

The technology behind the WASTX plants

Compact refinery WASTX Plastic

The compact refinery WASTX Plastic, basing on the process of catalytic depolymerisation, offers a prototype, ready to go into serial production, which converts plastic waste into a diesel-like fuel, automatically presorting, cleaning and shredding it beforehand. Hereby, the chemical compounds of the plastic material become resolved and transformed back to their original liquid state through thermodynamic processes during a process of a multi-stage refining progress. Using this technology, one kilogram of plastic will be converted into approximately one litre of fuel, corresponding to up to 10 kilowatt hours of energy.

What is polymerisation?

Mostly, plastic materials are made of mineral oil and in doing so - expressed in a simple way - their hydrocarbons are chained up (polymerisation), so that a former liquid substance will transform into a solid mineral. Depolymerisation inverts this process. The chains are again dissolved through influence of temperature and resulting are products with shortened chain lengths, such as oils (medium-length), but also waxes (slightly longer chains, when heated up they are also liquid) and gases (very short chains). All of those are suitable for the energetic use and in case of the oils, they are also excellently storable and transportable.

The temperature for the plastic materials' melt lays - depending on their composition, type of material and their fusion and boiling point - between

120 and 250°C, for the following pyrolysis (cracking process) between 350 and 450°C. The process is working consistently pressureless or with a slight overpressure, which prevents possible occurrences of atmospheric oxygen in the reactor system.

The WASTX technology is working with an entirely new reactor concept which allows a continuous process. Most of the forthcoming prototypes on the market however, work with the so-called batch method, a discontinuous handling process. During this procedure, a confined amount of waste is brought to the working system as a whole and afterwards, on completion of the production process withdrawn altogether as well. Thus, this process consistently starts from the beginning again.

The WASTX Plant is capable of feeding, processing and cleaning itself - 24/7 - completely automated. Due to its compact construction style - the entire system, presorting and crushing included, currently requires the space of a 20-foot sea container - one plant can be placed and operated decentralized at the spot of the waste occurrence, without having to transport the waste previously.

More than six years of development time was invested to create this patented reactor with continuous supply, as well as the automatic separation, dynamic gas purification and multistage condensation.

The plant is planned to go into serial production in the year 2018.

WASTX Oil and the WASTX Flash Technology

With the WASTX Flash technology, BIOFABRIK developed a solution for the processing of liquid oily residues, such as waste oil, polluted diesel, heating oil or oils

used in shipping.. The WASTX Oil plant, sized like a big wardrobe, can process up to 1.000 litres of waste oil per day. Using an unique procedure, polluted fuels get cleaned, condensed and transformed back into a reusable fuel within a few minutes, fully automated. Hereby, WASTX Flash combines standard processes of the crude oil industry with entirely new depolymerisation procedures of hydrocarbon resources and so-called coldcrackingtechnologies.

The base material is distilled in a patented process, in which a special energy output system, situated in the main reactor, is responsible for the heating of the resource within a few milliseconds. This flash pyrolysis separates impurities and transports the oil fraction into the gaseous phase uniquely efficient.

Subsequently, the gaseous phase is separated in predefined and controlled fractions of high and low boilers. This happens in a process of special rectification which was originally reserved by the crude oil industry. Like this, diverse qualities of distillates are formed. Fuels, suitable for engines, are removed, unclean fractions repeat the process, until they are completely separated into usable and waste components.

Depending on the scope of application, the different oil fractions get refined or delivered to distributors or end customers as finished products. In the waste discharge, five to ten percent of the resource come up as tar-like waste. This can be used for the production of bitumen in the road building or as a substitute fuel. Other emerging waste does not exist in this process.

An onboard generator provides both systems with energy, made from self-produced fuel. Every unit therefore works energy self-sufficiently. In doing so, an overall efficiency of around 75 percent is reached at the moment. All of the units transforms up to 1.000 litres of raw material per day - however, this can be expanded modularly to transform an unlimited amount of raw material.