Selection of biofuels and biomasses

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1. INTRODUCTION

In order to collect relevant data of the commercial biofuels utilized in the domestic sector of the Mediterranean countries involved in Biomasud, and with the final objective to select those of higher interest for characterization in Task 3.2. and further standardization in Task 3.3, it was made a questionnaire to the partners of the project, about the relevant national biofuels. In this questionnaire, in addition to relevant marketed biofuels, information was also requested about biomasses with a high potential that could be available for the domestic and residential sector and that are not used in a significant proportion at the moment. Table I shows the responsible partners for collecting the national information.

Table I shows the partners that are responsible for collecting the corresponding national biofuels and biomass information.

Table I: Responsible partner of the biofuels and biomass information

Country	Responsible partner
Croatia	ZEZ
Greece	CERTH
Italy	AIEL
Portugal	CBE
Slovenia	GIS
Spain	CIEMAT / AVEBIOM
Turkey	TUBITAK

The complete individual national questionnaires are included in attachment .

2. COMMERCIALIZED BIOFUELS IN BIOMASUD PLUS COUNTRIES

The annual quantities of solid biofuels marketed in each country, and their main destination (domestic-residential or industry and farms), according to national reports, are summarized in Table II.

Table II: Annual quantities of solid biofuels marketed in Biomasud Plus project countries, and their main destination

BIOMASSES (DOMESTIC AND INDUSTRIAL USE)	CROATIA			GREECE			ITALY			PORTUGAL			SLOVENIA			SPAIN			TURKEY		
	DOMESTIC USE (t DM/y)	INDUSTRIAL USE (t DM/y)	TOTAL (t DM/y)	DOMESTIC USE (t DM/y)	INDUSTRIAL USE (t DM/y)	TOTAL (t DM/y)	DOMESTIC USE (t DM/y)	INDUSTRIAL USE (t DM/y)	TOTAL (t DM/y)	DOMESTIC USE (t DM/y)	INDUSTRIAL USE (t DM/y)	TOTAL (t DM/y)	DOMESTIC USE (t DM/y)	INDUSTRIAL USE (t DM/y)	TOTAL (t DM/y)	DOMESTIC USE (t DM/y)	INDUSTRIAL USE (t DM/y)	TOTAL (t DM/y)	DOMESTIC USE (t DM/y)	INDUSTRIAL USE (t DM/y)	TOTAL (t DM/y)
FIREWOOD	n.a.	n.a.	3.817.584	667.037		667.037	10.620.000		10.620.000	1.056.240	563.760	1.620.000	1.127.130		1.127.130	1.500.000		1.500.000	5.934.208		5.934.208
WOOD CHIPS	n.a.	n.a.	354.356	n.a.	n.a.	n.a.	90.000	2.910.000	3.000.000	n.a.	n.a.	732.000	40.000	296.410	336.410	240.000	3.000.000	3.240.000	1.012.000		1.012.000
OTHER CHIPS	n.a.	n.a.		n.a.	n.a.	n.a.		90.000	90.000	n.a.	n.a.	309.396			n.a.				n.a.	n.a.	
OTHER CHIPS (OLIVE PRUNNING)	n.a.	n.a.														323.021	51.553	374.574			
WOOD PELLETS	n.a.	n.a.	192.275			26.775	2.430.000	270.000	2.700.000	594.000	440.000	1.034.000	140.000	0	140.000	406.542	37.383	443.925			
OTHER PELLETS (VINEYARD PELLETS)	n.a.	n.a.		n.a	n.a	n.a									n.a.		4.673	4.673	n.a.	n.a.	
OLIVE STONES	n.a.	n.a.	22.500	-	-	172.036	42.500	42.500	85.000	n.a.	n.a.	59.746	280		280	130.000	300.000	430.000			
EXHAUSTED OLIVE CAKE	n.a.	n.a.					70.967	70.967	141.933	n.a.	n.a.	94.597	1.100		1.100		800.000	800.000	715.000		715.000
ALMOND SHELLS	n.a.	n.a.				12.400				n.a.	n.a.	6.378				10.000	140.000	150.000	40.000		40.000
CHOPPED PINE CONE	n.a.	n.a.		n.a.	n.a.					n.a.	n.a.	54.847					38.250	38.250	n.a.	n.a.	
PINE NUT SHELLS	n.a.	n.a.		n.a.	n.a.					n.a.	16.317	16.317			n.a.		6.588	6.588	n.a.	n.a.	
HAZELNUT SHELL	n.a.	n.a.		n.a.	n.a.		43.709	43.709	87.418	n.a.	n.a.	86							270.000		270.000
PISTACHIO SHELL	n.a.	n.a.				3.553													57.000		57.000
OTHER (WALNUT)	n.a.	n.a.								n.a.	n.a.	998							100.000		100.000
SUN FLOWER	n.a.	n.a.																	1.104.000		1.104.000
WOOD BRIQUETTES ESTIMATION	n.a.	n.a.	43.266													46.729		46.729			
RICE HUSK	n.a.	n.a.				41.526															
PEACH KERNELS	n.a.	n.a.				16.983															
COTTON GINNING RESIDUES	n.a.	n.a.				69.209															
TOTAL	**n.a.**	**n.a.**	**n.a.**	**667.037**	**n.a.**	**1.009.519**	**13.297.176**	**3.427.176**	**16.724.351**	**1.650.240**	**1.020.077**	**3.928.365**	**1.308.510**	**296.410**	**1.604.920**	**2.656.292**	**4.378.447**	**7.034.739**	**9.232.208**	**n.a.**	**9.232.208**

