FREQUENTLY ASKED QUESTIONS

WOODY BIOMASS

THIS DOCUMENT ADRESSES FREQUENTLY ASKED QUESTIONS IN MUNICIPALITY COUNCILS AND REGIONAL ENERGY MEETINGS

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BIOZE

TABLE OF CONTENTS

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01

INTRODUCTION

Biomass energy plays a crucial role in Europe's energy transition and serves as a significant source of renewable energy. However, it is not without controversy, as concerns regarding its impact on climate and the environment persist.

This document focuses on the primary method of energy production from woody biomass, which is combustion. In the next pages, when referring to biomass, it should be understood as woody biomass.

There are other methods of energy production from biomass, such as anaerobic digestion for wet biomass, which is covered in a separate FAQ-document.

Insights into the impact of bioenergy are constantly evolving. Therefore, this document should not be considered final. It serves as the basis and source of information for the FAQ in the regions participating in the BIOZE program.

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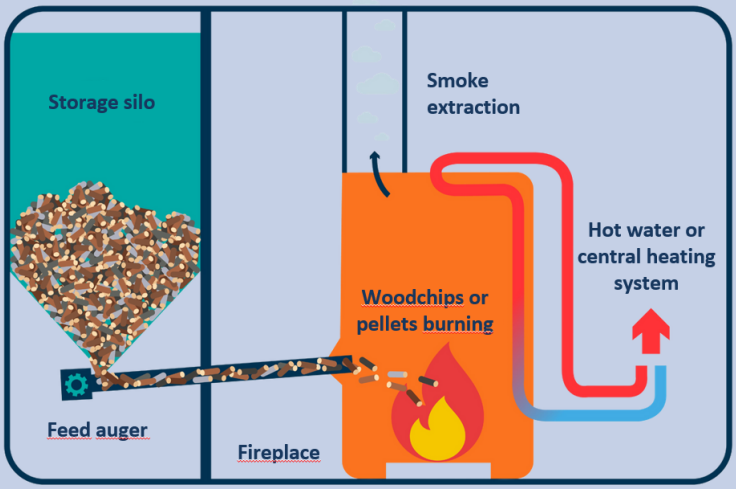
02 WHAT IS WOODY BIOENERGY?

Wood bioenergy is energy from **wood residues** from the wood and paper industry, forest maintenance, hedges, lanes, parks and gardens. Wood – often in the form of **chips** or **pellets** - is combusted in a furnace releasing heat to generate **steam** or **hot water** in a boiler. After combustion, flue gases are cleaned before release in the atmosphere. Wood energy is widely used in Europe in the industry and heating networks and forms an important source of renewable energy especially for heating.

