



# **Energy Efficient Air Drying of Biomass ( Woodchips, Bark, Saw Dust, Forest Waste, & Bagasee)"**

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## **Belt Dryer Design Basis:**

**The Metso Kuvo belt dryer is a low-temperature dryer which is designed to remove water efficiently by evaporating moisture from wet biomass, like bark, wood chips, sawdust, bagasse etc. The dryer is able to utilize various low-temperature heat sources; waste heat, low-pressure steam, hot water, or hot air – no primary energy is needed. Dry biomass can then be used as biomass fuel, or in fuel making process . The drying process is gentle to the product and it has high availability and high capacity**

## Metso Kuvo Belt Dryers For Biomass

- **Based on the Following Belt Drying Principles**



- \* **Utilization of waste heat**
  - \* **High availability**
- \* **Non-destructive drying**
  - \* **Low emissions**
- \* **Automatic operation**
  - \* **Low Maintenance**

# Kuvo Belt Dryer For Biomass

- **Several applications**

- 1) Gasification process**

- Replacing oil with syn gas in  
lime kiln

- High oil price

- CO<sub>2</sub> taxation

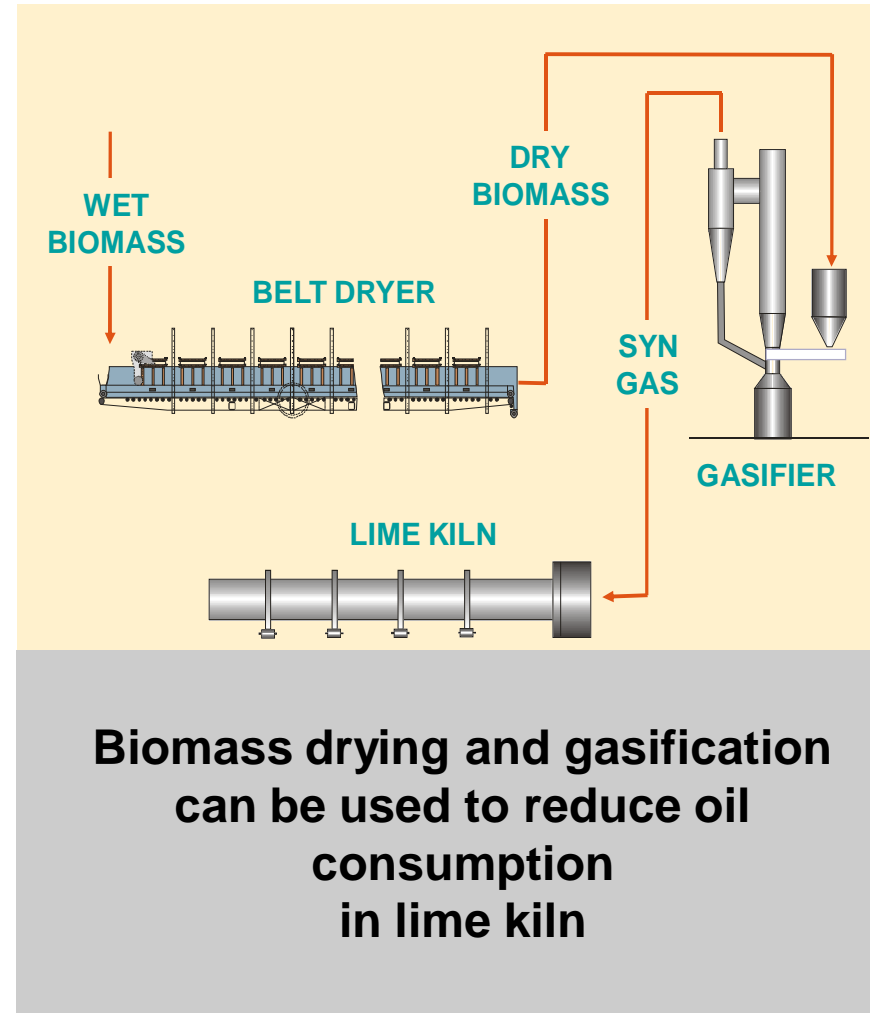
- Bioethanol/biodiesel  
production

- 2) Pelletizing**

- Raw material drying before  
pressing

- 3) Power production**

- To increase combustion  
efficiency



# Belt Dryer For Biomass

- **Modular Structure Provides flexible dimensioning**

- **Capacity**

- Evaporation 2 - 20 tons of H<sub>2</sub>O/h
- Material flow 20 - 200 loose-m<sup>3</sup>/h
- Dry content in typically 30-60 %

- Dry content out - up to ~90 %

- **Size / unit**

- Area 40 - 260m<sup>2</sup>
- Length up to 50m (165 ft)
- Width up to 6m (20 ft)



**For bigger capacities, several dryers can be installed one on top of the other to save floor space**

- **Utilization of waste heat**

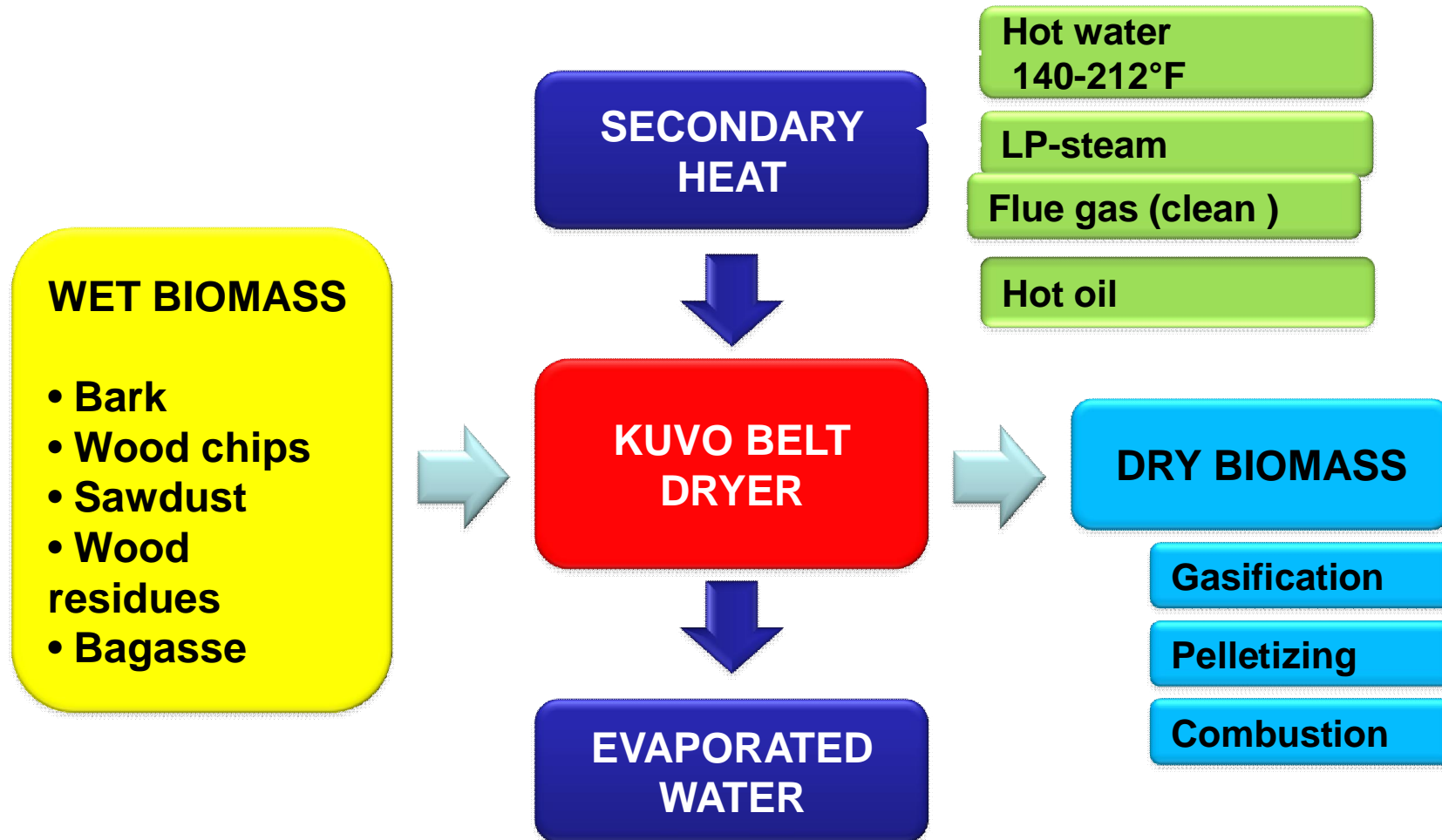
**Belt Dryer can utilize several types of low temperature sources**

