5 MINUTE GUIDE

Matching water and purpose

This 5 Minute Guide assists in matching water and purpose. It can be difficult to know the impact of alternative water on operating equipment and the quality of water required, even the risks to staff, product quality and productivity. Risks can include infectious disease, contamination, reduced product quality, to name a few.

High quality drinking water may not always be required for industrial or other processing purposes. Sometimes water can be reused, again and again instead of single pass usage. It is important to know when and how to reuse water and to match it correctly so it is fit for its intended use.

The cheapest to most expensive water saving actions are usually in the order of:

1. Avoid use
2. Reduce use
3. Reuse
4. Recycle

Many of the initiatives identified in this guide will fit into the reuse category and the costs incurred will be the re-routing of water flows around the plant.

'Fit for purpose'

'Fit for purpose' is matching water of a certain quality to appropriate uses. For example recycled water from machines might be coloured and contain magnesium salts which are fine for use in one process, but not for use in another, e.g. this water may suit irrigation but not cooling towers.

The best official guides for the use of recycled water are EPA Victoria's *Industrial Water Reuse Guidelines (Publication IWRG632 — June 2009) and the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (NRMMC 2006).*

Sources and potential end use of 'fit for purpose' water

There are many sources and uses for fit for purpose water. The table opposite details these and includes ideas to use as a starting point and a confirmation of what can be used where.

Sources of fit for purpose water can include:

- ✓ Rainwater
- ✓ Stormwater
- ✓ Cooling tower blow down
- ✓ Boiler blow down
- ✓ Steam trap condensate
- ✓ Clean in Place (CIP) rinses
- ✓ Pump seal water
- ✓ Acoustic water (water that is used for insulation purposes)
- ✓ Fire water testing
- ✓ Grey water from washing
- ✓ Local recycled water schemes
- ✓ Local/neighbour trade waste streams
- ✓ Product 'wastewater'

Areas where fit for purpose water may be suitable include:

- Cooling towers
- Wash down
- Toilet flushing
- Irrigation
- Low grade product
- Fire water testing
- Clean in Place (CIP) first rinses

Other opportunities exist offsite and these can include:

- Sharing across boundaries
- Dust suppression
- Cement making
- Local park or sporting field irrigation

