

About advanced waste processing



Different technologies are being used successfully overseas to recover recyclables or produce electricity and heat.

Advanced waste processing facilities are being used safely and reliably around the world, including in the United Kingdom (UK), Europe, Asia and North America. They provide an essential and cost effective service to local authorities and businesses.

Best practice facilities have strong safety track records and are characterised by:

- proven and efficient technology
- strict emission controls and safety standards
- transparent operations that are open to the local community
- appropriate locations and a design that is sympathetic to the surrounding area
- excellent transport links
- ongoing and effective community engagement.

A medium sized plant can process 300,000-400,000 tonnes each year (the waste from around 10 or more councils in Melbourne). Combustion is the most commonly used technology overseas.

Advanced waste processing solutions are proven technologies that make better use of household rubbish than burying it in the ground.

PART OF A TOTAL SOLUTION

Advanced waste processing solutions have great potential as part of a total approach to managing the waste we produce.

Best outcomes will be achieved by minimising our waste, reusing or recycling, and then what is left over can go to advanced waste processing.

Converting waste to energy is better than putting waste in landfill, but only material that can't be viably recycled should be transformed into energy.

Used reliably and safely around the world

Large cities overseas rely on advanced waste processing to manage residual waste, with landfill as a last resort.

It is common for plants to be modernised over time with up to date technology. This ensures that plants continue to operate efficiently and economically, and be as environmentally friendly as possible.

Exterior designs range from industrial style buildings to architect designed landmarks.

Here are just a few examples of advanced waste processing facilities from the UK and Europe.



Suffolk Energy From Waste Facility, UK

This combustion facility processes 269,000 tonnes of waste a year from households and some businesses, and will reduce greenhouse gas emissions by 75,000 tonnes a year. The facility generates electricity and metals are extracted from the ash that is left over. An educational visitor centre and tours let the local community see the facility in action.



Spittelau Waste to Energy Facility, Austria

Behind this unusual façade in central Vienna is a combustion facility that processes 250,000 tonnes of household rubbish every year. It produces electricity, heat and scrap iron.



Twence, The Netherlands

Twence is an integrated waste processing centre established by 14 municipalities. Originally a landfill site, Twence includes facilities for anaerobic digestion of organic household waste, a biomass power plant that uses waste wood and a combustion plant. These facilities produce electricity, heat, steam for industry and waste metals.



Vernéa Integrated Waste Treatment Facility, France

Vernéa handles household and similar waste, and processes 230,000 tonnes of waste each year. This facility combines advanced sorting, anaerobic digestion/composting and combustion. The facility produces electricity, agricultural compost, and materials that can be used in steelworks or construction.



Marchwood Energy Recovery Facility, UK

Marchwood is located on the Southampton Water estuary. It processes 165,000 tonnes of residual waste each year for the Hampshire County, Southampton City and Portsmouth City councils. It supplies enough electricity to power 22,000 homes. The unusual design was created through consultation with local residents, councils and architects.



Ruhleben Waste to Energy Facility, Germany

Modernised in 2012, the Ruhleben combustion facility can process 520,000 tonnes of residual waste each year. The plant provides electricity and heat. It also recycles around 12,000 tonnes of ferrous metals every year.



Ardley Energy Recovery Facility, UK

Ardley is a combustion facility that processes 326,000 tonnes of waste a year. It diverts at least 95% of Oxfordshire's residual waste from landfill and generates enough electricity to power 53,000 homes. The facility also processes residual waste from businesses and other local authorities.

How safe are facilities?

Modern waste to energy plants use sophisticated emission control equipment to minimise pollution. The newest facilities in Europe and North America are designed to meet strict emissions standards. Facilities have real-time emission monitoring and they are inspected and tested regularly to ensure safety standards are achieved, and many outperform standards.

All large industrial facilities have to manage the risks of pollution. The Environment Protection Authority (EPA) Victoria has strict standards for new waste to energy facilities to protect people's health and the environment.

According to EPA, waste to energy is an established disposal method used globally with international best practice standards available. An independent literature review commissioned by EPA found that there was little potential for health impacts or risk from exposure to air emissions from modern facilities.¹

Similarly, in the UK, the Health Protection Agency (now Public Health England) produced a report in 2010 on the impact on health of air emissions from combustion facilities.² The report states that modern, well-managed combustion facilities make only a very small contribution to local concentrations of air pollutants, and that "It is possible that such small additions could have an impact on health but such effects, if they exist, are likely to be very small and not detectable".

A study funded by Public Health England³ and published in 2017, found that particle levels caused by combustion facilities are extremely low, and could often not be distinguished from other background sources such as traffic.

¹ EPA. Australian Paper waste to energy works approval decision. 2018, Publication 1717

² Maynard, R L et al. The impact on health of emissions to air from municipal waste incinerators. Health Protection Agency. 2010. [PDF file]

³ Douglas, P et al. Estimating particulate exposure from modern municipal waste incinerators in Great Britain. Environ. Sci. Technol. 2017, 51, 7511–7519

How do they work?

There are two broad types of advanced waste processing that are commonly used to process household rubbish.

Waste to Energy

Waste to energy technologies all recover energy from waste to produce electricity, heat or gas. The three most common technologies are:



Anaerobic digestion—a biological process (e.g. microbes) used to produce gas from organic waste. The gas can be used in an engine or turbine to generate electricity. Digestate (what is left over from the process) is sent to landfill.

