Smart waste solutions

MBD Energy, founded by Andrew Lawson (right), is developing techniques to harvest algae and turn it into plant fertiliser.

FAST FORWARD

Name: MBD Energy
HQ: Melbourne
R&D: >$1 million/year
Reach: China, Thailand, Canada

At a glance: MBD Energy is a private start-up company established in Melbourne in 2006 that uses biological processes to deal with industrial waste. The company has 70 staff (including 50 based at its R&D centre in Townsville) and links with James Cook University and the AMCRC.

EVERY YEAR, HUGE blankets of algae – some larger than Sydney Harbour – spread along the Shandong coast between Shanghai and Beijing – the by-products of fish farms. Although not toxic, the blooms block sunlight and suffocate marine life. It costs the Chinese government around A$250 million every year to clear its seas using chemicals to break down the blooms.

Then, Chinese officials visited MBD Energy's works at Pacific Reef Fisheries, Ayr, in Queensland, where scientists are using biological processes to clean up wastewater from prawn farms. Then the delegation asked MBD Energy to develop a technique to harvest the Shandong algae and to turn it into biochar – a soil conditioner – which could fertilise the ground in the region naturally. The process would reduce use of synthetic fertilisers, cut costs and reduce water pollution.

A demonstration plant to remediate algae in a ceremonial lake is now scheduled to open in April and will be followed by large-scale projects along the China Shandong coast. MBD Energy founder Andrew Lawson – who trained as a civil engineer – says entry into the Chinese market was helped by high-level political support.

In addition to its marine work, the company is developing techniques for using algal biomass to capture and sequester carbon dioxide from coal- and gas-fired power stations (a process known as Bio-CCS) in Australia, Thailand, Canada and now China. Lawson attributes much of the company's success to its early commitment to establishing its world-leading algae R&D centre at Townsville with the Advanced Manufacturing Cooperative Research Centre (AMCRC) and drawing on the expertise of James Cook University (JCU) algae researchers Associate Professor Kirsten Heimann and Professor Rocky de Nys.

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"AMCRC has profoundly increased our project research and demonstration capacity," Lawson says, "and having access to JCU's knowledge has allowed us to expand our horizons well beyond our early aspirations. It makes sense to partner with the best and brightest in each area and that's what these relationships have enabled us to do."

At Townsville, large prototype devices are tested under commercial conditions to clean up wastewater, carbon dioxide, methane and other industry waste. In the process, the system produces tonnes of algal oils, nutrients for animal feed and other valuable by-products including plastics and potential new pharmaceuticals. In addition to this work, Lawson has overseen the construction of a 50,000 tonne/year biodiesel plant.

"The remediation of industrial wastewater alone is a multi-billion dollar industry and market," adds Lawson. "And we are more optimistic than ever about the role algae will play in helping to meet growing demand for energy, food and clean water."