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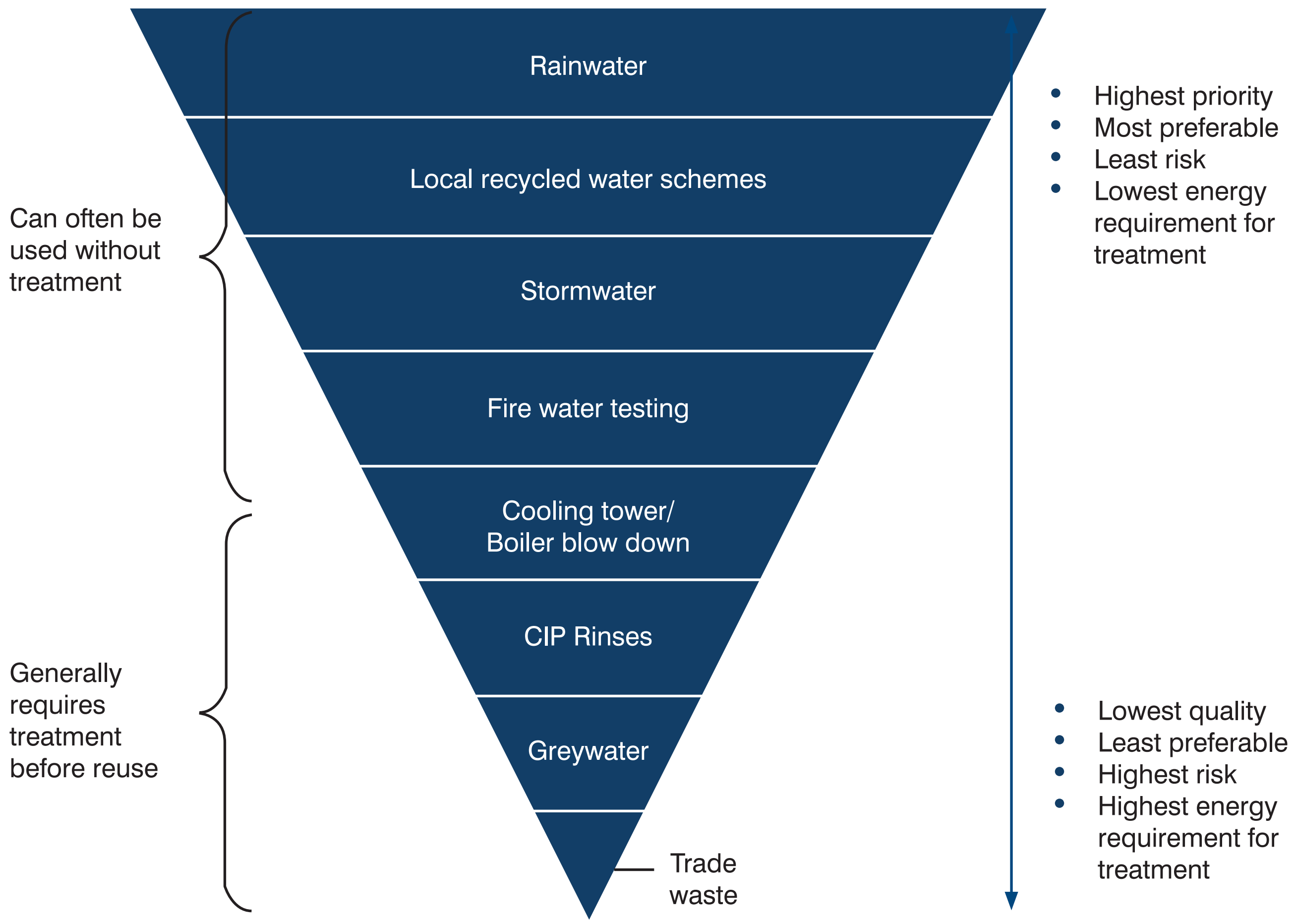
Quality and quantity queries

Rainwater, stormwater, industrial wastewater, and other non-potable waters will vary significantly in quality, quantity and reliability. It is very important to understand the risks of each water stream when selecting fit for purpose water for use.

Fig.1 below details an indicative hierarchy of water quality from best to worst. This is not prescriptive to all waters but can be used as a guide for expected quality of water.

Fig.1 Water Quality Prism



“The cheapest to most expensive water saving actions are usually; **Avoid use, Reduce use, Reuse, and Recycle.**”

14 Key Steps to identifying Potential End Uses

There are 14 key steps to identifying and implementing the replacement of potable water with fit for purpose water:

1. Record all the areas, processes and procedures where water is used around the plant
2. Ensure the waste hierarchy has been followed, including measures to avoid and reduce first. This could include closing cooling loops rather than a single use of the water before disposal. (e.g. once through heat exchangers)
3. Brainstorm with colleagues those areas where potable water could be replaced with fit for purpose water
4. Determine the total volume and quality (testing may be necessary) of fit for purpose water which is required (also known as the 'non-potable demand')
5. Remember to include seasonal variations for major items and the variable volumes
6. Investigate the site for water which is currently used and discharged to trade waste which might be suitable for reuse
7. Determine the volumes and quality of water which may be available for reuse. Include rainwater that can be harvested from roof areas. (If there is not a rain gauge rainfall data can be found at http://reg.bom.gov.au/climate/averages)
8. Compare the potential supply volumes and quality with the non-potable demand for water
9. Determine the quality requirements for each end use, for example, chlorine can affect the quality of product in plasterboard production
10. Figure out the infrastructure requirements for use of fit for purpose water, e.g. pipes, pumps, extra storage and treatment
11. Prepare a business case. Be sure to look at the overall impact of reuse of fit for purpose water including energy, chemicals, raw water savings, trade waste, staff handling procedures, reputation and community acceptance.
12. Assess the risks of using fit for purpose water; it may be useful to involve a third party to confirm the facts and plan
13. Implement and deliver infrastructure required for fit for purpose water
14. Measure and communicate success. Fit for purpose water offers a great marketing opportunity to promote environmental initiatives with staff, community, customers, local media and more.

