

## In Brief

# Engine retrofit kit helps Filipinos breathe easier

Retrofitting the engines of smoke-belching Philippine motorcycle taxis to reduce pollution could cut their fuel use more than 30 per cent and emissions by 90 per cent according to non-profit US company Envirofit.

The two-stroke engines in 1.3 million Philippine motorcycle taxis are a major source of pollution, including carbon monoxide and particulates. Envirofit Chairman Ron Bills says that each two-stroke engine emits as much pollution as 50 conventional car engines.

The Philippine Government abandoned an earlier plan to ban the vehicles because they represent about one-third of the country's vehicular population and are a major source of income for many Filipinos.

Envirofit has developed a retrofit engine kit that costs about US\$300 – not cheap by local standards, but the government is sponsoring micro financiers to lend taxi drivers the money for their installation.

At the moment, taxi drivers make US\$3–5 a day, but after their motorcycles are fitted with the kit, they can expect their income to increase by US\$1–2 a day due to the engines' improved fuel efficiency, says Bills. In any economy, he adds, a 30 per cent pay rise is a welcome one, and this extra income should enable drivers to pay back their loans within a year.

Engine-retrofitting has also created new jobs in the areas where the technology is being trialled.

The retrofit system works by eliminating the carburettor and instead introducing fuel directly into the engine cylinder, resulting in a more efficient combustion process. Envirofit licenses the core of the direct injection system from Orbital Corporation whose patented combustion process has been used in a range of commercial and recreational market products for more than 20 years.

Envirofit's Chief Technical Advisor, Dr Bryan Willson, was recently awarded the international World Clean Energy Award for Transport and Mobility for developing the kit. The judges noted that the project tackled one of the largest sources of vehicular emissions in the world 'in a simple and



Engine retrofitting provides employment and business opportunities for many Filipinos. Envirofit

profitable way', and should 'directly benefit half a million people through better health and higher incomes'.

To date about 150 retrofit kits have been installed in the Philippine city of Vigan where the pilot project is running. In the next few years, Envirofit expects to retrofit all 3000 of Vigan's motorcycle taxis.

Working with local partners, Envirofit has been helping local people set up micro businesses to install and service the kits. Eighty-five per cent of the kit's components are locally produced, with the remaining highly specialised parts being imported.

Vigan city's mayor at the time the project started, Ferdinand C. Medina, said that as well as reducing fuel costs and consumption, the technology will reduce the risk of respiratory diseases – 'the number one killer disease in the city'.

Last year, the city of Vigan passed an ordinance that requires all two-stroke tricycles to either convert to four-stroke engines, undergo direct-injection retrofitting or adopt other technologies to significantly reduce emissions and fuel consumption. Envirofit estimates that the the city will reduce carbon monoxide emissions by more than 3000 tonnes a year and reduce its fuel consumption by 1.4 million litres due to the project.

Vigan's work with Envirofit is in line with the *Philippine Clean Air Act* of 1999, established to deal with the devastating



Each of the 1.3 million two-stroke motorcycle and tricycle engines in the Philippines produces an emissions load equivalent to 50 conventional cars. Envirofit

effect of air pollution. According to the 2006 Philippines Environment Monitor, smog and pollution cause more than 15 000 deaths in the Philippines each year, and also create a financial burden of US\$19 million in health care costs and loss of income.

Envirofit plans to roll out 40 000–50 000 retrofit kits in other Philippine cities.

Because they are commonly used throughout developing countries, vehicles with carbureted two-stroke engines – Asia has an estimated 100 million – represent one of the largest single sources of the world's vehicular emissions.

More information:  
Envirofit, [www.envirofit.org](http://www.envirofit.org)