

Case study

# Replacing a Heavy Fuel Oil boiler by a Biomass boiler

Holme, Denmark



Johnson Controls, a worldwide leader in energy efficiency in buildings creates intelligent environments for a more comfortable, secure and sustainable world.

Our efforts concentrate on energy performance and reducing greenhouse gas emissions in our clients' buildings and in our own sites.

The Holme factory in Aarhus, Denmark was built in 1960. It has around 600 people working there manufacturing Ammonia Chillers for Industrial Process Plant and Air Conditioning, Reciprocating and screw compressor units for the Industrial Refrigeration business. The factory is part of Johnson Controls' Building Efficiency business, which in Europe & Africa has over 17,000 employees spread across 30 countries all working to make buildings more comfortable, productive, safe and energy efficient.

In 2007, Johnson Controls decided to replace the 40+ year old boilers in its factory in Denmark due to their age, performance and the cost of fuel (heavy fuel oil). It called the Energy & Environmental Solutions team to find a solution to reduce both the energy costs and the environmental impact of the boiler installation.



*Demand controlled hot water distribution pumps.*



*Heating central with gasoil tank ash container.*



*Top part of biomass boiler.*



*Inside the biomass boiler .*

## Goals

- To reduce the operating costs of previous boilers and create a degree of fuel independence necessary to face the price instability of all fuel types in the Danish market.
- To reduce the energy expenditure by 60% and the greenhouse gas emission by 66%.

## Johnson Controls Solution

The EES team designed an innovative and efficient solution based on a biomass boiler. The biomass represents all the organic degradable matter (as shaving wood) which can create energy. In Europe, biomass represents 50% of the energy production from renewable sources.

## Technical challenges

- Modification of the existing building to house the biomass boiler (2MW) to cover the baseload alongside a gasoil boiler (3MW) to provide both the peak-load and stand-by capacities.
- The biomass solution was created to burn wet biomass (wood chips) and is easily adaptable to burn dry biomass. Over the past 20 years, the price of wet wood chips in Denmark was very stable while price of dry wood-pellets increased 45% just in the last year.

## Results

The Johnson Controls solution gives a high degree of independence to fossilfuel and presents a triple benefit ...

- Economic: the importation of fossil resources is reduced thanks to the use of biomass boilers and above all the biomass technology increases the energetic independence. Moreover the overall investment of 2 million euros leads to a total yearly energy expenditure reduced by 60%, which yields a simple payback of 3.5 years.
- Social: the use of wood grown from nearby forests to feed the boiler helps develop the local economy and reduces the costly imports of fuel oil.
- Environmental : the wood used comes from forests managed in a sustainable way so the use of biomass boilers is CO<sub>2</sub> neutral and it reduces the polluting emissions by two third compared to the previous one and the greenhouse gas emission (NO<sub>x</sub>) is cut by 66%.

## Our solutions to satisfy you

Leader in energy efficiency and in sustainable development, Johnson Controls propose biomass energy solutions made to free the energy stored in organic waste (vegetal or animal). We can design, develop, install, implement and maintain your biomass solution in order to reduce your dependence to fossil energy resources. Our solutions guarantee your energy supply and reductions in operating costs together with reduced environmental pollution. The innovative approach of Johnson Controls integrates renewable technologies such as biomass, solar and wind energy combined with strategies of energy supply in order to provide sustainable solutions to our clients.