n.a.: Not available

3. BIOMASSES WITH POTENTIAL INTEREST IN BIOMASUD PLUS COUNTRIES

Agricultural prunings from tree crops and more specifically olive trees, and vineyard prunings have been reported as biomasses with high potential for solid biofuels production in the domestic and residential sectors in most of countries, particularly Italy, Spain and Turkey.. Vineyard pruning pellets are already being marketed in Spain.

Table III presents the potentialities of these materials in the participating countries. The figures are based on data from Eurostat 2014.

Table III. Pruning biomasses with potential interest in Biomasud Plus countries

COUNTRY	VINEYARD PRUNINGS (t DM/y)	OLIVE TREE PRUNINGS (t DM/y)
Croatia	41.262	4.420
Greece	520.156	1.178.489
Italy	2.079.240	981.835
Portugal	245.664	227.685
Slovenia	28.284	405
Spain	1.866.498	2.288.895
Turkey	1.252.500	884.000
TOTAL	**6.033.604**	**5.565.729**

Some biomasses (e.g. olive stones), are already being widely commercialized as domestic fuels in some countries whilst are reported as high potential raw materials in other.

4. BIOFUELS AND BIOMASS SELECTION

Considering a widespread use in the participant countries, the quantities of solid biofuels marketed in each country (Table II), and the reported raw materials with potential for residential solid biofuels production (Table III), table IV shows the biofuels and biomasses selected for further work in Tasks 3.2 and 3.3, as well as the countries where samples of each selected biomass will be collected. In a few cases, biomass samples from a determinate country (e.g

pistachio shells from Spain and Greece) will be picked-up in order to have a variability in the origin of the samples for the pre-normative work.

Table IV. Selected biofuel/ biomasses and countries for samples collection

BIOMASSES	CROATIA	GREECE	ITALY	PORTUGAL	SLOVENIA	SPAIN	TURKEY
OLIVE STONES	X	X	X	(*)	X	(*)	
ALMOND SHELLS		X	X	X		(*)	
HAZELNUT SHELLS	X		X			X	X
PISTACCHIO SHELLS		X				X	X
WALNUT SHELLS				X		X	X
PINE NUT SHELLS				X		X	
OLIVE TREE PRUNINGS	X	X	X	X	X	X	X
VINEYARD PRUNINGS	X	X	X	X	X	X	X
VINEYARD PELLETS						X	

(*) Spain and Portugal have enough number of characterized samples of these biomasses in the previous Biomasud project, so it will not be necessary to provide new samples for this project.

After the selection indicated in Table IV the next work will be the collection of samples of the selected biofuels/biomasses in the different countries

According to work programme conditions, at least ten samples of each material will be collected per country by the corresponding national partners (AVEBIOM and CIEMAT will do this task jointly in Spain).

CIEMAT, BIOS, CERTH and CBE, will jointly define a protocol for collecting samples and the conditions of delivery to their laboratories for analysis.

ATTACHMENTS: Task 3.1 Questionnaires

The questionnaires sent by the project partners are attached below, on the following order: Croatia, Greece, Italy, Portugal, Slovenia, Spain and Turkey.

Biomasud Plus Questionnaire for Task 3.1.

CROATIA

Domestic Biofuels Use and Biomass Potential

Please use all the space you need for the answers

Purpose. The purpose of this questionnaire is to collect relevant data of the commercial biofuels utilized in the domestic sector of the Mediterranean countries involved in Biomasud, with the final objective to select those of higher interest for characterization in Task 3.2 and further standardization in Task 3.3 . Additional information is also requested of biomasses presently not used in the market but that may have a significant potential as raw materials for solid biofuels production.

