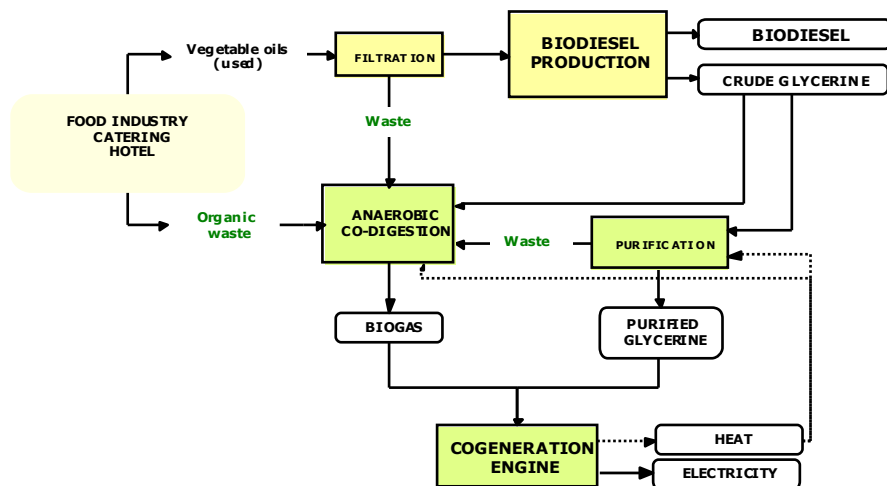


Background

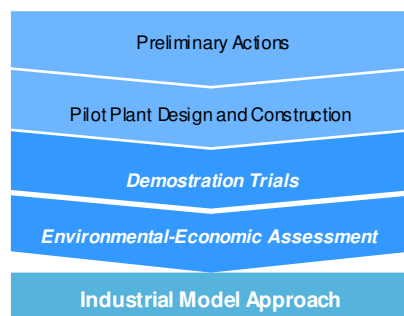
In Spain, most of the 500.000 t/year of bio-residues generated in the food service industry and catering activities are not valorized. The Waste Framework Directive (2008/98/CE) points out the importance of separate collection of these bio-residues and their valorization through composting or anaerobic digestion. Particularly, used vegetable oils generated in these sectors are already being collected and primarily used as feedstock in the biodiesel production industry.

Project Description

The **objective** of the INTEGRAL-b Project is to demonstrate the increased sustainability of biodiesel production plants utilizing used vegetable oils as feedstock. This is achieved by integrating in one installation an anaerobic process which allows energetic valorization of generated waste and other complementary organic bio-residues together.



The 3-years-project covers the development of the following **principal activities**:

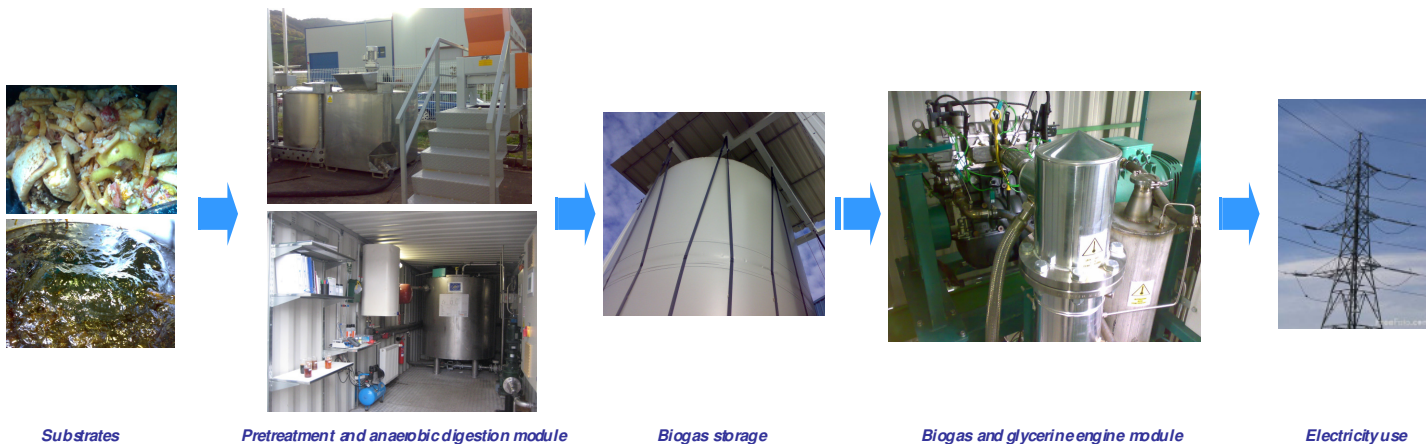


The Project goal is focused on **integrating biodiesel and biogas plants**, through the implementation of anaerobic digestion processes to valorize bio-residues coming from hotel, restaurant and catering activities (horeca) together with waste generated in the biodiesel production plant itself, such as glycerine. This new approach seeks to improve biodiesel plants energy balance and to offer a solution for bio-residues recovery and valorization as required in the new Waste Framework Directive.

Demonstration Pilot Plant

The demonstration pilot plant is located in the biodiesel plant of BIONORTE (Asturias) and comprises two **main modules**:

- **Anaerobic digestion module** for biogas production, which is based on a 10 m³ fermenter, fed with organic waste coming from restaurants leftovers and from biodiesel production. These substrates are previously crushed, pasteurized and mixed, and then, loaded to the digester. Biogas, which can be produced in rates up to 1m³/h, is stored in a 20 m³ gasometer for its further use as fuel in the engine. All process parameters are automatically registered and locally and remote controlled, and a small laboratory set up in the module is used to control biological process aspects.
- **Alternative internal combustion engine** coupled to a 15 KW asynchronous generator. The engine was adapted to be fed with a mixture of biogas produced in the anaerobic digestion and additionally with about 2 l/h of glycerine coming from the biodiesel plant. The module enables electricity generation and a partial heat recovery required for the glycerine conditioning subsystem. The operation is fully automatic and allows remote monitoring and control.



As a result of the experimental demonstration trials, important data and information will be generated for further sustainability and economical feasibility evaluation, by means of a Life Cycle Analysis (LCA).