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Residential solid biofuels stakeholders list and description

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CONTENTS

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1. Introduction

In task 2.1 the consortium has made a report about the state of the art of the biofuels market for each of the countries that basically comprise: identification of the importance of the residential heating biofuels market in the context of the national energy demand and the bioenergy market, the biomass resources available for relevant biofuels production in each country, the residential heating biofuels production and biofuels use and market prices, the main biofuels chains description, the related legislation and market support measures and relevant information of the most representative national market stakeholders. The public acceptance of the studied biofuels will also be addressed.

The work proposed to do within deliverable 2.2 is a list of stakeholders of the biomass sector: agroindustries (oil and nut companies), biomass and biofuel producers and suppliers, boiler and stove manufacturers, installers and ESCos. One of the most important data to collect from these stakeholders is the production (if the industrial production is not available, estimations will be made according to accepted industrial conversion rates). These data, the different stakeholders, its production, its location, etc. will be later on integrated in the BIORAISE GIS platform.

Due to space limitations in this deliverable is not present the list with all stackeholders but this database will be available on the BIORAISE GIS platform.

2. Methodology

The objective of this chapter of the document is to present a methodological guide to update and extend the BIOMASUD stakeholders database currently available in the GIS tool BIORAISE. The database, created in the former BIOMASUD project, contains the majority of the companies dealing with solid biofuels products and services in de SUDOE region.

The integration of the information will be carried out following the methodology of BIORAISE, applying the market and environmental restrictions established in BIORAISE in order to estimate the available biomass from the potential resources and costs, as well as calculating the transport costs. All the participants will collaborate with CIEMAT in supplying, as mentioned, the national relevant data as well as giving suggestions of restriction factors to the use of biomass potentials in their respective countries that will be discussed with CIEMAT. TFS will perform software adaptations in order to introduce the new country datasets in the BIORAISE platform

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The database is classified in two main groups. The first group is formed by the agro industrial raw biomass producers:

Code 1: raw biomass producers

11	Wood industry
12	Olive oil industry
13	Nut hulling industries: (almonds, pine nuts, hazelnut, walnut and pistachio)
15	Wine sector: distilleries (not included)

Codes 2 to 7: other stakeholders

The methodology applied for the quantitative estimation of available by-products in the first group, and other approaches used are detailed below.

Code 11: WOOD AND FURNITURE SECTOR

General Methodology

Obtaining basic information

For the wood industries, a statistical data base obtained from the Spanish Statistical Institute (INE) containing addresses and the number of employees has been used. (The number of jobs is used as an estimator of biomass produced by the enterprise). In addition, associations, platforms and agencies were consulted in order to get additional information.

Obtaining specific information

In the case of wood industry, once the basic statistical information of each residue producer (or potential producer) is gathered, they are classified by by-product type and quantity. The following groups have been differentiated:

- Sawmills
- Packaging without sawmill

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- Barrels
- House building and laminates
- Panel boards
- Carpentry (doors, window frames, etc)
- Furniture

The best indicator to know the production of residues of sawmills would be to know the total amount of wood consumed per year. However, these data are not available in any data base. To solve this inconvenient, a sample of companies were interviewed in order to obtain a relationship between the quantity of by-product obtained with the number of employees of each enterprise, a variable that was included in the data base provided by INE. For that propose, telephonic interviews, questionnaires sent by email and previous works were utilized.

SAWMILLS

By-products quantity

Sawmills constitute the industry of the wood's first transformation sector that produce the highest amount of clean like splinters, sawdust, shavings, firewood and bark that don't contain any component different to wood.

For sawmills 71 interviews were performed obtaining an average production (sawdust, chips, shavings, bark, coastal, firewood, etc.) of 157.7 t DM/job yr. The data obtained was consulted compared with other studies and expert opinions. Finally it was decided to allocate 140 t DM/job yr of wood by-products and 17.7 t DM/job yr of bark

The wood products were resumed in two types: 64.7% of chips, 35.3 % of mixtures of sawdust and shavings.