Involved partners. As discussed during the kick-off meeting at Soria, the following partners are responsible for collecting the corresponding national biofuels and biomass information:

Country	**Responsible partner**
Croatia	ZEZ
Italy	AIEL
Greece	CERTH
Portugal	CBE
Slovenia	GIS
Spain	CIEMAT / AVEBIOM
Turkey	TUBITAK

Solid biofuels use

Instructions: In the next table indicate the annual quantities of solid biofuels marketed in your country and their main destination: domestic-residential or industry and farms. Please, reference the source of data and indicate any relevant comment . In the case that a biofuel is totally or partially marketed under quality standard, please, indicate the corresponding standard in "Comments", as well as the estimated percentage the biofuel is utilised under the standard.

BIOFUEL	DOMESTIC USE (tDM /y)	INDUSTRIAL USE (tDM /y)	TOTAL (tDM/y)	Source	Comments
Firewood	Not available	No available	5 302 200 m3	Croatian Bureau of Statistics, EIHP (Annual Report 2014)	Even around 78% of the forests in Croatia are in the ownership of Hrvatske Sume (Croatian Forests),the public enterprise for forest and woodland management.. These forests are certified in accordance with the requirements of the Forest Stewardship Council (FSC certified).
Wood chips	Not available	No available	354 356 t	Croatian Bureau of Statistics, EIHP (Annual Report 2014)	
Other chips (ex. from prunings) Specify	Not available	Not available	Not available	Not available	
Wood pellets	Not avaliable	Not available	192 275 t	Croatian Bureau of Statistics, EIHP (Annual Report 2014)	In 2014 pellets were produced in 14 facilities.Total installed capacity for the pellet production is 350 400 t/yr, out of which 55% is utilised during 2014. Around 72% of the total pellets production was exported while

					little was placed on the domestic market.
Other pellets (ex. from prunings). Specify	Not available	Not available	Not available	Not available	
Olive stones	Not available	Not available	20.000-25.000 t*	ZUMAH	*Estimation for 2015. The problem with olive stones in Croatia is big amount spread on about 150 oil refineries on our coast, one third of them being on islands. Olive stones are mostly treated as waste or compost. But in very small amount used as biofuel. The production of olive oli has decreased from 50 000 hl (2013.) to 10 640 hl (2014.), also the total production of olives has decreased from 34 269 t (2013.) to 10 640 t (2014) (Source: DZS)
Exhausted olive cake	Not available	Not available	Not available	Not available	
Nut shells	Not available	Not available	Not available	Not available	Annual production of nut for 2014 was 2487t which is more than for 2013 when it was 902t. Data on nut shell usage for Croatian market isn't available.
Almond Shell	Not	Not	Not	Not	

	available	available	available	available	
Chopped pine cone	Not available	Not available	Not available	Not available	
Pine nut shells	Not available	Not available	Not available	Not available	
Hazelnut shell	Not available	Not available	Not available	Not available	There are a few hazelnut manufacturer in Croatia, the biggest one is PP Orahovica, that produces 500-600t and amount of shell is estimated to be 200-300 t.
Pistachio shell	Not available	Not available	Not available	Not available	
Other(specify)					
Other(specify) Wood briquettes Estimation	Not available	Not available	43 266	Croatian Bureau of Statistics, EIHP (Annual Report 2014)	Wooden briquettes capacity is estimated to 64 890 t/yr while its actual production is usually done periodically depending on the feedstock availability – waste from wood processing industry. Around 62% of the total briquettes production was exported during 2014.
TOTAL					

DM.-. dry matter basis

In Croatia, the market for certain kinds of biofuels like nut shells and olive stones is not yet fully developed, because the whole system is resting on a lot cheaper fossil fuels. Also, for any stronger engagement of other agricultural residues, the input from government is needed. Energy production systems are expensive and require more investment, therefore, agricultural waste is easier to throw away or use as a compost. Because the market for olive stones and different types of shells is not developed in Croatia, there isn't any data available. There is a potential for olive stone to become a biofuel, but it is still treated as a waste because there is not a solution for management and usage of olive stones.

Biomasses of potential interest

Instructions: In the table below indicate those biomasses which are not or are scarcely used for domestic solid biofuels production and that could have a large potential in the future in that sector. In the column "Comments" indicate the present applications, if any. Please, reference the source of data

BIOMASS	POTENTIAL t DM/y	UTILIZED T DM/y	REFERENCE	COMMENTS
Specify				
Short Rotation Woody Crops	3,26 million t	No available	Kajba et al (2011)	In Croatia until 2015, this potential remained completely unused, and further development of Short Rotation Woody Crops remains tied to research activities connected to clone productivity and breeding measures. (Source: SRCplus Handbook on Sustainable Short Rotation Coppice). The SRCplus is supported by the Intelligent Energy for Europe Programme of the European Commission.

