AgroBioHeat

Promoting the penetration of agrobiomass in European rural areas

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D5.1: National and European framework conditions

Part 7: National framework conditions - Romania

Lead Beneficiary: GEA
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Abbreviations

Abbreviation	Explanation
ARBIO	Romanian Association of Biomass and Biogas
CAP	Common Agricultural Policy
CHP	Combined Heat and Power
EAFRD	European Agricultural Fund for Rural Development
GD	Government Decision
GDP	Gross Domestic Product
INSSE	National Institute for Statistics and Economic Studies
NAPCP	National Air Pollution Control Plan
NCEP	National Climate and Energy Plan
NO_X	Nitrogen Oxides
PM	Particle Matter
RDP	Rural Development Programme
UEFISCDI	Executive Unit for Financing Higher Education, Research, Development and Innovation
VAT	Value Added Tax

Project consortium

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2	Fundación Centro de Investigación de Recursos y Consumos Energéticos	CIRCE
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11	White Research Sprl	W.R.
12	Agronergy	AGRONERGY
13	Association d'Initiatives Locales pour l'Energie et l'Environnement	AILE

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Country: Romania

Romania is one of the largest countries in South-Eastern Europe. With an area of 237,500 km² and a population of 19.5 million inhabitants it is the 7th largest country in the European Union in terms of population, while its capital Bucharest (2 Mio. inhabitants) is the 6th largest city in the EU. Geographically it is determined by the Carpathians Mountains but also by large agriculture lands around the Carpathians Mountains. The Romanian agriculture sector is represented by massive fragmentation of agricultural areas, the average farms size is 3.66 ha, 98% of the farmers using less than 10 ha of land. The lack of innovative technology, and an old, outdated irrigation system, reasons why Romania is registering lower yields per hectare for its main cultures, compared with the other member states from the European Union.

Romania has an agricultural capacity of approximately 15.5 million hectares, of which above 10 are used as arable land. Agriculture summed up about 4.3% of GDP in 2019, down from 12.6% in 2004 (Word Bank, 2019). As of 2017, 25.8% of the Romanian workforce is employed in agriculture, compared to an EU average of 4.4%.

The Romanian agriculture sector is one of the few sectors of the economy that put Romania at the top of the European charts due to the generous grain and oilseed crops productions obtained each year. The richest counties from the point of view of the agricultural resource used as biomass in energy production are Timis (1,432,000 t/y), Călăraşi (934,000 t/y) and Brăila (917,000 t/y).

In 2018, Romania was the first producer of maize in the EU, with more than 2,5 mil. hectares. Romania produces almost 28 percent of the European Union maize. Sunflower harvest rose in Romania to 3.35 million tons in 2018, up 15.01 percent over 2017 at a yield of 2.9 tons/ha. This data positions Romania on the first place in the EU. Regarding vineyards, currently in Romania existing a total of 186.9 thousand hectares of vineyards plantation, 94.9 thousand hectares represent the plantations with noble vines while the rest of the plantations being covered with organic vineyards, accepted only for domestic production. Another significant source of agrobiomass come from mountain pasture lands. In Romania, 3,2 mil. hectares mountain pasture lands are registered, where the annual cleaning activities can provide 1-2 ton solid biomass/ha.

1. Agrobiomass availability

The energetic sector in Romania is under development and shifting towards creating a bigger share in the power scheme for the energy that is originating from biomass, however still the major focus is on woody biomass resources. At the moment, only 3% of the electricity is generated from biomass - both from woody and agricultural biomass. There is currently increasing interest in usage of wood chips, pellets and in making the chipping technology more available in the central region, this trend is due to the set of policies and projects that has influenced the sector, and also because of the availability of the resources as we can see from the figure below.

According to the Romanian Association of Biomass and Biogas, ARBIO, in 2019 there are a number of 9 operational cogeneration, biomass based plants in Romania, with a total installed capacity of 134.28 MW. In the same time, the primary energy product of Romania estimated for the period 2015-2020 targets 8,373 GWh forest wood per year, 9,762.2 GWh by products of wood-based industry per year and 18,445.18 GWh agriculture by-products per year.

The use of agricultural biomass for energy purposes in Romania is insignificant, despite the fact that an increased potential exists in the country. According to the Romanian Strategy for the Valorization of Renewable Energy Resources (2003), which was approved by a Government Decision (GD 1535/2003), the Romanian potential of agricultural biomass is about 12.6 mio. tones × year-1 which 13 corresponds to approximately 201 PJ. However, more recent studies indicated that the amount of agricultural biomass would be of about 154 PJ (Scarlat et al., 2011), with significant annual variations. The last study refers only to the amount of biomass which is available for bioenergy by considering the agricultural biomass consumptions for other related agricultural activities.