Price

For the wood chips, the current estimated price is 27 €/t with a 40% of humidity.

The investigated sawdust prices vary from 10 €/t in origin if it's destined to livestock beds; 10 to 27 €/t in origin if it's destined to panel board industry; 20 to 40 €/t in origin if it's destined to paper or

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pellets. In any case, those are prices with the corresponding percentage of humidity for each product and always prices in origin.

For the shavings, a mean Price of 21 €/t with a 40% of humidity is considered.

The bark presents a price in origin of 24 €/t with a 40% of humidity.

In any case, the variability of the by-product prices is very high.

Destination

The main destinations are panel board, paper and pellet industries

Transportation distances

The transportation distances of these are highly variable, from 0 km in the case that the residues are auto-consumed to more than 1000 km in the case that it is exported abroad. However, excluding those extreme cases, we observed a mean transportation distance of 150 km.

PACKAGING WITHOUT SAWMILL

Quantity of by-product

A total production of 15 tons of dry matter per year and employee of chips, sawdust, and shavings was estimated.

Price

The Price was 10 € in origin with a 15% of humidity.

Destination

It is usually collected from the industry by an authorized residues manager or sold to a wood by-product enterprise.

Transportation distance

Variable, from 50 to 150 km

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BARRELS

Quantity of by-product

10 tons of dry matter per year and employee.

Price

The Price was 10 € in origin with a 15% of humidity.

Destination

It is usually collected from the industry by an authorized residues manager or sold to a wood by-product enterprise.

Transportation distance

Variable, from 50 to 150 km.

HOUSE BUILDING AND LAMINATES

Quantity of by-product

50 tons of dry matter per year and employee.

Price

The Price was 15 € in origin with a 12% of humidity.

Destination

It is usually collected from the industry by an authorized residues manager or sold to a wood panel enterprise or to an energy plant.

Transportation distance

Variable, from 50 to 150 km.

PANEL BOARDS

Quantity of by-products

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126.6 tons of dry matter per year and employee.

In the disaggregated analysis of each type of by-product, a mean proportion of 56% of chips, 30% of shavings-sawdust and 14% of bark were estimated.

Price

The Prices used were:

- chips: 20 €/t with a 25% of humidity.
- Shavings and sawdust: 15 €/t with a 20% of humidity.
- Bark: 18 €/t with a 10% of humidity.

Destination

The mean destinations are panel and paper industries.

Transportation distance

Variable, from 50 to 150 km.

CARPENTRY (DOORS, WINDOW FRAMES, ETC)

The wood's second transformation sector presents a high variability of enterprises such as carpentries, structure builders, parquets or frames.

Quantity of by-products

Mostly, the by-products are sawdust, shavings and small wood pieces.

Taking into account the sample of 43 studied enterprises of this sector, the mean production of residues was 5.8 tons of dry matter per year and employee. However, this value is closer to 1.2 tons of dry matter per year and employee for the industries that are closer to furniture and to 7.1 tons of dry matter per year and employee for the industries that are closer to carpentry.

Unlike the wood's first transformation sector, the by-product data that were facilitated by the enterprises were barely disaggregated by by-product type. For that reason, it wasn't possible to

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analyse the production percentage of sawdust, shavings and small wood pieces.

In any case, taking other previous studies as a reference, we considered 4.6 tons of dry matter per year and employee from which a 30% is estimated to be free of chemicals such as glues, paints, varnishes etc. and 70% mixed with them.

Prices

The low by-product production and the presence of non-wood material (glues and additives) impede the immediate utilisation of these by-products. For that reason, the enterprises of this sector are obliged to pay for the removal of the residues or to give them for free to an authorized manager of not-dangerous residues.

In the cases when the enterprise pays for the removal of the residues, the costs of these services are 150€/month for small carpentries, while in other cases they only have to pay the rent of a container, from 70 to 80 €/month.