Biomasud Plus Questionnaire for Task 3.1.

GREECE

Domestic Biofuels Use and Biomass Potential

Please use all the space you need for the answers

Purpose. The purpose of this questionnaire is to collect relevant data of the commercial biofuels utilized in the domestic sector of the Mediterranean countries involved in Biomasud, with the final objective to select those of higher interest for characterization in Task 3.2 and further standardization in Task 3.3 . Additional information is also requested of biomasses presently not used in the market but that may have a significant potential as raw materials for solid biofuels production.

Involved partners. As discussed during the kick-off meeting at Soria, the following partners are responsible for collecting the corresponding national biofuels and biomass information:

Country	Responsible partner
Croatia	ZEZ
Italy	AIEL
Greece	CERTH
Portugal	CBE
Slovenia	GIS
Spain	CIEMAT / AVEBIOM
Turkey	TUBITAK

Solid biofuels use

Instructions: In the next table indicate the annual quantities of solid biofuels marketed in your country and their main destination: domestic-residential or industry and farms. Please, reference the source of data and indicate any relevant comment . In the case that a biofuel is totally or partially marketed under quality standard, please, indicate the corresponding

standard in “Comments”, as well as the estimated percentage the biofuel is utilised under the standard.

BIOFUEL	DOMESTIC USE (tDM /y)	INDUSTRIAL USE (tDM /y)	TOTAL (tDM /y)	Source	Comments
Firewood	667,037		667,037	Ministry of Environment and Energy (2013)	Almost all firewood is used for domestic heating.
Wood chips	N/A	N/A	N/A		
Other chips (ex. from prunings) Specify	N/A	N/A	N/A		
Wood pellets			26,775	HELLABIOM (2013)	The annual production capacity is listed as 137,840 t/y. Mostly targeting the domestic heating market.
Other pellets (ex. from prunings). Specify	N/A	N/A	N/A		
Olive stones			172,036	Hellenic Statistical Authority (2012) & calculation	Olive stones are used both in industrial applications and domestic heating. Excluding self-consumption during production.
Exhausted olive cake					Grouped in category above
Nut shells					
Almond Shell			< 12,400	Hellenic Statistical	Actual quantity may be lower, depending on the quantity of almonds sold

				Authority (2012) & calculation	in the market with their shells.
Chopped pine cone	N/A	N/A	N/A		
Pine nut shells	N/A	N/A	N/A		
Hazelnut shell	N/A	N/A	N/A		
Pistachio shell			< 3,553	Hellenic Statistical Authority (2012) & calculation	Actually available quantity much lower, since most of the pistachios are sold with the shells.
Peach kernels			16,983	Hellenic Statistical Authority (2012) & calculation	Used for heating in domestic applications, greenhouses, etc.
Other(specify)					
TOTAL					

DM.-. dry matter basis

Biomasses of potential interest

Instructions: In the table below indicate those biomasses which are not or are scarcely used for domestic solid biofuels production and that could have a large potential in the future in that sector. In the column "Comments" indicate the present applications, if any. Please, reference the source of data

BIOMASS	POTENTIAL t DM/y	UTILIZED T DM/y	REFERENCE	COMMENTS
Specify				
Olive tree prunings	2,093,200	**N/A**	Hellenic Statistical Authority (2012) & calculation	
Vineyard prunings	591,126	**N/A**	Hellenic Statistical Authority (2012) & calculation	
Apricot tree prunings	16,695	**N/A**	Hellenic Statistical Authority (2012) & calculation	
Peach tree prunings	173,439	**N/A**	Hellenic Statistical Authority (2012) & calculation	
Cherry tree prunings	23,555	**N/A**	Hellenic Statistical Authority (2012) & calculation	
Almond tree prunings	89,964	**N/A**	Hellenic Statistical Authority (2012) & calculation	

Biomasud Plus Questionnaire for Task 3.1.

ITALY

Domestic Biofuels Use and Biomass Potential

Please use all the space you need for the answers

Purpose. The purpose of this questionnaire is to collect relevant data of the commercial biofuels utilized in the domestic sector of the Mediterranean countries involved in Biomasud, with the final objective to select those of higher interest for characterization in Task 3.2 and further standardization in Task 3.3 . Additional information is also requested of biomasses presently not used in the market but that may have a significant potential as raw materials for solid biofuels production.

