LAWI ENGINEERING

Brief project description of the biomass multi-fuel

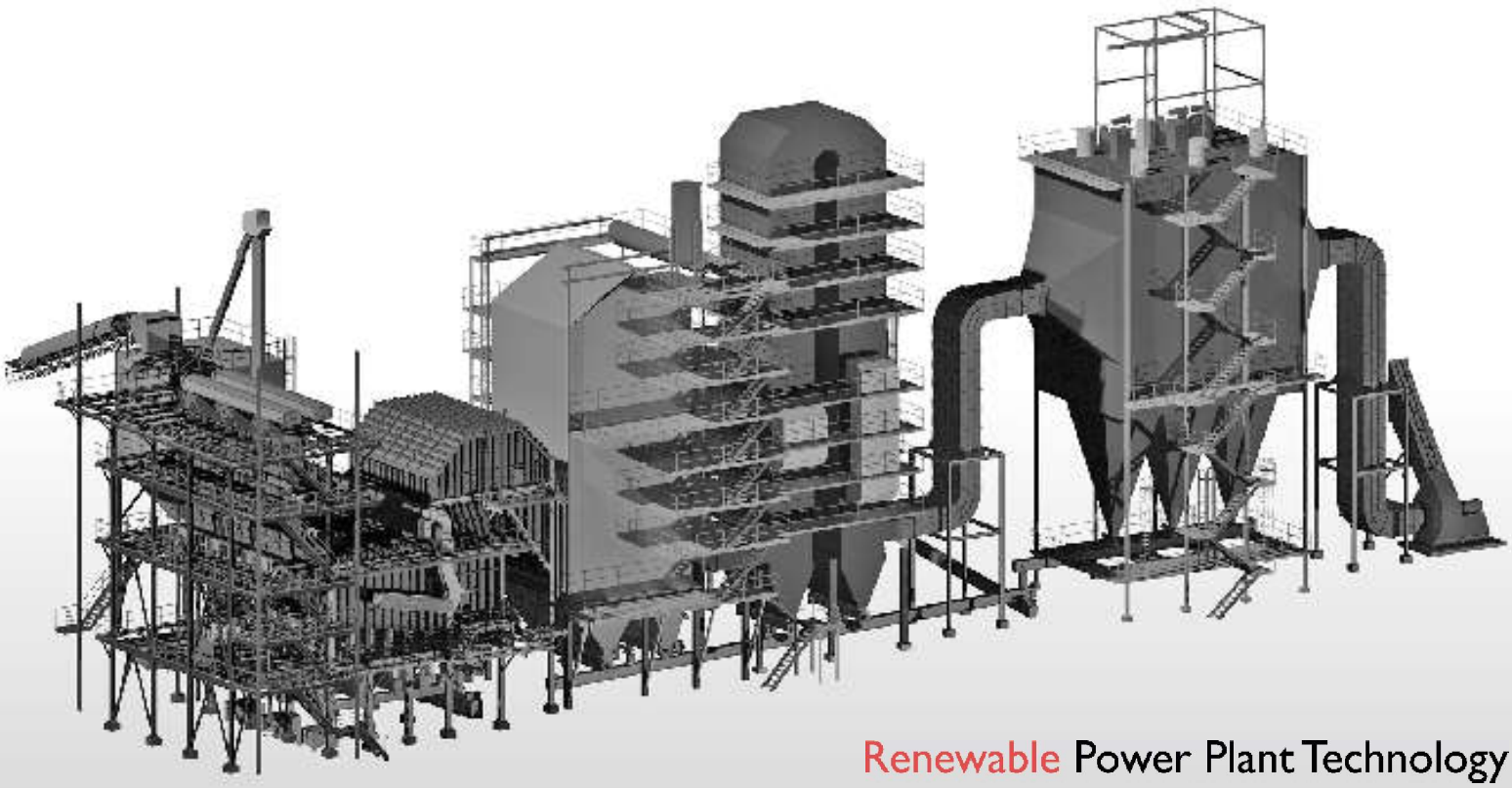
LAWI EtaPlant® Srisangdaw 9.9 MW

with 45 tph steam boiler capacity at 66 bar(a) and 485°C

Commissioning Date: June 2012

Client: Srisangdaw Biopower Co., Ltd.

Plant Location: Roi Et, Thailand



Renewable Power Plant Technology

PROJECT OVERVIEW

TYPE:
Biomass Power Plant with LAWI EtaComb® 400

CLIENT:
Srisangdaw Biopower Co., Ltd.

LOCATION:
Roi Et | Thailand

COD:
June 2012

DESIGN MULTI FUEL:
Rice Husk, Eucalyptus Bark

SCOPE:
Overall power plant design engineering
Project management
Supply and Installation of LAWI EtaComb® 400 combustion system

Srisangdaw 9.9 MW biomass power plant was designed by LAWI Engineering for Srisangdaw Biopower Co., Ltd. and commissioned in 2012. This project is conceptualized as a fully condensing power plant to supply electricity to the public grid of the Provincial Electrical Authority (PEA). The total investment for this project is around 25,000,000 USD. All works for it have been completed within initial project schedule under LAWI project management.

This power plant is located in Roi Et Province in Thailand and is connected to the local Srisangdaw rice mill. In order to provide flexibility and constant operation even in times when rice husk is unavailable or available only at increased prices, LAWI Engineering has integrated the LAWI EtaComb® multi-fuel combustion system into this project. It allows safe and reliable usage of not only rice husk, but also other available agricultural residuals, in particular residuals from the nearby bark industry.

Srisangdaw power plant has made a significant contribution to improve northern Thailand's decentralized power supply from renewable sources, saving Thailand 38,610,000 kg of CO_2 emissions per year. This project is as well supporting local economy of Srisangdaw by making use of different agricultural residuals. The only waste, which is being produced by this power plant, is ash. It is used by the local farmers to fertilize their rice fields.

