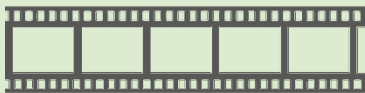
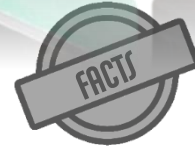
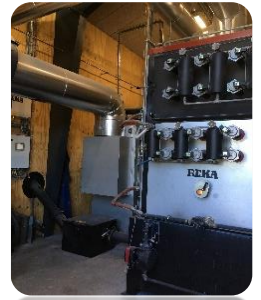




Creating savings to the heating bills of inhabitants of a small rural village in Denmark by switching the district heating from natural gas to straw

Ulbjerg (Viborg Municipality)
1,200 tonnes of straw / year
Started 2016
District Heating to 500 inhabitants village



THE STORY

Ulbjerg is a 500 inhabitants village located in Central Denmark Region. A gas fired district heating system provided heat to the households and buildings of the village. Natural gas prices grew steady from year 2000, with important peaks more frequent, leading to very high energy bills for Ulbjerg inhabitants in 2010. Conscious of the situation, Ulbjerg Kraftvarme Amba (CHP) applied to obtain support of the Danish rural development program to explore the alternatives to natural gas. Rambøll, one of the most acknowledged consultancy companies in Denmark, performed the work.

Among the energy sources considered (solar, biogas, straw, wood pellets, wood chips, and bio-oil) straw was the most economic option (considering both investment and operating costs). At that time, driven by the high prices of natural gas, the Danish government had already published a new regulation where CHP plants above 1 MW were legally allowed to use straw.

It was not till 2014 when certain plants under 1 MW were also allowed; then Ulbjerg Kraftvarme decided to convert from natural gas to straw and wood chips: since both biomass sources had proven over the years to not be influenced by cyclical economic fluctuations and crises, and independent of natural gas prices. The plant was built in 2016 and has caused a significant reduction of heating bill for Ulbjerg inhabitants.

The biggest challenge for Ulbjerg Kraftvarme Amba in the transition from natural gas to biomass has been the change of routines and getting familiar with straw logistics. The boiler is automatic, though ash removal and other checking requires a person to be present few hours twice a week. The REKA boiler is flexible and in case of a biomass shortage it can burn also other agricultural residues or biomass types (up to 30% moisture).

From the side of the Ulbjerg inhabitants, the solution was welcomed, and no social reaction was evidenced. They were informed about the choice and invited to visit a boiler similar to the one selected.



Challenger



Keys of success



Technology



Economics



Community

- Establishing a new facility based on a non-conventional fuel
- Achieve approval from the public (as the new DH would provide heat to the whole community)
- Planning new manual work routines and learning about straw logistics and ash disposal – runs
- Getting to know how to operate new technology

- Cheaper fuel
- Availability of flexible and reliable boiler system by national brand in operation in other communities
- Dedicated and reliable feasibility study performed by a well acknowledged and reliable consulting company
- Campaign for branding the solution to be adopted
- Compliance with emission limits
- Regulation allowing switch from gas to biomass

- 1 MW straw fired automatic boiler
- Patented ESP filter that removes 98% of particle emissions
- Fuel versatility wood, straw and other biomass (moist <30%)
- Produced by local provider (Danish company REKA www.reka.com)

- Investment circa € 1 million (not subsidised)
- Annual fuel savings € 128,000
- In comparison to natural gas prices when peaking, heating bill reduced by upwards of 50%

- Heat prices are much lower which means that the community is very happy with the solution

