

📍 Celje, Slovenia

## **PROBLEM**

The planned WtE plant forms part of an integrated approach to waste in Slovenia whereby a dedicated MBT facility adjacent to the WtE plant has been established to process waste from up to 240,000 people across municipalities effectively diverting waste from landfill a renewable energy for the community.

## **SOLUTION**

A CHP system was successfully designed and installed for the Celje Town Energy centre which is achieving industry leading performance. The system has been designed to turn RDF and Sewage Sludge into renewable heat for district heating and power for export to the local community. The fully WID gasification process up to 35,000 tpa of mixed waste (80% RDF and 20% Sewage Sludge)



## **Fuel**

- RDF 30,000 tpa
- Sewage sludge 5,000 tpa

## **Output**

- 15 MWth steam output
- 2.1 MWe

### → **Technology**

#### → Fuel storage & feeding

RDF is tipped into the waste reception bunker. An automatic single crane is used to extract the RDF from the bunker. Sewage sludge is delivered to a storage tank. From there, it is pumped and blended with the RDF prior to feeding into the moving grate by means of four parallel screw feeders.

#### → Gasification

Moving grate design basis is 570 kW thermal input per square metre of grate area. Three point air introduction for gasification and complete combustion in secondary chamber. Flue gas recirculation for fuel drying and primary NOx

control. Standby gas burner for temperature boost, if necessary, as flue gas temperature above 850°C has to be maintained for more than two seconds as required by WID.

#### → Boiler

Water tube boiler with vertical tubes. Consists of radiation chamber - membrane walls partially lined with refractory to lower heat load on the walls, second and third evaporator pass. Third pass with two superheaters and evaporators. Economiser is installed as fifth pass in order to preheat water and increase efficiency. Pressure of live steam is 35 bar and temperature 350°C.

→ Flue gas cleaning

Flue gas after economiser pass into a cyclone to remove large dust particle load. Sodium bicarbonate and activated carbon are then blown in for dry cleaning. A bag filter is then used for cleaning fine dust, sodium bicarbonate and activated carbon. Ammonia water is injected as a secondary measure for NOx lowering.

→ Turbine

Turbine installed is backpressure steam turbine produced by Siemens. Turbo generator produces 2.1 MWe of electricity at full load

→ Heat production

Plant produces 15 MWth of heat for district heating system.

→ Legislation

WID Compliant  
 PED compliant (CE mark)  
 IPPC  
 BREF  
 BAT



**Emissions**

	Unit	Measured	Allowed
CO	mg/m <sup>3</sup>	7,15	30
TOC	mg/m <sup>3</sup>	0,56	10
NOx	mg/m <sup>3</sup>	135,79	180
Dust	mg/m <sup>3</sup>	1	5
SO2	mg/m <sup>3</sup>	0,62	40
HCl	mg/m <sup>3</sup>	2,34	8
HF	mg/m <sup>3</sup>	0,18	1

**Typical RDF composition**

FRACTION	Properties			Fuel composition	
	Water	Ash	Burnable	Heat value	Average content
		(%)		(MJ/kg)	%
Textile	7.56	5.76	86.68	16.65	15
Cardboard	6.85	11.88	81.27	17.49	13.5
Paper	23.99	12.43	63.58	10.1	38
Plastic foil	0.51	13.24	86.25	40.14	13.5
Hard foil	0.4	5.28	94.32	40.12	11
Plastics	0.42	0.15	99.43	21.51	5
Wood	12.52	2.31	85.17	16.32	3
Styrofoam	1.07	9.98	88.95	27.95	1

Statement from, Bojan Šrot, former Mayor of the City Municipality of Celje:

“The Regional Waste Management Centre Celje is a project that was implemented during my term of office as mayor and one I can truly take pride in. It represents the single greatest environmental investment of the City Municipality of Celje. The environmentally responsible approach to waste management that we have embraced will also have a positive effect on the generations to come. This is undoubtedly a great success!”