

Biomass Conversion



Why convert from fossil fuel to Biomass?

Biomass is a renewable and carbon-neutral energy source, and as such it is a sustainable alternative to fossil fuels.

There is a strong political desire to implement renewable energy supply in many countries. This has led to economic incentives for biomass-based energy generation.

Also the emission of especially SO₂ and NO_x tends to be lower for biomass than for fossil fuels. Therefore a biomass conversion of a fossil fired power station can reduce or even eliminate the cost of complying with current and future legislation.

An additional advantage is that a biomass conversion allows older units to operate for an extended period under conditions that are both profitable and environmentally sound.



Biomass firing systems

Special biomass characteristics require dedicated solutions that differ from coal firing systems. BWE offers advanced biomass fuel preparation, dosing and firing systems based on our extensive experience in pulverized fuel (PF) firing.

Existing coal or HFO boilers can be converted to biomass firing, typically based on biomass pellets. This requires an upgrade of the fuel supply and preparation system as well as an evaluation of the boiler suitability and any necessary modifications.

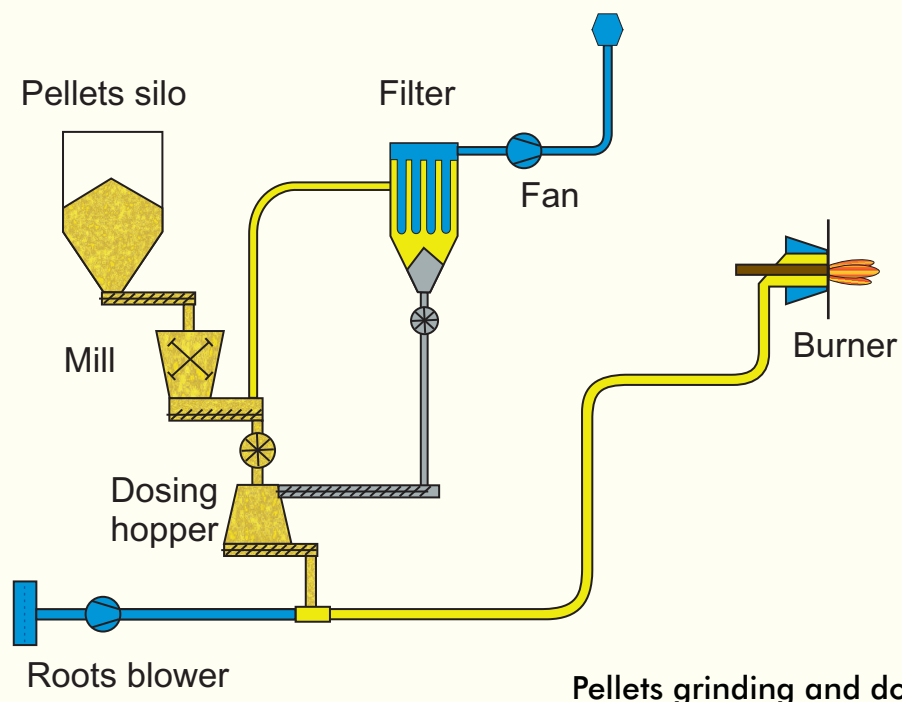
In most cases original fuels can be maintained and this increases boiler fuel flexibility.

Fuel system

A pellets unloading, transport and closed storage system is required. BWE works in close cooperation with suppliers of such systems.

Silos can either be new silos or reused coal silos modified for pellets. Pulverizing machinery must be optimized for particle size distribution, capacity and power consumption. In some cases existing coal mills can be reused with only minor modifications.

A stable fuel supply is required and this can be obtained by proper design of the fuel dosing system. Fuel is always transported pneumatically to the burners.



Pellets grinding and dosing system



Reference Plants

| Power plant | Owner | Year Comm. | MWth | Steam data | | | Oil | Coal | Fuels | | |
|-------------|------------|------------|------|------------|-----|----------|------|------|-------|---------|-------|
| | | | | t/h | bar | °C | | | Gas | Pellets | Chips |
| Herning | Dong | 2009 | 292 | 425 | 115 | 525 | 100% | - | 100% | 43% | 41% |
| Amager 1 | Vattenfall | 2009 | 352 | 500 | 185 | 562/540* | 100% | 100% | - | 100% | - |
| Avedøre 2 | Dong | 2001 | 800 | 1067 | 305 | 582/600* | 100% | 100% | 100% | 80% | - |

* reduced steam temperature during biomass combustion



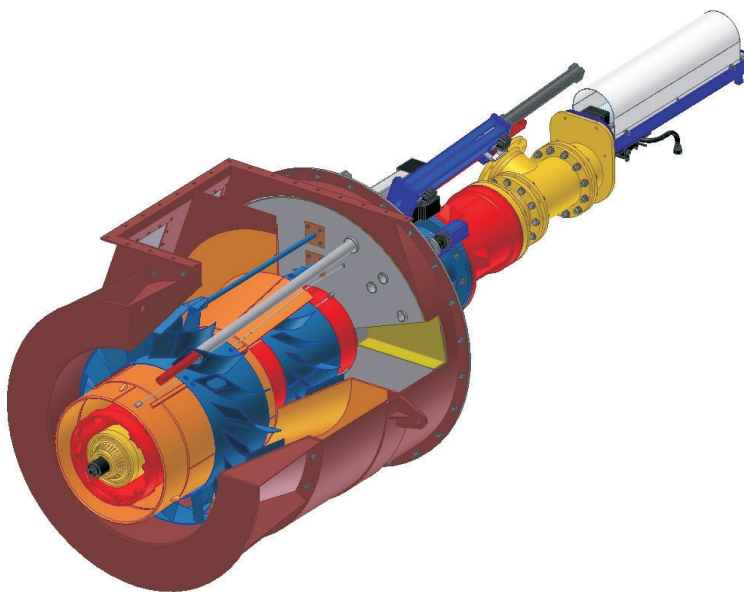
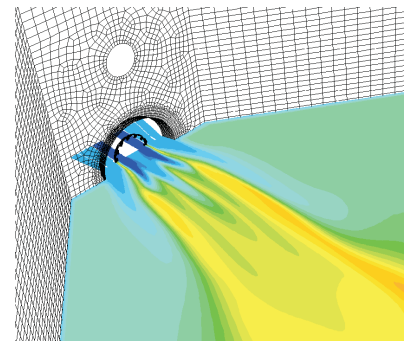
PF burners

The BWE Low NO_x burners are applied for biomass dust firing allowing advanced air staging and high adjustability to achieve low NO_x formation and stable ignition. The burners can be constructed to allow various fuels: biomass/coal/oil/gas.

Design basis

To design a robust and reliable biomass solution the following issues must be considered:

- Biomass properties (particle size, moisture, chemical composition)
- Boiler pressure part design (especially superheater pitch)
- Reusable equipment (coal silos, mills, pipes)
- Footprint (mills, dosing units)
- DeNO_x/FGD/Ash consequences
- Burner openings (number, sizing)
- Slagging/fouling potential
- Allowable boiler de-rating



World leader in steam power technology

Burmeister & Wain Energy A/S has specialized in the development and design of advanced steam boiler plants for utility and biomass fired power stations.

Furthermore, BWE designs a wide range of auxiliary power station equipment such as the BWE Low-NO_x coal/oil/N-gas/biomass burners, Air Preheaters and Gas-Gas Heaters.

BWE is part of the Italian STF S.p.A. Group.

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