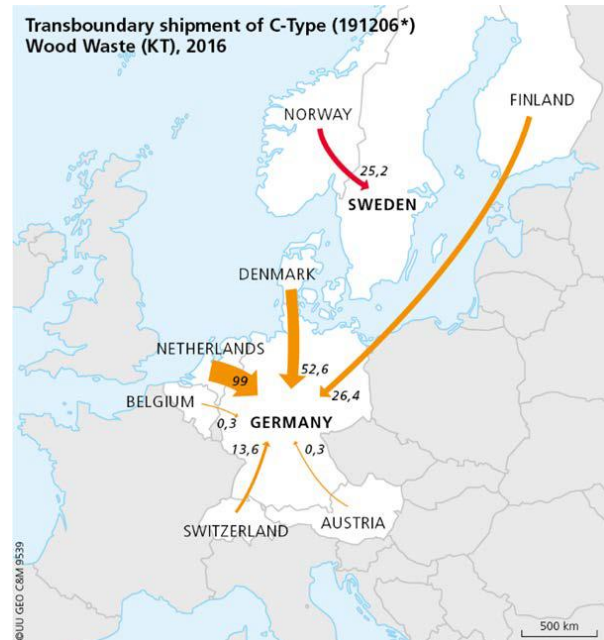


Figure ES1: Transboundary shipments of hazardous wood waste in Northwestern Europe in 2016

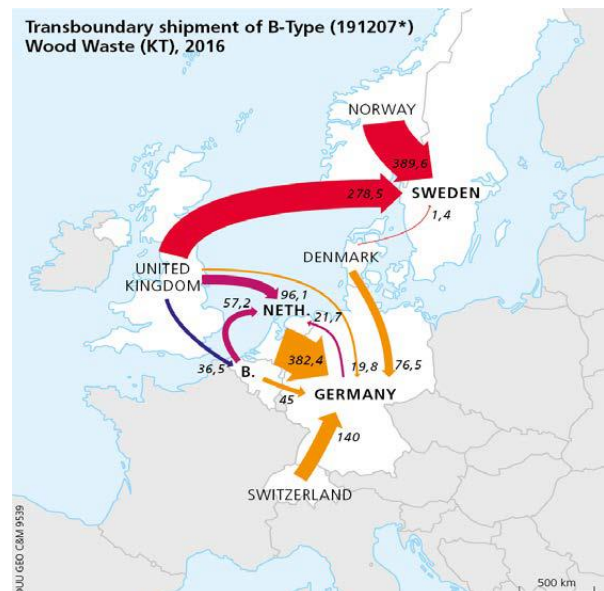


Figure ES2: Transboundary shipments of non-hazardous wood waste in Northwest Europe in 2016

installation of bioenergy plants.

In 2015, 700 solid biomass-fired combined heat and power plants dedicated to wood waste were in place with an installed electric capacity of 1510 MW<sub>e</sub>1 requiring a considerable amount of wood waste (DBFZ, 2015). This demand largely drives the trans boundary shipment of wood waste in Europe.

The non-hazardous (B type) wood waste trans boundary flow occurs extensively in Northwest Europe (see figure ES.2). Germany and Sweden are the two major importers and UK and The Netherlands are the two major exporters of non-hazardous wood waste. A total of 1522 KT of wood waste was traded in 2016, with Germany importing 664 KT and Sweden importing 668 KT.

The trade of non-hazardous wood waste is mainly driven by the installed wood waste combustion capacity in Germany and Sweden. These trade flows also looked very similar in the years before 2016.

While trade flows especially from the UK and to Germany can be in the order of several hundred kilotons, the overall contribution of traded wood waste to national bioenergy production is very small to negligible in the countries investigated, typically between 1-3% of total bioenergy production. This is also likely to remain this way, as it is not expected that wood waste volumes will suddenly strongly increase in coming years.

The full report is available at <https://www.ieabioenergy.com/wp-content/uploads/2019/01/IEA-Bioenergy-2019.-Wood-waste-trade-study-FINAL.pdf>