In the case of carpentries with more than 50 employees or structure or house building enterprises where the production of sawdust reaches the 400 Tones, it's been observed that it is sold with prices that vary between 8 and 20 €/Tons to panel, pellets or cement industries.

With these data, the following prices have been considered:

- Enterprises with more than 10 employees: 15 €/t in origin for the clean fraction with a 12% of humidity and 0 €/t for the rest.
- Enterprises with less than 10 employees: 0 €/Tn.

Destination

The main destinations for this kind of by-product are panel industries, auto-consumption as bio-energy for the same industry, pellet industries and horse beds

Transportation distance

The Transportation distance decreases in comparison with the first transformation, around 50 km.

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FURNITURE

Only enterprises with more than 50 employees have been included on the data base.

Quantity of by-products

We estimated a production of 0.97 Tons of dry matter per year and employee. This by-product is likely to contain chemicals such as paints and glues.

Price

The Price was 0 €/Ton in origin.

Destination

It is usually collected from the industry by an authorized residues manager.

Transportation distance

Variable, from 50 to 250 km.

Codes 12 and 13: AGROINDUSTRY

General Methodology

In order to obtain information of enterprises or organisations that produce agro-industrial residues that can be used as fuel for thermal uses, the following sources were consulted:

- Previous studies
- Internet search
- Information facilitated by associations, platforms and agencies.

Code 12: OLIVE SECTOR

OIL MILLS

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Estimation of olives milled by oil mill

A data base of oil mills ordered by production was provided by the Spanish Ministry of Agriculture through the Agency for the Information and Food Control (AICA). The previous BIOMASUD study was used to assign and update production data.

In the previous study, it was concluded that the small oil mills don't remove the stones from the olive pomace. The raw olive processing limit used to differentiate the oil mills that removed the stones form those that don't remove them was fixed in 2000 tons of milled olives.

In some cases this limit is too high. Some oil mills in Badajoz, Córdoba or Granada removed the stones and process relative small quantities: 1500, 1600 and 1700 tons of milled olives, respectively. However, in other cases like in Madrid, Alicante or Castellón, some oil mills that milled 5500, 4200 and 5700 Tons of olives respectively, didn't remove the stones.

Quantity of by-products

A production of 5.8% stones per ton of processed olives was estimated. A 24.5% of self-consumption of olive stones was assumed. The separated stones use to have a mean moisture content 25% w.b.

Price

The mean selling price obtained after the consultations was 50 €/t in origin with a 25% humidity.

Destination

Usually for thermal uses in the cattle or domestic sector and electric plants.

Transport distance

Variable, from 50 to 250 km

OLIVE POMACE OIL EXTRACTION PLANTS

Estimation of the quantity of olive mill pomace processed per extraction plant

As for oil mills a data base of extraction plants ordered by production was provided by the Spanish Ministry of Agriculture through the Agency for the Information and Food Control (AICA). The previous

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BIOMASUD study was used to assign and update production data.

The production of each plant was estimated assuming that the olive mill pomace constitutes the 81% of the weight of the milled olive.

Quantity of by-products

4% of olive stone and 10% olive exhausted cake per ton of olive mill fresh pomace. 40% of self-consumption of olive stone and a 19.5% of olive cake, both with a 10% of humidity are assumed.

Price

The Price is 50 €/Ton in origin with a 10% of humidity for the olive pit and 15 €/Ton with the same humidity for the olive cake.

Destination

The usual destinations are electric plants and exportation.

Transport destination

Variable, from 50 to 150 km.

Code 13: NUT HULLING INDUSTRIES

ALMOND SECTOR

Hulling plants

The production of almond shells for thermic use is exclusively produced in cracking-shelling plants

Estimation of the quantity of almond shells

In order to calculate the quantity of almond shells produced by the shelling plants, a relation between the number of employees and the almond processed was investigated and the following factor was obtained:

Almond processed (t)= Number of employees * 403.68

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The mean ratio of the shell/almond weight is 0,75.

