

ENERGY BARGE

Building a Green Energy and Logistics Belt

Project Code: DTP1-175-3.2

Deliverable 6.2.1

Country reports on identified legal and administrative barriers to biomass production in the partner countries

15th December 2017

For the implementation of the project “ENERGY BARGE – Building a Green Energy and Logistics Belt” a subsidy is awarded from the European Regional Development Fund under the Danube Transnational Programme.

The sole responsibility of this publication lies with the author. The European Regional Development Fund is not responsible for any use that may be made of the information contained therein.



Content

I	Tables.....	1
II	Abbreviations	1
III	About the ENERGY BARGE project	4
IV	About this document	6
1	Background	7
2	Executive Summary	8
3	Legal and administrative barriers to biomass production.....	9
3.1	Main biomass feedstocks in the Danube region	9
3.2	Country reports	10
3.2.1	Austria.....	10
3.2.1.1	Funding in the field of biomass.....	10
3.2.1.2	Support for biomass	12
3.2.1.3	Technical barriers	14
3.2.1.4	Barriers in the field of agricultural/forestry laws	14
3.2.1.5	Suggestions for improvement	15
3.2.2	Bulgaria.....	16
3.2.2.1	Funding in the field of biomass.....	16
3.2.2.2	Support for biomass	19
3.2.2.3	Technical barriers	19
3.2.2.4	Barriers in the field of agricultural/forestry laws	20
3.2.2.5	Suggestions for improvement	20
3.2.3	Croatia.....	21
3.2.3.1	Funding in the field of biomass.....	21
3.2.3.2	Support for biomass	22
3.2.3.3	Technical barriers	22
3.2.3.4	Barriers in the field of agricultural/forestry laws	23
3.2.3.5	Suggestions for improvement	23
3.2.4	Germany	23
3.2.4.1	Funding in the field of biomass.....	23
3.2.4.2	Support for biomass	25

3.2.4.3	Technical barriers	26
3.2.4.4	Barriers in the field of agricultural/forestry laws	27
3.2.4.5	Suggestions for improvement	28
3.2.5	Hungary	28
3.2.5.1	Funding in the field of biomass.....	28
3.2.5.2	Support for biomass	29
3.2.5.3	Technical barriers	30
3.2.5.4	Barriers in the field of agricultural/forestry laws	31
3.2.5.5	Suggestions for improvement	32
3.2.6	Romania.....	32
3.2.6.1	Funding in the field of biomass.....	32
3.2.6.2	Support for biomass	34
3.2.6.3	Technical barriers	36
3.2.6.4	Barriers in the field of agricultural/forestry laws	36
3.2.6.5	Suggestions for improvement	37
3.2.6	Slovakia.....	38
3.2.6.1	Funding in the field of biomass.....	38
3.2.6.2	Support for biomass	40
3.2.6.3	Technical barriers	40
3.2.6.4	Barriers in the field of agricultural/forestry laws	41
3.2.6.5	Suggestions for improvement	41
4	References.....	43

I Tables

Table 1: Expected biomass supply for bioenergy production in EU-Danube countries in 2015.	9
Table 2: Expected biomass supply for bioenergy production in EU-Danube countries in 2020.	9
Table 3: Federal subsidies of the Kommunalkredit Public Consulting (KPC) for biomass plants in the commercial and industrial sector in Austria.....	10

II Abbreviations

ADI	Intercommunity Development Associations
AFMCs	Associative Forest Management Communities
ALPA	Agricultural Land Protection Act
ANRE	Romanian National Regulator
ANRSC	Municipal Authority of the Public Services Regulatory
APEE	Association of Producers of Ecological Energy
APPBR	Romanian Association of Producers of Pellets and Briquettes
ARBIO	Romanian Association of Biomass and Biogas
ASPA	Agricultural Producers Support Act
ATUS	Territorial administrative units
BAAP	Bulgarian Association of Agricultural Producers
BAB	Bulgarian Biomass Association
BGBIOM	National Biomass Association
BLC	Biomass Logistics Center
BLE	Federal Office for Agriculture and Food
BMLFUW	Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management
BMVIT	Austrian Ministry for Transport, Innovation and Technology
BMFWF	Austrian Ministry of Economy
CAP	Common Agricultural Policy
CEPF	Confederation of European Forest Owners

CHP	Combined Heat and Power
EEG	Erneuerbare Energien Gesetz (Renewable Energy Law)
EERSF	Energy Efficiency and Renewable Sources Fund
EFA	Executive Forest Agency
EPEEF	Environmental Protection and Energy Efficiency Fund
ESCO	Croatian Public Energy Service Company
EU	European Union
EUBA	Energy Utilization Biomass Association
FITs	Feed-in tariffs
FNR	Agency for Renewable Resources
GDP	Gross domestic product
GIS	Green Investment Scheme
GTKA	Hungarian Scientific Research Fund
HEA	Hungarian Energy and Public Utility Regulatory Authority
HROTE	Croatian Energy Market Operator
ICP	Investment Climate Programme
IEA	International Energy Agency
KLIEN	Austrian Climate and Energy Fund
MAP	Marktanreizprogramm (Market Incentive Programme)
METAR	Hungarian Renewable Energy Support Scheme
NAAFS	National Agricultural Advisory Service
NABB	National Association of Biofuels in Bulgaria
NAPCC	National Action Plan on Climate Change
NDEF	National Trust EcoFund
NGO	Non-governmental organisation
NKFIA	National Research, Development and Innovation Fund

NREAP	National Renewable Energy Action Plan
KPC	Kommunalkredit Public Consulting
OP	Operational Programme
OPIC	Operational Programme “Innovation and Competitiveness”
ÖSG	Ökostromgesetz (Green Electricity Act)
PEFC	Programme for the Endorsement of Forest Certification
PM	Particulate matter
R&D	Research and Development
RDI	Research, Development, Innovation
REA	Renewable Energy Act
REAP	Regional Energy Agency of Pazardjik
RES	Renewable Energy Sources
REECL	Residential Energy Efficiency Credit Line
SEDA	Sustainable Energy Development Agency
SMEs	Small and medium-sized enterprises
SNS	Slovak National Party
SRREA	Slovak Renewable Energy Agency

III About the ENERGY BARGE project

The Danube region offers a great potential for green energy in the form of biomass. The main objective of ENERGY BARGE is to exploit this potential in a sustainable way, considering the Renewable Energy Directive 2009/28/EC, thereby increasing energy security and efficiency in the Danube countries. The project brings together key actors along the entire value chain, biomass companies and Danube ports as well as relevant public authorities and policy stakeholders. The project maps value chains and facilitates the market uptake of biomass, supports better connected transport systems for green logistics and provides practical solutions and policy guidelines. The Agency for Renewable Resources (FNR) coordinates the ENERGY BARGE project consortium with fourteen partners from Austria, Bulgaria, Croatia, Germany, Hungary, Slovakia and Romania.

Project coordinator

Agency for Renewable Resources

Fachagentur Nachwachsende Rohstoffe e.V.	FNR	Germany
--	-----	---------

Project partners

BioCampus Straubing GmbH	BCG	Germany
--------------------------	-----	---------

Deggendorf Institute of Technology	DIT	Germany
------------------------------------	-----	---------

Austrian Waterway Company	VIA	Austria
---------------------------	-----	---------

Port of Vienna	PoVi	Austria
----------------	------	---------

Bioenergy2020+ GmbH	BE2020	Austria
---------------------	--------	---------

International Centre of Applied Research and Sustainable Technology	ICARST	Slovakia
---	--------	----------

Slovak Shipping and Ports JSC	SPaP	Slovakia
-------------------------------	------	----------

National Agricultural Research and Innovation Center	NARIC	Hungary
--	-------	---------

MAHART-Freeport Co. Ltd.	MAHART	Hungary
--------------------------	--------	---------

International Centre for Sustainable Development of Energy, Water and Environment Systems	SDEWES Centre	Croatia
---	---------------	---------

Public Institution Port Authority Vukovar	PoVu	Croatia
---	------	---------

Technology Center Sofia Ltd.	TCS	Bulgaria
------------------------------	-----	----------

Romanian Association of Biomass and Biogas	ARBIO	Romania
--	-------	---------

Federation of owners of forests and grasslands in Romania	Nostra Silva	Romania
---	--------------	---------

IV About this document

This report corresponds to D 6.2.1 *Country reports on identified legal and administrative barriers to biomass production in the partner countries of ENERGY BARGE*. It has been prepared by:

Due date of deliverable:	2017-12-31
Actual submission date:	2017-12-15
Start date of project:	2017-01-01
Duration:	30 months

Work package	WP6
Task	D 6.2.1
Lead contractor for this deliverable	Agency for Renewable Resources (FNR)
Editor(s)	Franziska Nych (FNR), Thies Fellenberg (FNR)
Author(s)	Ann-Kathrin Kaufmann (BCG), Christa Dißauer (BE2020), Ivan Chodak (ICARST), Nina Alexandrova (TCS), Jürgen Eisele (TCS), Marko Ban (Sdewes Center), Tibor Vojtela (NARIC), Grigoris Papageorgiadis (ARBIO), Mariana Stoicescu (ARBIO), Catalin Tobescu (Nostra Silva), Thies Fellenberg (FNR), Franziska Nych (FNR)
Quality reviewer	Birger Kerckow (FNR)

Version	Date	Author(s)	Reason for modification	Status
1.1	2017-11-16	Thies Fellenberg (FNR), Franziska Nych (FNR)	Request for input from partners	finalised
1.2	2017-12-15	Thies Fellenberg (FNR), Franziska Nych (FNR)	Integration of input	finalised
2.0	2017-12-15	Thies Fellenberg (FNR), Franziska Nych (FNR)	Final version	finalised



1 Background

This deliverable “D 6.2.1 Country reports on identified legal and administrative barriers to biomass production in the partner countries” is based on the activity as described in the latest approved version of the Application Form of the project ENERGY BARGE (Project Code: DTP1-175-3.2).

- *Activity 6.2 Identification of legal and administrative barriers (Lead: FNR)*

Separate country reports were produced by the partners from the biomass/bioenergy sector, identifying legal and administrative barriers and developing workable solutions that were grouped according to the main biomass feedstock relevant for each country, based on conclusions of the Work Packages 3, 4 and 5. Identified legal and administrative barriers and bottlenecks regarding green biomass logistics were summarized. In the further course of Activity 6.2, good practices at local level with regard to local biomass production will be identified. Regional/national stakeholders, including the ENERGY BARGE consortium, will be integrated into the process of legal and administrative barriers. Moreover, stakeholders from the bioenergy sector and Danube logistics sector may benefit from this action as well as from networking and communicating with regional/national policy makers, also beyond the project's lifetime. Regions along the Danube will be preferred, but for learning purposes other regions with similar background will be considered as well in order to support transnational collaboration.

2 Executive Summary

This report provides an overview on the legal and administrative barriers concerning biomass production in the Danube region. The different country reports outline the situation in the field of funding, support, technical barriers, legal barriers and suggestions for improvement concerning biomass production. The following countries are part of this report: Austria, Bulgaria, Croatia, Germany, Hungary, Romania and Slovakia. This deliverable is the basis for the development of recommendations for policy makers to develop wider biomass exploitation in combination with green logistics via inland waterways in the Danube region.

There is a wide range of policy measures regarding biomass in the Danube countries which are covered by the partners of the project consortium. They are outlined in the ENERGY BARGE Deliverable 6.1.1. The efforts of the countries to expand the bioenergy sector have progressed to different levels and are sometimes hindered by existing or missing legislation or guidelines.

Some countries like Bulgaria or Romania need effective incentive schemes and subsidies for the generation of energy from renewable resources. Also comprehensive legal provisions are needed.

Another important field for further actions in all partner countries is the mobilization of previously unused potentials. This applies especially to the forestry sector. Also an increased cascade use and the inclusion of waste and residue materials could increase the degree of utilisation of biomass. New breeds and optimized cultivation methods in the agricultural sector can contribute to an expansion of the biomass supply. Through the exploitation of areas that are currently not under agricultural or forestry use could also apply for biomass cultivation. This affects e.g. former mining landscapes, former military sites or wastelands.

In addition, an improved information policy is required. The general public needs up-to-date information on biomass resources and their potential fields of application. This could help to reduce prejudices, which exist in some parts of the society. Involving the society is essential in this context as the acceptance and support of the broader public is important to increase the use of biomass for the generation of bioenergy in a sustainable way.

3 Legal and administrative barriers to biomass production

3.1 Main biomass feedstocks in the Danube region

Forestry is the biggest producer of biomass for the purpose of energy production in the Danube region: 73.5% of the total amount of used biomass (Hujber and Szilágyi, 2014). This is equal to 20.03 Mtoe of energy. Biomass from agricultural production is the second largest producer of biomass with a share of 22.87% in renewable energy production. The leading role of the forestry sector will remain in the next years, but agricultural biomass will likely increase by 7% until 2020 (Hujber and Szilágyi, 2014). A more detailed overview of the biomass feedstocks in the Danube region, the bioenergy market and value chains situation is provided in Deliverable 3.1.1 of the ENERGY BARGE project.

Table 1: Expected biomass supply for bioenergy production in EU-Danube countries in 2015.

