



WATER SERVICES
ASSOCIATION OF AUSTRALIA



SUMMARY

ALL OPTIONS ON THE TABLE

LESSONS FROM
THE JOURNEYS
OF OTHERS

INSIGHTS AND PERSPECTIVES
REGARDING COMMUNITY
ENGAGEMENT ON PURIFIED
RECYCLED WATER
AROUND THE WORLD





SINGAPORE

SAN DIEGO

All options on the table FOREWORD



In Australia, we keep a close eye on global water industry evolutions. Technical innovations, policy shifts or regulatory changes for water supply security in the UK, US or Singapore (to name a few), can often become the next wave of change here. At the Water Services Association of Australia (WSAA), we emphasise that no single water supply solution is right for all situations.

Rather, diversification itself is critical. Good water industry planning means having all options on the table for consideration, including purified recycled water alongside desalination, water efficiency, dams and recycling for non-drinking purposes.

This is not a new concept – many voices in the water supply conversation have expressed similar views, either in commentary or in formal policy. In 2008, the Council of Australian Governments (COAG) adopted the National Water Initiative Urban Water Planning Principles. In particular ‘Principle 5; consider the full portfolio of water supply and demand options’ notes that options could include ‘...manufactured water sources (such as recycling and /or desalination), where appropriate.’

These principles, endorsed by all Australian governments, remain in place today. They were reinforced by the Productivity Commission in its 2017 National Water Reform report and more recently Infrastructure. Recently, Infrastructure Australia stated that ‘Ensuring all options are on the table, and can be deployed when required, is likely to be essential for governments and operators to effectively and efficiently ensure secure supply over the long term.’

It is in this context that we have prepared this insights report for our utility members. Purifying recycled water for drinking is becoming commonplace across the globe. Some 35 cities now rely on it (many for decades), and many more are looking at it.



These schemes span every continent, especially the US. It may form part of the solution to water supply needs in a range of contexts and every city or town that does it has its own unique circumstances. For most, a key driver is the need to expand local supply to meet customer demand in a context of urban growth, increased water scarcity and climate uncertainty.

The Australian community have already come on many journeys with the water industry as it crosses new frontiers. Dams, desalination, water efficiency and recycling for non-drinking uses are now common, and pathways for exploring community acceptance of them are relatively well documented. One of WSAA's focus areas is to foster the exchange of information among our members on education, research, and matters of common interest. Purified recycled water is such a topic, especially as it has had a chequered history in Australia. Even the best name for it is still unclear; different words may resonate better with different audiences. The language will evolve as we better understand how communities prefer to describe their water sources.

With this report, we are not advocating specifically for purified recycled water as the way forward for any city. That will depend on many factors. In most Australian cities apart from Perth, no decisions have been made to pursue purified recycled water as a drinking water source.

But amid the increasing focus on the circular economy, it may emerge as a potential drinking water supply option. Our goal is to lead advocacy efforts so that it receives fair consideration, without being unduly dismissed due to lack of information, preconceptions or stigma reactions.

**Diversification is critical;
good water industry planning
means having all options on
the table for consideration.**

This report aims to assist our members in considering engagement strategies around it, if appropriate. There is much to be learned from the journeys of others. This is not directly drought related – in fact it tends to be part of long-term supply planning instead. However, the current dry record conditions in some parts of Australia mean the community is focused on water, which can be a good time for conversations about long-term supply options. And if we can do so in a collaborative manner, in a common language that our customers understand, we are off to a good start.

We hope this report is of value to utilities and of interest to a broad range of stakeholders.

Adam Lovell
EXECUTIVE DIRECTOR



Executive summary

All water on Earth is used and reused, in an endless cycle that has repeated ever since people settled around rivers. Water recycling happens daily, when a community's used water is treated then discharged into rivers, oceans and water bodies everywhere; along with industrial pollution, stormwater and agricultural runoff.

Anyone living in a community that is downstream of another community, is reusing water from the upstream town. Well known examples include the River Thames in England, the Mississippi and Colorado rivers in the USA and the Murray-Darling in Australia. The well used phrase about water going through 'seven sets of kidneys', is simply a reflection of the water cycle.

