

# BIOMASS DRYER



In Association with SVCH-Technologii, Moscow (Russia)

ISO 9001:2015 | ISO 14001:2015 | ISO 45001:2018

# ABOUT US

KERONE is now renowned for serving the specialized needs of customers with the best quality and economical process of Heating /cooling and drying products, manufactured in a high-quality environment by a trained and qualified workforce (special purpose machinery)

-  48+ Years Manufacturing Excellence
-  Great Sale Support
-  Highly Customized Product
-  Adherence to Standards
-  Sound Infrastructure
-  Team of experts Delivering Quality
-  Timely Delivery
-  Cost Effective Solutions



KERONE is a pioneer in application and implementation engineering with its vast experience and team of professionals.



KERONE is devoteded to serve the industry to optimize its operations both economically and environmentally with its specialized heating and drying solutions.



KERONE is having immense expertise in manufacturing and implementing various types of engineering solutions.



KERONE is possessing employee strength of more than 280+ experts continuously putting efforts for happy industrial engineering solutions.

# WHY CHOOSE US

With decades of expertise, cutting-edge technology, and a customer-centric approach, Kerone Engineering offers tailor-made heating solutions that prioritize quality, flexibility, and cost-effectiveness. Benefit from our commitment to excellence, post-sales support, and innovative solutions for your unique heating needs. Choose Kerone Engineering for reliability, performance, and unmatched value.

## MISSION

- ✓ To enhance the value of customer operation through our customer need centric engineering solution
- ✓ We are committed to provide our customers, unique and best in class products in Industrial heating drying and cooling segment with strategic tie-up for the technical know-how with renowned leader in the industry specific segment