TECHNICAL PROJECT DATA

Firing design capacity:
40 MW_{th}

Steam boiler design:
45 tph; 66 bar(a); 485°C

Generator capacity:
9.9 MW_{el}

Fuel consumption:
9.4 tph

Net heat rate:
14,257 kJ/kWh_{el}

Gross electrical efficiency:
28.1 %

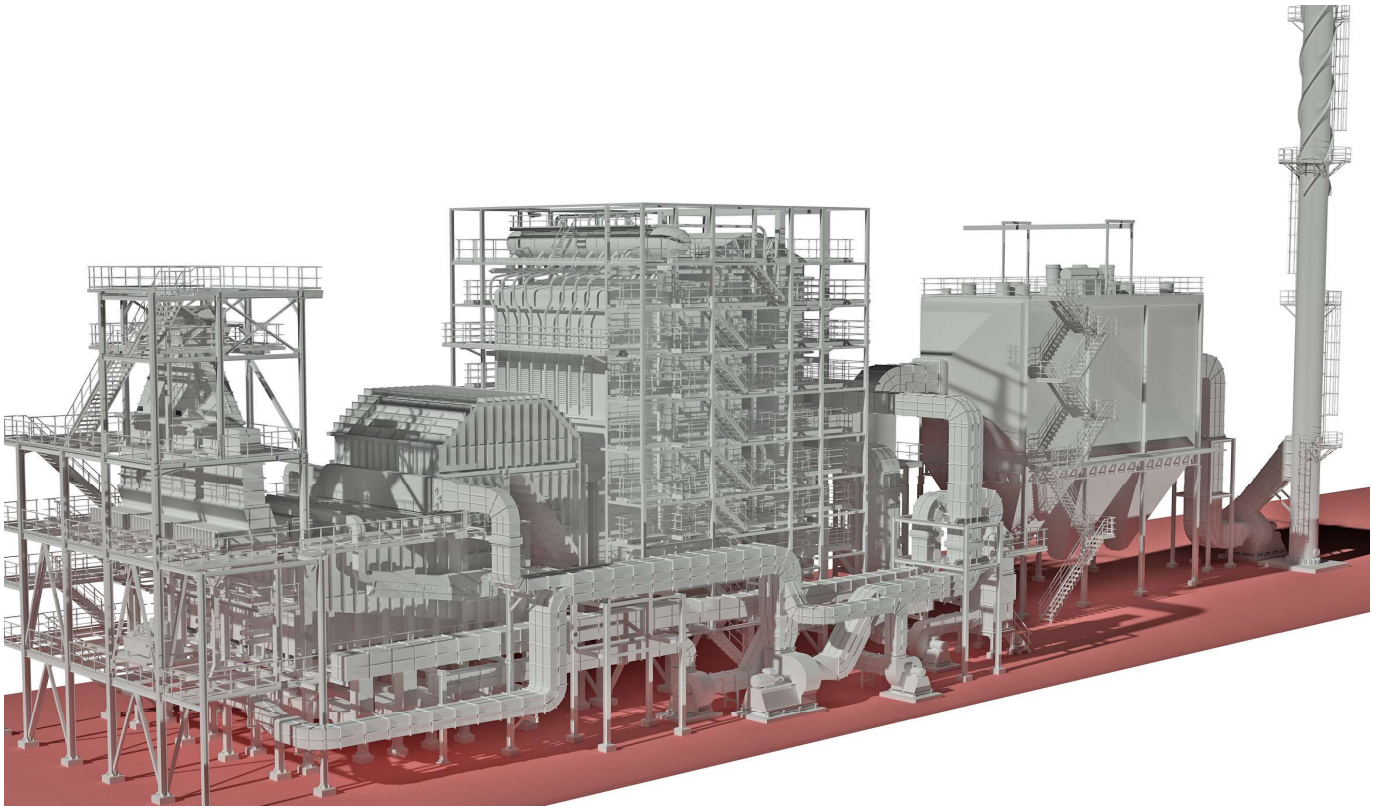
Operation hours:
8,000 h/a

Srisangdaw power plant has a generator capacity of 9.9 MW, firing design of 40 MW_{th} and steam boiler design of 45 tph. Main steam pressure of this power plant is 66 bar(a).

These technical parameters together with the conscious and professional operation management of the Srisangdaw team allowed to produce average gross power output of more than 75,000 MWh per year. This power output over-satisfies the design parameters and financial model for the project and therefore also the investor's expectations.

The heart of this power plant is LAWI EtaComb® the advanced combustion technology, which is significantly responsible for the overall power plant performance in terms of efficiency and flexibility. This combustion system is combined with a German designed waste heat boiler - its design allows to reach boiler thermal efficiency of over 90 %.

This power plant operates with a very low excess air rate with oxygen content of 3 - 4 %, resulting in combustion thermal efficiency over 98 %, because of low CO emissions and unburned hydrocarbons. An advanced emission control is reached through the electrostatic precipitator; these values fully meet emission regulation in Thailand. In terms of overall electric efficiency, it is possible to reach average gross electrical efficiency of 27 % during current years of operation.



ERECTION - COMBUSTION SYSTEM - COMBUSTION CHAMBER, FUEL TOWER WITH DOSING, GAS DUCT SYSTEM

ERECTION - GAS DUCT SYSTEM, CYCLONES

ERECTION - BOILER WITH BOILER HOUSE, WALK WAY

FUEL WAREHOUSE

FUEL CONVEYOR

INSIDE TURBINE GENERATOR BUILDING

COOLING TOWER

FLUE GAS CLEANING

BLOW DOWN TANK/ PIPING

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