

SUCELLOG: IEE/13/638/SI2.675535

D6.7a

**Report on the local-scale meetings
carried out within the auditing service in
Spain**

30.03.2017



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



Project partners



About this document

This report corresponds to a part of the D6.7 Report on the local-scale meetings carried out within the auditing service in Spain of the SUCELLOG project. It has been prepared by:

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1. Introduction

SUCELLOG supports the creation of biomass logistic centres inside agro-industries covering the gap of knowledge faced when willing to start this new activity. Within WP6, SUCELLOG provides an auditing service facilitating the decision making to agro-industries interested in becoming a logistic centre. As part of the auditing service and with the purpose of showing to the agro-industries the most promising paths to start-up their new activity, local-scale meetings have been carried out with interested stakeholders such as potential biomass suppliers and consumers, equipment manufacturers and so on.

This document includes a collection of these reports of these meetings classified by agro-industry and carried out in Spain with a total of 42 stakeholders-external companies/actors (71 participants).

2. Reports of local-scale meetings in Spain

2.1. Cooperativa Agraria San Miguel de Fuentes de Ebro

2.1.1. Cereal straw supplier in the area local-scale meeting

2.1.1.1. General data of the meeting

Date: 7 June 2016

Auditor's data:

Name: Jesús Abadias Ullod Organization: Cooperativas Agro-alimentarias de Aragón

Place: Cooperativa Agraria San Miguel de Fuentes de Ebro

2.1.1.2. Attendants:

4 people participated in this meeting.

2.1.1.3. Summary of the meeting

The meeting was held in the cooperative San Miguel de Fuentes de Ebro with the main supplier of straw in the area to discuss his possible contribution to the new business line of the cooperative as biomass logistic centre.

The straw supplier is also farmer and member of the cooperative. He was very interested in the project and commented the possibility of working as collaborator of the cooperative in this respect. According to his experience as cereal straw supplier he showed optimistic with regard to the enough supply of straw for the new business line.



Figure 1: Meeting with a straw supplier in C. A. San Miguel de Fuentes de Ebro.

On behalf of the cooperative, the manager took part in the meeting. He is very interested in the project both because of the possibility of giving additional use to the pelletizing equipment that currently is underused and for take advantage of the agricultural residues of its members. In the meeting the person in charge of the maintenance was also present to assess the suitability of a new raw material used in the pelletizing line.

2.1.2. Green Future Consulting (GFC) local-scale meeting

2.1.2.1. General data of the meeting

Date: 26 October 2016

Auditor's data:

Name: Jesús Abadias Ullod

Organization: CIRCE and Cooperativas Agro-alimentarias de Aragón

Place: CIRCE and Cooperativa Agraria San Miguel de Fuentes de Ebro

2.1.2.2. Attendants

7 people participated in this meeting.

2.1.2.3. Summary of the meeting

A working day between CIRCE and Agri-food Cooperatives from Aragón was organized for knowing the Green Future Consulting enterprise, a company that works in engineering environmental projects, renewable energy and I+D+I. The meeting was focused, as a first part, in knowing the drying systems, and the boilers and poly combustible burners which the company is working with, mainly of the ÖKOTHERM brand. This first part of the working day was developed in the CIRCE facilities, in Zaragoza. Besides knowing different technologies and real facilities that are working with agricultural biomass, it was mentioned the case of the audit of San Miguel de Fuentes de Ebro Agricultural Cooperative within the SUCELLOG project.

In the second part of the working day, it was visited the facilities of the San Miguel de Fuentes Agricultural Cooperative, in order that both the guests of the meeting and the Green Future Consulting company knew the facilities of the audited cooperative and synergies emerge to advance in the start-up of the cooperative biomass logistic center.

By one hand the dryer and granulated line of fodder was visited, and it was mentioned the possibility of continuing assessing the Aragon market for trying to search possible consumers of pelletized forestry and agricultural biomass, target of manufacturing of this line in its regular production idle period.

On the other hand, the dryer and packing line of fodder was visited, the most active from the cooperative regarding production. In this line, similarly to the developed audit study, it was assessed the implementation of a poly combustible burner which would substitute the currently gas burner for the fodder drying, or that both could be maintained at the same time. It was agreed with the Green Future Consulting company that they would start a research for watching the cost and amortizations of the facility for this burner.



Figure 2: Meeting with GFC in CIRCE Headquarter.



Figure 3: Visit of GFC to C. A. San Miguel de Fuentes de Ebro.

2.1.3. Equipment manufacturer (APISA, S.L.) local-scale meeting

2.1.3.1. General data of the meeting

Date: 16 December 2016

Auditor's data:

Name: Jesús Abadias Ullod

Organization: Cooperativas Agro-alimentarias de Aragón

Place: APISA SL Crta. Nacional 330, Km. 576,300
22193 YÉQUEDA (Huesca) España

2.1.3.2. Attendants

2 people participated in this meeting.

2.1.3.1. Summary of the meeting

A meeting with APISA SL was held, through a conversation with one of its technicians, to see if they had carried out some test of combustion in their facilities with cereal straw. According to the technician of this company, which is dedicated to manufacture and install drying equipment, the possibility of burning cereal straw in biomass boilers installed in some agro-industries could be raised, but he believed that problems could arise in relation to that due to the weight of the cereal straw, this fuel would crawl and would not produce the total combustion thereof. This would

make the combustion not efficient and drag the cereal straw to the drying process where the material to be dried. Therefore, he stated that to burn this type of fuel would have to adjust the burners or install a burner oriented to burn this type of fuel.

