

ENERGY BARGE

Building a Green Energy and Logistics Belt

Project Code: DTP1-175-3.2

Deliverable 3.2.1

**Transnational inventory of biomass and bioenergy
companies in the Danube corridor**

20th December 2017

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Content

I.	About the ENERGY BARGE project	5
II.	About this document	7
1.	Background	8
2.	Objective of the company landscape inventory (D.3.2.1).....	10
3.	Methodology	11
3.1	Data collection and scope.....	11
3.2	Template and company landscape assessment	13
3.3	Visualization in online map	14
4.	Inventory of national biomass and bioenergy company landscapes	15
4.1	Austria.....	16
4.2	Bulgaria.....	29
4.3	Croatia.....	36
4.4	Germany	44
4.5	Hungary	58
4.6	Romania.....	65
4.7	Slovakia.....	68
4.8	Summary on company landscapes in non-partner DTP-countries.....	73
5.	Brief analysis of the ENERGY BARGE company landscape inventory	77
6.	User manual company inventory online map: methodology, logic & function of the dynamic map	81
6.1	Relation of the deliverable with project outputs.....	81
6.2	Overview of the company landscape inventory map	83
6.3	Methodology	84
6.4	Dynamic online map visualizing biomass and bioenergy companies.....	85
6.5	Open-access function “company register”	88
7.	Conclusion	91
8.	References and data sources	92



Tables

Table 1: Description of template and categories	14
Table 2: Company landscape Austria.....	16
Table 3: Company landscape Bulgaria	29
Table 4: Company landscape Croatia.....	36
Table 5: Company landscape Germany	44
Table 6: Company landscape Hungary.....	58
Table 7: Company landscape Romania	65
Table 8: Company landscape Slovakia	68
Table 9: Numbers of the company categories in all countries	77
Table 10: Feedstock types of all countries (Multiple answers were possible).....	79

Figures

Figure 1: Green Energy and Chemistry Belt.....	8
Figure 2: Role of Work Package 3 in the entire project.....	9
Figure 3: Bioenergy companies in Austria.....	28
Figure 4: Landing page ENERGY BARGE Danube Platform	82
Figure 5: Mock-up of Web application user interface.....	84
Figure 6: Architecture of web platform	85
Figure 7: Mock-up of dynamic map showing all companies of category trader	86
Figure 8: Trade flows displayed on the dynamic map.....	87
Figure 9: Icons for the predefined company/stakeholder categories.....	89
Figure 10: Company registration page.....	90

I. 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
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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

II. About this document

This report corresponds to “D.3.2.1. Transnational inventory of biomass and bioenergy companies in the Danube corridor” of the ENERGY BARGE project. It has been prepared by:

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1. Background

ENERGY BARGE aims at exploiting the Danube macroregion's bioenergy potential to increase energy security and diversification of energy sources by establishing secure, efficient and sustainable bioenergy supply chains along the river. To this end, a holistic view on the bioenergy market and underlying value and supply chains is needed. Given national and regional disparities in the theoretical, geographical and market potential for bioenergy, deployment, public support, and also cooperation between private and public actors, it is necessary to identify starting points for tapping potential and options for market actor cooperation, business development and market uptake.

A theoretical model designed to increase the market uptake of bio-based feedstock for both material and energetic (ideally cascading) use in the Danube region and thus to address the objectives also set out in the EU Strategy for the Danube Region (EUSDR) is a concept called "Green Energy and Chemistry Belt" (see Figure 1). It was developed by the BioCampus Straubing GmbH (Project Partner 1) and aims at using the Danube River as a natural biomass corridor and sustainable transport axis for biomass. The underlying principle follows the logic of "local harvesting – decentral processing into more transport-worthy states (e.g. oils, pellets, liquids) – central refinement or end use", so that added value creation can mainly stay in rural areas along the Danube. This concept forms the basic idea of the ENERGY BARGE project.

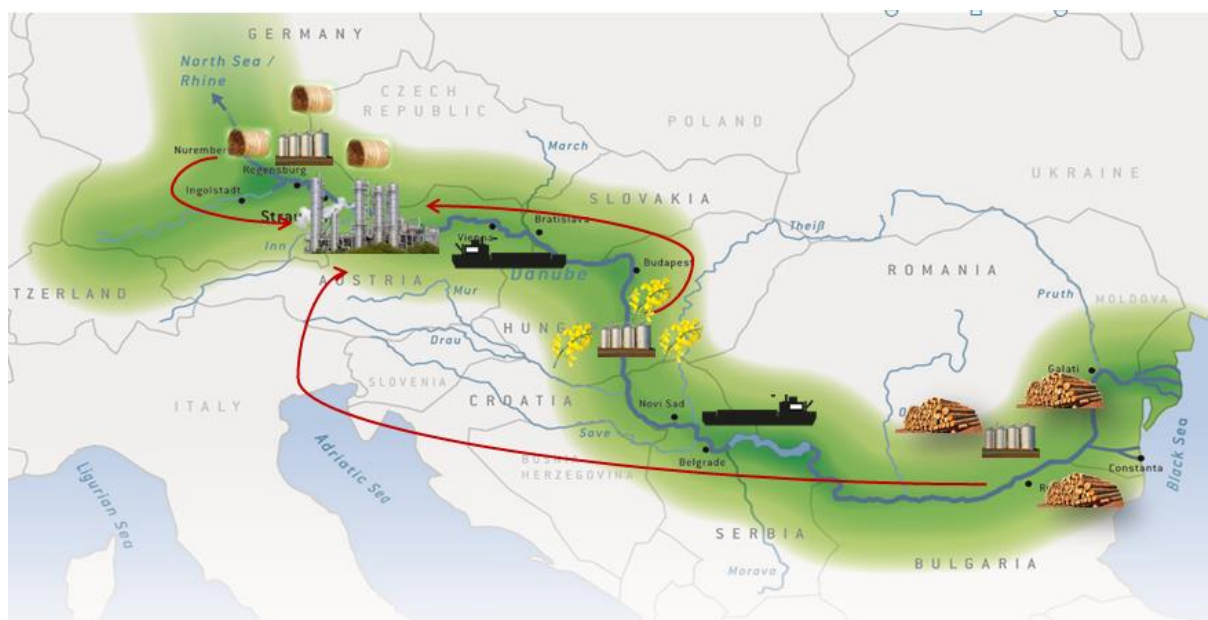


Figure 1: Green Energy and Chemistry Belt (Source: BioCampus Straubing GmbH, own visualization).

In order to reach the targets outlined above, Work Package 3 provides market-oriented mapping of the Danube region's value chains from biomass feedstock production and residues to energy generation from an integrated, transnational perspective, giving regional and transnational guid-

ance for market development along the river (green bioenergy belt) and setting the stage for increased use of Danube logistics in the bioenergy sector. This will be achieved through a transnational market study compendium including biomass flows and sustainability aspects (macro-perspective, Activity 3.1), business landscape mapping, case studies and identification of best practice locations for bioenergy value chain integration (micro-perspective, Activity 3.2).

An overall visualization of the relation of Work Package 3 and its activities is presented in the figure below:

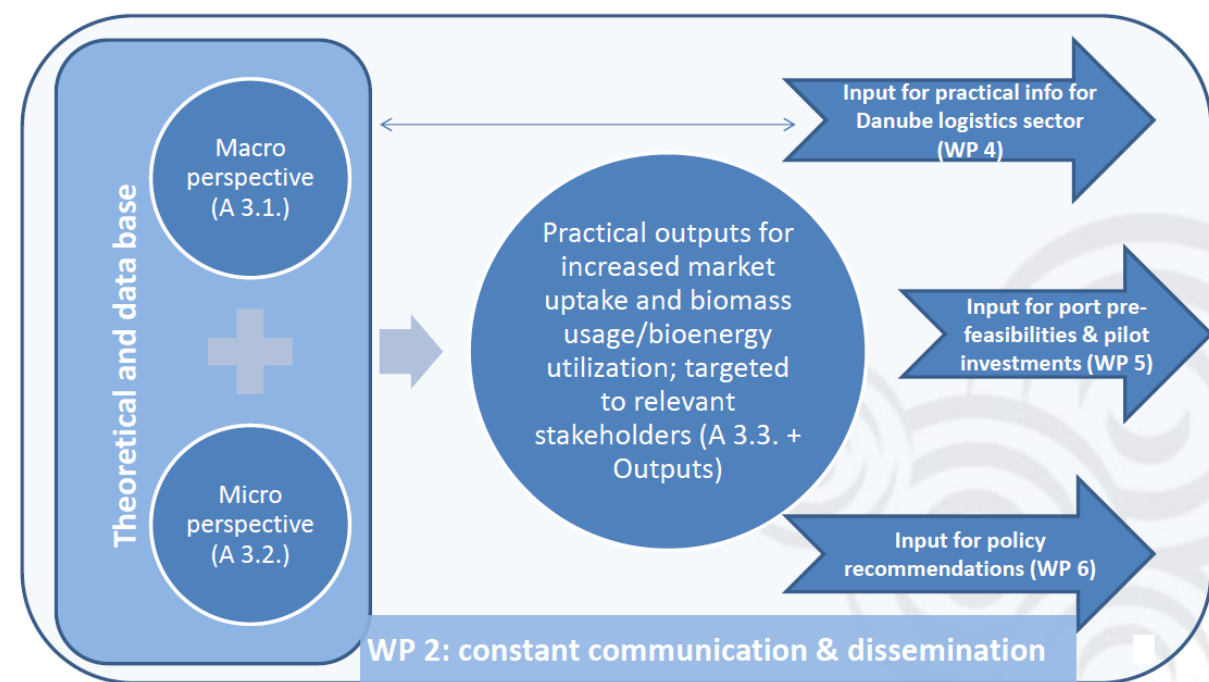


Figure 2: Role of Work Package 3 in the entire project (own visualization)

2. Objective of the company landscape inventory (D.3.2.1)

This deliverable “D 3.2.1 Transnational inventory of biomass and bioenergy companies in the Danube corridor” is based on the task as described in the latest approved version of the Application Form of the project ENERGY BARGE (Project Code: DTP1-175-3.2).

- *A3.2- Providing a systematic insight into the integrated bioenergy landscape along the Danube (lead: BCG)*

Activity 3.2 focusses on the biomass and bioenergy business sector, with the aim of mapping the state of the business landscape working along the bioenergy value and supply chain. This will be achieved via a transnational inventory of biomass and bioenergy companies (D 3.2.1).

With D 3.2.1, the project prepares a holistic and intuitive inventory on the biomass and bioenergy company landscape in the Danube corridor enabling identification of business partners along the bioenergy supply and value chain. Once integrated in the project’s Output 3.1., the online Danube biomass and bioenergy atlas (June 2018), it will serve as a business partner identification tool beyond the classical bioenergy value chain, providing information for actors from the inland waterway logistics sector and thus will function as an input for Work Package 4. A systematic transnational merger of the contents of Work Package 3 and Work Package 4 takes place in Outputs 3.1. and 4.1., resulting in ICT tools usable for all actors of the bioenergy and inland waterway sectors.

Based on the information provided in the data collected for this Deliverable, the output will generate a sort of “yellow pages” of the biomass-bioenergy actor landscape in the Danube region and shall be at disposal for all business actors looking for new partners in their own country or other Danube region countries, as well as for logistics actors looking for potential customers. It will also be possible to register one’s own company in case it has not been listed by the project consortium before. Moreover, public actors shall benefit from the map and the information gathered therein by gaining comprehensive insight into their own national, regional, as well as transnational company situation.

The deliverable consists of an introduction, a methodology description, a set of brief analyses of the national biomass and bioenergy company landscapes in all partner countries, the company inventory lists for all partner countries, a summary of the national company landscape in the Danube Transnational Program (DTP) countries not represented in the ENERGY BARGE consortium, a user manual of the company inventory map including mock-up screen shots of the company landscape map. The excel-based data set including detailed contact data is not included in this report as it contains data protection sensible information.

3. Methodology

In order to provide an inventory of the biomass and bioenergy company landscape in the Danube corridor, a data collection on the ENERGY BARGE partner countries' company structure along the biomass and bioenergy value chain with a focus on generally available address data, information on the type of biomass feedstock or bioenergy product utilized by the company as well as their position in the value and supply chain (supplier, processor, trader, end user) took place. Based on this comprehensive data set, an integration of this data into an online map which will be integrated in the overall ENERGY BARGE online platform and which forms part of the project's Output 3.1. (Danube biomass and bioenergy atlas) took place.

For the data collection, national and regional resources such as data from chambers of commerce, associations, previous projects and network and cluster organizations were utilized.

Additionally to the data set, this deliverable includes a brief objective assessment of all partner countries' national biomass and bioenergy company landscape covering aspects such as scope, size, regional distribution, market volume, ratio big/SME/start-up companies, growth potential, logistics modes most used.

Based on the data set collected, the consortium developed a dynamic, user-friendly online map in which the different companies are visualized. Three different detail levels of information are included in this map, all based on the value and supply chain relevant information available on the company. For example, it is possible to select "show all biomass suppliers" and an overview on all supplier companies in the Danube region becomes available. Besides the integration of the collected data in this map, the tool has a function for companies not represented in the map yet to register themselves on a voluntary basis. Moreover, an interlinkage with the inland waterway transport elements of ENERGY BARGE is provided. The final map and company register are part of the overall ENERGY BARGE online platform and the project's output 3.1. As such, it will only become fully and publicly available once the Output is completed and ready to be put online (foreseen for Period 3, June 2018). Once the go-life has taken place, a dissemination strategy motivating unregistered companies to register will be developed and validation sessions during the project's exchange workshops will take place.

3.1 Data collection and scope

The data collection for the company landscape focussed on company information along the value and supply chain in line with the ENERGY BARGE project's logic and definition. According to this definition, the main supply chain actors in the biomass and bioenergy sector are:

- suppliers (market participants active in raw biomass feedstock production)
- processors (market participants active in biomass conversion into intermediary or final products)
- traders (market participants active in trading feedstock, intermediaries or final products)

- end users (market participants active in final deployment of bioenergy carriers/products for energy generation, excluding private households)

In order to ensure a precise recording of the company's position in the supply chain, partners were asked to assign multiple categories, where deemed necessary. This results in the possibility that a company is listed both as processor and trader, which for example is often case with saw mills producing wood pellets and also trading them afterwards.

Regarding suppliers, only corporate biomass suppliers were considered, so no single farmers or forest owners were included, but e.g. agricultural corporations and cooperatives or corporate forest owners (no small-scale private forest owners) were taken into consideration. Regarding end users, it has to be noted that biogas plants are excluded from the project's scope due to their exclusively decentral and local feedstock supply strategies that exclude inland waterway transport as a logistics option. Only production sites were listed in the data set. Office sites and headquarters were excluded, except for biomass and bioenergy product traders.

In terms of geographical scope, the inventory covers the entire direct Danube-neighbouring countries' market actor landscape. As a special focus of the ENERGY BARGE project's objectives is on merging the biomass and bioenergy sector with the market actors of the Danube inland waterway transport sector, an emphasis was put on the Danube corridor (100 km left and right of the river banks), encouraging the data collecting partners to ensure that as many market actors/companies as possible in these areas and especially surrounding the ports are part of the data set. This also results in the fact that in the case of Germany, only companies in the two Bundesländer belonging to the Danube Transnational Programme area, namely Bavaria and Baden-Württemberg, were considered, with a clear focus on the Bavarian Danube region which is the only part of the German Danube stretch that is navigable via inland waterway vessels.

A clear focus was set on collecting data from companies active in the bioenergy market. However, in order to reach a comprehensive coverage of companies that also includes options for non-energetic or cascading use of biomass, data collection included companies trading or processing all types of biomass that can potentially be used in the energetic sector, but might also be used first or exclusively in the material or chemical sectors (e.g. wood traders). This means that a broad biomass definition is applied in the deliverable.

In order to better guide the data collection, a set of biomass raw materials (feedstock) as well as a set of bioenergy products, semi-finished/intermediary and by-products were defined in alignment with the project's biomass definitions.

The raw material/feedstock types are:

- wood-based raw materials
- straw-based raw materials
- starch-based raw materials
- energy crops
- oil seeds

- sugar beets
- other residues (wooden / agricultural)
- other (e.g. household waste)

The final, semi-final and by-products (solid & liquid) are:

- Bioethanol
- Biodiesel
- Vegetable oil
- Pellets, briquettes & wood chips
- Other residues (wooden, agricultural)
- Firewood
- Other

In terms of data sources, the project relied on the national partners' expertise and networks. In general, the data needed for the deliverable had to be publicly available as it pertains to companies that according to national law shall be publicly listed in commercial registers. Sources such as chambers of commerce databases, commercial registers, thematically relevant associations and ministries were used as sources of information for the data collection.

By using only publicly available data in this deliverable, it shall be ensured that no information included in this document or the data base of the online tool is compromising data security and protection regulations. As an additional means to ensure provision of data protection regulations, an information email will be sent to all companies listed in the data base giving them the opportunity to negate their listing before the map goes online in period 3 of the project (June 2018). This mailing will also function as a dissemination measure.

3.2 Template and company landscape assessment

The data collection was conducted based on an excel sheet template, the categories of the template are displayed below in table 1. This table includes examples from Austria in order to give guidance to the partners when filling in the template.

The following categories were included in the template and needed to be filled in by the partners. Those categories marked with a star were compulsory categories as this data was needed in order to make a visualization in the map possible based on geographical information. The description given served as guidance for the partners to fill in the boxes in a targeted and homogenous manner.

Table 1: Description of template and categories

Category	Description
Number	For counting purposes
Company category*	Categorization of the company in their role along the supply chain: supplier/producer, trader, processor, or end user. Multiple categories can be chosen (e.g. most suppliers are also traders). It is also possible to add company actors with supporting roles, e.g. technical equipment providers. Focus on the supply chain logic. No listing of single farmers or forest owners.
Company name*	The company's official name incl. all legal descriptions such as „Ltd.“ In original/national language
Optional: Brief description	In case the partner has more knowledge/info on the company that is not confidential, a brief description can be added; especially valuable information: size of the company (small (1-10 employees), medium (10-50 employees), big (>50 employees)); modes of transport usually used; local, regional, national or transnational scope; etc.
Country*	The partner's country
Address (street)*	Precise address (no headquarters or simple office sites)
City*	Precise city
Postal code*	Precise postal code
Web address / URL*	wherever available
Raw materials processed or traded	Indication of the types of feedstock/raw materials the company processes, supplies or trades with an „x“ – in case of „other“, a brief description can be given
Products, semi-finished products and/or by-products	Indication of the products, semi-finished products and/or by-products only with an „x“ –in case of „other“, a brief description can be given
Source	Source used and date of access

As the information collected for this deliverable serves as basic input for the project's Work Package 4, and more precisely on the inventory of potential users of Danube inland waterway transports, the data categories collected here were streamlined with the needs of Work Package 4.

