Triggering the creation of biomass logistic centres by the agro-industry

SUCELLOG: IEE/13/638/SI2.675535

D3.2 Summary of the regional situation, biomass resources and priority areas of action for SUCELLOG

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About SUCELLOG project

The SUCELLOG project - Triggering the creation of biomass logistic centres by the agro-industry - aims to widespread the participation of the agrarian sector in the sustainable supply of solid biofuels in Europe. SUCELLOG action focuses in an almost unexploited logistic concept: the implementation of agro-industry logistic centres in the agro-industry as a complement to their usual activity evidencing the large synergy existing between the agro-economy and the bio-economy. Further information about the project and the Partners involved are available under www.sucellog.eu.

Project Coordinator

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About this document

This report corresponds to D3.2 of the SUCELLOG project – Summary of the regional situation, biomass resources and priority areas of action for SUCELLOG. It has been prepared by:

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1. Introduction

SUCELLOG focuses on the implementation of biomass logistic centres into agro-industries as complement to their usual activity. Agro-industry facilities can be utilised in their idle periods to handle and pre-treat biomass feedstock (mainly from their own residues or agricultural residues nearby) to produce solid biomass with minor investment.

Within WP3-"Regional framework and stakeholders' engagement", SUCELLOG has carried out the following four actions in the project target regions of Spain, France, Italy and Austria:

- Assess available biomass resources.
- Evaluate with the stakeholders both the technical and the non-technical barriers of the implementation of SUCELLOG concept in the agro-industries.
- Determine the potential areas for the development of agro-industry logistic centres.
- Engage agro-industries to the project.

For the first action, an evaluation of the real potential of primary agrarian biomass has been carried out inside Task 3.1. The methodology selected corresponds to a "Resource focussed approach", as described by BEE standardised classification (project Biomass Energy for Europe), which starts with statistical data from agrarian inventories. This data has been complemented with the real availability indices (the share of biomass that is not currently being used for other aims including soil sustainability issues, see Annex I) gathered in the regional workshops with the agrarian sector during Task 3.3. As a first result, primary biomass resources have been firstly catalogued according to existing competitive uses and relevance in terms of current unused quantities. This assessment has been performed by country level since no regional differences have been observed. Secondly, a map of the distribution of real available primary resources and a table of the available tons per year in dry base were built per target region. Even though the use of agro-industry residues is a target of SUCELLOG, the data of the inventories was not sufficient to produce a reliable inventory of the biomass residues produced in the agro-industries processes. Therefore the maps and tables presented do not include this type of resources, which will be deeply assessed for particular cases of logistic centres monitored or audited during WP4-WP6.

As a second action, an assessment of the barriers and opportunities for the development of logistic centres was carried out through personal interviews with each target sector in Task 3.2. Existing agro-industries from the potential sectors (those owning compatible equipment for the conditioning and storage of raw material) were asked about: equipment, idle periods, residues produced in their facilities and upstream in the crop cultivation, the economic situation of the sector and possible upcoming changes due to the Common Agricultural Policy, practical and legal

incompatibilities in using their facilities for the production of solid biomass, social barriers for the development of this new activity and, finally, opportunities detected. After this analysis, target sectors were identified per region and specific agro-industry locations were included inside the biomass resource map.

To determine the potential areas inside each target region for the development of agro-industry logistic centres, it has been taken into account the diversity and quantity of available agrarian resources (both woody and herbaceous) and of agro-industries present in the region as well as the compatibility among them. Compatibility has been defined according to their seasonality (matching the months of biomass production with the idle period of the agro-industry) and their technical compatibility of use. Logistic issues such as good communication networks and proximity to consumption areas have also been taken into consideration. Potential areas have been identified per region. However, it is important to highlight that the selection of a potential area does not mean that an agro-industry non belonging to it could not start a new activity and the opposite. The size of the future logistic centre has not been a limiting factor for the selection of the potential area (even if SUCELLOG target is a production of 10 kt/yr per centre) since no data of the total amount of biomass is available (agro-industry residues missing as mentioned before).

Results obtained from the above menthioned work for each target region are shown in the corresponding reports that have been elaborated by country in their own language. In the following sections a summary per country is shown.

As a last activity belonging to this WP, workshops and personal contacts were carried out with agro-industries in Task 3.3, with the aim of engaging them to the services offered by the project (technical and decision-making support to become biomass logistic centres). The result of this action is shown in the document “D3.1-Report on engagement actions”.

2. Regional situation in SPAIN

SUCELLOG has evaluated the situation of the different target regions in Spain (Aragón, Castilla y León, Cataluña, Extremadura and Galicia) to host agro-industry logistic centres in terms of barriers/opportunities for their development and of available agrarian biomass resources.