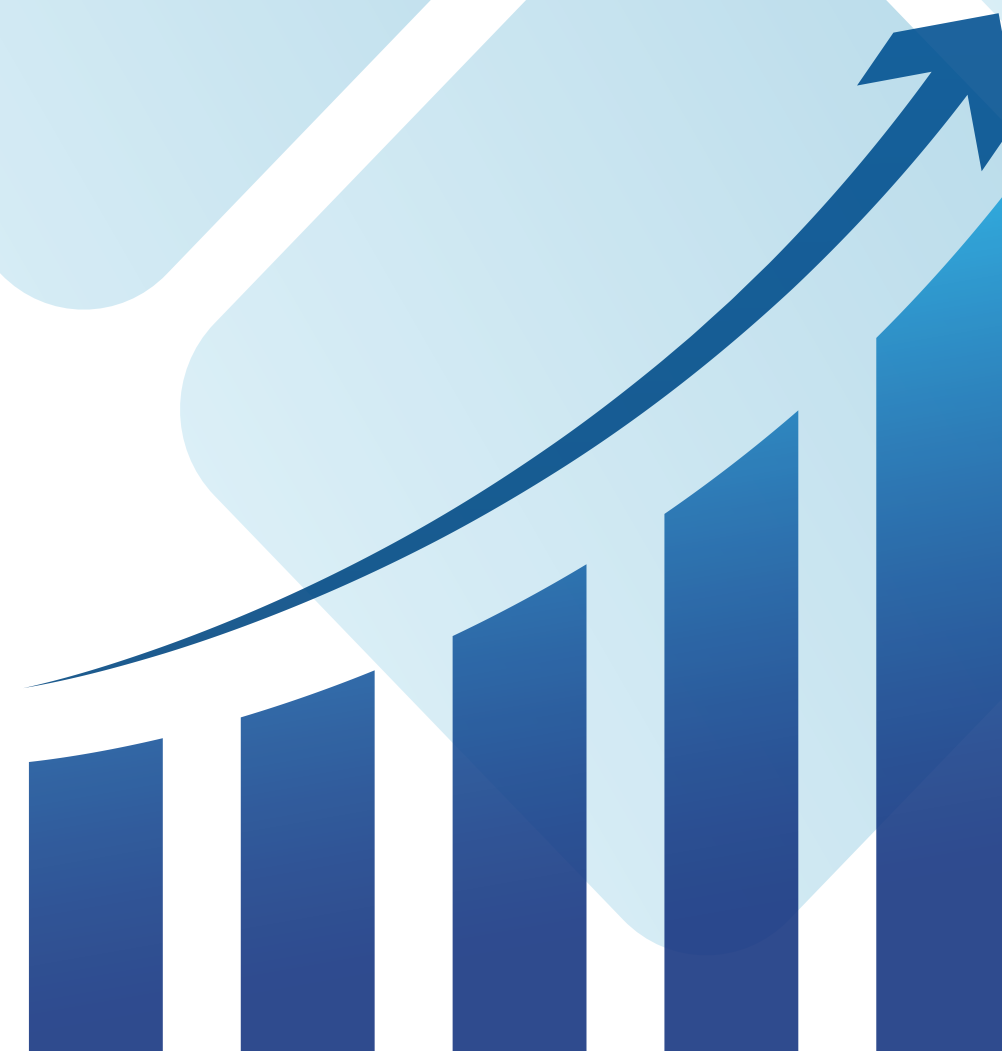
## VISION

- ✓ Turn into a world leader in providing specialized, top-notch quality and ecological industrial heating, cooling, and drying solutions across the globe.
- ✓ To attain global recognition as the best of quality and environment-friendly engineering solution company.

“

Enhance the value of customer operation through our customer need centric engineering solution.

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## Summary

A biomass dryer is a machine used to reduce the moisture content of various biomass materials such as wood chips, sawdust, and crop residues, making them more efficient and easier to handle in different applications. Biomass dryers offer several advantages, including increased efficiency of biomass utilization, reduced transportation costs, and decreased risk of biomass degradation. They also promote sustainability by enabling the use of renewable biomass resources and reducing greenhouse gas emissions.

However, selecting the appropriate dryer technology and considering factors such as the type and quality of biomass, energy requirements, and environmental impact is important for optimizing the drying process and ensuring the best possible results.



## What is Biomass Dryer?

- A biomass dryer is a machine used to dry biomass materials such as wood chips, sawdust, grasses, and agricultural residues. The dryer uses a combination of heat and air flow to reduce the moisture content of the biomass, making it easier to handle, transport, and store.
- The biomass drying process typically involves feeding the biomass into the dryer, where it is exposed to hot air, which dries the material. The dried biomass is then discharged from the machine and can be further processed for various applications, including fuel for power generation, animal bedding, and feedstock for biofuels.
- Biomass dryers come in different types and designs, including rotary dryers, flash dryers, and belt dryers, each with its own advantages and disadvantages depending on the specific application and biomass material being dried. The use of biomass dryers can help reduce greenhouse gas emissions by making biomass more efficient and cost-effective to use as a renewable energy source.