- 1) Low temperature water  
40°C...120°C (104°F -250°F)
- 2) Low pressure steam
- 3) Hot waste gas
- 4) Hot oils

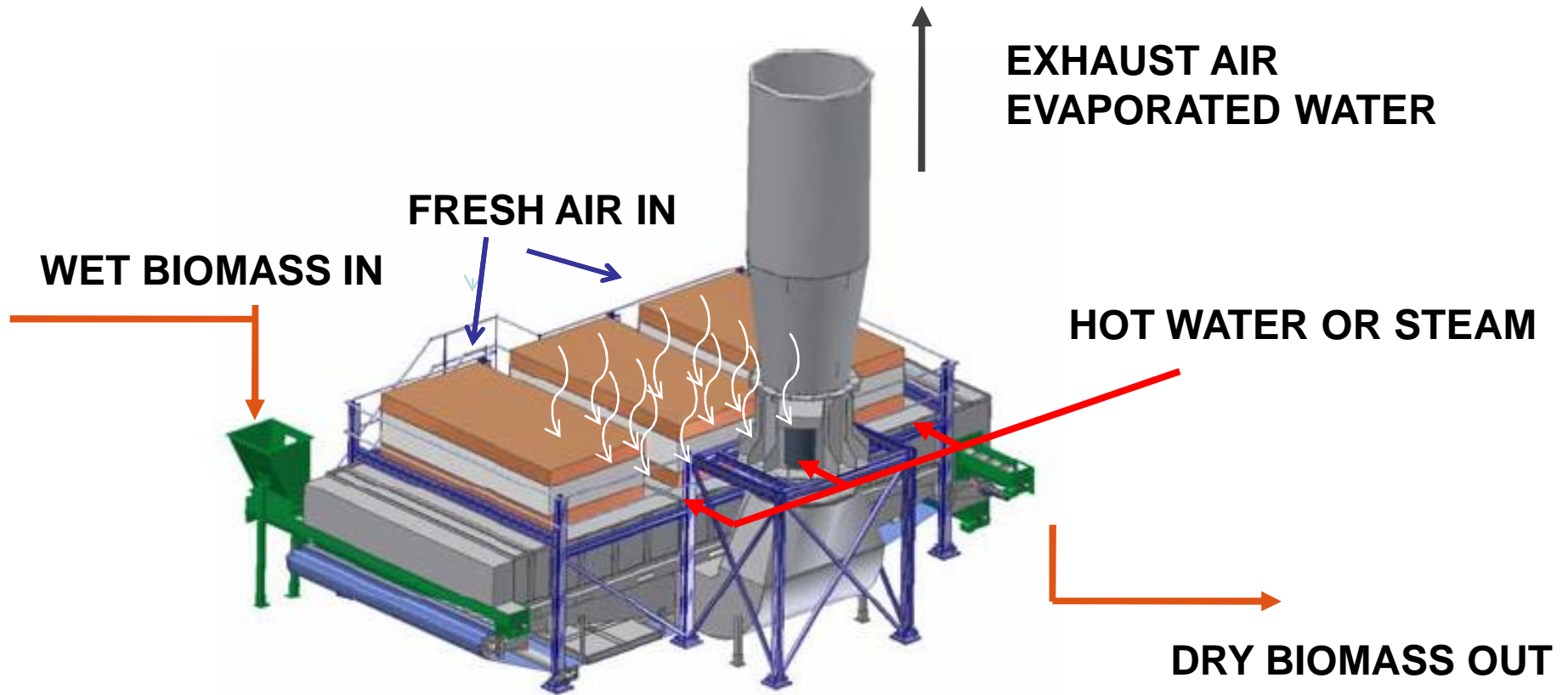


