Direct Injection Retrofit Kit For Two-Stroke Cycle Engines Cuts Pollution

Colorado State University

Carbureted two-stroke engines are one of the world's largest sources of air pollution, specially in Southeast Asia. Nearly 35 percent of the fuel in these engines escapes directly into the exhaust and never burns, resulting in high hydrocarbon emissions. Pollution from taxis, scooters and other vehicles powered by two-stroke engines kills thousands of people annually in Asia, Africa and South America. In the Philippines alone, particulate emissions from 1.8 million two-stroke vehicles are estimated to result in 2,000 premature deaths every year.

To counter this problem, researchers at Colorado State University's Engines and Energy Conversion Laboratory in Fort Collins, Colo., invented the "Direct Injection Retrofit for Two-Stroke Cycle Engines Kit." Core technology developed by Orbital Engine Corp. was used in the design.

The retrofit technology was disclosed in 2003 and Envirofit International, a nonprofit corporation, as formed to commercialize the product. About $1.5 million in seed funding was provided by the Bohemian Foundation in Fort Collins from 2004-2007. During that time Envirofit perfected a production-ready direct-injection product, performed extensive field testing and began installing the technology on vehicles in the Philippines.

The retrofit kit significantly reduces emissions and improves fuel efficiency. The direct-injection method results in more complete combustion of fuel, reducing carbon monoxide emissions by 76 percent, carbon dioxide emissions by 35 percent and hydrocarbon emissions by 89 percent. At the same time, fuel use is reduced by 35 percent and oil by 50 percent.

An Envirofit retrofit kit costs about $350, but the annual fuel and oil savings are more than $500. For a typical Filipino taxi driver, the $500 in annual savings represents about a 40 percent increase in income. To date more than 500,000 kits have been installed worldwide.

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