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Biomass Report (Romania)

Activity A.T2.1: Biomass potential analysis

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The potential for exploitable organic residue for each participating country listing key aspects such as location, amount, transport options and costs.

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1. METHODOLOGY

Although biomass in Romania is present in the landscape, whether it is forest residues or those that remain after the harvest of agricultural crops, much of it is not used and exploited even less in order to produce energy.

Much of the biomass that is still used is used to produce pellets and briquettes for domestic heating plants and even industrial heating plants for small and medium-sized industrial halls in order to produce heat.

Data availability is also restricted, and the Urbasofia team that collected this data, although finding the names and addresses of biomass producers and processors, had trouble finding the quantities of biomass produced.

Several online sources were used to collect the data.

One of them was sites that present information about various companies in Romania such as List of companies and RisCO, sites where those companies operating in the field of biomass were searched.

Another source of data was the Forest Stewardship Council portal where various characteristics can be filtered in this case, the producers who deal with the processing and processing of wood and other wood derivatives.

The Interreg Danube project platform, Energy Barge, has also been an important source of data collection, providing information on traders, suppliers, processors and end users.

Various reports were used to gather data and make a perspective on biomass in Romania, including Mapping the potential of Romania for the Bio-Based Industry prepared by the Bio-based industries consortium (BIC) and Cross-clustering partnership for eco boosting. -innovation by developing a joint bio-based value-added network for the Danube Region created by the Romanian Cluster Association in Work Package 3 of the DanuBioValNet project, funded by Interreg Danube.

Following the search for biomass data in Romania, biomass sources were identified that correspond to all 4 types, respectively Wood and woody biomass, Herbaceous biomass, Aquatic biomass, Animal and human waste biomass and implicitly with their various subtypes, among which the most predominant

Wood and woody biomass - Wood-based raw materials (logging), Stems, branches, foliage, bark (logging residues), Pellets, briquettes, chips

Herbaceous biomass - Straws (barley, wheat, sunflower etc.), Other residues (fruits, seeds, grains, cobs etc.)

Animal and human waste biomass - Meat and bone meal (MBM), Manure, Municipal / industrial organic waste.

In addition, some sources of aquatic biomass from several fish farms / farms and fish meat processors have been identified.

Regarding their presence in the territory, most biomass sources are found in Transylvania, which administratively corresponds to most of its territory, the Central Development Region, but also outside the Carpathian arc, in Moldova, Muntenia and Dobrogea. There is no detachment or large difference between the 4 regions. Several biomass sources are also found in the western and southwestern part of Romania.

All biomass processing and supply centers in the database have "in-use" status.

Qualitative details on Moisture, Bulk Density and Carbon were identified using two sources of information provided by the WPT2 - BSERC leader, respectively:

- Converting Biomass to Energy - A Guide for Developers and Investors, developed by The International Finance Corporation in collaboration with the Austrian Federal Ministry of Finance.
- A review on biomass: importance, chemistry, classification, and conversion published by Antonio Tursi in Biofuel Research Journal.

Another source of data collection of the representative List of accredited producers and power plants for renewable energy sources accredited for the application of the CV promotion system updated on 31.12.2019 - * where ANRE stands for National Regulatory Authority in the field of Energy

The information regarding the purchase price (expressed in Euro) and the transport price (expressed in EURO / ton / kilometer) were not available for Romania, therefore the European average was used in consultation with the other European states involved in the project.

The transport hubs were stipulated according to the example and directives specified by the leader of the work package, WPT2, thus establishing the nearest train stations but also the nearest ports.

*** Note: In some cases, the nearest railway stations were not taken due to the fact that they were from rural areas and only served passenger transport.

*** Note: In some cases in terms of stations and ports were not considered the closest in number of km (could be a few kilometers made on poor quality secondary roads) so in some cases those hubs were passed transport routes where access was more accessible and faster, although the distance was longer.

