



## Editorial

# Recycling waste energy

from gardens, through bagasse, to ethanol

**C**risis can be a good thing. It can bring about renewal, or it can make one reflect on better ways of doing things. Do *COSPP* readers enjoy gardening? I would guess that many of you do, if you have a garden. The link is easy to spot – the use of waste. One of the big appeals of gardening for many is the potential for composting – the conversion of waste outputs, from the kitchen and from the garden, into inputs to enhance productivity and appearance. Skilled gardeners can avoid the use of external inputs altogether and it must be a wonderfully satisfying talent.

High-efficiency cogeneration is a source of similar satisfaction. Maximum use is made of the fuel input, as little as possible is wasted, and resources are used as productively as possible. For engineers it is a source of tremendous pleasure. It also brings a smile to the faces of finance directors.

There is a form of cogeneration that demonstrates this productivity in a wonderfully pure way. Sugar cane is one of the world's most important agricultural products and its processing is a highly energy-intensive activity – ready-made for cogeneration. The question is – what fuel? The beauty of the solution is that the fuel is derived from the cane itself, in the form of bagasse, a waste product from cane milling. If sugar mill owners can sell surplus electricity to nearby consumers or a utility, then the plant can be optimally sized to maximize efficiency. This is therefore a renewable form of power and heat generation that uses the fuel in a highly efficient way and brings massive social and economic benefits in parts of the world where they really mean something.

The perfection of bagasse cogeneration does not stop there. Through the commercial benefit that it brings to the mill, it makes sugar production much more cost-effective. It can also improve the competitive position of ethanol, which can be easily produced from sugar. Ethanol is an alternative for vehicle fuel and, as we enter an era where the oil price may never fall much below US\$40/barrel again, this is a critical asset. For the world's major petroleum importers, ethanol derived from sugar

is a big attraction. And in yet another neat twist of the cane story, sugar producers can switch production between sugar and ethanol according to relative world market values.

We will all be hearing a great deal more about bagasse cogeneration in the future. To reflect this, WADE had produced a new report on the subject in which its Chairman, Tom Casten, has looked closely at the economic benefits. These are summarized in this issue of *COSPP*.

A final angle. James Lovelock is a celebrated atmospheric scientist who, among many other things, created the Gaia theory that says the earth is self-regulating in the same way that living organisms are. Lovelock has recently been in the news for stating that the threat of climate change is so dramatic and so urgent that we must respond in a similarly dramatic way – through massive investment in nuclear power. He believes that efficiency and renewable alternatives cannot take the strain. Clearly, Lovelock knows less about cost-effective energy solutions than he does about climate science.

But Lovelock's Gaia theory captures well the attraction of bagasse cogeneration – the efficient and effective use of waste products that can serve as precious inputs for other processes. There are countless examples in the natural and physical world and they highlight the growing relevance of cogeneration – energy recycling – in a world that is reaching its atmospheric limits.

So, if you have a garden, and you enjoy its cultivation – keep recycling that waste.

**Michael Brown**