

# WASTE AUTHORITY COMMUNICATION ON THE WASTE HIERARCHY



June 2013



# Waste Hierarchy Statement

## FOREWORD



Increasingly I meet Western Australians who are strongly committed to reducing waste, re-using where they can and recycling correctly. They don't always, however, have the knowledge and information they need to maximise the benefit of their waste minimisation efforts.

The waste hierarchy has provided a good basic guide to the behaviours that make the most difference but, as the range of waste disposal options increases, it's become obvious that more detail is needed.

The waste hierarchy and its role in assisting decision making has recently been a focus in the Waste

Authority's discussions with the community about the sorts of waste treatment technologies the State will require to process a projected 9.7 million tonnes of waste by the middle of this century.

It is therefore timely for the Authority to publish its views on the application of the waste hierarchy and to acknowledge that the hierarchy needs to be considered together with other approaches when making decisions about how various wastes should be managed.

Together, the work of the Strategic Waste Infrastructure Planning Working Group and the recent arrival in WA of proponents for thermal waste to energy technologies have prompted discussions about the need for resource recovery to be implemented at the highest point possible in the hierarchy for any given material.

This acknowledges that waste is a resource to be valued for its embodied energy and the opportunity it provides to displace the use of virgin materials, as well as the need for it to be managed with the least environmental impact possible.

I am confident this statement will support discussions on waste treatment applications for all types of waste and that it will remain current with the arrival of new technologies and new markets for recovered materials that emerge over time.

A handwritten signature in blue ink, appearing to read 'M. Geisler', written over a white background.

Marcus Geisler  
CHAIRMAN, WASTE AUTHORITY

## PURPOSE

This document explains the waste hierarchy and how the Waste Authority will apply the hierarchy in its decision making in delivering the waste strategy.

## SUMMARY

The waste hierarchy ranks waste management options in order of their general environmental desirability.

A waste hierarchy is set out in the *Waste Avoidance and Resource Recovery Act 2007* (WARR Act).

This document explains the waste hierarchy and how the Waste Authority will apply the hierarchy in its decision making in delivering the waste strategy.

Various adaptations of the waste hierarchy have been adopted in Australia and internationally. The waste hierarchy set out in the WARR Act is generally consistent with other variants of the waste hierarchy.

The Waste Authority supports the application of the waste hierarchy and considers it a useful guide to assist in decision making. The waste hierarchy is intended to be used alongside other tools (including economic, social and environmental assessment tools) to inform decision making.

No single waste management approach is suitable for managing all waste streams in all circumstances. In order to meet the Waste Authority's objectives, there is a need to use a number of approaches, processes and technologies along different points of the waste hierarchy.



# Context

## Legislation and Policy

The waste hierarchy is enshrined in Section 5(1)(c) of WARR Act as follows:

### 5. Objects of this Act

- (1) The primary objects of this Act are to contribute to sustainability, and the protection of human health and the environment, in Western Australia and the move towards a wastefree society by—
  - (a) promoting the most efficient use of resources, including resource recovery and waste avoidance; and
  - (b) reducing environmental harm, including pollution through waste; and
  - (c) **the consideration of resource management options against the following hierarchy —**
    - (i) **avoidance of unnecessary resource consumption;**
    - (ii) **resource recovery (including reuse, reprocessing, recycling and energy recovery);**
    - (iii) **disposal.**

The WARR Act establishes the Waste Authority and its functions, including a requirement for the Waste Authority to prepare a waste strategy for Western Australia. The Western Australian Waste Strategy *Creating the Right Environment* aims to move Western Australia to a low waste society.

The waste hierarchy is a key principle which supports the Waste Strategy.



# The Waste Hierarchy

## Description

The waste hierarchy ranks waste management options in order of their general environmental desirability, from avoidance as the most preferred option, through various resource recovery options, to the least preferred option of disposal, which in Western Australia is normally landfill (see figure 1).