2. BRIEF DESCRIPTION OF ROMANIA - BIOMASS LANDSCAPE

Biomass in Romania corresponds to two main types:

- forest biomass or derived from wood material - this is due to the forested areas in Romania which in 2020 amounted to 6.929 million hectares. However, this area is decreasing in 2016 Romania having 7.048 million hectares. As a result of the various processes that have wood as their main material, the purchase of firewood, for construction or furniture, results in sawdust, pellets, briquettes, wood scraps that are not compliant for other uses. In general, these types of biomass come from the most forested areas of Romania, ie Transylvania, the counties with administrative boundaries that overlap over the Carpathian chain but also the north of Moldova and the Bucovina region. Many of these counties, including Suceava, Harghita, Covasna, Brasov, Arges (NUTS type 3 administrative units) are on the first place in terms of forested area in Romania. Here are also the highest values of wood exploitation.

agricultural biomass - respectively, biomass that occurs as a result of various agricultural processes and approaches, especially crop harvesting. These types of biomass correspond to the agrarian areas of Romania that are found outside the Carpathian countryside, respectively Muntenia, Dobrogea, Moldova, Western Plain and Oltenia. In 2013, Romania registered the 6th largest agricultural area in Europe. The National Statistics Institute provides data on the land fund, the last records dating from 2014 when 14.6 million hectares of agricultural land were registered, of which 9.4 million hectares of arable land. Most crops in Romania are sunflower, followed by corn and cereals such as wheat and barley. In the last 10 years there has also been an increase in rapeseed crops.

Ministry of Energy. In the document "Energy Strategy of Romania 2016–2030, with the perspective of the year 2050 "in 2016 it is estimated that in terms of energy production biomass is used at 45% of its potential.

Various opinions from the private sector estimate that in Romania, biomass represents a percentage of over 60% of the renewable energy potential. The potential of biomass energy has been estimated by experts at a value of approximately 7.6 million tons / year which can be translated into approximately 318,000 TJ / year, and which represents almost 20% of the total consumption from primary sources in Romania. .

A report prepared by EY Romania entitled "Renewable energy can accelerate the decarbonization of the energy sector in Romania, but public initiatives must be synchronized with business intentions" states that by 2020, electricity production in the country came in proportion to more than 12 percent of wind energy, 3.4% of photovoltaic solar panels and 27.6% of hydropower. In total, the production of renewable energy (wind, photovoltaic and biomass) accounted for 16% of the total.

The Ministry of Energy published in 2020 an updated version of the Romanian Energy Strategy in which it estimates 7.6 million toe (* where tons of oil equivalent - unit of measurement equivalent to energy produced by burning fuels) potential energy of biomass.

At the time of this study, most publications, articles and energy specialists in their opinion estimate that in Romania biomass contributes about 3% to electricity production. However, the Integrated National Plan in the field of Energy and Climate Change 2021 - 2030 wants the use of biomass to increase to a value between 50-80 million MWh by 2025, with an estimated biomass volume between 21.5 and 35 , 8 million tons.

The approximations in figures made by various specialists and published by articles of various sites and specialized online magazines, but also on the site of some private institutions, approximate the potential of biomass by type and by region.

Therefore:

- The greatest potential of forest biomass and wood waste is found in the mountainous areas of Romania Carpathian Mountains (19,552 TJ) but also subarctic areas (13,034 TJ) and Transylvania (8,721 TJ) which combined with the potential of other regions in Romania amount to a total of 49,241 TJ per year, potential forest biomass.
- regarding the agricultural biomass, the highest values are in the Romanian Plain made

up of Muntenia and Oltenia (54,370 TJ) followed by the Subcarpathian Zone (40,849 TJ) and Moldova (37,071 TJ) to which are added the values from Dobrogea, Plia de West and other regions and totaling 200,935 TJ.

***Note : where TJ stands for unit of measure Terajoule - urban waste are estimated from the entire territory of Romania is estimated to amount to over 20,000 TJ per year.

According to the Gazeta de Agricultura - at the level of NUTS3 administrative unit regarding the potential of the counties in forest resources, the richest are the following:

- Suceava 647.0 thousand cubic meters
- Harghita 206.5 thousand m³
- Neamț 175.0 thousand m³
- Bacau 132.0 thousand cubic meters
- Constanța 10.4 thousand cubic meters
- Teleorman 10.4 thousand m³
- Galați 10.4 thousand cubic meters

When it comes to agricultural biomass, the richest counties are

- Timiș 1432.0 thousand tons
- Calarasi 934.0 thousand tons
- Brăila 917.0 thousand tons

In addition to these types of biomass in Romania, there are several other types of organic waste that result from various industrial processes such as animal husbandry, animal husbandry and foraging but also paper production or chemical industry, fertilizer production.

