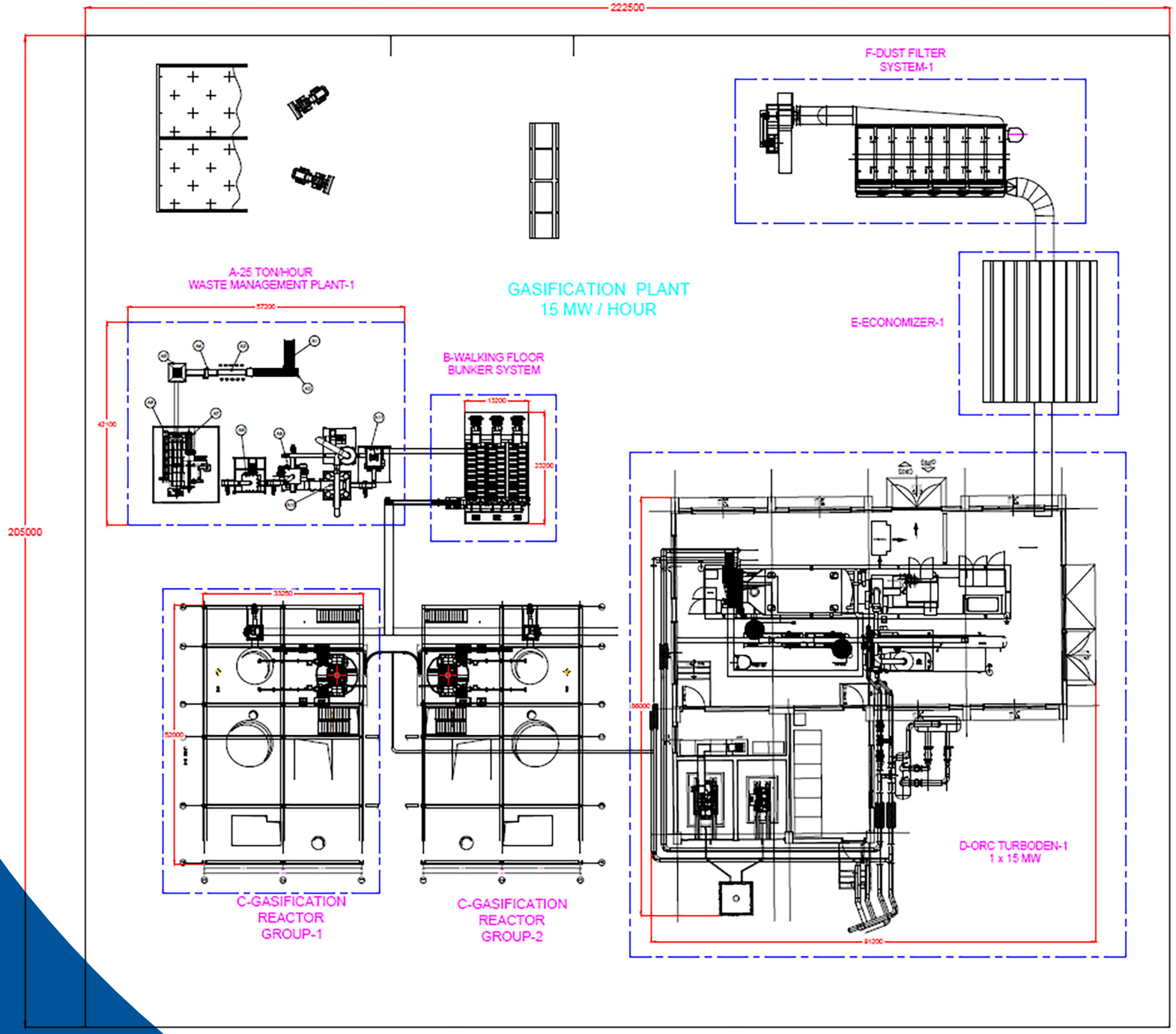
GEODYN SOLUTIONS, INC.