Regarding biomass resources and according to the criteria of competitiveness and availability, the maize straw and the woody prunings appear to be the most interesting agrarian sources to be taken into account in general with the exception of Galicia. A large number of types of residues do still not have a real market and are left on the soil, burnt or just given for free to avoid the costs of disposal. On the contrary to what happens in other regions, whose logistic centre could be entirely based on agrarian resources, the creation of a logistic centre in Galicia should rely on the supply of the important forest resources of the region together with the woody prunings.

In what concerns the main potential sectors for the creation of biomass logistic centres, they are: forage dehydration facilities, cereal dryers, rice dryers, sugar industry, nut industry, tobacco dryers, distilleries and oil pomace industries. They have been selected due to the existence of compatible equipment for the pre-treatment of raw material (dryers and/or pelletisers) that has idle periods and where no technical barriers for the development of the new activity as biomass logistic centre have been detected. Those sectors owning horizontal dryers (forage dehydration, sugar industries, distilleries and oil pomace industries) present most versatile facilities able to process a greater variety of raw material formats while vertical dryers are more limited to olive and grape pits and crushed almond shell. Additional sectors like cellars and oil mills have also been taken into account, even if they do not present compatible equipment, because of their important capacity to gather agrarian biomass and their high interest in the project. In this sector, a new line for the production of biomass should be implemented. Finally, the animal feedstuff producer sector has also been considered in Galicia, even though their dryers and pelletisers work all the year, since a possible decrease in their production could generate the existence of a line free for the production of solid biomass.

All target regions present potential areas for the creation of logistic centres and the interest of the sectors is high in general since they see it as an opportunity to consume their own residues (reducing fuel acquisition) and to diversify their activity. However, even if the agro-industry sector is one of the largest consumer of solid biomass in Spain, being familiar with bioenergy issues, the most limiting barrier to be overcome in this country is the mistrust to changes in regulatory frameworks that could generate the stop of an industrial activity. Renewable energies arose as a good solution for the rural development and in some cases (like electricity production with solar systems) failed due to regulatory framework. The legal emission limits to start

being applied in the next years are one of the reasons that stop the sector from starting operating as solid biomass logistic centre.

For further details please see the document in Spanish “D3.2-Resumen de la situación regional, recursos disponibles y áreas potenciales en España” prepared by CIRCE in close collaboration with Spanish Cooperatives.

3. Regional situation in FRANCE

SUCELLOG project has evaluated the six target regions in France (Auvergne, Centre, Champagne-Ardenne, Ile-de-France, Picardie and Rhône-Alpes) with respect to agrarian resources and agro-industry sectors for the development of biomass logistic centres.

Regarding the quantity of available resources, the straw from herbaceous crops (cereal, rape and maize) is the most interesting resource to be taken into account in France. However, to be able to upgrade the quality of the resulting fuel, a woody source should be acquired, being in some regions possible to come from agrarian sources (prunings from vineyards) but in others only forest residues would be available. Residues from the agro-industry could be a complement for a mixed pellet although they do already have a market, which in some cases is even bioenergy (biogas production from sugar or distillery process residues for example).

Concerning the agro-industry sectors, the ones evaluated within the project in France have been: forage dehydration facilities, cereal dryers, sugar industry, distilleries, tobacco dryers, cellars, oil extraction industries and feedstuff producers. All of them have been considered target for the project except the last two, since the extraction industries and the feedstuff producers, even if they have compatible equipment for the production of solid biomass, do work during the whole year having no idle period for this new activity, unless a new line is installed or their current production decreases due to market issues. From the rest, forage dehydration facilities are already a very integrated industry, working in many cases as logistic centres to diversify their activity for the production of animal feed or even to produce woody pellets coming from forest sources. Cereal dryers, due to their vertical drying system, are not really compatible with the majority of available residues in France (with no granulated format) and therefore their strength as logistic centre would rely on their handling and storage equipment. In the case of the cellars, they have been included as target, even if they do not own compatible equipment but their easy access to an agrarian woody residue (vineyard prunings) and the interest shown by the sector, makes this particular case interesting for the project.

Potential areas for the development of logistic centres have been identified in all regions except in Ile-de-France, which does not imply that it could be not placed in that region. Association among nearby industries should be promoted in France in order to take advantage of the different idle periods and equipment and it won’t be a barrier since the agrarian sector is used to taking advantage of synergies.

For further details please see the document in French “D3.2- Analyses régionales : ressources en biomasse et aires d’action prioritaires en France” prepared by CIRCE in close collaboration with Services Coop de France.