The pellet production from Romania is estimated at a capacity of 300,000 tons per year from which more than 85% is exported (Velcescu & Staicu, 2011). Over 40 plantations tests are implemented for energetic willow in most of the Romanian Counties. A few pilot projects are registered with pellet production from maize, but more common is to produce pellets from straw and shell of sunflowers.

Table 1: Biomass potential (TJ/y) in Romania (Source: Iulian - Dan Gutas, 2018).

Region	Biomass wood - forestry	Wood wastes	Biomass agriculture	Biogas	Urban wastes	Total
Dobroudja	451	269	13,422	1,477	910	16,529
Moldavia	1,728	802	37,071	2,462	2,370	44,433
Carpathians	19,552	8,049	17,506	1,231	1,640	47,978
Transylvanian Plateau	8,721	3,482	12,956	2,954	2,740	30,853
West Plain	3,622	1,603	24,761	4,432	1,825	36,243
Subcarpathians	13,034	5,366	40,849	3,693	6,570	69,512
South Plain	2,133	861	54,370	8,371	6,750	72,485
TOTAL	49,241	20,432	200,935	24,620	22,805	318,033

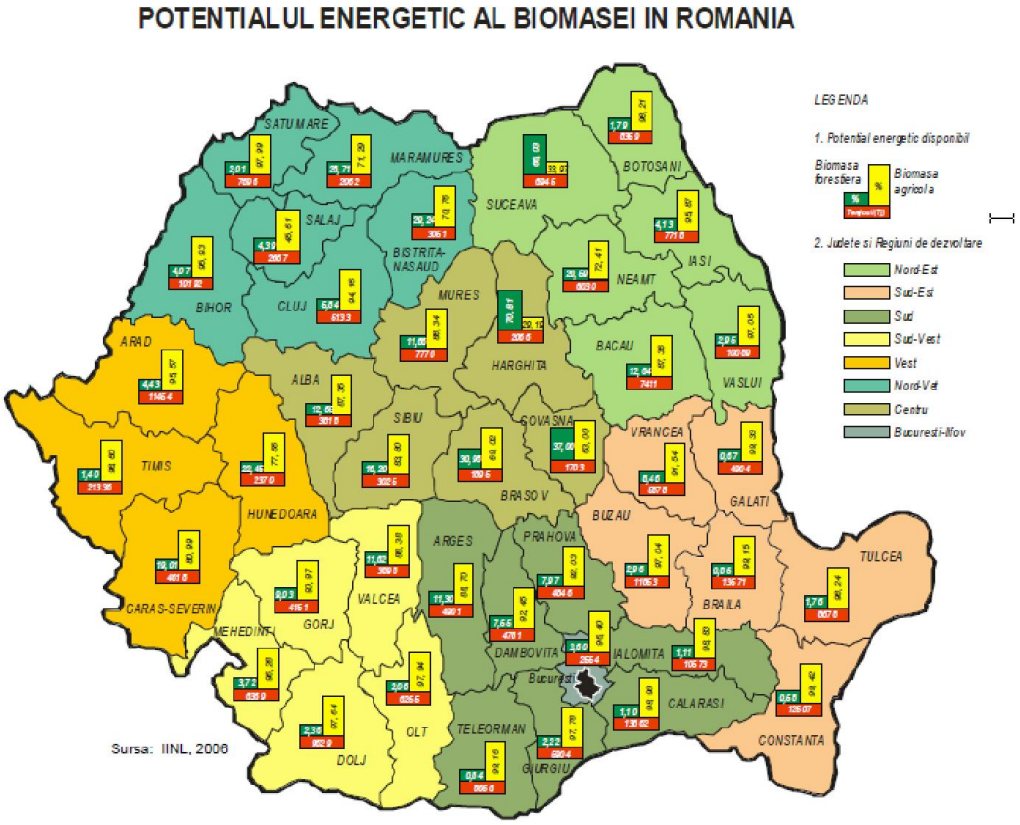


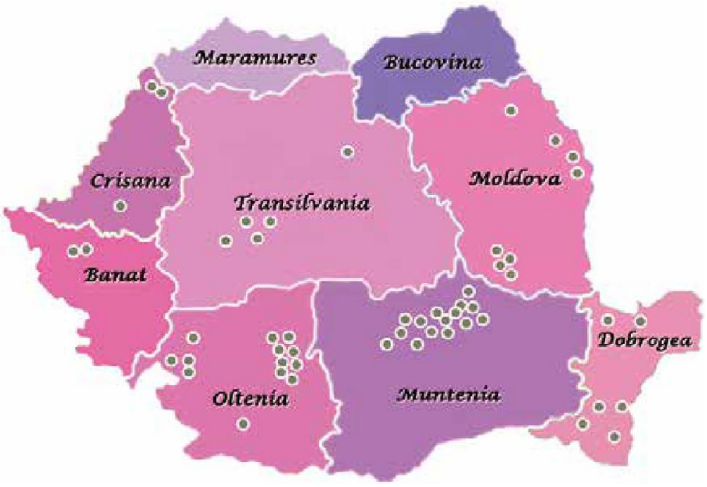
Figure 1: Energy potentials from Biomass Resources in Romania (Source: IINL, 2013).