Then the production of almond shells (tons of dry matter) = Almonds processed (tons) *0,75

The moisture content of the shells after processing is 20%.

Price

The Price is 60-70 €/ton in origin with a 20% of humidity.

Destination

The usual destinations are general public or biofuel distributors.

Transport destination

Variable, up to 300 km.

PINE NUT SECTOR

Pine nut industry

Pine nut industry presents two types of activities. On the one hand, the dryers separate the pine cones from the pine seeds. On the other hand the hulling industries separate the shell from the pine seed. Hulling plants usually have their own dryer.

In the case of dryers, the only by-product is the pine cones, while husking industries also produce pine nut shells.

Estimation of the quantity of by-products

The weight of pine cones is estimated to be 80% of the total cone weight, and the weight of the nut shells is estimated to be an 80% of the pine nuts.

Price

The price of the chopped pine cones is 100 €/ton in origin with a 25% of humidity, while the price of the pine nut shells is 110 €/ton in origin with a 20% of humidity.

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Destination

The usual destinations are general public or biofuel distributors.

Transport destination

Variable, up to 150 km.

DATABASE CONSTRUCTION AND GEO-REFERENCING OF STAKEHOLDERS

Methodology

The attached Excel data base contains the following information of each enterprise:

For all stakeholders codes 1 to 7:

- Company name
- Coordinate X (from google maps in decimal degrees)
- Coordinate y (from google maps in decimal degrees)
- Country
- Region
- Province
- Municipality
- Address
- Postal code
- Telephone (only company or professional numbers)
- Fax
- Email (only professional addresses)
- URL
- Contact person

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- NACE (Statistical classification of economic activities in the European Community, abbreviated as NACE, is the classification of economic activities in the European Union (EU)
- Factory type
- Stakeholder code
- Stakeholder sub-code

For stakeholders code 1 (primary by-product producers)

- Chain of Custody Certification (indicate PEFC, FSC ,other)
- Nº jobs
- Products (type 1, 2 and 3): Description, quantity, annual consumption, units.
- Residues (type 1, 2 and 3): Quantity, units, season, destination, transportation distance, transport type, selling price, selling place.
- Total residues produced

Geo-referencing

The geo-referencing was performed with a tool of the software Google Maps called "Google Maps GPS Coordinates" that converts an address to latitude and longitude coordinates (X and Y).

3. Confidentiality

Within this deliverable won't be published a detailed list for confidentiality reasons as is forbidden to give individual data from companies for the data protection law but It will be available under the BIORAISE GIS platform on aggregate basis (for example we could obtain the production of wood pellet or other biofuel in a determined area. Individual data of companies will be given in the application but only the general information that is allowed (name of the company, location, …)

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4. Overall overview of the data collected

Country	(Stakeholder code) group of companies	(Stakeholder sub-code) Sector of the company	Number of companies
Spain	1. raw biomass producers	11. Wood industry	14.711
		12. Olive oil industry	765
		13. Nut hulling industries: (almonds, pine nuts, hazelnut, walnut and pistachio)	172
		15. Wine sector: distilleries (not included)	19
		subtotal	**15.667**
	2. Industrial equipment and machines	21. Equipment manufacturer	59
		22. Equipment distributor	27
		23. Instrumentation and control	8
		subtotal	**94**
	3. Installation and services	31. Sector Association	
		32. Energy Agency	11
		33. Normalization, certification Agency	1
		34. Distributor of boilers and stoves	79
		35. Energy Services Company	60
		36. Engineering and Consulting	79
		37. Promotor of bioenergy installations	13
		38. Nursery plant producer	3
		subtotal	**246**
	4. Biofuel manufacturing and biomass valorisation	41. Biomass valorisator	116
		42. Wood recycler	51
		43. Pellet producer	111