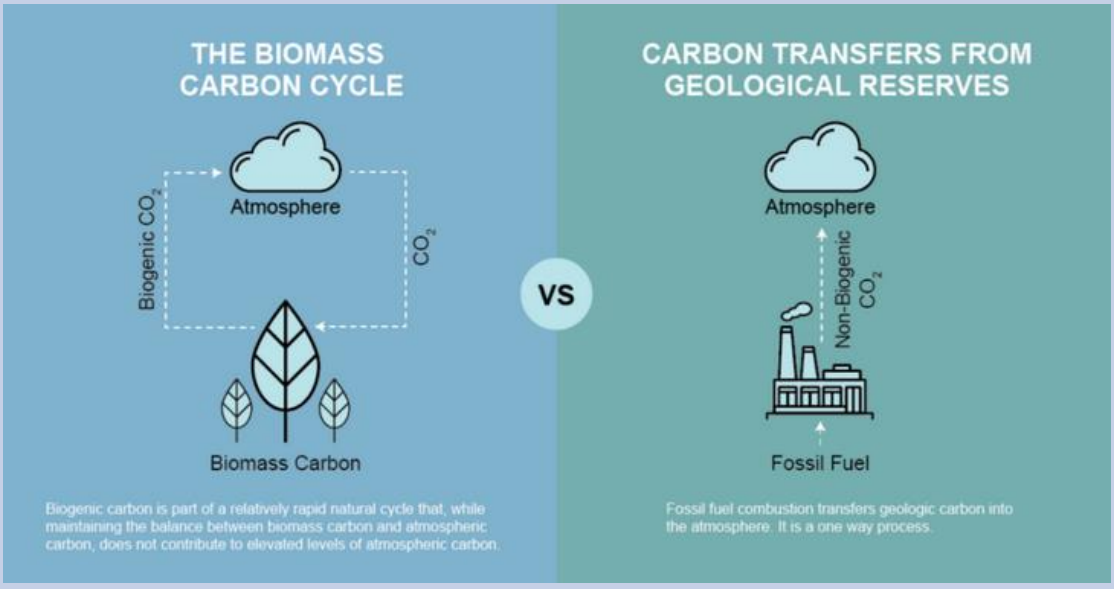
Woody biomass boiler operating diagram



03 DOES WOODY BIOENERGY CONTRIBUTE TO THE GREENHOUSE EFFECT?

No, it does not. Trees and plants absorb **carbon dioxide (CO2)** as they grow through the process of **photosynthesis**. This carbon is known as **biogenic carbon**, which is stored in organic matter. When biomass is used for energy production, this stored carbon is released again, but the amount released is equal to what was absorbed during the biomass's growth.

In contrast, carbon from fossil fuels, which has been sequestered deep underground for thousands of years, is released into the atmosphere when burned, contributing to **global warming**.



Source : De Guzman, 2020

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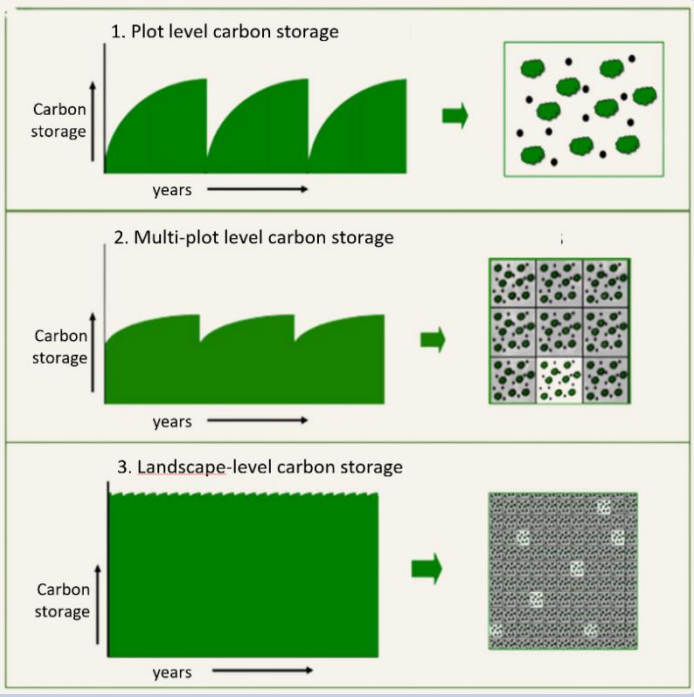
Furthermore, bioenergy helps in the battle against climate change by:

- saving fossil fuels (natural gas for heating, coal for electricity generation),
- avoiding spontaneous fermentation of organic matter which releases methane and CO2. Methane has a greenhouse effect more than 28 times stronger than that of CO2.

However, the overall CO2 emissions potential from biomass depends heavily on the type of feedstock used. The more waste or hedge-based biomass is utilized, the better the overall CO2 balance becomes. The emissions amount is comparable to other renewable energy sources, ranging between **10 and 30 gCO2/kWh**.

Bioenergy does emit some CO2 into the atmosphere due to fuel consumption during harvesting and transport. According to European regulations, only woody biomass that saves more than 70% CO2 compared to fossil fuels can be registered as renewable by Member States. This threshold will increase to 80% in the future (RED II regulation).



Source : CE Deft (2013), translated and compiled by BTG

Does cutting down trees result in a reduced absorption of CO2?

No, this is not necessarily true. Effective forest management is crucial for maintaining the health and vitality of forests and their capacity to sequester CO2. Well-managed forests serve as carbon sinks.

Forests are susceptible to climate change-related hazards such as storms, droughts, bark beetle infestations and wildfires. Implementing proper forest management practices helps to minimize these risks.

What about the long regrowth time of trees?

Trees regrow much faster compared to fossil fuel sources like coal, gas, and oil, which take thousands to millions of years to form. While individual trees can take 20 to 100 years to regrow, when looking at forests on a larger scale, replanting ensures their size and CO2 absorption capacity remain stable.

In European forests, more than 50% of harvested timber is obtained by thinnings. Thinnings are important to improve growth and stability of remaining well-shaped trees, as these benefit from the increased light availability, leading to accelerated growth.