Agricultural residues – Annual Crops

Agricultural residues – Annual Crops	
Cereal Straw	**CEREAL CROP PRODUCTION:** Cereal production has a central role in Romanian agriculture. According to Eurostat, in 2019 the surface dedicated to cereal cultivation was 5,426 mil. ha, which represents 40 % of the total utilized agricultural area in Romania (in 2018 15,413 mil. ha). The area cultivated with cereals for grains - wheat, maize, barley, barley and oats - increased from 5.04 million hectares in 2010 to 5.42 million hectares in 2019, and production increased from 16.71 million tonnes in 2010 to 31.78 million tonnes, in 2018. In this perspective, the volume of agrobiomass, eg. straws also increased very significantly in the last decade in Romania. In terms of cultivated area with wheat, Romania ranks fourth in Europe, the yield per hectare of 4.8 tonnes is less than the average yield of the European Union (INS, 2019). **GEOGRAPHICAL DISTRIBUTION:** Cereals cultivation has more density in the regions of the South (South Muntenia, South East and South West Oltenia) but it occurs in all the regions of Romania. **ESTIMATION OF BIOMASS PRODUCTION:** The biomass potential from all sectors is estimated at about 7.6 million tonnes/year or 318,000 TJ/year, representing about 19% of the total potentials from primary sources in Romania. Straws of cereal crops can reach 4-6 t/ha in Romania. **USES**: Straw has several different uses, including livestock bedding and fodder, soil fertilization, building material and a very limited part goes to be used as fuel. Prices in 2018 ranged from 10 to 15 €/100 Kg.

Agricultural residues – Annual Crops	
Maize (stalks, cobs)	**MAIZE CROP PRODUCTION:** Romania was on the first position for the second consecutive year in 2018 and 2019 in the EU with a total harvest of 19 million tons. With more than 2.438,5 Kha. Romania produced almost 28 percent of the European Union maize. **GEOGRAPHICAL DISTRIBUTION:** The biggest agriculture farm from south-eastern Europe, is Agricost SA which is a private owned join stock company (from Insula Mare a Brailei), in south-eastern part of Romania, followed by Comcereal Dolj and Transavia. The richest regions with maize production in Romania are South Muntenia and South East. **ESTIMATION OF BIOMASS PRODUCTION:** Maize stalks can achieve 4-6 t/ha in Romania, which are mainly directly chipped and spreaded on the field by harvesting. The annual volume of corns stalk is estimated to 11,85 mil tone in Romania. The bioenergy potential from maize is estimated at about 518,000 TJ/year. **OTHER USES:** Maize crop residues are used for animal breeding, mostly for sheep. **PRICES:** 17 €/100 kg (baled)
Sunflower straw	**SUNFLOWER CULTIVATION:** According to INSSE, Land dedicated to sunflower production in 2018 amounted to 1,006.3 kha, with a yield of 3,062.7 kt. **GEOGRAPHICAL DISTRIBUTION:** Most of sunflower cultivation is located in the regions of West, South-East and South Muntenia.
Rapeseed straw	**RAPESEED CULTIVATION:** According to INSSE, Land dedicated to rapeseed production in 2018 amounted to 632.7 kha, with a yield of 1,610.9 kt. **GEOGRAPHICAL DISTRIBUTION:** Most of rapeseed cultivation is located in the regions of South Muntenia.

Agricultural residues – Permanent Crops

Agricultural residues – Permanent Crops	
Vineyard prunings	**VINEYARDS:** According to INSSE, at present, the area cultivated with vines occupies over 180 kha. Thus, Romania is ranked 5th at EU level as a wine-growing area and 6th at grape and wine production. **ESTIMATION OF BIOMASS PRODUCTION:** According to the estimation, 10.5 MJ/kg is the energy value of the biomass from vineyard prunings. The annual cleaning of plantation produces 1-2 t biomass per hectare. The harvestable biomass from Romanian vineyards archives an annual 270 kt, while the energy output is estimated for 2,835 GJ/y. **GEOGRAPHICAL DISTRIBUTION:**  Currently, in Romania there are 37 major municipalities with vineyards gathered in eight wine regions - the hills of Moldova being the most extensive of them, with almost 70,000 hectares. Other regions such as Tarnavelor in Transilvania, or Vrancean vineyard in Muntenia region is also well-known, as well as the Dobrogean vineyard region. **MARKET:** A few initiatives are in Vrancea, Moldova and Tarnavelor vineyard region. All of them focused on small-scale biomass to heating on household level.
Fruit tree prunings	**FRUIT TREE CULTIVATION:** Total surface 19.69 kha **ESTIMATION OF BIOMASS PRODUCTION:** According to the estimation biomass residuals can achieve 1-2 t/h by pruning