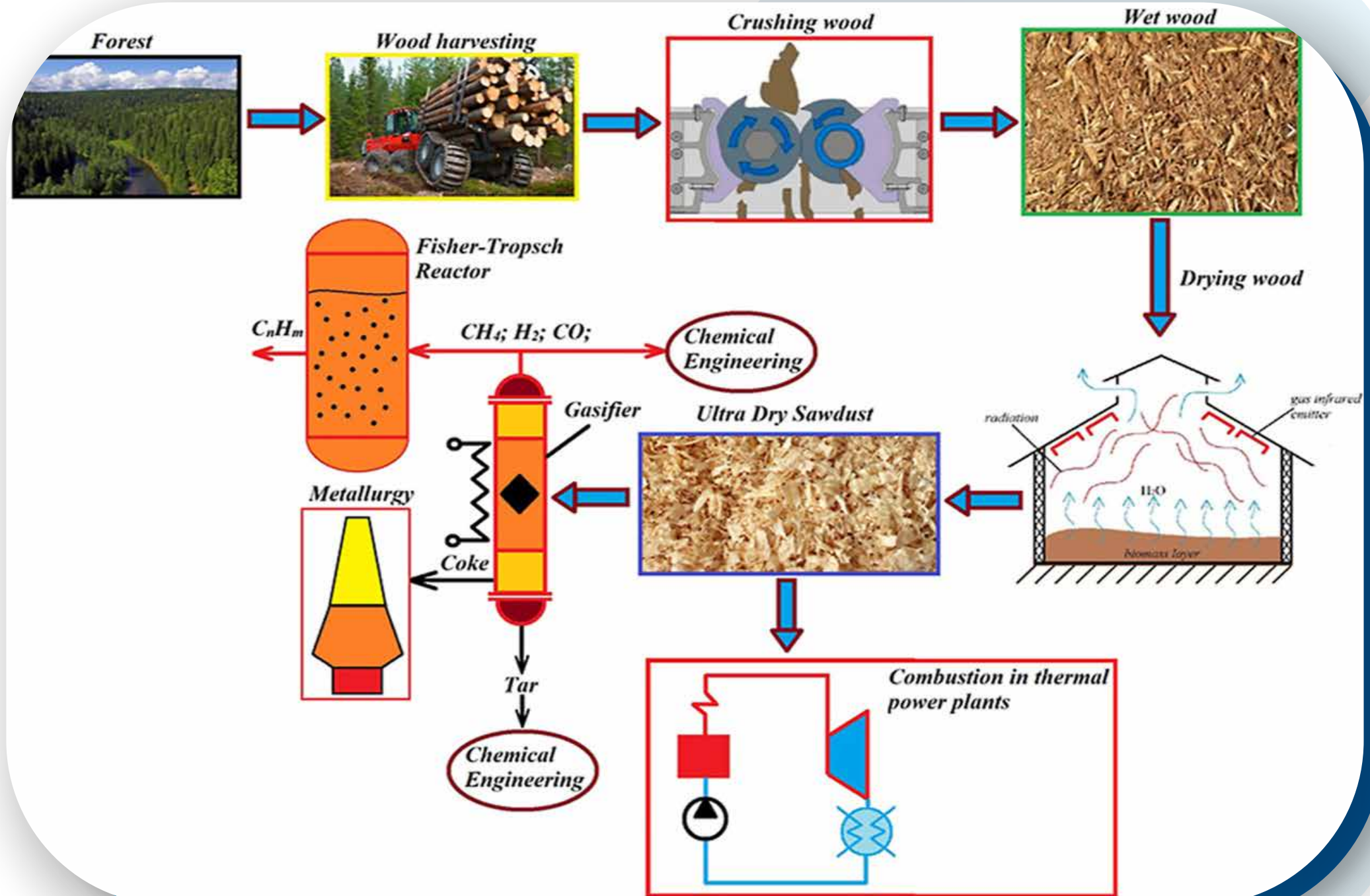


# Features

- Insulation
- Heating system
- Airflow system
- Control system
- Conveyor system
- Safety features