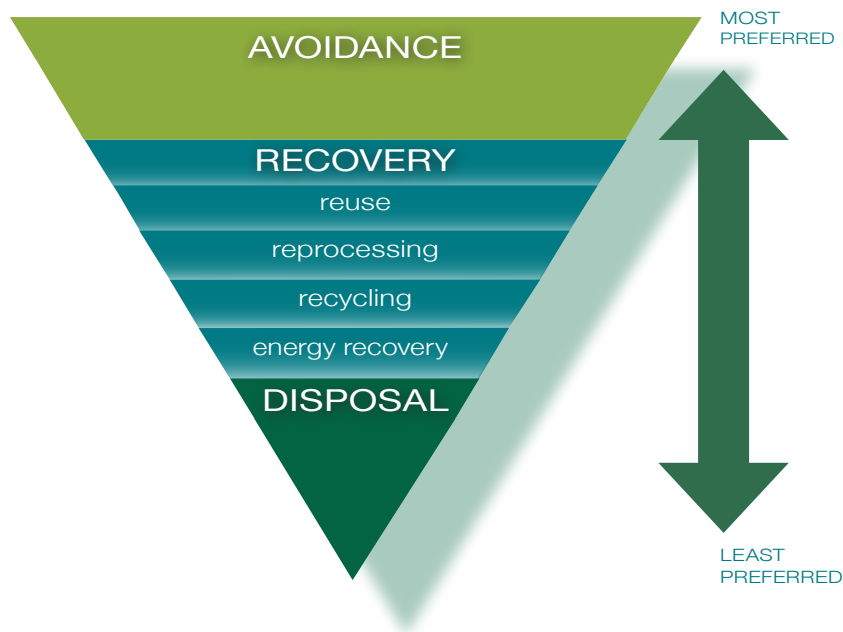


Figure 1 Waste hierarchy based on the WARR Act

The hierarchy is recognised as important in providing guidance on environmental impacts, and is enshrined in legislation in Australian jurisdictions and internationally. The hierarchy is not intended as a standalone assessment tool, rather, it should be used alongside other assessment tools to analyse the full environmental, economic and social impacts of waste management options.

The waste hierarchy is based on life cycle assessment which takes into account the total environmental impacts of different management options, including the direct and indirect impacts of materials use, water and energy.

Options higher up the hierarchy avoid or minimise the generation of waste. This in turn minimises the overall environmental impacts of resource use and waste management.

Resource recovery options in the middle of the hierarchy recover value from materials, thereby offsetting the environmental impacts of extracting and processing raw materials. Resource recovery options have some environmental impacts as a result of the resources used to collect and process materials. However, this option generally delivers a net environmental benefit. Resource recovery also minimises the need for disposal (to landfill).

Options at the bottom of the hierarchy recover the least value from materials and generally deliver the lowest environmental benefit. Options such as landfilling do not recover the value (including materials, and embodied energy and water) embedded in waste. Further, the direct impacts of landfilling can include groundwater contamination (from leachate), greenhouse gas emissions (primarily methane) and risks to community health and amenity.

## Emergence and use

A form of the waste hierarchy was introduced in Article 3 of the 1975 European Council Directive on waste.

Since its emergence, extensive life cycle analysis into the environmental impacts of different waste management options has helped to support the hierarchy. Life cycle analysis analyses the direct and indirect impacts of waste management on air, land and water throughout the life of a product or material.

*Example* The US Environmental Protection Agency compared the net, per-ton energy impacts for source reduction, recycling, combustion and landfilling of 40 different materials and groups of materials and found that managing waste in accord with the waste hierarchy saves energy in nearly all circumstances.

The Waste Authority website provides a bibliography of studies that compare and contrast the environmental impacts of waste management approaches at different points of the waste hierarchy.

The waste hierarchy has been adopted in policy and legislation by jurisdictions in Australia and internationally. For example:

### Australia

The waste hierarchy appears in legislation and policy documents in most Australian jurisdictions and in Australia's National Waste Policy.

### Europe

A waste hierarchy is incorporated into the EU – DIRECTIVE 2008/98/EC on waste.

### USA

A number of US states have a waste hierarchy within their statutes; Environmental Protection Agency policy documents refer to the waste hierarchy.

### OECD

The Organisation for Economic Cooperation and Development (OECD) Council Recommendation on Resource Productivity includes a waste hierarchy.

*Appendix 1 provides a list of examples of legislative and policy instruments that refer to and are supported by a waste hierarchy.*

## Waste Hierarchy options

This section explains each option in the waste hierarchy.

### AVOIDANCE

Avoidance refers to the prevention or reduction of waste generation, or the prevention or reduction of the environmental impacts (eg. toxicity) of waste generation.

Waste avoidance prevents substances, materials or products becoming waste. Waste avoidance is the most preferred option in the waste hierarchy, and can include the following.

Avoidance	Example
Improving the efficiency of production processes.	Developments in packaging design and manufacture to reduce material inputs are a form of avoidance.
Substituting a product or raw material with a less environmentally damaging product or raw material.	The move away from the use of lead in petrol is a form of avoidance.

### RECOVERY

Recovery refers to a number of actions (including mechanical, thermal, biological, or chemical) that recover all or some of the materials that may otherwise be disposed. Recovery options include the following.