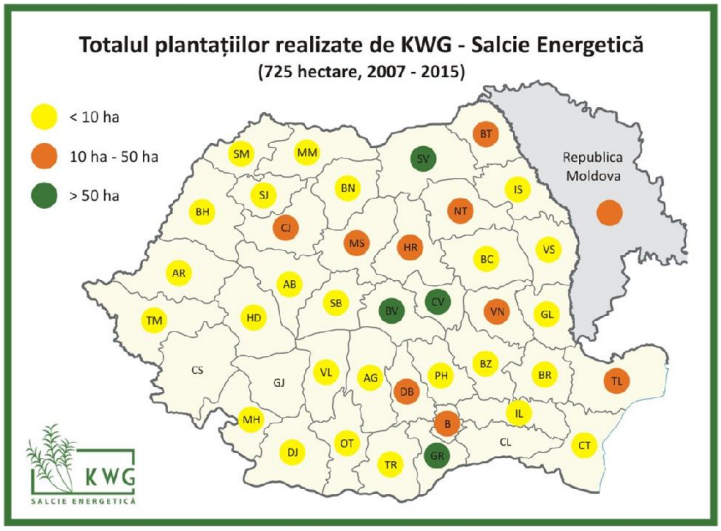
	activities in the early months of the year, therefore according to this assumption about 29.85 kt/y. **GEOGRAPHICAL DISTRIBUTION:** By development regions, the largest areas cultivated with fruit trees are in South-Muntenia, South-West Oltenia and North-West.
Cleaning of mountain/hilly pastures, meadows	**MEADOWS/PASTURES:** Mountain pasture lands in Romania are present on very large surfaces, approximately 3,2 mil. hectares mountain pasture lands are registered, where the annual cleaning activities can provide 1-2-ton solid biomass/ha. **GEOGRAPHICAL DISRIBUTION:** The lands occupied with mountain meadows and grasslands are found especially in the hilly and mountain areas. The counties with more than 115,000 ha, representing more than 20% of their total area, are: Harghita, Mureș, Brașov, Sibiu, Alba in the center of the country, Hunedoara and Caraș-Severin on the west, Cluj; Maramureș, Bistrița-Năsăud, Bihor in northwest; Suceava in the northeast;Vâlcea, Argeș and Gorj in the south and southwest. **MARKET:** In zone of Carpathian Mountains, several associations in agriculture sector established specialized teams for cleaning activities on pasture lands. This activity is obligatory on those areas which are registered for agriculture subventions. The harvested green biomass is chipped and used for local and domestic use, but some biomass is sold on the local markets. 

Figure 2: Biomass from pasture clearings (Source: GEA).

Agro-industrial residues

Agro-industrial residues	
Sunflower hulls	**SUNFLOWER CULTIVATION:** In 2018, more than 1098 mii ha was cultivated by sunflower, achieving 3 mil. ton production. **GEOGRAPHICAL DISTRIBUTION:** The most suitable regions are Oltenia, Dobrogea, Southern Romania, and Western Plain. This area has mainly cernozyme-type soils and properly ensures the sunflower requirements for temperature, respectively an amount of temperatures higher than 7 ° C during April-August, from 1,600-1,950 °C. **PRICES:** 120 EUR/ton Vrac en-gros price (VAT included), 130 EUR/ton pallet - VAT included 178 EUR (VAT inculded) with 15 bags packaging.
Rice Husks	**RICE CULTIVATION:** 8.4 Kha, yield 44.4 Ktons **GEOGRAPHICAL DISTRIBUTION:** In very limited places, mostly in South East **PRICES: na.**

Energy crops

Energy crops	
Woody varieties - SRC (Poplar, Willow, Robinia, etc.)	**Energy willow** 1,000 hectares across the country (source: kwg.ro)  *Figure 3: Location of energy willow plantations in Romania (Source: KWG)* **Paulownia:** Existing 200 ha plantation in Nord-Western Region of Romania, directly used for local district heating in Huedin town.