(Data refer to the whole territory of the countries, units in ktoe (European Commission, 2014))

2015	BG	CZ	DE	HU	AT	RO	SLO	SK
A) Biomass from forestry, of which:	860	2,529	12,218	604	3,588	1,560	324	979
1. Direct supply of wood biomass from forests and other wooded land for energy generation	830	1,223	8,659	533	1,978	720	324	434
2. Indirect supply of wood biomass for energy production	30	1,306	3,559	71	1,610	840	0	545
B) Biomass from agriculture and fisheries	130	286	7,847	651	420	1,586	0	2,180
1. Agricultural crops and fishery products	100	143	6,903	361	300	0	0	180
2. By-products and residues	30	143	944	290	120	1,586	0	2,000
C) Biomass from waste	144	113	2,126	0	100	0	0	64
1. Biodegradable fraction of municipal waste	80	96	764	0	70	0	0	50
2. Biodegradable fraction of industrial waste	60	17	1,099	0	0	0	0	2
3. Sewage sludge	4	0	263	0	30	0	0	12

Table 2: Expected biomass supply for bioenergy production in EU-Danube countries in 2020.

(Data refer to the whole territory of the countries, units in ktoe (European Commission, 2014))

2020	BG	CZ	DE	HU	AT	RO	SLO	SK
A) Biomass from forestry, of which:	930	2,716	11,966	656	3,870	1,800	333	1,222
1. Direct supply of wood biomass from forests and other wooded land for energy generation	892	1,405	8,192	567	2,175	840	333	650
2. Indirect supply of wood biomass for energy production	38	1,311	3,774	89	1,695	960	0	572
B) Biomass from agriculture and fisheries	169	358	9,136	1,130	730	1,604	0	2,194
1. Agricultural crops and fishery products	130	179	7,619	720	500	0	0	194
2. By-products and residues	39	179	1,517	410	230	1,604	0	2,000
C) Biomass from waste	194	183	2,317	0	150	0	0	90
1. Biodegradable fraction of municipal waste	110	166	597	0	100	0	1	75
2. Biodegradable fraction of industrial waste	80	17	1,457	0	0	0	0	2
3. Sewage sludge	4	0	263	0	50	0	0	13

3.2 Country reports

3.2.1 Austria

3.2.1.1 Funding in the field of biomass

The new Austrian CAP (LWG) came into force in 2015. The European Common Agricultural Policy (CAP) provides a framework for financial support to farmers (Pillar 1 – Direct Payments) and national rural development programmes (Pillar 2 – Rural Development). The new CAP 2014-2020 has been presented in 2014, and Member States have adapted their national approach within this framework.

However, the most common subsidies for renewable energy in Austria are direct subsidies such as feed-in tariffs for green electricity and investment grants (mainly for small plants), as well as tax reductions and tax exemptions (e.g. for biofuels).

Subsidies on national level

The **Kommunalkredit Public Consulting (KPC)** usually carries out the financial support of commercial and industrial biomass applications as well as biomass district heating plants (biomass heating plants and CHP) on national level. The number of the funded biomass plants as well as the paid out funding are shown in Table 3. The number of funded installed plants decreased over the last two years.

Table 3: Federal subsidies of the Kommunalkredit Public Consulting (KPC) for biomass plants in the commercial and industrial sector in Austria.

(Source: KPC 2017 in Biermayr et al., 2017)

	2014		2015		2016	
	Number	Funding €	Number	Funding €	Number	Funding €
Biomass boiler	452	3,909,838	341	3,744,893	283	2,643,793
Biomass district heating	117	12,629,117	124	13,269,947	52	4,849,894
Biomass Micro grid	40	2,794,215	49	3,711,359	36	1,466,502
Biomass CHP	4	1,636,783	-	-	-	-
Sum	613	20,969,953	514	20,726,199	371	8,960,189

The **Austrian Climate & Energy Fund** also provides a subsidy scheme for private households for the implementation of pellet and wood-chip central heating systems and pellet stoves. The subsidy applies to the substitution of fossil-fuel-based heating systems with renewable-energy-based ones. Installations must be operated either with wood chips or pellets. Log wood boilers are not subsidised. The financial support in the form of a non-refundable investment cost subsidy amounted to 2,000 € for pellet and wood chip boilers in 2016. For pellet stoves the investment subsidy amounted to 500 € in 2016.

The Green Electricity Act – Federal Act on the Support of Electricity produced from Renewable Energy Sources (Ökostromgesetz ÖSG, 2012) sets the following targets for new installations until 2020: Hydro 1,000 MW, Wind 2,000 MW, Photovoltaics 1,200 MW, Biomass and Biogas 200 MW. A feed-in tariff scheme under the Green Electricity Act supports the recovery of the investments. For green electricity plants based on solid and liquid biomass as well as biogas, an amount of 10 million € is available as an annual support volume in accordance with § 23 (3) Z 2 ÖSG 2012. Of this, 3 million € are designated to plants based on solid biomass. According to § 16 (1) no. 1 ÖSG 2012, the duration of the general contracting obligation for green electricity plants based on solid and liquid biomass or biogas is 15 years. The level of feed-in tariffs is set in the "Ökostrom-Einspeisetarifverordnung". The coming amendment to the Green Electricity Act will have a significant impact on future sales of wood chips. If the feed-in tariff is discontinued, the decommissioning of numerous plants is to be expected.

Specific research programmes are financed by the Austrian Climate and Energy Fund (KLIEN). This fund is endowed by the BMVIT (Austrian Ministry for Transport, Innovation and Technology) and the BMLFUW (The Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management). It focuses on advancing the mobility and energy transitions and subsidises measures for the reduction of greenhouse gas emissions. KLIEN is a hub for relevant issues of climate protection and reduces the time to market of research results. R&D projects are funded within the KLIEN's Energy Research Programme.

Subsidies on province level

Private households receive subsidies according to the specific requirements of the respective province. A part of the subsidies are handled through the residential building subsidy programme. For farmers there are own separate subsidy programmes.

The nine provinces of Austria paid out direct grants to the tune of 7.9 million € in 2016. In addition to direct grants, annuity subsidies and loans are granted as part of the residential building subsidy programme in Carinthia, Lower Austria and Styria. Currently, there is also a special funding programme "heating boiler exchange" (= replacement of fossil fuels by a heating system based on renewable energy) in Lower Austria.

The funding opportunities are easy to access; however, the funding volume decreased over the last several years. The sectors biomass boilers and stoves have a lasting downward tendency that reduced the sales figures in no time by half. The important influencing factors in 2016 were (Biermayr et al., 2017):

- Continuously low prices for fossil fuels: the decrease of the raw oil price started in autumn 2014 and caused a rapid price decline below 60 \$/barrel and from autumn 2015 even below 40 \$/barrel. Meanwhile the prices for oil and natural gas can be marked continuously low. This circumstance has a strong influence on the structure of the boiler market and is equally effective in the sector of new buildings as well as renovations and exchange of boilers.
- The price for solid biomass gradually increased in the past years and reached the real specific price of 2006 in the pellets sector in winter 2013/14, which had already led to the drop of the pellet boiler sales figures in 2007. Decreases of the pellets price after the actual

heating season 2013/14, 2014/15 and 2015/16 could not compensate the psychological effect of the high prices during the heating seasons. This effect was further increased through the simultaneously long term low oil price.

- In the years after the financial and economic crisis in 2008 an increase of early investments of private households in real long-life systems could be observed. This was due to the uncertainties in regard to the currency stability and due to the generally low level of interest rates. In the meantime this potential is used up and the earlier investments are missing in the actual sales figures.
- The expiration of the feed-in tariffs in accordance with the Green Electricity Act without subsequent regulations leads to uncertainty among the plant operators. Most of the biomass CHP plants are not profitable without special feed-in tariffs due to the high biomass prices compared to the low electricity prices.

3.2.1.2 Support for biomass

Regarding bioenergy there are three **relevant ministries** in Austria: the Ministry of Agriculture, Forestry, Environment and Water Management (<http://www.bmlfuw.gv.at/>), the Ministry of Economy (<http://www.bmwf.gv.at>) and the Ministry of Transport, Technology and Innovation (<http://www.bmvit.gv.at/>). In 2010 the Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) and the Ministry of Economy (BMWF) published an energy strategy. The pillars of the strategy are the promotion of energy efficiency and renewable energies as well as long-term energy security.

In 2010 the Ministry of Transport, Technology and Innovation (BMVIT) prepared the Austrian Energy Research Strategy. Later on it released agendas for biobased heating and cooling and most recently for a biobased industry. The successful development of the bioenergy sector is based on a long-lasting, internationally oriented R&D policy which aims to become innovation leader. Beside others, the Ministry supports the Austrian participation in IEA Bioenergy since the first days of the Agreement.

The **Austrian Biomass Association** (<http://www.biomasseverband.at>) represents the largest domestic energy resource whose raw materials come from agriculture, forestry and wood, as well as from municipal, commercial and industrial biogenic waste and the entire sector of energetic biomass use from raw material production to private consumers.

The Austrian Biomass Association is implementing a number of activities to implement the association's targets:

- Implementation of professional training courses, in particular basic and further training seminars for technicians
- Publications, in particular as support for various educational measures and media relations
- Development of position papers and concepts on various issues of energy policy and the use of biomass

- Influence on the national and international energy and environmental policy process as well as comprehensive information provision for politics and economy about the applications and advantages of biomass as an energy carrier
- Education and information provision for people who work with biomass in their practical occupations, especially in the fields of heat, electricity, biofuels and biogas
- Intensify the co-operation between application, enterprises, industry, research and science
- Improvement of marketing opportunities for biogenic fuels

Responsibility for the condition of 80% of Austria's forests lies with the many private forest owners. Most of them are family-run holdings where forests are passed on from generation to generation (BMLFUW, 2015). There are several organisations which support the private forest owners:

The **Forest Communities** ("Waldverbände", <http://www.waldverband.at/>) are special organisations acting under the roof of the Austrian (and provincial) Chamber of Agriculture, which is a special interest group for the agricultural holdings in Austria. Several other forestal organisations are associated or connected with the Forest Community such as educational institutes, communication platforms, the Austrian Biomass Association, which represents the entire biomass sector in Austria as well as the Forest Wood Paper Board, the central platform for the coordination of the several wood supplying and demanding organisations. Furthermore, the Forest Community is interconnected with the certification body Programme for the Endorsement of Forest Certification (PEFC), which also results in the fact that all wood marketed by the Forest Community must be certified under the PEFC scheme. Finally, the Forest Community is also linked with the Confederation of European Forest Owners (CEPF).

The Austrian Forest Community is organised in 8 provincial Forest Communities, one for each provincial state of Austria (except from Vienna). These organisations were founded between the year 1969 in the Austrian province Salzburg and the year 2000 in the province Lower Austria. All 296 local Associative Forest Management Communities (AFMCs) in Austria are organised under the umbrella of the provincial Forest Cooperative. The amount of wood supplied through the Forest Communities has increased since 2000, mainly due to the mobilisation of more forest owners organised in Forest Communities.

Under the initiative of the EU project "Biomass Logistic and Trade Centres" (<http://nuke.biomasstradecentres.eu>) the Forest Community Styria and the Styrian Chamber of Agriculture developed a concept for the realisation of **biomass centres**, which sell wood biomass for energy use and accelerating the regional added value of this product (<http://www.biomassehof-stmk.at/>). The main project's idea was creating and/or enforcing a place with the optimum logistics and trading organisation, where different biomass fuels (e.g. logs, wood chips, pellet) are marketed in a guaranteed quality. The priority is the establishment of biomass logistic and trade centres as reliable suppliers of wood biomass and heat. The quality of the biomass fuel is ensured by standardised controls. Uniform market images with strong brand identity promises a high recognition value to the customers, providing continuity and security,

which is the responsibility of the Forest Community Styria and the Styrian Chamber of Agriculture. Until now, the business concept of biomass logistic and trade centres has been unique in Styria.

3.2.1.3 Technical barriers

There is sufficient wood quantity in Austria and the resource potential is even increasing. However, sustainable forest management is not only ensured by the state in Austria. Responsibility for the condition of 80% of Austria's forests lies above all with the many private forest owners. A key factor for the success of all efforts to promote sustainability in forests is therefore the motivation of the forest owners (BMLFUW, 2015).

The regional supply chains with short transportation distances are well developed creating regional value. However, sustainable and economic as well as ecological efficient long distance transport possibilities should be established. The use of Danube logistics could help to reduce emissions, to establish a low-carbon transport system and to improve the environmental performance along the entire bioenergy value chain. The high costs could be difficult since prices for heating oil, gas and electricity remain at a low level.

Furthermore, the energy use for heating is decreasing due to the trend to zero-energy buildings. Hence, in new buildings there is decreasing space for the heating technology and no need for a chimney. This affects the use of biomass small-scale combustion systems with the necessity for a chimney and the space requirements for storage and boiler negatively.

3.2.1.4 Barriers in the field of agricultural/forestry laws

In Austria, the Forest Strategy in the framework of the Austrian forest dialogue is intended as an instrument to harmonise the multiple interests and demands made on Austrian forests and to find solutions to possible utilisation conflicts. The Forest Strategy 2020 is to provide forest-political cornerstones to ensure and continuously optimise the sustainable management and maintenance of Austria's forests (BMLFUW, 2015).

The overall objective of the Strategy is to ensure and optimise the ecological, economic and social dimensions of sustainable forest management in a well-balanced way. Special attention is paid to the added value and the potential of the Austrian forestry and timber sectors for a „liveable Austria“. With this in mind, the Forest Strategy 2020 is to help ensure the multifunctional services rendered by forests for present and future generations. In view of the threat of climate change it is a key objective of Austria's forest management to promote the stabilisation of forest ecosystems by strengthening sustainable forest management and developing and implementing suitable adaptation measures. There is also the commitment that energy generated from the renewable resource of wood is playing an important role and in addition to material exploitation, the use of wood as a source of energy is gaining importance (BMLFUW, 2015).

The use of agricultural raw materials and residues for energy production is less promoted. However, in both areas cascading utilisation should be encouraged.