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		44. Briquette producer	22
		subtotal	**300**
	5. Biofuel distribution	51. Sector Association	1
		52. Biofuel distributor	53
		subtotal	**54**
	6. Research centres	61. Sector Association	28
		62. Research centre, laboratory	22
		63. Specialized Editor	4
		subtotal	**54**
	7. Big biofuel consumers	71. District Heating Installation	6
		72. Bioelectricity Installation	36
		subtotal	**42**
		total	**16.457**

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Country	(Stakeholder code) group of companies	(Stakeholder sub-code) Sector of the company	Number of companies
Portugal	1. raw biomass producers	11. Wood industry	13
		12. Olive oil industry	10
		13. Nut hulling industries: (almonds, pine nuts, hazelnut, walnut and pistachio)	22
		15. Wine sector: distilleries (not included)	
		subtotal	**45**
	2. Industrial equipment and machines	21. Equipment manufacturer	22
		22. Equipment distributor	4
		23. Instrumentation and control	
		subtotal	**26**
	3. Installation and services	31. Sector Association	9
		32. Energy Agency	21
		33. Normalization, certification Agency	1
		34. Distributor of boilers and stoves	27
		35. Energy Services Company	1
		36. Engineering and Consulting	12
		37. Promotor of bioenergy installations	
		38. Nursery plant producer	
		subtotal	**71**
	4. Biofuel manufacturing and biomass valorisation	41. Biomass valorisator	
		42. Wood recycler	
		43. Pellet producer	24
		44. Briquette producer	4
		subtotal	**28**

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	5. Biofuel distribution	51. Sector Association	
		52. Biofuel distributor	13
		subtotal	**13**
	6. Research centres	61. Sector Association	
		62. Research centre, laboratory	13
		63. Specialized Editor	
		subtotal	**13**
	7. Big biofuel consumers	71. District Heating Installation	
		72. Bioelectricity Installation	20
		subtotal	**20**
		total	**217**

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Country	(Stakeholder code) group of companies	(Stakeholder sub-code) Sector of the company	Number of companies
Greece	1. raw biomass producers	11. Wood industry	30
		12. Olive oil industry	84
		13. Nut hulling industries: (almonds, pine nuts, hazelnut, walnut and pistachio)	9
		15. Wine sector: distilleries (not included)	
		subtotal	**123**
	2. Industrial equipment and machines	21. Equipment manufacturer	7
		22. Equipment distributor	
		23. Instrumentation and control	
		subtotal	**7**
	3. Installation and services	31. Sector Association	4
		32. Energy Agency	
		33. Normalization, certification Agency	
		34. Distributor of boilers and stoves	
		35. Energy Services Company	
		36. Engineering and Consulting	
		37. Promotor of bioenergy installations	
		38. Nursery plant producer	
		subtotal	**4**
	4. Biofuel manufacturing and biomass valorisation	41. Biomass valorisator	2
		42. Wood recycler	
		43. Pellet producer	9
		44. Briquette producer	
		subtotal	**11**

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	5. Biofuel distribution	51. Sector Association	2
		52. Biofuel distributor	
		subtotal	**2**
	6. Research centres	61. Sector Association	
		62. Research centre, laboratory	1
		63. Specialized Editor	
		subtotal	**1**
	7. Big biofuel consumers	71. District Heating Installation	
		72. Bioelectricity Installation	
		subtotal	
		total	**148**

