DP CleanTech

Creating value from waste

Advanced straw-fired power plant

(Agricultural & forestry residues)

Wuqiao Hebei Province, China

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Introduction

- Wuqiao is DPCT's 23rd biomass power plant in China. The project is located in Economic and Technological Development Zone of Wuqiao County, Hebei province.
- The Wuqiao power plant was invested and owned by State Grid (formerly NBE, National BioEnergy Group) . It's the 22nd project delivered by DPCT to NBE.
- It was put into operation in Nov, 2010.
- The plant has been instrumental in promoting the local rural economy by making good use of agricultural and forestry residues. The project has already provided more than 1,200 job opportunities for locals and directly generated CNY 60 million in additional revenue for local farmers.
- Wuqiao project was retrofitted into a CHP project in 2015. After several years operation, the project is responsible for local civilians' winter heat supply of more than 800,000 m^2 by the end of 2018.

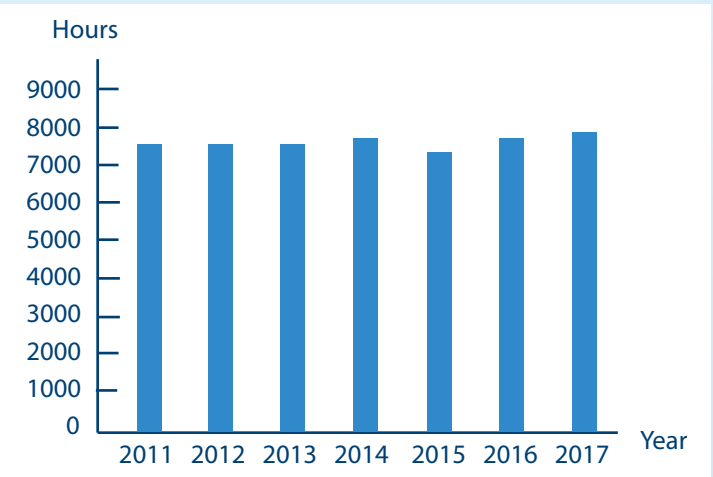
The 30 MWe plant at Wuqiao is one of the most advanced biomass plants in China; it consumes 250,000 ton of agricultural & forestry residue and generates 2*108 kWh of clean electricity every year. The plant is based on High Pressure High Temperature technology, which enables very high boiler efficiency (91%). In addition the plant's special design and high-quality materials guarantee high reliability and corrosion & fouling resistance.

Performance Data

Design Data

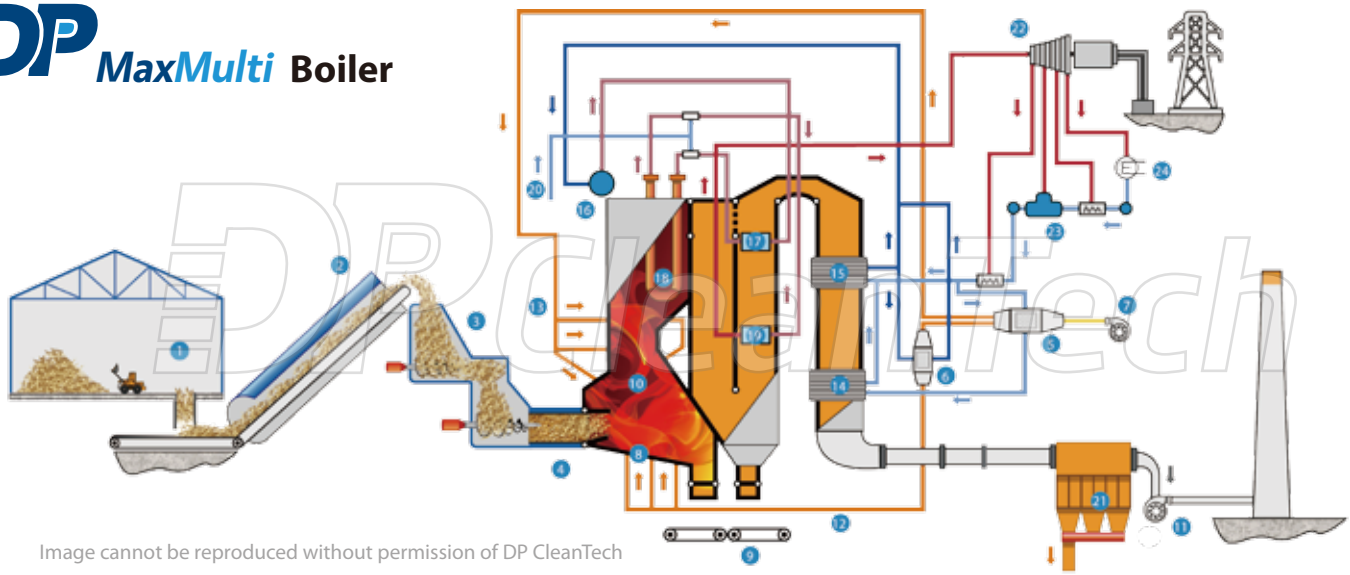
Fuel	Cotton Straw and Forestry Residues
Fuel Consumption	25tph
Plant Efficiency	>33%
Boiler Efficiency	>91%
Annual Operation Hours	>8000h
Main Steam Flow	130t/h
Main Steam Pressure	92 bar
Main Steam Temp	540 °C
Internal Consumption	10%