3.2.1.5 Suggestions for improvement

The success of bioenergy highly depends on the availability of suitable biomasses in sufficient volumes and at competitive prices. Therefore, measures to mobilise additional energy wood potentials are needed. The upgrading of residues, co-products and waste from agriculture to solid biofuels will be important in the upcoming years since it is seen as high potential for the future extension of the biomass base. The sustainable use of these biomass potentials requires the optimisation of processes as well as technologies and the integration of cascading utilisation paths and the development of an efficient bioeconomy. The establishment of sustainable supply and value chains and the cooperation of all actors along the value chain are of high importance. Research efforts are currently and in the next future focused on the extension of the power range, further reduction of emissions with increased focus on the reduction of particulate matter (PM) emissions and the reduction of NO_x emissions, on the development of specific new sensors for improved combustion control, optimisation of systems and combined systems (e.g. combined with solar thermal systems), annual efficiency improvement and on the development of market-ready small-scale and micro CHP systems (Biermayr et al., 2017).

In Biermayr et al. 2017, national experts of the renewable energy sector have compiled challenges and recommendations of renewable technologies:

- **Energy policy makers** are confronted with the challenge of using the limited public subsidies for efficient and long-term effective instruments which are incentive oriented. Apart from the appropriate amount and the dynamic use over a period of time, continuity is also an important factor in this area. The economy also needs continuity and predictability more than great onetime effects. Innovative methods of optimally using the subsidies as for example weekly Internet auctions enable a good use of the private willingness to pay and improve the efficiency of the subsidies as for example free riders are reduced. On the contrary long-term static (excessive) subsidies are just as bad for the diffusion of technologies as stop-and-go subsidies.
- Furthermore a budget neutral financing of incentive oriented energy political instruments through a **CO₂-tax** would mean double efficiency at reaching the goal one was aiming at. Anyway, the use of normative instruments in the area of energy efficiency or in the area of technological designs (for example standards for exhaust fumes) is efficient and also effective when it comes to testing the rules. Normative instruments have hardly proved themselves as an incentive on the market (for example enacting a technology).
- The actual developments lead to the following recommendations for **technology producers** in the various branches: on the one hand products should remain competitive through constant innovations and create new markets or uses, on the other hand economic learning effects must be passed to the consumers to create a long-term

competitiveness. If the development does not move on, innovative advance and competitiveness are quickly lost.

3.2.2 Bulgaria

3.2.2.1 Funding in the field of biomass

Funding for farmers concerning biomass production

Financial support mechanisms to farmers are regulated by the Agricultural Producers Support Act (APSA). Furthermore, APSA regulates some of the activities through which the measures envisaged for the Agriculture sector of the National Action Plan on Climate Change (NAPCC) can be implemented, as well as the activities related to biofuel production. There are three sources of agricultural support to Bulgarian farmers: the Common Agricultural Policy (CAP), the CAP Operational Programme (OP) Rural Development 2014-2020 and national support schemes. Until the end of 2020 Bulgaria will apply a simplified system for allocating direct payments to farmers, which links the amount of basic income support for Bulgarian farmers to the area of land declared by each farmer. Support is provided for arable land, permanent grassland, permanent crops and kitchen gardens maintained in good agricultural condition. Within the OP Rural Development 2014-2020 it is foreseen to increase the share of green economy based on forests through the creation of incentives for production of biomass for energy purposes. While no special scheme supporting the production of energy crops¹ is being implemented, investments concerning the production of energy can be supported under Measure M04:

“Restructuring, modernization and increased competitiveness of farms”: grants for farmers, who intend the following operations: doing investments in bioenergy production for energy needs for their own agricultural activity and/or for selling bioenergy, in case that the farmers are processing raw materials obtained from their own agricultural activity.

“Increase of added value for agricultural products”: farmers can receive financial support for doing investments in bioenergy production that are obtained through processing of plant and animal residues from primary and secondary biomass, excluding the processing of primary and secondary biomass from fish residues.

Projects/ Investments for the production of biofuels from biomass are supported, provided they meet the sustainability criteria, defined in Art. 37-40 of the Renewable Energy Act (REA) - for instance, the biomass materials are not grown on soil of major importance for the biodiversity. The amount of support (public grant) of the total amount of eligible costs varies between 40-90%, depending on the specific sub-measure.

¹There has been a domestic support programme for energy crops, but it was terminated after 2010.

Another form for financing of biomass projects is the traditional bank credit. But despite the change in the banks' policies and the policies for creating special financial tools for supporting RES projects, farmers are still a risky group for an investment of this nature (Georgieva, 2013).

Funding for biomass processors

In Bulgaria, the main support scheme for biofuels used in transport is a quota system. This scheme obliges companies importing or producing petrol or diesel to ensure that biofuels make up a defined percentage of their annual fuel sales. Furthermore, biofuels are supported through a fiscal regulation mechanism.

Biofuels quota: Persons introducing liquid fuels of crude oil origin for transportation shall be obliged to offer market fuels for diesel and petrol engines blended with biofuels.

Tax regulation mechanism: A reduced rate of excise duty is applied to unleaded petrol or gas oil if a share of more than 4% of bioethanol or biodiesel has been added.

Funding for plant operators

The main incentive for plant operators are specific feed-in tariffs (FITs)² for electricity from biomass. Depending on the size and type (power, cogeneration) of the plant and type of fuel (plant and animal substances, wooden biomass) different FITs will be applied, which are determined annually by the Energy and Water Regulatory Commission. Apart from the FITs, operators sign long-term contracts (20 years) for the purchase of electricity, get obligatory and priority connection to the grid and only have to pay the direct costs of connection to the grid.

Besides the above mentioned incentives, no other are in place for operators. Also it is visible that the production of energy from renewable energy sources for heating and cooling support mechanisms are not sufficiently developed in Bulgaria (Bachmann et al., 2012).

Investors who want to invest in renewable energies (main focus: biomass)

Potential investors in renewable energies in Bulgaria can seek financial support for their initiatives within the following support schemes:

Financial mechanisms:

The Energy Efficiency and Renewable Sources Fund (EERSF) finances energy efficiency projects of private persons, legal entities and municipalities with the exception of those funded by the state budget. Municipalities are the main target customers group for EERSF and by the end of 2016 the credit volume provided to the local bodies is almost 54% of EERSF's credit portfolio.³

²In recent years the State Energy and Water Regulatory Commission (SEWRC) reduced the FITs significantly.

³Projects for energy efficiency are often implemented through energy services companies (ESCO) agreements.

The Credit Line for households (REECL - Residential Energy Efficiency Credit Line) provides additional grant financing in the amount of 10% for implementation of eligible projects in houses with one or two independent households and 20% for projects in multi-family residential buildings with more than three independent households.

The OP “Innovations and Competitiveness 2014–2020” (European Commission, 2018a) supports the use of energy from renewable sources for own consumption. Enterprises –beneficiaries⁴ of OPIC will have the opportunity to implement measures for the use of biomass, including primary and secondary biomass.

The OP “Rural Development 2014–2020” supports improvement of energy efficiency and the use of renewable energy sources. The activities eligible under the Programme include investments for the improvement of energy efficiency in municipal buildings or other buildings used for the provision of public services, e.g. hospitals, schools, etc., and investments in farms utilizing new sources of energy, waste energy, etc. Furthermore energy production will be supported via 335 investment operations, and another 505 will target improved energy efficiency in the agricultural sector and food processing industry (Ministry of Agriculture and Food, 2016).

The OP “Regions in Growth 2014-2020” supports energy efficiency, smart energy management and renewable energy use in public infrastructures, including public buildings, and in the housing sector.

The Investment Climate Programme (ICP), the newest programme of the National Trust EcoFund (NDEF), finances projects for generating energy from RS.

Tax regulation mechanism:

The exemption of existing buildings from property tax for a period of 3-5-7-10 years depending on the period of commissioning of the building, the certified class of its energy consumption and the use of renewable energy therein is promoted through a system of tax incentives for building owners (Local Taxes and Fees Act)

Private and other Investment funds:

There is a lack of knowledge of how to use the funding opportunities of private and other investment funds. RES projects funded by similar sources are very few. More often foreign organizations and funds are investing in RES projects using this type of capital. Also it has been registered that the so called “pension funds” are more often interested in investing in this kind of “slow investments”. Often the funds and the conditions for their spending come together with the

⁴ With the exception of farmers and enterprises from food industry for processing and marketing of products energy production through processing plant and animal products with the exception of biomass of fishery products. The production of biomass in forestry will be supported under RDP

provider of the technological equipment. No information is available about this type of opportunities in Bulgaria so far (Georgieva, 2013).

3.2.2.2 Support for biomass

On state level there is no public authority dealing exclusively with biomass for energy purposes. Responsible in general for land and forest use, which implicates the production and use of biomass, is the Ministry for Agriculture and Food. The Executive Forest Agency (EFA) and its 16 Regional Forestry Directorates are responsible for implementing the national forest policy and provide support to private forest owners. Farmers can consult the National Agricultural Advisory Service (NAAS) for current information, specialized counselling and expert assistance for the implementation of efficient and competitive agriculture. Furthermore, the Sustainable Energy Development Agency (SEDA), responsible for the promotion of RES, informs about supporting schemes.

On non-state level, there are several associations providing information and consultancy in the field of biomass/-energy, namely:

- Bulgarian Biomass Association (BAB), which acts as an interface between investors in Bulgarian biomass sector and the government and regulatory institutions.
- National Biomass Association (BGBIOM), which promotes RES, mainly biomass as energy source for a sustainable society.
- Association of Producers of Ecological Energy (APEE), represents economic and branch interests to the state authorities and other organizations.
- Energy Utilization Biomass Association (EUBA), promotes biomass utilization for energy purposes
- Regional Energy Agency of Pazardjik (REAP), association of municipalities from the Pazardjik district, as well as private organizations and stakeholders with specific priority to biomass use for energy purposes.
- Bulgarian Association of Agricultural Producers (BAAP)
- National Association of Biofuels in Bulgaria (NABB)

3.2.2.3 Technical barriers

Different problems regarding the utilization of biomass occur depending on the type of biomass and the supply chain. While the availability of wooden biomass in general is sufficient, complicated logistics, transport over long distances and outdated equipment are the main barriers at the beginning of the supply chain. Logistics and transport, due to poor infrastructure,

remain a problem along the supply chain. At end user level the main obstacles are the high investment costs for the initial installation of new efficient technologies or modifications in the existing structure. This results in a lack of small, medium and large scale applications of bioenergy production, such as district heating, electricity generation and cogeneration plants.

Regarding agricultural biomass, the main barriers are not technical, because most (big) agro-companies are well equipped. In fact, the cost-benefit-ratio, mainly due to transport costs, is the determining factor.

3.2.2.4 Barriers in the field of agricultural/forestry laws

The forestry regulatory framework is very important and particularly the Forest Act of 2011 (Ministry of Agriculture and Food and Forestry, 2017). This law describes precisely the regulatory conditions for the use of wood residues for producing energy. The Forest Act also appoints the Forestry Executive Agency and its structures as a control body of the use of biomass derived from forests.

It should be pointed out that this basic forestry law introduces also some limitations. With its amendments in 2012 and particularly in Art. 213. (2), the Forestry Act states the following: "It is prohibited to use raw wood from the categories of large and middle scale wood for construction-grade III for energy production from biomass." (Наредба, 2013)

The regulation introduces requirements, restrictions and administrative burdens both for state forest enterprises, municipal forestry structures owned by municipalities, but also for potential users and purchasers of wood (forest-wood biomass) for the production of energy. These requirements, constraints and complex procedures for leveraging and selling wood, on the one hand, restrict potential market entrants and, on the other hand, do not give them the necessary certainty and sustainability for long-term investments in biomass production sites and installations for energy chips, pellets, briquettes, etc. and in energy from forest-wood biomass (Consortium "Focus Systems – Dan Tea", 2017).

The Agricultural Land Protection Act (ALPA) (Ministry of Agriculture and Food and Forestry, 2012) allows land use change of agricultural land only in certain specific cases. Burning of stubbles and other plant residues in agricultural lands is prohibited. The owners and the users of agricultural land are entitled to tax and credit preferences when implementing the mandatory limitation on agricultural land use as well as when implementing projects to restore and improve the fertility of agricultural land.

3.2.2.5 Suggestions for improvement

In general, the Bulgarian state supports the biomass energy sector, which is, besides solar power, the only RES eligible for FITs. In 2017, in comparison to the same period of the previous year, the

electricity generation of biomass plants increased by 64.81%. However, there are still many barriers for the further development of the Bulgarian biomass market:

- Insufficient national policies concerning particularly the biomass as such – definition of biomass and regulatory framework only for biomass production and use.
- Insufficient incentive schemes and subsidies at the moment in practice.
- There is no public and up-to-date information on the available biomass resource and its territorial distribution; there is also lack of relevant information that focuses on the interests of potential biomass energy producers. Also the existing opportunities for public-private partnerships in this area are also somewhat neglected.
- In addition to the standard incentives provided at a national level in the Renewable Energy Act, there is no active implementation of local or regional policies. The municipal measures and targets that are implemented concern mainly general situations (e.g. informing potential investors about RES opportunities).

Finally, it can be concluded that many policies, laws, regulations, etc. have been developed, but they do not sufficiently specify the potential and the role of biomass for its use for energy purposes. In addition, relevant regulatory texts are needed in the regulating framework that are specifically concerning the regulation and the stimulating of the use of biomass for energy production, as well as the development and application of incentives - financial, taxes, etc. to promote this process (Consortium “Focus Systems – Dan Tea”, 2017).

