



XYLOWATT sa

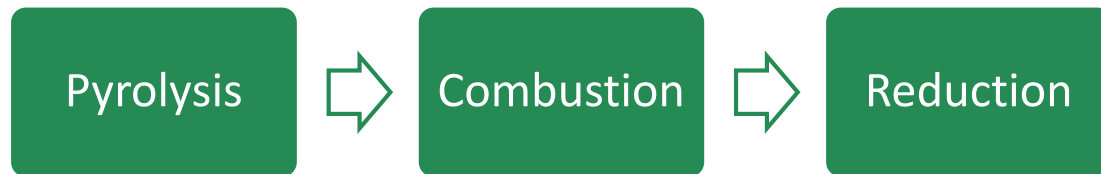


# NOTAR<sup>®</sup> Technology

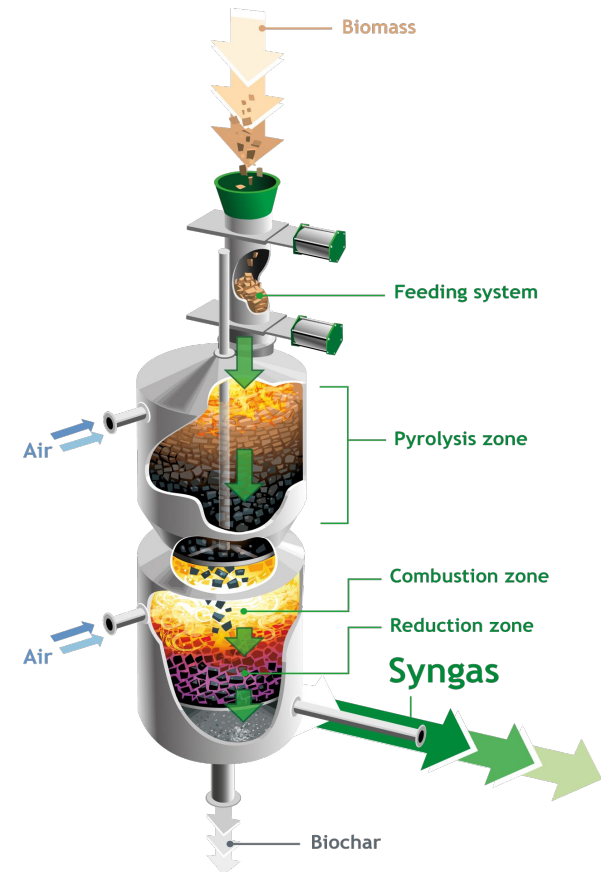
Converting biomass into clean syngas

# NOTAR<sup>®</sup>: clean syngas without Tar

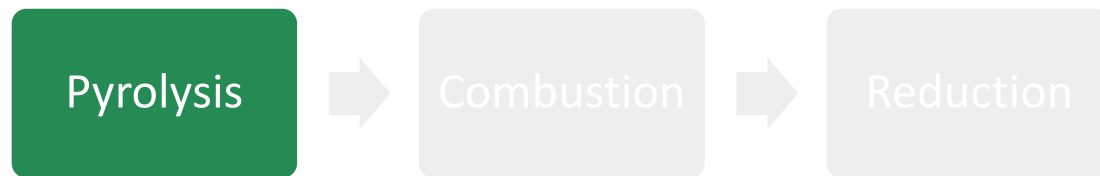
The NOTAR<sup>®</sup> principle lies on the **physical separation** of the gasification reaction zones. This design leads to **accurate control** of the critical parameters.



Integration of the separate reaction zones in the **NOTAR<sup>®</sup> compact reactor** makes it the sole industrial gasifier producing a **clean syngas** at the outlet of the process.



# NOTAR<sup>®</sup> GASIFICATION REACTOR



# Step 1- Pyrolysis: production of Tar Free char

Heat is used to break down the fresh solid fuel into Char (C) and into Pyrolysis gases (a mixture of light gases and Tar).

*Biomass + Heat → Char + Pyrolysis Gases & Tar*

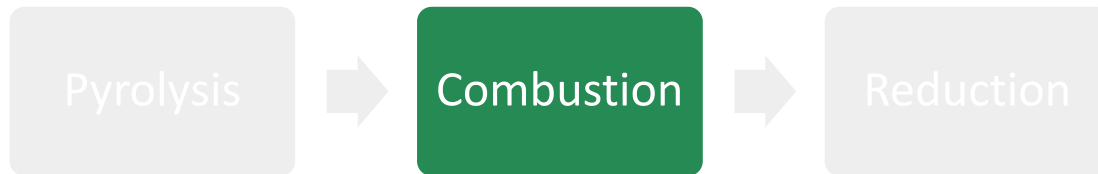
## Key advantages of the NOTAR® Technology

- ✓ **Autothermic Pyrolysis:** Heat needed for the pyrolysis is developed by partial combustion of the raw biomass within the pyrolyser.
- ✓ **Complete Pyrolysis:** The physical separation of the pyrolysis zone from the other reaction zones offers a precise control of the various reaction parameters (residence time, temperature).

## Products of the pyrolysis:

- « **Tar Free** » char is perfectly pyrolyzed, it does not contain Tar.
- **Pyrolysis gases:** Tar from pyrolysis gases is mainly primary Tar, easily destructed in the combustion zone.