2.2. Cooperativa Agraria Destilerías San Valero

2.2.1. Vineyard pruning supplier in the area local-scale meeting

2.2.1.1. General data of the meeting

Date: 22 November 2016

Auditor's data:

Name: Jesús Abadias Ullod

Organization: Cooperativas Agro-alimentarias de Aragón

Place: Destilerías San Valero Sociedad Cooperativa

2.2.1.2. Attendants

5 people participated in this meeting.

2.2.1.3. Summary of the meeting

Taking advantage of the initial meeting with the San Valero Distilleries Cooperative, a local meeting was held with one farmer as potential biomass supplier. It was carried out in the facilities of the own cooperative. The cooperative managing director, the technician responsible for the SUCELLOG project in the Regional Federation of Cooperatives of Aragon and two persons from CIRCE attended to the first part of the meeting. It was stated by the cooperative in the meeting, the interest in participating in the project originated by it idea of converting in the future in a biomass logistic center. All the productive process was explained by the cooperative and it was determined what type of raw materials are being consumed, and what solid by-products with an organic origin, are generated and consumed as biomass.

After the meeting in the cooperative facilities, a local meeting was carried out nearby with one farmer to assess the possibility of collecting the vine pruning on the field. It was discussed with him all the pruning process, the possibilities of collection of the pruning residues and its availability for supplying that pruning as biomass resource, as long as economically it supposed an advantage for him regarding the management actions of pruning that is currently carrying out. So far, no logistic chain has been developed in the area, even though the large potential.



Figure 4: Picture of the visit to the stem storage in the vicinity of the cooperative.

2.3. C. A. San Miguel de Fuentes de Ebro & Destilerías San Valero

2.3.1. Local-scale meeting with policy makers

2.3.1.1. General data of the meeting

Date: 2 December 2016

Auditor's data:

Name: Jesús Abadías Ullod

Organization: Cooperativas Agro-alimentarias de Aragón

Place: Gobierno de Aragón. Departamento Desarrollo Rural y Sostenibilidad. Dirección General Sostenibilidad. Servicio de Cambio Climático y Educación Ambiental.

2.3.1.2. Attendants

3 persons participated in this meeting.

2.3.1.3. Summary of the meeting

A meeting was performed in the facilities of the Rural Development and sustainability Department of the Aragon Government to expose the SUCELLOG project, through a of summary-video of it. In the meeting the audit cases carried out in Aragón in the Cooperative San Miguel Fuentes de Ebro and Destilerías San Valero were also explained and the work performed in the Cooperative San Miguel of Tauste.

The target of the meeting was to make known the administration the important role that the cooperatives can play due to their potential of agglutinate the agricultural biomass, and to the management capacity in their facilities. It is also intended that actions of this type can be promoted from the department, through subsidies and new projects which allow start up the supply chains of agricultural biomass supply in our territory.

Jesús Abadías was present in the meeting representing Agri-food Cooperatives of Aragon, and 2 other persons participated on behalf of the General Direction of Sustainability from the Aragon Government.

2.4. Cooperativa Agraria Cooperativa Agrícola Regional (CAR)

2.4.1. Local-scale meeting with the Spanish Bioenergy Association and GFC

2.4.1.1. General data of the meeting

Date: 17th May 2016

Auditor's data:

Name: José M^a Santos Rodríguez and Ana Isabel de Coca Sinova

Organization: Unión Regional de Cooperativas Agrarias de Castilla y León (Urcacyl)

Place: Sede Central de la Asociación Española de Valorización Energética de la Biomasa (AVEBIOM). C/ Panaderos nº 58, entreplanta. 47004 - Valladolid

2.4.1.2. Attendants

3 persons attended this meeting.

2.4.1.3. Summary of the meeting

Prior to this meeting, AVEBIOM, with which Urcacyl had maintained contact in the early stages of SUCELLOG and pre-audit project, has always shown great interest in knowing the state of work and the different results with its execution were getting. AVEBIOM, as committed company to achieving independency of fossil fuels, contributing their work to sustainability and rural development by saving energy, we believe it is an interesting bidirectional information channel between the different actors in the sector with we are working on the project SUCELLOG.

This causes and in recent months the existing contact between Urcacyl and AVEBIOM in this regard has been continuous and fluid, motivating such meetings between companies associated to AVEBIOM with potential suppliers of different

resources and cooperative companies that offer solutions to the use of agricultural residues through its energy transformation.

This time, the scenario presented was focused in the cooperative Car (Carrión de los Condes, Palencia) that has the adequate equipment for proper pretreatment of the raw materials and it is, a priori, an excellent candidate to become a biomass logistic centre, both for its strategic geographical location and for the idle periods of its equipment. Thus, several companies with which AVEBIOM contacted to inform them of this project, expressed their interest in collaborating as potential suppliers of biomass boilers adapted to agricultural materials.

The meeting with the company Green Future Consulting, served to have a first idea about the characteristics of the cooperative Car presented at the prospect of being reconverted into biomass logistics center. In the area there is a strong forestry tradition of poplar, cultivated for achieving fast-growing wood but with low added value. It is thought that their combined use with agricultural residues from the members of the cooperative, could result in an energy interesting business model for both types of organizations.

Therefore, at that meeting technical issues such as amount of biomass consumption in the area, quality and storage potential of biomass in the cooperative were treated in the area.

On the other hand, as an alternative to analyze, the consumption needs of the cooperative on its current activities of drying and dehydration as well as a hypothetical pellet production for market supply were commented.

Finally, the technical needs that would involve the acquisition of a certain type of boiler capable of combining forestry and agricultural raw materials, as well as the investment required that the cooperative would need to do to undertake this type of project were established.