3.2.3 Croatia

3.2.3.1 Funding in the field of biomass

Funding for farmers concerning biomass production

In Croatia, The Environmental Protection and Energy Efficiency Fund co-finances systems that use biomass, but also drives for production of biomass - as part of a public tendering system for use of renewable energy sources and public calls and Energy Renewal Contest (Cutic, 2016). It has been reported that the majority of the currently distributed funds were aimed at woody biomass production/processing. The funds seem to be sufficient, yet the majority goes to bigger investments (mostly in the building sector).

Funding for plant operators

Croatia has been actively supporting renewable energy and cogeneration on the policy level since 2007, when it first introduced a Feed-in Tariff system. On 1 January 2016, a new Renewable Energy and High Efficient Cogeneration Act ended the Feed-in Tariff system (for power plants with a power output greater than 30 kW (OG 100/2015)) and introduced Feed-in premiums.

Although almost two years have passed since the act came to power, the Feed-in premiums have still not been implemented due to numerous by-laws that have not been defined (Dukan, 2017).

The Croatian Energy Market Operator (HROTE) performs activities of organizing electricity and gas market as a public service, as well as performing activities in systems for incentivizing electricity production from renewable sources and cogeneration and in systems for incentivizing production of biofuels for transport. HROTE is in charge of making contracts with suppliers of electric energy from renewable sources and has currently active contracts with preferred producers running 12 solid biomass powered power plants and 26 biogas powered plants (HROTE, 2017).

Funding for investors

Financing for investors who want to invest in renewable energies is enabled by commercial banks and Croatian Bank for Reconstruction and Development (HBOR). Beside them, for those investors who are interested in ESCO financing models, there is a public energy service company (ESCO) (HEP ESCO, 2017) which finances projects from 100,000 to 2,000,000 €.

There is also a possibility for non-refundable co-financing from The Environmental Protection and Energy Efficiency Fund (EPEEF). Depending on the size of the company, EPEEF is co-financing 45-65% of eligible costs for investments of companies which want to reduce the share of conventional (fossil) fuels in total energy consumption by switching to renewable energy sources (Ministry of Environment and Energy, 2017).

3.2.3.2 Support for biomass

"Hrvatske šume" Ltd. is a public company for forest and woodland management in the Republic of Croatia (Hrvatske šume, 2017). Its subsidiary, "Šumska biomasa" Ltd. is dealing exclusively with market for wood chips, i.e. by organizing the collection of forest biomass, wood chopping and selling of wood chips (Šumska biomasa, 2017). Currently, persons interested in obtaining the raw biomass from "Šumska biomasa" can apply for auction/bidding of the feedstock and transport should be organized by themselves, usually directly from the origin (i.e. there is no central place for material collection / pick-up).

3.2.3.3 Technical barriers

The most used technologies in Croatia are individual stoves and boilers and less common are CHP and district heating systems. Firewood is certainly the most used fuel for individual heating systems, especially in private households. Technologies for individual stoves and boilers are fully developed and competitive. In Croatia, there are some companies which have a long tradition of producing the equipment which uses different biomass (wood, pellets, wood chips) (Centrometal, 2017). When talking about biomass utilization for an electricity production, Croatian industry also

has the required technology. Those technologies still cannot produce electricity for a price which would be competitive on wholesale electricity markets.

3.2.3.4 Barriers in the field of agricultural/forestry laws

One of the barriers to utilization of biomass is the current political situation. As mentioned before, since the feed-in premiums have still not been implemented due to numerous by-laws that have not been defined, at this moment investors are not motivated for new cogeneration projects. Also, when talking about the pellet market, it is still rather small (around 90% of produced pellets in Croatia are being exported).

Furthermore, there is a rather complicated procedure of becoming a preferred producer getting a feed-in tariff for production of electrical energy, including, in total, five ministries/agencies from which a new producer needs to get an approval/certificate. The current legal framework includes the following conditions for developing an electrical / thermal facility: NO_x/CO emissions, feedstock handling propositions, feedstock storage propositions, sufficient distance from the inhabited area, additional load of the local access roads, local resource handling, use of local energy infrastructure and enforcement of fire protection standards.

3.2.3.5 Suggestions for improvement

Defining by-laws which would ensure implementing Feed-in premiums would significantly improve the current situation. Also, the situation can be improved by better-informing citizens and small and medium enterprise about possibilities to profit from the various sources of funding (mentioned at 2.1.3.). One of the possibilities for increasing the market of biomass (pellets) is implementing sustainable and green public procurement.

3.2.4 Germany

3.2.4.1 Funding in the field of biomass

Funding for farmers concerning biomass production

The funding scheme “Joint Task on Agricultural Structures and Coastal Protection” concentrates on the development of a sustainable and efficient agricultural and forestry production and management. The main aims of the programme in these fields are:

- Funding of sustainable processes in agriculture
- Funding of sustainable processes when cultivating permanent grassland
- Diversification of the agricultural use (e.g. short rotation coppice)
- Funding for agricultural consultancy
- Sustainable and nature-oriented management of forests

- Funding for afforestation
- Eligible: agricultural enterprises, forest owners as well as forestry and similar associations as defined in the National Forest Act (Bundeswaldgesetz)

Although this funding scheme is quite complex, there are some aspects which need improvement. The most significant problem in agricultural areas in Germany is the demographic trend. More and more people are leaving these areas. To counter this trend further measures are needed: integrated development, compensation of inequality in terms of regional living conditions, improved combination opportunities with other funding schemes and encouragement of women (Tressel, 2016).

The Market Incentive Programme (*'Marktanreizprogramm'*, MAP) is an integral part of the EEWärmeG and has become a central funding instrument for heat supply from renewable energies. The programme offers support for the use of renewable energy sources for heat (see ENERGY BARGE D3.1.3):

- the installation of solar collector systems
- small systems for solid biomass heat production
- photovoltaic systems at schools and universities
- biogas systems
- large biomass systems
- hydro systems
- deep geothermal systems
- Eligible: Private individuals, municipalities, municipal authorities, municipal associations, non-profit organizations, companies, enterprises, freelancer, cooperatives, contractors

Funding for plant operators producing energy from biomass

The EEG (Bundesministerium für Justiz und Verbraucherschutz, 2017) exists since April 2000 and has been continuously amended since then. It remains the central control instrument for the expansion of renewable energies. The aim of the EEG is to transform the energy supply and to increase the share of renewable energies in the field of power supply towards at least 80 percent by 2050.

On 13th October the new EEG 2017 came into force and there are fundamental changes. Up to now, producers of electricity from renewable energies have received a state-approved remuneration for each kilowatt hour. Since 1st January 2017 the amount of this subsidy has been determined by tendering on the market. Therefore producers of electricity have to take part in biddings. Those who request the lowest support rates for the economic operation of a new renewable energy facility are financially supported (see ENERGY BARGE D6.1.1).

This new system is not uncontroversial. It is feared that the large power generators have an advantage at the expense of smaller companies, which could miss-out funding. Furthermore, a decline in the facilities that generate electricity from biomass is feared (DBFZ, 2016).

Funding for investors who want to invest in renewable energies

The funding scheme “Energie vom Land” is used to finance projects for the generation, storage and distribution of renewable energies. The main aims of the programme are:

- Investments in the production, storage and distribution of bioenergy, such as: biogas plants, biomass cogeneration plants, plants for the production of biogenic fuels or local heating networks
- Investment in the generation, storage and distribution of renewable energies
- Investment in photovoltaics and hydroelectric power plants
- Investments in wind power plants of farmers, citizens' energy companies or rural municipalities
- Investing in storage and distribution of electricity
- Promotion with loans; where appropriate, additional grants for subsidies
- Eligible: Energy production companies, which are small and medium-sized enterprises (SMEs) as defined by the EU Commission

3.2.4.2 Support for biomass

In Germany, the **Federal Office for Agriculture and Food** (BLE) is the authority for the implementation of the sustainability criteria of Directive 2009/28 / EC (Renewable Energies Directive). The BLE is responsible for:

- Biofuel sector
- Data-management on the sustainability of liquid or gaseous biomass
- The evaluation of the implementation of the RED criteria
- The recognition and monitoring of the certification authorities
- The recognition and monitoring of certification schemes

The **Agency for Renewable Resources** (FNR) is a project sponsor of the Federal Ministry of Food and Agriculture (BMEL) (www.fnr.de). It was set up in 1993 on the initiative of the Federal Government in order to coordinate research, development and demonstration projects in the field of renewable raw materials. The purpose of FNR is to make an effective and continuous contribution to the development and use of renewable raw materials, in particular taking into account competition for use, direct and indirect land effects, biomass conversion and partial and overall sustainability concepts. The funding programme "Nachwachsende Rohstoffe" of the BMEL sets the rules for this. The funding for the implementation of the programme is available from the federal budget. In addition, FNR has funds from the Energy and Climate Fund for research and development in the bioenergy sector. The main task of FNR is the technical and administrative supervision of research projects for the use of renewable raw materials. Expertise in the field of renewable resources is gathered and made available to interested scientists, private individuals, politicians, business and media representatives via publications. FNR also draws attention to the

potential of renewable raw materials through fairs and exhibitions. Further, the coordination of EU projects belongs to the tasks of FNR.

Furthermore, there are associations dealing with Bioenergy. The **Bundesverband Bioenergie e.V. (Federal Association Bioenergy)** is the umbrella organization for Bioenergy (<https://www.bioenergie.de/>). Specialized industry associations and companies are involved. The association provides political and industrial representation of interests and the possibility to contribute to the national and European framework conditions.

The **Bundesverband Erneuerbare Energien e.V. (Federal Association Renewable Energies)** is the umbrella organization for renewable energies (<https://www.bee-ev.de/home/>). The individual activities of the associations with regard to politics and the public are coordinated. Additionally the cooperation and exchange of experience in the field of renewable energies is promoted.

Consultation on funding can be found at two Federal Councils:

- The Federal Government's Consultation "Research and Innovation": <http://www.foerderinfo.bund.de/>
- The Federal Funding database: <http://www.foerderdatenbank.de/>.

3.2.4.3 Technical barriers

Biogenic residual and waste materials contributed to over 50% of the entire energy supply through biogenic materials in Germany in 2014. There are still high unused potentials of residual and waste materials of approximately 448 PJ which could be used to generate energy in the future. The highest shares of currently unused potentials are covered by residual forest wood and straw (FNR, 2015).

The potential of agricultural by-products is determined indirectly through the cultivated area of the main crops, which are utilised on the basis of the economic framework conditions. To what extent crop rotations, forms of interim use or further utilisation cascades can be integrated to existing production processes, depends on the regional framework conditions, available technical process chains and economically appropriate process chains. In the agricultural context, an optimised land use, e.g. through the cultivation of catch crops, in combination with an increased biodiversity and an enhanced protection of abiotic resources is particularly to be mentioned (Brosowski et al., 2015).

The generation of final energy per unit area can be increased through a more efficient use of material flows and by-products. This concerns e.g. the extensive utilisation of waste heat via cogeneration and the ideally complete material and energetic use of resources in cascades. Nowadays the conversion factor for the electricity generation by using biomass amounts to 0.32. If it would be achievable to increase the conversion factor to 0.5 until 2050 through technical improvements, approximately one third of the required area for the electricity generation through biomass would become available for other forms of use. However a substantial reduction of the

primary energy demand through increased efficiency measures has been already taken into account to the energy concept of the German Federal Government (FNR, 2013).

According to the targets of the energy concept of the German Federal Government, the primary energy consumption is striven to be reduced by almost 50% until 2050. If targets are reached, bioenergy could be able to cover around one quarter of the remaining demand. However the utilisation of all current unexploited biogenic residual and waste materials would not be sufficient to cover the expected share of bioenergy in the scenarios of the bioenergy concept. Other potentials, e.g. wood shavings, residual materials from the food and fodder production sector or scrap wood are already almost fully exploited (FNR, 2015). Therefore, an option could be to import raw materials to meet the demand. Another option is to rethink the scenarios and the bioenergy target.

3.2.4.4 Barriers in the field of agricultural/forestry laws

In Germany there is a wide range of laws and funding programmes which support bioenergy generated from biomass (see ENERGY BARGE D 6.1.1 and D 3.1.3). At the same time, there is subsidization of fossil fuels such as coal, oil and natural gas. Each year, the extraction, processing and use of these fossil fuels are subsidized with a total of 46 billion € (Zerzaway et al., 2017). In contrast, there is an investment of 15.1 billion € in renewable energies in 2016 (Bundesministerium für Wirtschaft und Energie, 2017). The largest shares of the financial funds supporting fossil fuels, about 40.5 billion €, are consumer and business subsidies in form of energy price reductions and exceptions or transport subsidies. These include the tax deduction for diesel, the energy tax exemption for kerosene, the tax deduction of the agricultural diesel and the energy tax deduction for coal. 2.2 billion € are spent to subsidize fossil fuels. Here, the royalty and the water abstraction fees are of great importance. Also important are subsidies at the level of energy production. One example is the free allocation of emission allowances in Germany (Zerzaway et al., 2017).

Any amount invested in the promotion of fossil energy sources cannot be invested in renewable energy. The incentives for investing in renewable energies are reduced and the expansion cannot be promoted in a targeted manner.

The Federal Government has to ensure that the extension of renewable energies is not slowed down. One example for such a deceleration is the new amended EEG-law from 2017, which is the central control instrument for the expansion of renewable energies in Germany (see ENERGY BARGE D 6.1.1). In this amendment, the annual tendered quantity of funding commitments for renewable energy plants is smaller than the drop out of plants whose funding is discontinued. This means that more plants go off the grid and there won't be enough new plants to replace them. In the future, this grievance should be resolved.

