Photograph by Meriolisis - Own work.

Option 5 Advanced thermal treatment

Advanced thermal treatment covers a range of technologies, including variations of pyrolysis and gasification. In general, these processes may use specific pressures and/or limit oxygen to achieve thermal conversion of organic materials. Depending on conditions, outputs include:

- Energy
- Syngas - which can be further processed to produce a natural gas replacement
- Char (carbon rich)
- Ash
- Tar/Oil - a hydrocarbon that can be refined for use as fuel or raw material for further processing

Gasification - A highly controlled process that uses high temperatures with some oxygen to force a chemical reaction. This reduces waste to produce various combinations of tar, heat and energy and a combustible gas or lower-grade liquid fuel (lower-quality diesel).

Pyrolysis - A highly controlled process under high temperature without oxygen to force a chemical reaction, reducing waste to char, tar, heat, energy and an uncompressed gas. Examples include the production of charcoal or coal gasification.

These technologies typically require pre-sorting of the waste stream to provide consistent feed material for the thermal conversion process. They have the potential to operate at a smaller scale than conventional incineration. A significant portion of the cost of advanced thermal treatment processes is related to managing emissions to meet relevant standards. This is likely to be more significant for small plants.

Examples in operation

New Zealand: None, although trials have been completed for single waste streams (e.g. waste timber) but not general waste

Australia: None

Rest of the world: Yes, but mostly for specific waste streams (e.g. tyres or wood waste)