As for the commitments made in the meeting, commenting that despite the good feelings and the interest shown by the suppliers of equipment, everything has been pending and awaiting the final results of the audit to CAR in the frame of SUCELLOG project. In any case, potential suppliers also stressed the great interest they had to know the facilities of CAR, as well as the different possibilities that the geographical area has to offer.

2.5. COPISO SORIA

2.5.1. Farmers local-scale meeting

2.5.1.1. General data of the meeting

Date: 6 June 2016

Auditor's data:

Name: José M^a Santos Rodríguez and Ana Isabel de Coca Sinova.

Organization: Unión Regional de Cooperativas Agrarias de Castilla y León (Urcacyl)

Place: COPISO SORIA (Avda Valladolid, 105 - Soria)

2.5.1.2. Attendants

8 persons participated in this meeting.

2.5.1.3. Summary of the meeting

The Regional Union of Agricultural Cooperatives of Castile and Leon (Urcacyl), has carried out an analysis of the four diagnosis performed to four cooperatives (Ucogal, CAR, Agropal and Copiso) interested in the valorization of biomass coming from residues of their exploitations and with enough potential to explore the opening of new business development based in those raw materials.

The mentioned analysis gave out as result that the Copiso Soria Cooperative, located in the city of Soria, was, along with the CAR cooperative, one of the agroindustries with higher possibilities of developing a business related with biomass with success. This is the reason why, last 6th of June, Urcacyl convoked a meeting in their facilities in which, besides the technicians of the cooperative, three farmers of the surroundings with interest in knowing the targets and situation of the project were present.

One important part of the meeting was focused in assessed the type and quantity of available resources in the cooperative. The three farmers commented issues related to their experience giving approximated data about the type, quantity, quality and seasonality of them. Moreover, they showed their opinion about the harvest of the resources and the approximated costs of this operation.

Additionally they spoke about their knowledge of the use of biomass in the pig farms of the associated farmers of the cooperative and their point of view about it.

The meeting held clarifies and detail different aspects relate to the temporal and spatial organization of the different sections of work, as well as the storage facilities and with heat requirements (own pig farms and of integration) and available equipment of the cooperative. In that meeting were also commented the results from

different biomass market studies of the area, previously performed by the cooperative (availability and supply of biomass, type of clients).

The different aspects analysis previously exposed lead the cooperative to make the decision of not utilize biomass coming from agricultural residues because the following reasons:

- The tests performed by the cooperative in different types of boilers using Straw as fuel, gives as a result severe slag problems due to ash accumulation and corrosion by high amounts of straw chlorine utilized, coming from their partner exploitations.
- Different market studies give as a result the availability of a high amount of forestry biomass (taking advantage of pine forests) coming from the area were the cooperative is located, counseling and prioritizing it use against other sources of energetic raw material.

This situation brings as consequence that Urcacyl decides looking for other cooperative agro-industry with enough success guaranties in the utilization of agricultural biomass. The analysis of different alternatives gives as a final result the choice of the Cocope cooperative as organization susceptible of using agricultural residues coming from their partners, giving value to them through its transformation to biomass.

2.6. COCOPE

2.6.1. Technical experts local-scale meeting (AVEBIOM, GFC)

2.6.1.1. General data of the meeting

Date: 6 September 2016

Auditor's data:

Name: José M^a Santos Rodríguez and Ana Isabel de Coca Sinova.

Organization: Unión Regional de Cooperativas Agrarias de Castilla y León (Urcacyl)

Place: COCOPE, S. Coop., (Ctra Pesquera, km 0,8 - 47300 Peñafiel, Valladolid)

2.6.1.2. Attendants

7 persons attended this meeting.

2.6.1.3. *Summary of the meeting*

The past 6th of September it took place a meeting in the Cocope facilities with the objective of that, after exposing to their representatives the targets and current state of development of the SUCELLOG project, those had enough criteria to assess their participation in the same. The president and manager as well as technicians from the cooperative were present in that meeting.

Taking advantage of this meeting, expert technicians who could give their vision were invited to participate. A representative of Avebiom and another from the Green Future Consulting company were present. This last company, as expert in the design and the sizing of poli-fuel biomass boilers, showed interest for knowing of first hand the calorific requirements of the cooperatives as well as their real possibilities of acquisition of agricultural residues for their transformation into biomass.

Cocope cooperative (Peñafiel-Valladolid), with different sections in the different activities in which they work (gathering and marketing of herbaceous and aromatic plants, wine cellar and nursing home) present very appropriated characteristics for the substitution of fossil fuels by biomass to utilize in their diverse facilities. Therefore, once presented the dependencies of the cooperative, issues like the amount of resources (agricultural residues) available distributed along the time and the energy requirements of the different working areas of the cooperative were treated.

The meeting showed the possibility of analyzing different feasible alternatives for the biomass use, though it was the self consume of lavender straw for trying to satisfy the energetic requirements of the nursing home (heating and sanitary hot water) which provided greater guarantees of success. The nursing home demands continuous energetic requirements (winter and summer), which with the different resources facilitated by the cooperative, may be met in a satisfactory way with the prunings of the lavender harvest that, without alternative use, could suppose a solution for the management and storage problems of the residue which currently represents for the cooperative.

To highlight that the Cocope cooperative does not dispose of equipment as dryers or dehydrators which could serve for the pretreatment of agricultural residues and its later transformation into biomass; by other side, none of the technician of the cooperative presents knowing related to the alternative energy sector neither the biomass market, so an hypothetic pellet production for the supply of the market is not presented as a good choice. This brings as consequence that the alternative of self consumption has been assessed by all the assistants to the meeting as the best one, object of the present report.

Finally, and given the described situation, the assistants to the meeting agreed the convenience of carrying out a study with the technical needing which entail the acquisition of a specific type of boiler capable of processing the agricultural surpluses

coming from the cooperative partners, as well as of the required investment which the cooperative would need to do to rush this kind of project.