Energy crops	
Grassy Varieties (Arundo Donax, Miscanthus, Switch grass, etc.)	**Miscanthus:** There are existing plantations in the Southern counties like Constanța, Călăraşi, Mehedinţi, Dolj, Ialomiţa, Galaţi, Olt, Dâmboviţa, Vaslui, Vâlcea, but also in Satu Mare, Timiş, reaching in 2019 more than 1,200 ha. in total. In Romania, the Agency of Payments and Interventions in Agriculture provide subventions for such project with the aim to increase the biodiversity and greening. According to the law, if an arable land/parcel is greater than 15 ha, the given farmer must ensure that an area corresponding to at least 5% of the arable land has ecological function. Miscanthus plantation is eligible to fulfil this requirements. **Alternative uses:** insulation products, horticulture, Horse bedding Miscanthus can be chipped or pelletized/briquetted for energy use. **Giant Reed** SRCs such as giant reed or elephant grass, can also be used for heating or power production. In total, 5,500 hectares were cultivated with such plants in 2019 in Romania. 400 ha out of this was established in last 2 years, along with energy willow and others one third out of these plantations are with paulownia.

2. Rural Development

Rural Development	
How is Rural Development managed?	Rural Development in Romania is managed nationally through one Rural Development Programme (RDP), funded under the European Agricultural Fund for Rural Development (EAFRD) and national contributions. The RDP sets out priority approaches and actions to meet the needs of the specific geographical area it covers.
Are agrobiomass feedstocks suitable for bioheat included in the Ecological Focus Area? (for example, Short Rotation Coppice, Miscanthus, Silphium perfoliatum)	Only those cultivated forest species with short indigenous production cycle are considered, namely: willow (Salix spp), white poplar (Populus alba), black poplar (Populus nigra), including on plots with areas less than 0.3 ha.
Are there any restrictions on the cultivation of dedicated energy crops (woody or grassy varieties)?	The list of energy crops intended for the production of biomass used for electricity generation was approved by the Order of the Minister of Agriculture and Rural Development no. 46/201228, among which rapeseed, corn, energy spade, energetic poplar, giant reed, grass-elephant, princess tree, millet, topinambur, energy grass, etc. Contrary to the legislation, principles and objectives assumed at European level, there was a regress that could not be explained at national level. Thus, in contradiction with the evolution and prospects established at European level, Law no. 186/2017 for the modification and completion of the Land Fund Law no. 18/1991, respectively the Order of the Minister of Agriculture and Rural Development no. 304/201729. In particular, by art. I point 6 of the Law no. 186/2017, art. 92 para. (4) of the Law no. 18/1991, was amended as follows: "Nonagricultural energy crops can be set up only on the arable land of the IV-grade V-grade, established by the pedological and agrochemical offices. The minimum distance to which these crops are placed in relation to other neighboring agricultural crops is at least equal to the height of the energy crop matured". Also, by art. III par. (4): "The list of non-agricultural energy crops shall be established by order of the minister of agriculture and rural development, within 30 days from the date of entry into force of this law".

Rural Development	
	According to Order no. 304/2007, the list of non-agricultural energy crops is represented by seven of the energy crops, namely energy lizard, elephant grass, poplar, giant reed, tree prince, oil shrub, energy grass and dog milk.
Are there any restrictions or mandated practices covering agricultural residues collection?	Not available.
Is there any support for the valorization of agricultural residues at national level? Or at local level?	In the National Program for Rural Development 2014-2020, Measure 4 ”Investment in physical assets” supports, among others, investments in installations for the production of electricity and / or thermal energy, by using biomass. Under this measure, investments aimed at improving / saving water consumption, using renewable energy in the agri-food sector, processing waste, residues as well as reducing greenhouse gas and ammonia emissions in agriculture, including in the fruit sector, will be encouraged. In the National Program for Rural Development 2014-2020, Measure 6 "Development of farms and enterprises" supports inter-alea investments in the production of biomass fuels as well. One of the diversification areas covered under sub-measures 6.2 "Support for setting up non-agricultural activities in rural areas" and 6.4 "Investments in the creation and development of non-agricultural activities" is the production of biomass fuel (eg pellets and briquettes manufacture), with a view to the commercialization, production and use of energy from renewable sources for carrying out its own activity. The financial allocation for sub-measure 6.2 between 2014-2020 was 117.8 million euros, and for measure 6.4 it was 152.6 million euros. By means of sub-measure 8.1 "afforestation and creation of forested areas" support is provided for afforestation of agricultural and non-agricultural land, among the species eligible for afforestation are found acacia and 3 species of willow: white willow, energy willow, weeping willow. This measure between 2014-2020 has a financial allocation of approx. 124.5 million euros. Through the measures of local interest that could be financed by measure 19 "Local Development LEADER" are encouraged, among others, the investments aimed at

