HEDVIGA GROUP

IFAT Munich

PTR rCB
SMART HYBRID PTR SOLUTION

TYRES AND WASTE RUBBER MATERIAL AS A SOURCE OF CARBON BLACK, MATERIAL FOR PETROCHEMISTRY, RENEWALBE ENERGY AND RENEWABLE HYDROGEN

PTR® 1000 TECHNOLOGY

SMART HYBRID ENERGY

MOMENTA® COGENERATION

HEDVIGA GROUP, a.s. in its patented **PTR solution**, presents a method of neo-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 RUBBER always decomposes/separate into other fractions - solid carbon / rCB, liquid oil fraction and gaseous fuel and inert iron wires.

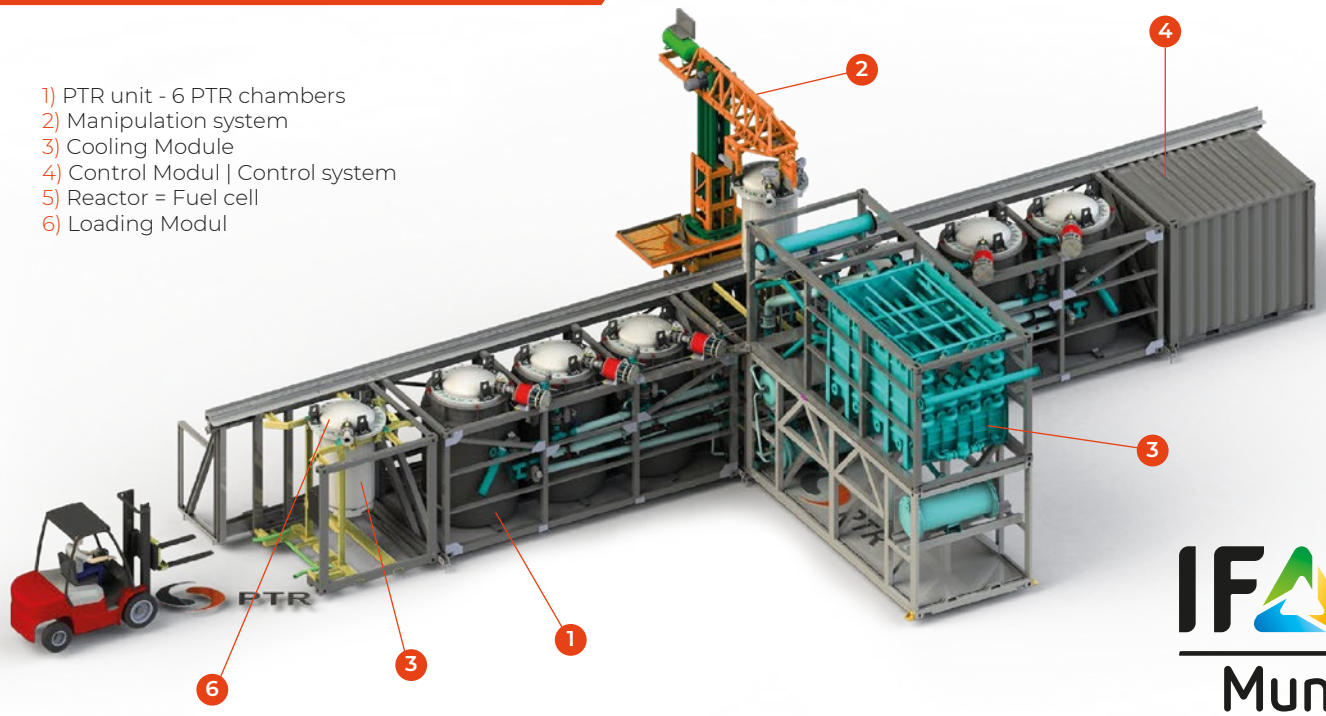
Depending on the origin of this input raw material, here rubber material, especially rubber from tires, these production fractions can further be used in the chemical industry and petrochemicals, as high-quality production of recovery Carbon Black, as liquid products, e.g. as sources of aromatics, and gaseous products as sources for the production of synthetic gaseous fuels and/ or hydrogen. Process of thermal conversion of rubber is energy self-sufficient and enables continuous supply of electricity to the grid too.

An innovative point of view of PTR technology is especially in the 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 productand 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_2 save. This system is called PTR SMART HYBRID ENERGY.