2.6.2. Biomass and boiler providers (NATURPELLET, BAZA MAZANO) local-scale meeting

2.6.2.1. General data of the meeting

Date: 16 December 2016

Auditor's data:

Name: Ana Isabel de Coca Sinova.

Organization: Unión Regional de Cooperativas Agrarias de Castilla y León (Urcacyl)

Place:

NATURPELLET Salida 60, A-601, 40297 Sanchonuño, Segovia

BAZA MAZANO Carretera Soria, Km.13,5, 47320 Tudela De Duero, Valladolid, Valladolid

2.6.2.2. Attendants

2 people participated in this meeting.

2.6.2.3. Summary of the meeting

In order to know the actual situation of the biomass market in the area of COCOPE and its degree of penetration among the potential consumers, the biomass manufacturer NATURPELLET was contacted and also BAZA MAZANO, which is dedicated both to the commercialization of Biomass and combustion biomass equipment.

The facilities of each one of them were visited. Firstly the main ideas about the SUCELLOG project were exposed, as well as the course of the works that were being carried out in the cooperatives and, especially, those of Castilla León.

Subsequently, they went on to discuss the most relevant aspects regarding their vision on the biomass market in Castilla León. Their opinions were quite coincident and were based on the following statements:

- In general, it could be said that the Castilian-Leonese community possesses a great wealth in the production of biomass due to a significant forest area and the use of the land, mainly agricultural. In addition, there are agro-food industries that generate

biomass by-products, mainly industries derived from the use of vineyards, olive trees, fruit trees and pine forests.

- Taking into account the above potential, one might think that agricultural waste from the vineyard will be the first choice among consumers of thermal energy when choosing biomass fuel.

- However, the reality is quite another. According to their views, the current consumption of biomass for industrial or urban thermal energy is based on the use of by-products generated by the wood industry in the form of chips and pellets, accounting for 80% of total energy consumed. The remaining percentage up to 100% (about 18%) would come from the consumption of olive pit and dried fruit shell, while the final 2% would be due to the consumption of biomass from the by-product of the vineyard.

2.7. Agrària de Miralcamp, SCCL

2.7.1. Machinery Technical experts local-scale meeting

2.7.1.1. General data of the meeting

Date: 13 September 2016

Auditor's data:

Name: IBAN MULET.

Organization: Federació de Cooperatives Agràries de Catalunya

Place: FEMAC (Manufacturers and Exporters Association of Agricultural Machinery of Catalonia) Avinguda de L'Exèrcit, 48, 25194 Lleida

2.7.1.2. Attendants

3 persons participated in this meeting.

2.7.1.3. Summary of the meeting

A brief introduction has been done per each entity to remind the main activities that are being carried on in each of them, around 76.000 partners and 215 federate cooperatives by the FCAC (Federation of Agriculture Cooperatives of Catalonia).

FEMAC (Manufacturers and Exporters Association of Agricultural Machinery of Catalonia) <http://www.femac.org> is an organization (cluster) which agglutinate input and machinery firms for the agriculture. It is noteworthy that, currently, the NATUREEF (Natural Efficient Resource Concept) European project is being carried out (<http://www.natureef.eu>), among other things also related with biomass.

The project actions have been presented from the FCAC with certain detail. It has been delivered the project triptychs, it has been commented that is about an European project, with participant federations and cooperatives in different countries, therefore it has a remarkable impact. Is not only about taking advantage of the own biomass resources, but also about taking advantage of the facilities idle period, and to develop new business lines.

It has been explained that we are carrying out two audits to district cooperatives from Lleida, giving detail about each of them, and about their perspectives and place inside the project.

The conversation of the meeting has been more focused in Miralcamp on the issue of the corn residues, with the reality that, apart from grain, all the rest of the plant is rejected, incorporating it into the ground and adding nutrients to the soil. But which could be useful is the heart of the corn cob, both because it has little interest in adding nutrients into the soil and because it is almost a dry material, so the issue is focused in watching if there is any available machinery or equipment that could carry out this separation without the corn cob has contact with the soil, so this would be ruining it because of the moisture.

We asked the technician if any of their partners have companies that might be interested in study the issue of the corn cob collectors, directly from the plant (without any contact to the soil) and he answered that there could be some, but with the doubt about if there would be any grant for the development of this kind of agricultural equipment for adapting the corn harvesters (would be easier).

They are asked about their general opinion about the SUCELLOG Project:

Initially it seems interesting for them, but with certain uncertainty about how could this affect them if they participate as possible intermediaries to find solutions, especially for the company which had to implement the equipment intended to give answer to the issue of the biomass collection set up from Miralcamp.

- Offer the availability of the FCAC to cooperate in projects about this issue (and others).

I have commented them that, for every kind of proposal focused on the cooperative world and, especially for the resources harnessing, from a perspective of circular economy from which in the FCAC are charmed of receiving proposals, and backwards that will be commented to FEMAC , new conclusions and proposals about the SUCELLOG project.

They have been informed that we will perform a workshop the 29th in the Lleida fair about the SUCELLOG project. They are asked to help us to give it publicity and they show their willingness and good disposition to spread it among their partners.

2.7.2. Potential biomass provider and consumer local-scale meeting

2.7.2.1. General data of the meeting

Dates: 15 July 2016 and 28 September 2016

Auditor's data:

Name: Màrius Simón

Organization: Federació de Cooperatives Agràries de Catalunya

Place: Federació de Cooperatives Agràries de Catalunya

2.7.2.2. Attendants

3 persons participated in this meeting.

