

Plastic waste in, diesel fuel out

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Seeing is believing. On Wednesday last week a group of engineers from Japan demonstrated how waste plastic fed into the one side of a conversion plant is spewed into a bottle on the other side and used to fuel a diesel powered vehicle.

This jaw-dropping demonstration took place at the ribbon cutting of a plastics-to-oil conversion plant that opened at the Kraaifontein integrated waste management facility.

A first of its kind in the country, this facility was made possible thanks to a \$1 million donation by the Japanese government and the pyrolysis plant technology developed and supplied by Japanese companies CFP Corporation and Kanemiya Co. Ltd in a collaboration between the City of Cape Town and Japan International Cooperation Agency (Jica).

After two years of preparation and hard work this project will now enter a six-month pilot phase to gain insights into the commercial potential for creating fuel from plastic waste diverted from landfill sites.

The Japanese ambassador to South Africa, Shigeyuki Hiroki, said Japan was one of the most waste conscious nations in the world and that sustainable development tops their list of global agendas.

Since coming to South Africa in 1997, Jica has partnered with many South African entities in several development projects.

In its profile Jica president Akihiko Tanaka states that the people of the world have



The process starts with the waste plastic being loaded into the washer, PHOTOS: DESIRÉE RORKE

become more interdependent as globalisation continues.

"And as a key member of the international community, Japan has a duty to address global issues in developing countries."

This policy is motivated by the fact that 80% of the world's seven billion population is currently living in developing countries.

Mayco member for utility services, Ernest Sonnenberg, said: "Japan is a world leader in waste minimisation and applying their technology in a South African context aligns with

the city's commitment to a future that is more energy secure, resource efficient and resilient to the impact of climate change."

By using the existing structures in the form of its Think Twice recycling collection initiative, the City, with the technical assistance from the Japanese engineers, built on available resources to support the functioning of the plant.

Tetsuya Sato, project manager from the CFP Corporation, briefly explained the process known as pyrolysis, which uses thermal treatment to convert plastic into fuel.

"Pyrolysis is a thermochemical decomposition of material at elevated temperatures which involves the change of chemical composition. Three types of plastics – polyethylene, polypropylene and polysty-

rene, all mainly harvested from the recycling plant – are brought to the processing plant where it is washed, dried, extruded and shredded. It is then fed into a reactor where it is heated and cooled to be converted into oil."

The yield of 500kg of plastic materials per day works out to approximately 500 litres of fuel.

These yields will be assessed by specialised technicians on site to determine the quality and quantity of fuel being produced in different combinations and ratios.

"Ultimately, the aim is to test the best combinations to yield the highest quality."

Approximately 70% of fuel produced by the pilot plant will be channelled back into the running of the plant, powering the 150 kilowatt generator on site. The rest could be used to power any other machinery that run on diesel, if the oil is of a good quality.

"The rising volumes of waste material produced in countries across the world represent a problem that cannot be ignored. They pose a threat to the health of the environment, and to humans. Sadly, we are united as a global community in this regard," Sonnenberg said, expressing his hope that through this partnership the City will be able to explore possibilities and share ideas.

According to Sonnenberg the amount of waste plastic as one of the major waste materials in South Africa, is increasing at a rate of 6%, while the City's recycling rate at 16% is still low. The bulk of the waste is sent to landfill sites.

"In terms of the national waste management strategy of 2011, South Africa aims to achieve a recycling rate of 25% of the waste currently sent to landfill by the end of 2015.

"Considering this, we are naturally very keen to learn about new technologies that would help us to achieve that goal in a sustainable manner, as South Africa is the only G20 member in Africa and considered a newly industrialised country," he said.



Tetsuya Sato explains the heat process that takes place in the reactor to Sonnenberg and City engineer Dr Gisela Kaiser who is also executive director of utility services.



The final product is spewed out (top) and below used to power up a diesel vehicle.