PTR TECHNOLOGY / NON-OXIDATIVE PTR THERMAL PROCESS

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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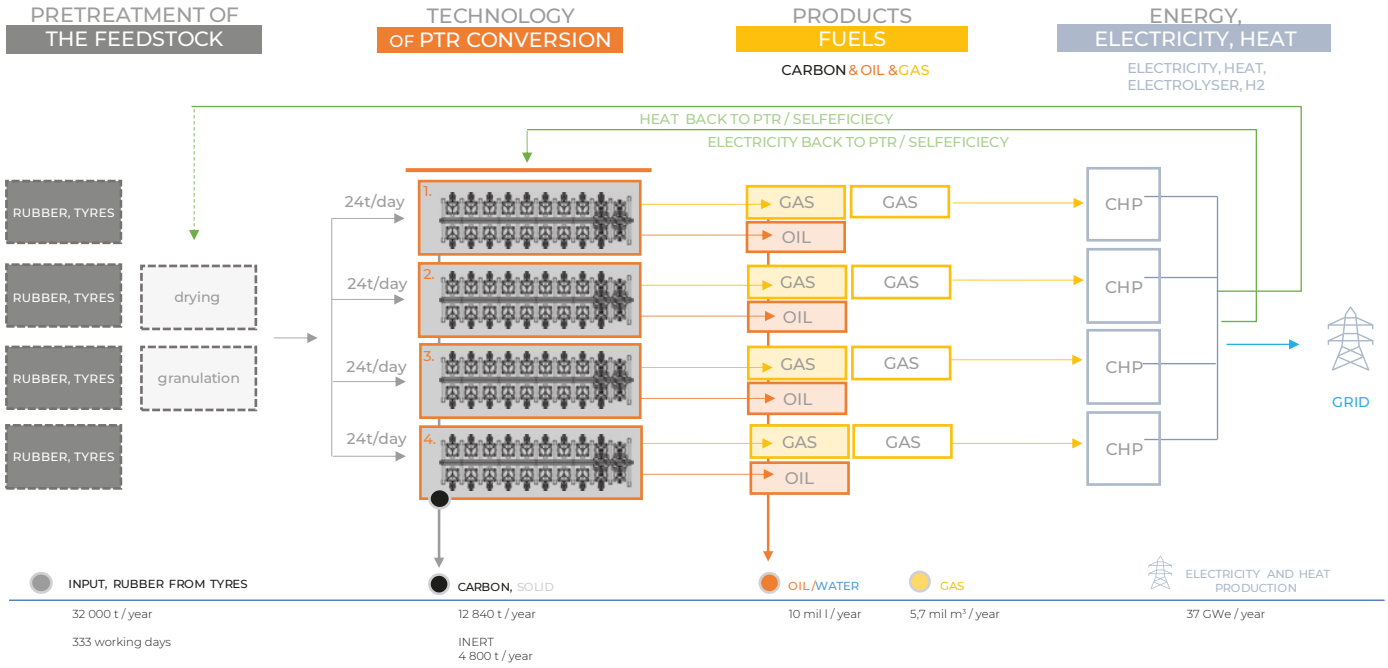
The actual process of slow thermal decomposition (PTR) takes about 2–3 hours and is proceeded in a closed system without air access = Non-oxidative thermal process. The PTR process itself is thermally stable and during the operation it continuously generates from the input charge three output fractions: 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

Europaisches Patentamt
European Patent Office
Office européen des brevets

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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THEo SYSTEM

PTR®

WASTE TREATMENT AND FUEL AND ENERGY PRODUCTION

PTR rCB - SMART HYBRID PTR SOLUTION

TYRES AND WASTE RUBBER MATERIAL AS A SOURCE OF CARBON BLACK, MATERIAL FOR PETROCHEMISTRY, RENEWALBE ENERGY AND RENEWABLE HYDROGEN

PTR rCB is an innovative technology solution, for using rubber material from tyres or belts based on patented non-oxidative slow thermal decomposition (PTR process) of organic feedstock.

The PTR rCB system represents a self-sufficient system not only for the disposal of rubber waste, but also for an use of rubber as a raw material for the production of a high-quality solid carbon product and at the same time the fuel for direct energy use.

PTR conversion of rubber generates high caloric value gas, higher than natural gas and oil, which can be directly used for energy production in CHP or turbine, or produce grid quality gas in regime "Gas to grid injection", as useful sellable product.

The main product is rCB (recovered Carbon Black) in PTR system is able to set the process | programme according to requirements of the carbon product. The carbon product is used back in petrochemistry, it is named rCB and has a function as specific chemical, that has to achieve purity LTTE 90-95%. The produced rCB has REACH and is available as a Product.

Thermal conversion of rubber is way to produce Carbon black and Liquid oil product (with high content of aromatic compounds) usage in petrochemistry and bring the positive carbon footprint within produced products, or electricity for renewable energy production.

= Rubber -> PTR gas, PTR oil -> **ENERGY and CARBON CAPTURE**

= Rubber -> PTR gas -> produced **GRID QUALITY GAS**

= Rubber -> rCB - **recovery CARBON BLACK**

= Rubber -> PTR gas, PTR oil -> Electricity -> **HYDROGEN**

= Rubber -> Elimination of Waste and Energy production

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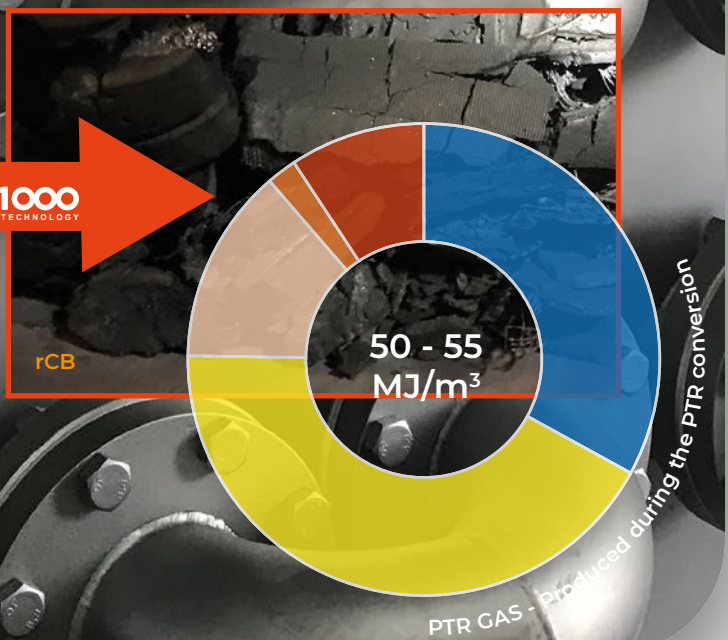

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PTR TECHNOLOGY / NON-OXIDATIVE PTR THERMAL PROCESS