# NOTAR<sup>®</sup> GASIFICATION REACTOR



# Step 2 - Combustion: destruction of pyrolysis tar

Air is injected in the combustion zone in order to burn the pyrolysis gases. Combustion zone releases the heat and the gaseous reactants ( $\text{CO}_2$  and  $\text{H}_2\text{O}$ ) of the reduction zone.



## Key advantages of the NOTAR® Technology

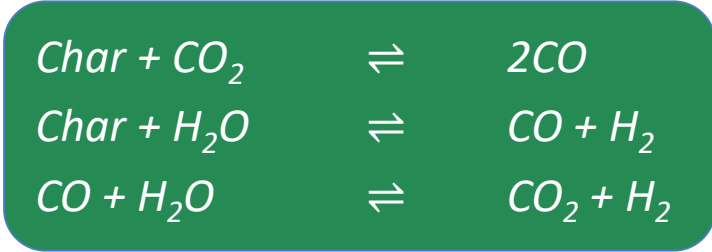
- ✓ Combustion takes place in gaseous phase
  - Air doesn't enter in contact with the char, avoiding the creation of clinkers.
  - Tar from the pyrolysis gases are destroyed by oxidation and thermal cracking; producing Tar Free combustion gases.
- ✓ Accurate design of the combustion zone (improved air/gas mixture, accurate residence time)
- ✓ Accurate control of the combustion parameters (temperature)

# NOTAR<sup>®</sup> GASIFICATION REACTOR



# Step 3 - Reduction: production of clean syngas

In the reduction zone, the Tar Free char (C) reacts with the Tar Free flue gases from the oxidation zone (CO<sub>2</sub>, H<sub>2</sub>O). The clean syngas is produced through the following reactions:



**SYNGAS** 

## Key advantages of the NOTAR<sup>®</sup> Technology

- ✓ The reactants of the reduction (CO<sub>2</sub>, H<sub>2</sub>O, C) being Tar Free, thus the syngas doesn't contain Tar.

**NOTAR means NO – TAR in the raw syngas**

- ✓ Maximum syngas Temperature at the outlet of the gasifier is 750°C, metallic compounds condense in biochar and thus do not pollute the syngas.



# Compact integration of the 3 reactions

## REDUCTION ZONE

### Pyrolysis

*Biomass + Heat → Char + Pyrolysis Gases & Tar*



### Combustion

*Air + Pyrolysis Gases & Tar → CO<sub>2</sub> + H<sub>2</sub>O*



### Reduction

*Clean syngas production*



NOTAR® Technology is the integration of three independently designed and controlled reactors in a **compact** way. The technology produces clean syngas from different types of **biomass**.

## TECHNOLOGICAL ADVANTAGE

### Accurate control of operating parameters:

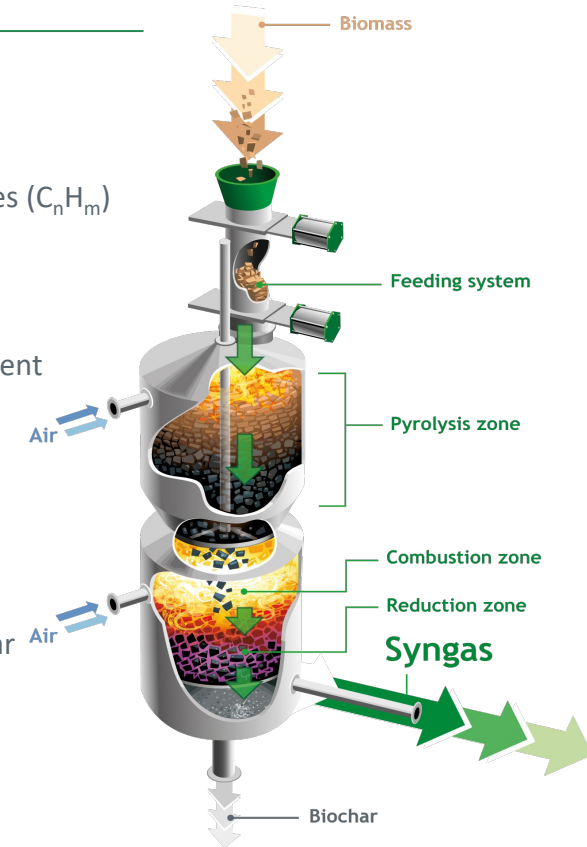
- ✓ Tar Free Char (C)
- ✓ Light Pyrolysis Gases (CH<sub>p</sub>)
- ✓ Primary Tar concentrated in pyrolysis gases (C<sub>n</sub>H<sub>m</sub>)

### Combustion in gaseous phase:

- ✓ Destruction of Pyrolysis Tar
- ✓ Conversion of biomass with high ash content
- ✓ Power range from 0.1 to 2 MW

### Reduction is fed with Tar Free products:

- ✓ Production of a Tar Free syngas
- ✓ Maximum Gas Temperature of 750°C
- ✓ Metallic Compounds condensed in biochar



## **XYLOWATT S.A.**

Avenue Jean Monnet, 1  
1348 Louvain-la-Neuve  
Belgium

[info@xylowatt.com](mailto:info@xylowatt.com)  
[www.xylowatt.com](http://www.xylowatt.com)