

Ametller Origen - Hub Mont-roig

Circular Agro-Industrial model for sustainable food production

PROJECTE DESCRIPTION

Ametller Origen is a Catalan company founded in 2001, dedicated to agricultural production, agri-food processing, and the distribution of fresh and prepared products through its own network of stores across Catalonia. Its model integrates the entire value chain, from cultivation to marketing, with the aim of strengthening the competitiveness of the Catalan agri-industry and responding to new consumer demands.

Following the launch of the Agroparc Penedès, considered the first circular agro-industrial district with a positive energy balance and a negative carbon footprint, the company is now promoting the Mont-roig Hub.

The project foresees more than 50 hectares of technical greenhouses and facilities dedicated to horticultural production and to research and innovation activities in new production systems. The design of the Agroparc is based on principles of circularity and sustainability, integrating renewable energy generation, efficient water management, and the valorisation of agricultural and agro-industrial by-products.

The main objectives of the project are:

- Fresh food sustainably and efficiently produced
- Ensure energy self-sufficiency through 100% renewable sources.
- Implement a circular model for water management and agricultural by-products.
- Promote research and innovation in cultivation techniques and alternative proteins.
- Generate employment and stimulate the region's agri-food economy.



BARRIERS IDENTIFIED

The development of the Mont-roig Hub has highlighted a series of challenges that must be addressed to ensure its technical, economic, and social viability. The main barriers identified are the following:

- **Project scale and financing:** the required investment (over €10 million) calls for exploring innovative public-private collaboration models and financing mechanisms suited to a pioneering, large-scale project.
- **Regulatory and urban-planning complexity:** integrating technical greenhouses, energy facilities, and agro-industrial activities within the same site involves long and complex administrative procedures, including environmental, urban-planning, and activity permits.
- **Selection of valorisation technologies:** determining the optimal technologies to make use of by-products (anaerobic digestion, pyrolysis, biochar, etc.) is essential to ensure energy self-sufficiency, reduce the carbon footprint, and achieve territorial integration.
- **Lack of internal technical resources:** despite its experience in agri-food production and distribution, the company did not have sufficient internal technical capacity to design an integrated circular strategy for waste, energy, and by-products.
- **Territorial and social integration:** the scale of the project requires establishing strong connections with local stakeholders (public administrations, waste managers, agro-industries, and technology providers) to ensure the use of available resources, the creation of synergies, and the social acceptance of the project.



HOW BIOBOOST HAS HELPED IN THIS PROJECT?

In an initial phase, and in order to address three of the identified barriers, BioBoost has carried out a set of technical tasks to design an integrated circular strategy for waste management, its valorisation, and energy generation.

1 Biomass and Residual Flows mapping

The first step was the identification and quantification of the **resources available in the territory** in order to make the project more integrated and systematic. According to initial data provided by Ametller Origen, the Hub would generate 15,000 tonnes of horticultural waste annually. To improve the energy potential as well as the nutritional quality of the co-digestible materials, BioBoost mapped the region's potential considering the use of pig, horse, and poultry manure. Likewise, flows with technical or regulatory limitations—such as sewage sludge, certain agro-industrial residues, and supermarket food waste—were excluded.

2 Preliminary technical Feasibility Study

Based on this, an analysis of the **biogas production potential** through anaerobic digestion was carried out. The study made it possible to estimate energy yields and define investment needs depending on the combination of substrates.

This work highlighted the importance of selecting optimal proportions to maximise the biogas generated while ensuring the economic viability of the project.

3 Definition of By-product Valorisation Models

Another key area was the analysis of the digestate resulting from anaerobic digestion. BioBoost proposed its **transformation into fertilisers and organic soil amendments**, and suggested combining it with biochar to obtain higher-quality products.

This strategy not only improves soil fertility and water retention capacity but also ensures stable carbon sequestration, contributing to climate objectives and agricultural regeneration.

4 Exploració de tecnologies complementàries:

BioBoost has studied the feasibility of integrating a **pyrolysis plant for the treatment of non-fermentable waste**, such as forest residues and local pruning materials.

Pyrolysis provides a value-added product, biochar, which when combined with digestate can result in advanced soil amendments. This technology also opens the door to diversifying energy sources and products, strengthening the resilience and circularity of the Agroparc.

HOW BIOBOOST HAS HELPED IN THIS PROJECT?

5 Design of a Circular Energy System

The final proposed project goes beyond a biogas plant. BioBoost has defined an **integrated model that combines a 7 MW photovoltaic installation with a 1 MW biogas cogeneration unit and the incorporation of pyrolysis as a complementary technology.**

In this way, the energy self-sufficiency of the site is ensured while maximising the use of the organic resources available in the territory.

6 Strategic and Investment Support

Finally, BioBoost has supported Ametller Origen in the conceptualisation of the project, preparing a **preliminary technical and economic proposal to size investments and scenarios.**

The **environmental and territorial impact has also been analysed, identifying social and economic benefits** that strengthen its integration with local and institutional stakeholders.

ENERGY VALORIZATION SCENARIOS

To assess the **real possibilities for biogas production in the Mont-roig project**, different combinations of agricultural and livestock residues available in the territory were analysed. This analysis made it possible to quantify the energy potential, estimate investment needs, and evaluate the profitability of each alternative. The results were summarised into three scenarios that serve as a basis for decision-making regarding the optimal design of the anaerobic digestion plant.

SCENARIO 1

Vegetable residues combined with 40% pig slurry.

Estimated production: >1.3 M m³/year
 Approximate investment: €3.4 M

SCENARIO 2

Use of all available pig slurry, in addition to vegetable residues.

Estimated production: 1.75M m³/year (+27%)
 Approximate investment: €4 M

SCENARIO 3

Poultry and horse manure added to Scenario 2 flows.

Estimated production: >2.16M m³/year;
 Approximate investment: >€4 M



LESSONS LEARNT AND CONCLUSIONS

The analysis carried out within the framework of BioBoost has shown that large-scale agro-industrial projects **can only progress with strategic and integrated planning**. Resource mapping is essential to understand the real availability of biomass and to ensure a stable supply of organic residues. Without this information, the technical and economic risk of the project increases significantly.

It has also been confirmed that **the composition of the available organic residues has a direct impact on the performance and economic viability of the biogas plant**. Scenarios that appear more ambitious in volume may generate only marginal energy gains while requiring substantial additional investment. This experience highlights the **need to find a balance between resource availability, energy yield, and investment costs**.

The integration of complementary technologies, such as pyrolysis and biochar production, **opens new opportunities for valorisation and improved environmental sustainability**. However, it also brings technological, financial, and regulatory coordination challenges that require a gradual and well-planned approach.

Finally, the project has demonstrated the **importance of connecting technical development with the territorial context**. The involvement of local stakeholders, the pursuit of social acceptance, and the definition of a model that delivers economic and environmental benefits to the region are essential factors for the project's viability and acceptance.

In conclusion, the Mont-roig Hub has the potential to become a benchmark in circular and energy-self-sufficient agro-industry, provided it moves forward with a strategy based on real data, careful technology selection, and strong engagement from territorial actors.