Furthermore, it is important that associations provide better information and inform the population about these facts. There should be a wide public knowledge and consensus on the development in the renewable energies sector. It should not be concealed that there are still

problems. Wider public participation can also produce solutions that are supported by a broad majority.

3.2.4.5 Suggestions for improvement

The basis for an efficient energetic use of biomass is laid through an extended value chain. For a cascade use of biomass an ideally multiple material use is followed by an energetic utilisation at the end. An important factor to achieve this target is the utilisation of integrated solutions like the concept of biorefineries. In general all material flows should be assessed with regard to this approach (FNR, 2013).

An increase of the biomass potentials could be further achieved through enhanced yields as a result of new breeds in the agricultural and forestry sectors as well as optimized cultivation methods. This could also comprise the exploitation of areas that are not used by the agricultural or forestry sector yet, e.g. former mining landscapes, former military sites and wastelands, taking into consideration further social objectives. Concepts on regional level, like bioenergy villages or energy cooperatives, could exploit further potentials of wood fuel and energy crops (FNR, 2015).

The cultivation of renewable resources could be increased from 2.1 mio ha in 2015 up to 4 mio ha cropland until 2050 while keeping the level of food production and respecting sustainability requirements as some studies suggest (FNR, 2015). In addition to a sustainable nature-compatible cultivation of raw materials, a contribution to reach the goals of the bioeconomy and an enhanced biodiversity and sustainability in agriculture (e.g. the concept of production integrated nature conservation with renewable resources) could be achieved. As part of the greening measures in the frame of the Common Agricultural Policy, the general conditions to use the plant biomass from ecological focus areas energetically should be enhanced (FNR, 2015).

3.2.5 Hungary

3.2.5.1 Funding in the field of biomass

Renewable energy sources contribute extensively to the fulfilment of national economic objectives (job creation, GDP increase, security of supply, etc.), and therefore, it is a strategic objective to increase their use to the highest possible extent. As regards funding, the Hungarian Government intends to develop forms of financing for green economy development to ensure an increased involvement of capital market resources in addition to aids.

Returns are fundamentally dependent on two factors: (a) state guaranteed production for the produced energy, at least for the payback period of the investment, (b) support for the received energy, which is similar to the European average and the practice of neighbour countries (so that, their payback period would be 8 to 10 years, which is also accepted by the creditor banks). In addition, in order to meet the objectives set for renewable energies as set out in the National Renewable Energy Action Plan NREAP, further conditions are needed: - more concrete and long-

term regulation of subsidies; - stable return on investment could be planned by law; and finally the need for social consensus is not negligible.

In detail, the government approved the following strategies to improve sustainable development, innovation R&D, the economy and the employment in various sectors: National Rural Development Strategy; New Széchenyi Development Plan; National Research and Development and Innovation Strategy 2020. Concerning RDI actions, the largest funds are the National Research, Development and Innovation Fund (NKFI), the Hungarian Scientific Research Fund (OTKA) and the Operational Programmes for the period of 2014-2020.. The Commission also encourages other R&D funding schemes as well, such as Era-Net programmes to contribute to bioeconomy. The most relevant Operational Programme to bioeconomy, is the so-called Environment and Energy Efficiency Operational Programme. Priority areas for this Operational Programme include adapting to climate change, waste water management, waste management and energy efficiency. Besides the aforementioned Operational Programmes, the Hungarian Green Investment Scheme (GIS) funds measures to reduce greenhouse gases. In addition, the European Economic Area Agreement and Norway Grants are also accessible for Hungarian partners, with programmes including Green Innovation, Energy efficiency, Renewable energy, and Adaptation to climate change.

The Common Agricultural Policy (CAP) can enable rural areas to benefit from renewable energy technologies, including advanced biofuels in particular by facilitating the supply of wastes, residues and non-food raw materials.

3.2.5.2 Support for biomass

At administrative level, besides the Ministry of Agriculture and the Ministry of National Economy, the Ministry of National Development is responsible for biomass issues. Within this ministry, two sub-units dealing with these issues: The Minister of State for Energy Affairs and the Minister of State for Development and Climate Policy and Key Public Services.

The Hungarian Energy and Public Utility Regulatory Authority (HEA) is the regulatory body of the energy and public utility market, supervising the national economy's sectors of strategic importance. The Authority's responsibility covers licensing, supervision, price regulation, tariff- and fee preparatory tasks in the fields of electricity, natural gas, district heating as well as in water utility supply, besides pricing of public waste management services.

In connection with technology counselling, there are many domestic associations available: Union of Biomass Product Line, Association of Renewable Energy Organizations, Hungarian Biogas Association, Hungarian Bioethanol Association etc.

Besides the universities, the two largest research networks are the Hungarian Academy of Sciences and the National Agricultural Research and Innovation Centre.

Main support programmes for renewable energy sources and energy efficiency are the followings:

- Green Economy Financing System (quota revenues) from 2014
- EU funds available for 2014-2020: KEHOP, TOP, GINOP, VEKOP operational programmes
- the new Renewable Energy Support Scheme (METÁR)

The country has turned its focus towards green industries in the recent years, which includes environment protection and environment conscious technologies, waste and sewage utilization and management have been areas of special attention and support.

The Government traditionally supports renewable energy production with a Feed-in Tariff System and guaranteed price. The new support scheme (“METÁR”, “Megújuló Támogatási Rendszer” – “Renewable Support Scheme”) is already operational from 1 January 2017. The introduction of the new legislation also means that the former system, the so-called KÁT (Kötelező Átvételi rendszer – Obligatory Off-take) is gradually changed to METÁR, with a transitional period, until the termination of the last effective agreement which includes KÁT, but not later than year 2045. The key feature of the new support scheme is that the producers of renewable energy receive the aid as a paid premium over the market reference price. The producers of electric energy are classified into three different categories depending on the performance and the type of generation power plants. Apart from the above green premium system, METÁR also introduces the so-called “brown premium” to promote the generation of electricity from biomass or biogas sources of existing plants. In light of the above, it is obvious that the declared goals of the new support scheme are cost-effectiveness and the development of new generation capacities apart from ensuring competitiveness.

3.2.5.3 Technical barriers

There is considerable potential in Hungary for the biomass-based economy, especially biomass production and processing. Ratios of biomass raw materials are expected to shift in favour of energy crops specifically grown for this purpose, but even more towards by-products and wastes. Based on national experts (Szlavik and Csete, 2012), the role of domestic capital in energy and environmental investments is considerable, therefore mobilizing local industries and consumer spending is key to utilizing energy saving potentials.

Regarding the solid biomass, some things have to be taken into account in the current combustion technologies, adding biomass (especially agricultural biomass) to coal increases slagging and fouling as well as corrosion of metal elements of the generation equipment. The cause of this is the composition of the biomass (alkali compounds, content of chlorine and sulphur). Another type of technological issue is efficiency of power generation in thermal power stations, where ~25-30% of the energy input is converted into electricity, while the remaining energy is released as heat. It is a huge amount in a typical power station, and only a tithe fraction of it can be used as district heat, while the rest is usually emitted to the environment as an unutilised waste.

It is especially important to support research and development concerning biofuels and to support efforts to develop second generation biofuels. With regard to the contradiction between biofuel and food production, Hungary’s clear intention is to ensure a secure food supply. As regards the use of biofuels, with direct admixture and the current technological limitations, the spreading of vehicles capable of utilising engine fuels with high biofuel contents will be essential.

In the near future, Hungary will enable the use of purified biogas equivalent to natural gas for transport purposes by feeding it into the gas pipe network.

The number of biogas plants needs to be increased to reach the energy targets which was previously accepted. The achievement of this target is justified, first of all, by the fact that Hungary predominantly generates energy from waste; secondly, it would also provide a solution for disposing of large amounts of waste that is harmful to the environment, and thirdly, the technologies known today do not pollute the local environment.

3.2.5.4 Barriers in the field of agricultural/forestry laws

In the energy sector, the Hungarian Renewable Energy Utilisation Action Plan 2010-2020, based on the EU Renewable Energy Directive 2009, aims to exceed legal requirements of renewable energy production. The National Energy Strategy 2030 (2011) suggests measures for biomass based solutions, including the gradual conversion of uncultivated land to energy crops and the recognition of biomass and waste as potential feedstocks for biotechnology-based economy (pharmaceuticals, fine chemicals and advanced biofuels). The strategy identifies that development requires training, and a stronger industrial and innovation knowledge base.

The Forest Act has recently been amended (CXXVII of 2016. law) as follows: the licensing procedures will be simpler and in many cases the official procedural charges will be terminated. Furthermore, the forest area itself could grow in Hungary. Currently, an autonomous government decree regulates the installation of industrial woody plantations (135/2017. (VI.9) Government Decree). As a result, the Rural Development Programme provides support for afforestation for the establishment of industrial wood plantations, which do not qualify as forests.

Concerning biofuels, the B-100 types were never available and in 2011 the excise tax on the E 85 was increased in two steps. Decreasing oil prices also significantly contributed to the decline of the E85 market. The compulsory mixing ratio of biofuels is ruled by a government decree: currently it is 4.9% for gas oil and motor gasoline, and will remain until the end of 2018.

Still there is a need to set policy framework for the biogas plants, to connect biomethane systems to the national network and to promote public transport using biogas fuel. The spread of biogas plants is obstructed by the high investment cost of the facilities. The gas supply using biomethane is allowed by the natural gas law, but implementation rules are partly not completely uniform, it is necessary to elaborate and supplement it. In essence, biomethane is allowed but not promoted. For example, it is subject to regulation designed for natural gas suppliers and grid operators, and there are no filling stations for biomethane. It is also a serious disadvantage that legislation does not define exactly the biogas digestate. Periodic test procedure for digestate should be applied uniformly, instead of the currently use detailed or simplified soil protection plan.

Finally, in addition to administrative barriers, public perceptions of RES can also be an issue in certain cases.



3.2.5.5 Suggestions for improvement

As one can see, the present energy utilisation of biomass is largely unsustainable. According to the NREAP concepts the use of biomass for burning is carried out among the population as well as in larger rural or urban heating plants. Most of them are energy-efficient CHP cogeneration systems. Considering the fact that a lion's share of the biomass is used in large scale power stations requiring deliveries from large distances, biomass should mostly be used for energy purposes in local scale units within decentralised energy systems, where electricity is generated by many small energy producers, close to where it is used, rather than at large power plants located far from the consumers. Since the energy density of biomass is low, its energy utilisation is transport intensive. Therefore, utilisation of biomass is most efficient if used locally, in small scale units, in frame of a decentralised energy system. It is a disadvantage that this solution has a significant cost that is not feasible without subsidies, since raw material harvesting, storing and infrastructural (electrical connection, district heating) facilities also require significant investment costs.

The market for biofuels is emerging in Hungary, as evidenced by recent investments, but there is still huge potential for growth in biofuel production supported by agricultural products. With the emergence of second generation biofuels, via expansion of the raw material range, this volume could be increased further, depending on seasonal changes in agricultural production. Second generation biofuels could be also provided a secure market through the EU's long-term objectives regarding biofuel admixture, and their national adaptation besides that they ensure a secure food supply.

With regard to biogas, increasing attention will need to be paid to dual-purpose use and the increase of added value in the following years. Besides green electricity generated through biogas production, green heat generated for direct use of sales will also have priority. The achievement of this target is justified, first of all, by the fact that we predominantly generate energy from waste; secondly, it would also provide a solution for disposing of large amounts of waste that is harmful to the environment, and thirdly, the technologies known to us today do not pollute the local environment at all. In the field of transportation, the role of biogas is expected to increase in the future. It is also necessary to feed the biomethane into the natural gas pipeline network according to the uniform standards of the EU, since it is not only possible to conclude contracts at national level due to the liberalized market conditions. In addition, it is also necessary to simplify the land application of biogas digestate, of course taking into account the raw material.

3.2.6 Romania

3.2.6.1 Funding in the field of biomass

In present time, the farmers' interest in biomass technology is increasing. Biomass production creates new business opportunities and reduces their costs. The latest developments show the growing concern among farmers for the cultivation of energy crops, with the purpose of its use as raw material for the production of biomass (Bioenergy for Business, 2017). The advantage of this type of biomass is in its energy content, which is much higher than for the most of other resources.

However, there are some limitations and issues related to operating costs, usage patterns and the availability of land for this type of crop.

The support through the Law no. 220/2008 on the promotion of energy from renewable sources expired and there is no subvention scheme for the support of biomass projects and cogeneration projects. Also there is no subvention for the production of heat for district heating by the use of biomass. The existing projects that are producing electricity and heat by biomass are facing significant problems due to the problems on the Green Certificates market, blocked by the impossibility of selling them (Bioenergy for Business, 2017).

Currently, the Chamber of Deputies in Romania (Camera Deputatilor, 2017) has approved a proposal for a new Bioenergy Law (Number of Decision: 853/27-12-2016) and is up to parliament to approve or not the proposal in the forthcoming period. The proposed Bioenergy Law aims to support the creation of 300 MW of projects in Romania.

Currently, one of the funding opportunities is through **Large Infrastructure Operational Programme** (European Commission, 2015a). The percentage of non-reimbursable funding is between **60-98%**, with a net allocation of **83.85 million €**, maximum project value is **15 million €**. The session is open from July 2017 until 31.12.2018.