3.3 Visualization in online map

All company data gathered by the partners and presented in this inventory has been translated into a digital data base and will be finalized in the online tool “Danube biomass and bioenergy atlas” (Output 3). In order to facilitate visualization of the company locations and integrate dynamic functions into the tool, address data was required by the project's spatial informatics partner DIT. In the final map, no data will be published that is not in line with data protection regulations. Therefore, also this report does not entail the entire data base as this includes address data which is subject to data protection.

4. Inventory of national biomass and bioenergy company landscapes

In the following sub-chapters, all researched biomass and bioenergy companies as they were presented by the project partners for their respective countries are listed in an inventory. As described above, the tables presented here do not include all the criteria and corresponding data, firstly due to data protection reasons, and secondly for the sake of increased readability. The data not included here are the companies' address and web address data.

It has to be stated that the lists below do not have a claim to completeness. The data was collected based on the partners' best knowledge and judgement, relying on their internally available expert and network knowledge as well as their discretion to whether the respective companies have relevance for the ENERGY BARGE project as a whole. Moreover, once the online tool is launched, the project aims at motivating companies not included to list themselves in the register. This could be achieved by national mailings send out via the expert networks of the ENERGY BARGE partners as well as through disseminating the tool through branch-relevant online channels such as expert magazines. A dissemination strategy will be included in the launch of the tool in Output 3.1.

4.1 Austria

Table 2: Company landscape Austria

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
1	Processor / Trader	Andreas Wiessbauer	Wood pellet producer	Hohenberg	X											X			
2	Processor / Trader	Arlberg Pellets (Holz Falch)	Wood pellet producer	St. Anton	X											X			
3	Processor / Trader	Binderholz GmbH	Wood pellet producer	Fügen	X											X			
4	Processor / Trader	Binderholz GmbH	Wood pellet producer	Jenbach	X											X			
5	Processor / Trader	Binderholz GmbH	Wood pellet producer	St. Georgen	X											X			
6	Processor / Trader	Cycle Energy - Bioenergie Gaishorn	Wood pellet producer	Gaishorn	X											X			
7	Processor / Trader	Cycle Energy	Wood pellet producer	Gresten	X											X			
8	Processor / Trader	FM Pellets GmbH	Wood pellet producer	St. Martin	X											X			
9	Processor / Trader	Franz Eigl GmbH, Waldviertel Pellets	Wood pellet producer	Rastendorf / Zwettl	X											X			
10	Processor / Trader	Enzlmüller	Wood pellet producer	Peterskirchen	X											X			
11	Processor / Trader	Firestixx-Salzburg-Pelletproduktion GmbH	Wood pellet producer	Abtenau	X											X			
12	Processor / Trader	Glechner Ges.m.b.H.	Wood pellet producer	Mattighofen	X											X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
13	Processor / Trader	Glechner Ges.m.b.H.	Wood pellet producer	Oberweis	X											X			
14	Processor / Trader	Hasslacher Hermagor GmbH - Norica plus	Sawmill/Wood pellet producer	Hermagor	X											X			
15	Processor / Trader	Hasslacher Preding Holzindustrie GmbH	Sawmill/Wood pellet producer	Preding	X											X			
16	Processor / Trader	Holz-Bauer KG	Wood pellet producer	Floing	X											X			
17	Processor / Trader	Johann Pabst Holzindustrie GmbH	Wood pellet producer	Zeltweg	X											X			
18	Processor / Trader	Kärntner Pellets - löwenstark	Wood pellet producer	Althofen	X											X			
19	Processor / Trader	Labek Biopellets	Wood pellet producer	Kufstein	X											X			
20	Processor / Trader	Ländle Pellets	Wood pellet producer	Dornbirn	X											X			
21	Processor / Trader	Mafi Naturholzboden GmbH	Wood pellet producer	Steindorf	X											X			
22	Processor / Trader	MAK Holz GmbH	Wood pellet producer	Haimburg	X											X			
23	Processor / Trader	Mayr-Melnhof Holz Leoben GmbH	Wood pellet producer	Leoben	X											X			
24	Processor / Trader	Ökostixx GmbH	Wood pellet producer	Reichraming	X											X			
25	Processor / Trader	Pellex Green Power	Wood pellet producer	Sachsenburg	X											X			
26	Processor / Trader	Pfeifer Holz GmbH & CoKG	Sawmill/Wood pellet producer	Kundl	X											X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
27	Processor / Trader	Pfeifer Holz GmbH & CoKG	Sawmill/Wood pellet producer	Imst	X											X			
28	Processor / Trader	PROöko Energie GmbH	Wood pellet producer	Neukirchen / Vöckla	X											X			
29	Processor / Trader	RZ Pellets GmbH Ybbs	Wood pellet producer	Ybbs / Donau	X											X			
30	Processor / Trader	RZ Pellets GmbH Wiesenau	Wood pellet producer	Bad St. Leonhard (Wiesenau)	X											X			
31	Processor / Trader	RZ Pellets GmbH	Wood pellet producer	Leiben bei Melk	X											X			
32	Processor / Trader	RZ Pellets GmbH	Wood pellet producer	Vöcklamarkt	X											X			
33	Processor / Trader	RZ Pellets GmbH	Wood pellet producer	Amstetten	X											X			
34	Processor / Trader	Schmidt-Energie Produktions GmbH	Wood pellet producer	Aspang	X											X			
35	Processor / Trader	Schößwendter Holz GmbH	Wood pellet producer	Saalfelden	X											X			
36	Processor / Trader	Peter Seppeler Gesellschaft m.b.H.	Wood pellet producer	Feistritz / Drau	X											X			
37	Processor / Trader	Sturmberger Pelletproduktions GmbH	Wood pellet producer	Wels	X											X			
38	Processor / Trader	Weinsbergpellets	Wood pellet producer	Martinsberg	X											X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
39	End user	Bioenergie St. Gilgen registrierte Genossenschaft mit beschränkter Haftung - Biomasse-Heizwerk	Heating plant	St. Gilgen	X														
40	End user	Biomasse Heizwerk Abfaltersbach GmbH	Heating plant	Abfaltersbach	X														
41	End user	Biomasse Heizwerk Bezau GmbH	Heating plant	Bezau	X														
42	End user	Biomasse Heizwerk GmbH	Heating plant	Oberwang	X														
43	End user	Biomasse Heizwerk Mellau GmbH	Heating plant	Mellau	X														
44	End user	Biomasse Heizwerk Schwadof bei Wien	Heating plant	Schwadof bei Wien	X														
45	End user	Biomasse Heizwerk Zürs GmbH	Heating plant	Zürs	X														
46	End user	Biomasse-Heizwerk Alberschwende GmbH	Heating plant	Alberschwende	X														
47	End user	Biomasseheizwerk Bifang GmbH	Heating plant	Rankweil	X														
48	End user	Biomasse-Heizwerk Damüls GmbH	Heating plant	Damüls	X														
49	End user	Biomasse-Heizwerk Gaschurn GmbH	Heating plant	Gaschurn	X														
50	End user	"BEG Bioenergie Gaspoltshofen GmbH	Heating plant	Gaspoltshofen	X														
51	Processor	Binderholz	Sawmill	Fügen	X														

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
52	Processor	Brunner-Stern	Sawmill	Hohenberg	X														
53	Processor	Egger Holz	Sawmill	Liezen	X														
54	Processor	Erhart Holz	Sawmill	Sonntag	X														
55	Processor	Säge Gußwerk	Sawmill	Gußwerk	X														
56	Processor	Hutter Sägewerk	Sawmill	St. Michael im Lungau	X														
57	Processor	Holzindustrie Kaml & Huber	Sawmill	Rottenmann	X														
58	Processor	Kirchner Säge- und Hobelwerk	Sawmill	Radstadt	X														
59	Processor	Holzindustrie Maresch	Sawmill	Retz	X														
60	Processor	Mayr-Melnhof Holding	Sawmill	Leoben	X														
61	Processor	Josef Moser	Sawmill	Münichreith	X														
62	Processor	Mosser Holzindustrie	Sawmill	Zarnsdorf	X														
63	Processor	Neuschmied Holz	Sawmill	Hopfgarten im Brixental	X														
64	Processor	Planegger Holz	Sawmill	Launsdorf	X														
65	Processor	Prehofer Säge- u. Hobelwerk	Sawmill	Rutzenmoos	X														
66	Processor	Rubner Holzindustrie	Sawmill	Rohrbach a. d. Lafnitz	X														
67	Processor	Donausäge Rumplmayr	Sawmill	Enns	X														

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
68	Processor	Samonig Sägewerk	Sawmill	Fürnitz	X														
69	Processor	Schaffer Sägewerk & Holzexport	Sawmill	Eppenstein	X														
70	Processor	Holzhof Schmidt	Sawmill	Aspang	X														
71	Processor	Schößwendter Holz	Sawmill	Saalfelden	X														
72	Processor	Gebrüder Steininger	Sawmill	Rastenfeld	X														
73	Processor	Stora Enso Wood Products	Sawmill	Ybbs	X														
74	Processor	Brüder Theurl	Sawmill	Assling	X														
75	Processor	Troger Holz	Sawmill	Vomp	X														
76	Processor	VM-Holz	Sawmill	Vöcklamarkt	X														
77	Processor	Zwickl Holz	Sawmill	Raabs/Thaya	X														
78	End user	Anton Eder GmbH	Stove fitting	Wien															
79	End user	Austroflammb GmbH	boiler manufacture	Krenglbach															
80	Processor	Binderholz GmbH	Sawmill	Fügen	X														
81	End user	ETA Heiztechnik GmbH	boiler manufacture	Hofkirchen an der Trattnach															
82	End user	Fröling Heizkessel- und Behälterbau Ges.m.b.H.	boiler manufacture	Grieskirchen															
83	End user	Gast Herd und Metallwarenfabrik	boiler manufacture	Steyr															

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
84	Trader	Genol Gesellschaft m.b.H. & Co.	fuel trader	Wien	X											X			
85	End user	Gilles Energie- und Umwelttechnik GmbH & Co KG	boiler manufacture	Gmunden															
86	Processor/trader	Glechner GesmbH, Hot's Holz Pellets	Wood pellet producer	Mattighofen	X											X			
87	End user ¹	GUNTAMATIC Heiztechnik GmbH	boiler manufacture	Peuerbach															
88	End user	Haas & Sohn Ofentechnik GmbH	boiler manufacture	Puch bei Hallein															
89	End user	HET Heiz- & Energietechnik Entwicklungs-GmbH	boiler manufacture	Seekirchen am Wallersee															
90	End user	Hoval Gesellschaft mbH.	boiler manufacture	Marchtrenk															
91	End user	KÖB Holzheizsysteme GmbH	boiler manufacture	Wolfurt															
92	End user	Kohlbach Ges.m.b.H & Co	boiler manufacture	Wolfsberg															
93	End user	KWB - Kraft und Wärme aus Biomasse GmbH	boiler manufacture	St. Margarethen/Raabs															
94	End user	Lohberger Heiz- und Kochgeräte Technologie GmbH	boiler manufacture	Schalchen															
95	End user	Viessmann Holzfeuerungsanlagen Ges.m.b.H	boiler manufacture	Hard am Bodensee															

¹ In the case of Austria, the end user number also includes boiler manufacturers, which is not a typical end user group per se, but plays an exceptional role in the overall Austria bioenergy company landscape (e.g. strong export volumina), as well as due to their reputation for the bioenergy market in Europe as a whole.

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
96	End user	OkoFEN Forschungs- und Entwicklungs Ges.m.b.H	boiler manufacture	Niederkappel															
97	End user	Ortner GmbH	boiler manufacture	Loosdorf															
98	End user	RIKA Metallwarenges.m.b.. & Co KG	boiler manufacture	Micheldorf															
99	End user	Urbas Maschinenfabrik GmbH	boiler manufacture	Völkermarkt															
100	End user	Viessmann	boiler manufacture	Steinhaus bei Wels															
101	End user	Windhager Zentralheizung Technik GmbH	boiler manufacture	Seekirchen															
102	Supplier / Trader	Fuchsluger	Recycling	Aschbach							X								
103	Supplier / Processor / Trader	Pölzleitner Holz GmbH	Wood waste recycling	Abtenau							X								
104	Supplier	Forstbetrieb des Stiftes Klosterneuburg	Forestry	Klosterneuburg	X														X
105	Supplier	Montecuccoli Forstbetrieb	Forestry	Markersdorf / Haindorf	X														X
106	Supplier	Österreichischen Bundesforste AG	Forestry	Purkersdorf	X														
107	Supplier	Forstbetrieb Esterházy	Forestry	Eisenstadt	X														
108	Processor / Trader	Hanl Hackschnitzelerzeugung und Holzhandel	Wood chipper	Langenstein	X											X			
109	Supplier	Bäuerlicher Waldbesitzerverband Oberösterreich	Forestry	Linz	X														

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
110	Supplier	ADF – Miscanthus	Miscanthus	Stephanshart				X											
111	Supplier	ARGE Elefantenwärme	Miscanthus	Mining				X											
112	End User	Lenzing AG	Fiber producer	Lenzing	X														
113	Supplier	Miscanthus F.A.R.M.	Miscanthus	Hofamt Priel				X											
114	Supplier	Team Giganteus	Miscanthus	Böheimkirchen				X											
115	End user	Cycleenergy Gaishorn GmbH	Heating plant	Gaishorn am See	X						X					X			
116	End user	Cycleenergy Gresten GmbH	Heating plant	Gresten	X						X					X			
117	End user	Cycleenergy Aschach GmbH	Heating plant	Aschach/Donaue	X						X					X			
118	End user	Nawaro Energie Betrieb GmbH	Heating plant	Zwettl	X						X								
119	End user	Biomassekraftwerk Timelkam	CHP	Timelkam	X						X								
120	End user	Biomassekraftwerk Neudorf	CHP	Neudorf	X						X								
121	End user	Biomassekraftwerk im Fernheizkraftwerk Linz-Mitte	CHP	Linz	X						X								
122	End user	Biomasseheizkraftwerk Steyr	CHP	Steyr	X						X								
123	End user	Biomasseheizkraftwerk Baden	CHP	Baden	X						X								
124	End user	Biomasseheizkraftwerk Mödling	CHP	Mödling	X						X								

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
125	End user	Biomasseheizkraftwerk Ybbs	CHP	Ybbs	X						X								
126	End user	Biomasseheizkraftwerk Lienz	CHP	Lienz	X						X								
127	Processor	Agrana Stärke GmbH	processor of agricultural commodities, in the Segments Sugar, Starch and Fruit	Pischelsdorf			X			X			X				X		
128	End user	Biomass Powerplant Simmering	CHP	Vienna							X								
129	Processor	MÜNZER Bioindustrie GmbH	Conglomerate merger	Vienna					X						X				
130	Processor	Bunge (Novaol Austria GmbH)	By-product: Vegetable Crude Glycerin, End product: Biodiesel	Bruck an der Leitha					X						X			X	
131	Processor	ABID-AG Biotreibstoffe	Biodiesel producer	Hochenau an der March					X						X				
132	Trader	Stadlober GmbH	Fuel trader, energy contractor	Fohnsdorf												X			
133	Trader	Schmidmeier Naturenergie	Fuel supplier	Zeitlarn/Öden thal												X			
134	Trader	Raiffeisen Ware Austria AG	Fuel trader	Wien			X		X	X						X			
135	Processor / Trader	SPG Biopellets GmbH	Pelletproducer and trader	Altenmarkt im Pongau	X											X			
136	Trader	Fuchshuber Agrarhandel	Agricultural trading	Hörsching			X		X										
137	Supplier	Österreichische Bundesforste	Forestry and wood trading	Purkersdorf	X														



Brief description of the Austrian company landscape

The most important source of raw material for the biomass sector in Austria is biomass from forests. In 2013, they provided 82 % of Austria's biomass volume; the rest came from the agricultural and the waste sectors.

As opposed to many other European countries, Austrian forests are managed above all by private forest owners. The most frequent structure is small-scale ownership with holdings covering less than 200 hectares of forest land; 50 % of the Austrian forest is managed by such small holdings. Most of these private forest owners manage not only forests but also agricultural areas. The other half of the Austrian forests is managed by about 1,500 enterprises with 200 or more hectares of forest land. Beside these private forest holdings, which account for about 22 % of the forest area, and the community forests with approximately 10 %, the Austrian Federal Forests hold a special position. They manage 14 % of the domestic forested land and are thus by far Austria's largest forest enterprise. In addition to the state, also some Provinces and municipalities own forests (altogether 3 %) (BMLFUW, 2015).

Over the past decades, massive structural changes have taken place in Austrian agriculture and forestry sectors. The number of enterprises has been steadily on the decline in recent years due to a decrease in the traditional ties between forest property and agricultural enterprises. Furthermore, the group of urban forest owners is increasing. In consequence, people feel less closely linked to the forest and are therefore less willing to work in forests themselves (BMLFUW, 2015).

Together with the wood, paper and cardboard industries, forestry plays an important role in economy. In 2012, the Austrian forestry sector accounted only for about 1.8 % of the GDP; in absolute terms the gross value added amounted to 5 billion Euro. However, with a foreign trade surplus of 3.69 billion Euro, the value-added chain of forest-timber-paper is one of the most important items of Austria's foreign trade. About 300,000 persons draw an income from the forest- and wood-based sector. The significantly increasing mechanisation and technical development of timber harvesting which has taken place since the beginning of the nineteen eighties, as well as administrative rationalisation measures, have led to declining numbers of employees (BMLFUW, 2015).

Generating 45 % of the total turnover in the field of renewable energy sources, biomass is the sector's biggest contributor with 2.8 billion Euro. The bigger part of the operational effects – more than 1.3 billion Euro – comes from the provision of combustible material, thus solid biomass (logwood, wood chips, wood pellets or sawmill by-products) (Austrian Biomass Association, 2016a).