4. Regional situation in ITALY

The situation of the five target regions in Italy (Emilia-Romagna, Marche, Puglia, Sardegna and Toscana) have been analysed in order to evaluate their potentiality to set an agro-industry logistic centre. The evaluation has been carried out from the perspective not only of the available resources but also of the existing agro-industries compatible with this new activity according to SUCELLOG concept.

Regarding the resources, the potential feedstock are several: straw from cereal and maize mainly, prunings from olive tree and vineyards and agro-industry residues coming from the olive and wine sectors. A large number of types of resources do have not a market and are left on the soil or burnt to avoid the cost of harvesting/disposal.

The agro-industries evaluated by the project have been the following ones: forage dehydration facilities, cereal dryers, rice dryers, tobacco dryers, distilleries, oil pomace industries and sugar industries. They all own equipment that can be used for the production of solid biomass like dryers and/or pelletisers and idle period in their regular activity (not working the whole year). They all have been considered as target for the project since no important technical barriers for the development of a logistic centre in their facilities have been detected. More concretely, from all of them, cereal and rice dryers are the less versatile installations because of their existing drying system, which can be only compatible with a granulated product (like olive pits, grape pits and crushed almond shells). The rest of sectors could be able to pre-treat a large variety of resources format (straw, chips or granulated) since they have horizontal dryers. Cellars and oil mills have also been considered as target industries since, even if not owning compatible equipment, their easy access to biomass residues (from the agrarian practice or from the industrial process) make them interesting for the project. Therefore, in their case, investment in a new pre-treatment line should be made. The tobacco dryers have been also considered for the project even though they are not currently allowed to use their dryers with other resources due to commercial restrictions. Due to the fact that the sector is in decline and a restructuration will be needed, it can be a good possibility to include it as a possible new business line using existing equipment.

The situation of Italy is promising in terms of available resources and amount of agro-industries. However, it should be highlighted that there are still barriers to be faced when developing the project and which have come up during the interviews with the sector. The first can be the lack of trust that the society has in services that are provided for free (even if the project will not finance any investments or analysis, giving only technical support) which can lead to a lack of compromise. The second

barrier is that, in some cases, the law is different according to the region and often differently interpreted among provinces belonging to the same region. The best example is the definition of residue, whereas in Puglia the olive pomace is considered as by-product and it can be used as biomass, in other regions (i.e. Tuscany) it is considered as waste, and it cannot be used as biomass, because of the chemical treatment to extract oil using hexane. Different provinces can give their own more or less strict interpretation of the law, allowing or not to consider the raw material as a by-product. The third barrier can be the target consumers since the main market for SUCELLOG, which is the agro-industry sector, is not really familiar with biomass being highly dependent on natural gas whose network is really developed in Italy. However, the project considers that these barriers will be overcome with a good pilot example that can show that developing a biomass logistic centre can be a sucessful business line for the agro-industry to diversify their activity. Association among industries (even from different sectors) can be a convenient option to avoid high investment costs that could discourage possible entrepreneurship.

For further details please see the document in Italian “D3.2- Sintesi della situazione regionale, delle risorse di biomassa e aree di azione prioritaria in Italia” prepared by CIRCE in close collaboration with D.R.E.Am Italia.

5. Regional situation in AUSTRIA

The situation of the four target regions in Austria (Carinthia, Lower Austria, Styria and Upper Austria) was evaluated by SUCELLOG project in order to see the potential of the agro-industries to become solid biomass logistic centres.

From all the agro-industry sectors evaluated in Austria (cereal dryers, animal feedstuff producers, sugar industry, oil extraction industries, cellar and breweries), the project considers the cereal dryers and the animal feedstuff industry are the only two sectors able to implement SUCELLOG concept, although with minor modifications. Sugar industry has been discarded since there is only one present in the target Austrian territory and their interest in starting this new activity has been low, even if they present an appealing potential. The rest, either do not own compatible equipment or do not have idle period in the production.

In contrast to what happens in other countries, in Austria the main biomass feedstock available to be used in a future logistic centre is clear: the corn cobs. In the case of cereal straw, even if some part is sold in the feed market and some is left on the soil there is still a 33% of availability. Maize straw has no availability since it is mainly used to increase the amount of organic content in the soil, which is currently a problem in the country. Residues produced by the agro-industries are also used for animal feed having an important market. In the cereal dryers, a new drying line should be implemented in the facility to be able to process this kind of biomass, but handling equipment as well as storage and transport means (and in minor cases also

pelletisers) could be utilised in the idle period (9 months). The feedstuff producers own a drying system that works all the year but their pelletisers work according to demand, having the possibility to be adjusted for the production of agro-pellets. Even if both industries could work as logistic centres on their own, it is considered that an association among them, taking advantage on the synergies of available equipment and periods of work, could play an important role in the success of the new business activity.

