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# Green careers guide

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## Innovative Idea for using Waste Plastic to generate Energy Products and Services

I did my PhD from Loughborough University, UK in 2011 in the field of mechanical engineering. I worked in a multidisciplinary research group which had versatile projects ranging from bio-medical, fluid dynamics/energy and additive manufacturing. This multidisciplinary nature of the research group and exposure provided the atmosphere to think big, out of box and view the challenges from different prospects.

Coming back to Pakistan, we faced steep challenges including energy supplies & poor infrastructure with increasing intensities of natural disasters and calamities. The change in climate change and its linkage with my country is clearly evident. One such challenge is the plastic waste and its disposal. In major cities such as Karachi, unusual rain (something linked with climate change) caused havoc owing to many reasons and one main reason is solid waste (mainly waste plastics).

While we produce 100-150g/capita of waste plastic today, its disposal and re-use hasn't been thought of. Being part of academia, with training of working in a multidisciplinary environment of the UK, we approached the issue by linking two problems with one solution. The solid waste in urban centers and energy shortages in general can be solved together in one solution we researched, prototyped and now in start-up phase as 'PlastoFuels'

Plastofuel, a registered startup, is presenting an alternate approach to digest the plastic waste with benefits of extracting combustible gas and liquid fuel(s) which can be used to solve

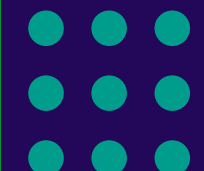
the shortage of fuel and lubricants in different industries. Our product uses the electro-chemical principle of pyrolysis to convert plastic waste into fuel. The unit consists of a pyrolysis reactor, gas filter and other necessary parts to control the process to run and produce the gas in economical, environmentally friendly & sustainable fashion. Different sizes of pyrolysis plants are planned to fulfill the requirements of energy intensive industries.

The team has successfully demonstrated the working of a prototype model for 2-3kW heat supply. The next phase is the development of 15-20 kW of thermal energy by processing waste plastic. Major benefits of the product is climate action (SDG-13), in terms of managing the solid waste such as plastics which ends up in water and food cycles, while also ensuring clean energy at affordable prices (SDG-07).

## Background

Plastic pollution has become major environmental issue in the modern world. A rapid drive in production of disposable plastic overwhelmed the potential of the world to deal with it. Current techniques for plastic waste management involves landfilling and recycling. Land filling is an expensive approach as it requires the use of often prime land, machinery and labor; while recycling has to be economically viable. As a result, major quantity of waste (mostly on-time use plastic) ends up in water ways & oceans.

Pakistan lacks solid waste management arrangements as it is still a developing country & lacks resources to manage the rising urban waste with burgeoning urbanization and population growth. This is creating dangerous environmental & water pollution as well as other related health and social issues. Most of





the community thrown waste is being dumped, burned and/or submerged in valuable lands. Entering in to water ways, ocean are also getting full of waste plastics bottles and other kind of solid waste. While, incineration of plastics results in harmful release of gases that lead to serious environmental issues regarding air pollution.

On the other hand our industries which are using Natural gas and LPG are facing acute shortage of fuel especially during winter season. These industries are forced to shut down due natural gas shortage and rising cost of alternates such as LPG. The purpose of converting plastics to liquid and gas fuels can diverge the acute problem (of solid waste management) into an opportunity of making useful product/energy from waste. The conventional mechanical recycling technique is not applicable for all kinds of plastics, owing to economic viability, while this technique of pyrolysis covers almost all the types of plastics and have advantages of being relatively easy processing in a sustainable manner. The need for the project is immense, as daily use of plastic products is increasing which require to implement e modern ways of recycling for plastic waste management.



The engine to convert waste plastics to fuel.

The startup of Plastofuel is recently being registered with BIC IIU. The team is currently furnishing the requirements of registration of own private limited company. I am part of the board member of company with partnership in UK.

My advise for all is to think big and face the challenge upfront. Its easy to get derailed in the nitty gritty, keep your focus on the goal.