Due to the use of renewable energy sources, almost 40,000 full-time jobs are secured in Austria, 19,500 of them are associated with the biomass sector. A large share of the jobs in the field of bioenergy is related to the operation of facilities processing solid biomass. Among the renewable energy branch almost every second full-time job deals with the use of solid biomass (Austrian Biomass Association, 2016a). In 2016, the whole sector of solid biofuels made a total turnover of 1.467 billion Euros thus creating 17,486 jobs (Biermayr et al., 2017).

Traditionally, biomass in Austria is used for heat production. In 2013, heating consumed 82 % of the bioenergy production, followed by biofuel with a share of 10 % and green electricity from

biomass and biogas with a share of 8 %. Almost 80 % of biomass heat is used in single combustion systems, the rest is used for district heating which showed the highest increase, its production having nearly tripled in the past ten years. Austrian producers of biomass boilers sell about 75 % of their products abroad. In Germany for instance two out of three installed biomass boilers are of Austrian origin. The most important export markets for Austrian biomass boilers are Germany, France, Italy and Spain; hopes lie in the British market. Domestic production of biomass boilers is characterised by a high vertical range of manufacture in domestic facilities. In most cases, components are either produced by the manufacturers themselves or by other domestic enterprises. Austrian companies not only produce the boilers, but also compatible components such as buffer tanks as well as extractor and storage systems (Biermayr et al. 2017). Due to this situation, boiler manufacturers have been included in the Austrian biomass company inventory even though they cannot be classified into one of the four pre-defined market participant categories.

In 2016, 4,378 pellet boilers, 3,177 wood log boilers, 696 wood log-pellet combi-boilers and 2,083 wood chip boilers were sold on the Austrian market, all boilers concerning the whole range of power. Furthermore at least 1,773 pellet stoves, 5,468 cooking stoves and 8,638 wood log stoves were sold. Austrian biomass boiler manufactures typically export approximately 80 % of their production. The biomass boiler and stoves sector obtained a turnover of 757 million Euro in 2016. This resulted in a total number of 3,162 jobs in Austria (Biermayr et al. 2017).

Currently, there are about 3,889 “bioenergy” companies in Austria (Austrian Biomass Association, 2016b) (see Figure 3):

- 855 Bio-based heat plumbing companies and Bio-based heat chimney sweeping companies
- 266 Stove –fitting companies
- 300 biogas plants with a total capacity of 80 MW producing 559 GWh electricity per year, 335 GWh heat per year and 106 GWh biomethane per year
- 21 Biofuel plants: 1 bioethanol plant, 8 biodiesel plants and 12 vegetable oil plants
- 22 Wood gas CHPs
- 2108 Biomass district heating plants with a total capacity of 1,860 MW and a production of 4,650 GWh heat per year
- 111 Biomass CHPs with a total capacity of 313 MWel and 2,128 GWh
- 40 Pellet producers
- 61 Research centers, colleges and schools
- 58 Boiler and stove manufactures and 16 ancillary industries
- 16 Planning and engineering
- 15 Chippers/Processors

The most important and relevant ones have been listed in the table above.

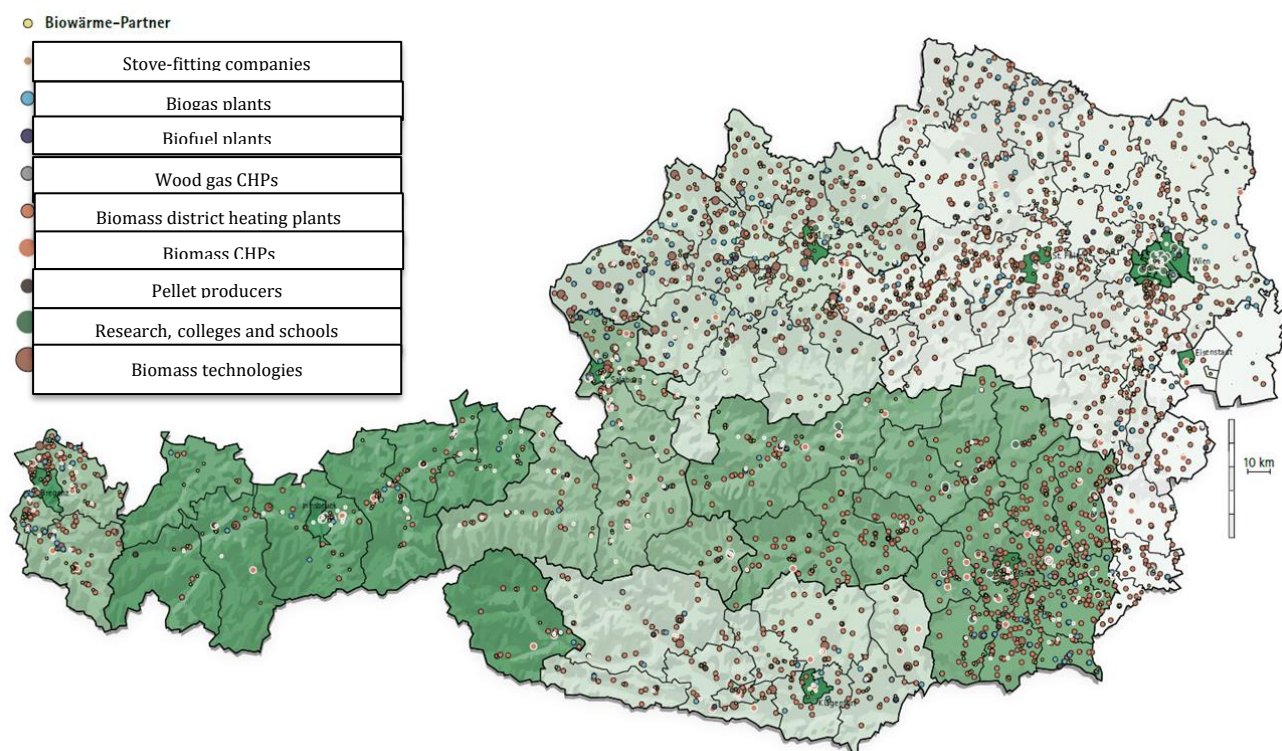


Figure 3: Bioenergy companies in Austria. Source: Austrian Biomass Association 2016b

4.2 Bulgaria

Table 3: Company landscape Bulgaria

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, other residues and materials (wooden, agricultural)	Other	Firewood	
1	Processor, Trader	DeltaForest	Wood pellets producer	Sofia/Airport	X											X			
2	Processor, Trader	SAMKOV Invest OOD	Wood pellets producer	Samokov	X											X			
3	Processor, Trader	Corepellet OOD	Wood pellets producer	Stara Zagora	X											X			
4	Processor, Trader	Pirin Pellet EOOD	Wood pellets producer	Razlog	X											X			
5	Processor, Trader	AHIRA JSC	Wood pellets producer	Rogosh	X											X			
6	Processor, Trader	Arsoff 90 Ltd.	products from beech wood	Mitrovtsi	X												X		
7	Processor, Trader	Keramaris Impex LTD	Firewood	Kazanlak	X													X	
8	Processor, Trader	BURGAS FIREWOOD OAK ASH BEECH EXPORT LIMITED	Firewood	Bourgas	X													X	
9	Processor, Trader	WOOD BULGARIA Ltd.	Firewood	Bourgas	X													X	
10	Supplier, Processor, Trader	Red Wood Trade	Wood pellets producer	Varna	X											X			
11	Processor, Trader	BIOENERGY Ltd.	Wood pellets producer	Sofia	X											X			
12	Processor, Trader	Visor LTD OOD	Wood Pellets Producer	Haskovo	X											X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, other residues and materials (wooden, agricultural)	Other	Firewood	
13	Supplier, Processor, Trader	Alpina Group Bulgaria Ltd.	Wood Pellets Producer	Plovdiv	X											X	X		X
14	Processor, Trader	ROCCOPELLET LTD	Wood Pellets Producer	SOFIA	X											X			
15	Processor, Trader	„Motocar Service” Ltd.	Wood Pellets Producer	Plovdiv	X											X			
16	Processor, Trader	EKO BIO KALOR LTD	Wood Pellets Producer	Welingrad	X											X			
17	Processor, Trader	LESOTERM-M	Wood Pellets Producer	Blagoewgrad	X											X	X		X
18	Supplier, Processor, Trader	HOLZ TRADE 87 SLTD	Wood Pellets Producer	Kustendil	X											X			X
19	Processor, Trader	TRON Ltd.	Wood Pellets Producer	Dunavzi	X											X			
20	Processor, Trader	Bioenergy Sliven Ltd	Wood Pellets Producer	Varna	X											X			
21	Processor, Trader	Agri Market Ltd.	Wood Pellets Producer	Plovdiv	X											X			
22	Processor, Trader	Leskomers 94 Ltd.	Wood Pellets Producer	Shumen	X											X			
23	Processor, Trader	Daris Ltd.	Wood Pellets Producer	Chakalarovo	X											X			
24	Processor, Trader	Inter Machinex Ltd.	Wood Pellets Producer	Sofia	X											X			
25	Processor, Trader	Erato Ressource LTD	Wood Pellets Producer	Haskovo	X											X	X		X
26	Processor, Trader	Kagip OOD	Wood Pellets Producer	Teshel	X											X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, ag-ricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, other residues and materials (wooden, ag-ricultural)	Other	Firewood	
27	Processor, Trader	Eko Bio Maks EOOD	Wood Pellets/Briquettes Producer	Sofia	X											X	X		
28	Supplier, Processor, Trader	Ekoteknika	Wood Pellets/Briquettes Producer	Svishtov	X											X			
29	Processor, Trader	J-Term EOOD	Wood Pellets Producer	Plovdiv	X											X			
30	Processor, Trader	GTI Ltd.	Wood Pellets Producer	Ognyanovo	X											X			
31	Processor, Trader	Silwood EOOD	Wood Pellets Producer / Firewood	Alfatar	X											X	X		
32	Processor, Trader	TOPLIVO AD	Wood Pellets Producer / Firewood	Sofia	X											X	X	X	
33	Processor, Trader	Ecoflame OOD	Briquettes Producer	Tryavna	X											X			
34	Processor, Trader	Albrek	Briquettes Producer	Dupnica	X											X			
35	Processor, Trader	Kadi OOD	Briquettes Producer	Varna	X											X			
36	Processor, Trader	Bioresursi EOOD	Briquettes Producer	Dulovo	X											X			
37	Processor, Trader	Eko Brik	Briquettes Producer	Beli Osam	X											X			
38	Supplier, Processor, Trader	Eko Bio Bri EOOD	Straw Pellets Producer	Pet Mogili		X										X			
39	Processor, Trader	Eko Briketi 2016	Briquettes Producer	Yambol	X											X			
40	Processor, Trader	Best Pelets Ltd.	Wood Pellets Producer	Veliko Tar-novo	X	X			X							X			

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products					
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, other residues and materials (wooden, agricultural)	Other	Firewood
41	Processor, Trader	Energy House Ltd.	Wood Pellets Producer	Sofia	X											X	X	X
42	Processor, Trader	National 7 Ltd	Wood Pellets Producer	Skravena	X											X		
43	Processor, Trader	Pelletissimo Ltd.	Wood Pellets Producer	Breznik	X											X		
44	Processor, Trader	Toriya – 08 Ltd.	Wood Pellets Producer	Velingrad	X											X		
45	Processor, Trader	Lovela OOD	Firewood	Slivo pole	X													X
46	Processor, Trader	Ekoeffect Bulgarien LTD.	Wood Pellets, Sunflower Husk Producer	Divotino	X	X			X							X	X	X
47	Processor, Trader	Euro Trade Consulting Company Ltd.	Wood Pellets, Sunflower Husk Producer	Pleven	X				X							X		
48	Supplier, Processor, Trader	Brevis Ltd.	Oilseeds	Dulovo					X								X	
49	Processor, Trader	Kehlibar	Sunflower Oil, Sunflower Husk Pellets	Lyaskovets					X					X		X	X	
50	Processor, Trader	Olimex	Sunflower Oil, Sunflower Husk Pellets	Vidin					X					X		X	X	
51	Processor, Trader	Papas Oil JSC	Sunflower Oil, Sunflower Husk Pellets	Sofia					X					X		X	X	
52	Processor, Trader	Gold oil LTD	Sunflower Oil, Sunflower Husk Pellets	Harmanli					X					X		X	X	
53	Trader	KMS FOODS LTD	Oilseeds	Yambol					X								X	
54	Processor, Trader	Maristo & Co	Oilseeds, Sunflower Husk Pellets	Suhodol, Sofia					X							X	X	
55	Processor, Trader	BALCHO AGRO PRODUCT LTD	Oilseeds	Suhodol, Sofia					X					X			X	

					Raw materials processed or traded								Products, semi-finished products and/or by-products					
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, other residues and materials (wooden, agricultural)	Other	Firewood
56	Processor, Trader	"BISER OLIVA" JSC	Sunflower Oil	STARA ZAGORA					X					X		X		
57	Processor, Trader	„Geostroy Engineering” Ltd.	Sunflower Oil	Kalchevo					X					X		X	X	
58	Trader	S. N. Export Serres North Export Ltd.	Oilseeds	Sofia					X					X		X	X	
59	Supplier, Processor, Trader	PREDEL OOD	Oilseeds, Sunflower Husk Pellets	Branichevo		X	X		X					X		X	X	
60	Trader	Union 09 Ltd	trading, managing the transportation	Stara Zagora		X	X		X							X	X	
61	Processor, Trader	Brama Ltd	Sunflower Oil	Gabrovo					X					X		X	X	
62	Processor, Trader	Astra Bioplant EOOD	Biodiesel	Slivo pole					X					X	X	X		
63	Processor, Trader	"Guytek Oliva" Ltd.	Sunflower Husk Pellets	Stara Zagora					X					X		X		
64	Processor, Trader	"Kris Oil 97" Ltd.	Sunflower Oil	Kaspichan					X					X			X	
65	Processor, Trader	Pliska Oil Ltd.	Sunflower Hull Pellets	Shumen					X					X		X	X	
66	Processor, Trader	Olimex Ltd.	Sunflower Husk Pellets	Vidin					X					X		X	X	
67	Processor, Trader	Klas Oil JSC	Sunflower Oil	Karapelit					X					X		X		
68	Processor, Trader	"ROSA" AD	Sunflower Oil Sunflower Husk Briquettes	Popovo					X					X		X	X	
69	Processor, Trader	Kerpi Ltd.	Sunflower seed shell pellets	Pavlikeni					X							X		X
70	Processor, Trader	Ren Group Bulgaria Ltd.	Oilseeds	Plovdiv					X							X		

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, other residues and materials (wooden, agricultural)	Other	Firewood	
71	Trader	Vitagrain BG AD	Storage & shipping of grains and oilseeds	Sofia / Svishtov		X			X								X		
72	Processor, Trader	Faustina Group Ltd.	Biodiesel, pellets from sunflower husks, sunflower oil	Vratza					X					X	X	X	X		
73	End user	Biomass central heating plant	provides heat and electricity to numerous buildings in the town.	Bansko	X											X	X	X	
74	End user	Oberosterreichische Biodiesel Bulgaria LTD	production of biodiesel and glycerin	Slivo pole					X					X	X			X	
75	End user	Almagest ad	producer of bioethanol	Verinsko		X							X				X	X	
76	Processor, Trader, End user	FAZERLES AD	hardboard panels, In-house biomass boiler	Silistra	X						X						X		
77	End user	Mondi Stambolijski EAD	In-house biomass boiler	Stambolijski	X						X						X		
78	End user	Svilosa AD	In-house biomass boiler	Svishtov							X						X		
79	End user	Hospital Oriahovo	In-house biomass boiler	Oriahovo	X											X			
80	End user	Kindergarten Elhitsa	In-house biomass boiler	Elhitsa	X											X			
81	Manufacturer	Vaptech	Manufacturer Briquetting/Pelleting lines	Sofia															



Brief description of the Bulgarian company landscape

Bulgaria's national biomass and bioenergy company landscape is quite diverse. Wood and oilseeds are the most common materials used for processing. The compiled company list shows that 47 companies are using wooden material and 27 companies are using oilseeds (23 for vegetable oil and husk pellets production, 4 for the production of biodiesel/-ethanol).

The majority of processing companies use wooden material to produce wood-based products, mostly pellets. From 2010 to 2015, a sharp increase in pellet production can be identified, from 7,000 tonnes to 112,000 tonnes (Eurostat, 2017)². However, according to Glavonjić et al., Bulgaria had a high disproportion between the size of the installed capacities and realized production of wood pellets in 2013, with only 36 % of the potential capacity used to produce wood pellets. Furthermore, Bulgaria has one of the highest percentages of wood pellet producers in the southeast European region with a total of 24 % in 2015 of all pellet producers in the south-east European region. Production of companies varies between 250 – 10,000t of pellets per annum with 60 % of the producers using facilities with small pressing machines (BioRES, 2016).

Main driver for the mentioned increase in production and company numbers is the high demand of wood pellets in the European Union in the last years and the corresponding export opportunities (Glavonjić et al., 2015). Main export destinations are Italy, Greece and Turkey (BioRES, 2016) and the main transport mode is by road (Peetz, 2017).

The fact that export is the main driver of wood pellet production in Bulgaria implies that the local market is embedded in a state of under-development. In 2011, the domestic consumption rate of pellets was only at 0.3%. However, the internal demand is growing by 10-15% annually (Zlatev, 2014).

Bulgaria has a high production of oilseeds, especially sunflowers. A number of companies are specialised in processing these to vegetable oils and seeds among other products. Furthermore, the waste products, generated while producing oil, are often used to produce sunflower hull pellets which can also be used for bioenergy generation.

There are actually only a few biodiesel/-ethanol producers operating in Bulgaria. The most used raw materials for biofuels are wheat and corn for bioethanol, and rapeseed oil and sunflower oil for biodiesel, meaning that these are first generation biofuels plants. One of the biggest companies in this market is the company Bulmarket. 39,000 tonnes of biodiesel were produced in 2016 (European Biodiesel Board, 2017) and for bioethanol the capacity is indicated at 99 million litres (European renewable ethanol association, 2017).