#### *Reuse*

Reuse refers to using a material or item again. Reuse is the most preferable form of recovery because it requires no (or minimal) resources and therefore has no (or minimal) environmental impact. Reuse can include the following.

Reuse	Example
Reusing an item in its original form for its original purpose.	Using second hand items is a form of reuse.
Reusing an item in its original form for a new purpose (also referred to as 're-purposing').	Using railway sleepers for garden beds is a form of reuse.
Replacing disposal items with items that can be re-used.	Using reusable rather than disposable nappies is a form of reuse.

### Reprocessing

Reprocessing refers to using an item or material that might otherwise become waste during the manufacturing or remanufacturing process. It may include actions both pre and post consumption. Reprocessing can include the following.

Reprocessing	Example
Using materials that would otherwise become waste during the production process (pre consumer).	Using off cuts of plasterboard in the production process is a form of pre consumer reprocessing.
Remanufacturing or refurbishing of items to extend their useful life (post consumer).	Retreading a used tyre is a form of post consumer reprocessing.

### Recycling

Recycling refers to using recovered waste materials as substitutes for extracted raw materials. Recycling involves taking 'waste' materials or products and reconstituting those wastes into materials that have a market value. Recycling can include the following.

Recycling	Example
Converting 'waste' materials back into raw materials for use in new products.	Using materials collected from recycling bins for sorting and sale to commodities markets as inputs for new products is a form of recycling.

### Energy Recovery

Energy recovery refers to the process of converting waste products into some form of energy. It can include:

- thermal treatment, which uses heat to release energy bound in waste or
- biological treatment which uses biological processes to convert biodegradable waste into a biogas which is rich in methane

Energy recovery can include the following.

Energy Recovery	Example
Energy recovery from thermal treatment.	A thermal waste to energy plant which produces electricity, steam and/or heat is a form of energy recovery.
Energy recovery from biological treatment.	An anaerobic digestion plant which produces a methane rich biogas used to generate electricity or heat (when combusted) is a form of energy recovery.

**Note:** See the Waste Authority position statement for more information on Waste to Energy.

## DISPOSAL

Disposal refers to the discharge of waste into the environment, either into landfill or another disposal route. Disposal is the least preferred option in the waste hierarchy.



# Waste Authority Application of the Waste Hierarchy

A waste hierarchy is set out in the WARR Act and the Waste Authority supports its application.

The Waste Authority

- recognises that the waste hierarchy should be used alongside other assessment tools to help guide decision making
- will use the waste hierarchy to help guide decisions to support the delivery of the waste strategy and targets
- recognises that a range of different waste management options will be required to deliver the waste strategy and targets
- recognises that Western Australia has particular characteristics that impact on the feasibility of waste management options across the state, and that preferred options will be ultimately determined according to an overall net benefit.

The Waste Authority strongly supports source separation as a way of supporting the application of the waste hierarchy. Separation of materials in the waste stream at source significantly improves the opportunity to extract the maximum value from each material (source separation includes co-mingled recycling collections).

## Conclusion

The waste hierarchy is an important and internationally recognised tool to help understand waste management options in order of their general environmental desirability.

A waste hierarchy is set out in Western Australia's WARR Act. This document aims to assist in understanding the hierarchy by explaining its intended purpose, describing with examples, each of the options, and explaining how the Waste Authority intends to use the hierarchy to help guide decision making.

The hierarchy provides guidance for decision makers. It is not intended as a standalone decision making tool, but instead should be used alongside tools to analyse the full environmental, economic and social impacts of waste management options.

The Waste Authority will use the waste hierarchy alongside other tools to support its decision making in delivering Western Australia's Waste Strategy.

## Appendix 1

### Examples of legislative and policy instruments that refer to and are supported by a waste hierarchy

#### International Agreements

Organization for Economic Cooperation and Development (OECD), Recommendation of the Council on Resource Productivity (28 March 2008)

#### Australia

NSW: *Waste Avoidance and Resource Recovery Act 2001*

QLD: *Waste Reduction and Recycling Act 2011*

SA: *Zero Waste SA Act 2004*

Environment Protection (Waste to Resources) Policy 2010

Vic: *Environment Protection Act 1970*

Tas: The Tasmanian Waste and Resource Management Strategy

WA: *Waste Avoidance and Resource Recovery Act 2007*

#### European Union

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste. European Parliament, Council. (1975). Council Directive of 15 July 1975 on waste

#### USA

Maine - Title 38, Chapter 24: SOLID WASTE MANAGEMENT AND RECYCLING