

## Waste to energy

**Australia sends 22 million tonnes of waste to landfill each year. Waste in landfill degrades slowly over time, often producing emissions for decades after it has been dumped.**

**There is huge potential in Australia to improve the waste-to-energy stream. This would lead to reductions in landfill and greenhouse gas emissions as well as producing energy.**

There are two main waste streams which are both suitable for the creation of energy: solid waste in landfill, and wastewater from industrial and commercial processes.

### Solid waste to energy

In Australia:

- there are currently over 650 landfills
- 22 million tonnes of waste goes to landfill each year
- this generates over 15 million tonnes of CO<sub>2</sub> equivalent emissions each year (mostly in the form of methane).

Australia produces around 250TWh (terawatt-hours) of electricity per year. The energy that could potentially be produced from waste treatment in Australia is estimated at around 45TWh. This means that nearly 20% of the electricity demand in Australia could be generated from waste.



Gästadsverket waste incineration plant in Linköping, Sweden

## Sweden sets an example

Sweden is one of the world leaders in waste-to-energy. Around half of Sweden's domestic, commercial and industrial waste is recycled and the rest – over two million tonnes – is transported to one of 32 waste-to-energy facilities around the country, where it is incinerated to produce electricity. After incineration, products that have not burned are extracted and where possible re-used. For example metals are melted down while porcelain and stone are used for road construction. This leaves only 1% of waste which ends up in landfill. Sweden even imports rubbish from other countries that pay to have their waste removed!



<https://sweden.se/quick-facts/quick-fact-food-waste/>

## Environmental issues

There has been some opposition to waste-to-energy facilities on environmental grounds. Clearly a reduction in waste along with increased and improved waste recycling is the preferred first step in waste management. However, there remains an argument that as long as there is waste going to landfill, burning waste is better than burning coal, for example.

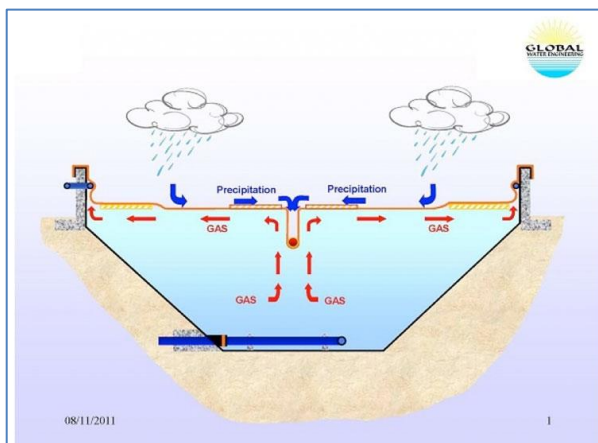
The technology involved in waste incineration has been improved over time so that energy generation has increased five-fold while emissions have been simultaneously reduced by up to 99%.

Australia's capacity to generate energy from waste is currently underutilised, with the first waste-to-energy plant only recently being approved in Kwinana, WA.

## Wastewater to energy

The extraction of biogas from wastewater has been occurring for a number of years, however, recent technological advances have made this a much more attractive option for enterprises with a significant output of wastewater.

The Oakey abattoir in Queensland is one of the largest beef processing plants in Australia. Covered High Rate Anaerobic Lagoon (COHRAL) technology will be installed at the abattoir in 2015. Similar technology has been utilised in tanks all over the world, however, this will be the first time the technology has utilised covered lagoons.



Anaerobic bacteria are used to digest 70% of the organic matter (COD, or Chemical Oxygen Demand) in the wastewater. The methane captured in the process is then harnessed for use as a direct energy source.

The Oakey abattoir is expected to save over a million dollars a year in the cost of purchasing gas for its boilers, while simultaneously improving the quality of its effluent. Thus the implementation of the biogas plant turns an environmental problem into an environmental and financial benefit.

A number of agricultural enterprises have taken up biogas technology, in particular piggeries and poultry farms. However, the technology is suitable for a wide range of industries, including agricultural, food and beverage processing and pulp paper

plants – the more organic matter contained in the effluent the better!

The option for treating wastewater to create energy is likely to be more palatable to the general public than burning solid waste to create energy. This is largely due to the fact that burning solid waste may simply shift the environmental problem from the consequences of landfill to the consequences of burning, whereas treating wastewater to make biogas solves an environmental problem.

The benefits of using wastewater to generate biogas include:

- biogas can replace other forms of energy, saving on costs such as natural gas to heat water
- reduced carbon footprint
- cleaner effluent, making it easier (and possibly cheaper) to meet local standards for discharge of wastewater
- odour reduction – less bacteria = less smell!

Studies have shown that if all of the organic waste from domestic, industrial and agricultural sources in Australia was treated in biogas plants, it would create enough gas to power almost a million homes.

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Sources:

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