² The actual production is difficult to determine. The amount given by Eurostat does not match for example with numbers from the BioRES project (140,000 tonnes in 2014) (BioRes, 2014) or Zlatev (120,000 tonnes in 2014) (Zlatev, 2014).

4.3 Croatia

Table 4: Company landscape Croatia

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
1	End User	LIKA ENERGO EKO d.o.o.		Udbina	X											X			
2	End User	UNIVERZAL D.O.O.		Varaždin	X													X	
3	Processor / End User	STRIZIVOJNA HRAST D.O.O.		Strizivojna	X											X	X		
4	Processor/ End User	PELET GRUPA D.O.O.		Novska	X											X			
5	End User	SLAVONIJA oIE d.o.o		Slavonski Brod	X												X		
6	End User	BE-TO GLINA d.o.o.		Glina	X												X		
7	End User	UNI VIRIDAS D.O.O.		Babina Greda	X												X		
8	Processor	SPIN VALIS d.d.		Požega	X												X		
9	End User	SERVICE & ENGINEERING INDUSTRY		Bjelovar	X												X		
10	End User	BENDIX D.O.O.		Nijemci	X												X		
11	Processor / End User	SENSE ESCO BELIŠĆE D.O.O.		Belišće	X												X		
12	Processor	Biodizel Vukovar d.o.o	rapeseed oil	Vukovar					X						X				

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
13	Processor	BIOTRON d.o.o.	rapeseed oil	Ozalj					X						X				
14	Processor	Vitrex d.o.o.	waste oil	Virovitica								X			X				
15	Processor	PELETI RENGEL d.o.o	straw pellets	Pitomača		X										X			
16	Processor	Energy pellets d.o.o		Delnice	X											X			
17	Supplier	VELPEL d.o.o		Ivanić Grad															
18	End User	Solana Pag d.d.		Pag	X														
19	Trader	Solarno		Zagreb												X			
20	Supplier	BETON-RAD d.o.o.		Vukovina	X											X			
21	Supplier	FOREST d.o.o.		Jastrebarsko	X											X			
22	Processor	PPS Galeković d.o.o		Mraclin	X											X			
23	Processor	Drvoproizvod		Jastrebarsko	X											X		X	
24	Supplier /Processor	Drvna industrija Zelina d.d.		Sveti Ivan Zelina	X														
25	Processor	MDI d.o.o.		Vrbovec	X													X	
26	Processor	Pilana Krašić d.o.o.		Krašić	X													X	
27	Processor	DI Novoselec d.o.o.		Novoselec	X													X	
28	Processor	Pin d.o.o.		Jasenovac	X											X			

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
29	Processor	Ante Mijić - Quercus d.o.o.		Novska	X											X			
30	Processor	MMM - Vukelić d.o.o.		Novska	X													X	
31	Processor	Solidum - Žužić d.o.o.		Petrinja	X													X	
32	Processor	Solidum - Žužić d.o.o.		Velika Gorica	X													X	
33	Processor	ROBUR d.o.o.		Sunja	X													X	X
34	Processor	Ante Mijić - Quercus d.o.o.		Novska	X													X	
35	Processor	Damir Vuković d.o.o.		Novska	X													X	
36	Processor	Drvni centar Glina d.o.o.		Glina	X													X	
37	Processor	DIP Karlovac d.d.		Karlovac	X													X	
38	Processor	MPS-67 d.o.o.		Slunj	X													X	
39	Processor	Požgaj d.o.o.		Veliki Bukovec	X													X	
40	Processor	Drvo Vrhovine d.o.o.		Vrhovine	X													X	
41	Processor	Drvna industrija Bohor d.o.o.		Belovar	X													X	
42	Processor	Hrast Export Puklaveć d.o.o.		Martijanec	X													X	
43	Processor	Drvo Commerce Huzjak d.o.o.		Visoko	X													X	
44	Processor	Drvodjelac d.o.o. - Pilana Bednja		Bednja	X													X	

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
45	Processor	TPS tvornica parketa d.o.o.		Križevci	X													X	
46	Processor	Bilokalnik drvo d.o.o. - pilana		Koprivnica	X													X	
47	Processor	Brestovac pilana d.o.o.		Garešnički Brestovac	X													X	
48	Processor	Garstil d.o.o.		Garešnica	X													X	
49	Processor	Čazma trade d.o.o.		Gornji Draganeć	X													X	
50	Processor	Drvenjača d.d.		Mrkopalj	X											X			
51	Processor	Energy Pellets d.o.o.		Delnice	X											X			
52	Processor	Finvestcorp d.d.		Čabar	X											X			
53	Processor	Di Klana d.d.		Klana	X													X	
54	Processor	Finvestcorp d.d.		Čabar	X													X	
55	Processor	Ravnogorska pilana d.o.o.		Ravna Gora	X													X	
56	Processor	DIP Pilana Gomirje d.o.o.		Gomirje	X													X	
57	Processor	GEC GP d.o.o.		Delnice	X													X	
58	Processor	Calligaris d.o.o.		Ravna Gora	X													X	
59	Processor	Tvin drvna industrija d.o.o.		Virovitica	X													X	
60	Supplier	Gamauf d.o.o.		Poljana	X											X			

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
61	Processor	Spin Valis d.d.		Požega	X													X	
62	Processor	Slavonija DI d.o.o.		Slavonski Brod	X													X	
63	Supplier	Agroeuropa d.o.o.		Donji Miholjac	X											X			
64	Supplier	A.M.S. - BIOMASA d.o.o.		Drada	X											X			X
65	Supplier / Processor	Strizivojna - Hrast d.o.o.		Strizivojna	X											X		X	
66	Processor	Prerada drveta d.d.		Darda	X													X	
67	Processor	Đakovo pilana d.o.o.		Đakovo	X													X	
68	Processor	Belišće d.d.		Belišće	X													X	
69	Processor	A-G Dinas d.o.o.		Đurđenovac	X													X	
70	Supplier/Processor	Spačva d.d.		Vinkovci	X											X		X	
71	Supplier	Šišarka d.o.o.		Županja	X											X			
72	Supplier	Lamel d.o.o.		Otok	X											X			
73	Processor	Furnir Otok d.d.		Otok	X													X	
74	Processor	Naprijed d.o.o.		Sinj	X													X	
75	Supplier	Promming d.o.o.		Čakovec	X											X			
76	Supplier	Trgošped d.o.o.		Nedelišće	X											X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
77	Supplier / Processor	PANA d.d.		Čakovec	X											X		X	
78	Supplier / Processor	Mundus viridis d.o.o.		Zagreb	X											X		X	X
79	Supplier	JVR d.o.o.		Zagreb	X											X			
80	Supplier	Viševicakomp d.o.o.		Perušić	X											X			
81	Supplier	Moderator d.o.o.		Udbina	X											X			
82	Supplier	Dasović d.o.o.		Brinje	X											X			X
83	Processor	Viševicakomp d.o.o.		Perušić	X													X	
84	Processor	Pilana Krasno d.o.o.		Krasno	X													X	

Brief description of the Croatian company landscape

In Croatia, biomass accounts for approximately 11 % of the total primary energy supply, while the majority of fuelwood is consumed in households for heating.

Currently, the biomass market in Croatia mainly is based on using woody biomass for energy purposes, which can also be seen in the company inventory Table 4. Wood has been traditionally used for heating and cooking in rural households and still households are the primary woody biomass consumers. The main product in this segment is logwood which is being sold locally in a fairly informal market. In many cases, homeowners are also private forest owners and harvest wood for their own uses practically for free. Most of the forest area in Croatia is state-owned (78 %) and managed by "Hrvatske šume" Ltd.. Its subsidiary, "Šumska biomasa" Ltd. is dealing exclusively with the market for wood chips, i.e. by organizing the collection of forest biomass, wood chopping and selling of wood chips ("Šumska biomasa online", 2017). This is usually done by public bidding/auction (regulated also by Croatian laws – Official Gazette 100; 2015).

There are approximately 600,000 private forest owners in Croatia (Posavec et.al., 2004) and privately owned forests are often linked with a lack of professional knowledge in forest management. Additionally, there are no strong private forest associations, through which the forest owners would exchange knowledge and experience, and coordinate forestry interventions. This blocks participation on the market. Parts of private forests are degraded and require high investments for rehabilitation.

As it can be expected, most companies related to biomass production/processing are based on woody biomass and according to the last issue of the Biomass producers in Croatia catalogue (dating back to 2012) there were 10 pellet producers (currently available information lists 9 to 15 producers) and also 13 producers of wood chips (Biomass producers in Croatia catalogue, 2012). Additionally there are 45 larger saw mills listed with additional 224 contractors related to forestry. A Croatian wood cluster was organized with the goal to improve the sustainable competitiveness of wood processing sector, especially regarding the encouraging and promoting inter-sectoral and trans-sectoral cooperation. It currently lists 77 members, including biomass producers and processors, furniture producers, and construction wood producers (Croatian wood cluster online, 2017). The process of licensing of private entrepreneurs in Croatian forestry began in October 2007. It is reported that 940 licenses were issued (the state on 25th April 2016) (HROTE, 2017). Public institutions and other types of organizations (joint-stock company, limited partnership, family farm, cooperative) account for 24 (6.7 %) active licenses (Šporčić et.al., 2017).

As to the current information, there are no companies that deal exclusively in biomass wholesale in a form of traditional traders. Most of the producers sell their products directly to the end users, thus taking a double-role as processors and traders.

Production of wood pellets started in 2006/07 as a result of fossil fuels prices growth and increased demand for pellets on the EU market. Approximately 95 % are exported to EU market mostly in Italy, Slovenia, Germany and Austria (BioRES Project, 2016).

Production of non-woody biomass for energy purposes is currently rather limited in Croatia, where one can find only one producer of straw pellets, which started in 2016 with 1,500 tons produced yearly. Three companies are registered producers of biodiesel using mostly rapeseed as raw material (year 2017 was a record breaking year for the amount of sawn and gathered rapeseed, mostly used by the food industry). Two of them use rapeseed exclusively with a yearly capacity of total 55,000 tons per year, and one uses waste oil and produces 6,000t/y (Biodizel Vukovar, 2017). All are, however, facing financial problems since the Croatian market is not favouring biodiesel fuel and are depending on state subsidies (Poslovni dnevnik, 2014)

At the moment, there are 12 active biomass fuelled power plants (all combined heat and power and privately owned) totalling in 26 MW installed capacity with two additional being in test phase commissioned by the Croatian national power company (HEP) – also CHP with a total of 6MW (HROTE, 2017).

Except for the state owned company who manages the forests, which can be regarded as big, other companies involving biomass processing and usage would fall into the SME group. From the supply side, several big agricultural companies, currently entirely oriented to food production/processing, could be regarded as new sources of raw material (wheat straw and corn stover). This would support future innovative approaches on using agricultural by-products in either processing part (as seen in agro-pellet case) or in construction and application of small/medium non-woody-biomass fired furnaces.

Regarding the spatial distribution of the biomass included parties in all groups, one can observe that although the woody biomass is prevalent in energy use, and the forest area is more or less uniformly distributed throughout the country, end users mostly reside in the central, continental part of the country with road transport being almost exclusively used to distribute goods among the parties. Even though there were initiatives and projects to implement biomass logistic and trade centres in the country, they have not yet come to final stages (REGEA Feasibility study, 2014). In the case of woody biomass coming from the state owned forests managed by “Šumska biomasa” Ltd, a common practice is for the buyer to collect the material directly at the spot where it has been extracted from the forest.

4.4 Germany

Table 5: Company landscape Germany

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
1	Processor	ADM Spyck GmbH, Werk Straubing	rapeseeds and soy to plant oil	Straubing				X	X					X					
2	Trader	Bayernhof Erzeugergemeinschaften Vertriebs GmbH	silos in the port	Straubing		X	X	X											
3	Trader	BayWa AG	pellets, briquettes (heating oil, fuels & lubricants)	Straubing							X					X			
4	Trader	Raiffeisen Straubing GmbH	pellets, briquettes (coal, lubricants) (agricultural products, building materials)	Kirchroth							X					X			
5	Processor	Clariant Produkte (Deutschland) GmbH	wheat straw to cellulose-ethanol	Straubing		X							X						
6	Supplier / Trader	TTW Waldpflege GmbH	Services	Straubing	X														
7	Trader	1heiz Pellets AG	Pellets	Straubing	X						X					X			
8	Trader	Max Schierer GmbH	building materials, interior design	Cham	X														
9	End User	Biomasse Heizwerk Dingolfing GmbH, Stadtwerke Dingolfing GmbH	biomass heating plant - wood chips	Dingolfing							X								

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
10	End User	Biomasseheizwerk Drachselsried, Biomasse-Heizwerk Zellertal GmbH		Drachselsried							X								
11	Trader	AS Agency and Trade UG (haftungsbeschränkt)	canola oil, oils, wood chips, pellets, ...	Straubing	X			X	X		X			X		X			
12	End User	Biomasseheizwerk Furth GmbH & Co. KG	biomass heating plant - wood chips, sawmill residues	Furth							X								
13	Trader	Treml OHG	building materials, combustibles	Gotteszell	X						X					X			
14	Processor / Trader	Sägewerk Schwaiger GmbH & Co. KG	sawn wood, pellets	Hengersberg	X						X					X			
15	Supplier / Processor	Biomasse Ecker GmbH&Co.KG	wood chips, bark mulch	Hunderdorf															
16	Supplier / Trader	Forstwirtschaft Rudolf Laschinger	forestry - raw materials for woodturning	Kirchberg i. Wald	X						X					X	X		
17	End User	Biomasseheizwerk Regen GmbH	biomass heating plant - wood chips, sawmill residues	Regen															
18	End User	Heizwerk der Gemeinde Kollnburg GmbH	wood chip heating	Kollnburg							X								
19	End User	Biomasseheizwerk Mitterfels GmbH	biomass heating plant - wood chips, sawmill residues	Mitterfels							X								
20	Processor / Trader	Holz Resch KG	saw mill	Neureichenau	X														
21	Trader	Scheiffele-Schmiederer KG	wood, wood products, combustibles	Plattling	X											X			
22	Processor / Trader	HOLZ SCHILLER GmbH	building materials	Regen	X														

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
23	Processor / Trader	Bayerwald-Pellet-GmbH & Co.KG	Pellets	Regen							X					X			
24	Trader	Holz-Montagebau	combustibles (briquettes, pellets, firewood)	Viechtach	X						X								X
25	End User	Agrar-Energie-Heizwerk Vils-hofen GmbH	biomass heating plant	Vilshofen															
26	Processor / Trader	Holzwerke Weinzierl GmbH	wood processing plant (wood products, pellets)	Vilshofen	X											X	X		
27	Processor / Trader	Hinkofer & Wolf UG	timber construction, saw mill	Böbrach	X												X		
28	Supplier / Trader	Josef Lockinger	logging works and trade with roundwood, firewood and wood chips	Büchlberg	X						X					X	X		X
29	Trader	Natura Holzprodukte Handels GmbH & Co. KG	wood products (solid wood, saw wood, building materials)	Büchlberg	X														
30	Trader	BRENNPUNKT ENERGIE GmbH, Allgäu Pellets	pellets	Ruderatshofen	X											X			
31	Processor / Trader	Erdenwerk Gregor Ziegler GmbH	pellets, briquettes	Plößberg	X						X					X			
32	Processor / Trader	Pfeifer Holz GmbH	processing of coniferous trees to pellets, saw wood, pellet blocks	Unterbernbach	X						X					X	X		
33	Trader	Biomassehof Achenal GmbH & Co KG	wood fuel (pellets, wood chips, briquettes, firewood)	Grassau	X						X					X			X
34	Trader	FHP Frankenwald Holzpellets GmbH	pellets, briquettes	Hof/Saale	X						X					X			
35	Trader	Firma Peter Gump	pellets, briquettes (heating oil)	Gemünden am Main	X						X					X			

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
36	Trader	Kreuzmayr Bayern GmbH	pellets (heating oil)	Garching b. München	X						X					X			
37	Trader	Maier Korduletsch Energie GmbH	pellets (natural gas, heating oil, lubricants)	Vilshofen	X						X					X			
38	Trader	Adolf Präg GmbH & Co. KG	pellets (natural gas, heating oil)	Kempten	X						X					X			
39	Trader	Schnürer Energie e. Kfr.	pellets (heating oil, lubricants, diesel)	Mühldorf am Inn	X						X					X			
40	Trader	Stärkere Stoffe Georg Wagner KG	anti dust pellets, pellets (heating oil, fuels, lubricants)	Wertingen	X						X					X			
41	Trader	StegMühle von Berg GmbH & Co.KG	pellets (agricultural products)	Oberstetten	X						X					X			
42	Trader	BAHO GmbH	pellets, wood products export, brokerage	Deggendorf	X						X							X	
43	Processor / Trader	Weiss Holzwerk GmbH	wood processing plant	Julbach	X													X	
44	Supplier	Forstbetrieb Schmidbauer GmbH & Co. Kg	forestry	Neureichenau	X													X	
45	Processor / Trader	Holzbau Dünstl GmbH	saw mill - wood chips, wood products	Oberschneiding	X						X					X		X	
46	Trader	Holzladen Gentner	briquettes, wood products	Pilsting	X						X					X			
47	Supplier / Processor / Trader	Holzwerk Ferdinand Stögbauer e.K.	wood processing plant - wood chips, briquettes, other wood products	Wegscheid	X						X					X		X	
48	Supplier / Processor / Trader	MR Niederbayern GmbH	merger of farmers, offer wood chips and firewood & agricultural services	Straubing	X						X					X			X

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
49	Trader	Sanomol GmbH, Chemdmand	agricultural products like residues and food; chemical residues, waste, by-products	Ebersberg							X								
50	Trader	Schmidmeier NaturEnergie GmbH	develop energy concepts, supply customers with combustibles - wood chips & pellets	Zeitlarn /Ödenthal	X						X					X			
51	Processor / Trader	Südstärke GmbH	potato starch plant, production and marketing of potato starch as well as starch derivates and by-products	Schrobenhausen			X										X	X	
52	Processor / Trader	Südstärke GmbH, Standort Sünching	potato starch plant, production and marketing of potato starch as well as starch derivates and by-products	Sünching			X										X	X	
53	Processor / Trader	TECOSOL GmbH	biodiesel, glycerine, by-products (plant-based fatty acids and plant fertilisers)	Ochsenfurt				X	X						X				
54	Trader	Agrarhandel Erhardt GmbH	energy crops as well as other agricultural products (f.e. seeds, fertilizer, ...)	Feldkirchen		X	X	X	X										
55	Trader	Franz Buchner Landhandel	energy crops as well as other agricultural products (f.e. seeds, fertilizer, ...)	Neufahrn i. NB		X	X	X	X										
56	Supplier / Trader	Laubenbacher Agrarhandel GmbH & Co. KG	agricultural crops	Reisbach		X	X	X	X										
57	Trader	Brennholz M. Gmeiner GbR	combustibles (briquettes, pellets, firewood, brown coal)	Pfrombach, Moosburg a.d.I.	X						X					X			X
58	Trader	DANUBIA Holzbrennstoffe GmbH	combustibles (briquettes, pellets, firewood)	Hemau	X						X					X			X