There is a higher share of biomass deposits exploited in the Transylvanian area and outside the Carpathian arc, but there is enough business with biomass in the western part of the country.

The biomass quantities correspond to the potential by regions and counties mentioned above.

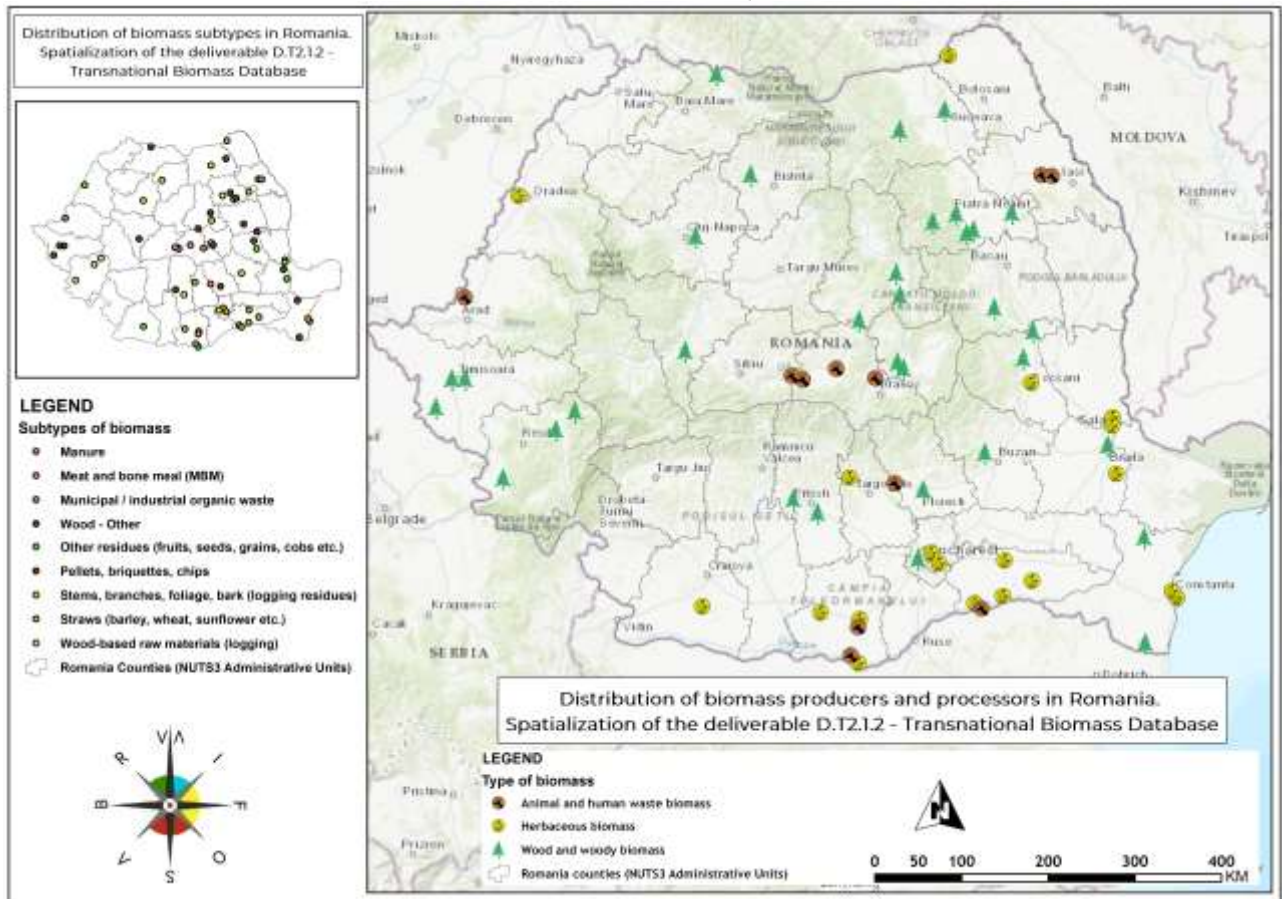


Figure 1: Mapping of Transnational Biomass Database

Regarding the biomass transport, from the perspective of water transport, the ports on the Danube stand out, of which the most accessible is the one in Galati, which also has a larger capacity. Apart from these, the port of Constanta, the largest port in Romania and the second largest port in the Black Sea, is also a viable option for the transport hub, having a large capacity, and being easily accessible via the A2 Bucharest-Constanta Motorway.

Water transport is very viable given that it is the cheapest, and near all ports in the country there are railways and industrial stations but also a network of national roads and highways that will be densified and improved in the coming years. Also, many of the big companies on the list have headquarters and offices on the Black Sea coast in Constanta County.

Each biomass deposit mentioned in the list also has a station within a maximum radius of 50 km to which it is connected by various national roads. Most of the options for the stations were selected from the urban environment, because they are larger and have industrial terminals equipped with storage spaces.

Other future considerations regarding the use of biomass in Romania would be the diversification in terms of its use, currently being used mainly for power plants. Thus, an emphasis on its utility in energy production would be auspicious in Romania's efforts to increase its energy capacity and efficiency.

The Romanian state should also consider the elaboration of a guide of good practices regarding the use of biomass, especially by wood processors and farmers because there is a waste of biomass. In the case of wood processors, they recycle wood waste and give it to other uses that are not related to energy production.

Farmers use the biomass left over from harvesting crops to provide food for the animals (those that feed on leftover corn, alfalfa, or other related plants) or arrange the stables with it in order to provide conditions for horses and cattle. better, over time I use it to help light fires in wood stoves. However, this is the best scenario because in recent years in Romania the phenomenon of land burning has been very noticeable in the post-harvest autumn months, under the false information that this offers a higher degree of fertility to the land and is a more easy to clean the arable space and prepare it for the next sowing.

