



COGENERATION PLANT UTILIZING PAPER RESIDUES IN ÇORLU, TURKEY

Turnkey cogeneration plant utilizes paper industry by-products such as paper rejects, biological sludge, paper sludge, and ropes for fuel.

EREN Holding and its affiliates operate in the energy, paper, packaging, retail, cement, textile, and tourism sectors. Modern Karton, a subsidiary of EREN Holding, is a major European paper manufacturer and the industry leader in Turkey. The company operates several paper machines at its production facilities in Çorlu, 90 km northwest of Istanbul. The facility produces 1.1 million tons per year of packaging papers and corrugated cardboard materials from waste paper. EREN Holding selected Outotec to design and build a new power plant on a turnkey basis. Completed in 2015, the plant uses by-products from the paper recycling process as fuel.

CHALLENGES

- Thermal processing of solid fuel with a high degree of non-combustible debris
- Strict emissions limits
- Need for a strong financing partner

SOLUTION

- Turnkey power plant solution utilizing paper mill by-products
- Thermal treatment of solid fuel in Outotec Fluidized Bed Incinerator with open-nozzle grid
- Production of electricity and/or export steam dependent on demand

BENEFITS

- Avoids landfill disposal costs for waste production
- Saves natural gas for steam or power generation
- Produces minimal environmental emissions

OUTOTEC SLUDGE AND WASTE INCINERATION PLANT PROCESS

Paper mill rejects and sludge are transported via trucks and conveyors to a bunker system. The fuels are fed by a crane into an intermediate dosing hopper, from where they are transported to a bubbling fluidized bed (FB) incinerator.

The refractory-lined incinerator, equipped with an air pre-heater and flue gas recycling, allows highly flexible operation in terms of the feed material.

Outotec's open-nozzle grid configuration allows debris such as metals, glass, and stones to be removed during operation. The heat recovery boiler, which consists of an evaporator, super heater, and economizer, uses the hot flue gases from the FB incinerator to produce steam for the turbine. An external superheater increases the live steam temperature to achieve high turbine efficiency.

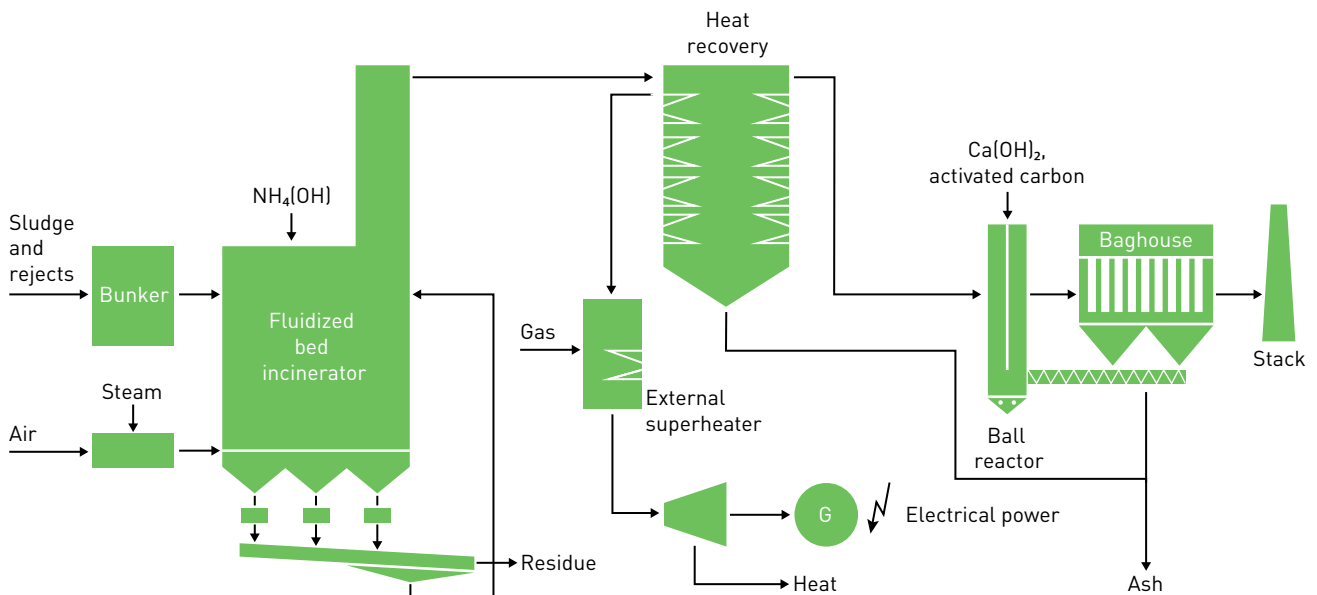
The flue gas enters the baghouse when leaving the economizer, and lime and activated carbon are added to clean the flue gas. The de-dusted flue gas then passes a condensate preheater and leaves the plant via a stack.

Project scope

Outotec's turnkey solution encompassed everything from the plant equipment engineering through to delivery of the complete process, including startup and operator training.

DESIGN DATA

Throughput	
Fuel	450,000 t/y
Natural gas (STP)	32,600 m ³ /d
Fluidized bed incinerator	
Combustion air flow (STP)	150,000 m ³ /h
Recycle gas flow (STP)	20,000 m ³ /h
Flue gas flow outlet (STP)	210,000 m ³ /h
Flue gas temperature outlet	850-950°C
Air preheating	<260°C
Heat recovery boiler	
Steam temperature	380°C
Steam pressure	62 bar (a)
Flue gas temperature outlet	<160°C
External superheater	
Thermal capacity	13 MW
Steam turbine	
Steam flow	96 t/h
Steam temperature	530°C
Electrical power output	30 MWel
Flue gas cleaning	
Flue gas flow (STP)	230,000 m ³ /h
Flue gas outlet temperature	<120°C



Outotec Fluidized Bed Incineration Plant

Outotec provides leading technologies and services for the sustainable use of Earth's natural resources. As the global leader in minerals and metals processing technology, we have developed many breakthrough technologies over the decades for our customers in metals and mining industry. We also provide innovative solutions for industrial water treatment, the utilization of alternative energy sources and the chemical industry. Outotec shares are listed on NASDAQ OMX Helsinki. www.outotec.com