



 **BIOMAL**

The new demonstration plant in Karlskoga, Sweden, producing 85 000 tons/year of renewable Biomal™-fuel. The grinding plant is partly funded by LIFE

From a rest product to a fuel
Animal by-products are crushed and
grinded to the renewable fuel Biomal™

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Environmentally favourable
Financially advantageous
Energy effective
Safe
Concept
for handling
Animal by-products



www.biomal.com

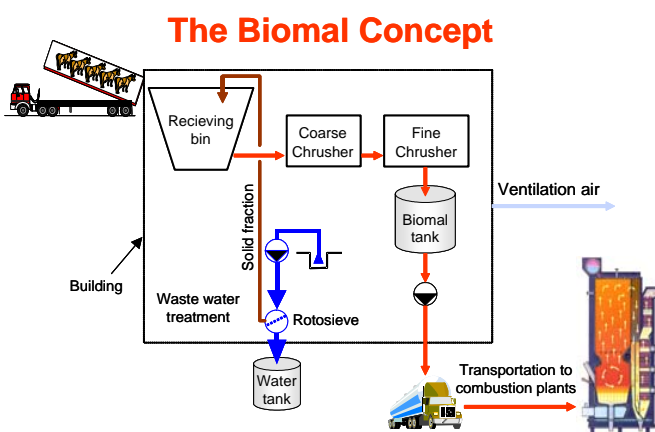


The LIFE Environmental project BIOMAL, which started in January 2004, has now successfully been completed. A new fuel preparation plant has been taken into operation in Karlskoga, Sweden, producing 85 000 tons of Biomal fuel annually from animal by-products.

The invention

Within the European agricultural sector about 16 million tons of animal by-products are produced annually. These by-products have to be taken care of and the conventional way is to render the animal-by-products to meat and bone meal after separation of the animal fat. The rendering process is energy consuming and unnecessary complicated and expensive.

A less complicated concept to take care of the animal-by-products was hence developed by the companies **Konvex** and **S.E.P. Scandinavian Energy Project** in close cooperation with **Karlskoga Heat and Power Plant**. The raw material, carcasses and rest products from slaughter houses, is just crushed and grinded and used as a fuel in conventional district heating plants. The concept is called the Biomal concept and the fuel produced is called Biomal.



A schematic drawing of the Biomal concept

Advantages

Compared to a conventional rendering process the Biomal concept has several advantages:

- The risk for BSE-infection or other diseases is eliminated.
- The Biomal concept is an energy effective method
- The risk for smell is reduced
- The water usage is reduced
- The discharge of organic substances is reduced

The LIFE project

Within the scope of this project a new modern grinding plant for production of Biomal has been constructed and taken into operation in Karlskoga, Sweden, with a yearly capacity of 85 000 ton. The project started in January 2004 and the grinding plant was inaugurated in November 2006.



Inauguration of the new grinding plant in November 2006

The main goal with the LIFE project has been to build this new grinding plant and demonstrate the new Biomal concept for safely taking care of animal by-products. The objective has also been to demonstrate Biomal as a fuel and its environmental benefits. The LIFE Environmental program has funded the project with about one million euros. The BIOMAL -project has been carried out by the three partners Konvex, Karskoga Heat and Power and Findest Oy and the consultant company S.E.P Scandinavian Energy Project AB.

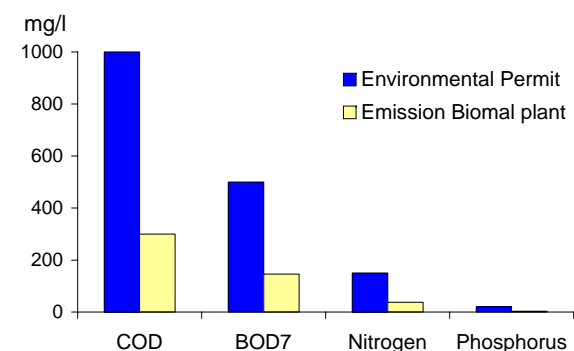
The project has included:

- Investigation of the fundamentals of the grinding plant such as, where to place the demonstration plant, the suitable capacity and the process design.
- Calculations, detailed construction and purchasing of the plant
- Evaluation of the operating conditions of the demonstration plant
- Evaluation of Biomal as a fuel at Karlskoga CHP-plant and at some other plants which during the project time also have included Biomal in their fuel mixture.
- Dissemination of the result and administration of the project.

Operation experience

The new grinding plant was taken into operation without any problems. The construction started in November 2005 and the plant was in full production one year later. The total energy demand is only about 13 % of the total energy demand (both heat and power) of an ordinary rendering plant. The effluent discharge is kept very low since most of the wash water is collected and recirculated to the Biomal.

The emissions of oxygen demanding substances and nutrients is very low and well below the environmental permit for the plant.



The emissions of oxygen demanding substances and nutrients compared to the environmental permit

In addition to being a much simpler and less energy consuming process than a rendering process the risk for smell is also reduced, which has been confirmed by the daily observations during the first three months of operation.

The Biomal fuel

The Biomal fuel has the consistency of minced meat and is delivered to the end users in bulk vehicles. The Biomal fuel is pump through a closed piping system into the boiler where it is co-combusted together with fuels such as wood chips, peat or recovered wood. Energy is recovered from the Biomal by producing renewable heat and electricity. The produced Biomal is a renewable fuel, which does not contribute to the global warming and can replace fossil fuels for production of heat and power. Biomal has a heating value comparable with wood chips.



A bulk vehicle delivering Biomal to a combustion plant



The receiving station for Biomal at the Karlskoga plant

Several combustions tests has been carried out in the project and the environmental aspects of the combustion has been evaluated. Most of the testing has been carried out at the Karlskoga Heat and Power Plant.



Karlskoga Combined Heat and Power plant in Sweden, one of the plants firing Biomal

Biomal is now used as a co-combustion fuel at totally four plants in the south of Sweden. The normal energy contribution from the Biomal is about 20-40 %. The experience from the different plants have shown that that Biomal:

- is easy to feed into the boiler in a closed fuel feeding system.
- gives approximately the same energy output per ton as wood chips
- Results in stable and good combustion conditions with low emissions