Arnoldstein WtE plant, 6/5/2010

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The Arnoldstein plant is located in the town of Arnoldstein in the district of Villach-Land in the Austrian state of Carinthia (within the borders of Austria, Slovenia and Italy).It is the southernmost state of Austria, with a population of 560.000 inhabitants. The plant serves the whole state processing almost 27% of the state's waste.

The plant commenced operations during the spring of 2004. The plant was constructed by Martin GmbH, Siemens, Austrian Energy and Environment and PORR technobau und Umwelttechnik. The operator is KRV which consists of Verbund (40,85%), Kelag (42,85%) and Porr Infrastruktur(14,3%). The original investment cost was 67 million € and the final budget reached approximately 75 million €. The plant has technical and managerial staff of 29 persons, allocated into 3 shifts, with 8000 operational hours per year.

The technical characteristics of the plant are listed below:

Waste reception

- The waste is delivered by trucks coming from all over of Carinthia. Each truck has a mean capacity of 4-5 tons. The trucks unload the waste into one of the four tipping halls available.

- The waste is moved from the waste bunker to the combustion chamber using cranes

Combustion Process

- The combustion chamber consists of a single line with two moving grates with a total capacity of 90.000 tpa MSW with a lower heating value of 10 MJ/kg
- The combustion process takes place with air enriched in oxygen at percentages of 24-35% (Syncom Process/Martin Technology)
- Flue gas temperature is 1100^{o} C - 1200^{o} C. There is a recirculation of flue gases for better combustion
- Due to the enriched air by oxygen the combustion is more efficient and there is almost a complete destruction of dioxins. Dioxin monitoring is done online.

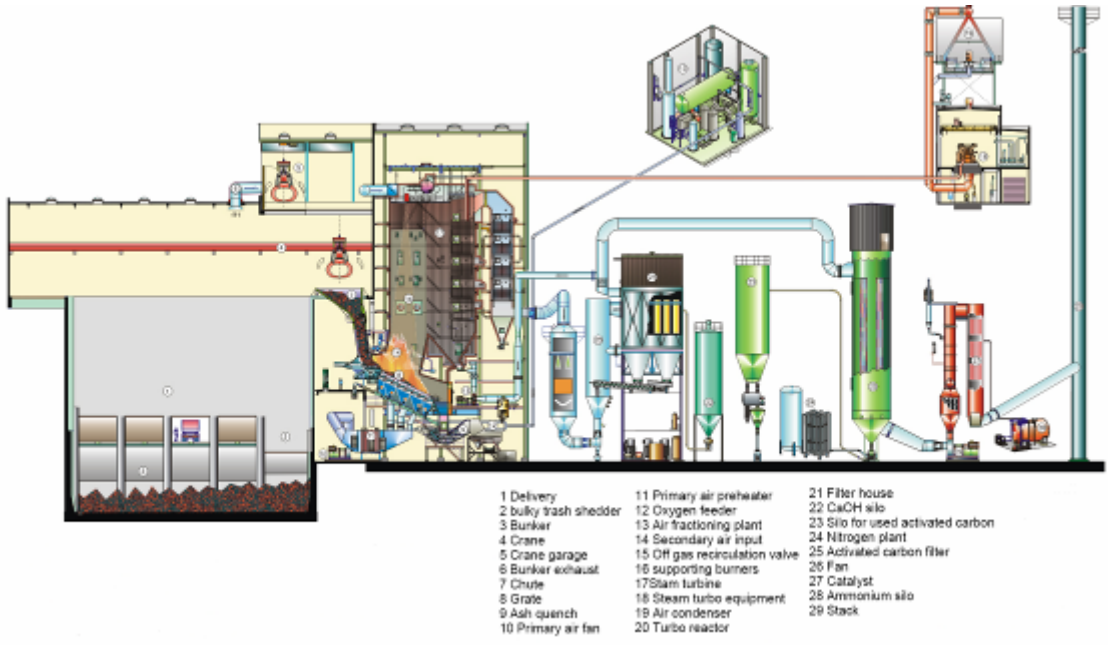
Air pollution control (APC)

- Semi-dry scrubbers with hydrated lime to reduce SO_2, HCl and Hydrogen fluorides
- Filters to reduce dust particles, heavy metals and organic pollutants
- Activated carbon filters
- Selective catalytic reduction- SCR to reduce NO_x in the flue gases

Electricity and steam production

- The plant produces steam of 400 ^{o} C, pressure 40 bar, 10-13 tn/hour
- There is a market for teleheating and for hot water usage

- The gross power is rated at 7 MWe , the net power is rated at 5,2 MWe and the R1 formula is above 0,65. Self consumption is higher than normal because of the oxygen production (~95%) to enrich the combustion air
- Energy production is 500 KWh/tn Electricity is sold at a price of ~35-60 €/MWh with 50% biomass and 30% bioenergy.



Residuals treatment

- The produced bottom ash is 25% and is of good quality due to the increased combustion efficiency. In order to avoid leaching the bottom ash is sintered.
- Boiler ash is recirculated for a more uniform product
- Bottom ash is landfilled in an ash monofill at a price of 50 €/tn
- Fly ash is stabilised with lime and cement within the landfill area and then it is landfilled. The transfer is via railway.