Although most of the agro-industries think that the idea is a good opportunity to diversify their activity, their main concern is the market of the product (reduced to large consumers or broaden also to household), which will depend on the legal aspects of the combustion of agrarian biomass in Austria, currently under discussion. The situation in some regions, where corn cobs are already allowed to be used in households make the sector be optimistic about this new business line.

For further details please see the document in German “D3.2- Zusammenfassung der regionalen Situation, der Biomasse-Ressourcen und der vorrangigen Handlungsgebiete in Österreich” prepared by CIRCE in close collaboration with the Chamber of Agriculture and Forestry of Styria.

Annex I. Ratios of biomass production and availability percentage

SPAIN

Table 1: Ratios of biomass production (t/ha) in SPAIN per region.

Crop	Galicia	Aragón	Castilla y León	Extremadura	Cataluña
Wheat	1,84	1,7	1,95	0,68	1,84
Rye	1,96	0,64	1,03	1	0,88
Barley	1,66	1,95	1,32	0,85	1,29
Oat	1,48	0,65	0,99	0,95	0,79
Maize	20	20	20	20	20
Rice	3,8	3,8	3,8	3,8	3,8
Beans	1	1	1	1	1
Pulses_oth	1	1	1	1	1
Tobacco	1	1	1	1	1
Hemp	-	-	-	-	-
Rape	1	1	1	1	1
Sunflower	3	3	3	3	3
Soya	1	1	1	1	1
Lineseed	-	-	-	-	-
Seed_other	1	1	1	1	1
Fruit_temp	3	3,5	2,5	3	2,5
Fruit_subtrop	3	3,5	2,5	3	2,5
Berry	1,5	1,5	1,5	1,5	1,5
Nuts	0,7	0,7	0,7	0,7	1,7
Citrus	-	6	6	6	6
Olive	-	3	3,75	3	3
Vineyard	3,75	4	3	0,5	3,75

Table 2: Percentage of availability of biomass (%) in SPAIN per region.

Crop	Galicia	Aragón	Castilla y León	Extremadura	Cataluña
Wheat	30	30	30	30	30
Rye	30	30	30	30	30
Barley	30	30	30	30	30
Oat	30	30	30	30	30
Maize	0	50	50	50	50
Rice	10	10	10	15	0
Beans	0	0	0	0	0
Pulses_oth	0	0	0	0	0
Tobacco	-	-	90	30	-
Hemp	-	-	-	-	-
Rape	50	50	50	50	50
Sunflower	10	10	0	10	10
Soya	-	-	-	70	-
Lineseed	-	-	-	-	-
Seed_other	-	-	75	75	-
Fruit_temp	80	90	90	95	90
Fruit_subtrop	80	90	90	95	90
Berry	95	95	95	95	95
Nuts	99	99	99	99	50
Citrus	-	90	90	90	90
Olive	-	80	97	95	80
Vineyard	80	99	80	70	97

FRANCE

Table 3: Ratios of biomass production (t/ha) in FRANCE per region.

Crop	Île-de-France	Champagne-Ardenne	Picardie	Centre	Rhône-Alpes	Auvergne
Wheat	3,3	3,3	3,5	3	3,5	3,5
Rye	1	1	1	1	1	1
Barley	3,3	3,3	4	3,64	3	3
Oat	1	1	1	1	1	1
Maize	3,3	3,3	5	5,9	5	5
Rice	2	2	2	2	2	2
Beans	8	8	9,75	8	8	8
Pulses_oth	2,6	2,6	4,5	5	5	1
Tobacco	-	-	-	-	2,5	2,5
Hemp	-	-	-	-	-	-
Rape	2	2	2,5	1,2	2	2
Sunflower	2,5	2,5	2,5	2,5	1	1
Soya	2,7	2,7	2,7	2,7	2,7	2,7
Lineseed	1	1	1	1	1	1
Seed_other	1	1	1	1	1	1
Fruit_temp	1,5	1,5	1,5	1,5	1,5	1,5
Fruit_subtrop	1,5	1,5	1,5	1,5	1,5	1,5
Berry	1,5	1,5	1,5	1,5	1,5	-
Nuts	-	-	-	1	1,1	-
Citrus	-	-	-	-	-	-
Olive	-	-	-	-	-	-
Vineyard		1,8	1,5	1,5	1,5	1,5

Table 4: Percentage of availability of biomass (%) in FRANCE per region.