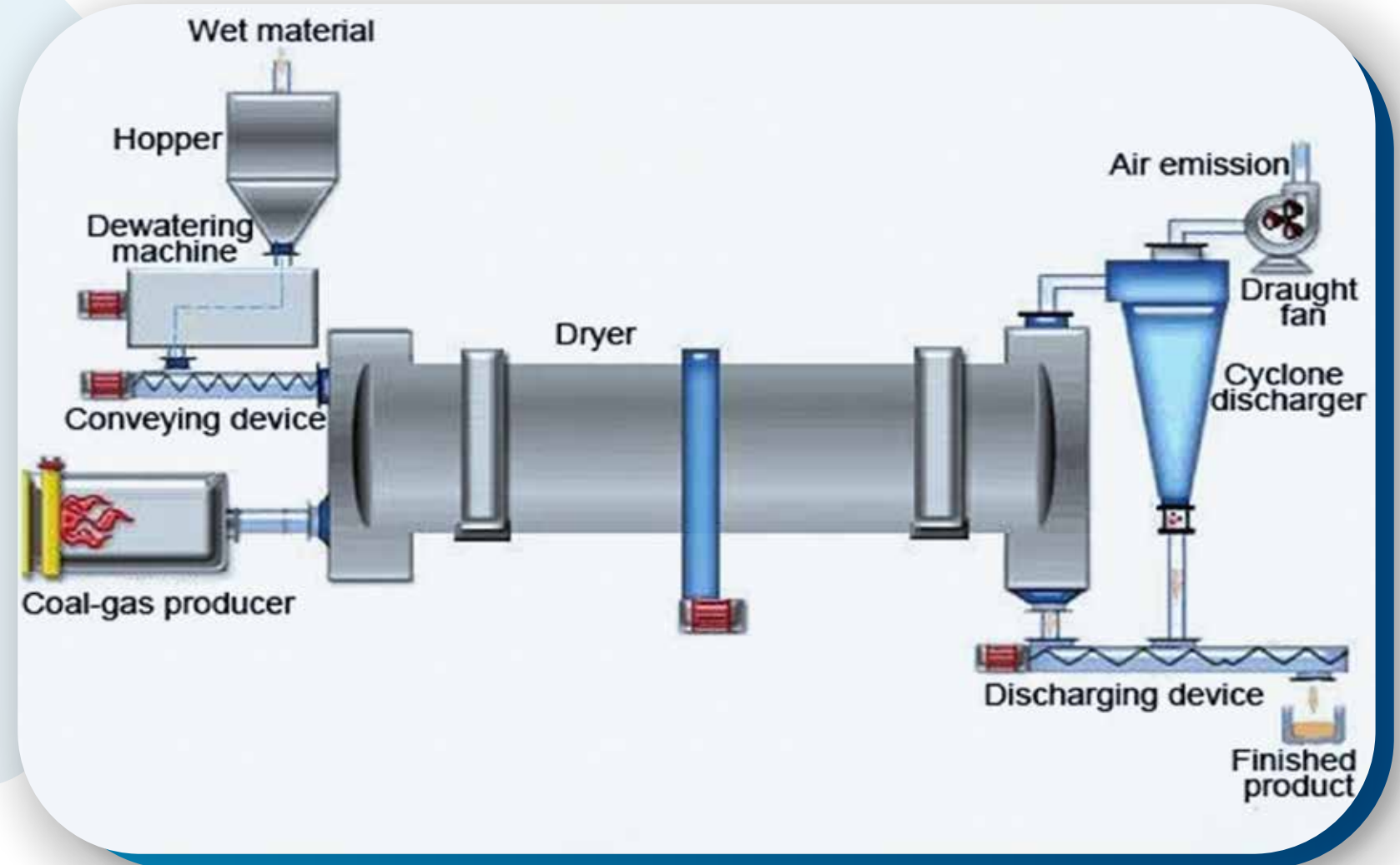
# Application

- Biomass fuel production
- Animal feed production
- Industrial drying
- Waste management
- Biogas production
- Other applications such as drying of medicinal herbs, fruits, and vegetables for use in the food and pharmaceutical industries.



## Working Principle

Biomass dryers consist of a heating furnace, feeding port, drum, filter drum, conveying pipe, cooling drum, and discharging port. Wet materials are continuously sent into the drum through a screw conveyor and then get separated and pushed by the high-speed hot flow. The moisture in wet materials is taken away in this process, and then we get powder or pellet dry materials.



## Biomass Drying System

- Rotary dryers are known as the workhorse of industrial dryers.
- They are able to process a wide variety of materials and can lend a hand in nearly any industry requiring industrial drying solutions.
- The most common industries and materials in which rotary dryers are employed include: Agricultural By-Products, Animal Feeds, Bagasse, Palm Meal, Biomass, Bio solids, Paper Mill Waste, Animal Manure, Sludge and more.
- The by-product of pulp and paper, agriculture, and municipal sludge, is perhaps the oldest source of renewable energy on Earth.
- The drying systems produce a high-volume, low-moisture product that is easy to ship and store and add efficiency to your process, helping you to cut operating costs and produce a quality product for market.

## Biomass Fuel

- The energy is generated or produced by living or once-living organisms.
- They are made from a variety of organic materials, including scrap lumber, forest debris, crops, manure, and even some municipal waste residues. It has more added value than conventional biomass.
- It help us to capture a new revenue stream in a biomass drying system while efficiently mitigating the processing challenges that come with air pollution, emissions, and vapor.



## Biomass Types

Biomass refers to any organic material that is derived from living or recently living organisms, including plants, animals, and microorganisms.



## Agricultural

Agricultural biomass plays a significant role in sustainable energy production, soil management, and waste reduction in the agricultural sector. By utilizing agricultural residues and waste streams, farmers can contribute to renewable energy generation and mitigate environmental impacts associated with conventional farming practices.



## Forestry

Biomass forestry involves cultivating and managing forests to produce renewable biomass for energy and industrial uses. It focuses on fast-growing tree species and employs silvicultural practices like short rotation forestry. Biomass is harvested sustainably, often in agroforestry systems, and can be used for bioenergy production. Forest certification ensures sustainability and environmental protection.



