

Oil Waste & Plastic to Energy – Utilization of plastic waste and waste oil

Interview with Oliver Riedel, CEO of BIOFABRIK

Mr. Riedel, your business BIOFABRIK is engaged in innovative technologies which the world seems to be waiting for: Transform accruing plastic waste into fuel. Considering the enormous amounts of plastic worldwide, a functioning solution would be desirable. When did you start committing yourself to this topic, how does your solution look and where do you stand with it at the moment?

We at BIOFABRIK have already been working on the technology to polymerise plastic waste for over six years. This is no sorcery, rather does it base on a technical process of depolymerisation. But until now, no one had success to put this process into practice unobstructedly with small plants, decentralized, ready to be operated from laypersons and in an industrial scale.

After a successful completion of the long-term test with our WASTX Plants, we are now close to the serial maturity. These plants are a lot more compact and work self-sufficiently with an own energy supply, compared to other prototypes from different providers. Therefore, they are applicable everywhere, either in remote villages without energy supply or on boats. Recently, we have polymerised maritime plastic waste for the first time worldwide. This means we have transformed it into a diesel-like fuel with which generators and engines can be operated.

How does it work and why did no one else get this idea before you?

Actually, many have come to this idea before. But no one has made it up to the actual applicability. This has several causes. Our compact refinery WASTX Plastic polymerises a defined fraction of the plastic waste on the basis of the catalytic depolymerisation to diesel-like fuel. Many of the previous plants have tried to transform preferably all plastic types at once. There is the error. I wouldn't throw the red blanket, the blue shirt and the white bed sheet into one washing machine either. Different material need different treatments - this counts for plastic as well. And that's exactly how our WASTX works.

Hereby, the chemical compounds of the plastic material are dissolved and transformed back to their liquid form in a multistage refining process through thermodynamic processes. This is - broadly speaking - the reversed process with which crude oil was transformed to a solid plastic material (polymerisation). From one kilogram of plastic one litre of fuel and therefore 10 kilowatt hours of energy can be transformed with our technology. This would be enough to charge a phone every day for an entire year. And we throw away such an amount of energy.

Alongside us, also other businesses engage, more or less, in the technology of the polymerisation. Because of reasons regarding the shortage of resources and the environmental protection, it is very important not to simply burn or throw away the plastic, but to recycle it. However, by recycling the plastic material, mainly inferior products accrue - this is called downcycling. That's why scientists and developers from all over the world deal with the problem to refine plastic materials and return them back to the cycle of materials, for example through depolymerisation. Therefore, plastic wastes are an increasingly important raw material source. Anyway, we are the first to offer this in such a compact and fully automated form. This is our significant USP.

Additional to plastic waste, you are dedicated to the refining of waste oil, also a waste material which no one was able to use, except of burning or centrally refine it expensively. How is the BIOFABRIK using it?

Waste oil is a global waste product which occurs in enormous amounts. Still, no one actually focuses on this material because it's not visible, contrary to plastic. However, it is too valuable to be burnt. In every litre of waste oil, polluted diesel or heating oil, more than 90 percent of reusable fuel are included.

That's why we have developed a process with which polluted fuels can be cleaned, refined and therefore transformed back into a usable fuel fully automated, within only a few minutes. Hereby, our WASTX Oil-Technology combines the standard process of the crude oil industry, connected with completely new depolymerisation processes of hydrocarbon materials and so-called Cold-Cracking- Technologies which we have developed by ourselves. The outcome is also compact, fully automated, easy to operate and as big as a Coca-Cola vending machine. Nevertheless, it can produce enough energy for 1.000 people. The plant is already deliverable and is highly demanded.

Which magnitude are we talking about here? Where do you see your target markets?

Approximately 25 million tons of waste oil arise during one year all over the world. Today, up to 95 percent of this are burnt, deposited or - and that's the worst - end up in the environment. According to the American Petroleum Institute, one litre of waste oil pollutes up to one million litres of drinking water. This corresponds to a water cube with an edge length of 10 metres! If we were able to use the annual amount of arising waste oil, 85 of the world's energetically weakest countries could be supplied with energy, permanently, stable and low-priced.

Therefore, we see our target markets for the compact WASTX Oil Plants in regions without an organized or supervised disposal system, in emerging or developing countries. The recovery of energy would have a direct effect on the economy right on-site and therefore the well-being of the population.

You are addressing a social aspect here. How does your concept look?

