Visit in Demonstration region Baden-Wurttemberg – Germany, STEAG, 07/07/2017

The team of BIOREG project visited STEAG facility in 2017 as a part of the project strategy to learn more about the Demonstration regions and to explore how the good practices can be transferred into recipient regions.

**STEAG - End-of-life wood cogeneration of BKO**

The facility is a co-generation plant which uses wood waste only (56 000 to 60 000 t/year). It started in 2003 for an investment of 21 M€. It has the permission to burn wood waste of the categories A I, A II, A III and A IV (excluding hazardous wood waste and railroad ties) according to the German Waste Wood Ordinance. The thermal power is 29 MW and the electric power is 7.5 MW. During the design of the plant, it was planned that the heat generated would be used in a planned district heating network of the nearby city (Buchen). However, the district heating network was never built and therefore the heat has to be cooled off.

The AWN company, which is also partial owner of the power plant, operates a landfill within 500 m of the installation. It directly delivers wood waste to BKO. Delivery of waste is between 8 am and 18 pm. Each delivery is weighted on a weighbridge and inspected visually. Material with too much unwanted material is rejected. According to the operator, the waste delivered is rather
clean i.e. it only contains minor fractions of unwanted material (e.g. plastics, scrap...) and thus rejects are very rare. Wood waste is usually delivered in bulky form to the plant. The unprocessed wood waste is stored at a large storage area on site. BKO has implemented several firewalls to prevent the spread of any fires at the storage area.

The waste undergoes an extensive treatment before it is fed into the boiler. In a first step, wood waste are crushed in a crusher. The crusher produces wood waste with a maximum grain size 300 mm. To limit dust emissions during crushing, the wood waste and the crusher are sprayed with water. In a second step, the crushed wood waste fractions are then mixed by the operator. By mixing the different wood waste fractions, the operators aim to maintain a rather constant fuel quality (calorific power, moisture, etc.) to facilitate the operation of the boiler. The third step is the further processing in an automated treatment plant, which consists of the following process steps:

- A magnetic separator (ferrous metals).
- A star screen to remove oversize material: the oversize material goes back to the raw material storage area to undergo crushing again.
A second magnetic separator (ferrous metals). Since a lot of material separated in this stage features a high wood content (which is attached to the metal pieces separated), the material goes back to the crushing step to increase the share of wood that actually enters the boiler.

An Eddy current separator (non-ferrous metals)

All process steps are equipped with a suction system that removes fines generated during the process for health reasons. The fines are collected in a silo and are returned to the wood waste stream at the fuel conveyor that leads to the boiler.

For start-up, wood waste of high quality (AI and AII) is used and stored in a dedicated storage area. The processed wood waste is burned in a biomass boiler at temperatures above 850°C. A flue gas recirculation system is used for temperature control in the furnace. The hot flue gas is used to generate super-heated steam (steam generation of 35 t/h at 65 bar and 430°C). The superheated steam is fed to a turbine that drives a generator that generates the electricity. The flue gases are cleaned by a powerful flue gas cleaning system (consisting of a SNCR unit to remove NOx, and cyclone, a sorbent injection and a fabric filter with dry sorption for dust and HCl/SOx removal). The cleaned flue gas that meets all emission limits of incineration is then sent to the chimney.