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
59	Trader	Brennstoffhandel Lehner	combustibles (briquettes, pellets, firewood, coal)	Ascha	X						X					X			X
60	Trader	Eberhard Limmer Einzelunternehmen	combustibles (briquettes, pellets, firewood, heating oil)	Mallersdorf-Pfaffenberg	X						X					X			X
61	Trader	Werner Biobrennstoffe	briquettes, pellets	Wurmannsquick	X						X					X			
62	Trader	HOT Briks GmbH	briquettes, pellets, firewood	Feldkirchen	X						X					X			X
63	Trader	BAY.RO International	briquettes, pellets, firewood	Mitterfels	X						X					X			X
64	Trader	BAY.RO International	briquettes, pellets, firewood	Schwarzach	X						X					X			X
65	Trader	BavariaForst GmbH & Co. KG, HolzCenter Tegernheim	briquettes, pellets, firewood	Tegernheim	X						X					X			X
66	Supplier / Processor / Trader	Augesky Brennholzhandel und Forstdienstleistungen	logging works and trade with firewood, briquettes, wood chips	Obertraubling	X						X					X			X
67	Trader	Brennholz Plank	briquettes, pellets, firewood	Thaldorf	X						X					X			X
68	Trader	Bauer Nadezda	pellets, briquettes	Windorf	X						X					X			
69	Processor / Trader	Vilsmeier Dienstleistungen	wood chips	Moosham							X					X			
70	Processor / Trader	Sägewerk Christl OHG	saw mill - wood chips, wood products, bark mulch, sawdust	Weihmichl	X						X					X	X	X	
71	Trader	Biomasse Hasenclever	briquettes, pellets	Feldkirchen	X						X					X			X
72	Trader	Diermeier Energie GmbH	pellets (heating oil, lubricants, fuels)	Straubing	X						X					X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
73	Trader	Nusser Mineralöl GmbH	pellets, briquettes (heating oil, lubricants, fuels)	Straubing	X						X					X			
74	Supplier	Forstservice Wirthmüller	forestry services - trunk wood	Gerzen	X														
75	Supplier / Processor / Trader	Forstbetrieb Maier	forestry services - wood chips	Eggldham							X					X			
76	Supplier / Processor / Trader	Eibl Franz	forestry services - firewood, briquettes, pellets, wood chips, bark mulch, saw dust, wood	Geiselhöring	X						X					X	X		X
77	Supplier	Forstunternehmen Vilser GmbH & Co. KG	forestry services - wood	Adlkofen	X														
78	Supplier	Bayerische Staatsforsten AöR, Forstbetrieb Bodenmais	Bavarian state forest - wood, firewood	Bodenmais	X														X
79	Supplier	Heinz Adam	forestry services - wood	Bodenmais	X														
80	Supplier / Processor / Trader	Forstbetrieb Maier	forestry services - wood, wood chips, firewood	Mamming	X						X					X			X
81	Supplier / Trader	Waldbauernvereinigung Straubing e.V	forestry services - trunk wood	Oberschneiding	X											X			
82	End User	Biomasseheizanlage Grund- und Mittelschule Schwarzach	biomass heating plant	Schwarzach												X			
83	End User	Biomasse Heizkraftwerk Bezirksklinikum Mainkofen	biomass cogeneration plant	Deggendorf												X			
84	Supplier / Trader	Forstbetrieb Brandl GbR	forestry services	Altenthann	X						X					X			X

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
85	Supplier / Trader	Weismann GmbH	forestry services	Breitenbrunn	X						X					X			X
86	Trader	Holzhof Regensburg	firewood	Obertraubling bei Regensburg	X														X
87	Trader	Brennholz Schuster	firewood	Burglengenfeld	X														X
88	Supplier / Trader	S & J Amann GbR	forestry services - firewood	Bernhardswald	X														X
89	Trader	Brennholz Koller	firewood	Wolfsegg	X														X
90	Trader	Cukur Hürol und Neumeier Alexander GbR	briquettes, pellets, firewood	Friesheim	X						X					X			X
91	Trader	Brennholz Stadler	firewood, bark mulch	Thalmassing	X														X
92	Trader	Schweiger Handels GmbH	briquettes, pellets, wood chips, firewood, diesel, heating oil	Deggendorf	X						X					X			X
93	Trader	Zwickl Mineralölvertriebs GmbH	pellets, mineral oils	Hengersberg	X						X					X			
94	Trader	Böttcher Energie	pellets, diesel, heating oil, lubricants, ...	Regensburg	X						X					X			
95	End User	Biomasseheizwerk Ascha	biomass heating plant - wood chips, pellets	Ascha	X						X					X			
96	End User	Biomasseheizwerk Aiterhofen	biomass heating plant - wood chips	Aiterhofen	X						X					X			
97	End User	Biomasseheizwerk Bogen	biomass heating plant - wood chips, sawmill residues	Bogen	X						X	X				X	X		
98	End User	Biomasseheizwerk Windberg	biomass heating plant - wood chips	Windberg	X						X					X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
99	End User	Biomasseheizwerk Straubing IFH	biomass heating plant - pellets	Straubing	X						X					X			
100	End User	Biomasseheizwerk Straubing JVA	biomass heating plant - landscape conservation wood, wood chips	Straubing	X						X					X			
101	End User	Biomasseheizwerk Straubing Stadtgärtnerei	biomass heating plant - wood chips, sawmill residues	Straubing	X						X					X			
102	End User	Fußner GmbH	waste management facility with focus on biomass, biomass heating plant	Großostheim							X	X							
103	Producer	J. Rettenmaier & Söhne GmbH + Co. KG	research & development & processing of organic fibre materials from renewable, plant-based resources	Rosenberg	X	X												X	
104	End User	Wurzer Umwelt GmbH	waste management facility	Eitting	X						X	X							
105	Trader	Südpellets.de	regional wood fuels from the Black Forest (briquettes, pellets)	Empfingen	X						X					X			
106	Supplier / Processor / Trader	Dillinger Biomasse GmbH & Co. KG	utilisation of residual woods, production of wood chips; forestry services	Dillingen a. d. Donau	X						X					X			
107	Trader	Biomassehof Regensburg	fire wood, briquettes, pellets, wood chips, saw dust	Wenzenbach	X						X					X			X
108	Supplier / Processor / Trader / End User	Rothofer Umwelt OHG	forestry services, production of wood chips, treatment of old wood, composting plant, trades with pellets and briquettes, and other materials	Fürstenzell	X						X	X				X	X		X

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
109	Trader	BSB Biomasse-Service-Bayern e.K.	biomass (bark mulch, wood chips as case material, straw pellets for animal bedding)	Samerberg	X	X					X						X	X	
110	Trader	BayWa AG Landshut	building materials and machines for agricultural usage	Landshut														X	
111	Trader	FireStixx GmbH & Co. KG	pellets	Essenbach-Altheim	X											X			
112	Trader	FastEnergy GmbH	pellets	Dingolfing	X											X			
113	Processor	Hot'ts	only pellet factory	Pfarrkirchen	X											X			
114	Processor / Trader	Binderholz Deutschland GmbH	wood for building materials, conversion of the residues to biofuels (briquettes and pellets)	Kösching/Interpark	X						X					X			X
115	Trader	BayWa AG Erding	building materials and machines for agricultural usage	Erding-Unterstrogn														X	
116	Trader	Römer Holz-Großhandel	pellets, construction timber	Emskirchen	X						X					X		X	
117	Trader	Geiger GmbH	pellets, briquettes, lubricants, heating oil, fuels, ...	Ansbach	X						X					X			
118	Trader	BayWa AG Neumarkt/Parksberg Vertrieb Energie	pellets, briquettes, lubricants, heating oil, fuels, ...	Parsberg	X						X					X			
119	Trader	Deglmann Energie	pellets, lubricants, heating oil, fuels	Weiden	X						X					X			
120	Trader	BayWa AG Passau-Thyrnau Vertrieb Energie	pellets, briquettes, lubricants, heating oil, fuels, ...	Passau-Thyrnau	X						X					X			
121	Trader	BayWa AG Deggendorf Vertrieb Energie	pellets, briquettes, lubricants, heating oil, fuels, ...	Deggendorf	X						X					X			

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
122	Trader	BayWa AG Würzburg Vertrieb Energie	pellets, briquettes, lubricants, heating oil, fuels, ...	Würzburg	X						X					X			
123	Trader	BayWa AG Kelheim-Saal Vertrieb Agrar	products for agricultural usage	Saal								X						X	
124	Trader	ROTT & SOHN GmbH & Co. KG	pellets, lubricants, heating oil, fuels	Kelheim	X						X					X			
125	Trader	Moser Agrar & Baufachzentrum e.K.	products for agricultural usage (f.e. seeds, fertilizer, ...)	Riedenburg								X							
126	Trader	BayWa AG Regensburg Vertrieb Agrar	agricultural equipment (f.e. seeds, fertilizer, ...)	Regensburg								X							
127	Trader	BayWa AG Plattling Vertrieb Agrar	agricultural equipment (f.e. seeds, fertilizer, ...)	Plattling								X							
128	Trader	AHS Agrarhandel Süd GmbH	agricultural equipment (f.e. seeds, fertilizer, ...)	Deggendorf								X							
129	Trader	Schreiner & Ziegler Brennstoffhandel GmbH	pellets, briquettes, lubricants, heating oil, fuels	Neuburg	X						X					X			
130	Processor / Trader	B+S Bioenergie Vertriebs GmbH	pellets	Kelheim	X						X					X			
131	Trader	Zieglmeier Energie Niederlassung Pfaffenhofen	pellets, heating oil, lubricants, fuels	Pfaffenhofen a. d. Ilm	X						X					X			
132	Trader	Brennstoffe Kasberger	pellets, briquettes	Hauzenberg	X						X					X			
133	Trader	Bauer Biobrennstoffe	pellets, briquettes	Windorf	X						X					X			
134	Trader	Brennholz Kapfer	pellets, firewood	Passau	X						X					X			X
135	Trader	Piehler Brennstoffhandel	pellets, briquettes	Schwarzenfeld	X						X					X			

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
136	Trader	Brennstoffe-List GmbH	pellets, briquettes, heating oil	Schwarzenfeld	X						X					X			
137	Trader	Firma Franz Lehrer	briquettes, heating oil	Schwandorf	X						X					X			
138	Trader	Winklinger GmbH	pellets, briquettes, lubricants	Niederwinkling	X						X					X			
139	Supplier / Trader	Forstbetrieb Lorenz Manfred	forestry services, trades with wood chips	Bad Griesbach	X						X					X			
140	Trader	Agrar Sitzberger	wood chips	Winzer	X						X					X			
141	Supplier	Bernhard Bäuml GmbH & Co.KG	forestry services	Schwandorf	X						X								
142	Processor	Südzucker AG	processor of sugar beets into sugar and thick juice	Plattling						X							X	X	
143	Processor	Südzucker AG	processor of sugar beets and grain into bioethanol	Zeitz			X			X			X						
144	Supplier / Processor / Trader	Ziegler global group	Saw mill for coniferous wood	Plößberg	X														
145	Supplier / Processor	UPM	Paper and cardboard plant	Plattling	X														



Brief description of German and Bavarian company landscape

11.4 Mio. ha of the German surface is covered by forest area. This is one third of the whole country. 48 % of German forests belong to private owners, 29 % belong to the federal states, 19 % is property of corporations and 4 % are property of the federal republic of Germany. Private forest predominates in sparsely populated, rural regions whereas in densely populated metropolitan regions corporate forests are predominant (BMEL, 2012).

Germany has about 2 Mio. corporate and private forest owners. Most private forest owners only keep small patches of land. Only 13 % of the entire German forest area belongs to owners who have more than 1,000 ha, almost 50 % own areas are below 20 ha of size. In order to support these small-scale forest owners, public support by state-run institutes is provided, including the usage of the raw material wood, aspects of forest tending, adjustment on climate change, prevention of biotic damages and protection of the forests and their biodiversity (BMEL; 2012).

As can be seen from the company inventory listed above, the German biomass and bioenergy company landscape in Germany in general and in Bavaria in particular is dominated by the woody biomass – solid bioenergy carrier value chain. More than 85 % of all companies listed can be classified in the sectors of forestry and wood and respective downstream products.

In Bavaria, a comparatively high share of the economic production takes place in the primary sector (agriculture and forestry), making it an important region for biomass production. The gross value added of Bavarian agriculture and forestry adds up to 3.7 billion Euro in 2013 (StMELF, 2016).

Bavaria in total has around 2.6 Mio. ha forest area, resulting in 36.9 % of the entire surface being covered with forests (LWFF, 2017). 57 % of this area is privately owned, 30 % belongs to the free state of Bavaria, 11 % is owned by corporate entities and 2% belongs to the federal republic of Germany (LWFF, 2017). Similar to the rest of Germany, the private forest is separated in small areas. In Bavaria alone, there are 491,000 private forest owners (LWFF, 2017). This can lead to challenges due to the many different usages, cultivations, treatments, and interests.

In order to manage this heterogeneous conglomerate of interests and stakeholders, the Bavarian forest and wood industry is organized in the 'Cluster Forst und Holz in Bayern', the 'cluster forestry and wood in Bavaria'. Their aim is to exhaust the growth potential of the branch's main value chain 'forestry-wood-paper' and to strengthen their competitiveness. Especially small and medium-sized enterprises in rural areas have a high profit due to networks with research institutes (Cluster Forst und Holz Bayern, 2009).

The Bavarian sector of forestry and timber industry has about 190,000 employees. Noteworthy is the before mentioned high company density. Almost 22,500 branch relevant companies are based in Bavaria. These are especially small and medium-sized enterprises. The sector also has a lot of self-employed persons which are included in this significantly high number (LWFF, 2017). The whole industry had sales of 37 billion Euro in 2015 (LWFF, 2017).

25 % of the 2014 harvested timber in Bavaria got processed to fire wood and 11 % to wood chips. In total, 6.3 Mio. solid cubic meters wood with bark got used as energy wood, making the primary forest sector the biggest source of solid biomass for bioenergy purposes, especially feeding into the wood chips production. The second biggest source of energy wood is presented by the saw mill industry. In Bavaria, and here mainly in the south-western part (Upper Bavaria), there are 700 saw mills in total, also including very small ones, which depicts the highest density of saw mills in the whole of Germany. Annually, there are 5.3 Mio. m³ incurred saw mill by-products, bark and sawdust. Thereof, 55 % are used energetically, providing raw material input for pellet production. Also the 0.9 Mio. m³ wood residues from carpentries were utilized for energy production. Another source for energy wood is wood waste. From the 2.7 Mio. m³ which incurred in 2014, 65 % got exploited energetically. Overall, Bavaria has the largest wood pellet production capacities in the whole of Germany, with 16 pellet production sites active in 2014 (LWFC, 2017).

Regarding cultivation areas for agriculturally produced bioenergy feedstock (first generation), 457,000 ha were used for the production of biogas, biodiesel, industrial use, bioethanol and short rotation coppice in Bavaria in 2015 (StMELF, 2016). In terms of processing facilities such as biodiesel or bioethanol plants run by big corporations and companies, the number in Bavaria is currently limited. The biggest vegetable oil mill processing rapeseed into oil with a further processing into biodiesel is the ADM Spyck mill in the port of Straubing. Südzucker, one of the biggest sugar players on the world market, is running a big first generation bioethanol plant in Zeitz, Saxony-Anhalt, north of Bavaria, via its daughter cropenergies GmbH (capacity: 400.000 t of bioethanol per year).

In the end-user segment, Bavaria counts 3,600 public and private (corporate) bioenergy facilities generating 8,704 Mio. kWh per anno, providing 2.7 Mio. households with bioenergy (Energieatlas Bayern, 2017). A good overview can be found on the web portal of the Energieatlas Bayern.

Overall, in the recent years, a number of companies from originally non-bio-bases sectors have started to look into business opportunities in the bio-based economy, especially stepping up their research and development into this direction. Here, a focus is on chemical- use of biomass, which in parts could create a competitive situation in terms of biomass demand. Other companies already active in classic bio-based industries, e.g. the paper and card board industry, also look into new options for business, e.g. the Finnish company UPM which has a big paper plant close to the port of Straubing. Hence, a more dynamic development in the bio-based company landscape in Bavaria in the years to come can be expected.

