

## PTR 4 BIOMASS SMART HYBRID PTR SOLUTION



**BIOMASS FROM LAND, FOREST, AGRICULTURE  
AND CITIES AS A SOURCE OF USABLE BIOCHAR  
AS MATERIAL FOR REUSE IN AGRICULTURE  
AND AS BIOFUELS**

**HEDVIGA GROUP, a.s.** in its patented **PTR solution**, presents a method of non-oxidative slow thermal decomposition, which takes place in closed fuel reactor without air access, in the process temperature range of 300 - 600 °C. In the process of thermal conversion, the input charge as BIOMASS always decomposes into other fractions - solid carbon / rCB, liquid oil and gas.

Depending on the origin of this input raw material - here biomass, these produced fractions can be further used for biochar and bioliquids. They are mainly solid substances with the function of auxiliary soil additions - fertilizers, carriers of smart-nutrients, both in classical and sustainable regenerative agriculture with the aim of retaining water in the soil, increasing soil fertility and thus also biodiversity. Bio-fuel are effectively used for the PTR equipment's just enough own operation.

An innovative point of view of PTR technology is especially in an identification of a clear goal of utilization and / or reuse of input raw materials in compliance with the principles of the Circular Economy.

The input raw materials for PTR technologies are different sorted recycles from plastic, rubber and waste biomass, sewage sludge or secondary raw materials. The products that can be produced in slow thermal decomposition (PTR) have parameters of saleable product and at the same time a lower emission factor than to usually produced.

PTR process is strictly non-oxidative process, what is key to assume the quality and usability of thermal decomposition products and represents the most significant difference between our patented PTR technology and others.

A huge advantage of PTR is the specific batch system for processing the input raw material in the PTR technology, which allows a separate and closable PTR reactors with processed in separate batches.

Then can be all PTR operation system modify for any feedstock combination to achieve those requirements parameters e.g., energy efficiency or CO<sub>2</sub> save. This system is called **PTR SMART HYBRID ENERGY**.

**SMART HYBRID  
ENERGY**

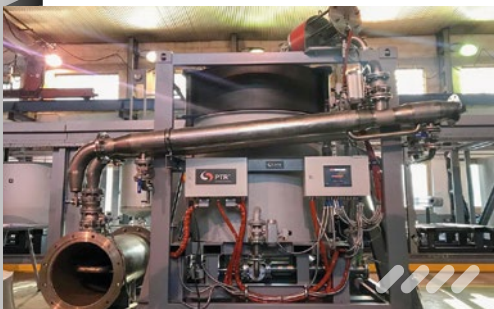
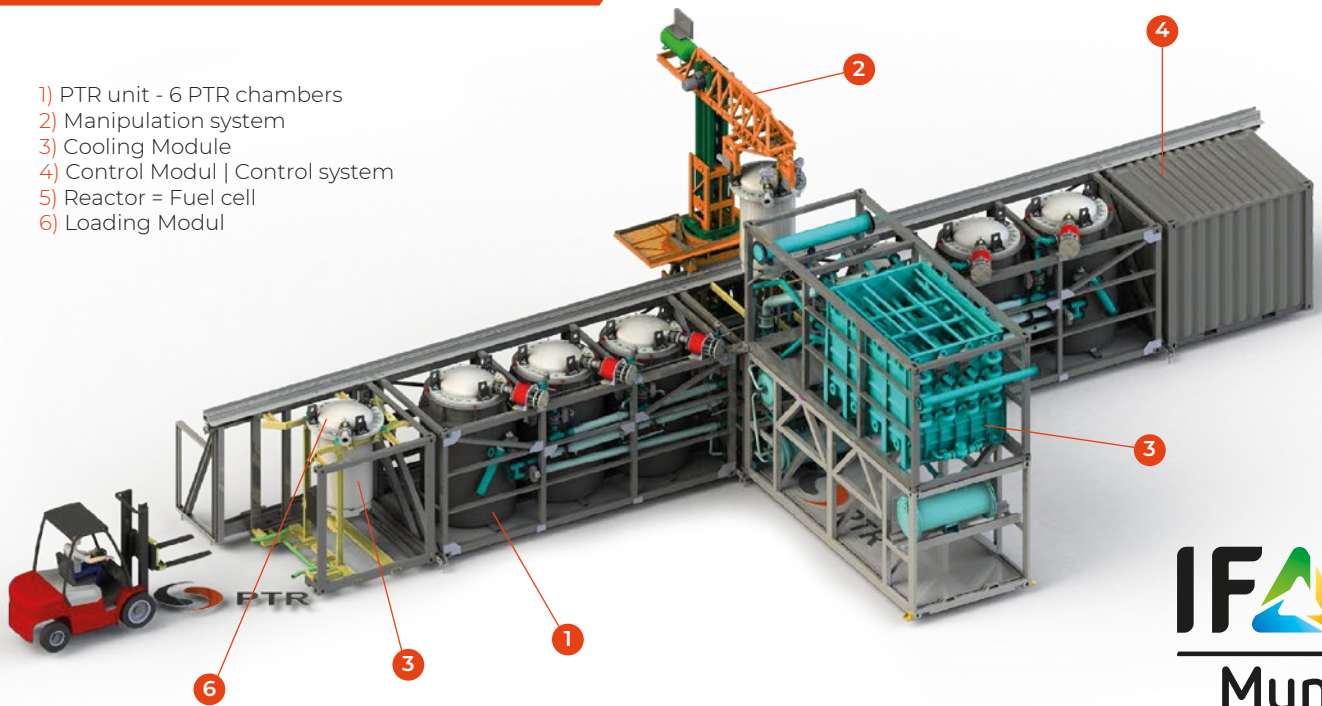
**PTR® BIOCHAR**