Under this specific objective, projects will be funded to implement the following action:

- Developing / modernization of high efficiency cogeneration power plants (maximum 8 MWe) on natural gas and **biomass**

Eligible applicants under OS 6.1 (according to the eligible CAEN code specified in Section 2.1 of the Guide) are (European Commission, 2015a):

- Territorial administrative units (ATUs) / administrative-territorial subdivisions, defined by Law no. 215/2001, as subsequently amended and supplemented, which produce thermal energy for the purpose of supply in the transmission and distribution network for the provision of public service for the supply of heat or for own consumption.

- Intercommunity Development Associations (ADI) established according to the provisions of Law no. 215/2001, as subsequently amended and supplemented, which produce thermal energy for the purpose of supply in the transmission and distribution network for the provision of public service for the supply of heat or for own consumption.

- Companies, established according to the provisions of Law no. 31/1990, republished, as subsequently amended or supplemented, or constituted in accordance with the specific legislation of the Member State from which is it, which has as its object the production of energy for the purpose of selling (at least 60% of the total produced energy)

For the investors in biomass, the adoption of the new legislation is **considered critical** according to the HORIZON2020 project “Bioenergy for Business” (Bioenergy for Business, 2017). At the present moment, biofuel is poorly understood and not much appreciated by most people. This is mainly due to the fact that the energy generation options from biomass are rarely discussed in

general and people are not informed. Moreover, biomass used to be the habitual fuel for the households in rural areas, as the fire wood. This situation is expected to change once the new legislation is adopted. The means necessary to attract the usage of biomass are the following: coherent legislative framework dedicated to biomass, identification of co-financing options for biomass projects, networking of the decision makers with the government representatives for the use of biomass, use of best practice examples of the EU in relation to the introduction of biomass production.

One of the barriers in biomass production is access to funding and poor interest of the Investment Funds to provide loans. The credit institutions are not interested in financing biomass projects because of the lack of specific legislation and the problems of the implementation of Law 220 for the promotion of renewable sources (wind, solar, biomass) that was caused due to the instability of the Green Certificates market.

The problems mainly occurred due to the fact, that the initial projection of NREAP (National Renewable Energy Action Plan) (PNAER, 2010) for how many projects were going to be constructed in Romania was not followed (e.g. the NREAP projection for wind projects was under 1 GW, while over 3GW were finally constructed). This was the major cause that created instability at the Green Certificates market of the market. The result was that the demand for Green Certificates was significantly less than the ones that were offered by the owners of Renewable Energy projects. As a result many projects have to face significant financial problems which are also confirmed by the local press (Posirca, 2016).

3.2.6.2 Support for biomass

The public authorities are not dealing exclusively with biomass, below are the relevant governmental and regional authorities in Romania:

- The National Regulator (**ANRE**). The role of ANRE (ANRE, 2017) lays in the settlement of the regulatory framework and the secondary legislation.
- The Municipal Authority of the Public Services Regulatory (**ANRSC**). ANRSC (Governul Romaniei, 2017) is the regulatory and control authority in relation to public utilities services (including centralized thermal energy) at local level.
- The **Ministry of Energy** (Ministerul Energiei, 2017) is responsible for:
 - drafting the National Energy Strategy of Romania, comprising the provision of the principles for the promotion of biomass, currently in the endorsement procedure at the Ministry of Environment
 - completing and updating the Law 220/2008, which is the essential Law for the promotion of the renewable energy sector
 The Ministry of Energy is currently preparing the new legislation on biomass (and biogas), as biomass is officially declared Romania's top priority. While the new law is still under preparation, at the moment there is no further information or details available in relation to any provisions related to biomass heating.
- The **Ministry of Environment** (Ministerul Mediului, 2017) is responsible for the national policy in the field of environment.

- The **Ministry of Waters and Forests** (Ministerul Apelor si Padurilor, 2017) is responsible for:
 - The strategies and rules applicable to forestry waste
 - The issuance of the Certificates of Origin for biomass feedstock
- The **Ministry of Agriculture and Rural Development** (Ministry of Agriculture and Rural Development, 2017) is responsible for the regulatory framework concerning energy crops
- The **Ministry of Regional Development, Public Administration and European Funds** (MDRAP, 2017) is responsible for attracting the city halls in financing RES projects (including biomass heating) and involvement in adopting new technologies. For example, one city hall in Romania, Suceava, has already built a biomass plant for District Heating production.
- The **Ministry of Transport** (Ministerul Transporturilor, 2017) is responsible for the regulatory framework concerning management of ports and waterways, the use of public transport infrastructure and the conduct of shipping activities in ports and inland waterways.

The most relevant associations in relation to biomass are the following:

- The **Romanian Association of Biomass and Biogas (ARBIO)**: ARBIO (ARBIO, 2017) is promoting the exploitation of Romania's biomass potential and the development of biomass projects in the country as well as identifying the problems of the biomass project developers and sustaining and representing them in their contacts with the authorities. Currently, ARBIO is involved in the drafting of the new Thermal Law in Romania and supports, inside the working group formed by the Ministry of Energy, the necessity of adopting specific legislation dedicated to biomass (and biogas), by presenting and advocating the sectors proposals.
- The **Romanian Association of Producers of Pellets and Briquettes (APPBR)**. The purpose of APPBR (APPBR, 2017) is to promote the benefits of the production and use of wooden pellets and briquettes and provide a favourable legal and investment framework for the development of these activities in the country.
- The **Federation of Forests' and Grasslands Owners in Romania NOSTRA SILVA** (Nostra Silva, 2017) is the main organization representing forest owners in Romania, but also owners of grasslands and has extensive expertise about **wood biomass resources**, contacts with other stakeholders related to the wood industry. Nostra Silva is represented in the National Monitoring Committee for the Rural Development Program, the main financing source for rural development, afforestation and biomass plantations.

The **Governance Programme 2017-2020** (Camera Deputatilor, 2017a) comprises several proposals at national level focused on Romania's country advantage for biomass:

- **Biomass**: 500,000 hectares - in order to achieve technical-energy plantations for production of electric and thermal energy for all Romanian municipalities, the support of the investment will be made through the Fund set up by the Ministry of Environment.

- **High efficiency cogeneration:** Financial support will be provided through a bonus cogeneration for high efficiency technologies.
- RO Green - Circular Economy (Waste Recovery) supporting investment through European funds, environment fund, and focus on energy);

3.2.6.3 Technical barriers

Large-scale heat and power producers have not initiated combined use of fossil fuels and biomass-based fuels (especially industrial pellets) (Bioenergy for Business, 2017).

In the absence of large projects based on centralized heat distribution systems supplied by factories in cogeneration, there were mainly projects for self-consumption of the thermal and electrical energy needs of large economic agents (Holzindustrie Schweighofer, Egger, Kronospan, etc.).

Technologies with little widespread in Romania (Bioenergy for Business, 2017):

- Production and use of straw pellets;
- Production of energy in cogeneration using industrial pellets;
- Biogas production technologies using household waste;
- Biogas production technologies using waste from agro-food industry;
- Using wood chips for obtaining electric and thermal energy in cogeneration mode;
- The energy plantation plant for biomass;
- Mobilization of biomass from wood-processing residues;
- Mobilization of biomass from young forest care (cleaning, thinning, scraping).

Wood waste is mainly used in the wood chipboard industry (chipboards, OSB, MDF) and for the production of heat for timber drying by primary woodworking industry producers.

In conclusion, there is a great potential for mobilizing both biomass and forestry biomass resources, which are currently underutilized.

3.2.6.4 Barriers in the field of agricultural/forestry laws

Both forestry and agricultural legislation include barriers that are hard to overcome in the use of biomass.

In the forestry field, in July 2017 a modification of the Forest Code - Law- 175-2017 was approved, which prioritizes the targeting of the forestry resource to ensure the fire needs of the population. This demand for firewood - 3.5 million households in Romania use firewood - was estimated at 10-14 million cubic meters, while the volume exploited in Romania is on average 18 million cubic meters.

By this law, about 40% of the entire resource exploited from public property forests is directed to the consumption of firewood of the population, being removed from the economic circuit. This resource would be able to support the projects for the use of forest biomass for energy and not strictly the consumption of firewood.

At the same time, projects using cogeneration firewood have been excluded from the green certificate support system, the only forest resource accepted is bark or sawdust from primary wood processing. This approach drastically limits the forest biomass resource usable in industrial energy production projects, with the exclusive use of the use of firewood by the population for domestic consumption.

There are also barriers regarding the land use the production of biomass through energy culture:

- The law on grasslands and pastures - Law 16/2016 - it is forbidden to change the land use category of these lands;
- For forestry land it is also forbidden to change the category of use.

3.2.6.5 Suggestions for improvement

The means necessary to attract biomass production are the introduction of financial incentives, conduction of awareness campaigns, training courses and provision of education that are necessary to inform the public of the advantages of using biomass and a coherent legislation, taking into account EU legislation in the field. Taxation of the pollutant emissions, the use of EU models and policies can also influence the attraction of biomass production. The main benefits associated with biomass utilization are reduction of CO₂ emissions, improvement of land use, waste management, and energy independence, cleaner and cheaper energy compared to fossil fuels (Bioenergy for Business, 2017; ARBIO, 2017).

Actions for improvement are:

- Comprehensive legal provisions to develop the use of biomass
- Governmental and local support in the form of financial incentives, regulations and standards, voluntary agreements, subvention and support schemes, research programmes and information instruments
- Investments in public infrastructure
- Incentives by the national authorities to the private sector to invest in the biomass sector.



3.2.6 Slovakia

Slovakia depends in great extent on the import of energy, since over 90% of energy consumed is imported, representing financial volume of almost 20% of all imports. Renewable energy sources (RES) are seen as a tool for substantial reduction of this trend which can furthermore contribute to the reduction of the greenhouse gas emissions and to the final reduction of the negative effect of the energy production on the environment (Ministry of Agriculture SR, 2016). The share of covering total electric energy production in Slovakia (28,590 GWh in 2013) is 55% nuclear power, 15.7% hydropower and 15.7% of fossil fuel plants. The rest of 11.6% accounted for power stations at companies and RES. Slovakia is planning to increase the utilization of RES from 6.7% of the total energy consumption in 2005 to 14% in 2020 (Rédli E., 2015).

3.2.6.1 Funding in the field of biomass

To keep renewable energy competitive, support from public sources is crucial. This is due to market and regulatory failures: in particular subsidies for fossil fuels and nuclear energy, the incomplete internalization of external cost and rigid electricity system. Public support differs at regional, national or local level, and in assisting mainly either sectors or companies in form of grants or exemptions from charges and taxes. Support on renewable energy resources is provided in form of investments and operating assistance (Fil'a M. et al., 2015). In the document Guidelines on State Aid for Environmental Protection and Energy 2014 – 2020, all ways of support regarding energy production are explicitly listed. Renewable energies are mentioned without any differentiation according to sources or technologies and the aid represents 60, 50 or 40% of the eligible costs for small, medium and large enterprises, respectively (Fil'a M. et al., 2015).

Funding for farmers concerning biomass production

Besides the support schemes described in the previous section, assistance aims especially, perhaps entirely, at farmers. It consists of subsidies for already established or new fast growing plants fields. These are aimed at companies farming on arable land (registered) in Slovak republic. Applications for payments are submitted to the agricultural payment agency. Applicants should meet criteria according the guidelines of Ministry of Agriculture and Rural Development (Slov-Lex, 2014). The subsidy was set at 205.57 €/ha in 2014 as an additional direct payments in crop production (Journal of Ministry of Agriculture, 2014).

Funding for plant operators

Substantial contribution towards RES is provided also from EU funding. E.g. in 2015 an amount of 115 million € was reported to obtain for the installation of five kinds of RES technologies, i.e. biomass boilers, solar collectors for heating or warming up water, heat pumps, photovoltaic panels, as well as wind turbines for generation of electricity with the output up to 10 kW (100 million € from the EU and 15 million € as government contribution. This was the first time the European Commission agreed to allocate EU funds directly to households. (International development Norway, 2014)

Another example of support from outside Slovakia is financing from Norwegian funds. A number of projects aimed to biomass were supported, such as the Biomass Logistic Centre (BLC) – BIOPEL – Slovakia (International development Norway, 2014) and the Centre for the research of biomass potential (USKSUP, 2014).

Plant operators producing energy from biomass have to be addressed and information will be obtained directly from the beneficiaries. As an example for a successful operator, the bioenergy company Green Energy, Slovakia, Ltd., can be named, dealing with projects related to wind, sun, and bioenergy, with an overall installed capacity over 200 MW (Green Energy, 2017).

In 2009, Slovenské elektrárne started biomass co-combustion generation in the Vojany Power Plant, Eastern Slovakia, and in 2011 in the Nováky Power Plant, Central Slovakia. It is possible to co-fire up to 20% of biomass in the near future. At Vojany an annual decrease **of carbon dioxide emissions represents 21,000 tons**, when co-firing biomass in the fluidised bed boilers, is performed. In the Nováky Power Plant co-combustion of biomass and brown coal takes place in the fluidised bed boilers of the operation ENO A. (Slovenske Elektrarne, a.s., 2017).

Funding for investors

The funding for the applicants who receive the grants or other kind of support (e.g. Ministry of agriculture and rural development on regulation No.342/2014 Coll) seems to be acceptable (Marčíšová E., et al., 2015) The basic rate of support is set at 50% of all eligible costs in the case of less developed regions (without Bratislava region) and 40% of all eligible costs in the case of Bratislava region. Applications for direct payments are submitted to the agricultural payment agency; eligible applicants should farm on arable land (registered) in Slovak republic and should meet criteria according the Guidelines of Ministry of agriculture and rural development on regulation No.342/2014 Coll. The single payment area was set at 205.57 €/ha (Fil'a M., et al. 2015).