4.5 Hungary

Table 6: Company landscape Hungary

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
1	Supplier & Processor	MBH Zrt.	MBH Zrt. manufactures wood pellet, is active in forest management, fuel wood processing (premium quality stock of wood) and is installing and operating biomass based heating centres.	Budapest	X											X			X
2	End User	PannonPower Ltd		Pécs												X	X		
3	Supplier & Trader	Pannon-Biomassza Ltd		Pécs		X		X											
4	Supplier	Jákófa Kft		Ganna												X	X		
5	Supplier	Pellet Produkt Kft		Sopron	X			X								X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
6	Supplier, Processor & Trader	Bio-Fungi Ltd	Bio-Fungi Ltd is a joint venture based on a family enterprise with 35 years of experience, which, by now, has expanded to be a considerable company. Main activities: - mushroom compost production and trade - mushroom cultivation and trade - mushroom gastronomy - mushroom cultivation research	Áporka														X	
7	Supplier & Trader	Hungrana Ltd	As the most significant corn processing company in Europe, Hungrana Starch and Isosugar Manufacturing and Trading Co. Ltd. has been a definitive player in the Hungarian food industry for more than 100 years. Hungrana is the EU market leader in isosugar production, located in Hungary. The company uses corn to produce its various products.	Szabadegyháza,			X						X						
8	Supplier & Trader	Raklap és Tüzép Kft.	Raklap és Tüzép Kft. was founded in 2003 to produce and market sawdust and wood chips.	Alsónémedi	X			X			X					X	X		

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
9	Supplier & Trader	Rossi Biofuel Zrt.	The biodiesel plant of Rossi Biofuel Zrt. is located at the base site of MOL NYrt. in Komárom. The factory was founded as a green field investment in 2006 and production started in 2007. The core activity of Rossi Biofuel Zrt. is biodiesel production from fresh vegetable oil and used cooking oil.	Komárom					X		X				X				
10	Trader	Pellet Expert		Érd															
11	Supplier & Trader	Bionova-Hungary Kft.		Bicske	X						X					X			X
12	Supplier & Trader	Pannonia Ethanol	Pannonia Ethanol produces fuel ethanol and animal feed. The facility currently utilizes more than 1,000,000 tons of corn annually to produce 450 million litres of renewable ethanol, 325,000 tons of Dried Distillers Grains with Solubles (DDGS), a high protein animal feed, and 10,000 tons of corn oil, a great animal feed ingredient.	Dunaföldvár			X						X	X				X	
13	Supplier & Trader	Agrár-Béta Kft		Dombóvár			X						X						
14	End User	DBM Dél-nyírségi Bioenergia Művek Energiatermelő Zrt.		Szakoly	X						X								

					Raw materials processed or traded							Products, semi-finished products and/or by-products							
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
15	End User	Mátraí Erőmű ZRt.		Visonta		X		X			X								
16	Processor	HEPIK Bt.		Pécs												X			
17	Processor & end user	Fővárosi Hulladékhasznosító Mű		Budapest								X						X	
18	Processor	Bunge Zrt		Martfű										X					
19	Processor	Pannon Növényolajgyártó Kft.		Foktő										X					
20	Processor	Biofilter Környezetvédelmi Zrt	The main profile of the company is supplying second-generation bio-energy sector, by providing the complex process of implementation of reverse logistics from the waste collected. The used cooking oil (UCO) collection, proceession and import of purified vegetable oils provides raw material supplies for biodiesel plants in Hungary and neighboring countries also.	Törökbálint								X				X			
21	Processor	T&T Technik Kft.		Szentes	X											X			
22	Trader	GlobalStone Magyarország Kft.		Páty	X											X			
23	Trader	Szalontai RGB Bt.		Balatonudvari	X											X			
24	Trader	Hazai Pellet Szolgáltató Kft.		Nagykanizsa												X			
25	Processor / Trader	Kincsem Hungária Szövetkezet		Tápiószecső		X		X								X			

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
26	Processor/Trader	Agri-Pellet Kft.	Boiler manufacturer	Törökbáint															
27	Supplier	Ipoly Erdő Zrt.	Ipoly Erdő is the largest forest manager in Nógrád County and in the northern part of Pest county; it also produces wood chips	Balassagyarmat	X											X			X
28	Supplier	Kisalföldi Erdőgazdasági Zrt.	The company operates 34,500 hectares of forest in the northwestern part of Hungary.	Kapuvár	X											X			X

Brief description of Hungarian company landscape

Based on previous policy formulations solid biomass is the largest proportion of renewable energy sources in Hungary, also shaping the company landscape. In the case of rural energy supply, the realization of decentralized and low capacity biomass and biogas power plants are considered realistically feasible and supported. The main advantages of these plants are to use local raw materials as well as serving local needs with little logistical effort. According to several domestic experts and resources, the Hungarian biomass and bioenergy market is still under development. Alike other countries of the region, renewable energy sources have been declining in recent years, with renewable electricity developing very slow, biodiesel and bioethanol stagnating (Ministry of National Development, 2010).

More than 20 % of Hungary is forest, meaning that there are two million ha of forests. Half of the forests belong to the state and this amount thrives each year by 5-10,000 hectares. At the moment, 22 state forestry companies are operating. Firewood, unlike other types of biomass, already had had a developed market, therefore the power-plants' increased demand had a great effect on the existing demand-supply relations. It is difficult to estimate the real market size of wood because the quantity of sold firewood of private forestry and the illegal wood market are unknown. However, it seems that the market is quite saturated. Concerning the straw-fired plants besides the positive effects (job opportunities, catchment area development, supplier chain, etc.) investments often create strong resistance from part of the local population near the planned plant or along the main routes of base material transport (Ministry of National Development, 2010).

Nowadays, in the country the dominant part of electricity which is partly bio-based is produced in big power stations, by adding biomass to coal (co-firing) which decreases the overall efficiency of power generation and has a serious impact on the environmental, social and economic aspects of sustainability. Moreover, those highly centralized systems generate energy hundreds of kilometers away from the consumers as opposed to the distributed power generation concept (decentrality). Some of the largest coal-fired power plants have been modified in the previous years to make them suitable for the burning of biomass. Actually biomass is used mainly for the production of heat and electricity through direct burning with a focus on firewood and other forestry by-product utilization. The Hungarian energy sector today utilizes a negligible proportion of agricultural by-products for energy production purposes and, on the basis of current trends, this will not change in the long term (Ministry of National Development, 2010).

The production of liquid biofuels has started about a decade ago in Hungary and made significant progress if compared to other countries of the region, however it is predominantly focusing on first generation biofuels, thus sources from food/feed suitable feedstock. Investigations are being made in second generation, yet mostly driven by the search for enhanced efficiency in conventional plants. The bioethanol market directly and indirectly employs more than 4,000 people and plays an important stabilizing role in the Hungarian agriculture. Conventional ethanol facilities are fed mainly with domestic corn (two million tons per year) and are operated by Hungrana and Pannonia Ethanol companies. The end products are nearly 900 million liters of ethanol and more than half a million tons of residue products for the feed industry. There are two other locations

for bioethanol production connected to biogas production under the so-called energy-farm concept (European Technology and Innovation Platform – Bioenergy, 2015). Domestic ethanol production has a short-term future vision only until 2020. According to the EU regulation, by 2020, 10 % of renewable energy should be allocated to transport energy. This is currently 4.9 % (until the end of 2018) in Hungary and the EU average is 5-6 %. Since 2007, the Envien Group has capacities in Komárom (Rossi Biofuel), with three production lines severally capacity of 50,000 tons per year biodiesel from rapeseed oil and used cooking oil. Currently, biodiesel is fully utilized as bio-based mixing component of diesel oil. Two new projects will probably be launched in the coming years (European Technology and Innovation Platform – Bioenergy, 2015) (A hazai bioetanol-gyártás jelene és jövőképe; 2017).

It can be stated that there are many Hungarian clusters and associations related to bioenergy and biotechnology, however, current activity is questionable in some cases. They are organized mostly locally or regionally and not really on the basis of their members' activities. Consequently, there are numerous players in the field of biotechnology, but their operational areas overlap each another.

From the logistics side during the last couple of years a cross-border trade of biomass developed increasingly in Central Europe. According to the latest data in Austria, 90 % of the imports of firewood come from the Czech Republic, Slovakia and Hungary. Most of the performance of the entire Hungarian freight transport segment is served by rail and road transport, while inland waterway shipping is primarily used for cross-border transport of goods (Danube Region Strategy Energy, 2017).

Hungary would be well-suited in case the bioeconomy will expand. Its capital region has vast untapped biomass resources (wooden as well as agricultural residue material) and R&D competencies. But this potential is currently solely theoretical. In the frame of a number of sample projects, modern, high-efficiency 5-10 MW plants were established, but their future is doubtful (EIT, 2014). Currently, the situation seems to be that no investments by local companies will be made (EIT, 2014).

4.6 Romania

Table 7: Company landscape Romania

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
1	Processor	AD PRIME DISTRIBUTION SRL		Piatra-Neamt	X														
2	Processor	FBR FORESTOPS S.A.		Timisoara															
3	Processor	EGGER Romania		Radauti	X														
4	Processor	Elnet Instal		Bucharest	X														
5	Processor	Holzindustrie Schweighofer S.R.L.		Radauti	X											X			
6	End user	Holzindustrie Schweighofer S.R.L.		Radauti	X											X			
7	End user	BIOENERGY SUCEAVA		Suceava	X														
8	End user	TEB Energy Business		Suceava		X													
9	End user	ENVISAN		Pitesti								X							
10	Processor	Ness Proiect Europe		Ploiesti												X			
11	End user	Ness Proiect Europe		Buzau												X			
12	Processor	Forestar		Tarcau	X														
13	Processor	Prutul		Galati					X					X	X				
14	Processor	Eco Wood		Bihor												X			

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
15	Processor	Industry Transilvan SRL		Harghita												X			
16	Processor	Ecoforest srl		Oradea															
17	Processor	Ameco Renewable Energy SRL		Harghita												X			
18	Processor	ULEROM SA		Vaslui										X	X				
19	Processor	Biofuel Energy SRL		Teleorman									X						
20	Processor	Agro Factory SRL		Constanta												X			
21	Processor	Agropan SRL		Calarasi												X			
22	Processor	Interagro		Teleorman												X			
23	Processor	Patru Agro SRL		Bucuresti												X			
24	Processor	Barlinek Romania SRL		Bacau	X											X			
25	Processor	Energy Serv		Bucuresti												X			
26	Processor	Cerealcom Dolj		Dolj		X	X												
27	Trader	ADM Romania Trading		Bucuresti		X													
28	Trader	Ameropa Grains SA		Constanta		X	X												
29	Trader	Nidera Romania SRL		Constanta		X	X												
30	Trader	Glencore Romania SRL		Constanta					X										
31	Processor	Bunge Romania SRL		Bucuresti					X						X				

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
32	Processor	Losan Romania		Dolj	X														
33	Supplier	Normarom Industrie SEL		Caras Severin	X														
34	Supplier	Ecolemn Products SRL		Caras Severin	X														
35	Supplier	Colcear Servcom SRL		Caras Severin	X														
36	Supplier	Yildiz Entegre Romania		Arges	X														
37	Supplier	Romanel International Group SRL		Bucuresti	X														
38	Processor	Kronospan		Sebes	X														
39	Supplier	Energo Granula		Sighetu Marmatiei	X														
40	Processor	Pellet Fabrique		Panciu	X														
41	Processor	Eco Pellet Invest		Buzau	X														
42	Processor	Kontrastwege		Miercurea-Ciuc				X											
43	Processor	Paulownia GreenE		Cluj				X											

4.7 Slovakia

Table 8: Company landscape Slovakia

					Raw materials processed or traded								Products, semi-finished products and/or by-products						
No.	Company category	Company name	Brief description	City	Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
1	Processor, Trader	RASL, s.r.o.	Biomass production biomass, market with agropellets	Nové Zámky		X										X			
2	Processor, Trader	BIO TRADE & TRANS, s. r. o.	Biomass production and marketing	Bratislava (agreement with Slovak Forests Trenčín - production; agro-biomass from all regions)	X	X										X			
3	Processor, Trader	Vojenské lesy a majetky SR - State company	Biomass production and marketing	Malacky	X						X					X			X
4	Processor	EPPROS, s.r.o.	Biomass production	Bratislava (prevádzka Hriňová)												X			
5	Trader	EnerBiz s. r. o.	Biomass market, energy distribution	Bratislava	X											X			X
6	Trader	Ecobrix s. r. o.	Biomass market	Tekovský Hrádok	X	X										X	X		
7	Processor	BIOPRODUKT Dunajský Klátov, s.r.o.	Biomass production	Dunajský Klátov							X						X		
8	Processor	RUPOS, s.r.o.	Gas production from biomass	Ružindol							X							X	

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
9	Processor, Trader	Ing. Peter Francisci - Ekover	Biomass waste for fuel	Košúty							X						X		
10	Processor, Trader	Agriwatt, s.r.o.	Biomass and pellets production	Dunajská Streda							X						X		
11	Processor	HelioPeleta s.r.o.	Pelletization of wood matter	Dvorany nad Nitrou	X											X			
12	Processor, Trader	Peter Mentel - Novamute	Production and marketing of pellets	Komárno	X	X										X			
13	End User	Intech Slovakia, s.r.o.	Biomass user	Bratislava	X														X
14	Processor	Woodpecker SK, s. r. o.	Biomass production, chips	Malé Leváre	X														X
15	Processor	PALEKO, s. r. o.	Biomass production, chips	Malacky	X														X
16	Processor	I. Svätajurská akciová spoločnosť	Biomass production, chips	Svätý Jur	X														X
17	Processor Biogas	Dry Fermentation Biogas, n.o.	Biogas station	Komárno (Biogas Station Kolárovo-Částa)							X							Biogas	
18	Processor	Viktor Kavický - MWNET	Wood Pellets Production	Myjava	X											X			
19	Trader	PILEXIM S.R.O.	Marketing all kinds of fire wood material	Senec	X						X					X	X		
20	Processor	MEROCO, a.s.	Biodiesel Production, member of Envien Group	Leopoldov					X					X	X				
21	Processor	ENVIRAL, a.s.	One of the largest bioethanol producers in CEE, part of Envien Group	Leopoldov		X	X		X				X						
22	Processor	Mestské lesy v Bratislave	Fire Wood Production	Bratislava	X														X

No.	Company category	Company name	Brief description	City	Raw materials processed or traded								Products, semi-finished products and/or by-products						
					Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oilseeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
23	Processor Biogas	ECO PWR, s. r. o.	Biogas station	Komárno - BGS Šamorín, Čilistov														Biogas	
24	Trader	SLOVWOOD Ružomberok, s.r.o.	The largest wood trader in Slovakia, member of Mondi Group, focused mainly on purchasing wood and biomass for paper producer (member of the group)	Ružomberok	X											X	X	X	X
25	End User	Národná energetická, a.s.	Member of Intech Group, heating producer (central heating for municipalities focused on wood biomass)	Bratislava	X													Heating	
26	Trader	IJF HOLZ Slovakia, s.r.o.	Trader - focused on construction materials	Špačince	X														X
27	Trader	Taper, s.r.o.	One of the largest wood traders in Slovakia	Bratislava															
28	End User	Slovenské energetické strojárna, a.s.	owner and operator of heating boiler running on wooden chips with annual consumption of 11.8k t	Tlmače	X													Heating	
29	End User	Lesy SR, OZ Levice	operator of boiler for heating of production areas	Levice															
30	Processor	Lesy SR, š.p.	the largest state owned operator and producer of wood in Slovakia	Banská Bystrica	X											X	X		X

Brief description of the Slovak company landscape

Characteristics of the Slovak national company landscape along the bioenergy supply chain are determined mainly by usage of solid feedstock material. Slovakia is primarily focused on wooden biomass (dendro-biomass). With 41 % of the total land area being forest, Slovakia a country with relatively high share of forest (compared to total of 35 % in EU). 40 % of total forest area is state owned, managed and operated by state company Lesy Slovenskej Republiky (Lesy SR - Forests of Slovak Republic) located in Banská Bystrica but with operations spread over the entire country. Lesy SR operates and manages not only state owned forests, but also parts of privately and cooperatively owned ones, where owners are not managing operations themselves. Lesy SR represents the largest producer of woody biomass in Slovakia.

Other important forest owners include mainly the Catholic Church in Slovakia, municipal forest companies, and private owners. Private owners – landowners are usually structured in a form of special forests cooperatives, so called “urbar”, consisting sometimes of hundreds of owners with very negligible single shares.

Traditionally, wood processing industries (including production of biomass) are located in mid and north Slovakia, related to more mountainous areas with higher concentrations of forests. Consequently, the same applies for processors and end users, such as central heat and/or electricity producers using biomass sources or pulp & paper producers, dominated by SCP Papier - Mondi Group (Ružomberok), the largest wood biomass processor in Slovakia.

Trading with wood and biomass is spread across a number of companies, as there is limited regulation in this respect. The total number of companies with wholesale trading with wood stated as business activity in Slovakia is approx 1,700 (Finstat, 2017). However, some of the companies are having whole-saling of wood as additional activities to other construction materials, not referring to the primary bioenergy market. The largest specialized traders include Slovwood Ružomberok, a.s. – part of Mondi Group, which is operating as the largest pulp and paper producer in Slovakia, Jaf Holz Slovakia (member of Austrian JAF Group) and Taper, s.r.o.

Regarding wood processors, pulp and paper producers represent by far the largest wood processing industry in Slovakia, dominating by SCP Mondi, which covers as much as 30 % of pulp & paper industry in Slovakia. Other important producers are Metsa Tissue (member of Metsallitto group) and SCA Hygiene.

The direct wood processing industry is deconcentrated between numerous small pillars and wood processors, oftentimes related to owners of forests. Kronospan group with its company Bučina DDD, represents one of the largest producers of chipboards, MDF / HDF boards and other wooden products with higher added value in Slovakia.

Bioethanol production in Slovakia is a developing industrial branch. The biggest national player here is Enviral, a.s., part of the Envien Group, which is currently producing first generation bioethanol with a capacity of 145,000 t of bioethanol per year, with the production running since 2007. Enviral lately has acquired a technology license from the Swiss biotech company Clariant to

produce bioethanol from lignocellulosic agricultural residue material in the near future (Clariant, 2017).

Logistics of biomass and wood is done usually via road transport. However, usage of railway transportation is gaining back popularity, especially for high volumes and in case of export. There are no important logistics and transportation companies, focused specifically on wood and biomass.



4.8 Summary on company landscapes in non-partner DTP-countries

In the following paragraphs, a brief textual overview on the market situation for biomass and bioenergy companies in those countries which are not part of the ENERGY BARGE project is provided.

Bosnia and Herzegovina

The potential to increase the energy generation by using renewable energy sources in Bosnia and Herzegovina is largely based on the wood resources in Bosnia and Herzegovina as 53 % of the total land area are covered by forests. In 2014, the availability of unused wood biomass was estimated to approx. 1,000,000 t (FIRMA Project, 2014). The potential of unused agricultural residues is also estimated to 1,000,000 t of which approx. one third could be utilised for the generation of energy (Šurković et al., 2017).

In 2015, 33 production plants were producing 213,000 t pellets in Bosnia and Herzegovina. The largest share of the domestic pellet demand is assigned to the residential heating sector (Gauthier et al., 2016). Only 1 % of the biomass which is used for energetic purposes is currently processed to pellets and briquettes. 99 % of the wooden biomass is used directly as firewood for heating purposes (Šurković et al., 2017). Biomass in general is primarily used in the heating sector in Bosnia and Herzegovina. In 2011, 82 % of all households were using solid biomass for heating purposes, in rural areas up to 92 % of the households (Quint-Kljajic, 2016).