Involved partners. As discussed during the kick-off meeting at Soria, the following partners are responsible for collecting the corresponding national biofuels and biomass information:

Country	**Responsible partner**
Croatia	ZEZ
Italy	AIEL
Greece	CERTH
Portugal	CBE
Slovenia	GIS
Spain	CIEMAT / AVEBIOM
Turkey	TUBITAK

Solid biofuels use

Instructions: In the next table indicate the annual quantities of solid biofuels marketed in your country and their main destination: domestic-residential or industry and farms. Please, reference the source of data and indicate any relevant comment . In the case that a biofuel is totally or partially marketed under quality standard, please, indicate the corresponding

standard in “Comments”, as well as the estimated percentage the biofuel is utilised under the standard.

BIOFUEL	DOMESTIC USE (tDM /y)	INDUSTRIAL USE (tDM /y)	TOTAL (tDM /y)	Source	Comments
Firewood	10.620.000	0	10.620.000	ISTAT e AIEL	0,01% ISO 17225-5
Wood chips	90.000	2.910.000	3.000.000	INEA - AIEL	10% ISO 17225-4
Other chips (ex. from prunings)	0	90.000	90.000	AIEL (estimated approximate)	0% ISO 17225-4
Wood pellets	2.430.000	270.000	2.700.000	AIEL - ISTAT	65% ISO 17225-2 (Enplus)
Other pellets (ex. from prunings). Specify					
Olive stones	42.500	42.500	85.000	AIPO	
Exhausted olive cake	70.967	70.967	141.933	AIEL (estimated approximate)	
Nut shells					
Almond Shell					
Chopped pine cone					
Pine nut shells					
Hazelnut shell	43.709	43.709	87.418	AIEL (estimated approximate)	
Pistachio shell					
Other(specify)					
Other(specify)					
TOTAL	**13.297.176**	**3.427.176**	**16.724.351**		

DM.-. dry matter basis

Biomasses of potential interest

Instructions: In the table below indicate those biomasses which are not or are scarcely used for domestic solid biofuels production and that could have a large potential in the future in that sector. In the column "Comments" indicate the present applications, if any. Please, reference the source of data

BIOMASS	POTENTIAL t DM/y	UTILIZED T DM/y	REFERENCE	COMMENTS
Chips. from prunings	4.900.000	90.000	ENEA	
Hazelnut shell	116.557	87.418	ENEA + Università Napoli	
Exhausted olive cake	690.000	141.933	ENEA + AIEL	
Olive stones		85.000	AIPO	
TOTAL	**5.016.557**	**177.418**		

Biomasud Plus Questionnaire for Task 3.1.

PORTUGAL

Domestic Biofuels Use and Biomass Potential

Please use all the space you need for the answers

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Greece	CERTH
Portugal	CBE
Slovenia	GIS
Spain	CIEMAT / AVEBIOM
Turkey	TUBITAK

Solid biofuels use

Instructions: In the next table indicate the annual quantities of solid biofuels marketed in your country and their main destination: domestic-residential or industry and farms. Please, reference the source of data and indicate any relevant comment. In the case that a biofuel is totally or partially marketed under quality standard, please, indicate the corresponding standard in "Comments", as well as the estimated percentage the biofuel is utilised under the standard.

BIOFUEL	DOMESTIC USE (tDM /y)	INDUSTRIAL USE (tDM /y)	TOTAL (tDM /y)	Source	Comments
Firewood	1.056.240	563.760	1.620.000	INE, 2015. Instituto Nacional de Estatística, Estatísticas Agrícolas 2014	This data refer the year 2013
Wood chips	n.a.	n.a.	732.000	INE, 2015. Instituto Nacional de Estatística, Estatísticas Agrícolas 2014	This data refer the year 2013 Total production High quantity utilised in industry like feedstock
Other chips (ex. from prunings) Specify	n.a.	n.a.	Olive trees - 96.403 Vineyards - 212.993	INE, 2015. Instituto Nacional de Estatística, Estatísticas Agrícolas 2014	This data refer the year 2014 Total production
Wood pellets	594.000	440.000	1.034.000	ANPEB, 2016. Associação Nacional de Pellets Energéticos de Biomassa	This data refer the year 2014
Other pellets (ex. from prunings). Specify	-	-	-	-	-
Olive stones	n.a.	n.a.	59.746	GPP, 2016. Gabinete de Planeamento, Políticas e Administração Geral. SIAZ - Sistema de Informação sobre o Azeite e a Azeitona de Mesa	campaign 2015-2016 Total production
Exhausted olive cake	n.a.	n.a.	94.597	GPP, 2016. Gabinete de Planeamento, Políticas e Administração Geral. SIAZ - Sistema de Informação sobre o Azeite e a Azeitona de Mesa	campaign 2015-2016 Total production
Nut shells					
Almond Shell	n.a.	n.a.	6.378	INE, 2015. Instituto Nacional de Estatística, Estatísticas Agrícolas 2014	This data refer the year 2014
Chopped pine cone	n.a.	n.a.	54.847	UNAC, 2010. União das Organizações de Agricultores para o Desenvolvimento da Charneca	This data refer the year 2010 Total production
Pine nut shells	n.a.	16.317	16.317	UNAC, 2010. União das Organizações de Agricultores para o Desenvolvimento da Charneca	This data refer the year 2011
Hazelnut shell	n.a.	n.a.	86	INE, 2015. Instituto Nacional de Estatística, Estatísticas Agrícolas 2014	This data refer the year 2014 - Total production
Pistachio shell	-	-	-	-	-
Other (Walnut)	n.a.	n.a.	998	INE, 2015. Instituto Nacional de Estatística, Estatísticas Agrícolas 2014	This data refer the year 2014 - Total production
Other(specify)					
TOTAL	**1.650.240**	**1.026.455**	**3.618.969**		

