

Biomass Boiler Installation and Conversion Solutions

By: Industrial Boilers Pvt. Ltd

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Overview of Industrial Biomass Pvt Ltd

Industrial Boilers Pvt. Ltd is a leader in sustainable energy solutions, specializing in the development and implementation of biomass boiler systems. Our mission is to provide innovative, eco-friendly, and economically viable energy solutions tailored to meet our clients' needs.

Importance of Biomass Energy

Biomass energy plays a crucial role in reducing greenhouse gas emissions, providing a renewable source of power, and fostering energy independence. Utilizing organic materials as fuel significantly decreases reliance on fossil fuels while promoting environmentally responsible waste management practices.

Objectives of the Presentation

This presentation aims to provide a comprehensive understanding of biomass boiler installations and conversions, outlining key components, benefits, and case studies that demonstrate the effectiveness and efficiency of biomass energy solutions.

Scenario 1: New Biomass Boiler Installation

- **Components Required:** The successful installation of a biomass boiler hinges on a series of crucial components that work together to ensure efficient operation and energy output. These components must be carefully selected and configured to match specific operational demands.
- **Fuel Feeding Conveyor:** This component facilitates the transportation of biomass material into the combustion chamber, ensuring a consistent and controlled feed that is vital for maintaining optimal combustion efficiency and energy output.
- **Waterwall Furnace with Chain Grate:** The waterwall furnace is designed to generate steam or hot water from biomass combustion. Its chain grate system allows for the continuous feeding of fuel, enhancing combustion rates and overall efficiency.
- **Fire Tube Boiler:** A fire tube boiler utilizes the flow of hot gases to heat water contained within tubes, producing steam for various applications. Its design allows for a compact and efficient heating system, crucial in industrial applications.
- **Water Economizer:** A water economizer captures residual heat from flue gases to pre-heat incoming water, significantly improving energy efficiency and reducing fuel costs in the heating process.
- **Multi Cyclone for Ash Removal:** This system effectively collects ash and particulates generated from biomass combustion, ensuring environmental compliance and operational efficiency by minimizing emissions and enhancing system performance.
- **ID Fan for Flue Gas Discharge:** The induced draft (ID) fan manages the airflow in the combustion process, facilitating the removal of flue gases while maintaining optimal combustion conditions within the biomass boiler.

Estimated cost for Scenario 1

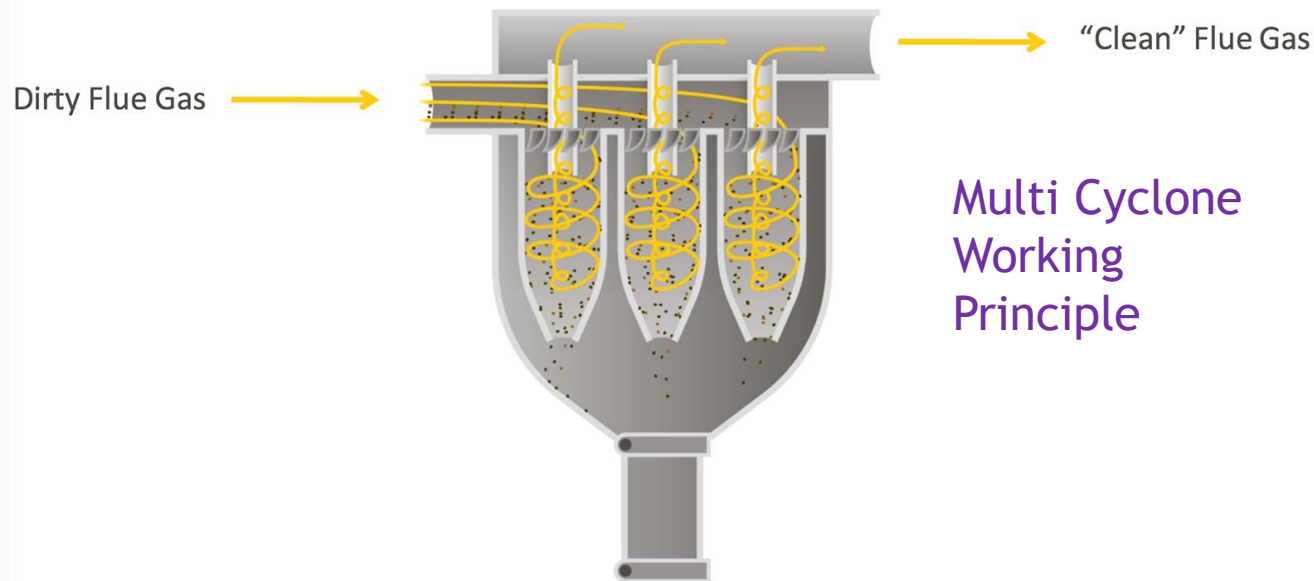
- ▶ 10 TPH Biomass Boiler costs around 70 to 100 Million PKR depending on client's requirements.
- ▶ Components Included: Fuel Feeding system, Boiler, Chain grate with Water wall, ID FAN, FD FAN, Economizer, Multi Cyclone, Chimney and electrical panels as per requirement, **Excluding Bag Filter House.**