Throughout this cycle, the water molecule remains pure; water treatment technology removes impurities that have attached to it, allowing communities to reclaim water rather than discard it. Regardless of their configuration, all modern schemes are designed to meet stringent treatment, monitoring and performance standards, with advanced safety and monitoring measures built in to protect against error.

The water industry has long struggled to know how much to talk about recycling in the water cycle. In modern life, less is known about the realities of wastewater treatment, as used water disappears down a drain, or is flushed away and forgotten. With limited visibility of most stages of the urban water cycle, community understanding has reduced and people tend to think of water usage as a linear process – water is received, used once and then disposed of once dirty.

Governments establish regulatory frameworks to ensure communities have reliable water and sanitation services, to appropriate standards. And the water industry complies, treating the full range of pollutants that exist in raw water. Because the treatment systems address them all, there is no technical or regulatory driver to single out wastewater above any other pollutant; nor to communicate about it in isolation. The consequence of not making a fuss about something quite unremarkable, is that many in the community are unaware that this recycling occurs.

In this context, purified recycled water schemes are often perceived as a recent innovation. In fact, unacknowledged recycling has always happened. Formal, planned schemes to purify recycled water for drinking began in the 1960s and are now becoming mainstream across the USA, Singapore, parts of Africa, Australia and Europe. Many produce cleaner water than standard drinking water schemes. Drivers for adopting it typically include resilience to climate change, rainfall independence, drought, strategic objectives like reducing reliance on imported water, cost, and managing wastewater nutrient disposal. Some 35 cities around the world have determined that it is an efficient, safe and sustainable component of their water supply.



WSAA emphasises that no decisions have been made about purified recycled water in most Australian states, apart from Perth. This report is not being driven by governments or utilities. It does not reflect the view of any individual utility; it reflects a topic of broad industry interest. With continued long-term climate change affecting water supply, and less reliable rainfall, it is simply appropriate to consider purified recycled water among other drinking water supply options as part of a robust planning process. This report is part of such general consideration and planning.

In 2017, the Productivity Commission was asked to undertake an inquiry into the reform of Australia's water resources sector. Recommendation 6.1 of the report called for State and Territory government to consider all options fully and transparently, including both centralised and decentralised approaches (including indirect and direct potable reuse and reuse of stormwater). In April 2019 the Australian Government responded, stating that 'The Australian Government supports this recommendation, noting implementation is a matter for relevant states and territories.'

In August 2019, in its Australian Infrastructure Audit 2019 report, Infrastructure Australia stated that 'Ensuring all options are on the table, and can be deployed when required, is likely to be essential for governments and operators to effectively and efficiently ensure secure supply over the long term.' They also noted that recycled water for potable reuse is typically less costly to produce than desalinated water, and that direct potable reuse could provide an additional non rainfall-dependent water resource that is cheaper to produce than desalination and a more flexible part of water networks than decentralised schemes.

Community engagement and support is important for any water supply proposal, and a fundamental part of good water industry operations. Achieving WSAA customer research of almost 9,000 people conducted in late 2017 showed acceptance of different water sources for drinking varies across demographics and regions. Higher acceptance levels of recycled water for drinking were found in Perth and Brisbane suggesting communication and awareness increases acceptance. Lower levels of support were found in regions where there has not been any significant public discussion about purified recycled water for drinking. Research by the Cooperative Research Centre for Water Sensitive Cities into Australians' water literacy revealed only 24 per cent of people surveyed had a clear understanding of the water cycle. Only a minority had knowledge about wastewater and stormwater treatment.

Community support can be a particular challenge for purified recycled water, more because of the 'yuck factor' than any technical aspects. Community education and engagement for purified recycled water has evolved significantly over recent decades; this report explores this fascinating field. A vast body of quality research has been done; this report only scratches the surface of that research.

What has been learned along the way, through research and experience, is that:

- Certain words and images cause negative or 'stigma' reactions
- It is very hard, but not impossible, to overcome these connotations once lodged
- Media and critics tend to focus on such terms and images, and can fixate on wastewater, because of its connotations; rather than on water's quality after treatment
- The best approach is to prevent stigma arising in the first place, by providing information about the urban water cycle context – that all water is used and reused, and purifying recycled water just speeds up this natural process – early on and through engaging, imaginative communications
- This can help to 'inoculate' against stigma reactions, and prompt rational judgement of any potential concerns (whether legitimate or 'scare campaigns') that may arise.