DM.-. dry matter basis

n.a. – not available

Biomasses of potential interest

Instructions: In the table below indicate those biomasses which are not or are scarcely used for domestic solid biofuels production and that could have a large potential in the future in that sector. In the column “Comments” indicate the present applications, if any. Please, reference the source of data

BIOMASS	POTENTIAL t DM/y	UTILIZED T DM/y	REFERENCE	COMMENTS
Specify				

SLOVENIA

Domestic Biofuels Use and Biomass Potential

Please use all the space you need for the answers

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Turkey	TUBITAK

Solid biofuels use

Instructions: In the next table indicate the annual quantities of solid biofuels marketed in your country and their main destination: domestic-residential or industry and farms. Please, reference the source of data and indicate any relevant comment . In the case that a biofuel is totally or partially marketed under quality standard, please, indicate the corresponding standard in “Comments”, as well as the estimated percentage the biofuel is utilised under the standard.

BIOFUEL	DOMESTIC USE (tDM /y)	INDUSTRIAL USE (tDM /y)	TOTAL (tDM /y)	Source	Comments
Firewood	1.127.130		1.127.130	Forests	Logs are used in households and not in industry.
Wood chips	40.000	296.410	336.410	Forests and wood processing industry	We have better data about wood chips production (in 2015 Slovenian producers of wood chips produced 215.000 tDM of wood chips)
Other chips (ex. from prunings)				No. Data available	
Specify					
Wood pellets	140.000	0	140.000		Production of pellets in Slovenia is estimated to be around 110.000 t/year. Pellets are exported to Italy and Austria but they are imported from Romania, Bosna and Hercegovina, Serbia and other Balkan countries.
Other pellets (ex. from prunings). Specify				No. Data available	
Olive stones	280		280		
Exhausted olive cake	1.100		1.100		The end users of olive residues are now mainly olive millers which use olive residues for composting. Two of them use olive residues for their private

					energy purposes (heating). Both of them have around 60 tons of residues per year. If they would use all of residues, it would be enough energy for heating at least 5 more households. In Slovenia pit separators, which separate olive pits from olive pomace are not used. There are also no drying facilities and refineries to dry wet pomace in order to make them more appropriate for burning (reference: project: m.o.r.e.)
Nut shells				No. Data available	
Almond Shell					
Chopped pine cone					
Pine nut shells					
Hazelnut shell					
Pistachio shell					

DM.-. dry matter basis

Biomasses of potential interest

Instructions: In the table below indicate those biomasses which are not or are scarcely used for domestic solid biofuels production and that could have a large potential in the future in that sector. In the column "Comments" indicate the present applications, if any. Please, reference the source of data

BIOMASS	POTENTIAL t DM/y	UTILIZED T DM/y	REFERENCE	COMMENTS
Specify				
woody biomass from vineyards and orchards				
Use of olive cake and stones				

Comment:

The potential of woody biomass from vineyards and orchards should be explored in detail. According to the Vineyard census in 2009 performed by the Statistical Office of the Republic of Slovenia the total area of Vineyards in Slovenia varies around 16354,3 ha. According to the orchard census in 2012 the gross and net area of orchards amounts 3933,2 ha and 3498,1 ha respectively. The area of olive plantation increased in 2014 (996 ha) in comparison to 2013 (925), however the production of olives decreased in 2014 (0,8 t/ha) when comparing with 2013 (1,6 t/ha). The potential of the above-mentioned biomass sources should be assessed further – only estimations from 2007 exist.