GEODYN™
SOLUTIONS

GASIFICATION PLANT
15MW/HOUR CAPACITY

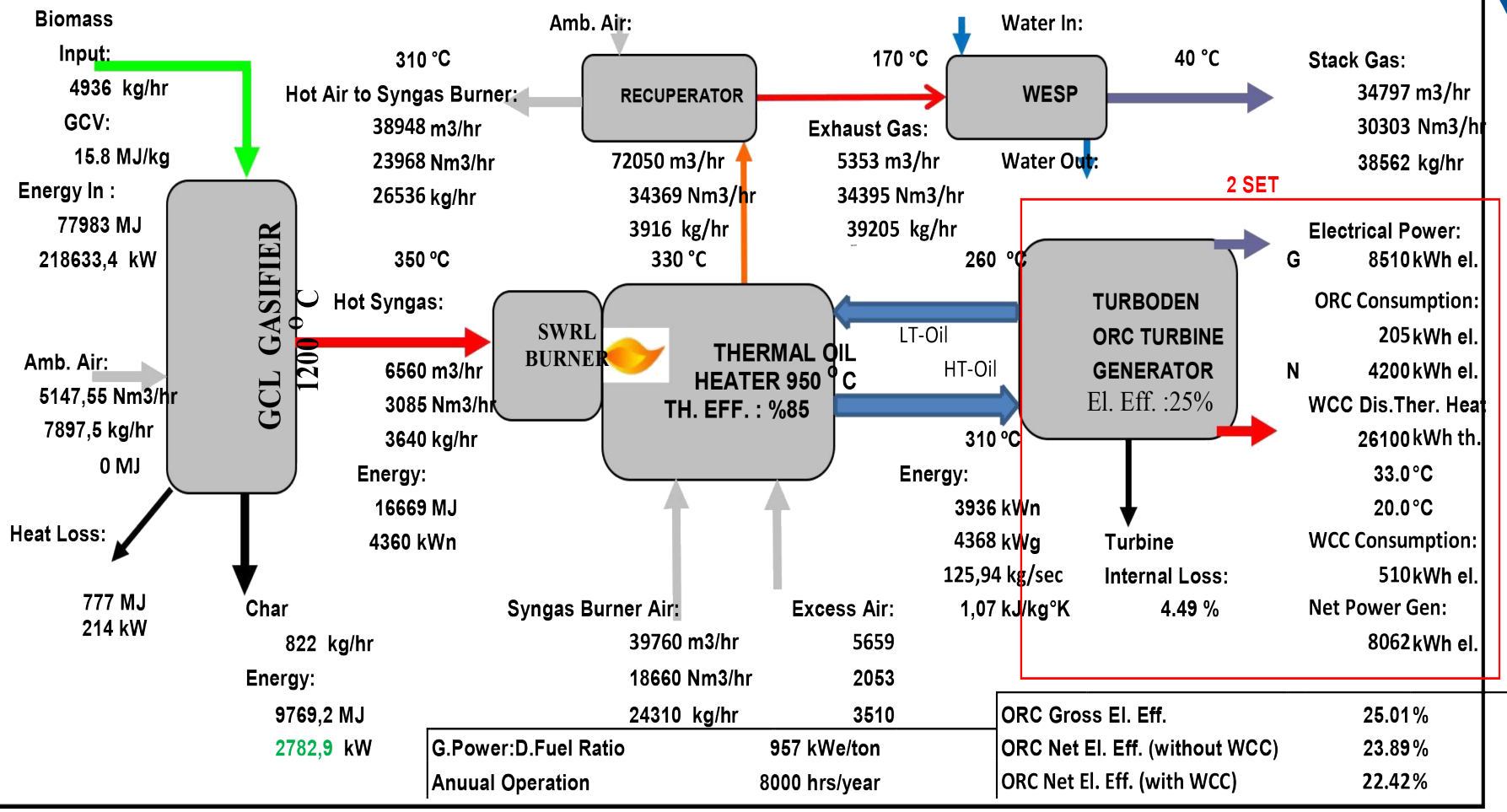

222500
205000
F-DUST FILTER
SYSTEM-1
A-25 TON/HOUR
WASTE MANAGEMENT PLANT-1
GASIFICATION PLANT
15 MW / HOUR
E-ECONOMIZER-1
B-WALKING FLOOR
BUNKER SYSTEM
C-GASIFICATION
REACTOR
GROUP-1
C-GASIFICATION
REACTOR
GROUP-2
D-ORC TURBODEN-1
1 x 15 MW