## Aquatic

Plants that grow in aquatic environments, such as water hyacinth and duckweed, can be harvested and used as biomass feedstock. They can be converted into biofuels, burned for heat and electricity, or used in bioremediation to clean up polluted water bodies.



## Energy Crops

Certain crops are grown specifically for their biomass energy potential. Examples include switchgrass, miscanthus, and fast-growing trees like willow and poplar. Energy crops are cultivated on marginal lands and can be harvested and processed into biofuels or burned for electricity generation.



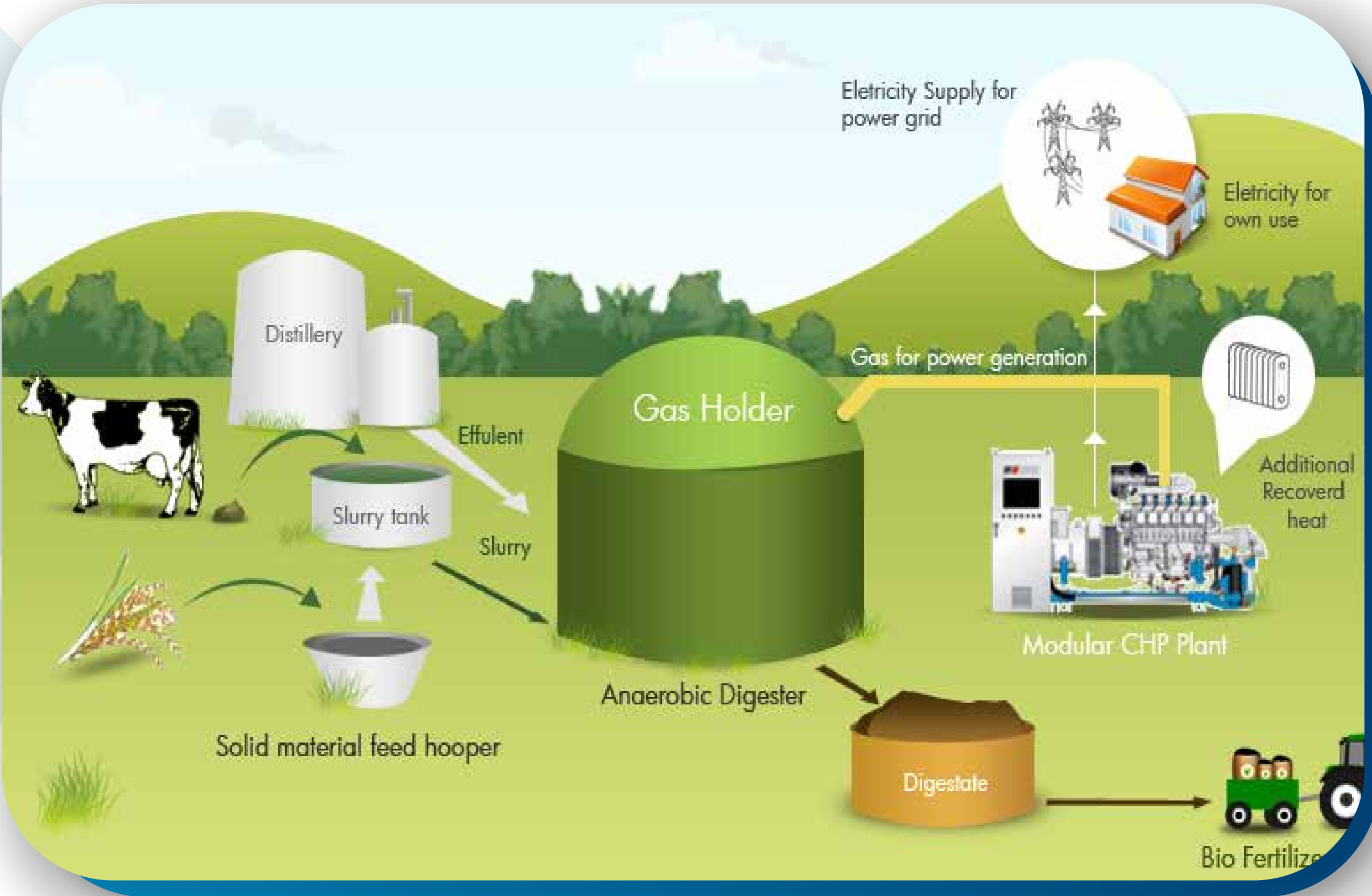
## Animal Waste

Effective management of animal waste is essential for sustainable livestock farming and environmental stewardship. By implementing best management practices and adopting innovative technologies, farmers can minimize the environmental impact of animal waste while maximizing its beneficial use as a resource.