According to Šurković et al. (2017), until now there are no logistics centres for a continuous supply with biomass existing in Bosnia and Herzegovina. The companies which are dealing with biomass are mainly focussed on firewood. The underdeveloped biomass market is described as the main barrier towards an increased utilisation of the high biomass potentials of the country for energetic purposes. The authors compiled a list of different domestic stakeholders which are operating in the field of biomass.

Czech Republic

In 2015, 22 pellet production plants were operating in the Czech Republic while the production of pellets amounted to 280,000 t (Gauthier et al., 2016). In 2013 the total pellet exports amounted to 147,500 t of which the vast majority was exported to Austrian, Germany and Italy (Stupavský, 2013). On the website of the Czech Pellets Cluster (2017) several pellets and other biomass processing companies (e.g. briquettes, manufacturers and sellers of biomass boilers) are listed.

Around 15 production facilities in the Czech Republic produce more than 5,000 t pellets per year. Additionally, a number of smaller producers have a production capacity up to 5,000 t per year. The sawmill Mayr Melnhof Holz in Paskov is the market leader with an annual pellet production of approx. 80,000 t. Another important market player, the company Holzindustrie Chanovice, is producing around 20,000 t per year (Stupavský, 2013).

20 % of the pellets which are produced in the Czech Republic are supplied as bulk cargo and are transported by trucks. The vast majority of the pellets are filled in 15 kg bags. In recent years the transport by trucks as bulk cargo increased due to larger production facilities (Stupavský, 2013).

Moldova

The electricity generation in Moldova is largely based on natural gas with a share of 94 %. Biogas and crude oil together contributed only to 0.5 % of the total electricity generation in 2014. The share of biomass and biogas of the heat generation amounted to 3 % in 2014. The largest consumers in the heating and cooling sector as well as in the electricity sector are households. In 2015, 56 % of the private households in Moldova were using biomass stoves for heating, mainly using firewood (BMW, 2016).

The annual generation of heat through biomass shall increase from 237 ktOE in 2009 up to 334 ktOE until 2020 as it is defined in the National Renewable Action Plan of Moldova (NREAP Moldova, 2013).

According to the BMW (2016) exclusively domestic companies are operating in the renewable energy market in Moldova at the moment. The European Bank for Reconstruction and Development (EBRD) has established the Moldovan Sustainable Energy Financing Facility (MoSEFF). Its aim is to support projects and investments of Moldovan companies in the fields of energy efficiency and renewable energies. Companies are funded all across the country, even though the majority is located in the capital Chisinau (MoSEFF, 2017).

At the beginning of 2016, approx. 120 companies were processing solid biomass in Moldova with a capacity of 120,000 t per year. Thereof 86,000 t were briquettes and 33,600 t pellets. The biomass industry is considered to have a development potential of around 515,000 t oil equivalents, whereof only approx. 8 % are being used today (Brînză, 2017). In the frame of the project “Moldova Energy and Biomass” a public list of briquette and pellet producers has been compiled by Brînză (2017), which contains 54 briquette and 24 pellet producers from Moldova. The list also provides information about the production capacities of the respective companies.

Montenegro

Due to the National Renewable Energy Action Plan (NREAP) from 2014, Montenegro aims to increase the share of renewable energies of the total energy consumption from 26.3 % in 2009 to at least 33 % by 2020. 60 % of the total area of the country is forested area so that wood fuels are supposed to have a high potential in terms of an increased utilisation of bioenergy in the future (Quint-Kljajic & Mezghani, 2016). Traditional biomass, e.g. firewood, is widely being used due to its comparatively low costs (approx. 80 % of the households in Montenegro used wood for heating in 2011). Other forms of biomass, like pellets or briquettes, only play a minor role up to now (Marinović et al., 2013).

In 2015 the domestic production amounted to 17,000 t of wood pellets, 15,400 t wood chips and 66 t wood briquettes (MONSTAT, 2015). Gauthier et al. (2016) indicate the annual pellet production for 2015 with 31,300 t and two operating production plants. A list of important stakeholders of the biomass market and renewable energies in Montenegro in general has been compiled e.g. by Quint-Kljajic & Mezghani (2016). 85 % of the domestically produced biomass products (wood chips, briquettes, charcoal) are exported, 15 % are used in Montenegro (Marinović et al., 2013).

Serbia

In 2014 the share of biomass and biogas at the total primary energy use of Serbia amounted to 7.2 % (Šuput et al., 2015). The majority of private households in Serbia, especially in rural areas and city outskirts, are using solid biomass for heating due to the good availability and a relatively low purchasing power. The use of biomass in cogeneration plants amounted to less than 1 % in 2014. It is expected that the utilisation of residues from forestry and agriculture for the generation of electricity and heat in CHP plants will increase in the future (Quint-Kljajic, 2015).

As around 30 % of the country is covered with forest areas, the potential to use firewood and forest residues in cogeneration plants for district heating systems is described as high. According to the NREAP, the share of biomass of the total potential of renewable energy sources amounts to over 60 % (Quint-Kljajic, 2015). The degree of utilisation of wooden biomass is already around 66 %, whereas agricultural residues are only being utilised marginally with 2 % and thus still have a high potential (Šuput et al., 2015).

In 2015, 56 pellet production plants were operating in Serbia while the production of pellets amounted to 229,650 t (Gauthier et al., 2016). The majority of the companies are producing less than 10,000 t per year, a few bigger producers in the range of 10,000 - 50,000 t annually. Approx. 50 % of the pellets are exported to Italy (Šuput et al., 2015). In the frame of the German Climate Technology Initiative DKTi (run by the German Association for Development GIZ) Programme "Development of sustainable bioenergy market in Serbia" Milijić (2014) compiled a list of wood pellet production companies, wood pellet boilers, burners and stoves producers and dealers as well as wood pellet distributors in Serbia.

Slovenia

Slovenia aims to generate approx. 25 % of its energy demand by renewable energies until 2020. Therefore producers of renewable energy are supported through different incentive systems like feed-in tariffs, tax reliefs or investment aids. Due to the high share of the forest area with 59 % of the total area in Slovenia, solid biomass, mainly in the form of firewood, has the largest share together with biogas of approx. 50 % of all renewable energy sources in Slovenia (Deutsch-Slowenische Industrie- und Handelskammer, 2016).

The Slovenian Forestry Institute quantifies the total pellet production in 2016 to 110,000 t. 19 pellet producers are listed by the Slovenian Forestry Institute, whereof one company is producing

more than 50,000 t annually and one in the range of 15,000 to 50,000 t per year. The other companies produce less than 15,000 t pellets per year. Pellets are mainly exported to Italy (90 %) and Austria (5 %). Romania, Bosnia and Herzegovina, Croatia and Austria are the main countries importing pellets to Slovenia (S4Q, 2017).

A list of important stakeholders of the Slovenian biomass and biogas market has been compiled e.g. by the German-Slovenian Chamber of Industry and Commerce (Deutsch-Slowenische Industrie- und Handelskammer, 2016).

Ukraine

Currently the Ukraine is highly dependent on natural gas imports and its energy intensity is higher compared to other economically developed countries. Nevertheless, Ukraine has high potentials for an increased utilisation of renewable energy sources in the future, particularly biomass. The most promising potentials for biomass are agricultural residues as well as waste wood and energy crops (BIO-PROM, 2011).

In 2015, the share of biofuels and waste of the total energy consumption of Ukraine accounted for 2.3 %, whereby the share of renewable energies in total was 3 % (State Statistics Service of Ukraine, 2015). 172 production plants were producing 585,900 t pellets in 2015 (Gauthier et al., 2016). More than 90 % of the produced pellets and briquettes are exported (Agentschap NL, 2012). Fordaq (2017) provides a list of wood pellet producers in Ukraine as well as companies from related business sectors.

Bioethanol was produced by six small production plants in 2011 with a capacity of 50,000 t per year and one plant accounted for 120,000-150,000 t. Biodiesel was produced by 84 production facilities (Agentschap NL, 2012).

5. Brief analysis of the ENERGY BARGE company landscape inventory

In order to sustainably exploit the Danube region's biomass and bioenergy potential, it is important to have knowledge about the microeconomic structure of these markets, its market actors, regional clustered occurrence of specific parts of the supply chain, etc.. Moreover, this knowledge is important when it comes to facilitating better connections between biomass market actors and potential new partners from the Danube logistics sectors. This deliverable aims at providing more detailed insights in the company landscape of the region. As has been stated before, the inventory collected here does not claim to be complete, but it clearly provides a good coverage of the overall structures of the biomass and bioenergy company landscapes in the seven partner countries. For a better overview, a brief quantitative analysis of the companies listed as well as the biomass and bioenergy product types they work with has been developed.

Table 9: Numbers of the company categories in all countries

Category	Countries							Total
	Austria	Bulgaria	Croatia	Germany	Hungary	Romania	Slovakia	
	Q	Q	Q	Q	Q	Q	Q	
Supplier	10	-	14	6	4	6	-	40
Processor	32	1	53	6	5	28	14	139
Trader	5	4	1	78	4	4	6	102
End User	47 ³	7	8	18	3	5	4	92
Supplier / Processor	-	-	5	1	1	-	-	7

³ In the case of Austria, the end user number also includes boiler manufacturers, which is not a typical end user group per se, but plays an exceptional role in the overall Austria bioenergy company landscape (e.g. strong export volumes), as well as due to their reputation for the bioenergy market in Europe as a whole.

Supplier / Trader	1	-	-	10	7	-	-	18
Supplier / Processor / Trader	1	7	-	8	1	-	-	17
Supplier / Processor / End User	-	-	-	1	-	-	-	1
Processor / Trader	41	61	-	17	2	-	6	127
Processor / Trader / End User	-	1	-	-	-	-	-	1
Processor / End User	-	-	3	-	1	-	-	4
Total	138	81	84	145	28	43	30	548

Data from 548 companies was collected from the project partners (Table 10). The number of companies collected vary between the different countries, which was to be expected firstly due to different market sizes, but also secondly due to varying depth of data research performed by the partners. The identified companies had to be classified in four main categories: supplier, processor, trader and end user. It was left to the partners to classify the company under more than one category, if necessary. Quite a big number of enterprises cannot be classified as just one particular category. For example, a lot of processors also trade their products. It is recognizable that most of the listed companies are processors, transferring biomass feedstock into semi-finished or finished bioenergy carriers, followed by traders.

With respect to end users, Austria takes a special role. In this number, the group of boiler manufacturers is included. This segment does not display a direct end user group, but rather functions as a technology provider for end users. As the boiler manufacturer segment is exceptionally strong in

Austria and represents market leaders in this segment also for the entirety of the European bioenergy market, they are represented in this table as well.

The least represented category is corporate suppliers. This rather small share of suppliers is mainly explained by the fact that farmers as classic “biomass suppliers” were excluded from the data collection methodology.

Table 10: Feedstock types of all countries (Multiple answers were possible)

Country	Amount of companies	Raw materials processed or traded								Products, semi-finished products and/or by-products						
		Wood-based raw materials	Straw-based raw materials	Starch-based raw materials	Energy crops	Oil-seeds	Sugar beet	other residues (wooden, agricultural)	Other (e.g. household waste)	Bioethanol	Vegetable oil	Biodiesel	Pellets, briquettes, Wood chips	other residues and materials (wooden, agricultural)	Other	Firewood
Austria	137	79	-	3	4	5	2	1	-	1	-	3	42	1	1	-
Bulgaria	81	51	7	2	-	29	-	3	-	1	19	3	53	37	18	12
Croatia	84	78	1	-	-	2	-	-	1	-	-	3	30	8	46	4
Germany	145	109	7	7	7	6	2	95	9	2	2	1	92	13	15	31
Hungary	23	8	2	3	4	1	-	5	2	3	3	1	11	3	3	2
Romania	43	17	5	3	2	3	-	-	1	1	2	3	13	-	-	-
Slovakia	30	18	5	1	-	2	-	7	-	1	1	1	12	7	2	10

The supplied and processed feedstock and the produced and traded products also were subject to listing in the company inventory template. Here as well, multiple answers were possible or even needed in the case where a company for example processes residue wood material into wood pellets. It is evident that wood or wood residues represent the biggest share in terms of raw materials / biomass feedstock in all ENERGY BARGE countries. Consequently, pellets, briquettes and wood chips prevail in terms of products or by-products. Since the focus for data collection clearly was on actors relevant in the bioenergy market, this detected emphasis comes at no surprise. Would the focus rather have been on potential industrial use for material-chemical processes, for example, the company mix would have been somewhat different. However, wood as a major source of non-food lingocellulosic material is also an important feedstock for this sector of the bioeconomy. With the aim of establishing a company register on the

ENERGY BARGE online platform, assisted by the data sources collected in this deliverable, it will be possible to further broaden the company inventory and in this way having a better basis for analysis.

6. User manual company inventory online map: methodology, logic & function of the dynamic map

In this final chapter, the translation of the 548 companies recorded in the excel inventory into a digital database and further into the ENERGY BARGE online platform (Output 3.1., Danube Biomass and Bioenergy Atlas), is briefly described. The main feature in which the data feeds in this platform is the dynamic, visually intuitive map of the Danube region where the company inventory can be displayed.

6.1 Relation of the deliverable with project outputs

This deliverable has the aim of covering the company landscape on biomass and bioenergy in the partner countries as comprehensively as possible. In order to make this inventory usable for a broad audience of market actors, a translation of this collected data into a visualization, namely a dynamic map, is needed. The final visualization will eventually be integrated into the project's Output "Danube Biomass and Bioenergy Atlas", which, in turn, will be part of the overall online platform, represented by a joint landing page that also contains the project's other Outputs (a first mock-up of this landing page is presented in Figure 4).

JOIN US TO BUILD A GREEN ENERGY AND LOGISTICS BELT

Main objective: Exploit the potential for green energy from biomass along the Danube river in a sustainable way

Implemented under the INTERREG Danube Transnational Programme, the project follows a unique cross-sectoral approach between the bioenergy industry and the navigation logistics sector along the Danube river. The team of ENERGY BARGE is comprised of partners from the biomass/bioenergy sector, the logistics sector, ports, as well as partners from the field of research. The common goal is to exploit the potential for green energy in the form of biomass along the Danube river in a sustainable way, thereby increasing energy security and efficiency in the Danube countries.

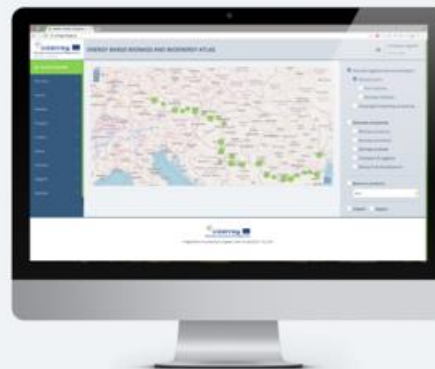
Focus on results

- Improve logistics
- Reduce emissions
- Low-carbon transport
- Improve the environmental performance along the bioenergy value chain
- Promoting ports as a location for processing, handling and storage of biomass
- Support port development
- Map value chains
- Facilitate market uptake
- Newsletter, articles, news and social media to disseminate results

Signup

A platform supporting key actors and stakeholders from the bioenergy industry. The Website promotes building new partnerships, improving cross-sectoral cooperation and provides information to support the development of associated value chains.

Register company now for free



Bioenergy markets
Explore the national and transnational biomass and bioenergy markets in the Danube region and check out what they can do to improve EU renewables goals and sustainability.



Green Danube logistics
Learn what Danube logistics can do to facilitate biomass transport and how Danube ports can become bioenergy hotspots.



Find your partner
Use ENERGY BARGE to find new partners along the bioenergy supply and value chain and discover new possibilities for logistics solutions.



Value chains
Get an overview over current biomass product and trade flows relevant for the bioenergy sector and explore potentials for improved and sustainable utilization of biomass for bioenergy purposes.

Figure 4: Landing page ENERGY BARGE Danube Platform

The report at hand serves as a first input to the development of this overall platform⁴. For the purposes of this deliverable, the collected company data was transferred into the database, allowing to visualize the company locations on a dynamic map. The final functions of the online platform will be developed in the further process of the project. Due to this situation, the online tools will be put online in the second project year, 2018.

In the following, a brief description of the objectives and methodology of the platform-element 'dynamic map' as well as the interactive function of the company register is provided. In order to enhance the visual character at this stage, exemplary screenshots of the platform drafts, the dynamic map and the company register are included.

6.2 Overview of the company landscape inventory map

The dynamic map developed by the project partner DIT is a web based application designed to illustrate the business landscape of the biomass and bioenergy sector along the Danube River. It incorporates statistical data about relevant value and supply chains and information about registered producing/supplying, processing, trading and logistics companies as well as energy producers and other end users. The idea behind this application is to enable relevant actors to cooperate on a transnational level and to optimise transport logistics and market acceptance.

The user interface (UI) of the interactive map is subdivided in four areas: header with project logo and top navigation, left-hand sidebar for selection of country and port, right-hand sidebar for filtering of data and in the centre the interactive map (Figure 5).

The top navigation in the header contains six navigation items which are assigned with the following functionalities:

- Interreg ENERGY BARGE logo: link to landing page
- "About": link to landing page (central point of the final overall project platform)
- "Atlas": link to dynamic map
- "Companies & Ports": link to list of company and port profiles
- „Registration“: link to company registration page
- „Programme“: link to Interreg DTP ENERGY BARGE project page

⁴ Moreover, the data collected for this deliverable functions as input for project work package 4 where actors from the biomass and bioenergy landscape relevant for logistics offers from the Danube inland waterway transport sector are identified.