Success Story

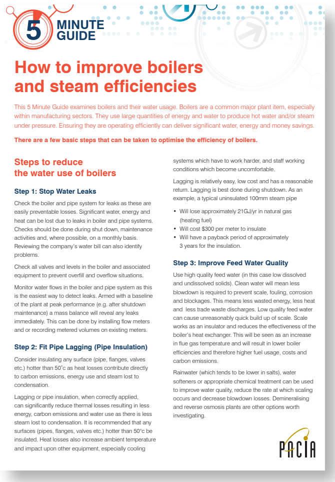
1. Dow Chemicals produces desalinated water for the boiler with a reverse osmosis plant. "The plant produces two streams, the high quality desalinated water and a more concentrated reject stream. Dow have been able to supplement their cooling tower feed water with the reject stream thereby replacing some of their potable water use. The volume of potable water replaced is estimated to be in the order of 35Ml/yr. Typically this reject stream would be considered a waste and discharged to trade waste; however, by utilising this fit for purpose water they are able to reduce their demand on potable water and trade waste impact."

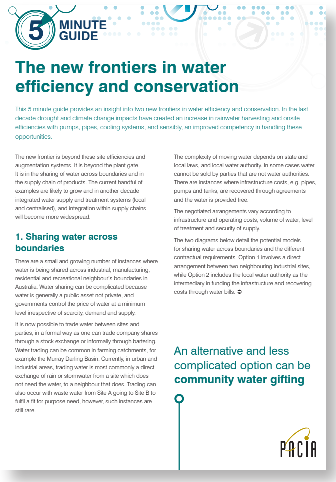
Further reading

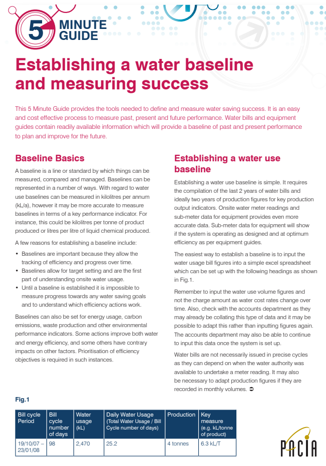
O'Neill, M and Lambert, D (2010) *"Water resource efficiency and cleaner production"* Australian Master Environment Guide, CCH Publishing, Sydney

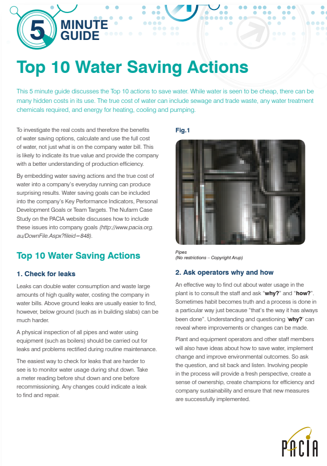
5 MINUTE GUIDE SERIES

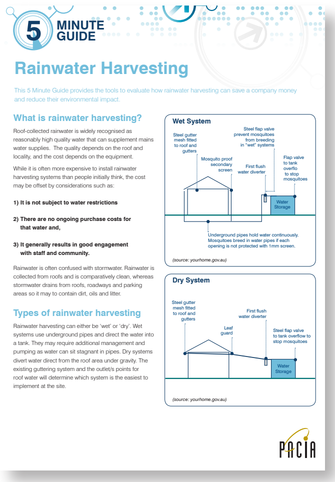
There are 9 titles in the 5 Minute Guide series. See also:

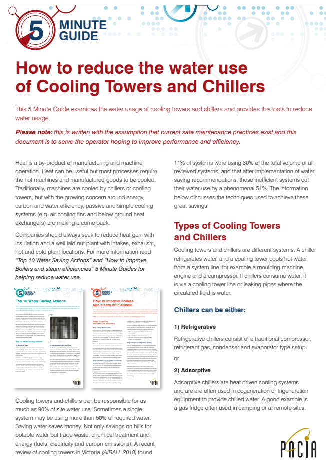












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