2.7.2.3. Summary of the meeting

With the purpose of gathering some opinions and experiences about the production and use of agricultural biomass, taking advantage of some sectorial meetings, we held some bilateral meetings with a potential biomass provider and consumer.

Firstly the overall ideas of the SUCELLOG project were presented.

The potential biomass provider interviewed is a worker of a winery cooperative very interested in innovation issues. He showed his opinion and commented the experience of the cooperative gathering the vineyard pruning.

The pig farmer interviewed informed us about the most important types of biofuels used in the pig farms of the area. Moreover, since he has a wide experience using biomass for the boiler of his pig farm, he gave us his feedback about it.

This person is also the sectorial cattle representative in the Catalanian Federation of Cooperatives, so this contact was consider very interesting due to the capacity of spreading the main conclusions of the SUCELLOG project.

2.7.3. Technical experts local-scale meeting

2.7.3.1. General data of the meeting

Dates: 13 July 2016 and 23 November 2016

Auditor's data:

Name: Màrius Simón

Organization: Federació de Cooperatives Agràries de Catalunya (FCAC)

Place: Federació de Cooperatives Agràries de Catalunya

2.7.3.2. Attendants

3 people participated in this meeting.

2.7.3.3. Summary of the meeting

The project was presented to some technicians of the Catalanian Federation of Cooperatives.

One of the participating persons is also a farmer owning peach trees so he gave us some information about his experience gathering pruning and its potential use as biomass. As technician he is usually working with a wide number of cooperatives so he was consider as a collaborator in the dissemination of SUCELLOG project. After this meeting he offered his total collaboration for the diagnosis and audits of SUCELLOG.

Another person is the FCAC technician in charge of the energy issues so he is a relevant person to show us his point of view about the most important items about energy in Catalanian Agri-food Cooperatives. In this way he gave us his opinion about the project and he promised to collaborate in the dissemination of SUCELLOG.

2.7.4. Technical experts local-scale meeting

2.7.4.1. General data of the meeting

Dates: 13 July 2016 and 23 November 2016

Auditor's data:

Name: Màrius Simón

Organization: Federació de Cooperatives Agràries de Catalunya (FCAC)

Place: Federació de Cooperatives Agràries de Catalunya

2.7.4.2. Attendants

8 people participated in this meeting.

2.7.4.3. Summary of the meeting

Taking advantage of the regional workshop held in Lleida, a meeting was held with the main speakers of the workshop.

A General Manager of INFRUSEC Cooperative showed his concern about the energy consumption of the cooperative and his interest in deeply exploring the use of renewable energies. Now they are using almond shell as biofuel for its process.

A representative of COVIDES exposed the experience of the cooperative participating in a project about the use of the vineyard pruning as biomass for energy use.

Person working for IRTA (Research Institute owned by the Government of Catalonia) comment the interesting connection of the findings of the project with the olive sector in which he has expertise. Since he usually works with a lot of cooperatives and companies related to the olive trees and the olive oil, he could contribute to the dissemination of the results of the project.

Another participant from Lleida University took part in the meeting; she spoke about the potential synergies of SUCELLOG with other European projects about energy efficiency and renewable energy in which her department is now working.

From FCAC a Rural Development and innovation Representative and President, were present in the meeting. The main role of this people will be the dissemination of the main findings of SUCELLOG among the associated cooperatives to FCAC.

Finally, with regard to the equipment for biomass combustion, a representative from Natefi, showed his opinion about the last trends in the biomass consumption, highlighting its increasing, in spite of the price decreasing of the fossil fuels.

2.8. Troil Vegas Altas, Sdad. Coop. Ulterior Grado

2.8.1. Meeting with main actors involved in the possible new business project

2.8.1.1. General data of the meeting

Date: 14th December 2016

Auditor's data:

Name: José Antonio Paz

Organization: Cooperativas Agro-alimentarias de Extremadura

Place: TROIL facilities

2.8.1.2. Attendants

7 people participated in this meeting.

2.8.1.3. Summary of the meeting

From different conversations among the Federación de Cooperativas Agroalimentarias Extremadura, CIRCE and TROIL, it became clear that the main

interest of TROIL is to develop a study evaluating the possibility to use the olive tree prunings from the surroundings to cover their own thermal consumption.

As a first stage for the study and, in order to understand the raw material for TROIL main activity as olive pomace extractive industry, CIRCE and the regional association visited the facilities of the main oil mill in the surroundings (Soc. Coop. del Campo San Pedro de Guareña). The cooperative produces olive oil and a sub-product with 70 % moisture content that is sent to TROIL for the further extraction of oil. Figure 15 shows the different processes existing in the plant from the arrival of the raw material to the facility provided by the member, the separation of leaves from the olives, the production of olive oil and the extraction of the olive pomace to be sent to TROIL.



Figure 5: Pictures of the oil mill facility visited.

After this visit, a meeting was celebrated in the offices of TROIL agro-industry in order to understand the boundary conditions for the consumption of biomass from olive prunings inside their facilities. In order to cover all issues to be treated, all type of actors involved in the possible new activity were attending to the meeting:

- The agro-industry TROIL (the agro-industry manager and the site responsible)
- The biggest cooperative in the area involving olive tree farmers (Soc. Coop. del Campo San Pedro de Guareña) and with some experiences in the harvesting of olive prunings
- A logistic operator which harvest this type of resources in the area (TABISA servicios y obras SL)
- A biomass burner manufacturer who designs equipment to cover heat demand from this type of resources (Calquega Biomasa)

- The Regional Association of Agroindustries which represents and provide the view of many agro-industries and farmers in the area.

CIRCE joined the meeting to provide their expertise in the biomass field (logistics and combustion) as well as representing SUCELLOG view.

