

Big pig poo problem solved

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An Australian led-project to turn 1.4 million tonnes of Chinese pig poo into alternative energy and fertiliser has been hailed in a national science award.

The project, run by the Adelaide-based Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE), Chinese firm HLM Asia PL and Huazhong University of Science and Technology, has developed technology for treating one of the world's largest and smelliest waste disposal problems.

It was recently presented with a Federal Government 2013 Star Award, which recognises CRCs for working with small and medium enterprises to drive innovation.

"China has 1.8 million pig farms and over 700 million [pigs](#), while pork makes up 67 per cent of the nation's [meat consumption](#)," explains CRC CARE managing director Professor Ravi Naidu.

"It is estimated that the Chinese pig industry generates 1.4 million tonnes of pig excreta and 7 million tonnes of urine per year. However, only 10per cent of this waste is currently treated, posing a considerable disposal headache as well as health and water quality risks."

The project has developed a two-step anaerobic biodigester for treating pig waste in bulk, and established the settings for load and digestion time. It has also determined that a special combination of different anaerobic treatments is effective for this type of high-nutrient waste, and

that it can produce clean biogas energy.

The technology has been trademarked as pooCARE. It has been demonstrated in the field and is now being scaled up to treat large volumes of waste from many piggeries.

Prof. Naidu says that the demonstration biodigester can:

- Remediate 200 tonnes of piggery waste daily (73,000 tonnes annually)
- Produce 380 cubic metres of biogas daily, worth around A\$41,000 a year as a heating fuel
- Produce 5600 tonnes of fertiliser worth A\$550,000 per year.

"CRC CARE has also been working with the pork industry in Australia, including the Pork CRC, to transfer the biodigester technology from China to farms in Australia. This will enable Australian piggeries to gain a new income stream from their waste, which will help support farm operations, grow algae and produce biochar to provide soil nutrients, and increase the sequestration of carbon in soil.

"Our technology doesn't just solve a big and rather smelly problem for China – it does so for the world. Pork consumption is rising globally due to the increased demand for meat, and this development, which recycles the energy and nutrients in pig waste, makes a major contribution to the sustainability of this industry," Prof. Naidu adds.

To solve the problem, the partners in the project had to:

- understand the pollution threat posed by animal waste to the environment and human health as a basis for developing the business case
- characterise pig farm solid and liquid wastes (especially in terms

- of their nitrogen, phosphorous and heavy metal content)
- develop ways to manage leachate from existing landfills
 - preventing further contamination of the environment
 - develop advanced alternative technologies for nitrogen removal
 - come up with novel a bioreactor design and operational technologies
 - devise an efficient way to collect and market biogas to local communities
 - solve the problem of toxic heavy metals by using biochar to absorb them
 - value add piggery [waste](#), including developing and marketing an acceptable fertiliser.

"Pig poo might seem like simple stuff, but it creates a very complex set of environmental problems, which I am pleased to say the CRC CARE/China team has managed to overcome with some lateral thinking and sound, practical, affordable technologies," he says.

Provided by CRC for Contamination Assessment and Remediation of the Environment

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