Clearly, terminology is a complex but critical aspect. Different words may resonate better with different communities. In this report WSAA predominantly uses purified recycled water, however you will also see the terms potable, indirect and direct reuse and purified recycled water for drinking as we reflect the many different terms being used around the world. The language we adopt will evolve as we come to better understand how different communities prefer to describe drinking water sources.

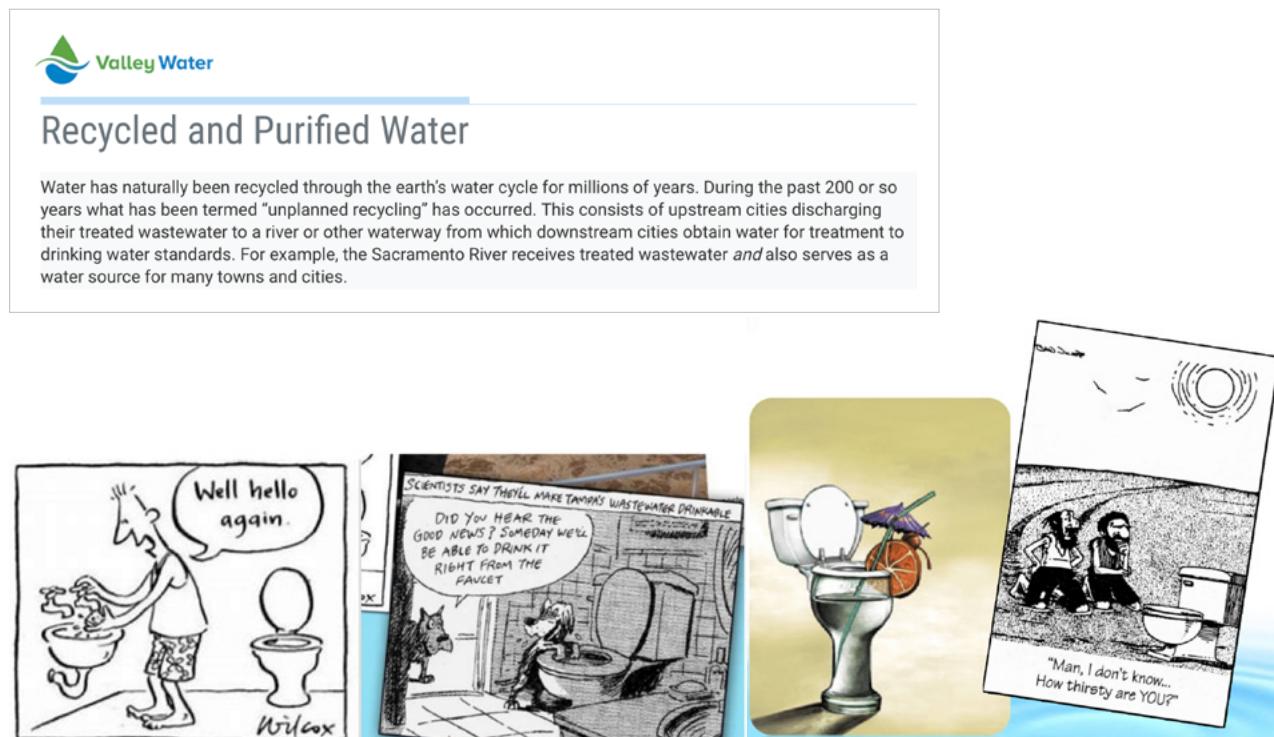
On a similar vein, it is now increasingly accepted that certain forms of purification tend to be favoured through terminology – for example, schemes configured around 'environmental buffers' like rivers, tend to be filled with 'natural' connotations. There is also a range of definitions for different forms, like 'direct' and 'indirect,' so much so that there is now a compelling push to dispense with such terms. WSAA agrees and proposes to use the current Californian definitions (groundwater augmentation, river water augmentation, raw water augmentation or treated water augmentation).

This report considers ten case studies from around the world, each with its own unique circumstances. There is no 'recipe' to achieve community acceptance of purified recycled water. Nonetheless, some common themes do emerge. An essential element underpinning all efforts, is collaboration. While the water utility often develops a proposal for purifying recycled water and leads the engagement around it, it rarely happens in isolation. Good working relationships between utilities, their customers, communities, governments, regulators and interest groups, are essential for robust consideration and an informed engagement process.