References:

1. Statistical Office of the Republic of Slovenia. 2016. Forestry and Hunting (http://www.stat.si - SI-STAT Data Portal).
2. Statistical Office of the Republic of Slovenia. 2016. Agriculture and Fishing (http://www.stat.si - SI-STAT Data Portal).
3. Ščap Š., Triplat M., Piškur M., Krajnc N. 2014. Metodologija za ocene potencialov lesa v Sloveniji / The methodology for wood potential assessment in Slovenia. Acta Silvae et Ligni, 105, 27 – 40.
4. Krajnc N. and Čebul T. 2012. Katalog proizvajalcev polen in sekancev. (Catalogue of wood fuel producers). Gozdarski inštitut Slovenije, Silva Slovenica, Ljubljana.
5. Wood chips producers in Slovenia – data gathered with questioner in 2015. Slovenian forestry institute.
6. Wood pellet production in Slovenia - data gathered with questioner in 2015. Slovenian forestry institute.

Biomasud Plus Questionnaire for Task 3.1.

SPAIN

Domestic Biofuels Use and Biomass Potential

Please use all the space you need for the answers

Purpose. The purpose of this questionnaire is to collect relevant data of the commercial biofuels utilized in the domestic sector of the Mediterranean countries involved in Biomasud, with the final objective to select those of higher interest for characterization in Task 3.2 and further standardization in Task 3.3 . Additional information is also requested of biomasses presently not used in the market but that may have a significant potential as raw materials for solid biofuels production.

Involved partners. As discussed during the kick-off meeting at Soria, the following partners are responsible for collecting the corresponding national biofuels and biomass information:

Country	Responsible partner
Croatia	ZEZ
Italy	AIEL
Greece	CERTH
Portugal	CBE
Slovenia	GIS
Spain	CIEMAT / AVEBIOM
Turkey	TUBITAK

Solid biofuels use

Instructions: In the next table indicate the annual quantities of solid biofuels marketed in your country and their main destination: domestic-residential or industry and farms. Please, reference the source of data and indicate any relevant comment . In the case that a biofuel is totally or partially marketed under quality standard, please, indicate the corresponding standard in “Comments”, as well as the estimated percentage the biofuel is utilised under the standard.

BIOFUEL	DOMESTIC USE (tDM /y)	INDUSTRIAL USE (tDM /y)	TOTAL (tDM /y)	Source	Comments
Firewood	1.500.000		1.500.000	Statistical Yearbook, 2014 MAGRAMA	
Wood chips	240.000	3.000.000	3.240.000	AVEBIOM (Biomasud Project, 2014)	
Other chips (olive prunings)	323.021	51.553	374.574	La biomasa en Andalucía, 2015. Own Data	
Wood pellets	406.542	37.383	443.925	AVEBIOM	
Other pellets (vineyard pellets)		4.673	4.673	Own Data	
Olive stones	130.000	300.000	430.000	La biomasa en Andalucía, 2015. Own Data	
Exhausted olive cake		800.000	800.000	La biomasa en Andalucía, 2015. Own Data	
Nut shells				AVEBIOM	
Almond Shell	10.000	140.000	150.000		
Chopped pine cone			38.250		
Pine nut shells			6.588		
Hazelnut shell					
Pistachio shell					
Other(specify)					
Other(specify) Wood briquettes					
TOTAL	2.656.292	4.378.447	7.034.739		

DM.-. dry matter basis

Biomasses of potential interest

Instructions: In the table below indicate those biomasses which are not or are scarcely used for domestic solid biofuels production and that could have a large potential in the future in that sector. In the column "Comments" indicate the present applications, if any. Please, reference the source of data

BIOMASS	POTENTIAL t DM/y	UTILIZED T DM/y	REFERENCE	COMMENTS
Chips from prunings	4.155.393		Based on Eurostat Data 2014	
Hazelnut shell				
Exhausted olive cake				
Olive stones				
TOTAL				

References:

1. Statistical Yearbook, 2014 MAGRAMA http://www.magrama.gob.es/en/estadistica/temas/publicaciones/anuario-de-estadistica/
2. La biomasa en Andalucía https://www.agenciaandaluzadelaenergia.es/documentacion/informes-y-estudios/la-biomasa-en-andalucia
3. Based on Eurostat Data 2014 http://ec.europa.eu/eurostat/data/database?p_p_id=NavTreeportletprod_WAR_NavTreeportletprod_INSTANCE_nPqeVbPXRmWQ&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1

Biomasud Plus Questionnaire for Task 3.1.

TURKEY

Domestic Biofuels Use and Biomass Potential

Please use all the space you need for the answers

Purpose. The purpose of this questionnaire is to collect relevant data of the commercial biofuels utilized in the domestic sector of the Mediterranean countries involved in Biomasud, with the final objective to select those of higher interest for characterization in Task 3.2 and further standardization in Task 3.3 . Additional information is also requested of biomasses presently not used in the market but that may have a significant potential as raw materials for solid biofuels production.