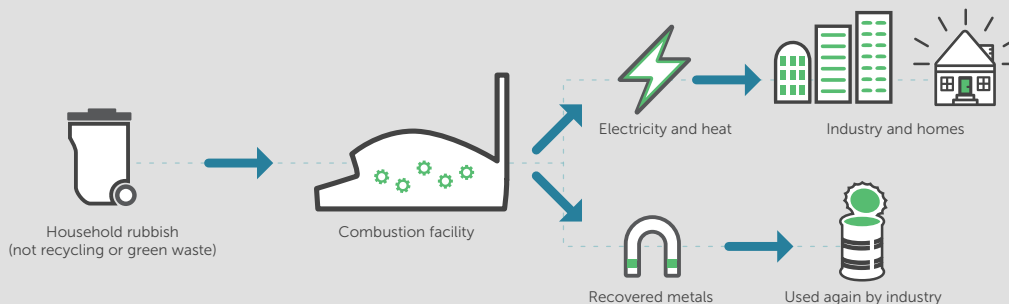


Combustion—waste is burned to produce heat. The heat is used to create steam that turns a turbine to produce electricity. Metals can be extracted from the ash that is left over. Ash and residues are sent to landfill.



Gasification—waste is heated (but not burned) to release gases that can be used in a gas engine or furnace to produce electricity. Metals can be extracted from the ash that is left over. Ash and residues are sent to landfill.

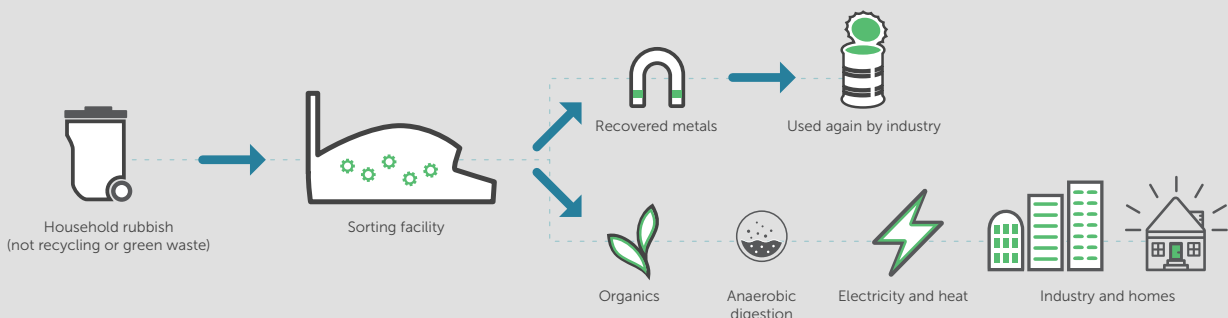
ENERGY AND METALS ARE RECOVERED FROM COMBUSTION



Advanced sorting and separation

Also known as Mechanical Biological Treatment (MBT), advanced sorting and separation extracts hard recyclables (e.g. metals) and then treats the food and garden waste to reduce the amount of organic material that is then sent to landfill. The organic treatment can produce energy (e.g. anaerobic digestion).

ADVANCED SORTING AND SEPARATION



Advanced waste processing in Australia

There are some advanced waste processing solutions already operating in Australia, however there are no facilities that can handle the metropolitan Melbourne quantities of household rubbish. Councils are seeking proposals from businesses to design, build and operate facilities to meet the needs of their local communities.

- The Kwinana Waste to Energy facility will be located in the Kwinana Industrial Area, south of Perth, Western Australia. Co-developed by Macquarie Capital (Australia) Limited and Phoenix Energy Australia Pty Ltd, the project has sourced financing from the private sector and government to build the \$668 million facility. When complete in 2021, the combustion facility will process 400,000 tonnes of residual, commercial and industrial waste each year, and generate enough electricity to power more than 50,000 homes.
- In New South Wales, the recently commissioned Woodlawn MBT facility is able to process 144,000 tonnes of waste a year from six councils. The plant will recycle metals and divert approximately 55% of general waste from landfill.
- German company REMONDIS has announced plans to build a \$400 million waste-to-energy facility in Swanbank, south of Ipswich, Queensland. The proposed plant will process 300,000–500,000 tonnes of waste each year.
- In Victoria, Australian Paper has proposed a large combustion facility in Maryvale to process up to 650,000 tonnes of residual waste as well as commercial and industrial waste. The facility would provide steam and electricity to Australian Paper's Maryvale mill. EPA granted works approval in late 2018, which was amended and resolved in 2019.
- Recovered Energy Australia is proposing to construct a gasification facility in Laverton North, Victoria to process 200,000 tonnes of residual waste each year. A works approval was issued by the EPA in 2019, and a planning permit was issued by the City of Wyndham in 2019.

REGULATED BY EPA

Since 1970, EPA has regulated the operations of industries to prevent harm to the environment and people—industries such as petrol refineries, landfills, abattoirs, chemical manufacturers, power stations and sewage treatment plants.

EPA sets standards that facilities must operate within, and regularly monitors compliance with these standards through reporting and inspections.

Advanced waste processing facilities are also regulated by EPA. Any facility will need to be appropriately located, constructed and operated according to strict regulations that minimise risks to the environment and people.

Benefits of advanced waste processing



Send less waste to landfill



Reduce greenhouse gas emissions



Recover more resources from household waste



Can transform waste into energy to power homes and businesses



Better outcomes for community, economy and environment



Preserve land for better uses than burying waste