Full Load Operation Hours



The plant will consume 250,000 tons of agricultural and forestry residues each year.

DP MaxMulti Boiler



1. Fuel storage
2. Belt conveyer
3. Dosing silo
4. Stoker
5. Low temperature air preheater
6. High temperature air preheater
7. FD fan
8. Vibrating grate
9. Slag conveyor
10. Combustion chamber
11. ID fan
12. Primary air
13. Secondary air
14. Flue gas cooler
15. Economizer
16. Steam drum
17. Superheater 1
18. Superheater 2
19. Superheater 3
20. Water for atemperators
21. Bag filter
22. Turbine
23. Deaerator
24. Condenser

Key Technology

The Fuel Feeding System is one of the core DP CleanTech technologies that has been introduced to clients in China. As one of the most advanced European biomass fuel feeding systems, it has been adapted specifically for varying fuel types and quality often found in China. The combustion efficiency is high, and the automated system is very stable and easy to operate. Specialized safety features further protect fuel from fire, self-burning or jamming and also includes a fire-extinguishing water supply.

Water-Cooled Vibrating Grate

DP CleanTech's Superheaters are specifically engineered to resist corrosion and coking through both the structural design and the use of high grade materials. The structure consists of vertical tube panels and ASME SA-213TP347H extra thick pipe stainless steel materials, which together help to avoid high temperature oxidation (steam side); and to significantly reduce coking and high temperature corrosion (flue gas side).

Boiler

High efficiency and durability are key features of DP CleanTech's products and the design of the boiler and the materials used are fundamental to ensuring long term performance. The boiler itself is supported from the bottom, the placement of the centre of gravity and guiding devices ensures a uniform expansion in all dimensions, as well as supporting the boiler. In addition, the boiler is designed to resist earthquakes. In the event of seismic activity, any horizontal force that might affect the body of the boiler would be transmitted to its main and auxiliary steel frames, and from there to the foundations, thus preventing damage to the boiler itself. The boiler is manufactured using high grade materials to resist corrosion and extend life cycle.

Proprietary Technology for Handling Corrosive Fuels

Biomass fuels are significantly different from coal, having a higher content of chlorine and alkali metals, and lower sulfur content – all of which can heavily corrode heating surfaces. DP CleanTech uses proven, proprietary technology to reduce flue gas temperature and prevent low temperature corrosion. In essence, the temperatures within the Air Preheater and Flue Gas Cooler system are raised and cooled using recirculated feed water. This proprietary technology reduces flue gas temperature, which improves the efficiency of the boiler. At the same time, low temperature corrosion is reduced because the cold end average temperature【(130+90)/2=110℃】is higher than dew point.

External Air Preheater

Using DP's patented system for the Air Preheater also avoids problems such as low temperature corrosion, ash blockage and abrasion of the Air Preheater.

Superheaters

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