

System for Converting Biosolid into Solid Fuel “J-Combi”

1. Introduction

With the spread of sewers, biosolids (sewage sludge) have been ever increasing in volume. Today, nearly half of all biosolids are dumped into landfill. Now that such landfills have been filled almost to their capacity, the issue of how to dispose of biosolids has become a major social problem.

The “Renewable Portfolio Standard (RPS),” which came into effect in April, 2003, obligates electric utility companies and PPS (Power Producer and Supplier) to utilize new energies (solar, wind, geothermal, biomass).

Biosolids are a form of biomass. They have a calorific value and are carbon neutral.

Characteristically, biosolids are more accumulative and more useful than other kinds of biomass. It is considered, therefore, that the social problems involved with them could be solved in method for converting biosolids into fuel and by utilizing them as an auxiliary fuel for coal-fired thermal power stations.

By applying a drying process that permits full utilization of the organic components of biosolids, Nippon Steel Corporation has developed and commercialized a new system that dries biosolids and converts them into a fuel in the form of pellets. The company calls the system “J-Combi.”

2. Characteristics of the System

(1) Features of the system (Fig. 1)

- 1) The closed circuit system allows for effective utilization of waste heat and effective control of foul odors and dust.
- 2) The direct drying system employs a hot blast having a simple configuration. The system offers high efficiency in the evaporation of moisture.
- 3) The double-shaft mixer allows for stable pelletization of biosolids whose moisture content varies widely (between 65% and 85%).
- 4) No promoters or additives are required, and the end product can be mixed with other substances increasing the overall calorific value.
- 5) The system is safe and easy to operate and maintain.
- 6) When integrated into a factory unit, the system offers higher product quality and a shorter production cycle.

(2) Features of dry pellets (Photo 1)

- 1) The pellets are hard and uniform in size and can be handled easily.
- 2) Because of their low moisture content (8%), the pellets produce little offensive smell. Even when the pellets are stored for an extended period of time, they exhibit little change in overall quality.

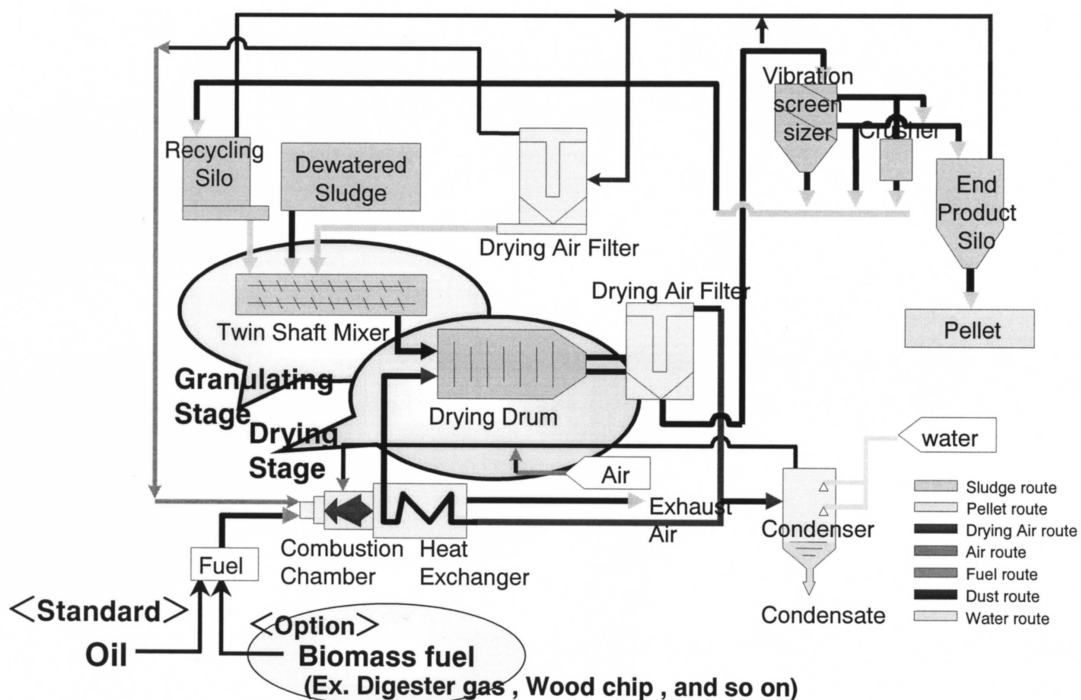


Fig. 1 System flow

3) The organic components of biosolids are concentrated in the pellets, the calorific value of which is about two-thirds that of coal (3,500 to 4,500 kcal/kg).