WSAA has identified ten key lessons from the journeys of others, and 34 actions. The ten lessons outline key learnings from the case studies and include recommended actions. The lessons and actions cover themes of education and awareness building, the importance of planning, the role of media and importantly engagement with regulators and government.

FIGURE 2

Information about recycling in the natural water cycle, on the Santa Clara Valley Water District website.





Timeline and maps

Figures 5, 6 and 7 show purified recycled water for drinking around the world. Interest in it as a supply source is growing rapidly.

Projects are not always easy to categorise; this map does not include places in the demonstration or study phase, which can be added to the map when they decide to implement it on a large scale. It also does not include the many places all around the world where unacknowledged recycling occurs.

For regularly updated information, the Global Connections Map available on WSA's Water 360 platform or the Water Reuse Association's website, provides case studies and videos.

Developing these maps is a complex exercise as places can move along the spectrum quickly. It is not always easy to categorise the status because:

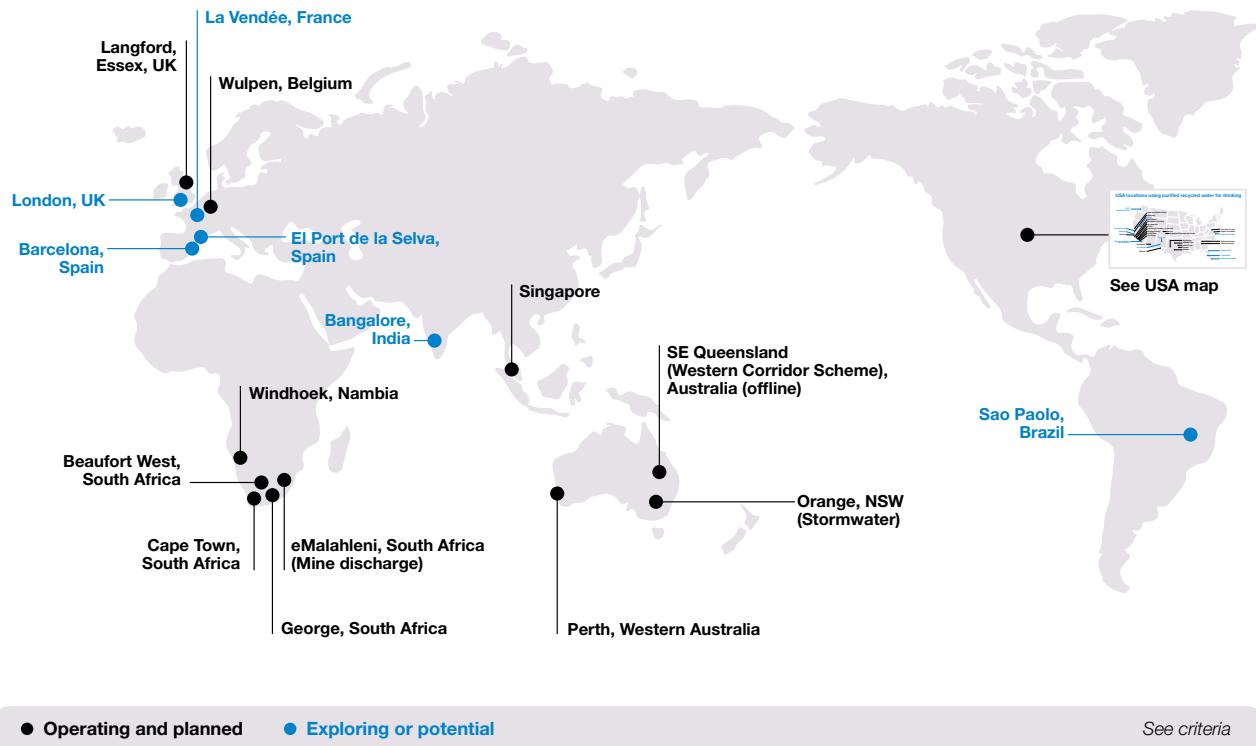
- There can be confusion in source documents between the name of the water district, the project, and the area it services.
- Some places investigate purified recycled water for drinking, or build a demonstration facility, but go no further for various reasons such as budget and weather.
- Other places built schemes, but they are not currently turned on (South East Queensland).
- Some maps show places with recycling for non-drinking purposes, as well as for drinking.
- Some places use a different type of source than wastewater, such as Orange NSW (stormwater).