Rural Development	
	promoting the use of heat sources based on biomass, the creation and development of biogas production and distribution systems at the level of biogas. community. The total public allocation for 2014-2020 is 563.5 million euros.
Is there a ban on burning stubbles, prunings or other agricultural residues?	Farmers exploiting arable land (including grassland) should not burn the straw or vegetal residuals resulting after harvesting of the crops (straw, grain cereals, maize stalk, sunflower stalks, etc. Also, the grassy or woody vegetation of the permanent grasslands, mountain pasture lands should not be burned. If the farmers do not comply with this condition, reductions and exclusions will be applied to the total amount of agriculture subsidy payment. If the stubble burning affecting larger surface, even fines are applied. By the Law no. 195/2005 on environmental protection, with subsequent amendments and completions, it is forbidden to burn the stems, reed, bushes or grassy vegetation, without the approval of the competent authority for environmental protection. The Government Decision no. 537/2007 regarding the establishment and sanctioning of contraventions to the norms of prevention and extinguishing of stubble burning and fires was not applied in the beginning but year by year the control and monitoring became serious.

3. Logistics and other market considerations

Logistics	
Are harvesters/balers for agricultural residues readily available in the market?	Depending on the micro-region, a few harvesters is available in the larger agriculture regions.
Is there an investment support available to cover the cost of these machines?	In the National Program for Rural Development 2014-2020, Measure 4, Measure 6, and subsidy programs at Leader Action Groups -LEADER e.g. http://www.sovidek-hegyalja.ro/sovidek-hegyalja-leader-ro Leader Measure 4.3 Support for the purchase of equipment needed to collect and prepare biomass from forests, pastures, meadows
Are there any specialized service companies for agricultural residues harvesting and logistics? How does the biomass market usually operate? Are there companies producing agro-pellets?	Agro-Bio-Briquette and pellet producer, Agrobiobrichet, about 105 realized projects on Agro-Bio-Briquette production. https://agrobiobrichet.ro/agrobiobrichet-proiecte-realizate.html The National Institute of Research – Development for Machines and Installations Designed to Agriculture and Food Industry – INMA Bucharest.
Are there any resistance in the market for this kind of product?	

4. Air quality

Air quality	
Has the state submitted a NAPCP? (National Air Pollution Control Programme)	Romania has not fulfilled its obligation, despite previous warnings. Therefore, in February 2020 the European Commission decided to issue a letter of formal notice, granting the country additional two months to respond and to adopt and communicate its plan by this deadline. Otherwise, the European Commission may decide to send a reasoned opinion to the Romanian authorities. The public perception on air quality is increasing mainly in urban areas, where according to measurements high pollution is registered, over the permitted levels, because of the immense traffic. On the other hand, in rural Romania the air quality is from medium to very good, due to less pollution and poor industrialisation.
Competence over air quality related issues is at National or at Local level?	Regulated by Law No. 293/03.12.2018 is mentioned the followings: a) national emission reduction commitments for anthropogenic atmospheric emissions of sulfur dioxide (SO2), nitrogen oxides (NOx), non-methane volatile organic compounds (VOCnm), ammonia (NH3) and fine particulate matter (PM2.5); b) the obligation to develop, adopt and implement a national program for air pollution control, hereinafter referred to as PNCPA; However up today the PNCPA was not published yet. The National System for Assessment and Integrated Air Quality Management provides the framework for cooperation between authorities and institutions with relevant experience for monitoring air quality.. It includes, as integrated parts, the National System for Monitoring Air Quality and the National Inventory System of air pollutant emissions. Data related to air quality can be obtained through the National Network for Monitoring Air Quality. http://www.calitateaer.ro/public/home-page/?__locale=ro