## Urban and industrial waste

Urban and industrial waste encompasses a wide range of waste materials generated in urban areas and industrial facilities. Urban waste includes municipal solid waste, construction debris, e-waste, and hazardous waste, while industrial waste includes solid, liquid, and gaseous waste from manufacturing processes. Management involves collection, transportation, treatment, and disposal, with a focus on waste minimization, recycling, and compliance with regulations to protect public health and the environment.





## Biomass to Energy Routes

### Combustion

Biomass can be burned directly to produce heat and electricity in a process called combustion. This is one of the simplest and most commonly used biomass-to-energy routes.

### Gasification

Biomass can also be converted into a gas through a process called gasification. The resulting gas, known as syngas, can be used as a fuel for heat and electricity production

### Pyrolysis

Biomass can be converted into bio-oil through a process called pyrolysis. Bio-oil can be used as a fuel for heat and electricity production, or further refined into transportation fuels.

## Anaerobic digestion

Biomass can be processed in an anaerobic digester to produce biogas, which can be used as a fuel for heat and electricity production, or upgraded to bio methane and used as a transportation fuel.

## Hydrothermal processes

Biomass can also be converted into biofuels through hydrothermal processes such as hydrothermal liquefaction and hydrothermal gasification.

## Direct conversion

Biomass can be directly converted into electricity through processes such as microbial fuel cells and thermoelectric devices.

# Why Drying?

## Burning biomass with high moisture content

- reduces the combustion temperature
- incomplete combustion
- undesirable reaction products
- Requires a large amount of auxiliary fuel to make it combustible

## Drying of biomass

- Can increase the combustion efficiency, reduce pollution and improve operation.

## But

- Drying of biomass is an expensive process that requires huge capital investment and energy input.

Therefore, the level of drying should be optimized.

