Deliverable Nº 1

CURRENT BIOMASS MANAGEMENT PLAN OF SERRA

UPV

11/30/2018

This document presents the current biomass and forest management strategy of Serra's municipality.

CURRENT BIOMASS MANAGEMENT PLAN OF SERRA

ACTION A.1: Updating and modelling of Serra's forest and biomass management approach

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Deliverable 1; name: *Current biomass management plan*

Beneficiary responsible: UPV

Action A.1: *Updating and modelling of Serra's forest and biomass management approach*

From month 4 – month 5

Name of the Deliverable	Number of associated action	Deadline
Current biomass management plan	A.1	11/2018

1. Introduction

The construction industry, as secondary residences, followed by the secondary sector (because of Valencia's proximity), has always played a main role in the economic structure of Serra's municipality since 1960, leaving the primary sector, which includes forestry and agriculture, as a complementary activity. As a result, there is a flow of labor from the primary sector to more the productive ones that causes the abandonment of forestry and agricultural activities. This land abandonment degrades the landscape and increases the risk of wildfires, pests and outbreaks, which definitely compromises the Natural Patrimony of Serra and the future of Serra Calderona. Furthermore, the effects of the collapse of the Spanish property bubble at 2008 that destroyed the construction industry and severely diminished families' purchasing power, increased not only the land abandonment but also the village.

Under this context, Serra's municipality decides to change its productive and economic model, and following the EU rural development guidelines, Serra develops a strategy towards the local employment creation by fostering sustainable activities and circular economy. In this sense, Serra's location, a forest area close to Valencia city, facilitates the possibility of setting agricultural and forestry activities, together with a sustainable tourism as a booster of its economic development. This change includes the biomass production (and consumption) as it constitutes a renewable and low-carbon feedstock that contributes to circular economy at the same time that can be used to reduce greenhouse gas emissions and resist global climate change. Serra considers that wood-based energy is an appealing and growing opportunity for the forestry community, whose demand is increasing as society seeks more renewable sources of energy. Using woody biomass as an energy source is both a tremendous opportunity and challenge. The opportunity is for economic growth that works hand in hand with improved forest management and ecosystem enhancement. The challenge is that, if poorly carried out, forests can be damaged and livelihoods endangered. Therefore, the development of wood energy requires careful consideration, good information for decision makers to analyse options and of course, an adequate forest management planning.

2. Background

The first biomass production project developed by Serra was carried out on 2012, and it only included gardening residues of the public facilities. Serra collected all these residues (about 1290 Tn), dry them, convert them into pellets and consume it by substituting the heating system of some public buildings. This experience resulted in saving around 19.000 €/yr considering not just the fuel substitution (electric power was substituted by biomass), but also the fact that it was not necessary anymore hiring a company to manage the gardening residues.

After this positive experience, Serra aimed to increase the production, change all heating public system and include forest residues into the pellet processing, as it for sure would increase the quality of the final product. These aims lead to the current biomass management plan of Serra's municipality.

3. Objectives

The main goal of the action A.1 is to update and improve the current forest management approach running at local scale in the municipality of Serra. In this sense, this particular deliverable contributes to this action by compiling the information about the current forest and biomass management strategy: biomass origin, production (quantity and quality), consumption, commercialization, CO2 emissions and jobs.

4. Methodology

This deliverable aims to compile all the information about the biomass processing and exploitation of Serra's municipality and transform it into a technical document that defines the current forest and biomass management strategy. To that end all the information was provided by Serra to UPV, who compile it and developed the technical document. This document was subsequently discussed with Serra in order to assure its accuracy and clarity.

The CO_2 emissions by gasoil and biomass are calculated according to del Canvi Climàtic, O. C. (2013), where the following conversion is established:

- CO_2 emissions by gasoil: 2,79 kg CO2/l de gasoil
- Biomass CO2 emissions are considered as neutral as the CO2 emitted has already been fixed by the plant.

5. Description of the activities

The activities carried out to accomplish this deliverable are:

1.- Initial meeting with Serra's municipality to organize the work and compile all the information. This meeting was held in Serra at November 12th of 2018 and the participants were María González Sanchis (UPV) and Pilar Moce.

2.- Elaboration of the technical document by the UPV using all the information provided by Serra, which is:

- History of the biomass processing and exploitation of Serra.
- Analysis of the quality of the pellets with forest biomass.
- Inventory of biomass management facilities of Serra.
- Current pellet production and consumption of Serra's municipality.

3.- Discussion of the document between Serra and UPV by means of 2 meetings.

4.- Inclusion of Serra's suggestions into the document by UPV.

6. Results and conclusion

As mentioned in the introduction, the first biomass production strategy of Serra was based on agricultural and gardening residues. The positive results obtained from this experience leaded to the current strategy, where the wood-based energy is obtained **from agricultural and gardening residues', but also from its forests, where Aleppo pine is the main spices.** This improvement produced changing form an initial biomass heater of 35 kw to a heater of 250 kw, and therefore moving from the city hall basement to a bigger biomass management plant with enough space to store the woody-biomass.