All these habits that lead to the waste of biomass also happen because farmers, wood processors or any producer, or processor that generates biomass do not have any advantage from the state if they would hand over the biomass to be used for other purposes.

Thus, the Romanian state through the competent bodies could in the best case regulate what happens to the biomass residues that result from different processes of any kind (agricultural, processing or industrial) or if it could not do through various institutions campaigns, workshops and raising awareness about the importance of biomass and the possibility of using it in other fields, especially in energy production, and by offering subsidies or incentives to those individuals or associated companies that collect biomass and teach it could encourage an increase in the amount of biomass that is received and used. This would have ticked another very important topic and which has been specified quite often in recent years at the level of the European Union, namely that of circularity.

The most difficult part of these studies was the lack of data on biomass in Romania. In various situations, the actors working in this field were identified, but other data about these institutions, respectively, the quantities processed and produced, the type of biomass were difficult to find and identify. In fact, none of the companies responded when it was approached. The data regarding the price of biomass for purchase by type but also the price of transport were also difficult to find.

Thus, it would be a useful recommendation to have a "census" of biomass in Romania, of biomass producers and processors, but also a value chain of biomass to show how it is obtained, further processed and then put to use for others. purposes.

Therefore, data of any kind and biomass data must be as accurate as possible so that the true potential of biomass for various uses, including energy uses, can be estimated as accurately as possible. As mentioned above, in the National Energy Strategies developed by the relevant ministry, various forecasts are made based on past results. Various specialists contradict, approve or even give higher predictions regarding the importance that biomass will have in energy production in the coming years.

However, the more accurate the data, the more accurate scenarios can be made and strategies can be made where realistic and achievable goals can be set, the premise being that ambitious goals are set in vain if they are not met on time.