**PTR® 1000  
TECHNOLOGY**

**MOMENTA®  
COGENERATION**

# VISUALIZATION OF PARTICULAR PTR SOLUTION

- 1) PTR unit - 6 PTR chambers
- 2) Manipulation system
- 3) Cooling Module
- 4) Control Modul | Control system
- 5) Reactor = Fuel cell
- 6) Loading Modul



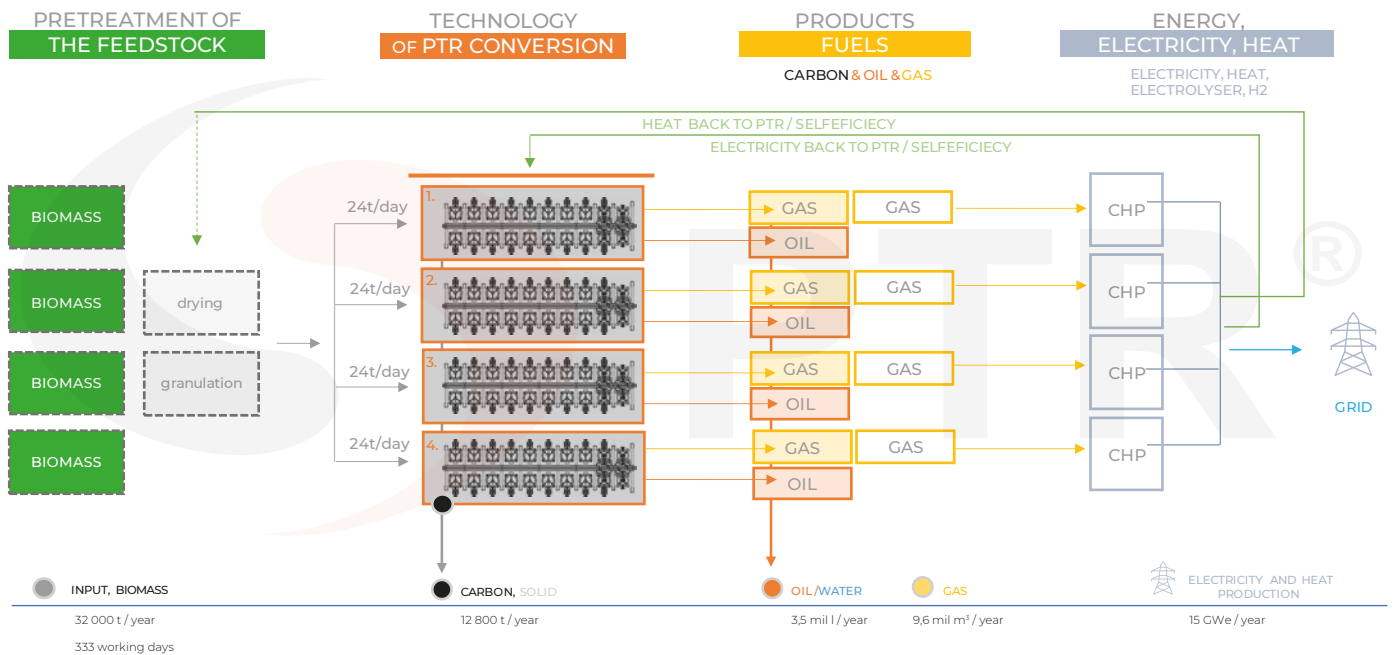
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The actual process of slow thermal decomposition (PTR) takes about 2-3 hours and is proceeded in a closed system without air access = Non-oxidative thermal process. The PTR process itself is thermally stable and during the operation it continuously generates from the input charge three output fractions: gaseous, liquid and solid. Depending on the end use of these fractions, the PTR process outputs are certified as products.



