Fuel made from recycled plastic could power ship engines

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Credit: University of the West of England

New research will test whether Plaxx, a fuel made from mixed plastic waste, can be used as an alternative to crude derived fuels in industrial and marine engines.

The research, funded by Innovate UK and ESPRC will be led by Associate Professor Farid Dailami, BristolRobotics Laboratory (BRL), in partnership with Recycling Technologies, developers of Plaxx. The project is also supported by Swindon Borough Council, Crapper and Sons Landfill Ltd, and an international marine insurer.

The research will determine if Plaxx, made from residual mixed plastic waste, can be used efficiently in diesel engines which currently use HFO (Heavy Fuel Oil), without increasing engine wear. These engines are in marine vessels such as tankers, ferries and other nautical machinery.

The research is also of interest to the waste treatment companies, packaging manufacturers and local waste handling authorities. Its long term application helps create a useable resource from waste which cannot be efficiently recycled mechanically.

The waste source is the plastic entering the commercial, industrial and municipal waste streams that is mixed, laminated, contaminated and otherwise not available to conventional plastics recycling techniques. At present unfortunately this represents the bulk of plastic waste. Plaxx is the product of the depolymerisation of plastic and is made up of a mixture of hydrocarbon monomers similar to crude oil. It is however very low in sulphur and other organic/inorganic contaminants. Currently it is a soft wax at room temperature but a low viscosity liquid at 70°C. As with crude oil it can be further refined and could be used as an input to plastics manufacturing.

The research will develop the use of Plaxx by testing engine performance, exhaust emissions and engine wear on different engines over a broad range of test conditions. The research will also develop software tools that will monitor these three aspects to enable engine users to achieve optimum performance from Plaxx.

Associate Professor Farid Dailami says, "This new fuel could have huge environmental benefits as an alternative to HFO currently used in marine diesel engines and industrial engines. Our research will compare the performance of this fuel with standard diesel fuel in order to gain data on how it performs and to ensure it won't damage the engine or cause harmful emissions or gases. The aim is to demonstrate to producers and

users of these engines that Plaxx can be a viable alternative to HFO and to pave the way for commercialisation of Plaxx.

"HFO is a fossil fuel which needs to be extracted and refined and therefore has environmental costs and consequences, whereas Plaxx is very low in sulphur and is made from a waste product which otherwise would have to go into landfill or be incinerated. Our research will seek to show if you put Plaxx into an engine it won't harm the engine. In time Plaxx, as an alternative to HFO, has the potential to benefit local authorities and ultimately tax payers, by lowering the cost of waste management and turning plastic waste into a useable fuel."

Adrian Griffiths, CEO, Recycling Technologies says, "This research will allow Recycling Technologies to characterise the use of Plaxx for use in diesel engines thus opening up a global market for an important new innovative material to replace fossil fuels with a product derived from waste."

Plaxx is low in sulphur and complies with new emission rules. HFO, used in marine main diesel engines is a residue from crude oil refining and as such is the dregs of the process.

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