Regarding to the origin of the woody-biomass:

- The gardening residues come from public gardens. These residues are carried to the biomass management plant where they are separated in two groups according to the wood content. One group, the one with enough woody material to produce a high quality pellets, is introduced into the pellet processing, while the other one is just grinded and converted into mulch. Likewise, the agricultural residues are managed in a very similar way. The residues are collected from the agricultural fields, and separated into the same two groups. In this case, the classification is carried out in the agricultural fields, so the mulch can be directly placed into the field, while the residues designated to pellets are carried to the management plant facilities. This strategy reduces not only the costs derived from the management of the public gardening residues, but also the fire risk, as the usual management of agricultural residues is its burning into the fields.
- The forest biomass extraction is just based on salvage and sanitation cutting. In other words, nowadays, the local community is only allowed to cut dead or ill trees. During the last 10 years, the region has experienced several drought periods, being the last one (occurred in 2014) highly severe. This consecutive drought events, together with the high tree competence derived from the lack of forest management, has led to an important tree mortality increase. As a

consequence, the regional government issued a Law-decree (*Orden 25/2014, de 29 de octubre, de la Conselleria de Infraestructuras, Territorio y Medio Ambiente*) where dead or ill trees can be cut down in order to prevent from pests. Therefore, the dead trees or if the case, severely ill, are selected, cut and carried to the biomass process plant, where they are transformed into pellets.

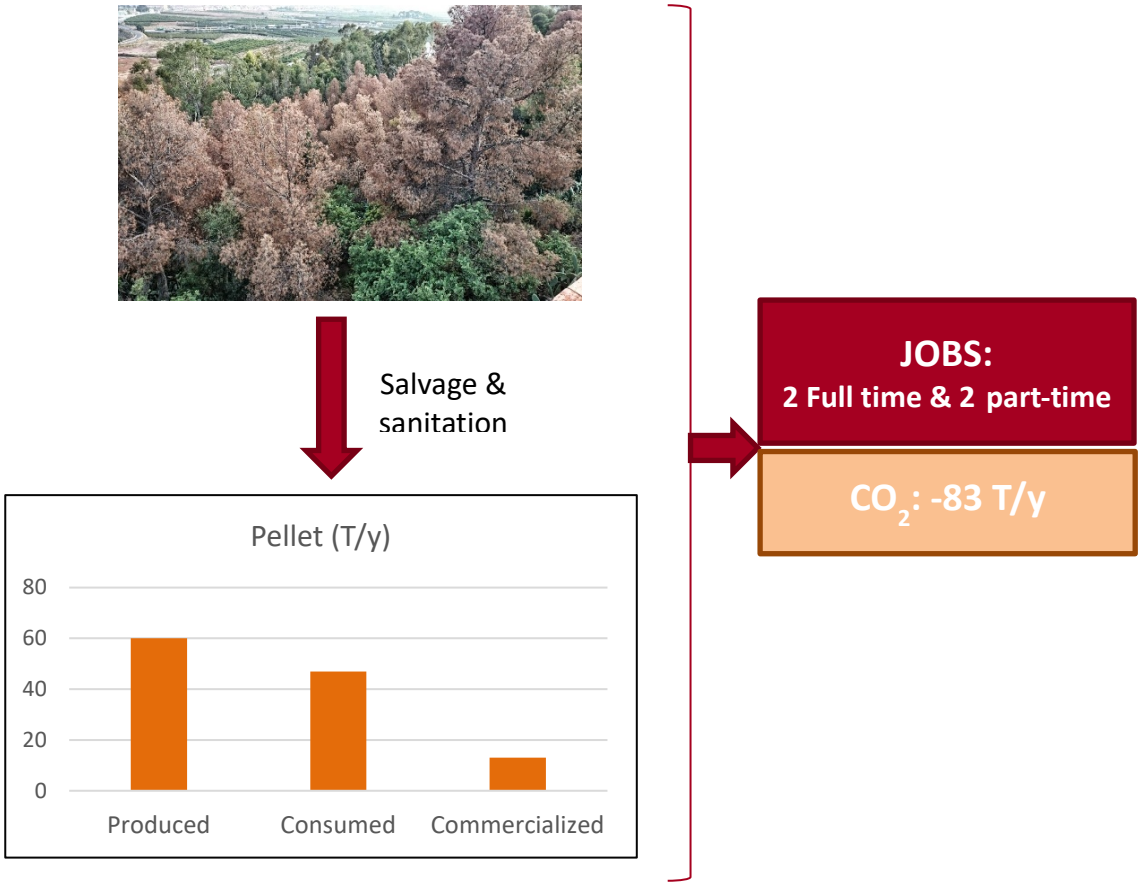

Figure 1: Scheme of the current biomass management approach.

As a result, the forest biomass generates a much higher quality pellet than agricultural or gardening residues. Hence, the main component of Serra's pellets nowadays comes from the above mentioned forest management, while the other 2 components (agricultural and gardening residues) oscillates between 5 and 15 % of total composition. The **yearly pellet production is 60 T/y, where 47 T/y is consumed by the heating system of public Serra buildings', and 13 T/y is commercialized. The pellet production process generates 2 full time jobs and 2 part-time jobs**, and saves the equivalent of 30 Ml diesel fuel and avoid emitting **83 tons of CO_2**, considering that 15 Kg of pellets are energetically equivalent to 7.5 l of diesel fuel (see Figure 1).

The pellet commercialisation does not just look for making money, but for boosting the circular economy and environmental sustainability. Hence, the pellets sold to Serra's population are commercialised at cost price, and economic grants are fostered in order to promote the change to a biomass heating systems in the entire neighbourhood.

Once we know what and how is Serra producing biomass, this deliverable constitutes the starting point of the project from which it will increase the biomass production together with the quantification and valorisation of other goods and services derived from Serra's forest management.

6. References

del Canvi Climàtic, O. C. (2013). Guía práctica para el cálculo de emisiones de gases de efecto invernadero (GEI). *Oficina Catalana del Cambio Climático: Barcelona, Spain*.