

# Energy-from-waste brings home the bacon



Berrybank Farm has been converting pig waste into energy and other byproducts using innovative energy-from-waste technology for 25 years. The farm saves money on power and water and has created new revenue streams while also addressing community concerns.

## Collecting methane from piggery waste

Berrybank Farm is a family-run business in south-west Victoria that established a piggery in 1970. In 1989, the family invested two million dollars in an ambitious and innovative project to collect methane from piggery waste to generate electricity for the farm and improve its management of its waste.

Today, the farm's waste management system consists of an anaerobic digester, which converts the effluent from the piggery into biogas to generate electricity. The waste is then reused and sold as an odourless organic fertiliser and the nutrient-rich water is recycled for irrigation purposes.

## Deciding to invest in energy-from-waste

"My father Melville had always been very interested in producing electricity from pig waste," said Jock Charles, a fourth-generation farmer at Berrybank and director at the 20,000-sow piggery.

Building a sustainable way of farming was a strong motivation for the system change, especially in dealing with the waste and the resulting odour. "Waste was and still is a problem for piggeries," said Jock, and Berrybank's close proximity to regional towns extended the problem beyond the farm's parameters.

## A fortuitous meeting

In the late 1970s, there were no equivalent energy-from-waste systems in Australia. Melville Charles had looked at several energy-from-waste systems in the United Kingdom that were operating with mixed results, but remained unconvinced of the investment potential.

In a fortuitous twist of fate, Dr. Pietro Andreoli, an Italian specialising in anaerobic digestion, approached the Charles family in the late 1980s to gauge their interest in a system similar to the ones he had built in Italy. They liked what they saw and proceeded with Dr. Andreoli as project engineer.

### SNAPSHOT

#### ORGANISATION

Berrybank Farm

#### PROJECT

Waste management system that turns piggery waste into energy, potting mix and fertiliser.

#### OBJECTIVES

To minimise waste and convert effluent into energy and fertiliser. To alleviate pollution concerns and provide savings and steady returns to the company.

#### STATUS

Operating since 1989.

#### OUTCOMES

Energy and water savings, revenue diversification and positive community amenity.

#### CHALLENGES

Large-scale, innovative project using knowledge and machinery not readily available in Australia at the time.

#### NEXT STEPS

Look for more opportunities to maximise energy use such as a cooling system for the piggery.

## Building a case for investing

The family had no board or investors to convince at the time, instead basing their decision on their own analysis and judgment. The payback calculations were based on projected savings rather than an increase in revenue.

"It was by far the biggest capital expenditure we'd ever undertaken and it was tricky at the start because there wasn't a market for the end products," explains Jock. "Our payback calculations were based on projected savings in electricity usage. We had to impute a value based on all the environmental benefits as well as the revenue we could potentially gain in the future."

## Building the system

The biggest challenge at the time was the lack of knowledge in Australia. "It was hard to source parts and it took a lot of time to piece the system together," remarks Jock. "Finding every part was almost like a research project in itself".

Luckily they had a good team so, while the project took over two years, it progressed fairly smoothly. "We knew it could be done," says Jock. "It would just be a matter of persistence."

Jock believes that the success of this kind of project depends on the business taking complete ownership of every aspect. "Do lots of research and then work out what is the best technology and who are the best providers," he adds. "Work closely with your providers so that you pick up on things that are specific to your type of waste and you know how to manage the system over the long term."

## Unexpected returns from investing in innovation

The farm's waste management system generates about \$160,000 worth of electricity a year – enough to power the farm year-round. The system has also provided some very beneficial bi-products. "A lot of things we didn't envisage at the start have stemmed from it, which is often the case when you outlay capital," says Jock.

Approximately 70% of water is reused during the process and all the nutrient-rich water that has been through the digester is irrigated on the farm's cropping land to grow crops. "So it's replacing traditional chemical fertiliser," says Jock. "And our crop is vastly superior to what we used to be able to grow."

Berrybank has been able to easily expand the piggery over the years as it can manage the increase in effluent without affecting the amenity of the local community.

The Charles family has also established a flourishing new business selling the odourless organic potting mix and compost left over from the solid waste.

## Data returns

The waste management plant saves or recovers annually:

- › an estimated \$160,000 in electricity
- › 12,000 tonnes of packaged organic garden products with a value of \$2.4 million
- › organic fertiliser used on the property replaces a commercial product that would cost approximately \$90,000
- › a reduction in fresh water usage of approximately 200,000 litres per day – a 70% saving.

The system also has several environmental benefits such as eliminating odour, pathogens and weeds; reducing greenhouse gas emissions by 7,000 tonnes per year of CO<sub>2</sub> equivalent; and preventing soil and waterbody degradation.

## Investing in the future

For Berrybank Farm, their investment in energy-from-waste technology has created a sustainable business model that helps them avoid rising energy costs.

"I think this technology should be used for most, if not all liquid organic waste streams," says Jock. "You are better off staying on the front foot and getting ahead of regulation".

"You don't always see some of the opportunities when you first start."

Jock Charles, Director, Berrybank Farm

**Further information**  
Sustainability Victoria  
Level 28, Urban Workshop,  
50 Lonsdale Street,  
Melbourne VIC 3000

Website [www.sustainability.vic.gov.au/invest](http://www.sustainability.vic.gov.au/invest)  
Email [invest@sustainability.vic.gov.au](mailto:invest@sustainability.vic.gov.au)  
Phone +61 3 8626 8746  
Fax +61 3 9663 1007

Published by Sustainability Victoria.  
Case study: Energy from waste helps Berrybank Farm bring home the bacon  
© Sustainability Victoria, November 2015 RRR008