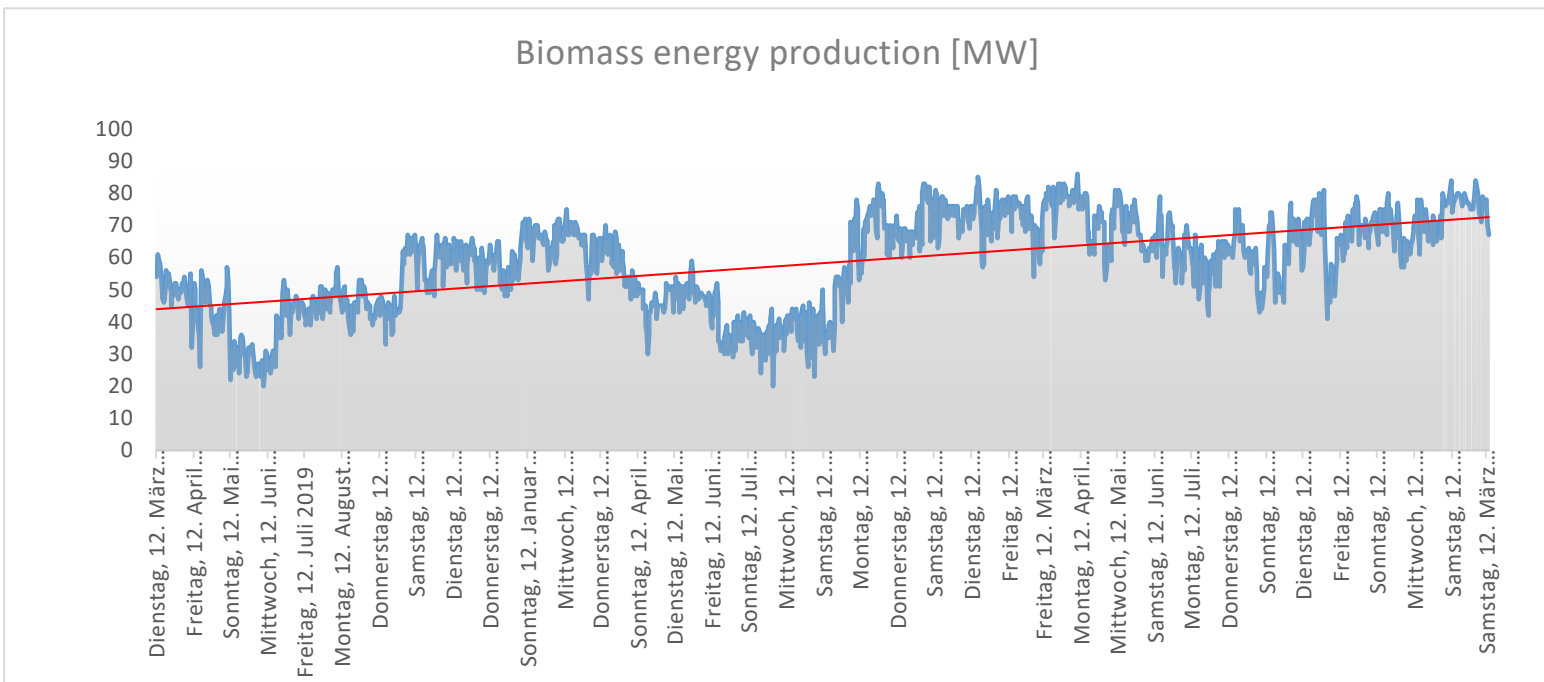


Figure 2. Biomass energy production (2019 – 2022) MW/day

On the national platform that provides real time data called Sistemul Energetic portal (https://www.sistemulenergetic.ro/statistics/show_graph/2019/3/12/0/0/2022/3/14/23/59) which provides information on energy consumption and production general but also categorized by sources but also according to the data presented above, the share of energy produced in Romania from biomass is an increase.

Using the data from the energy portal, the table in Figure 1 was created, to which a trend line was added to emphasize the increase in biomass energy production. Production is expressed in MW / day.

The bottom line is that although the legislative framework is not well regulated and there are no other levers and economic facilities to use biomass for any purpose such as energy production, there are some "pioneers" who produce energy from biomass whether they are private or belong to the state.

However, this increase could have been greater if all the necessary economic, legislative and technical requirements had been put in place. These are a good starting point and can be a good basis for any future action.