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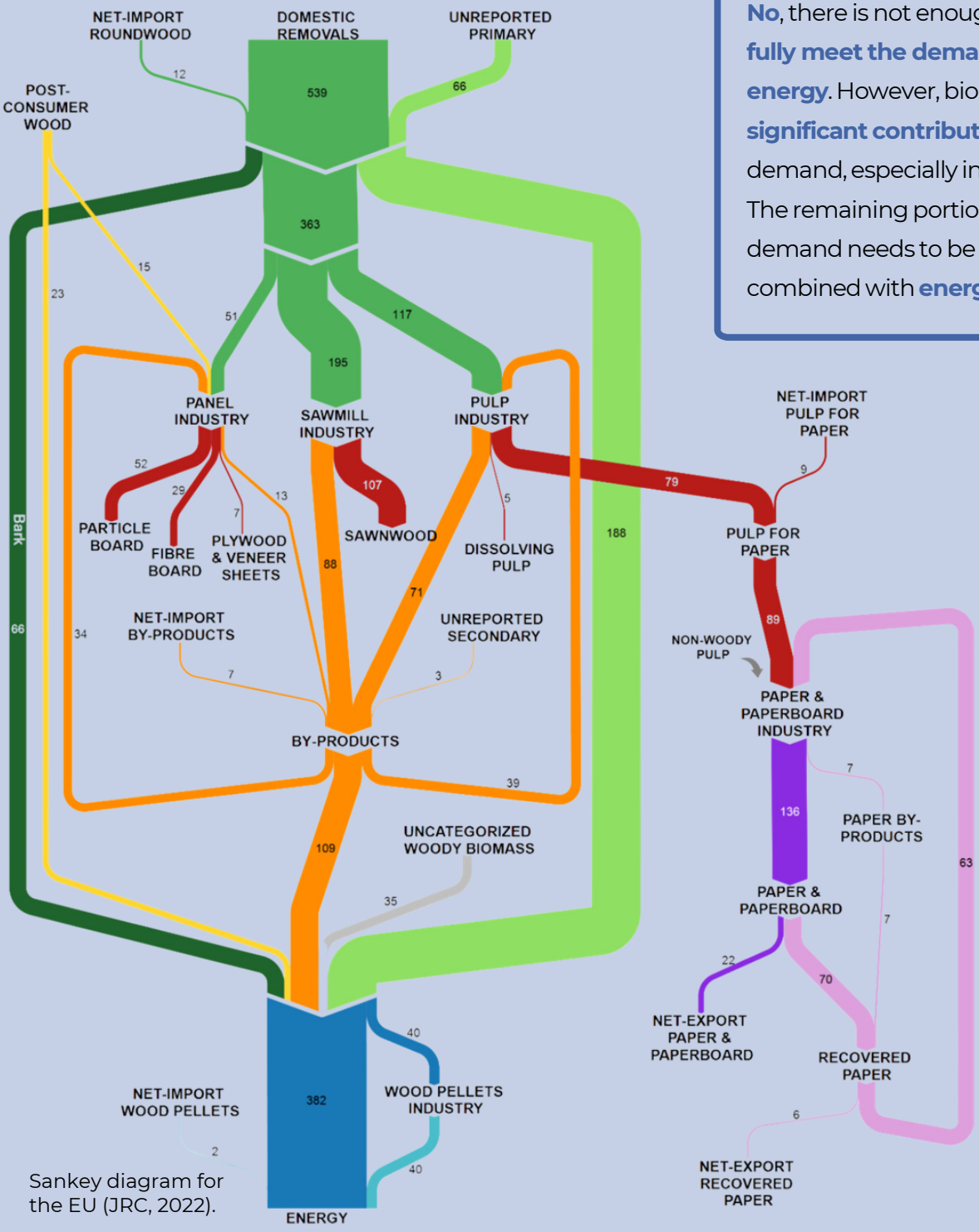
04 IS THERE ENOUGH BIOMASS TO MEET RENEWABLE ENERGY TARGETS?

year 2017 - EU



Sankey diagram for the EU (JRC, 2022).

No, there is not enough biomass available to **fully meet the demand for renewable energy**. However, biomass can still **make a significant contribution** to the energy demand, especially in heating applications. The remaining portion of the energy demand needs to be met by other sources, combined with **energy-saving measures**.

The availability of biomass depends on the volume of residual streams generated by the **forestry**, **timber** and **paper sectors** and other products as shown in the Sankey diagram for the EU (JRC, 2022).

These streams account for more than **60%** of the total amount. The remaining 40% comes from forest and landscape maintenance, hedges, lanes, parks and gardens.

The availability of biomass may increase in the coming years due to measures aimed at improving **forest maintenance** and the **growth of the biobased industry**. Moreover, the utilization of residues for chemicals and materials is expected to increase with the development of new technologies in the future. This aligns with the EU's policy on promoting a biobased economy.