**Two heat sources like hot water and steam or two hot water sources can be combined in the same air heat exchanger**

# KUVO Belt Dryer For Biomass

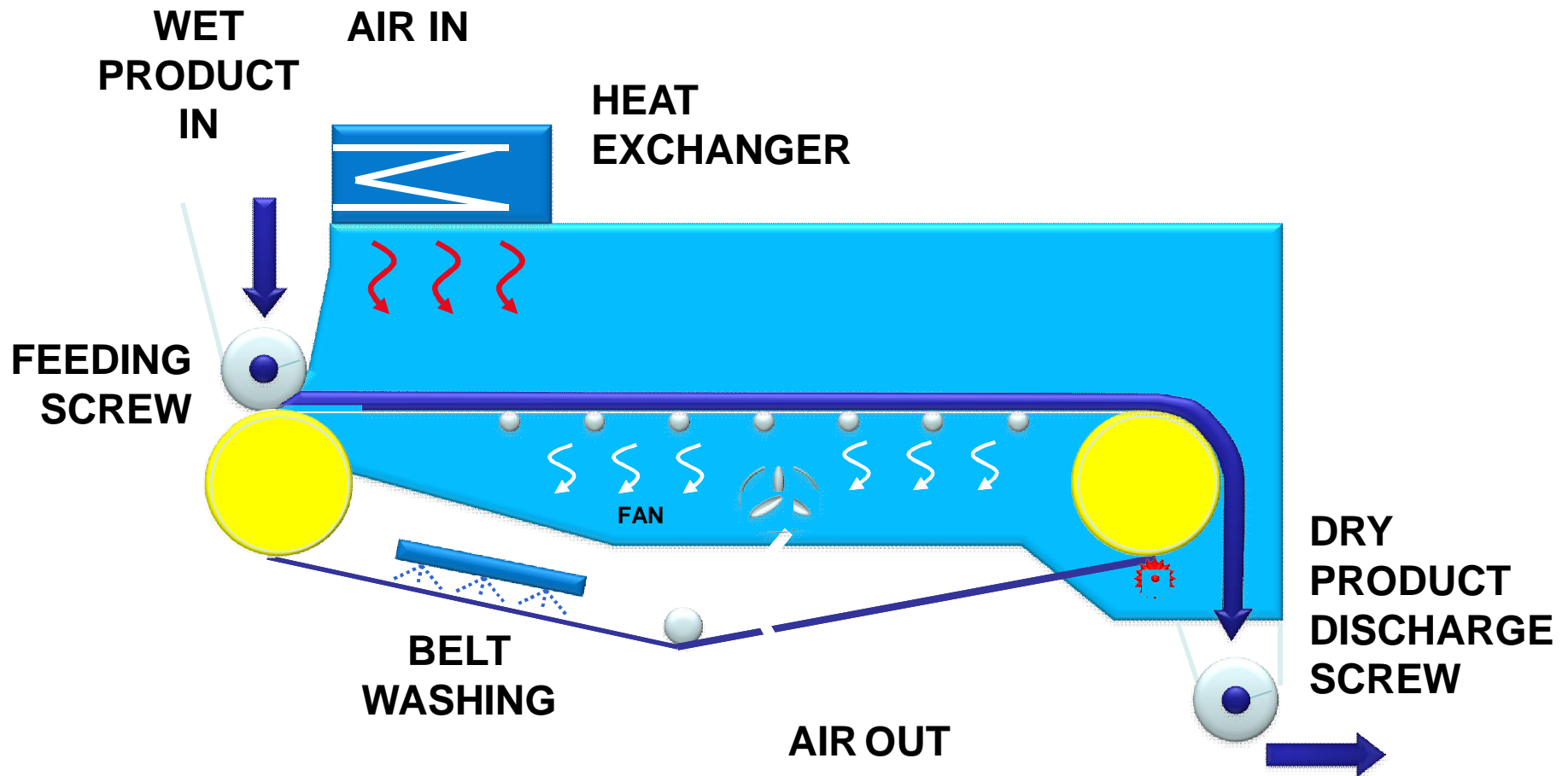


# Belt Dryer For Biomass



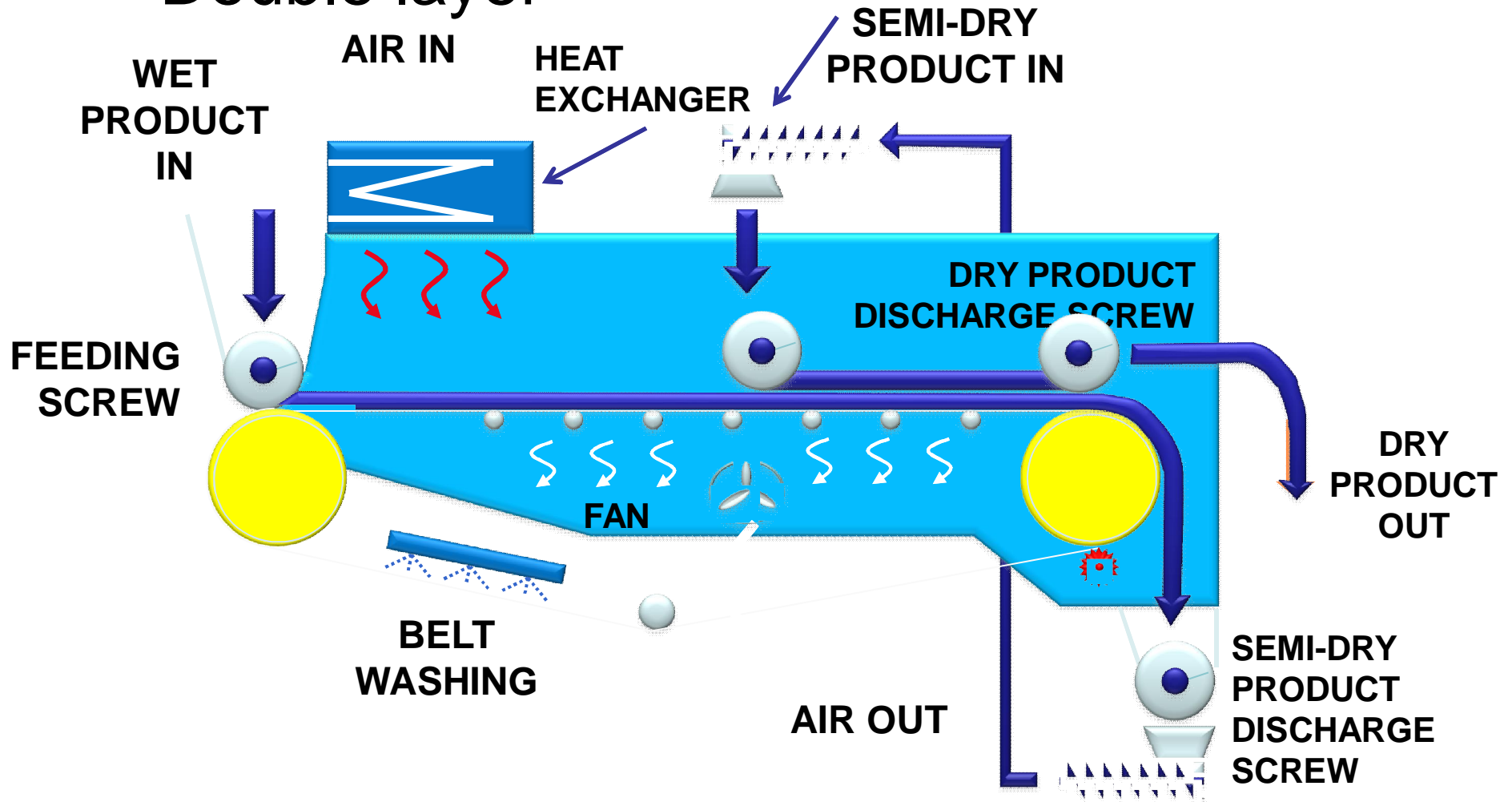


# Belt Dryer For Biomass



# Belt Dryer