Are performance standards and/or emission limits a possible barrier to deployment of agrobiomass heating systems up to 500 kW?	According to ORDER No. 845/2015 of October 12, 2015 regarding the approval of the technical regulation, published in Monitorul Official nr. 897/02.12.2015 "Normative for the design, execution and operation of central heating installations there are categorized 3 type of boilers: - small size: up to 300 kW - medium size: 300-2000 kW - large size: from 2000 kW upwards - The thermal plants operating with fuels like agrobiomass origin are usually located outside the living areas, taking into account the difficulties created by the transport of the fuel, slag and ash, as well as the danger of pollution. Except the thermal plants using fuels of the above-mentioned category, equipped with boilers with a capacity below 70 kW. For the pollutants resulting from the combustion of the fuel in the boilers, it is recommended to use, in the specific calculations for environmental protection, depending on the type of fuel, the following maximum pollutant emission values: ● for solid fuel (coal, wood) - dust: 100 mg / m3N - carbon monoxide (CO): 250 mg / m3N - sulfur oxides (SO (x)): 2000 mg / m3N - nitrogen oxides (No (x)): 500 mg / m3N The number of boilers depending on the nominal thermal load can be: a) 1 boiler with a capacity of less than 0.3 MW; b) two boilers at heating plant with capacities between 0.3 MW and 2 MW; c) at least three boilers at heating plants with capacities over 2 MW. When no mandatory criteria for choosing boilers regarding performance are imposed, it is recommended to have the following minimum global values at nominal performance: a) 90% for gas fuel (natural gas, liquefied petroleum gas) b) 89% for liquid fuel (light liquid fuel, type M fuel, etc.) c) 88% for pellets from agrobiomass and wood biomass d) 83% for solid fuel (coal) e) 75% for fire wood and wood waste

Air quality	
Are performance standards and/or emission limits a possible barrier to deployment of agrobiomass heating systems from 500 kW to 1 MW?	According to ORDER No. 845/2015 of October 12, 2015 regarding the approval of the technical regulation, published in Monitorul Official nr. 897/02.12.2015 "Normative for the design, execution and operation of central heating installations, it is recommended to equip the heating systems with boilers with high efficiency and low emissions. Wherever possible, heat recovery systems from the flue gases shall be used. However, there is no specified standards and/or emission limits for agrobiomass heating systems from 500 kW to 1 MW in Romania.

5. Tax breaks

Tax breaks	
What is the VAT applicable to agrobiomass feedstock?	Romania standard VAT: 19 %
For comparison, what is the standard VAT rate and the one applicable to fuels used for heating (e.g. heating oil, LPG, natural gas, firewood, pellets, etc.)?	Romania standard VAT: 19 % Natural Gas & Electricity: 9 % Fire wood: 19 % LPG: 19 % Pellets: 19 % Coal: 19% There is no specific VAT rate for heat from district heating, but there is a subsidy programme, namely In the Capital, household consumers pay a subsidized price for heat and hot water of cca 32 EUR/MWh, while the thermal energy in Bucharest without without subsidy is cca. 75 EUR/MWh for companies and public institutions.- 2019 prices.
Are there any tax detraction on refurbishment of buildings/replacement of heating system that can be potentially applied to agrobiomass heating?	There is no tax incentives like detractions on refurbishment of buildings/replacement of heating systems that can be potentially applied to agrobiomass heating in Romania. However, municipalities can decide locally if they apply such financial instruments to encourage the local inhabitants and business towards utilization of agrobiomass heating, especially in rural Romania.

6. Other support measures targeting heating

Other support measures targeting heating	
Are there any rural development measure in place to support the production of bio-heat on-farm? Are there national or local incentives to substitute old fossil fuel boilers (investment support)? Are they applicable to agrobiomass heating solutions?	In the previous financing period 2017-2020, the following supporting scheme was operational Operational Program for Large Infrastructure (POIM), Priority Axis 6 - Promoting clean energy and energy efficiency aiming at supporting a low carbon economy. Specific objective 6.1 Increase power generation from less exploited renewable sources (biomass, biogas, geothermal);
Are there any specific measures in support of energy communities / renewable energy cooperatives that could be applicable to agrobiomass heating?	Support has been provided by subsidy programmes of the Romanian Environmental Fund, National Rural Development Programme and Ministry of Regional Development, Public Administration and European Funds. However, for the upcoming period 2021-2027 supporting measure are not yet defined. In the previous financing period, the following supporting schemes were operational: • The subsidy measure 4, encompassing the sub-measures 4.1 - Support for investments in agricultural holdings and 4.2- Support for investments in processing and marketing of agricultural products, is part of the National Rural Development Programme and it is financed by the European Agricultural Fund for Rural Development (EAFRD). • The National Rural Development Programme's new financing period operated from 2014 to 2020. The programme aimed at facilitating access to finance for local farmers and rural entrepreneurs. Under this programme, installations for heat and/or power production from renewable resources, which will be utilized for the farm's own consumption, were eligible for financing. • Support scheme for less exploited energy sources - the state aid scheme has been approved by Government Decision no. 216/2017 in April 2017 to promote energy production from less exploited energy sources, namely biomass, biogas and geothermal energy (art. 8 Government Decision no.