A brief introduction of the scope of the study was provided by CIRCE, highlighting the fact that the amount of biomass from prunings to be used to cover the expected own heat demand is high (between 6000 t/yr to 12.000 t/yr).

TROIL explained the flow diagram of the plant process (Figure 6) and the necessity to install an additional drying system able to process the increase of olive pomace that is expected in a near future. The current drying system is working with the hot gases from the natural gas cogeneration plant existing in the facility. They are olive pits producers (around 2400 t/yr; sub-product from their extraction process) but this resource is sold to consumers demanding a high quality product. They are expecting to use another type of biomass resource at lower price (and quality) in their new drying equipment. Chips from olive prunings can be therefore an interesting resource to be considered. However they do not plan to do themselves the harvesting of the prunings but to contract this service to an external company. The prunings could be provided by the members of TROIL (oil mills cooperatives whose members are farmers with oil tree plantations).



Figure 6: Scheme of TROIL process.

TABISA Servicios y Obras, explained their experiences in the region with the harvest of prunings from holm oak and olive tree plantations. The company highlighted the fact that organising the harvesting and transport of the resource is not a problem if

the owner of the plantation is available. The farmer has to be conscious that the service of harvesting the prunings will cost a similar price of the mulching process that farmers do. In the case that the normal practice is firing the prunings in the field side, the service will avoid the money for transporting the prunings aside and the waste of time in burning and asking for the permit (in case needed).

The manager of the biggest cooperative in the area involving olive tree farmers (in total 10.000 ha; 4.000 ha in 20 km distance from TROIL) explained the characteristics of the plantations from their members and their experiences with similar initiatives that did not end up in reality because of logistics problems. The main problems seem to be: (1) the small average field size in traditional cultivations which seems to be the most appropriate for the mechanizations of pruning harvestings (around 0,2 ha/field); (2) the difficult access to the fields since sometimes the road is not asphalted and a truck would not be able to enter in winter when the soil is wet. However, he declared his availability to provide the contact of some farmers with larger plantations that could be interested in testing the harvesting of their prunings.

Finally and with the aim to prove the possibility to burn olive tree prunings in a feasible way that does not compromise the plant operation, Calquega Biomasa explained their experiences in different type of medium and low quality fuels. Since they are also distributors of drying equipment, they provided the information of new highly efficient drying technology. They offered the possibility to TROIL to visit several facilities working with their products.

The meeting concluded with a visit to TROIL facility. Due to climate conditions (rain), it was not possible to visit some representative plantations around to have an overview of the field and access characteristics.

Some pictures of the meeting and of the visit to TROIL facility are presented below.



Figure 7: Pictures from the visit to TROIL facilities.

2.8.2. Visit to a logistic centre working with holm oak and prunings

2.8.2.1. General data of the meeting

Date: 14th December 2016

Auditor's data:

Name: José Antonio Paz

Organization: Cooperativas Agro-alimentarias de Extremadura

Place: Plant of Provisiona Verde SL (Brozas, Cáceres)

2.8.2.2. Attendants

4 people attended this meeting.

2.8.2.1. Summary of the meeting

The Federación de Cooperativas Agroalimentarias Extremadura and CIRCE carried out a visit to Provisiona Verde logistics centre. The goal was to show to the regional association that there are stakeholders operating already with “non-conventional” resources (olive prunings included) and generating a solid biomass product that is sold in the regional and national market.

A visit to their 2 facilities was carried out showing some of their harvesting machinery, the raw material classification process and pelletising process. The company explained their experience along the years in the pre-treatment process of this type of raw material. Thanks to this show case, it became clear that, when performing a proper pre-treatment process, non-conventional sources can cover from high to medium quality consumers' requirements.



Figure 8: Pictures of PROVISIONA VERDE facilities.

2.9. Cooperativa Agraria Melisanto

2.9.1. Technical experts and policy makers local-scale meeting

2.9.1.1. General data of the meeting

Date: 2nd June 2016

Auditor's data:

Name: Mario Fernández Redondo

Organization: AGACA

Place: Melisanto, S.Coop.Galega (Melide - A Coruña).

2.9.1.2. Attendants

5 people participated in this meeting.

2.9.1.3. Summary of the meeting

The meeting began with a brief presentation of SUCELLOG project, which aims to develop a new concept in logistics of non-forest biomass to supplement the normal activity of agro-industries taking advantage of the synergy between the agricultural economy and biofuels.

It was explained the concept of "non-forest" biomass resulting from the use of some residues (straw, corn stalk, prunings of fruit and/or vineyard, silage, poorly formulated feed, etc.) to transform them into solid biomass biofuel usable in the boiler or heating process. Here comes the first difficulty: is there enough residue to create a biomass logistic centre?

The cooperative has facilities that allow annually produce 40,000 tonnes of compound feed. The possibility of using these facilities as biomass logistic centre depends on the time of installation, the investment required to adapt the equipment and its economic viability. The doubt that existing facilities can be used to manipulate agricultural residues without compromising feed safety also arises.

Another issue of concern arises from the quality of the current biomass: There is ignorance of the qualities of biomass, whether in chip or pellet. Doubts about the size, moisture content, content of impurities, etc., that influence in the final price of biomass. We must also improve the conditions of the supply chain to avoid loss of quality.

About profitability and price stability biomass: The use of biomass is profitable versus fuel oil and heating oil, and lost profitability compared to natural gas and LPG. The price of energy (electrical, thermal) is related to the price of a barrel of oil, which does

not happen with biomass, which keeps prices stable. The problem is the shortage natural gas pipeline in rural areas, which is solved with liquefied gas tankers.

