An example of a modern, environmental friendly and intelligent building planning

THE DISTRICT HEATING OF BORGO MODOLETTO

ITALY
PROVINCE OF UDINE

www.stradadellegnoenergia.net

Bio-building and wood energy

The district heating is located within the Municipality of San Giovanni al Natisone (Province of Udine).
The heating system, supplied by woodchips, was planned in the original architectural project of buildings.
The small village is made up of 44 houses build following bio-building criteria.
The aim of the project is carrying out an environmental friendly village with particular attention to energy saving and use of renewable energy source: wood energy!

Information on the community

Altitude: 66 m
Population: 5.797 inhabitants
Total surface: 24,8 km^2

Woodchips supply

The woodchips used to feed the boiler is supplied using wood coming from local forests of Natisone Valley.
The boiler burns woodchips with moisture content (w%) less then 35% and mean size between 5,6 and 31,5 mm (G30). The yearly consumption of woodchip is about 400 ton with w 35% (about 900 cubic metre). The energy service company that manage the boiler, buys the woodchips based on a supply contract with local farmers; the contract specifies the qualitative characteristics of fuels and price is expressed in €/GJ, it means that woodchips is commercialized based on its energy content. The wood fuel is delivered every 15-20 days, depending on the season, and fulfil the silo with the capacity of 100 cubic metre.

The heating system

The self-operating KÖB PYROT boiler has an output of 400 kW and ensures heating and hot water to 44 houses.
The energy annually supplied, with a burner efficiency of 90%, is 1.110.000 kWht.

Silo and feeder system

The woodchips is feed to furnace by mean of a rotating extractor and transfer screw

Rotary combustion

Continuous gasification is carried out on the moving grate with minimal primary air. The combustible gases rise into the rotary combustion chamber and are mixed with secondary air that had been diffused by the rotation blower and given with a spin impulse. This guarantees a perfect mixture of secondary air with the combustible gases.

Control System

The heating system is controlled and automatically regulated by a decentralized microprocessor system. It permits to optimize the combustion process (Lambda probe), therefore the emission levels.

Emissions and ashes

Thanks to high technological level the emissions result:
- comparable to those emitted by boiler supplied by fossil fuels;
- significantly inferior to limits fixed by Italian law (DPCM 08.03.02).

The high efficiency of combustion technology, besides low emission, produces a low amount of ashes which are collected into apposite containers.

The CO_2 avoided

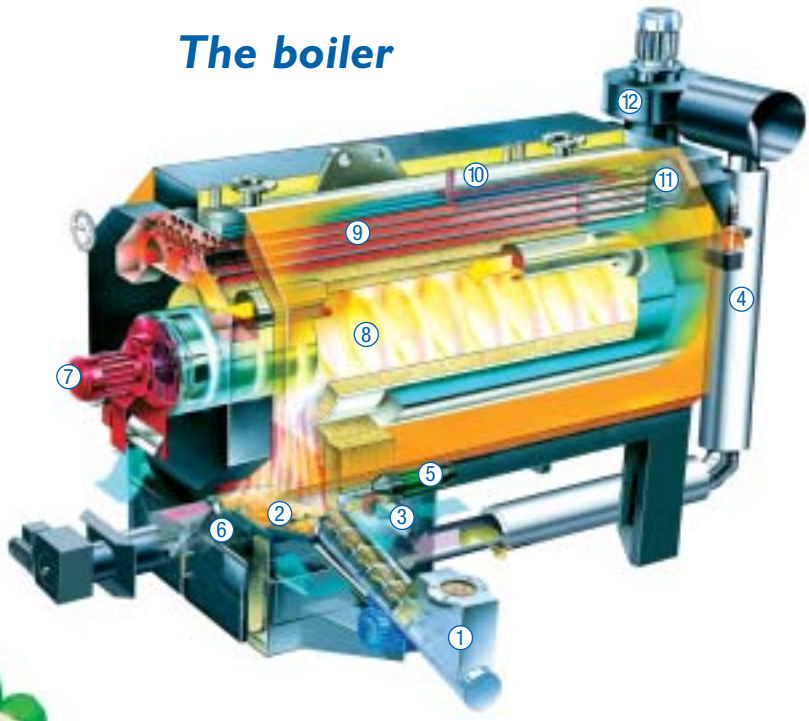
The woodchips boiler allows to avoid each year the emission in atmosphere of 270 tons of CO_2 compared to oil and 210 tons of CO_2 compared to gas methane.