For Biomass

- Double layer

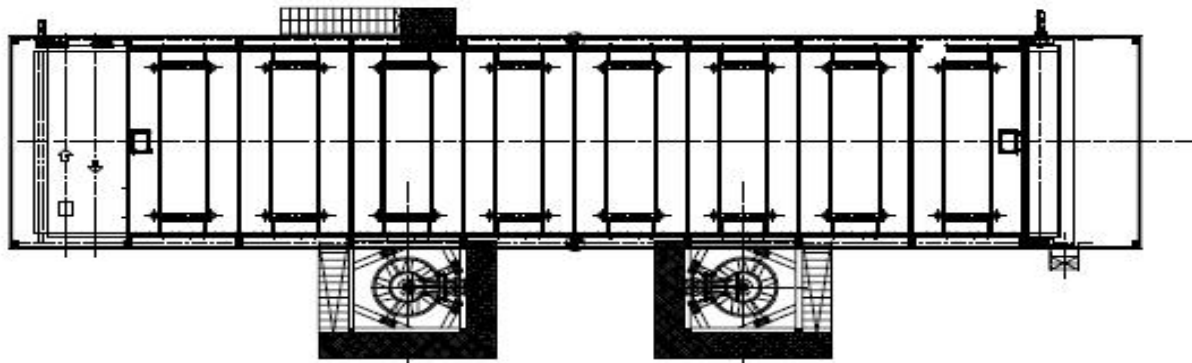
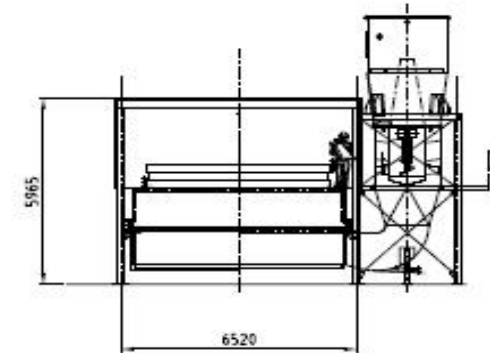
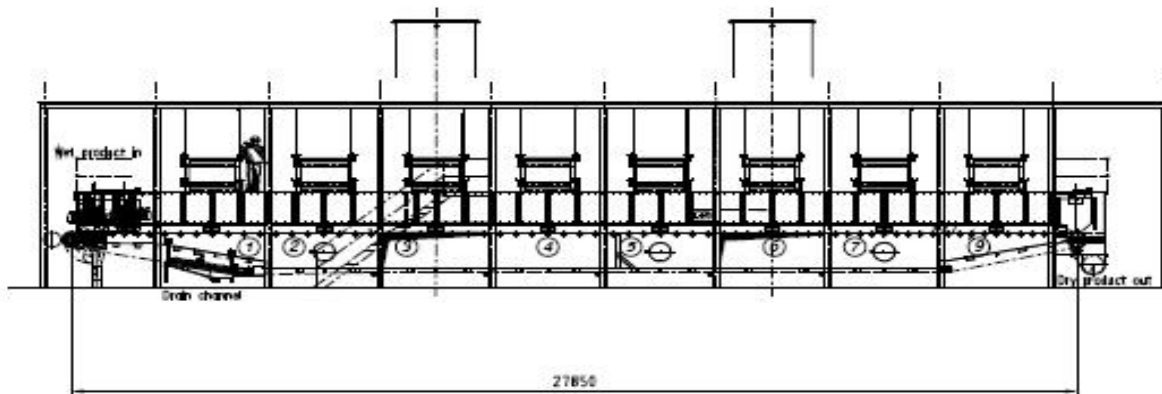


