**FIRE SAFETY SOLUTIONS FOR BIOFUEL**

Fire and explosion hazards in wood pellet fired power plants require safer storage facilities and transportation systems.

As many power plants convert to biomass and establish ever larger biofuel storage facilities, the risk of the fuel catching fire increases.

**Challenges in storage facilities**
Wood pellets and dust from wood pellets are prone to self-ignition. Although the material itself has inherent characteristics which contribute to the risk of self heating, the size and configuration of a storage facility also plays a major role.

The main challenges in storage facilities are that a smouldering fire is very difficult to detect, but can also be very complicated and hazardous to put out.

**New fire fighting solution**
Ramboll has invented and has a patent pending on a fire fighting concept which is highly suited for large inventories and wood pellets. It involves injection of liquid nitrogen in combination with a control system monitoring the condition of the storage and the state of the fire.

**Designing a strategy**
When developing the fire safety strategy in wood pellet plants, the fire risk and the explosion risk have to be assessed. As the factors influencing the hazards are dependent of the fuel itself - but also very much on the design of the transportation system and storage facility - the fire safety strategy has to be custom-made in each case.

**Qualified advising**
Through our experience with biomass storage facilities and participation in R&D projects, we have gained particular knowledge and insight into consultancy on fire safety for biofuels. Hence, Ramboll is leading in the development of fire safety solutions and on fire risk assessment for biomass feed stock, silos etc. Based on the client’s situation we advise on creating complete fire safety strategies as well as selected parts such as hazardous area classifications.

For further information please visit our website www.ramboll.com/power or contact our fire safety expert directly.
CHALLENGES

Dust present in a transportation system and in storage facilities causes a potential explosion hazard. The hazard has to be assessed and may result in hazardous area classification (ATEX).

When fuel handling systems are designed for large energy plants the fuel characteristics have to be established, and respective tests are usually undertaken.

The test results and the classification will indicate the requirements for the equipment exposed to the dust from pellets.

EXPERIENCES

Ramboll has extensive knowledge about the development of fire safety strategies. We have experience from biofuel storage facilities at a large number of power plants. Some selected references are shown below.

Avedøre pellet silo, Copenhagen, Denmark

**Design and commissioning of a 100,000 m³ fully automatic wood pellet storage facility**

The wood pellet storage facility at the Avedøre Power Station is the largest fully automatic wood pellet storage facility in the world. Due to the size of the storage it was designed with special focus on minimising the risks of fire and explosions. The experience with this storage has subsequently lead to a revised fire strategy where an advanced fire surveillance system and fire suppression system are planned.

Herning CHP, Herning, Denmark

**Fire safety engineering in connection with conversion from fossil to multi-fuel plant**

Herning CHP Station has been converted over three stages, latest two-thirds of the gas burners were rebuilt to take pulvlerised wood pellets making the plant a truly multi-fuel plant in full operation based on 90 % biomass. A part of the conversion was to establish a fire safety strategy that prevents and mitigates the fire and explosion hazards for this particular wood pellet transportation and storage system.

SERVICES

- Advising on detection systems for different kinds of biofuels
- Advising on fire risk and mitigations
- Risk assessment
- Design of fire and explosion protection systems
- Hazardous area classification
- Design of fire fighting systems, customised and adapted to the client’s system.