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Country	(Stakeholder code) group of companies	(Stakeholder sub-code) Sector of the company	Number of companies
Slovenia	1. raw biomass producers	11. Wood industry	44
		12. Olive oil industry	
		13. Nut hulling industries: (almonds, pine nuts, hazelnut, walnut and pistachio)	
		15. Wine sector: distilleries (not included)	
		subtotal	**44**
	2. Industrial equipment and machines	21. Equipment manufacturer	5
		22. Equipment distributor	11
		23. Instrumentation and control	
		subtotal	**16**
	3. Installation and services	31. Sector Association	1
		32. Energy Agency	8
		33. Normalization, certification Agency	3
		34. Distributor of boilers and stoves	60
		35. Energy Services Company	4
		36. Engineering and Consulting	1
		37. Promotor of bioenergy installations	1
		38. Nursery plant producer	
		subtotal	**78**
	4. Biofuel manufacturing and biomass valorisation	41. Biomass valorisator	
		42. Wood recycler	
		43. Pellet producer	9
		44. Briquette producer	2
		subtotal	**11**

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	5. Biofuel distribution	51. Sector Association	10
		52. Biofuel distributor	13
		subtotal	**23**
	6. Research centres	61. Sector Association	
		62. Research centre, laboratory	9
		63. Specialized Editor	
		subtotal	**9**
	7. Big biofuel consumers	71. District Heating Installation	33
		72. Bioelectricity Installation	29
		subtotal	**62**
		total	**243**

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Country	(Stakeholder code) group of companies	(Stakeholder sub-code) Sector of the company	Number of companies
Croacia	1. raw biomass producers	11. Wood industry	24
		12. Olive oil industry	1
		13. Nut hulling industries: (almonds, pine nuts, hazelnut, walnut and pistachio)	10
		15. Wine sector: distilleries (not included)	5
		subtotal	**40**
	2. Industrial equipment and machines	21. Equipment manufacturer	2
		22. Equipment distributor	
		23. Instrumentation and control	
		subtotal	**2**
	3. Installation and services	31. Sector Association	
		32. Energy Agency	5
		33. Normalization, certification Agency	
		34. Distributor of boilers and stoves	3
		35. Energy Services Company	1
		36. Engineering and Consulting	1
		37. Promotor of bioenergy installations	
		38. Nursery plant producer	
		subtotal	**10**
	4. Biofuel manufacturing and biomass valorisation	41. Biomass valorisator	
		42. Wood recycler	
		43. Pellet producer	8
		44. Briquette producer	1
		subtotal	**9**

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	5. Biofuel distribution	51. Sector Association	
		52. Biofuel distributor	
		subtotal	
	6. Research centres	61. Sector Association	
		62. Research centre, laboratory	2
		63. Specialized Editor	
		subtotal	**2**
	7. Big biofuel consumers	71. District Heating Installation	1
		72. Bioelectricity Installation	
		subtotal	**1**
		total	**65**

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Country	(Stakeholder code) group of companies	(Stakeholder sub-code) Sector of the company	Number of companies
Italia	1. raw biomass producers	11. Wood industry	10
		12. Olive oil industry	25
		13. Nut hulling industries: (almonds, pine nuts, hazelnut, walnut and pistachio)	9
		15. Wine sector: distilleries (not included)	12
		subtotal	**56**
	2. Industrial equipment and machines	21. Equipment manufacturer	33
		22. Equipment distributor	2
		23. Instrumentation and control	2
		subtotal	**37**
	3. Installation and services	31. Sector Association	
		32. Energy Agency	2
		33. Normalization, certification Agency	1
		34. Distributor of boilers and stoves	4
		35. Energy Services Company	17
		36. Engineering and Consulting	99
		37. Promotor of bioenergy installations	
		38. Nursery plant producer	20
		subtotal	**143**
	4. Biofuel manufacturing and biomass valorisation	41. Biomass valorisator	
		42. Wood recycler	12
		43. Pellet producer	3
		44. Briquette producer	
		subtotal	**15**

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	5. Biofuel distribution	51. Sector Association	1
		52. Biofuel distributor	3
		subtotal	**4**
	6. Research centres	61. Sector Association	7
		62. Research centre, laboratory	2
		63. Specialized Editor	1
		subtotal	**10**
	7. Big biofuel consumers	71. District Heating Installation	
		72. Bioelectricity Installation	
		subtotal	
		total	**265**