15 MW / HOUR CAPACITY FLOW CHART

GASIFICATION/ORC TURBINE MASS & ENERGY BALANCE DIAGRAM – 5 MW/h X 3

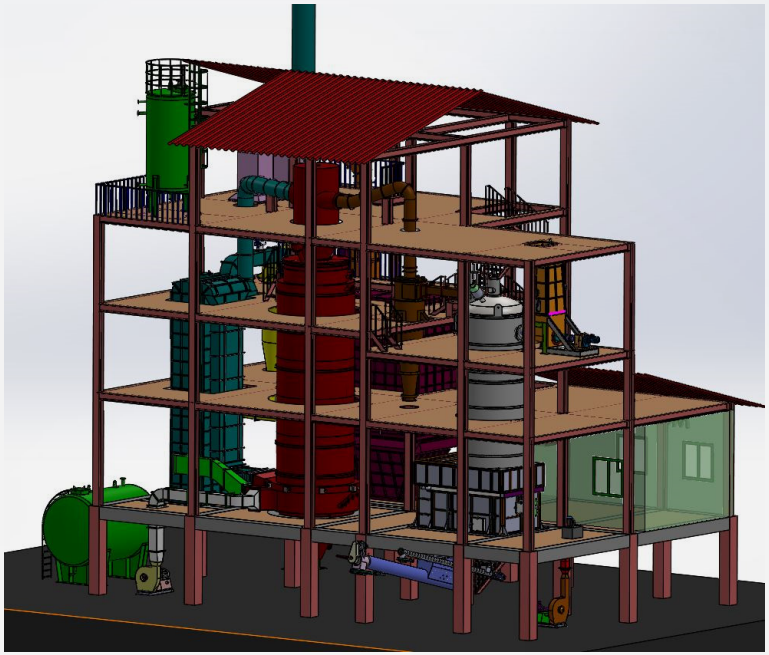
Biomass Moisture	10 % w/w	Hot Syngas Efficiency	85.77 %	Gas:Fuel Ratio	2.5 Nm3/kg
G. Heating Value	17.5 MJ/kg	Gasifier Heat Loss	1.00 %	Char:Fuel Ratio	0.2
L. Heating Value	15.8 MJ/kg	Biomass Dry 0% Feedrate	4441,8 kg/hr	Char Heating Value	12.5 MJ/kg
Biomass Feedrate 10%M	4936 kg/hr	Biomass Wet 40% Feedrate	6909,7 kg/hr	Syngas Heating Value	7.00 MJ/Nm3