# PTR TECHNOLOGY

PATENTED COMPLEX SOLUTION



# PTR TECHNOLOGY

COMPREHENSIVE TURN-KEY SOLUTION



The intention of the PTR comprehensive energy solution is always to design for the future operator a turn-key utilization (disposal) of a particular input material (waste), as well as to simultaneously design an effective energetic arrangement within the current use of PTR products (fuels) to drive a power unit. The PTR comprehensive solution, extended by energy module - cogeneration, will enable to create a completely self-sustaining system, independent of external energy supplies.

## ADVANTAGES OF PTR COMPREHENSIVE SOLUTION

- ✓ **Container arrangement** > which is capacitively modular.
- ✓ **Semi-mobile** > enables a continuous and temporary operation at various locations according to needs (e.g. near landfill sites), of to purposefully use it as a local source for production of electricity and heat for companies, municipalities and micro-regions.
- ✓ **Energy self-sustaining** > can be installed even where there is no assured supply of electric current.
- ✓ **Combinability of input raw materials** > operational and technological system PTR SMART HYBRID ENERGY | SOLUTION for ensuring the required product quality and sufficient energy.

PTR solution + Cogeneration unit =  
**TECHNOLOGY FOR WASTE TREATMENT AND FUEL AND ENERGY PRODUCTION**

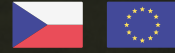


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WASTE TREATMENT AND FUEL AND ENERGY PRODUCTION



# PTR 4 BIOMASS - SMART HYBRID PTR SOLUTION

BIOMASS FROM LAND, FOREST, AGRICULTURE AND CITIES AS A SOURCE OF USABLE BIOCHAR AS MATERIAL FOR REUSE IN AGRICULTURE AND AS BIOFUELS

**PTR 4 BIOCHAR** is an innovative non-oxidative technology solution, for thermal conversion of different type of biomass, from agriculture, forest management, from the cities... type of feedstock is in range from wood chips to chicken droppings.

PTR 4 BIOCHAR system represents a self-sufficient system for transform biomass to biochar with another added value. That value is based on the source of the biomass and potential of specific application and usage.

Products of conversion are PTR biogas, PTR bio-oil, and Biochar.

Main product is Biochar, in PTR system is able to set the process | programme according to type of feedstock and requirements of the carbon product. If the carbon product is used back in agriculture, named biochar and has a function as fertilizer or auxiliary soil and plant substance, with specific properties and content of other micro-elements (N, P, K, S). If the carbon product is used as filtration material, is usually pelletized, and prepare PTR pellets to achieve e.g.: BET > 300 and purity LTTE 90-95%.

= Biomass -> PTR Biochar -> Fertilizer or auxiliary soil and plant substance

= Biomass -> PTR biogas, PTR bio-oil -> **ENERGY**

= Biomass -> PTR biogas -> produced **GRID QUALITY GAS**

= Biomass | Manure, Droppings -> Elimination of infectious properties and biochar with nutrients production

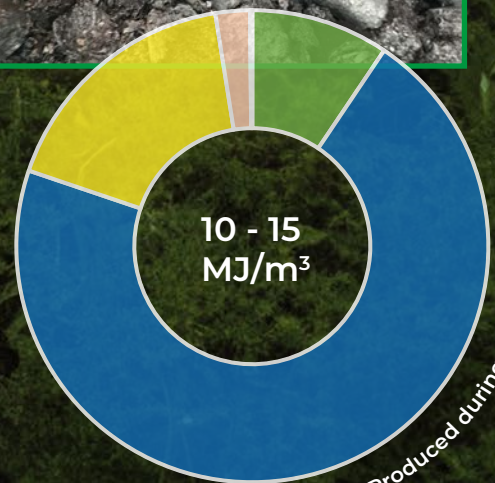


Biomass - Pellets



Biochar

**PTR 4 BIOCHAR**



PTR GAS - Produced during the PTR conversion