We are talking about "**Plastic to Prosperity**". Plastic waste is a scourge of the modern affluent society of which especially those have to suffer who belong to the lower two thirds of the global community, those with a low education standard from developing and emerging countries. 80 percent of the world population, correlating to - state 2007 - almost 6 billion people do either have no access to an organized and affordable energy supply, or just limitedly. This however, is one of the basic modules for a prospering society - exactly "Plastic to Prosperity".

As soon as we stop looking at plastic waste as valueless waste, but as a recyclable material which can be used to generate fuel and electricity, the problem of pollution is going to decrease in both land and sea. Our Plastic Waste to Energy- compact refinery WASTX Plastic transforms plastic waste into a valuable resource - and thereby helps to reduce plastic waste in the nature, for example through remuneration concepts for Social Plastic. Through the remuneration of the collected plastic from landscape, industry or waters, it is aimed to provide income in the world's poorest areas which underlie every economic ascent, connected with a balanced and sufficient nutrition, medical supply, as well as education and training. For us, the WASTX is a persuasive instrument on the way to our big aim: "Plastic to Prosperity", which means upswing and wealth for the wide social classes, through the recycling of plastic waste.

We believe that the people will become creative by themselves and start to collect plastic waste from land, rivers or from the sea, as soon as a suitable infrastructure is provided by us. Why should a fisherman overfish the population, if he would be able to raise money from fishing the marine plastic waste? Why should people go on throwing their waste into the woods or seas? And what happens with the non-rotting plastic waste on landfills? Plastic waste is a giant resource and income source and everyone is happy when all of it would be gone.

In return, the collectors earn money which they can invest in food, education or low-priced fuels. According to the World Bank, there are still around 10 percent of the world population who live in extreme poverty - therefore do not have more than 1.90 Dollar per day. 2 Euro for 50 kg of plastic would be much money.

Where do you want to be with your company in the future?

We don't plan in such dimensions. Our world is way too dynamic for that. However, we will continue working on unconventional and profitable solutions for social challenges, because just like this new ideas spread, not only ecologically, but also economically.

Still in 2018, also the WASTX Plastic is going into serial production, right after the WASTX Oil. The global distribution of the plastic refineries will start by the beginning of next year. The next big milestone is our first overall project which includes the collection, sorting, remuneration, polymerisation and energisation, all bundled up and ready to be installed and operated at one place. We do not have a special name for those Waste Parks yet, but they are supposed to be our next product and complete our range. Out of it, the construction phase for the international multiplication of our complete solution is aimed to start. The preparations are already initiated and first conversations with the administration of diverse Asian countries are already taking place in July 2018. Hopefully, we can put the first Waste Park into operation, this year.

Another big milestone is the polymerisation on the high sea which we are already preparing with our partner One Earth- One ocean (OEOO). Hereby, you are going to take over the marine and nautic part with your experience, whilst we are taking care of the processing technology. First tests with marine plastic waste were made in June 2018, highly successful in our plant which is ready to go into serial production. In the foreseeable time, we want to offer a solution which can collect and process plastic waste directly from the middle of the

huge garbage swirls, operated by a over 100 metre long energetic ship SeeElefant by OEEO.

Last but not least: To neutralize the greenhouse gases which are bound in the plastic and set free in our process, we put our energy in projects which bind them. On the one hand, this will be a very comprehensive afforestation, on the other hand we will be searching for new solutions. However, the primary aim is clear: every litre of our recycling- fuel, produced by our plant, will be carbon neutral.

BIOFABRIK Technologies Ltd

The BIOFABRIK Technologies Ltd business group, seated in Dresden, develops and markets innovative technologies and disruptive solution approaches for the sustainable overcoming of energetic, nutritional and waste problems worldwide. Hereby, BIOFABRIK aims to reduce the destroying degradation of fossil fuels and counts on the development of profitable and climate-neutral business models.

The business segment White Refinery develops the WASTX Technology, which helps to supply plastic and oily waste fully automated to a reasonable substantial and energetic exploitation. The chemical compounds of the problematic materials are resolved in the decentralized plant for compact pyrolysis and transformed back to their original liquid state - a diesel-like energy source is remaining. With this technology, one kilogram of plastic waste transforms to approximately one litre of fuel and therefore up to ten kilowatt hours of energy.

Hence, with the WASTX Technology, for the first time there exists a comprehensive system to purify holistically and sustainably, as well as the provision of the decentralized energy and heat supply out of fuel, recovered from plastic waste or waste oil. The WASTX compact pyrolysis plants can be situated wherever the waste arises - in industrial plants, harbours or communities all over the world. More information on www.biofabrik.com.

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