Scenario 2: Conversion of Gas Boiler to Biomass Boiler

- **Components Required:** The conversion from gas to biomass boiler necessitates specialized components that accommodate the different fuel properties and combustion characteristics of biomass materials.
- **Fuel Feeding Conveyor:** Similar to new installations, a fuel feeding conveyor is essential for transporting biomass to the combustion chamber, ensuring a steady flow of fuel tailored for the dual-fuel system.
- **Waterwall Furnace with Chain Grate:** This furnace type is adaptable for biomass fuels, allowing improved combustion efficiency and facilitating higher temperatures needed for effective heat production.
- **Integration with Existing Gas Boiler:** Careful integration with the existing gas boiler infrastructure minimizes operational disruptions and leverages existing components where viable, enhancing the overall energy efficiency of the system.
- **Water Economizer:** The water economizer, like in a new installation, plays a vital role in preheating water, aiding in energy savings and operational cost reduction during the conversion process.
- **Multi Cyclone for Ash Removal:** Implementing a multi cyclone system post-conversion becomes vital for effective ash management, especially as the biomass combustion process typically yields different ash characteristics compared to gas.
- **ID Fan for Flue Gas Discharge:** Maintaining an ID fan ensures the optimized discharge of flue gases and the overall safety of the biomass boiler system, which changes in nature compared to gas operations.

Estimated cost for Scenario 2

- ▶ 10 TPH Gas Boiler Conversion to Biomass Boiler costs around 40 to 65 Million PKR depending on client's requirements.
- ▶ Components Included: Fuel Feeding system, Chain grate with Water wall, ID FAN, FD FAN, Economizer, Multi Cyclone, Chimney and electrical panels as per requirement , **Excluding Bag Filter House.**
- ▶ Boiler: Existing Gas Fired Boiler is used in this case.



Scenario 3:

Conversion of Coal Boiler to Biomass Boiler

- **Components Required:** Key components for converting a coal boiler to a biomass system differ in design to accommodate the specific combustibility and handling characteristics of biomass fuels.
- **Fuel Feeding Conveyor System:** This conveyor system must be designed to handle coarser biomass materials compared to coal, ensuring a steady supply with minimal blockage and operational downtime.
- **Water Economizer:** Similar to previous scenarios, this system captures residual heat to maximize energy efficiency during the transition of fuel types, showing its importance regardless of the energy source.
- **Multi Cyclone for Ash Removal:** As biomass combustion produces different ash properties, upgrading to a multi cyclone setup enhances the efficiency of the ash removal process compared to traditional coal systems.(Mostly available in coal fired Chinese Design Boilers.)
- **Existing ID Fan Utilization:** Utilizing existing ID fans from coal boiler setups can streamline costs and facilitate the conversion process, ensuring an effective draft system remains in place while adapting to biomass standards.