# Biomass Drying for Combustion-Modeling

## Goal

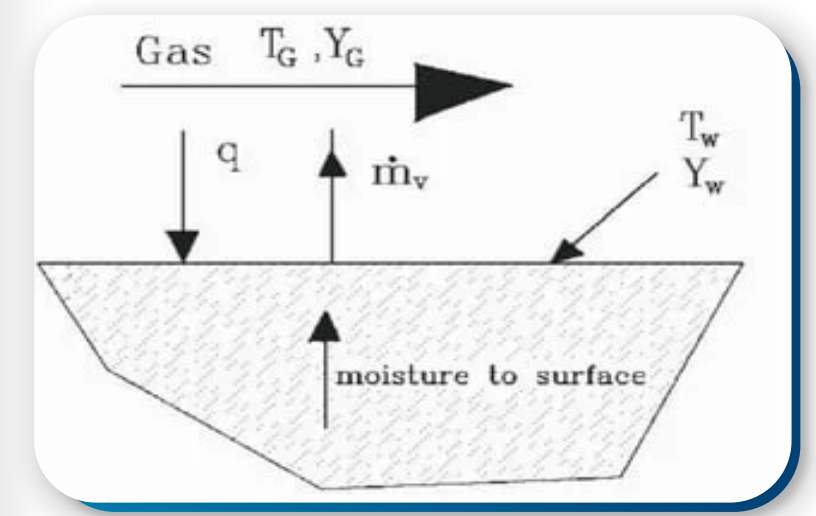
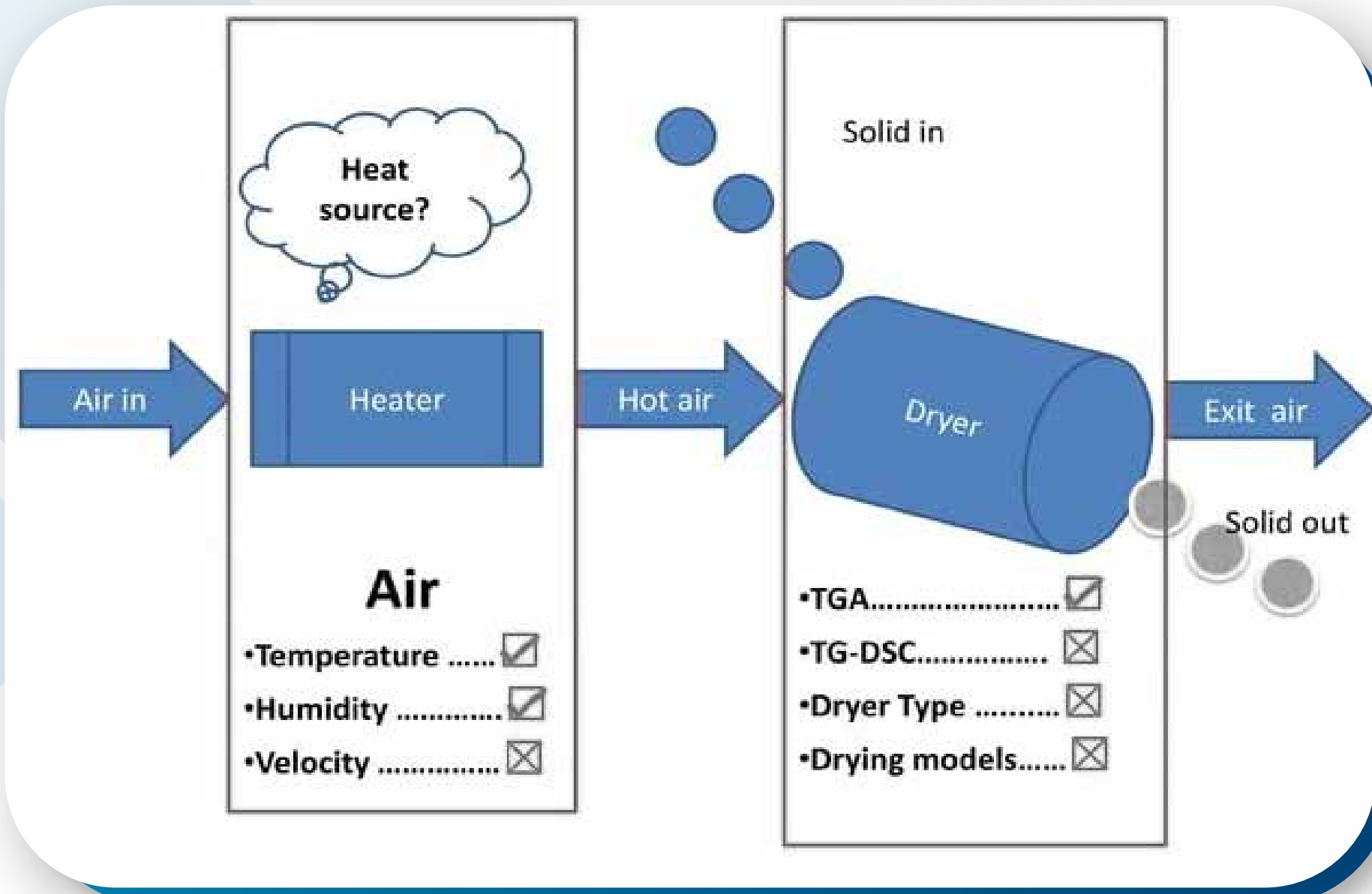
- To develop a validated model of the drying kinetics of solids like wood, solid wastes and sludge for heating value enhancement before combustion process.
- To use the model to analyze the drying time, moisture removal rate, Energy requirement and design parameters for practical drying of solids.