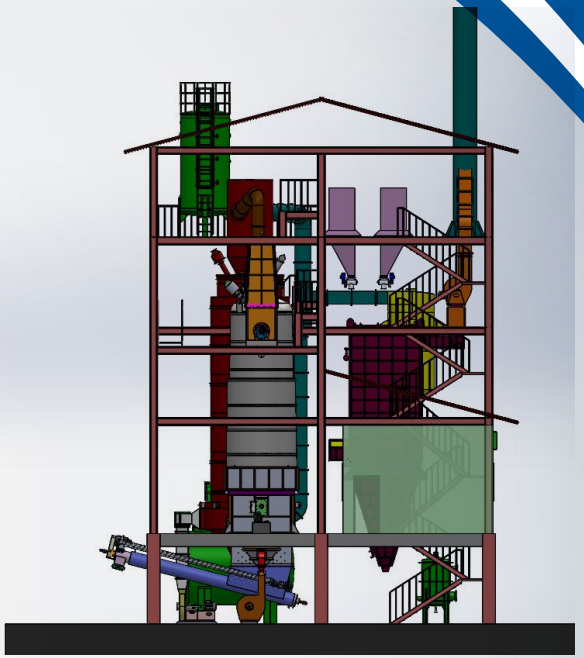
Designed by;
HSK
HİDROLİK

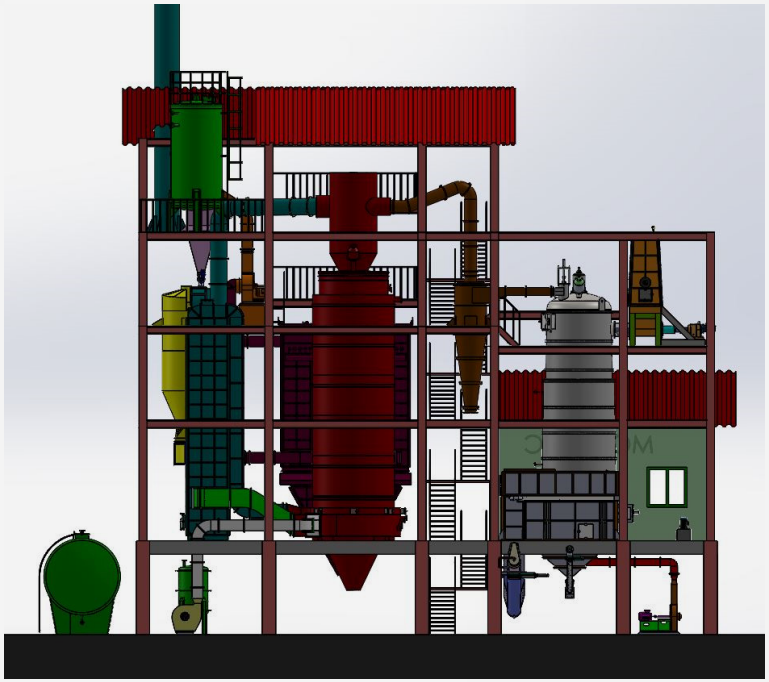


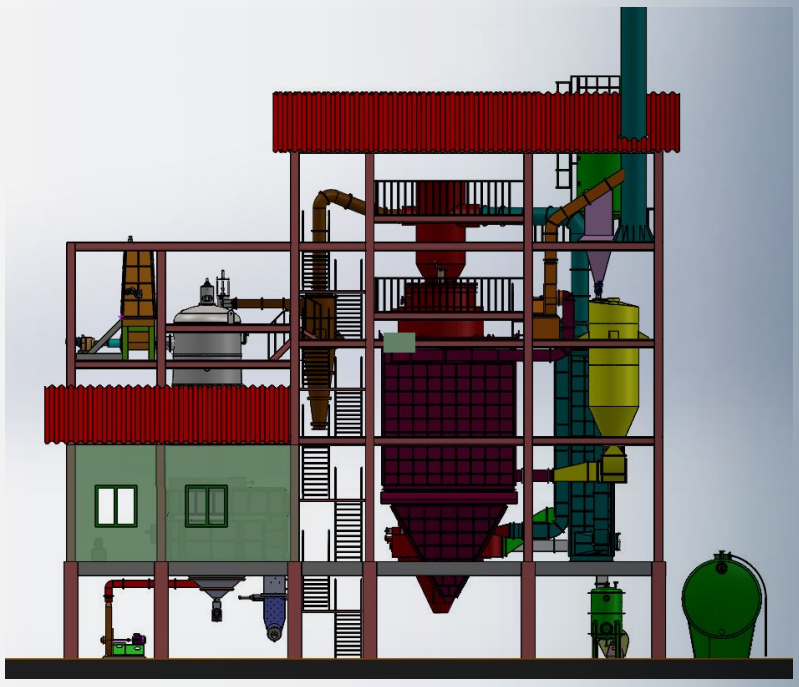
G.Power:D.Fuel Ratio	957 kWe/ton
Anuual Operation	8000 hrs/year

ORC Gross El. Eff.	25.01 %
ORC Net El. Eff. (without WCC)	23.89 %
ORC Net El. Eff. (with WCC)	22.42 %









Technical Information Sheet

1. Name of technology
MSW gasification and ash melting furnace

2. Type of technology
Combination of a fluidized bed gasification furnace (partial-combustion) and vertical ash melting furnace for MSW treatment (gasification and ash melting)