At present only two investors have been identified to be interested in investing in bioenergy:

BioCON, Ltd (Biocom Group, 2017) belongs to the Bio CON investment group and Bioenergy Investments, Bratislava. Search via Google identified several other companies claiming this, but more detailed checking showed that most of them claim interest but they not only cannot present any investment but also are lacking of sufficient knowledge on the topic.

Access for funding opportunities suffers from similar discrepancies as in other sectors in the country. In spite of some, perhaps significant, amount of funds is ready to be distributed to applicants, the number of applicants and the total amount requested is much higher than the available funds. The distribution criteria are in many cases not quite clear, the evaluation process of projects is not even for all applicants and in many cases external pressures affect the selection. E.g. the companies producing biomass energy claim that photovoltaics, but also many other technologies are economically self-sufficient, EU supporting these only distorts the market and postpones investments by households.

3.2.6.2 Support for biomass

Several public or non-governmental organizations are fully or partially dealing with various aspects of biomass, including bioenergy. Perhaps the most important is the Slovak Renewable Energy Agency (SK REA), which is a non-profit organization, established in 2006 by Ministry of Agriculture and Rural Development in order to promote the development of renewable energy sources in Slovakia. The Agency's activities are also aimed to raise public awareness on energy-efficient solutions, but at the same time they initiate and support the contacts and discussions between private sector and political sphere regarding issues of both economic and legislative support for such technologies.

Among other NGOs, two have been identified to deal entirely or mainly with biomass, namely Biomasa, a Consortium of legal entities, an association supporting the use of biomass in Slovakia, Kysucky Lieskovec and Energy Centre, a non-governmental consulting organisation which promotes the rational use of energy and utilisation of renewable sources of energy.

3.2.6.3 Technical barriers

Energy from biomass can be obtained in several ways divided into three basic categories:

- Thermochemical conversion (direct combustion, pyrolysis or carburation)
- Biochemical conversion (anaerobic fermentation or aerobic fermentation)
- Mechanical and chemical conversion (oil pressing or esterification of raw biological oil) of energies

It looks like that current technical level in the world is high enough to offer appropriate technologies for all abovementioned options. The decision on, first, whether invest in the biomass energy, and if so, which option is optimal, depends entirely on the results of highly professional discussion considering the comparison of price / performance ratio of available technologies related to the situation in Slovakia (which may differ significantly compared to other, even

neighbouring countries), as well as the economic priorities consisting in available resources and period of investment return.

3.2.6.4 Barriers in the field of agricultural/forestry laws

The legislative barriers related to biomass energy may be discussed generally from two points of view, namely legislative regarding all aspects of biomass production and technological processing on one hand and ecological impact of energy production from biomass. Both aspects are overlapping in a number of factors but other aspects exist where the mutual relation is contradictory. This is understandable, since even the relations between economic and environmental role of forests is contradictory and the wood producing sector is often in fierce arguments with ecology protecting authorities, not mentioning ecology-protecting NGOs. Moreover, independent experts express concern that massive exploitation of biomass does not necessarily contribute to better environment, stressing that biomass is primarily a local source.

Concerning other legal activities on biomass, the Slovak National Party (SNS) initiated the change to prevent speculative purchases, in accordance with the goals of the current government concerning the protection of agricultural land. The new initiative is sound, considering slower deterioration of ground, but may create barriers considering the necessary increase in bioenergy from biomass, especially wood.

3.2.6.5 Suggestions for improvement

Chopped wood, woodchips and wood in the form of pellets or briquettes are currently the most commonly used forms of biomass in Slovakia. Other forms of biomass, such as waste from agricultural production, bilge produced by wastewater treatment plants or waste collected from households, are still underused in Slovakia and wider exploitation should be supported. The cultivation of special plants specifically producing industrial biomass is just at the beginning.

Agricultural or forest-sourced biomass represents, from an economic and ecological point of view, the most appropriate and effective renewable source of energy under the natural conditions of Slovakia. and with regards to its existing energy infrastructure, i.e. central heating systems in towns and villages. Unlike photovoltaic – i.e. solar – power stations and wind, biomass is a predictable source, which can be regulated. Biomass currently generates up to 3 percent of the total energy consumed in Slovakia, but the total potential of biomass currently represents the possibility to cover more than one half of heating needs, especially in areas of central heating systems, but less in households, in the forms of pellets, briquettes, woodchips and reeds.

The biggest challenge for the entire forest -timber sector in relation to the Green Economy is the establishment of payments for ecosystem services of forests and in broader sense services of the rural area. These services make an important contribution to the quality of life of citizens. To

achieve this, it is necessary to implement a sustainable way for incorporation into the market economy, to improve methods of quantification and financial evaluation, and to introduce a applicable system of regulations and institutions to facilitate the entire process. This approach would result in greater production diversification and lower dependence of forest and agricultural enterprises solely on agricultural sale earnings which would subsequently reduce the risk of economic losses and staff redundancies. (Ministry of Agriculture SR, 2016; European Comission, 2017)

4 References

ANRE, (2017). Role and competencies. [online] <http://www.anre.ro/en/about-anre/anre-role-and-competencies> [Accessed: 15.11.2017].

APPBR, (2017). Scop și obiective. [online] Available at: <http://peletibrichete.ro/scop/> [Accessed: 15.11.2017].

ARBIO, (2017). [online] ARBIO. Available at: <http://www.arbio.ro/english/#all> [Accessed: 15.11.2017].

Bachmann, N. and Wellinger, A., (2012). National Biogas Roadmaps. [online] Available at: https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/biogasin_national_biogas_road_maps.pdf [Accessed: 22.09.2017].

BioCON Group, (2017). Biomass – Impact on environment. [online] Available at: www.biocon1.sk/en/ [Accessed: 25.10.2017].

Bioenergy for Business, (2017). [online] Available at: <http://www.bioenergy4business.eu/> [Accessed: 30.06.2017].

Biermayr, P., Dißauer, C., Eberl, M., Enigl, M., Fechner, H., Leonhartsberger, K., Maringer, F., Moidl, S., Schmidl, C., Strasser, C., Weiss, W., Wonisch, P., Wopienka, E., (2017). Innovative Energietechnologien in Österreich Marktentwicklung 2015 -Biomasse, Photovoltaik, Solarthermie, Wärmepumpen und Windkraft. Federal Ministry for Transport, Innovation and Technology, Report No. 13/2017, Vienna.

BMLFUW, (2015). The Austrian Forest Report 2015. Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna, November 2015. [online] Available at: <https://www.bmlfuw.gv.at/english/forestry/The-Austrian-Forest-Report-2015--Austria-s-forests-receive-top-grades.html> [Accessed 22.9.2017].

Brosowski, A., P. Adler, G. Erdmann, W. Stinner, D. Thrän, U. Mantau, C. Blanke, B. Mahro, T. Hering & G. Reinholdt. (2015). Biomassepotenziale von Rest- und Abfallstoffen – Status quo in Deutschland. [online] Available at: https://mediathek.fnr.de/downloadable/download/sample/sample_id/1251/ [Accessed 08.11.2017].

Bundesministerium für Justiz und Verbraucherschutz, (2017). Gesetz für den Ausbau erneuerbarer Energien. [online] Available at: http://www.gesetze-im-internet.de/eeg_2014/ [Accessed: 25.10.2017].

Bundesministerium für Wirtschaft und Energie, (2017). Erneuerbare Energien in Zahlen. Nationale und internationale Entwicklung im Jahr 2016. Eigenverlag. 75 pages.

Camera Deputatilor, (2017). Proiect de Lege pentru stabilirea sistemului de promovare a producerii energiei produsă din sursele regenerabile biomasă, biogaz și energie geotermală. Project co-funded by European Union funds (ERDF)

[online] Available at: http://www.cdep.ro/pls/proiecte/upl_pck.proiect?cam=2&idp=16110
[Accessed: 15.11.2017].

Camera Deputatilor, (2017a). Programul de Guvernare. [online] Available at:
<http://www.cdep.ro/pdfs/oz/Program%20de%20Guvernare.pdf> [Accessed: 15.11.2017].

Centrometal, (2017). Centrometal.[online] Available at: <http://www.centrometal.hr/> [Accessed: 20.09.2017].

Consortium “Focus Systems – Dan Tea”, (2017). Development, discussion and adoption of the National Action Plan for Forest Biomass Energy 2018-2027: Analysis of the current European policies and regulations on forests and forestry related to the use of biomass for the production of heat and electricity (original: Разработване, обсъждане и приемане на Национален план за действие за енергия от горска биомаса 2018-2027 г.: Анализ на действащите европейски политики и регулации за горите и горското стопанство, имащи отношение към използването на биомасата за производство на топло и електроенергия). [online] Available at:
https://www.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1503571599.pdf [Accessed: 24.09.2017].

Ćutić, I., 2016. “MOGUĆNOSTI SUFINANCIRANJA PROJEKATA PROIZVODNJE I KORIŠTENJA BIOMASE.”. [online] Available at:
http://www.srcplus.eu/images/Seminars/Woodchips/Croatia/9_Mogucnosti_sufinanciranja_projekata_proizvodnje_i_koristenja_biomase-1.pdf, [Accessed: 25.09.2017].

Danube Region Strategy Energy, (2014). Danube Region Biomass Action Plan. [online] Available at: http://danubebiomass.eu/documents/Danube_Region_Biomass_Action_Plan_03191001.pdf
[Accessed: 01.09.2017].

DBFZ-Deutsches Biomasseforschungszentrum, (2016). Presseinformation – Schwindende Biomasseförderung: DBFZ veröffentlicht Hintergrundpapier zur Situation der Bestandsanlagen im Bund und in den Bundesländern. [online] Available at:
<https://www.dbfz.de/presse/pressemitteilungen-2016/schwindende-biomassefoerderung-dbfz-veroeffentlicht-hintergrundpapier-zur-situation-der-bestandsanlagen-im-bund-und-den-bundeslaendern.html> [Accessed: 25.10.2017].

Dukan, M., (2017). Croatian Feed in Premium support system for renewables | Low Carbon Development in South East Europe. [online]. Available at:
<https://www.starfishenergy.org/single-post/The-design-of-the-Croatian-Feed-in-Premium-support-system-for-renewables> [Accessed: 18.09.2017].

European Commission, (2014). Flagship Cluster fiche. The Danube Bioenergy Nexus (DBN). [online] Available at:
http://iet.jrc.ec.europa.eu/remea/sites/remea/files/files/documents/events/danube_bioenergy_nexus3june2014.pdf [Accessed: 16.09.2017].

European Commission, (2015). Regional policy – InfoRegio. [online] Available at:
http://ec.europa.eu/regional_policy/en/information/publications/factsheets/2016/european-project-co-funded-by-european-union-funds-erdf

[structural-and-investment-funds-country-factsheet-slovakia](#) 19/05/2016, [Accessed: 08.01.2018].

European Commission, (2015a). POIM (2014-2020). [online] Available at: <http://www.fonduri-ue.ro/poim-2014> [Accessed: 15.11.2017].

European Commission, (2017). Agriculture as supplier of biomass for energy. [online] Available at: https://ec.europa.eu/agriculture/bioenergy/supply_en [Accessed: 19.10.2017].

European Commission, (2018). Operational Programme "Innovations and Competitiveness". [online] Available at: http://ec.europa.eu/regional_policy/en/atlas/programmes/2014-2020/bulgaria/2014bg16rfop002 [Accessed: 12.01.2018].

European Commission, (2018a). Factsheet on 2014-2020 Rural Development Programme for Bulgaria. [online]. Available at: https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/bg/factsheet_en.pdf [Accessed: 20.09.2017].

Fil'a M., Tóthová V., (2015). Economic and Managerial Decision Making in Enterprise in the Field of Diversification. *Ekonomika poľnohospodárstva*. ročník XV. 3 / 2015. Page 58-68.

FNR (Fachagentur Nachwachsende Rohstoffe e.V.), (2013). Nachhaltige Nutzung von Biomassepotenzialen. [online] Available at: https://mediathek.fnr.de/media/downloadable/files/samples/w/e/webversion_02.pdf [Accessed 08.11.2017].

FNR (Fachagentur Nachwachsende Rohstoffe e.V.), (2015). Potenziale biogener Rest- und Abfallstoffe für eine nachhaltige Energie- und Rohstoffbereitstellung. [online] Available at: http://www.fnr.de/fileadmin/allgemein/pdf/broschueren/Handout_Folder_Parlam_Mittag_Web.pdf [Accessed 08.11.2017].

Filipova, I., (2016). Биотехнологични проекти ще получат 190 млн. евро по "Хоризонт 2020". *www.capital.bg*. [online]. Available at: http://www.capital.bg/biznes/kompanii/2016/04/19/2745717_biotehnologichni_proekti_shte_poluchat_190 mln evro po/ [Accessed: 23.09.2017].

Georgieva, V., (2013). Use of bioenergy – solid biomass and biogas for heat and biomass power generation - Presentation material for the Deutsch-Bulgarische Industriehandelskammer held on 08.10.2013 in Sofia, Bulgaria. (original: Използване на биоенергия – твърда биомаса и биогаз за топло- и електропроизводство. [online]. Available at: http://bulgarien.ahk.de/fileadmin/ahk_bulgarien/Dokumente2013/DEinternational/Biomasse_Biogas/Vladislava_Georgieva_BG.pdf [Accessed: 23.09.2017].

Governul Romaniei, (2017). English Translated Law. [online] Available at: <http://www.anrsc.ro/legislatie/english-translated-law/> [Accessed: 15.11.2017].

Governul Romaniei, (2017a). LEGE nr. 175 din 14 iulie 2017. [online] Available at: <http://legislatie.just.ro/Public/DetaliuDocument/191314> [Accessed: 15.11.2017].