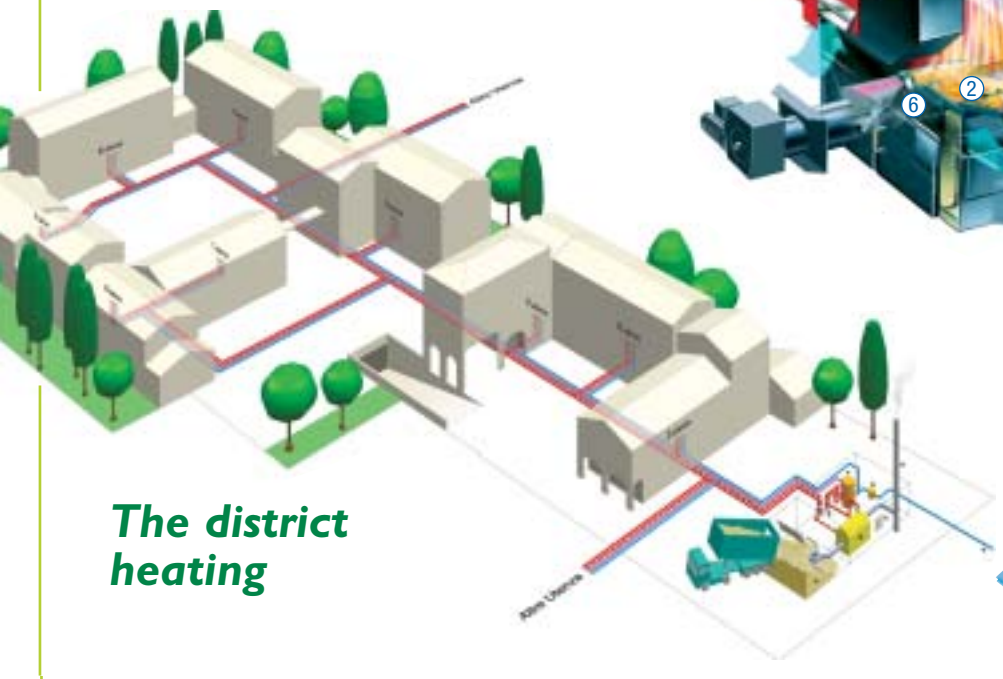
The district heating

The heating system is managed by an energy service company in a frame of a specific contract with end users.
Each house is connected to the boiler by mean of heating network and the heat consumption is calculated with calories counter, therefore each one pays exactly what he has consumed! The accounting of consumptions is made via web using specific software, till the delivering of payment incomes.

Legend of boiler
1.Transfer screw
2. Moving grate
3. Primary air
4. Smoke recycler
5. Automatic lighter
6. Ash clearing screw
7. Secondary air with spin impulse
8. Rotary combustion chamber
9. Heat exchanger
10. Safety heat unloading
11. Pneumatic cleaning of heat exchanger
12. Smoke extractor

The boiler





The district heating

Legend of district heating
Heating out
Heating return
Sanitary hot water
Cold water

Technical and economical data

- Investment: **290.000 €**
- Heat output: **400 kW**
- Boiler manufacture: **KÖB PYROT**
- Fuel: **woodchips**
- Yearly consumption of wood fuel: **400 ton (w 35-40%)**
- Price of wood fuel: **50-60 €/ton**
- Length of heating network: **220 m**
- Volume heated: **20.000 mc**
- Energy output: **1.110.000 kWh/anno**
- Energy price: **€/MWht**

This fact sheet was designed by AIEL in the frame of Project Interreg III B - Alpenergywood.
ITEBE is the lead partner of project that, relative to Italian part, is financed at 50% by European Union and 50% by Italian State.

INFORMATION

For visits, contact:
AIEL - Associazione Italiana Energia dal Legno
Agripolis - Viale dell'Università, 14
35020 - Legnaro (Pd) - ITALY
Tel. +39 0498830722 Fax +39 049 8830718
aiel@cia.it www.aiel.cia.it

ITEBE
28, boulevard Gambetta – BP149
F 39004 Lons le Saunier Cedex – France
Tel. +33 (0) 384478100 Fax +33 (0) 384478119
info@itebe.org www.itebe.org

SGUASSERO COSTRUZIONI S.p.a.
Via Giovanni da Udine, 13
33058 - S. Giorgio di Nogaro (UD)
Tel. 0431.65403 Fax 0431.621050
info@sguassero.com www.sguassero.com

Fornitore della caldaia
KÖB & Schäfer AG
Flotzbachstrasse, 33
A-6922 Wolfurt
Tel. +43 55746770-0 Fax +43 557465707
office@koeb-schaefer.com www.koeb-schafer.com

Regolazione e contabilizzazione
FSB S.p.a. - IMIT S.p.a.
Via E. Mattei, 1/C
30020 Marcon (VE)
Tel. +39 0415953216 Fax +39 0415952860
samuele.zavan@fsbspa.it www.fsbspa.it

For further information on European wood Energy Road, contact AIEL or visit the web site **www.stradadellegnoenergia.net**

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