



Closing the Loop - Developing Better Waste Re-use Systems

Waste Re-use Innovation

There is increasing pressure worldwide for firms to become more efficient in their use of resources and to reduce waste emissions to landfill, air and water. Consequently, individual firms and groups of firms are seeking to develop innovative and commercially attractive alternatives to waste disposal. Wastes are increasingly being regarded as 'by-products' rather than wastes and one firm's waste is increasingly being regarded as another's input.

Closing the loop requires understanding the nature of the waste streams and the options for transforming these into re-usable inputs. Because many rural towns tend to have similar waste streams, this study lays the groundwork for the development of industrial ecosystems in regional Australia.

GAIE

Regional centres such as Tamworth (NSW) have agro-industrial estates that produce significant levels of organic by-product. The Glen Artney Industrial Estate (GAIE) in Tamworth is home to two abattoirs, a meat products manufacturer, livestock saleyard, hydroponic vegetable producer, industrial laundry and a range of other smaller service industries. There is potential to double the number of firms operating within its boundary. The major wastes presently produced include heat, carbon dioxide, various wastewaters, plant and animal waste products (including paunch).



The Report

This report provides a technical discussion of the major processes for transforming organic waste to energy (e.g. direct combustion, gasification; pyrolysis; anaerobic digestion and alcoholic fermentation). The advantages and disadvantages of each process are discussed. The nature, amount and type of waste produced suggest that the process of anaerobic digestion might have the most potential. There are, however, other issues that need to be addressed before general recommendations and development of this process can be recommended. These include OH&S issues, institutional (including legal and bureaucratic) constraints, possible problems in obtaining a constant, reliable quality and quantity of required organic inputs on which new systems will depend, and the development of efficient transport systems.

Re-use Options

The study also undertook preliminary research into three significant by-product re-use alternatives. They were:

- **Paunch.** Various re-use options were discussed and a trial undertaken to evaluate the usefulness of sheep paunch as a soil conditioner for tree and crop production.
- **Carbon Dioxide.** There is significant interest in the possible re-use of CO₂ between two firms. A preliminary analysis indicates that while the process is feasible there are technical and institutional risks that will need to be addressed.
- **Wastewater.** An abattoir was keen to consider alternative uses for run-off water that may enhance the aesthetic quality of the firm's grounds and minimise the quantity of nutrients leaving the site. An initial study undertook detailed testing of the water quality on the site and discussed the potential to use constructed wetlands to improve the quality of the water sufficiently to use for on-site irrigation.

Project Details

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