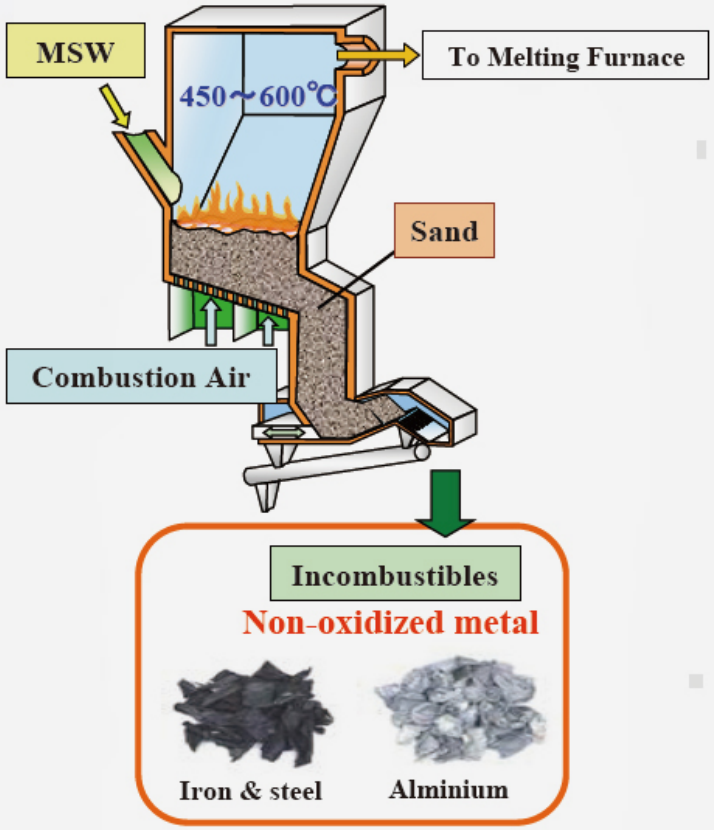
3. Description of technology
[Objective and application of the technology]
MSW is gasified and the gas is incinerated at over 1,300 degrees C for ash melting to reduce volume and minimal dioxin emission simultaneously.

[Characteristics of the technology]
Fluidized bed gasification furnace
Gasification of MSW (partial-combustion)
Extraction of valuable materials such as iron, steel, and aluminium from waste without oxidation (easy to recycle)
Ash melting furnace
Ash is melted at over 1,300 degrees C for volume reduction & stabilization of residue.
Melted ash becomes ÿgmolten slag,ÿh which is a recyclable material for use in construction.
Minimal dioxin emission due to decomposition at high temperature
Minimal energy consumption for ash melting since this system produces flammable gas that is used in the ash melting process.

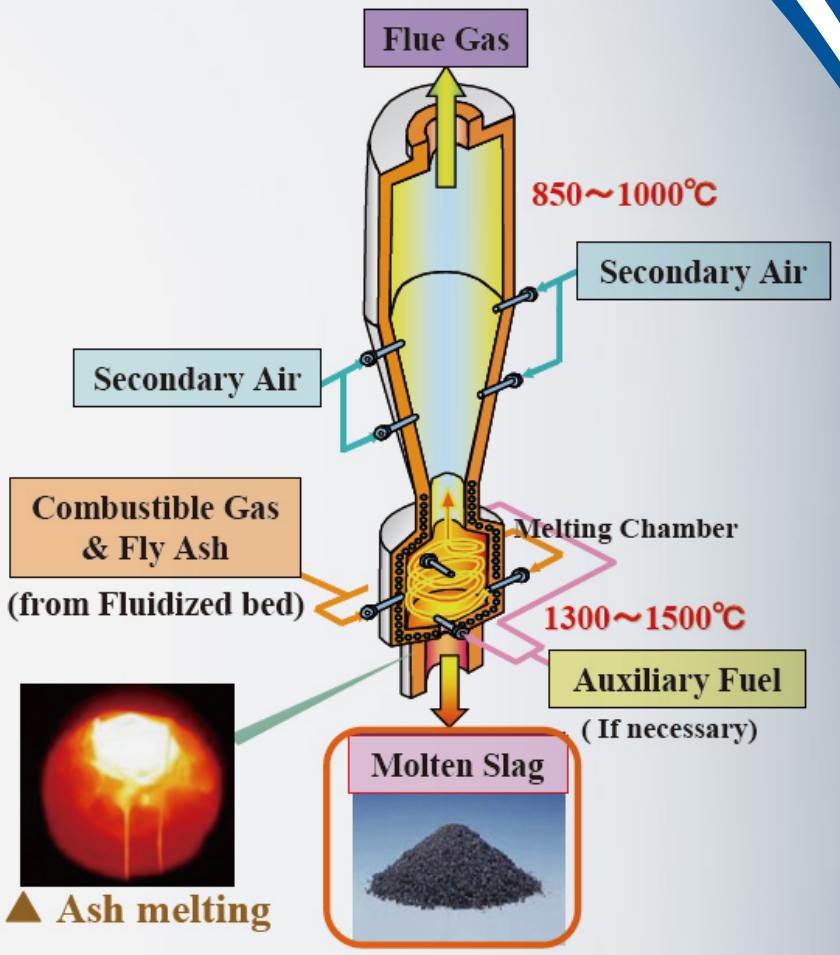
4. Classification of technology
Applicable fields Municipal solid waste treatment, Industrial waste treatment, Recycling