Crop	Île-de-France	Champagne-Ardenne	Picardie	Centre	Rhône-Alpes	Auvergne
Wheat	14,4	14,4	30	30	5	5
Rye	14,4	14,4	30	30	30	30
Barley	14,4	14,4	30	50	30	30
Oat	14,4	14,4	30	50	30	30
Maize	17,4	17,4	5	5	50	50
Rice	-	-	-	-	-	-
Beans	100	100	100	100	100	100
Pulses_oth	0	0	0	0	-	-
Tobacco	-	-	-	-	90	90
Hemp	0	-	-	0	-	-
Rape	50	50	50	50	50	50
Sunflower	40	50	50	50	50	50
Soya				70	70	70
Lineseed	80	75	75	75	-	-
Seed_other	75	75	75	75	75	75
Fruit_temp	90	90	90	90	90	90
Fruit_subtrop	-	--	-	-	-	-
Berry	90	90	90	90	90	-
Nuts	-	-	-	90	90	-
Citrus	-	-	-	-	-	-
Olive	-	-	-	-	-	-
Vineyard	90	90	90	90	20	20

ITALY

Table 5: Ratios of biomass production (t/ha) in ITALY per region.

Crop	Puglia	Sardegna	Emilia-Romagna	Toscana	Marche
Wheat	1,51	2,27	2,71	2,48	1,96
Rye	0,73	0	2,16	1,12	0
Barley	1,23	1,99	5,28	2,55	3,67
Oat	1,2	1,67	2,47	1,81	2,35
Maize	4,04	6,6	4,08	4,12	6,43
Rice	0	2,27	1,92	3,21	0
Beans	1,88	1,84	3,81	2,83	2,41
Pulses_oth	1,65	1,2	4,89	3,3	2,26
Tobacco	0	0	0	0,47	0
Hemp	0	0	0	5	0
Rape	0	0	0	0	0
Sunflower	1,52	1,54	2,75	1,57	1,15
Soya	0	0	3,75	0	0
Lineseed	0	0	0	2,5	0
Seed_other	0	0	0	0	14,74
Fruit_temp	1,11	1,1	1,6	1	2,2
Fruit_subtrop	2	1,45	0	0,45	0
Berry	0,83	0,9	0,81	0,65	1,01
Nuts	1,45	1,38	1	0,96	1
Citrus	2,01	1,45	0	0,47	0
Olive	1,32	2,3	0,06	1,39	1,27
Vineyard	1,82	1,61	1,68	1,55	1,59

Table 6: Percentage of availability of biomass (%) in ITALY per region.

Crop	Puglia	Sardegna	Emilia-Romagna	Toscana	Marche
Wheat	35	25	10	25	35
Rye	40	40	40	40	0
Barley	35	30	10	30	30
Oat	40	40	40	40	40
Maize	45	50	50	45	45
Rice	0	40	40	40	0
Beans	0	0	0	0	0
Pulses_oth	0	0	0	0	0
Tobacco	0	0	0	85	0
Hemp	0	0	0	0	0
Rape	0	0	0	0	0
Sunflower	40	40	40	40	40
Soya	0	0	70	0	0
Lineseed	0	0	0	0	0
Seed_other	0	0	0	0	0
Fruit_temp	25	20	20	20	20
Fruit_subtrop	0	0	0	0	0
Berry	40	40	40	40	40
Nuts	40	40	0	40	40
Citrus	40	35	0	40	0
Olive	55	45	47	45	47
Vineyard	50	50	50	40	50

AUSTRIA

Table 7: Ratios of biomass production (t/ha) in AUSTRIA per region.

Crop	Austrian target regions
Wheat	4
Rye	4
Barley	3,5
Oat	2,6
Maize	4
Rice	10,3
Pulses	-
Tobacco	-
Hemp	0
Rape	4
Sunflower	10
Soya	2
Lineseed	-
Seed_other	7
Fruit_temp	2
Fruit_subtrop	-
Berry	1
Nuts	1
Citrus	-
Olive	-
Vineyard	3

Table 8: Percentage of availability of biomass (%) in AUSTRIA per region.

Crop	Austrian target regions
Wheat	33
Rye	33
Barley	33
Oat	33
Maize	0
Rice	-
Pulses	0
Tobacco	-
Hemp	0
Rape	50
Sunflower	0
Soya	50
Lineseed	
Seed_other	50
Fruit_temp	70
Fruit_subtrop	-
Berry	70
Nuts	70
Citrus	-
Olive	-
Vineyard	70