Involved partners. As discussed during the kick-off meeting at Soria, the following partners are responsible for collecting the corresponding national biofuels and biomass information:

Country	Responsible partner
Croatia	ZEZ
Italy	AIEL
Greece	CERTH
Portugal	CBE
Slovenia	GIS
Spain	CIEMAT / AVEBIOM
Turkey	TUBITAK

Solid biofuels use

Instructions: In the next table indicate the annual quantities of solid biofuels marketed in your country and their main destination: domestic-residential or industry and farms. Please, reference the source of data and indicate any relevant comment. In the case that a biofuel is totally or partially marketed under quality standard, please, indicate the corresponding

standard in “Comments”, as well as the estimated percentage the biofuel is utilised under the standard.

BIOFUEL	DOMESTIC USE (tDM /y)	INDUSTRIAL USE (tDM /y)	TOTAL (tDM /y)	Source	Comments
Firewood	5,934,208		5,934,208	**http://www.ogm.gov.tr/lang/en/SitePages/OGM/OGMDefault.aspx**	*Average of three years (2012, 2013, 2014), *Wood density=0,8 t/m^3
Wood chips	1,012,000		1,012,000	Opportunities For Canadian Wood Producers To Expand Their Market Share in Turkey-2014, http://www.aqua-calc.com/page/density-table/substance/wood-blank-chips-coma-and-blank-dry	*2012, *%50 humidity, *chips density=0,38 t/m^3
Other chips (ex. from prunings) Specify	NA	NA	NA		
Wood pellets	430,000		430,000	http://www.buyuktorbali.com/dogalgazin-pabucunu-dama-atan-yakit-pelet	*2013
Other pellets (ex. from prunings). Specify	NA	NA	-		
Olive stones / **Exhausted olive cake**	715,000		715,000	http://www.zmo.org.tr/genel/bizden_detay.php?kod=23172&tipi=17&sube=0	*Average of three years (2011-2012-2013), *1,300,0 00 ton olive for olive oil production *55% of olive is taken as biofuel
Nut shells					
Almond Shell	40,000		40,000	http://www.tzob.org.tr/Bas%C4%B1n-Odas%C4%B1/Haberler/ArtMID/470/ArticleID/765/En-iyi-badem-bizde-ama-en-231ok-ihra231-eden-ABD	* 80,261 ton production in 2012, *approx.. 50% of almond production amount was taken as almond shell based biofuel amount
Chopped pine cone	NA	NA	NA		
Pine nut shells	NA	NA	NA		
Hazelnut shell	270,000		270,000	http://www.zmo.org.tr/genel/bizden_detay.php?kod=24516&tipi=17&sube=0	*Average of three years (2013-2014-2015) *50% of 540,000 ton hazelnut production was taken as biofuel
Pistachio shell	57,000		57,000	http://www.tzob.org.tr/Bas%C4%B1n-Odas%C4%B1/Haberler/ArticleID/738/ArtMID/470	*Average of three years (2011-2012-2013) *50% of 114,000 ton pistachio production was taken as biofuel
Walnut shell	100,000		100,000	http://www.tzob.org.tr/Bas%C4%B1n-Odas%C4%B1/Haberler/ArtMID/470/ArticleID/726/Cevizde-252retim-t252ketim-art%C4%B1%C5%9F%C4%B1na-yet%C5%9Femiyor	*200,000 ton walnut was produced in 2013, *50% of 2013 production was taken as biofuel
Sun Flower	1,104,000		1,104,000	Turkey Sunflower report -2014	*Average of three years (2013-2014-2015), *150% of 736,000 ton sunflower oil produced was taken as biofuel

TOTAL	**9,655,535**		

DM.-. dry matter basis

Biomasses of potential interest

Instructions: In the table below indicate those biomasses which are not or are scarcely used for domestic solid biofuels production and that could have a large potential in the future in that sector. In the column "Comments" indicate the present applications, if any. Please, reference the source of data

BIOMASS	POTENTIAL t DM/y	UTILIZED T DM/y	REFERENCE	COMMENTS
Apricot stone	58,200		http://www.zmo.org.tr/genel/bizden_detay.php?kod=24994&tipi=17&sube=0	*Average of three years (2012, 2013, 2014) *60% of 97,000 ton dry apricot production amount was taken as biofuel
Animal waste	25,740,000		http://www.tarim.gov.tr/HAYGEM	*Average of three years (2013-2014-2015) 51,480,000 t *50% of Total cattle, sheep and poultry waste was taken as biofuel potential. *Some of this potential is used as fertilizer and biogas raw material, But there is no data for this amount.