Target waste Paper/cardboard, Waste plastic, Plastic bottles, Glass bottles, Steel cans, Aluminum cans, Styrene foam, Food waste/ raw garbage, Waste oil, Other

Services provided Plant construction, Sales of machinery and equipment, Waste treatment service



Gasification furnace

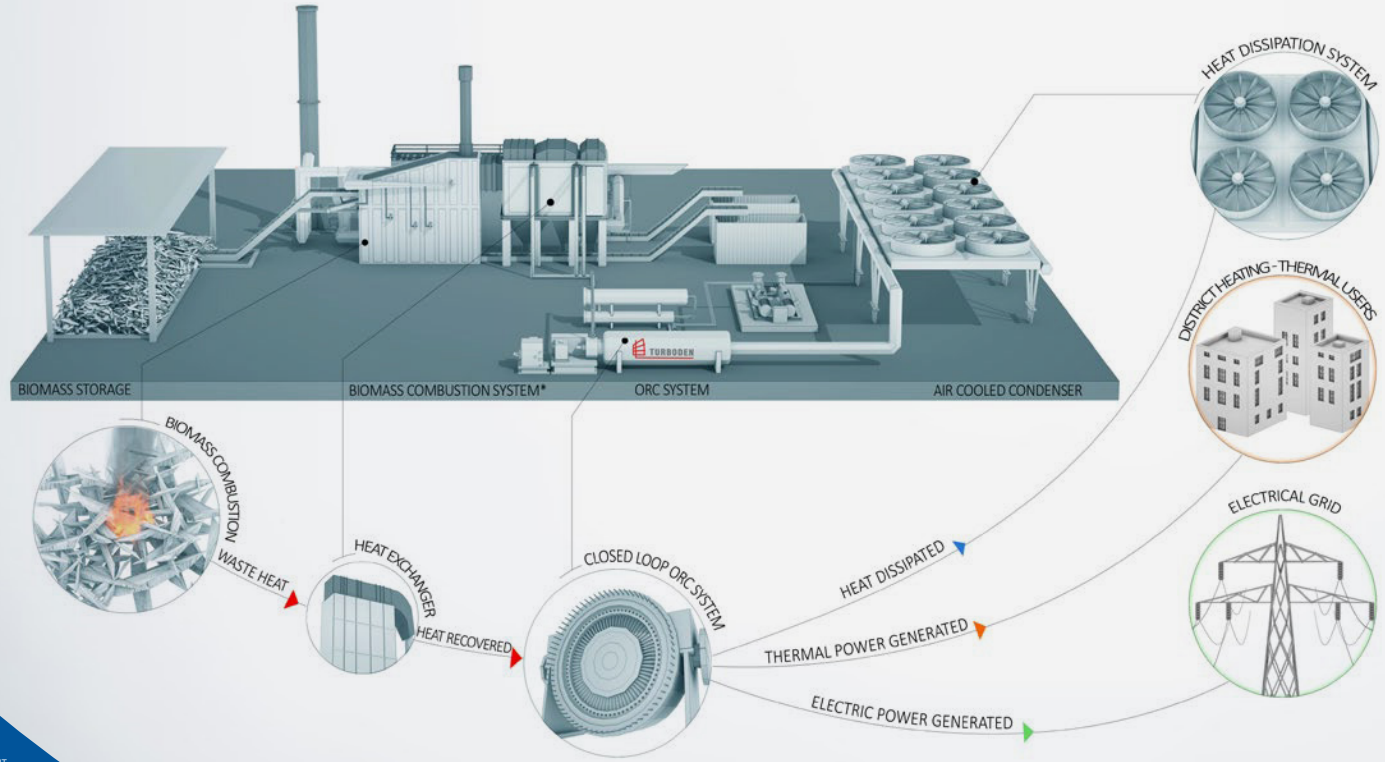


Ash melting furnace

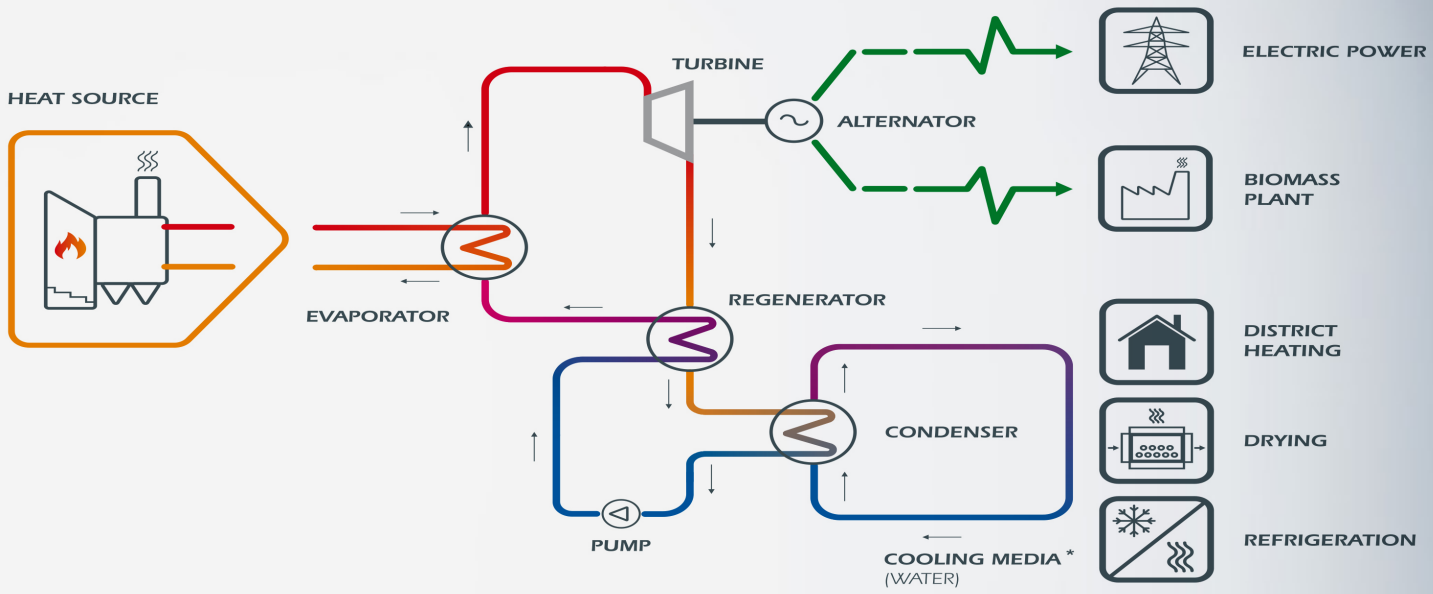
ORC TUBODEN
Turn green fuel into useful power

Turboden Organic Rankine Cycle (ORC) units are employed for generation of electric power only and Combined Heat and Power (CHP) with high efficiencies by using any kind of biomass, from virgin wood to organic residues from various production processes.
Turboden turbogenerators in this field can generate up to 20 MW of electricity per single shaft.

POWER ONLY: generation of electric power only with no condensing heat valorization.
CHP: generation of heat and electric power.



Technical Information Sheet



The ORC turbogenerator makes use of a closed thermodynamic cycle to convert heat into electricity. The thermal power recovered from biomass combustion vaporizes a suitable organic working fluid, which then expands through the turbine and produces clean and reliable electric power through the alternator. Thanks to the regenerator, internal heat recovery takes place improving the cycle efficiency. Downstream from the regenerator, the organic vapor is condensed and pumped back to start the cycle again. The heat from condensation can either be used by the heat users or dissipated.