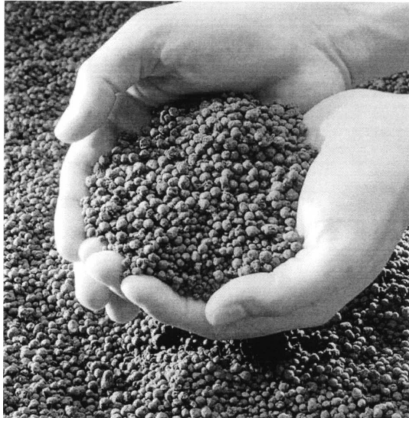


Photo 1 Dry pellet of biosolid

3. Use of the Pellets at Coal-fired Thermal Power Stations (Fig. 2)

At present, coal-fired thermal power stations suffer the following problems:

- (1) Obligation to introduce new energies in compliance with the RPS Law
- (2) Need to cut fuel costs
- (3) Need to reduce CO₂ emissions

By employing the dry pellets produced by the system, it is possible to solve the above problems.

In some foreign countries, this system has already been introduced at coal-fired thermal power stations of several hundred MW class, contributing to the cutting of fuel costs and the reduction of CO₂ emissions.

4. Conclusion

NSC intends to actively promote the J-Combi system to help reduce waste generation, secure biosolid disposal grounds, cut the cost of biosolid disposal, curb global warming, build a resource recycling-oriented society, and cut the cost of power generation, etc.

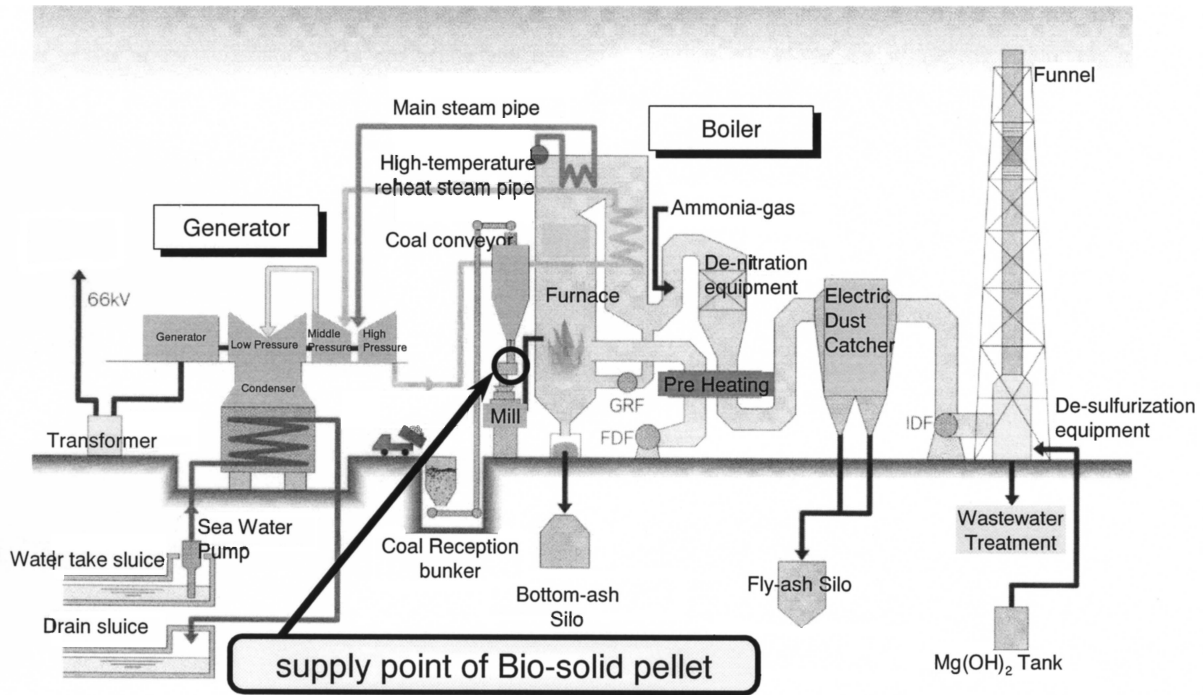


Fig. 2 Image of supply to power plant

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