



Innovative Silo for the Supply of Wood Chip (SISE)

Introduction

The SISE platform, the Catalan acronym for Innovative Wood Chip Supply Silo, is an automated logistics warehouse for chip distribution, which allows quality chips to reach all points of the region, thus optimising the biomass distribution chain and reducing the CO₂ footprint from transport. The SISE platform has a storage capacity of 190 m³ chips. The chips are supplied in 90-m³ trailer trucks from the main production plant in Celrà. Next, small, authorised local trucks (30-40 m³) are responsible for local distribution from the SISE platform to the end customer's silo. The SISE platform works without personnel thanks to an automated system that allows the persons responsible for transport, whether loading or unloading the chips, to work without additional help. The platform automation provides significant flexibility in wood chip delivery times to customers' silos, as it depends only on local carriers unloading over short distances. Automation and absence of staff with the SISE platform means a monitoring system had to be developed which was capable of predicting and managing demand, learning automatically as the platform delivers chips to customers, thereby optimising the transport flow to ensure the silo always has enough chips. The SISE platform is strategic for the development of biomass as renewable energy. The actions involved in the SISE project started with drawing up a master plan to provide the technical documentation for its construction. At the same time, while the master plan was being produced, a field study was carried out in order to find the ideal location to build it. Building started once the master plan was complete, the location established, and all administrative documents were prepared. Now built and in the testing phase, its operation is being analysed. No mechanical deficiencies or problems that impede loading and unloading have been observed. Analyses were also carried out to ensure the chips in the SISE maintain their quality standards and technical specifications. At the same time, a survey system analysed the degree of satisfaction among both logistics operators and end customers. Finally, the carbon footprint before and after the implementation of the SISE was calculated.

Lessons Learned

The most conclusive end-result from the SISE platform shows that this new logistics distribution model reduces CO₂ emissions by over 110%. A standard 7-tonne load of wood chips at 30% humidity transported 120 km by pneumatic truck with 30 m³ (24.59 MWh) of storage capacity, where the chips are kept until delivered to the end customer, produces 94.67 kg of CO₂ emissions, while with the SISE system, a standard 7-tonne load of wood chips at 30% humidity over 120 km, 100 km by trailer (90m³) to the SISE and 20 km by 30 m³ pneumatic truck

(24.59 MWh) to the end customer, produces 44.51 kg of CO₂ emissions. Thus, the SISE system cuts CO₂ by 50.16 kg per trip (113% reduction in CO₂ emissions using the SISE). A further conclusive result found there were no significant differences after testing chip samples obtained from the SISE, based on current regulations (UNE-EN-ISO 17225, UNE-EN-ISO 18122, UNE-EN-ISO 18125, UNEEN-ISO 18134), hence the chip maintains its quality and technical specifications within the SISE. General conclusions regarding the use of biomass as fuel are:

- It reduces greenhouse gas emissions
- It reduces external energy dependence by improving supply security and internalising the energy bill.
- It improves sustainable forest management.

Regarding the SISE system, it maybe be concluded that:

- It ensures regularity and homogeneity of supply. A frequent problem with the supply of wood after 9-month drying period is that it does not coincide with the period of demand for wood chips in a region (mostly in colder periods).
- Biomass reaches the end customer's silo with:
 - A smaller CO₂ footprint.
 - Guaranteed quality.
 - Fast order delivery response. - It boots the number of potential customers, who would otherwise not consider biomass as a fuel, thus helping reach established countrywide penetration targets for renewables.
- Quality biomass is provided throughout the country.
- Data on chip quality and real-time consumption are obtained, which were hitherto unavailable outside the academic world.
- Greater reliability, as it is a non-seasonal supply.

The information presented in this factsheet was developed by the FOREST4EU partner, drawing on the innovations and knowledge generated by the indicated operational group with their explicit authorization.

Further information

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