Producing energy from discarded wood chips

Energy production from renewable sources entail new and innovative solutions to produce thermal and electric energy with low environmental impact. The wood chip by-product is one of these renewable sources used for producing such energy.

The D.M.G. Srl has always operated in the Heating Energy sector gaining experience based on 30 year collaboration with special industrial burner manufacturers (building to client specification) with after sales services included (commissioning, routine and non-routine maintenance, revamping).

In addition to exploiting its industrial burner know-how, and thanks to the experience gained in process development, D.M.G. engineers and designs automation systems for energy generation and conversion processes. Their clients who require core business applications are mostly engineering companies that create thermal energy conversion production systems or end clients that exploit biomass fuel in order to save on energy. In terms of savings this refers to reduction of fossil combustion and /or reduction of CO2 emissions in the atmosphere in order to remain within the limits stipulated by the Kyoto protocol.

ELECTRIC- THERMAL ENGERGY PRODUCTION SYSTEMS

The electric-thermal production system uses woodchips as fuel that have been discarded by the end user when debarking tree logs to manufacture plywood. In brief, the end user peels off layers from the tree log and discards the outer layer, being the tree bark, in order to use the wooden part inside only.

The biomass system is composed of a furnace in which an underlying stepped grate conveyor moves the biomass fuel from the start to the end to finish off as ashes. A small methane or solid fuel (sawdust) burner is used to set the biomass alight for the first time and/or for integrating extra heat when the biomass fuel does not produce enough. The hot gas output deriving from the furnace enters, after various cleaning processes, a diathermic oil or water boiler to produce steam based on the fluid needed for energy conversion.

THE SUPERVISION SYSTEM

The automation system has been realized with an Allen Bradley PLC based on dual I/O card racks for gathering motor status data. The power panelboards have also been realized by D.M.G. All the process signals have been using junction boxes containing local data acquisition systems whereby, thanks to Ethernet, all data can be transferred to the memory process center. A ring network has been implemented with special switches so that any unexpected cable malfunctioning will not hinder the correct running of the plant system.

The system's supervision and management is based on Progea's Movicon 11 platform for

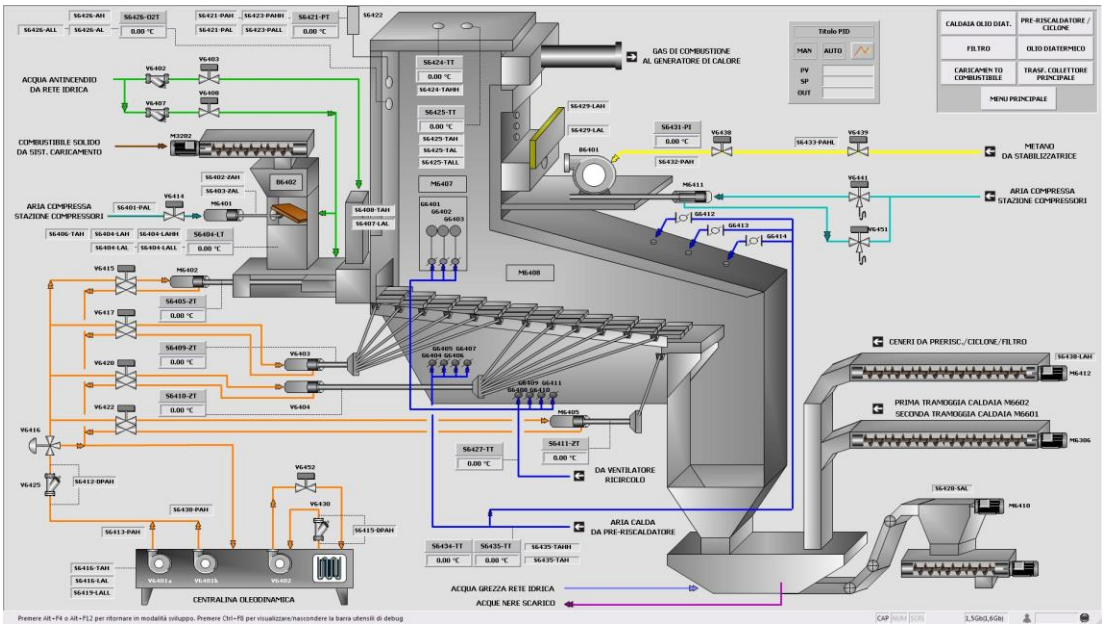

Figure 1 –Supervision system diagram and connections

whom D.M.G. is a "Solution Provider". Due to captivating graphics and great intuitivity, this