Green Energy, (2017). [online] Available at: www.greenenergy.sk [Accessed: 15.11.2017].

Greenpeace Magyarország, (2016): A Greenpeace Magyarország szakmai ajánlatcsomagja a METÁR és megújuló energiaforrások részletszabályozásaihoz. [online] Available at: <http://www.greenpeace.org/hungary/hu/sajtokozpont/Energiaforradalmat-Magyarorszagon-is/METAR-javaslatcsomag/> [Accessed: 15. 09.2017].

Gullai, P., (2017). Rövid ismertető a METÁR-ról. *Magyar Energetika*, Year XXIV , Issue 2; page 26-27.

HEP ESCO, (2017) [online]. Available at: <http://www.hep.hr/esco/>. [Accessed: 20.09.2017].

HROTE, Annual report, (2017), [online]. Available at: http://files.hrote.hr/files/PDF/OIEIK/GI_2016_HROTE_OIEiK_verzija_za_WEB.pdf, [Accessed: 01.09.2017].

Hrvatske šume, (2017) [online]. Available at: <http://portal.hrsume.hr/index.php/hr/tvrtka/onama>. [Accessed: 19.09.2017].

Hujber, D. and Szilágyi, T., (2014). Danube region biomass action plan. [online] Available at: http://danubebiomass.eu/documents/Danube_Region_Biomass_Action_Plan_03191001.pdf [Accessed: 02.11.2017].

Hungarian Energy and Public Utility Regulatory Authority, (2015). [online] Available at: <http://www.mekh.hu/>. [Accessed: 01.09.2017].

IEE Project 'BiogasIN', (2012). National Biogas Road Maps. [online]. Available at: https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/biogasin_national_biogas_road_maps.pdf [Accessed: 25.09.2017].

International Development Norway, (2014). Biomass Logistic Centre Slovakia. [online] Available at: <http://www.id-norway.com/projects/biomass-logistic-centre/> [Accessed: 21.11.2017].

Journal of Ministry of agriculture and rural development no. 722/2014 -100Ministry of Agriculture and Rural Development, (2016). Green report, Report on Forestry in the Slovak Republic per Year 2015. [online] Available at: <http://www.mpsr.sk/en/index.php?navID=16&id=65> [Accessed: 25.11.2017].

J. Szlavik, M. C., (2012). Climate and Energy Policy in Hungary. *Energies* 2012, 5, 494-517. ISSN 1996-1073.

Maričšová E., (2015) Legislation, support and development of renewable energy resources and business. *Ekonomika poľnohospodárstva*. ročník XV. 3 / 2015. Page 58-68. [online] Available at: <http://www.vuepp.sk/EP2015/3/3.Mari.pdf> [Accessed: 28.10.2017].

MDRAP, (2017). MINISTERUL DEZVOLTĂRII REGIONALE ȘI ADMINISTRAȚIEI PUBLICE (MDRAP). [online] Available at: <http://www.mdrap.ro/ministerul/prezentare> [Accessed: 15.11.2017].

Ministerul Apelor si Padurilor, (2017). [online] Available at: <http://apepaduri.gov.ro/> [Accessed: 15.11.2017].

Ministerul Energiei, (2017). Programul de guvernare si prioritati. [online] Available at: <http://energie.gov.ro/ministerul-energiei/programul-de-guvernare-si-prioritatile-din-domeniul-energetic/> [Accessed: 15.11.2017].

Ministerul Mediului, (2017). Minister. [online] Available at: <http://www.mmediu.ro/categorie/minister/6> [Accessed: 15.11.2017].

Ministerul Transporturilor, (2017). Organ de specialitate. [online] Available at: <http://mt.gov.ro/web14/despre-noi/despre-noi-atributii/organ-de-specialitate> [Accessed: 15.11.2017].

MINISTARSTVO ZAŠTITE OKOLIŠA I ENERGETIKE, "UPUTA ZA PRIJAVITELJE POZIVA NA DOSTAVU PROJEKTNIH PRIJEDLOGA ZA POVEĆANJE ENERGETSKE UČINKOVITOSTI I KORIŠTENJA OBNOVLJIVIH IZVORA ENERGIJE U PROIZVODNIM INDUSTRIJAMA.", (2017). [Online]. Available at: <https://esavjetovanja.gov.hr/Econ/MainScreen?entityId=5532> [Accessed: 20-Sep-2017].

Ministry of Agriculture and Food and Forestry, (2012). Agricultural Land Protection Act. [online] Available at: http://www.mzh.government.bg/odz-pernik/Libraries/%D0%97%D0%B0%D0%BA%D0%BE%D0%BD%D0%B8/Zakon_opazvane_s_elskostopansko_imushtestvo.sflb.ashx [Accessed: 25.09.2017].

Ministry of Agriculture and Food and Forestry, (2016). Annual report on the situation and development of agriculture (agrarian report 2016). [online] Available at: <http://www.mzh.government.bg/MZH/Libraries/Actual2/2016.sflb.ashx> [Accessed: 22.09.2017].

Ministry of Agriculture and Food and Forestry, (2017). Forest Act. [online] Available at: http://www.iag.bg/data/docs/ZAKON_za_gorite2017.pdf [Accessed: 22.09.2017].

Ministry of Agriculture and Food and Forestry, (2016). Annual report on the situation and development of agriculture (agrarian report 2016)). [online]. Available at: <http://www.mzh.government.bg/MZH/Libraries/AgryReports/2016.sflb.ashx> [Accessed: 20.09.2017].

Ministry of Agriculture and Food and Forestry, (2010). Agricultural Land Protection Act (original: Закон за опазване на селскостопанското имущество). [online]. Available at: http://www.mzh.government.bg/odz-pernik/Libraries/%D0%97%D0%B0%D0%BA%D0%BE%D0%BD%D0%B8/Zakon_opazvane_s_elskostopansko_imushtestvo.sflb.ashx [Accessed: 20.09.2017].

Ministry of Agriculture and Food and Forestry, (2015). Bulgaria - Rural Development Programme (National). [online]. Available at: <http://www.prsr.bg/documents/Програма-за-развитие-на-селските-райони-2014---2020-г./6/0/index.html> [Accessed: 20.09.2017].

Ministry of Agriculture and Food and Forestry, (2017). Forest Act (original: ЗАКОН за горите). [online]. Available at: http://www.iag.bg/data/docs/ZAKON_za_gorite2017.pdf [Accessed: 20.09.2017].

Ministry of Agriculture and Food and Forestry, (2012). Ordinance on the conditions and procedure for assigning the implementation of activities on forest territories - state and municipal property. (original: Наредба за условията и реда за възлагане изпълнението на дейности в горските територии - държавна и общинска собственоности). [online]. Available at: http://www.iag.bg/data/docs/NAREDBA_new_2013.doc [Accessed: 20.09.2017].

Ministry of Agriculture and Rural Development, (2016). Green report, Report on Forestry in the Slovak Republic per Year 2015, [online] Available at: <http://www.mpsr.sk/en/index.php?navID=16&id=65> [Accessed: 25.11.2017].

Ministry of Agriculture and Rural Development, (2017). [online] Available at: <http://www.madr.ro/en/> [Accessed: 15.11.2017].

Ministry of Energy, (2015). Third National Report on Bulgaria's progress in the promotion and use of energy from renewable sources. [online]. Available at: <http://seea.government.bg/documents/Report%202015-Bulgaria-EN.pdf> [Accessed: 22.09.2017].

Ministry of Economy and Energy, (2014). National Energy Efficiency Action Plan 2014–2020. [online]. Available at: http://www.seea.government.bg/documents/2014_neeap_en_bulgaria.pdf [Accessed: 22.09.2017].

Ministry of Economy, (2015). Operational Programme “Innovations and Competitiveness 2014–2020”. [online]. Available at: <https://www.rairarubiabooks.com/view.php?res=1ufV2aWYnerY4InY3tbQ1tvO4tzV0uHO3NjU3JnL1aLK1szQ0-aQz9TV0-XG2drc1-fQ2-SYoaqUnMq4vrykyJ2Zn6fAm5ubntLCzdrZ4tjFyM3izbikyJyfnKOUi52Zn6jArrmX3tfHSSE8Wk41MQ&keyword=Operational+Programme+%E2%80%9EInnovation+and+Competitiveness%E2%80%9D+2014-2020&a=pqeWmZ-cpykwMVVJPUNjODE&b=okBzX1lzc3dhT3UtOGwrMTQy> [Accessed: 23.09.2017].

Ministry of National Development, (2010). Hungary’s renewable energy action plan for 2010 – 2020. [online] Available at: http://2010-2014.kormany.hu/download/6/b9/30000/RENEWABLE%20ENERGY_REPUBLIC%20OF%20HUNGARY%20NATIONAL%20RENEWABLE%20ENERGY%20ACTION%20PLAN%202010_2020.pdf [Accessed 01.09.2017].

Наредба, (2013). Наредба за условията и реда за възлагане изпълнението на дейности в горските територии - държавна и общинска собственоности [online], Available at: www.iag.bg/data/docs/NAREDBA_new_2013.doc [Accessed: 22.09.2017].

Nemes Csaba, (2015): A megújuló energiaforrások hazai helyzete és jövője, [online] Available at: http://www.met.hu/doc/rendezvenyek/metnapok-2015/01_NemesCs.pdf [Accessed 01.09.2017].

- NNFCC The Bioeconomy Consultants, (2015). Bioeconomy Factsheet – Hungary [online] Available at: <http://www.nnfcc.co.uk/files/mydocs/Bioeconomy%20Factsheet%20Hungary.pdf> [Accessed 03.09.2017].
- Nostra Silva, (2017). [online] Available at: <http://www.nostrasilva.ro/activitati-nostra-silva/> [Accessed: 15.11.2017].
- Posirca, O., (2016). Romania's renewable investors struggling with financial pressures. [online] Available at: <http://www.business-review.eu/sidebar-featured/romanias-renewable-investors-struggling-with-financial-pressure-100762> [Accessed: 15.03.2016].
- PNAER, (2010). Planul Național de Acțiune în Domeniul Energiei din Surse Regenerabile. [online] Available at: http://www.minind.ro/pnaer/PNAER_29%20iunie_2010_final_Alx.pdf [Accessed: 15.11.2017].
- Official gazette, (2015). "ZAKON O OBNOVLJIVIM IZVORIMA ENERGIJE I VISOKOUČINKOVITOJ KOGENERACIJI.", [online], Available: http://narodne-novine.nn.hr/clanci/sluzbeni/2015_09_100_1937.html, [Accessed: 23.09.2017].
- Rédli, E., (2015). Slovakia renewable potential untapped. *The Slovak Spectator*, [online] Available at: <https://spectator.sme.sk/c/20056441/slovakia-renewable-potential-untapped.html> [Accessed: 21.11.2017].
- Slovenske Elekrarne, a.s. (2017). Biomass. [online] Available at: <https://www.seas.sk/biomass> [Accessed: 20.11.2017].
- Slov-Lex: Regulation of Ministry of agriculture and rural development on No.342/2014 Coll. [online] Available at: <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2014/342/20170301> [Accessed: 22.11.2017].
- "Šumska biomasa d.o.o." [Online]. Available: <http://portal.hrsume.hr/index.php/hr/umska-biomasa-doo>. [Accessed: 20-Sep-2017].
- Sustainable Energy Development Agency, (2017). Sources of financing for the production of biofuels and energy from renewable sources in transport, Rural Development Programme 2014-2020 (original: Източници на финансиране на производството на биогорива и енергия от възобновяеми източници в транспорта - Програма за развитие на селските райони 2014-2020 г.). [online]. Available at: http://www.seea.government.bg/documents/Biofuels_financing_PRSR_Mar2017_update.pdf [Accessed: 23.09.2017].
- Tóth, L., (2013). A mezőgazdaság szerepe az energiagazdálkodásban. *Mezőgazdasági Technika*. March 2013. pp 16-18.
- Tóth, L., Schrempf, N., Nagygal J., (2016). Energiaellátás, jelen és jövő. *Mezőgazdasági Technika*. May 2016. pp 2-6.

Tóth L., Beke J., Hajdú J., (2012). A mezőgazdaság szerepe a Megújuló Energiák Nemzeti Cselekvési Tervben. *Mezőgazdasági Technika*, 2012. augusztus, pp2-6.

Tressel, M., (2016). Gemeinschaftsaufgabe Agrarstruktur und Küstenschutz. [online] Available at: <https://www.gruene-bundestag.de/parlament/bundestagsreden/2016/juli/markus-tressel-gemeinschaftsaufgabe-agrarstruktur-und-kuestenschutz.html> [Accessed: 25.10.2017].

USKSUP, (2014). Centre for the research of Biomass potential. [online] Available at: <http://www.tsup.sk/?sktc=vyskum-en> [Accessed: 21.11.2017].

Wojciech G, Harmat Á., (2014). The Characteristics of the Biomass Sector in Poland and Hungary, Geographical Locality Studies 2014 Volume 2, Number 1. pp. 412-437, ISSN 2052-0018.

Zerzawy, F., Fiedler, S. & Mahler, A. (2017). Subventionen für fossile Energien in Deutschland. [online] Available at: <http://www.foes.de/pdf/2017-05-FOES-Studie-Subventionen-fossile-Energien-Deutschland.pdf> [Accessed: 21.11.2017].

Contact

Fachagentur Nachwachsende Rohstoffe e.V.

Thies Fellenberg

Hofplatz 1

18276 Gülzow-Prüzen

E-mail: t.fellenberg@fnr.de

<http://www.interreg-danube.eu/energy-barge>