2.10. Os Irmandiños, S.Coop.Galega

2.10.1. Technical experts and policy makers local-scale meeting

2.10.1.1. General data of the meeting

Date: 17th June 2016

Auditor's data:

Name: Mario Fernández Redondo

Organization: AGACA

Place: Os Irmandiños, S.Coop.Galega (Ribadeo - Lugo)

2.10.1.2. Attendants

8 persons participated in this meeting.

2.10.1.3. Summary of the meeting

At the beginning of the meeting a brief presentation of SUCELLOG project was exposed, which aims to develop a new concept in logistics of non-forest biomass to supplement the normal activity of agro-industries taking advantage of the synergy between the agricultural economy and biofuels.

It was explained the concept of "non-forest" biomass resulting from the use of some residues (straw, corn stalk, prunings of fruit and/or vineyard, silage, poorly formulated feed, etc.) to transform them into solid biomass biofuel usable in the boiler or heating process. The difficulty about the use of medicated, poorly formulated feed as a source of biomass for thermal use is suggested.

The cooperative owns facilities that allow annually producing about 80,000 tonnes of compound feed. The possibility of using these facilities as Biomass Logistic Centre depends on the time of installation, the investment required to adapt the equipment and its economic viability.

The cooperative is familiar with seeking funding for new projects. The policy makers attending the meeting commented the ability to access to public aid within the measures included in the Rural Development Plan 2014/2020, for the promotion of the use and promotion of investments in biomass transformation technologies. Specifically, there is a provision of aid for machinery and stores that can reach 40% subsidy with a ceiling of 130,000 € per company.

Currently, according to the data cited in Galicia, there are five factories with an annual output of 170,000 tonnes of pellets from forest biomass. The goal for 2020 is that 25% of the thermal energy needed in Galicia comes from biomass.

Consumers have a lack of knowledge about the qualities of biomass, whether in chip or pellet: size, moisture content, content of impurities, etc., factors influencing the final price of biomass. The biomass price should be negotiated in terms of €/kWh, whether it is pellet as if it is chip, to compare it with the prices of oil or natural gas. Moisture content and particle size influence also in the biomass heating value.

Another issue of concern arises from the need to know the available biomass to use one type or another type of boiler, or use of poly-fuel boilers. For urban consumption the pellet by its high density and less need for transportation is recommended, while for large consumption is expected increased consumption of chip for its easy handling.

At this point we were informed that, according to the Regulation 2015/1186 and 2015/1187, 70 kW boilers have to carry a label indicating the Energy Efficiency Index. The A ++ (EEI \geq 150) class can achieve biomass condensing boilers. In heating appliances up to 50 kW power, class A (EEI \geq 130) can only be achieved with pellets. It was also reported the Regulation 2015/1189 which includes requirements for energy efficiency and air emissions of particulates, carbon monoxide, gaseous organic compounds and nitrogen oxides for biomass boilers up to 500 kW. This Regulation shall not apply to boilers of non woody biomass (which run on straw, seeds, grains, pits and shells).

Some issues about the emissions, both in the use and transport of biomass, diesel and natural gas were also commented. Low temperature biomass boilers product less pollutants emissions, depending on the quality of the biomass. The boiler type and quality of biomass have a big influence in the amount of ash which management can be difficult.

2.11. Cooperativa Agraria Melisanto&Os Irmandiños, S.Coop.Galega

2.11.1. Technical experts and policy makers local-scale meeting

2.11.1.1. General data of the meeting

Date: 20th June 2016

Auditor's data:

Name: Mario Fernández Redondo

Organization: AGACA

Place: AGACA (Santiago - A Coruña).

2.11.1.2. Attendants

6 persons participated in this meeting.

2.11.1.3. Summary of the meeting

In this meeting the possibility of applying the circular economy in the Biomass Logistics Centers (CLB) was analyzed.

The meeting began with a brief presentation of the SUCELLOG project, which aims to develop a new concept in the logistics of non-forest biomass as a complement to the usual activity of agro-industries, taking advantage of the synergy between the agrarian economy and biofuels.

The circular economy tries to increase the added value of the raw materials, looking for new uses to the products once they have reached the end of their expected useful life so that they can be reused to create more value, reducing the generation of waste.

The meeting dealt with the following topics:

- The need to strengthen links between agriculture, research and innovation, in order to improve environmental management and efficiency.
- Encourage greater use of renewable energies and energy efficiency, with the aim of reducing external energy dependence and CO2 emissions.
- The circular economy should be able to promote the activation of the economy favoring the development of rural areas. The Rural Development Groups of the LEADER program can support CLBs for pellet production, increasing the value chain and setting the population in rural areas.
- Intercooperation must take advantage of the innovative approach and synergies that can be derived from the combination of complementary (producer-transformer-consumer) activities.

2.11.2. Biomass boiler provider (Belenus, S.L.) local-scale meeting

2.11.2.1. General data of the meeting

Date: 15 April 2016

Name: Mario Fernández Redondo

Organization: AGACA

Place: Energy Forum - INEGA (Silleda - Pontevedra).

2.11.2.2. Attendants:

2 people participated in this meeting.

2.11.2.3. Summary of the meeting

Taking advantage of the Energy Forum held in Silleda, a meeting was held with a representative of BELENUS, company which is working as biomass boiler provider.

After an explanation of the main items of the SUCELLOG project, the different types of biomass boiler were analyzed at this meeting.

