

Innovative Silo for the Supply of Wood Chips (SISE)

Summary

The Innovative Silo for the Supply of Wood Chips (SISE) is an innovative concept with significant potential to disrupt the marketing of biomass and optimise consumption for a wide range of customers and buildings. SISE will offer biomass producers, distributors and consumers a new product to use biomass for heating systems. This project targets all areas related to climate action, the environment, resource efficiency and raw material optimisation, in addition to the circular economy, nature-based solutions, climate services, and sustainable raw material supplies, in accordance with the work lines set lines by the Europe Union.

The pilot silo (SISE) will have the capacity for roughly 240 m³ of forest wood chips, which is the volume normally used for large and medium-sized automatic biomass boilers, and will be located in an area where major biomass consumption has been detected or is expected to be detected. The silo will have a loading system with the capacity to receive two 90-m³ moving floor trailers, which will transport the wood chips from the Celrà production centre to the geographical distribution area. Additionally, there will be an unloading system to supply the wood chips to small trucks with a capacity of 20 to 40 m³, which will distribute the wood chips at the retail level. The silo will be fully automated, which means that the control and weighing of the loaded and unloaded wood chips will be automatic and controlled by the production centre at Celrà, regardless of where the silo is located.

A little context is in order. In 2005 and 2006, it was found that it was necessary to continuously supply a wood chip installation and solutions were sought from various companies. The idea of biofuel logistic optimisation was developed, but the biomass market was not consolidated enough to warrant investment in this material, and therefore the idea of an intermediate supply silo did not consistently materialise. In 2015 and 2016 the SECURECHAIN project (www.securechain.eu) established a relationship with technicians and researchers from the Polytechnic University of Catalonia (UPC) and the Forest Science and Technology Centre of Catalonia (CTFC). This resulted in the submission of the idea to the 2016–2017 subsidy programme for the creation of task forces, whereupon it became the SISE project.

The pilot silo will be constructed and used for demonstration purposes. An analysis will be undertaken to determine whether the quality required by the customers is maintained and the level of satisfaction of the end customer and the logistics operators will be assessed. Studies will be conducted on the impact of the system's carbon footprint, the potential jobs that could be created, new market niches and the company's increased competitiveness. The final action will be the dissemination of the system to inform the various agents in the sector.

The expected results are the improvement of the company's competitiveness, the improvement and optimisation of biofuel logistics in the region where the pilot is implemented and a better guarantee that the end customer will be supplied, consequently optimising the resources involved.

Objectives

1. Construct an innovative prototype for the supply of forest wood chips.
 - 1.1. Prepare an Executive Project.
 - 1.2. Secure a demonstration site.
 - 1.3. Turnkey installation of the pilot silo.

2. Analysis of the operation of the prototype.
 - 2.1. Confirm the maintenance of the quality and technical specifications of the stock fuel in the silo.
 - 2.2. Assess the degree of satisfaction of the logistics operators (who load the silo).
 - 2.3. Assess the degree of satisfaction of the local distribution network (who unload and make delivery to the end customer).
 - 2.4. Assess the degree of satisfaction of the end customers.

3. Optimise the distribution of the forest wood chips.
 - 3.1. Reduce the carbon footprint of the biofuel value chain.
 - 3.4. Estimate the increase in competitiveness of the company promoting the solution.

4. Impact and dissemination of the results of the project.
 - 4.1. Estimate the capacity to create jobs in the region where the silo is installed.
 - 4.2. Estimate the creation of new local market niches thanks to the installation of the silo.
 - 4.3. Analysis of the relevance of this technology on the international level.

Description of initiatives outlined in the project

1. Build the pilot biomass (forest wood chips) automated supplier silo.
 - 1.1. Preparation of the executive project.
 - 1.2 Location and conditioning of the site.
 - 1.3 Turnkey installation/assembly of the demonstration silo.
 - 1.4 Commissioning and testing.