## Belt Dryer View Inside the Dryer with Various Materials and Layered Drying

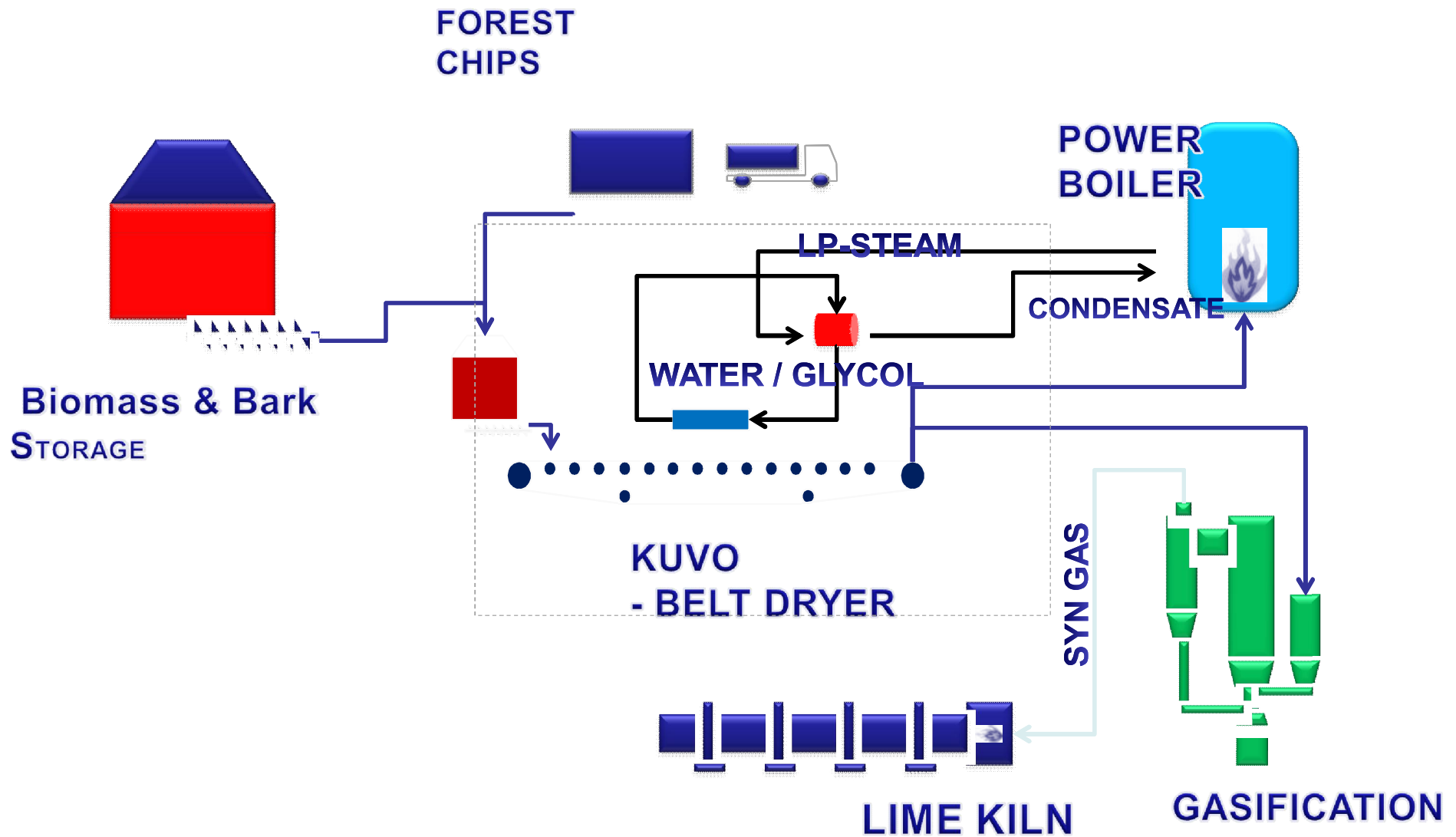


## For Biomass

Example Layout 150 m<sup>2</sup>



# KUVO Belt Drying System in Operation Drying Biomass for Gasification Process





<b>Material</b>	<b>Saw dust</b>
<b>Side</b>	<b>258m<sup>2</sup></b>
<b>Layer type</b>	<b>Single pass system</b>
<b>Heat source</b>	<b>72°C water/glycol</b>
<b>Capacity</b>	<b>7 t/h evap. water</b>

- **Uelzen  
(Germany)**

# Belt Dryer Installation

- **Vielsalm  
(Belgium)**



<b>Process</b>	<b>Pelletizing</b>
<b>Material</b>	<b>Saw dust</b>
<b>Size</b>	<b>2 x 205 m<sup>2</sup> (stacked)</b>
<b>Layer type</b>	<b>Double pass sy</b>
<b>Heat source</b>	<b>90°C water/glycol</b>
<b>Capacity</b>	<b>2 x 10t/h evap. water</b>

# Belt Dryer Installation

- **Krauchenwies**

<b>Process</b>	<b>Pelletizing</b>
<b>Material</b>	<b>Saw dust</b>
<b>Side</b>	<b>120m<sup>2</sup></b>
<b>Layer type</b>	<b>Double Pass System</b>
<b>Heat source</b>	<b>80°C water/glycol</b>
<b>Capacity</b>	<b>4.5 t/h evap. water</b>





# Metso Belt Dryer Installation

<b>Process</b>	<b>Gasification</b>