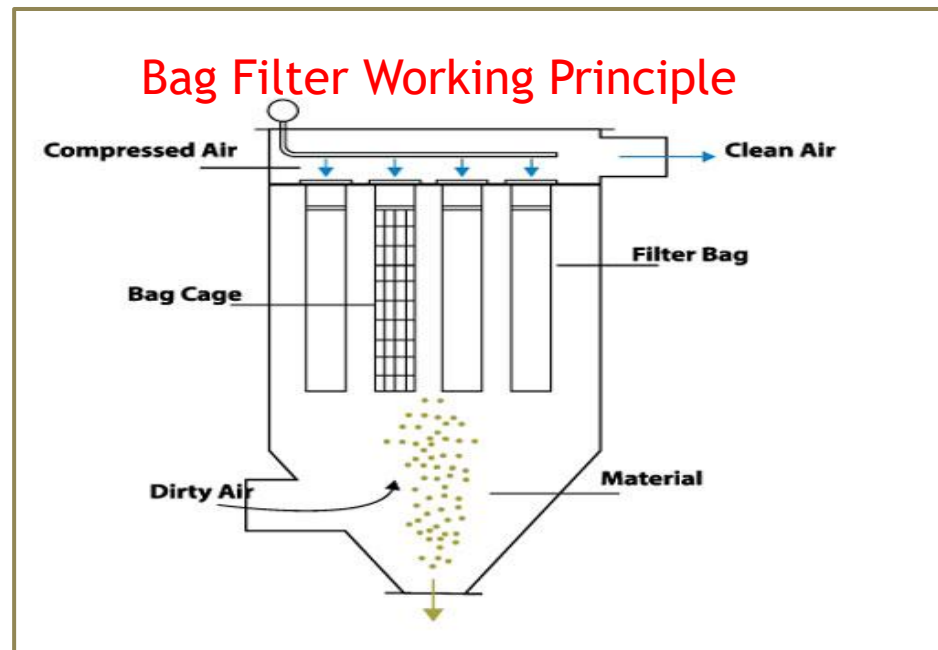
Estimated cost for Scenario 3

- ▶ 10 TPH Coal Boiler (Chinese Design) Conversion to Biomass Boiler costs around 7 to 15 Million PKR depending on existing system's design.
- ▶ Components Included: Fuel Feeding system. Economizer if needed.
- ▶ Key Note: Only Fuel Feeding System is installed and all other things are from existing Chinese design boiler.
- ▶ If, Chain grate + Waterwall not installed already, 18 to 20 Million be added in above cost.



Emission Control System

- ▶ As previously explained, Multi Cyclones remove dust and Ash particles from flue gases before the gases are released in atmosphere through chimney.
- ▶ To further enhance the emission control system, we are installing Bag Filter (Bag House) dust collection system which ensures that no solid particles above 0.5 microns are passed into the environment.
- ▶ Its installation cost for 10 TPH Biomass Boiler is around 25 to 30 Million Pkr.



Valuable Clients

- ▶ IBL has installed more than 600 Boilers to different industries in Pakistan.
- ▶ Some of IBL's prestigious clients:



Technical Specifications and Benefits



Efficiency of Biomass Boilers

Biomass boilers demonstrate high combustion efficiency levels, with modern systems achieving upwards of 90%. This efficiency translates into optimized energy production and reduced fuel consumption, significantly impacting operational costs.



Cost-Effectiveness

The initial investment in biomass technology can be offset by lower operating costs, tax breaks for renewable energy use, and potential government subsidies, making it a financially viable long-term solution.



Environmental Impact

Switching to biomass significantly lowers greenhouse gas emissions compared to fossil fuels, supporting sustainability. Biomass is often categorized as carbon neutral since it returns CO₂ to the atmosphere upon combustion, contributing to a balanced carbon cycle.



Long-Term Benefits

Transitioning to biomass not only promotes environmental sustainability but also supports energy independence, resource diversification, and provides stable pricing against volatile fossil fuel markets.

Thank You!

- If any questions, feel free to ask.

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