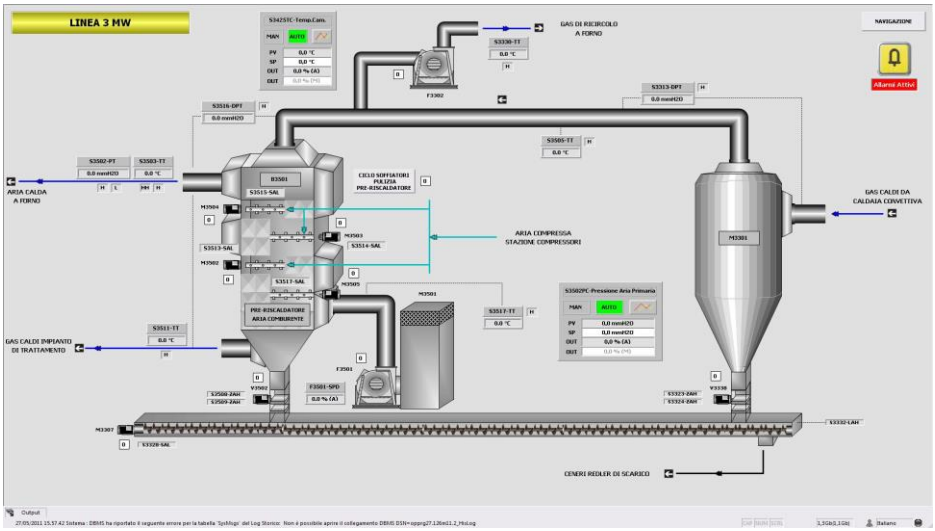

Figure 2 – Methane, sawdust burner

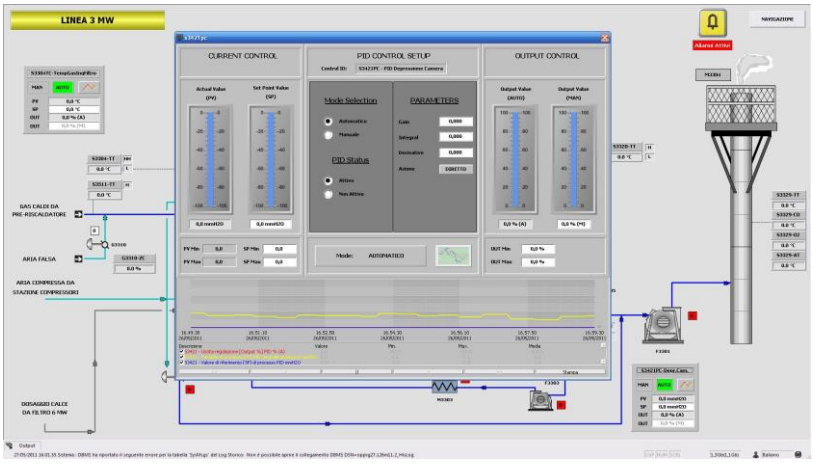

Figure 3 – Consumptions displayed transparently

system is capable of permitting immediate control of the biomass energy plant. Each tool is equipped with a pop-up to enable the setting of scale fields and alarm alert thresholds applied to the associated variable. Pages can be navigated by using a pop-up menu or flow indicator arrows (water, combustion gas, diathermic oil etc) to analyze the linear progress of each component.
The entire system has been designed to facilitate maintenance and prompt intervention in the event of system failure thanks to important visual alarm displays. As the running of two plant systems need to be visualized, it is possible to choose through the alarm screen page whether to display both of them completely or section by section. All statuses and alarms can be analyzed because they are recorded in data-loggers setup in the SQL server. Variable values up until the previous year can be loaded during analyzing sessions.

The data logger engine for collecting data is one of Movicon 11's strong points. The job of the Scada is to allow data to be aggregated in the simplest way possible and to define the most appropriate recording mode and archive management most suitable.
This important job is performed by Movicon according to concepts based on simplicity, reliability and openness.
Processing recorded data is a critical feature for company analysis on system productivity in order to improve heating energy use in function with purely productive phases and for isolating any anomalous behavior. The security, reliability and continuous recording of data are other fundamental aspects important to managing information processes for which Movicon implements an automatic Data Recovery system if the system should ever be interrupted and also restores ODBC connections for historically logging data even in the most critical situations.

D.M.G. has found a technological partner in Progea as joint collaborators in a specialized team to constantly compare and exchange ideas with the aim to maintain market competiveness and provide innovative solutions to their clients.

Massimo Gandini
D.M.G. SRL