## How?

- Material and energy balances, heat transfer and drying kinetics

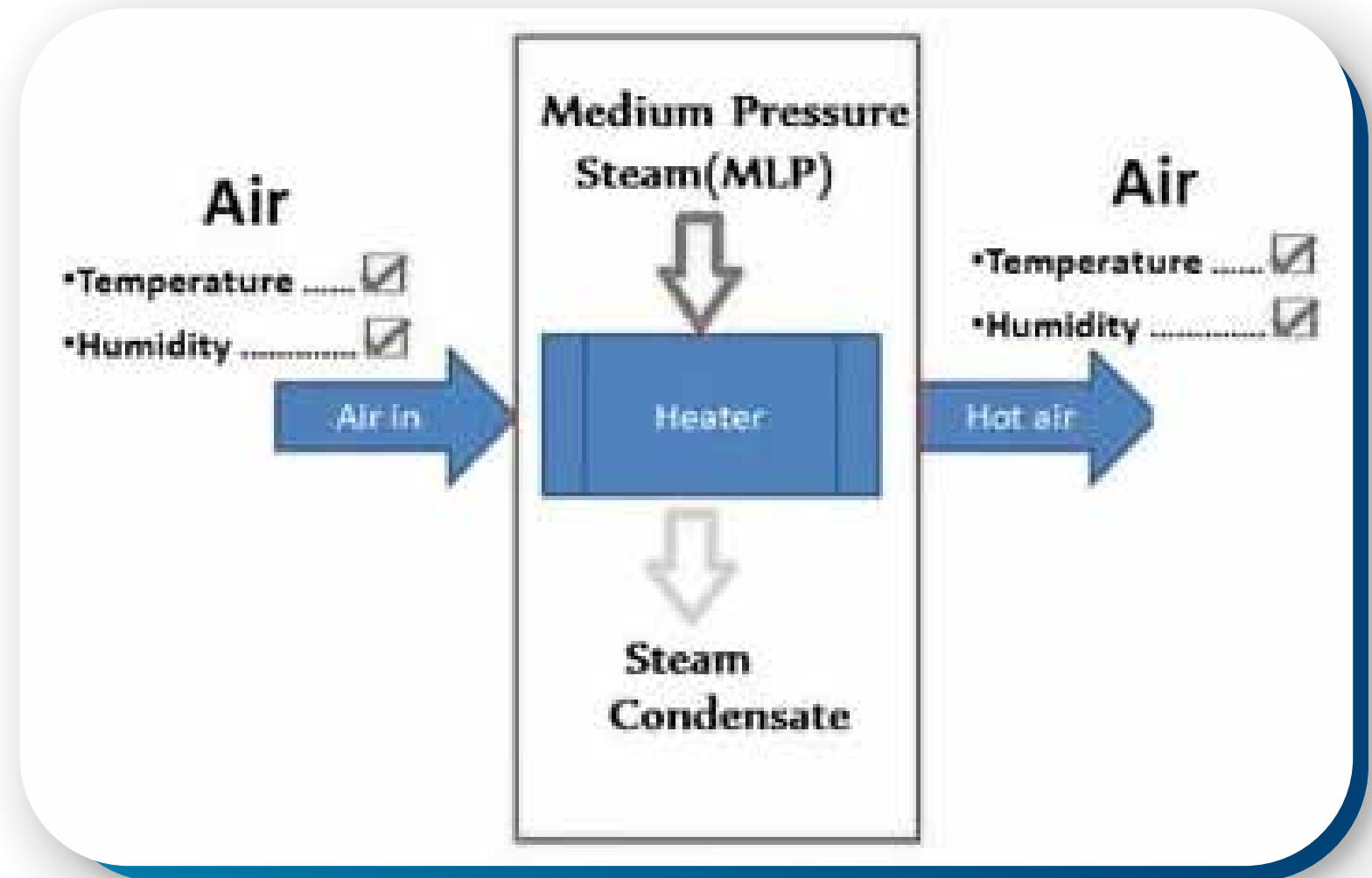
# Drying Process

Regardless of drying particle shape, there exists simultaneous heat and mass transport.



## Air Heater

- The corresponding property change of air for moisture removal from the solid is calculated by making use of psychometric relations (equations).
- The air heater cost was determined for the required air property change.



## Conclusion

- Biomass drying is a crucial process that is used to reduce the moisture content in biomass materials, making them more efficient and easier to handle in various applications. A biomass dryer is a specialized machine that is designed to perform this task, and it can be used to dry a variety of biomass materials, including wood chips, sawdust, crop residues, and more.
- Biomass dryers offer several benefits, such as increasing the efficiency of biomass utilization, reducing transportation costs, and decreasing the risk of biomass degradation. Additionally, the use of biomass dryers can help to reduce greenhouse gas emissions and promote sustainability by enabling the use of renewable biomass resources.

# TRUSTED PARTNERS

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# THANK YOU

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