

## Three new containers for landfill application in the North of Portugal

Caterpillar Energy Solutions consolidates itself as a solution provider in the waste treatment area with the supply of three containers for several CHP plants in the north of Portugal. The supply of these containers will provide an electric output of 800kWe per engine, that will work in parallel with the grid. The gensets, with an efficiency of 42.4 %, guarantee a heat recovery of the energy coming from the biogas produced.

**R**esinorte, the company which manages the solid waste treatment in the north and centre of Portugal, granted the company Painhas the awarding of several landfills located in the north area of the country.

The three plants located in Gonça, Boticas and Santo Tirso are equipped with three MWM containerized gensets TC-G2016V16. In these plants, the biogas is currently burned in torches and therefore it has no further use, but with these MWM gensets, the biogas from the solid waste treatment can be used to produce electric power.

As a turn-key project, the three gensets were supplied containerized for each one of the plants. The containers comprise all the necessary equipment for their perfect running, management and control. The adaptability of these containers makes easier their installation, since there is no need of prior civil works, except for the concrete frame where they are placed. Once the containers are located in the concrete frame, the only thing that they need is a gas line for the fuel, in this case biogas, and a wiring to the power line that will inject the electric power produced to the grid.

MWM has improved its container design thanks to the new facilities where they are designed, produced and tested. The MWM facilities have several test bench workstations where the containers and all the equipment and systems that they comprise are tested to run correctly. Thanks to their design and the reliability of all their



components, the commissioning works at site is significantly reduced. The three containers delivered to the CHP plants of Botica, Santo Tirso and Gonça are equipped with this new design.

In only 122 m<sup>3</sup>, each container has two different areas clearly identified, the engine room and the control room. Both areas are equipped with a gas and smoke detection system.

In the engine room the following systems are located: the biogas supply, the engine cooling and the clean and wasted oil system.

- The biogas supply system comprises a blower, a CH<sub>4</sub> sensor and the biogas train which ensures the adequate engine inlet pressure.
- The engine cooling system comprises the following circuits:
  - a. High temperature circuit, HT. In this circuit the lube oil, the first stage of the gas-air mixture cooling and the engine jacket circuit are cooled down. The heat to be dissipated in the HT circuit is 415kW.
  - b. Low Temperature cooling circuit, LT. In this circuit the second stage

of the gas-air mixture cooling system takes place. The heat to be dissipated here is 74 kW.

- The container lube oil system comprises a clean oil tank, a wasted oil tank and an engine prelubrication pump, which drains the oil pan of the engine. All the auxiliaries (pumps, three way valves, etc.) and measurement sensors of the aforementioned systems are located in the engine room, except for the table coolers and the exhaust gas system, which are located on top of the container roof.

The table coolers and the exhaust gas system are mounted on base frames and they are supplied as loose parts in order to make easier their carriage to the plant. Once they are at site, they are easily installed on the container roof in only one working day.

The table coolers guarantee that the heat of the HT and LT circuits is dissipated correctly. On the other side, the exhaust gas system comprises a chimney and a gas silencer that reduces 40dB(A) the noise made by the exhaust gas.

In the other area of the container, the generator circuit breaker, the auxiliary and the control cabinets are located in the control room. The engine is controlled thanks to the TEM system developed by MWM, which allows an easy and an independent management of the engine.

Despite each container is located in a different plant and there is a distance greater than 50 Km amongst them, the container management will be carried out directly from the customer offices ◀◀