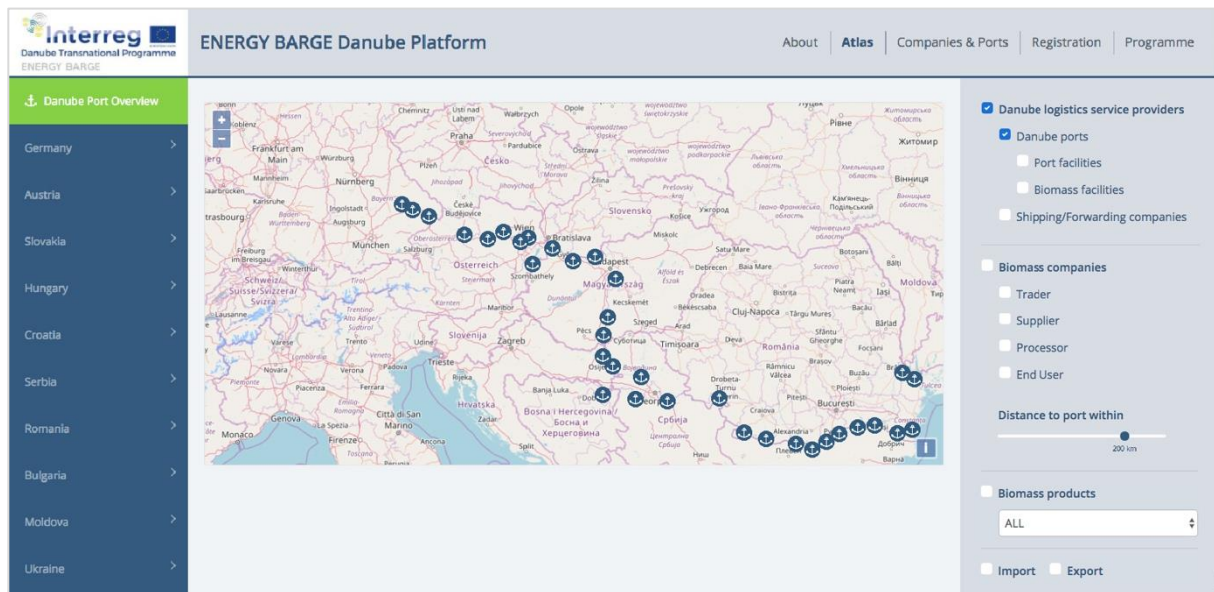


Figure 5: Mock-up of Web application user interface

6.3 Methodology

The dynamic map's web application is built with several web programming frameworks and libraries. The base of the architecture is the PHP framework Laravel which holds the application logic and manages the user interface. Application data, user generated data as well as data sets from external sources are stored in a PostgreSQL database. In combination with the PostGIS database extension PostgreSQL can be used as a spatial database which allows storing geographic objects. In the dynamic map of the biomass and bioenergy atlas the geographic objects can be visualized with the following geometry types:

POINT: used for positioning precise location markers at the addresses of companies and ports

LINESTRING: chain of coordinates for visualisation of biomass feedstock flows as lines

POLYGON: allows to mark port and company areas in the map

As visualised in the web application's architecture (Figure 6) the three external main data sources are the company landscape inventory presented in chapter 3, Danube ports profile datasets from via donau – Austrian Waterway Company as well as biomass feedstock import and export data of all Danube neighbouring countries from Eurostat (<http://ec.europa.eu/eurostat/>).

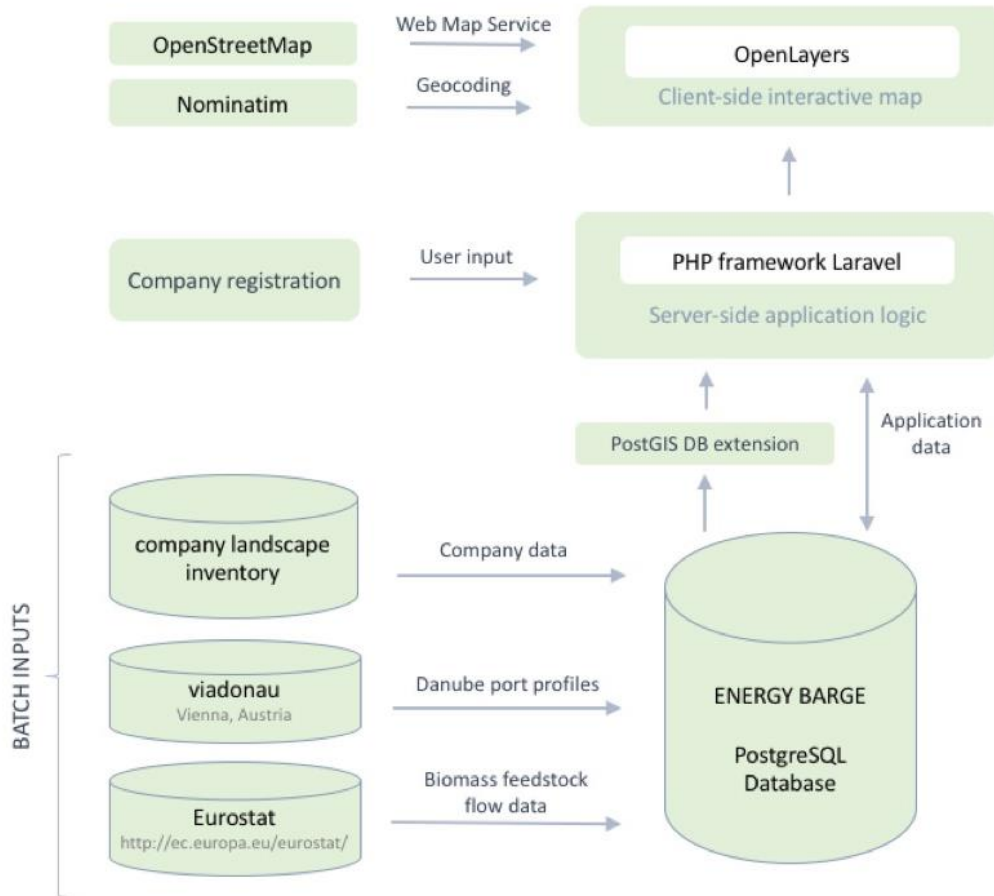


Figure 6: Architecture of web platform

For visualization of map tiles, vector data and location markers the open source JavaScript library OpenLayers builds the foundation for the full functionality of the interactive web map. The map data source is OpenStreetMap which can be used unrestricted for free. With the integration of Nominatim, search engine of OpenStreetMap data, it is possible to match user entered addresses of companies automatically with corresponding coordinates as far as the address is deposited at OpenStreetMap. If an address can not automatically be matched the user will be asked to manually put a location marker on the map where the company to register is located.

6.4 Dynamic online map visualizing biomass and bioenergy companies

As can be seen in Figure 7, the two available sidebars are the main way for the user to navigate through the information provided on the map. The sidebar on the left lists all Danube neighbouring countries represented in the ENERGY BARGE consortium. At the top of the list is the button "Danube Port Overview". This button will reset the UI to its default settings. Clicking on one of the

countries inside the list, a dropdown menu will open up, which lists all Danube ports in the respective country. Another click on one of the ports will bring this port into focus on the map and set the zoom to a predefined level. The right-hand sidebar incorporates all display options. The user can choose to display ports, registered companies and the transnational flow of biomass products. It is also possible to switch between import or export information.

In the centre of the website an interactive map is shown. This map is the key element of the application and visualizes information selected by the user. It is structured in three layers, each providing more detailed information:

1. Interactive icons displayed on the map
2. Popups providing key information
3. Complete company/port profile (“yellow page”)

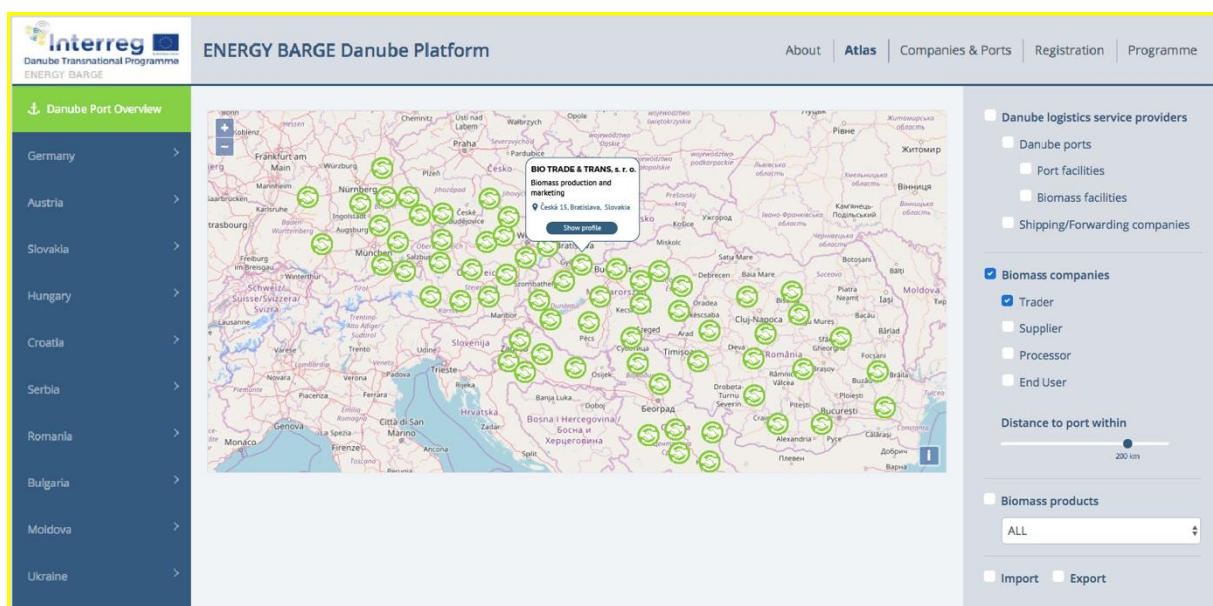


Figure 7: Mock-up of dynamic map showing all companies of category trader

Ports and registered companies are represented with an icon at their respective location on the map. Different icons help to distinguish between the different company categories (trader, supplier, processor, end user); it is however possible to categorize one company into several categories, e.g. in case a pellet producer also functions as trader. Furthermore, port and company icons have different colours, making it easy to identify ports at first glance. Clicking on one of the icons will open a popup box containing the full name of the company/port and the main field of activity. A second click will open a separate page with the company/port profile. This profile includes all information which were collected by the ENERGY BARGE project partners as well as information companies will provide during the registration process at the website in the future.

As mentioned above, the map application can also display statistical data dealing with biomass related product flows (Deliverable 3.1.2. of the project) between countries and thus provide an impression of the value chains interconnecting the Danube economic area. This data will be displayed as arrows on the map if the user selects the respective options from the right-hand sidebar. The size of the arrow will be used as a visual indicator for the trade volume. For more details the user can click on the arrow to get a pop-up with the exact amount of goods traded between two nations in 2016 (Figure 8). A second click on the button “show more” will open a page with more detailed information. Here the user can easily identify the most important trade partners of a specific country and follow the development of the trade volume over time.

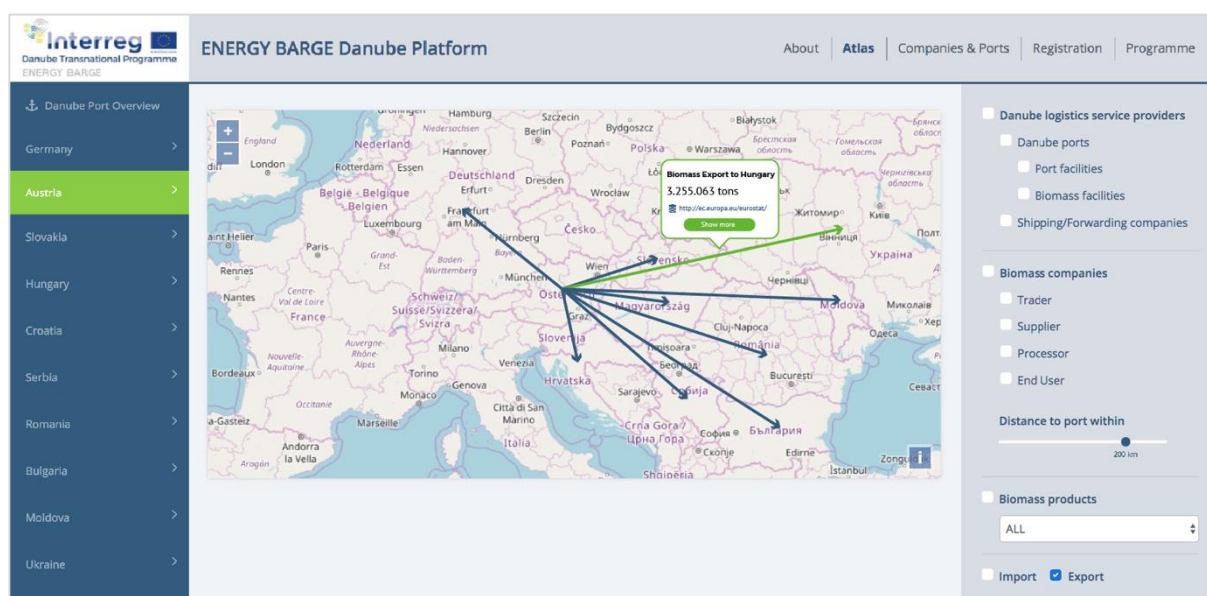


Figure 8: Trade flows displayed on the dynamic map

The project consortium has compiled an initial list of all actors in the fields of biomass, bioenergy and logistics known to the project partners. This list is the starting point for the underlying database of the company landscape represented on the dynamic map. In total the current database covers seven countries:

- Germany
- Austria
- Slovakia
- Hungary
- Croatia

- Romania
- Bulgaria

In these countries, 548 enterprises from the bioenergy sector were compiled the project partners, operating as supplier, trader, processor or end user. Before the website is launched, the companies will be contacted to obtain their permission to be listed at the online platform. This will help the website to get known by the relevant stakeholders as well as for the companies to edit the data in case they are interested.

The overall objective of the ENERGY BARGE project is to support utilizing the full potential of sustainable bioenergy production in the Danube region. The online tool will provide useful information for companies from related sectors. The dynamic map will help analysts and decision makers to quickly gain a detailed overview over the company landscape along the Danube River. It will provide contact information for each registered company and thus facilitate contacting potential new partners. Included information about ports and their respective equipment and infrastructure, aims to support the optimization of transport routes and minimization of costs and carbon emissions.

6.5 Open-access function “company register”

To introduce the user to the ENERGY BARGE project, the landing page as depicted in Figure 4 was created. This page provides a short overview of the main objectives and gives a short introduction to the dynamic map and the integrated ICT functionality. It also invites the user to register the enterprise, promising improved online presence through visualization on the map and an entry in the ENERGY BARGE ICT’s database. At the bottom of the page two buttons, enabling the user to continue with the registration process or to access the dynamic map directly, are located.

If the user chooses to register an enterprise that is not represented in the map yet and clicks on the respective button, the registration page will open (Figure 10). Here the application asks for the following company data (detailed information on collecting data in chapter 3.2 Template and company landscape assessment):


- Full company name
- Company address (country, city, postal code, street)
- Line of business (supplier, processor, trader, end user, etc.)
- Contact data (Email address, phone number, company website)
- Company logo
- Brief description
- Raw materials and products processed or traded

In the registration form the user have to select a predefined company category which is matched with an icon (see Figure 9), that will finally represent the company on the dynamic map. Beside the company categories also predefined biomass/bioenergy raw-materials and bio-products can be chosen for presenting a detailed scope of activity of the companies.



Figure 9: Icons for the predefined company/stakeholder categories

Before the registration process is completed, the user has the chance to check the entries on an overview page, summarizing all entries. Once the registration is completed the user will automatically be forwarded to the dynamic map.



ENERGY BARGE Danube Platform

[About](#)
[Atlas](#)
[Companies & Ports](#)
[Registration](#)
[Programme](#)

COMPANY REGISTRATION

Register now your company for free and join us to build up a biomass/bioenergy and logistics network along the danube. In a few weeks the biomass and bioenergy atlas will be published with comprehensive features for building new partnerships, improving cross-sectoral cooperation as well as a new way of visualisation of the biomass/bioenergy value chain.

*** = required fields**

Company name*

Please provide us with the full name of your company including legal status information

Country*

CIP-Code*

Please insert the cip-code of your city

City*

Please insert the city of your business

Street*

Please provide the name of your street as well as number

Phone number

Email

Website

Short description of your company and business

Logo

Keine ausgewählt

Company category*

☐ Port

☐ Trader

☐ Supplier

☐ Processor

☐ End User

☐ Shipping & Forwarding

☐ Research & Development

Bioproducts

Wood-based raw materials

Starch-based raw materials

DURUM WHEAT

WHEAT AND MESLIN

RYE

BARLEY (EXCL. SEED)

OATS

MAIZE (EXCL. SEED FOR SOWING)

GRAIN SORGHUM (EXCL. HYBRID FOR SOWING)

RAPE OR COLZA SEEDS (EXCL. FOR SOWING)

TRITICALE

Sugarbeets

FRESH SUGAR BEET

SUGAR BEET, DRIED, WHETHER OR NOT GROUND

Oil seeds

SOYA BEANS (EXCL. FOR SOWING)

SUNFLOWER SEEDS (EXCL. FOR SOWING)

Special energy crops

Please select the bioproducts your business produces. For multiple select please press the command key.

Figure 10: Company registration page

It is currently under discussion that before the official launch, new registrations get checked by a project partner. This is to prevent wrong information and to ensure a certain level of information and data quality.

7. Conclusion

The inventory presented in chapter 4 provides a sound basis to grasp the size, concentration, types and location of the Danube region's biomass and bioenergy industry and company landscape.

548 companies were identified and listed by the partners according to the data template, prerequisites for selection and categorization into market actor types (supplier, processor, trader, end user), biomass feedstock types (wood-based, starch-based, straw-based, sugar beets, oil seeds, other residue material from agri- and forestry sources) and bioenergy products (bioethanol, bio-diesel, vegetable oils, residue materials, fire wood, pellets, briquettes and wood chips). The list of companies covers a wide range of enterprises, including suppliers, processors, traders as well as end users with similar occurrence of prevalence of companies working along the wood-based bioenergy value chain in all countries. All partners have recorded this still existing prevalence also in their company landscape assessments, while in almost all countries, an increasing uptake of demand for all kinds of bio-based feedstock material for industrial utilization in the chemical sectors of a bio-based economy can be noted.

Based on the collected company data, a digital database has been set up. This database serves as source for the dynamic, visual map of the Danube region which is part of the ENERGY BARGE Danube biomass and bioenergy atlas. It displays the different market participant types and allows search and orientation also based on the biomass and bioenergy product types that are handled by the respective company.

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