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05 DOES HARVESTING BIOMASS LEAD TO SOIL DEGRADATION?

While the harvesting of biomass from forests does result in the removal of nutrients and soil degradation if not managed properly, it is possible to reduce this impact by conducting **proper biomass harvesting practices**. Well developed guidelines have been established by the forestry sector. Certification programs such as **FSC** and **PEFC** have been implemented to ensure sustainable forest management. Efforts are being made to mitigate negative impacts. Moreover, a significant amount of woody biomass is obtained from urban areas, where concerns regarding nutrient depletion are less prominent.

06 DOES BURNING BIOMASS CONTRIBUTE TO AIR POLLUTION?

Minimizing emissions from biomass combustion is crucial, and modern installations utilize **flue gas cleaning systems** to emit only a minimal amount of substances. The primary sources of emissions are **fireplaces** and **old wood stoves**. In certain rural areas, biomass-based heating may be the only viable option, and it should continue as long as it remains limited and the air quality allows it. The EU has set **regulations on emissions** for large-scale biomass boilers, aiming to minimize air pollution by imposing **limits on emissions of pollutants** such as particulate matter (PM), nitrogen oxides (NOx), and sulfur dioxide (SO2).

07 HOW CAN WE ENSURE FORESTS ARE NOT DESTROYED BY HIGH DEMAND?

By enforcing laws, regulations, and implementing robust certification systems, we can safeguard the health of our forests. The EU mandates that **only bioenergy derived from sustainable sources qualifies as renewable**. EU countries are prohibited from providing support to energy plants that rely on non-renewable sources. Certification systems play a vital role in ensuring compliance with the necessary sustainability standards, requiring effective control mechanisms.

WHY ARE THERE SO MANY DIFFERENT OPINIONS ON WOODY BIOMASS?

Opinions on biomass vary due to differing perspectives, including those of scientists. People's concerns range from future feedstock availability to agricultural transitions. Some place great faith in international treaties and certification, while others remain skeptical. Moreover, many emphasize the importance of nature and biodiversity. The diagram below illustrates these prevalent opinions on woody biomass. When engaging in detailed discussions about biomass, it is crucial to take into account these diverse perspectives.

OVERVIEW OF OPINIONS IN THE WOODY BIOMASS PUBLIC DEBATE

PERSPECTIVES	CLIMATE	STRICTLY RENEWABLE	RENEWABLE FEEDSTOCKS	ECOLOGY	SUSTAINABLE DEVELOPMENT
Objective	Immediate reduction of greenhouse gases to reduce temperature rise within 1,5 degrees	Renewable energy system on basis of solar, wind and green hydrogen	Regeneration of feedstocks with circular and biobased economy	Life within closed borders (e.g. circular agriculture)	Fair mondial trade with improvement of local communities
Source of inspiration	**IPCC**	**Rocky Mountains Institute**	**Ellen MacArthur Foundation**	**WWF Living planet; Rockström, Planetary Boundaries**	**VN Sustainable development goals**
Realisation	All options to be used. Technology neutral. Carbon pricing required.	Careful selection of technologies. Government incentives. Local initiatives.	Government to stimulate closing of supply chains and innovation.	Policy directed at preserving habitats and biodiversity. Change of induvidual lifestyle.	Fair trade. International cooperation. Certification.
Role of anaerobe digestion and biogas	Woody biomass required for climate goals. Including carbon capture and storage. Effective certification and verification.	Locally produced biomass when no alternative available. Biomass is an intermediate solution.	Biomass to be used for high value applications (chemistry and materials). Only use as energy as last step of cascade.	No wood combustion, planting trees as climate measure. Only with sustainable agriculture and forestry part of residues may be used.	Biomass is not scarce. Increase possible by import. Together with improvement of local living conditions abroad.

Source : MSG Strategies, adapted by BTG, 2023

BIOZE PROJECT

BIOZE is a small-scale project funded by the Interreg North Sea programme, scheduled to run from 2022 to 2024 for a duration of 18 months. Operating at the local level, this project aims to enhance the governance of biomass utilization for promoting a sustainable transition. It seeks to strengthen the capabilities of local authorities to effectively engage and collaborate with citizens and stakeholders in the bioenergy sector.

THE PARTNERS

- AILE (France) - Lead Partner
- 3N (Germany)
- BEON (Netherlands)
- EM Normandie (France)
- Innovatum Science Park (Sweden)
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