Other support measures targeting heating	
	216/2017). The support scheme is supported by the Ministry of Regional Development and Public Administration (art. 13 Government Decision no. 216/2017), and aims to increase the electricity and thermal energy production from these sources by 60 MW until the end of 2023 (art. 4 par. 2 and art. 11 letter c) Government Decision no. 216/2017). • Order No. 1818 from 2016 approving the Subsidy Guidelines for the Programme for installing heating systems using renewable energy sources including replacing or complementing classical heating systems, beneficiaries administrative-territorial unities, public institutions and religious institutions)

7. Buildings Efficiency

Buildings Efficiency	
Are there any incentives to renovate buildings integrating renewable heat? Are agrobiomass systems eligible for support under such schemes?	Subsidy Program for improving energy efficiency in houses, beneficiaries are private persons "CASA VERDE PLUS" Subsidy Program for improving energy efficiency in houses, beneficiaries are businesses and legal entities "CASA VERDE PLUS" Regio - Regional Operational Program (Regio-ROP) 2014-2020, Priority Axis 3 - Supporting the transition to a low carbon economy, Investment Priority 3.1 - Supporting energy efficiency, smart energy management and utilization energy from renewable sources in public infrastructures, including in public buildings and in the housing sector; Operation A - Residential buildings. Operational Program for Large Infrastructure, Priority Axis 6 - Promoting clean energy and energy efficiency in order to support a low carbon economy Specific objectives 6.1 Increasing energy production from less exploited renewable resources (biomass, biogas, geothermal). In the previous financing period 2014-2020, the following supporting scheme was operational for urban areas: Regional Programme through Priority Axis 3, IP 3.1, Operation A - Residential Buildings, dedicated to encouraging sustainable energies.

8. Policy Coherence

Policy Coherence	
Are policy instruments impacting agrobiomass designed in a coherent way?	In the EU National Energy and Climate Plans include bioenergy trajectories to forecast the growth of the sector towards 2030. Considerations on local biomass availability and supply should also be included. In certain cases in the same plan there are conflicting measures: integration of biomass residues in soils to increase the soil organic carbon together with measures promoting valorisation of agricultural residues. According to Integrated National Plan for Energy and Climate Change 2021-2030, published in January 2020, the fact that heating and cooling will continue to represent over 50% of final energy consumption requires finding local solutions to the energy needs for heating and cooling, based on new technologies and capitalizing on local and sustainable sources of biomass (investments in sustainable technologies of recovery of biomass from agriculture and waste through their local and non-industrial use and through technologies such as biogas production and not incineration).
1. Soil considerations vs. Valorisation of residues	Regarding soil considerations vs. valorisation of residues in agriculture lands there is no clear regulation.
2. Definition of waste vs. co-products/agri residues	The waste regime is governed by Law 211/2011 and it is NOT applicable to straw and other natural non-hazardous agricultural or forestry material used in farming, forestry or for the production of energy from such biomass through processes or methods which do not harm the environment or endanger human health. In general agricultural by-products come from crop production include straw, maize stalk, husks etc. Their use for feeding or other purposes is justified by the fact that they are produced in large quantities. By-products can be characterized by their low nutrient content.. It is a common feature that low-cost feeds contain high levels of hard-to-digest carbohydrates, ie. fiber. In everyday life agriculture by-products are considered those materials which still have economic rolle, in animal breeding, etc.

Policy Coherence	
	Agricultural residues / agro-industrial wastes are those organic materials which have no purpose for valorization. Furthermore, it can happen that in one micro-region straw is considered as agricultural waste, because there is no technology or capacity for further valorization, while in other region there is an alternative valorisation line, ie. heating of greenhouses.
3. Is the Common Agricultural Policy Strategic plan being developed in harmony with the National Energy and Climate Plan?	On national level no official statistics were available on biomass resources and the legislative area concerning the bioenergy sector is unclear. In establishing the policies and measures to achieve the proposed objectives in Romanian Integrated National Plan in the field of Energy and Climate Change 2021-2030, the main determinants for each dimension were considered, the Common Agricultural Policy and other national development strategies for development of industrial sectors as well.
4. NECPs: 5 dimensions are developed in harmony?	In Romanian Integrated National Plan for Energy and Climate Change 2021-2030 there are developed 5 dimensions: • Decarbonisation: emission mitigation and use of renewables • Energy Efficiency • Energy Security • Internal Energy Market • Research, Innovation and Competitiveness
5. Is there a national bioeconomy strategy? Are there any measures targeting agrobiomass for energy? Are those measures coherent with rural development and energy and climate related policies?	There is no elaborated and officially approved National Bioeconomy Strategy in Romania. However, the from 2016 on the National Institute for Research & Development in Chemistry and Petrochemistry is elaborating a integral research project, ”Research on Identification of the Development Priorities for Romanian Bioeconomy for the period of 2016-2030”. The project is financed by UEFISCDI, executive body of Ministry of Education for RDI activities in Romania.

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