

## Background

Semi-natural grasslands are strongholds of biodiversity and under special protection and management restrictions concerning cutting date and fertilisation. This management causes high concentration of fibres and low nutritional value in the biomass which therefore is of low quality for animal nutrition and conventional bioenergy conversion through anaerobic digestion. The integrated generation of solid fuel and biogas from biomass is able to convert this fibre-rich material into a solid fuel with improved combustion characteristics through the reduction of minerals detrimental to combustion.



## The Process

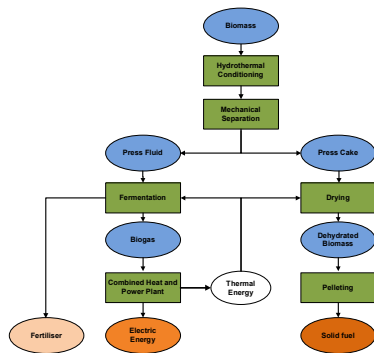


Fig. 1. Scheme of the IFBB process

The Biomass is harvested and ensiled. After that it is mashed with warm water and pressed through a screw press.

The press fluid is used in anaerobic digestion. The digestate can be used as a fertiliser, the biogas is burned to produce electricity and heat, which are re-used within the system to dry the press cake. The dried press is then compacted and ready to serve as a solid fuel.

## The Prototype

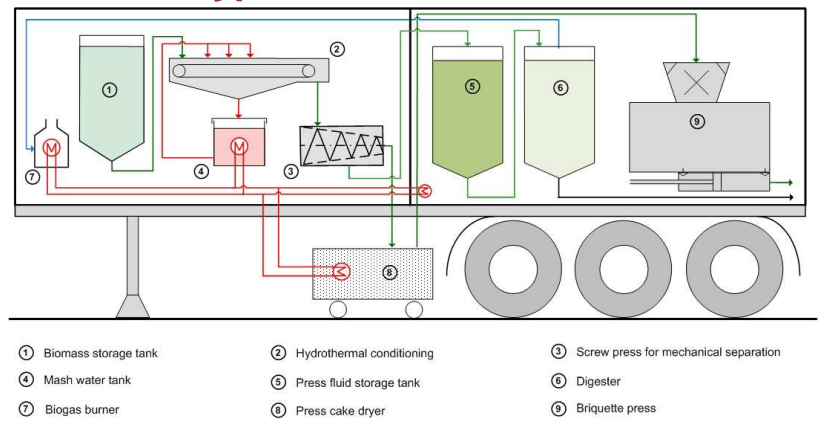


Fig. 2. Scheme of the mobile prototype

## Results

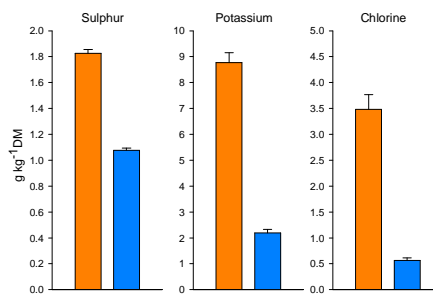


Fig. 3. Average concentrations of minerals detrimental to combustion in untreated extensive grassland silage and press cake of the IFBB system

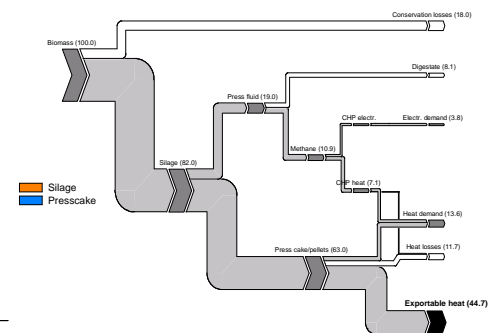


Fig. 4. Energy conversion efficiency of an IFBB plant

## Outlook

The IFBB process has been successfully tested both on laboratory and on prototype scale. The prototype has proven its value in several European projects (PROGRASS, COMBINE, DANUBENERGY). The first commercial IFBB plant started its operation in 2013 in Baden-Baden. New projects look into the implementation of the IFBB system in other European regions.