<b>Material</b>	<b>Bark &amp; forest chips</b>
<b>Size</b>	<b>150m<sup>2</sup></b>
<b>Layer type</b>	<b>Double</b>
<b>Heat source</b>	<b>100°C water/glycol</b>
<b>Capacity</b>	<b>8.3 t/h evap. water</b>

Heat exchangers mounted on top of the Belt Dryer





**Belt Drying Systems in warmer climates do not require a protective building**

# Belt Dryer For Biomass Stacking the Dryers for Limited Real Estate





**Kuvo Belt Dryer s  
include: Exhaust  
stacks and access  
platforms,  
Structural support  
structure, Rain  
Protection  
shields/covers**



# Metso Kuvo Belt Dryer For Biomass



**Infeed Metering Screws  
Meters the material evenly  
onto the Dryers Belt**



**Kuvo Belt Dryer uses a very durable Poly Mesh  
Belt – Belt life Averages 3- 5 years**

# Belt Dryer For Biomass

- **Modular construction**



# Metso Belt Dryers For Biomass

- Expect results



- \* Utilization of waste heat
  - \* High availability
- \* Non-destructive drying
  - \* Low emissions
- \* Automatic operation
  - \* Low Maintenance

**ARE THERE ANY QUESTIONS?**

**THANK YOU FOR YOUR ATTENTION !**