2. Analysis of the operation of the pilot.
 - 2.1 Assess and compare the quality and technical specifications of the stock fuel in the silo.
 - 2.2 Assess the degree of satisfaction of the logistics operators.
 - 2.3 Assess the degree of satisfaction of the local distribution network.
 - 2.4 Assess the degree of satisfaction of the end customers.

3. Optimise the distribution of the forest wood chips.
 - 3.1 Assess and calculate the carbon footprint of the biofuel value chain.
 - 3.2 Calculate the increase in competitiveness of the company promoting the solution.

4. Impact and dissemination of the results of the project.
 - 4.1 Calculate the capacity to create jobs in the region where the silo is installed.
 - 4.2 Calculate the creation of new local market niches thanks to the installation of the silo.
 - 4.3 Analysis of the relevance of this technology at international level.

Expected results and practical recommendations

The project is expected to have strong repercussions on the scale of the territory and the sector. Once the project has been developed, the biomass (forest wood chips) supply market will substantially change. This will therefore disrupt the traditional supply chain. Currently, the forest wood chip distribution market is limited by transport from the production plant to the consumption site. This geographic area has a distribution radius of approximately 100 km from the

production centre due to the characteristics of forest wood chips: low weight and high volume. Therefore, breaking the physical barrier that this distance represents is vitally important for the development of the production centre. This will be achieved by this automated silo project. The forest wood chip market for automated biomass boilers requires permanent production centres that are capable of producing a high-quality, homogeneous material, and solid biofuel customers and consumers are increasingly demanding a quality guarantee. Therefore, this silo model will maximise the production of biomass production centres, making it possible to distribute beyond the natural geographic area.

This innovative approach is based on the fact that the biomass can be delivered 24/7 with an automated system. Therefore, instead of having to transport biomass from the processing plants directly to the installations using inefficient means, with the SISE biomass can be supplied at an intermediate point using a smart system to plan and schedule optimal transportation.

- It provides biomass to customers using more efficient means.
- It increases the number of potential customers that otherwise would not use biomass.
- The system will provide real-time control data and there will be no third parties involved in the process.
- Benefits for the end customers:
 - It will not be necessary to wait for delivery: they go to the SISE centre when they need to.
 - More reliability, as it is a non-seasonal supply.

Task force leader

Entity: **SALA FORESTAL SLU**

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Typology of entity:

Forestry company

Task force coordinator

Other task force members (grant beneficiaries)

Other task force members

Entity: **Forest Science and Technology Centre of Catalonia (CTFC)**

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Typology of entity:

Technology centre

Entity: **Polytechnic University of Catalonia (UPC)**

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Typology of entity:

University

Subject area(s) of application

Energy management
Farming/forestry competitiveness and
diversification
Forestry

Geographical area(s) of application

<i>Province(s)</i>	<i>Region(s)</i>
Girona	Osona
Barcelona	Berguedà

Dissemination of the project *(publications, conferences, multimedia...)*

Communication plan:

- 1) Conduct a SWOT analysis for the entire project and establish the system to strengthen, improve and/or foster the various aspects of the system.
- 2) Establishment of the recipients, the target public.
- 3) Define the message to be transmitted: SISE as machinery for potential partners or SISE for the end customer.
- 4) The channels to transmit the message will be: the Biomass Cluster of Catalonia and at least one demonstration event.

Additionally, research centres (UPC and CTFC) will issue at least two publications related to the system, one of which will be a scientific or technical publication.

Project website

www.salaforestal.com

More information on the project

Project dates

Starting date (month-year): June 2018

Completion date (month-year):

Current status: *Underway*

Budget approved

Total budget: €181,250.00

DARP funding: €72,318.75

EU funding: €54,556.25

Own funding: €54,375.00

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Order ARP/133/2017, of 21 June, approving the regulatory bases of grants for cooperation for innovation through the promotion of the creation of European Association for Innovation task forces in terms of agricultural productivity and sustainability and the execution of innovative pilot projects by these groups.

Resolution ARP/1868/2017, of 20 July, calling for applications for grants for the year 2017.

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