The heat from biomass combustion is transferred to the ORC working fluid by means of an intermediate circuit or directly via the combustion gases in direct exchange systems. The media used in the intermediate circuits are thermal oil, saturated steam or superheated water.

* In Turboden power-only units, in which thermal users are not present, the cooling media can be either water or air with air cooled condensers.

FUEL AVAILABILITY AT AN AFFORDABLE COST IN THE LONG RUN MINIMIZING TRANSPORT COSTS

fuel

A HEAT USER TO VALORIZE THE CO-GENERATED HEAT (CHP CONFIGURATION IS MORE EFFICIENT AND REMUNERATIVE THAN A POWER-ONLY ONE)

heat

SUCCESSFUL BIOMASS PROJECT

power

HIGH ENERGY VALUE (RENEWABLE INCENTIVES, PPA, FEED-IN TARIFFS, GREEN CERTIFICATES, ETC.) AND RELIABLE SOURCE OF ELECTRICITY IN ISLAND MODE SYSTEM

TECHNICAL PROPERTIES OF THE WORK

1. HOT OIL BOILER

- In the hot oil boiler, it is necessary to circulate within the boiler pipes at certain speed limits so that the thermal oil is not disturbed.
- Hot oil coils will be produced to provide this feature.
- Serpentine material: P235GH seamless steel drawing
- The outside of the serpentines will be covered with steel sheet.
- The part of the hearth shall be fluid bed and shall be covered with refractory resistant to 1100 ° C.
- Fluidized bearing nozzles shall be resistant to wear and temperature from AISI 310 material.
- Body material: 19Mn6
- The boiler body shall be insulated with stone wool and aluminum plate of suitable thickness.
- Manufacturing standard:
- Ø88,9x4,5mm, with 4 + 3 pipe inlet
- Standard: EN 12952
- Serpentine Material: P235GH, seamless
- Hot Oil Capacity: 10.8 MW
- Hot Oil Input-Output Temperature: 310 ° C -260 ° C
- Operating Pressure: 4 bar
- Serpentine Test Pressure: 40 bar
- Boiler Efficiency: 85%
- A fire extinguishing material or dry chemical nozzles shall be placed on the top of the vessel.
- Underneath the boiler will be the ash spool bunker and will be emptied automatically.
- Hot oil coils will be produced to provide this feature.
- Dust will accumulate in the bunker will be given directly to the container to be supplied by the CUSTOMER and the bunker will have a manual flap.
- Equipment for controlling temperature and pressure at various points of the combustion chamber shall be installed, the contractor shall place the nozzles to which these equipment shall be connected.
- A suitable pressure relief cover shall be placed on top of the boiler. The discharge outlet line will be transported up to the roof.
- The cover on the channel shall be openable and sealed by internal pressure.

TECHNICAL PROPERTIES OF THE WORK

2. OIL DEGASIFIER AND EXPANSION TANK

- Oil degasifier: 3M³
- Oil Reserve Tank Capacity: 30m³
- Expansion Tank: 15m³
- Filling Pumps (Included in Customer)
- Calculations of the system to be established were made by HSK and tank volumes were determined accordingly.
- If the customer wants a special tank, it will be added to the offer.
- There will be 2 manhole holes on the tank with the necessary connection holes. After the end of welded manufacturing, the hydrostatic pressure test shall be carried out. After the hydrostatic pressure test, oil storage tanks will be painted with

3. AIR HEATER COMPONENT (AIR PREHEATER)

- Utilizing the energy of the hot smoke gas at about 250 ° C leaving the boiler, the combustion air temperature to be given to the boiler will be increased to ~ 100 ° C to increase the efficiency of the boiler and to ensure the complete combustion of the fuel. The outer surface will be isolated.
- Replaceable nozzles are placed in the recuperator pipe inlet to prevent wear.
- All thermal calculations will be made by the recuperator HSK and will be manufactured in appropriate dimensions.
- Sheet material: S235JRG2
- Heater pipes: S235JRG2

4. FANS - FILTER GROUPS

- All combustion and primary secondary chimney fans are included in the system. The filter bag will be used as a scrubber scrubber flue and cyclones.