

Identification of Dry Waste Management Strategies for Thermal Power Plant Sector

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Abstract: This paper presents the analysis of dry waste management approaches for thermal power plant sector. Now a day's coal and coal mines are running out. This paper discusses about best alternate solution for Coal and Coal Mining by using different dry waste with its availability. The "Waste to Best" initiative aims to address waste management and resource insufficiency by converting various waste types into valuable products and energy. This initiative reduces environmental/air pollution, minimizes landfill use and promotes a circular economy. It enhances sustainability by reducing greenhouse gas emissions, conserving resources and creating economic opportunities.

Keywords: Air Pollution, Electricity, Fly ash, Fossil Fuels (Coal, Oil and Natural Gas) and Waste Management.

I. INTRODUCTION

The "Dry Waste to Best" concept focuses on converting dry waste materials like Ash bricks, Dried corn husks, Dried leaves of the tree and Wood shavings into valuable products and resources. It involves efficient collection and segregation, recycling, upcycling and using advanced processing technologies to transform waste into reusable raw materials or higher-value products. Energy recovery methods are used for non-recyclable waste to generate electricity. This approach supporting to environmental sustainability.

II. KEY COMPONENTS OF THERMAL POWER PLANT

A thermal power plant is an industrial facility used to generate electricity from heat energy, typically by burning fossil fuels such as coal, oil, or natural gas, or using nuclear reactions.

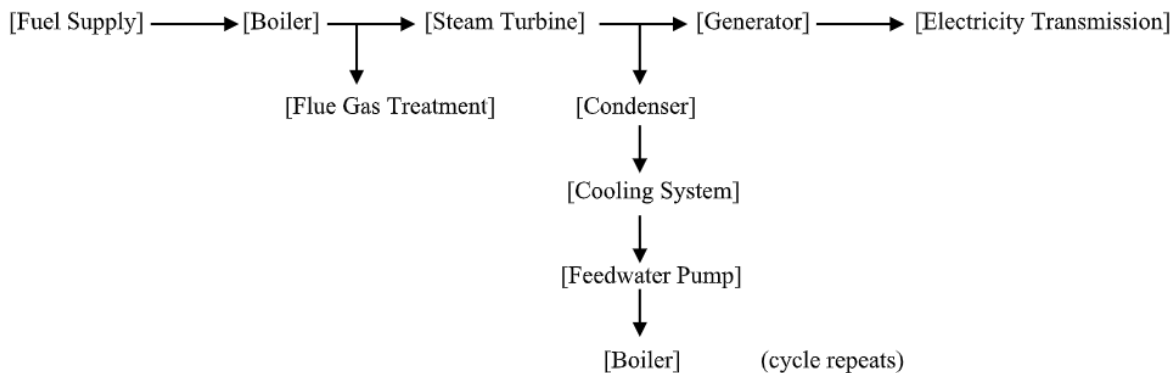


Fig. 1. Basic Block Diagram of Thermal Power Plant and Their Interconnections

- **Fuel Supply:** This includes the storage and feeding system for the fuel (coal, natural gas, oil, etc.). It represents the system for storing and feeding fuel into the boiler. It may include coal handling plants, gas supply lines or oil storage tanks.
- **Boiler/ Steam Generator:** The fuel is burned in the boiler to convert water into steam. In this block, fuel combustion takes place, converting water into high-pressure steam.

- **Steam Turbine:** The high-pressure steam from the boiler drives the steam turbine. The high-pressure steam drives the turbine, which is mechanically connected to the generator.
- **Generator:** The turbine is connected to a generator, which converts mechanical energy into electrical energy.
- It converts mechanical energy from the turbine into electrical energy, which is then supplied to the grid.
- **Condenser:** The exhaust steam from the turbine is condensed back into water. It cools the exhaust steam from the turbine, converting it back into liquid water.
- **Cooling System:** This includes cooling towers or other cooling methods to cool down the water in the condenser. It helps in dissipating the heat from the condenser. This system may involve cooling towers or other cooling mechanisms.
- **Feedwater Pump:** The condensed water is pumped back into the boiler to be reheated and turned into steam again. This pump feeds the condensed water back into the boiler for reheating, maintaining the cycle.
- **Electricity Transmission:** The generated electricity is transmitted to the power grid. The electricity generated by the generator is transmitted to consumers through the power grid.



Fig.2: Thermal Power Plant with Emission of CO₂ (Air Pollution)

III. QUALITATIVE ANALYSIS

Now a day's drawbacks of Coal and Coal Mining can be broadly categorized into environmental, health, social and economical. We are going to identify solution on these drawbacks using different dry waste materials. Identified dry waste components are Ash Bricks, Dried Leaves of the Tree, Dried Corn Husks, Wood Shavings and Natural Gas.



Fig.3: Coal



Fig.4: Coal and Coal Mining



Fig.5: Fly Ash Bricks



Fig.6 Dried Leaves of the Tree



Fig.7: Dried Corn Husks



Fig.8: Wood Shavings



Fig.9: Natural Gas

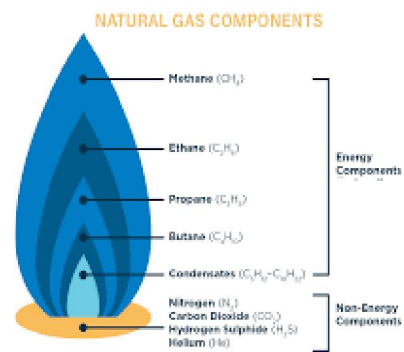


Fig.10: Natural Gas Components

Natural Gas Components: Methane (CH_4), Ethane (C_2H_6), Propane (C_3H_8) and Butane (C_4H_{10}) are the first four Alkanes. Methane gas, whose molecular formula is CH_4 , is the simplest Alkane.

IV. FUTURE SCOPE

We can analyse emission or impact of Carbon Dioxide (CO₂)/ Greenhouse gas from required parameters of above qualitative analysis. Means find quantitative analysis in the form emission of CO₂.

V. CONCLUSION

The "Dry Waste to Best" concept represents a sustainable and innovative approach to waste management that transforms dry waste materials into valuable resources. "Dry Waste to Best" initiative not only addresses the challenges of waste management but also contributes to environmental sustainability and resource efficiency, concrete the way for a cleaner and more sustainable future.



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