The main conclusions were as follows:

- Types of boiler depending on the biomass:
 - Pellet boilers, with powers between 4 and 35 kW can modulate their power and achieve yields over 90%.
 - Chip boilers have usually higher power (16-80 kW). In the case of large power boilers, the design is usually carried out expressly for the concrete fuel to be used.
 - Multi-fuel boilers with a power of 13 to 1,050 kW, work with vegetal remains: pellets of all kinds, chips, sawdust, wood chips, bark, straw, corn stalk, olive pit, dried fruits shell, wood crushed demolition, etc.
- The exhaust pipe should be beyond the deck and should be a separate pipe.
- They have a type of boiler (STREBEL Taurus), which in the range of 13 kW to 100 kW can use trunks up to 80 cm in length.

2.11.3. Biomass provider (García Forestal, SL) local-scale meeting

2.11.3.1. General data of the meeting

Date: 15 April 2016

Name: Mario Fernández Redondo

Organization: AGACA

Place: Energy Forum - INEGA (Silleda - Pontevedra).

2.11.3.2. Attendants

2 persons participated in this meeting.

2.11.3.3. Summary of the meeting

Taking advantage of the Energy Forum held in Silleda, a meeting was held with Energy Services Manager of García Forestal, S.L., company which is working as biomass provider, especially chips.

At this meeting, an overall vision of the SUCELLOG project was exposed and, after this, the company, based on its expertise, informed us about the different types and qualities of chips which usually works with.

The main conclusions were as follows:

- This company owns a chips drying plant with capacity for 40,000 ton/year, they make the distribution with movable ground trucks or with pneumatic discharge.
- The average quality of the forest chips that they use to provide is 25 % moisture content (M25), size 45-63 mm (P31-P45), ash A1.0, LHV = 3.74 kWh/kg, (ISO 17225.4).
- The type of chip to be used will depend on the type of installed boiler. In this way, for boilers up to 150 kW a P31 chip could be used. The P45 chips will be adequate for larger boilers.



Figure 9: Pictures of the García Forestal, S.L. usual activities.

2.11.4. Silos provider (SuperSilo, S.L.) local-scale meeting

2.11.4.1. General data of the meeting

Date: 15 April 2016

Name: Mario Fernández Redondo

Organization: AGACA

Place: Energy Forum - INEGA (Silleda - Pontevedra).

2.11.4.2. Attendants

2 persons attended this meeting.

2.11.4.3. Summary of the meeting

Taking advantage of the Energy Forum held in Silleda, a meeting was held with Supersilo, S.L., company which is working as silo provider.

Firstly, the general ideas about SUCELLOG project were exposed, following the below topics were discussed:

- The technical requirements of a textile silo for storage of biomass in pellet, were exposed by the general manager of Supersilo. This kind of silo has a simple assembly, not necessarily near the boiler depending on the available space.
- They use to supply silos with different sizes (from 1.20 x 1.20 m to 3.00 x 3.00 m), with extraction by means of rigid or pneumatic screw.
- Costs: Silo 2,00x2,00x2,50 m (3,5 t of pellet), could cost around 1,700 €.

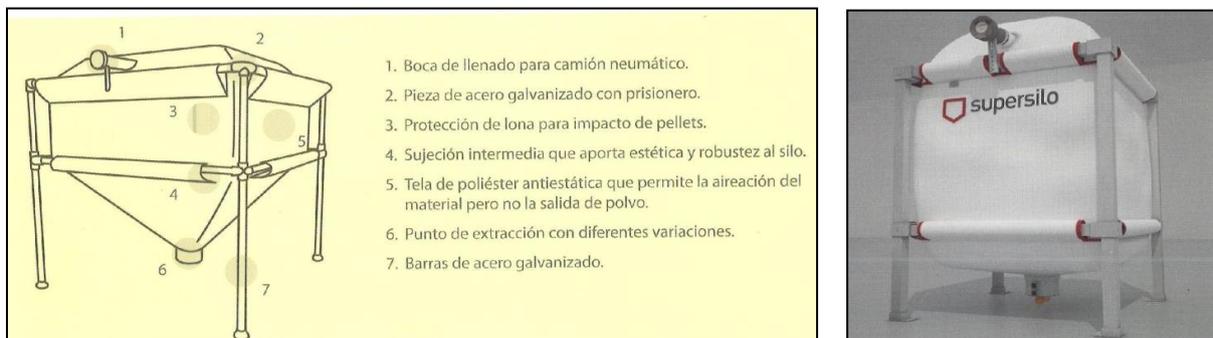


Figure 10: Pictures of a silo of SUPERSILO, S.L.

2.11.5. Energy Services Company (Servicios Integrales Emapel, S.L.) local-scale meeting

2.11.5.1. General data of the meeting

Date: 20 June 2016

Name: Mario Fernández Redondo

Organization: AGACA

Place: Biomass Forum - INEGA (Silleda - Pontevedra).

2.11.5.2. Attendants

2 persons participated in this meeting.

2.11.5.3. Summary of the meeting

Taking advantage of the Biomass Forum held in Silleda, a meeting was held with Servicios Integrales Emapel, S.L., company which is working as biomass provider.

Firstly, the general ideas about SUCELLOG project were exposed, following the general manager of Servicios Integrales Emapell, S.L. showed us the main activities of his company. They use to supply forest pellet in bags of 15 kg for domestic use: the price is 3,00 €/bag in pallet of 1000 kg. The average quality of the pellet is A1: 10% moisture content, size 40 mm, ash <0.7 %, LHV = 4.60 kWh/kg, (ISO 17225.2). It is not EnPlus certified.

Some issues about the general quality of the pellets were also commented:

- The best quality pellet is supplied by beech wood, although there are good pellets of pine wood (in roll without bark).
- For the performance of the boiler it is essential that the biomass has a certain quality and above all that it is constant. The periodic cleaning of the boiler (ash) also influences its performance.



Figure 11: Pictures of the facilities of Servicios Integrales Emapell, S.L.