These maps reflect WSA's research as at September 2019. On this map, 'operating and planned' includes places where planned schemes already form part of the drinking water supply, or are confirmed to do so in future. 'Exploring or potential' includes places in the demonstration or study phase; it does not include places only doing marketing campaigns such as beer made from purified recycled water. This map also does not include the many places where unacknowledged reuse occurs.

FIGURES 5, 6

Purified recycled water schemes around the world. For ease of presentation, schemes are listed by the city in which the scheme is based, not their full operating area or utility name.

Global locations using purified recycled water for drinking



USA locations using purified recycled water for drinking

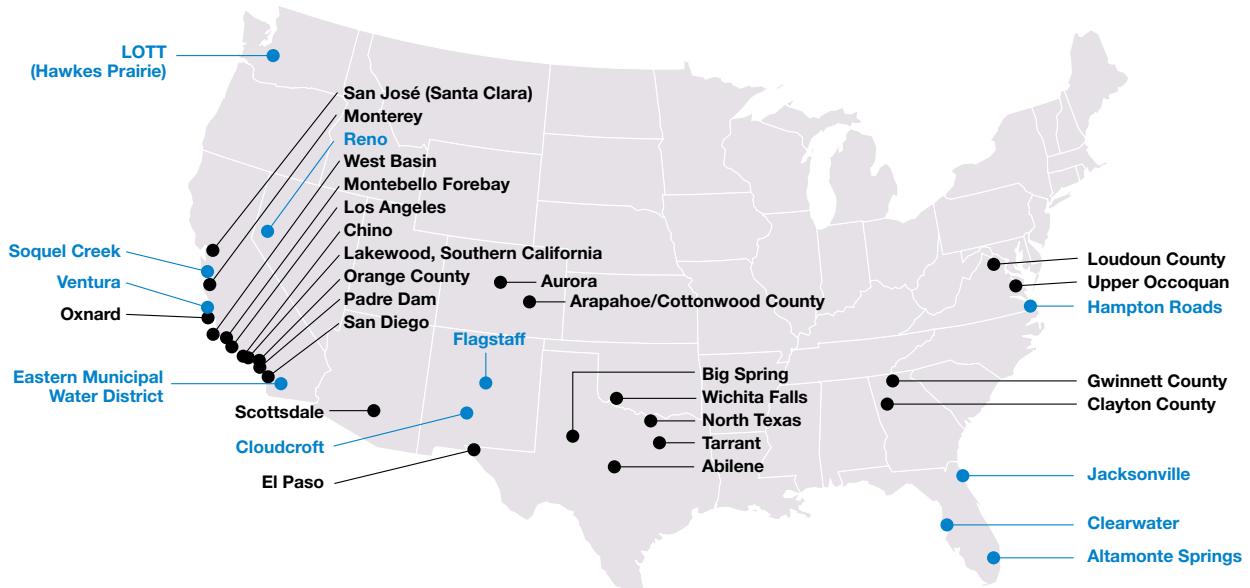


FIGURE 7

Evolution of purified recycled water around the world, also showing how key research began to inform community engagement. For ease of presentation, schemes are listed by the city in which the scheme is based, not their full operating area or utility name.



Timeline: Evolution of purified recycled water for drinking around the world

Key Research



2008

Community Views on Recycled Water – the Impact of Information (Roseth - CRCWQT)

2010

The effect of information on public acceptance: The case of water from alternative sources (Dolnicar, Hurlimann, Nghiem - UOW)

2011

Talking About Water (Macpherson, Slovic - WRRF)

2011

The Big Thirst (Fishman)

2013

Downstream: Context, Understanding, Acceptance (Macpherson, Snyder - WRRF)

2017

Potable Reuse: Guidance for Producing Safe Drinking Water (WHO)

● Treated Water Augmentation

● Raw Water Augmentation

● Reservoir Augmentation

● Groundwater Augmentation

All schemes are required to meet health and safety standards

Lessons from the journeys of others

LESSON 1

It can be done

Communities around the world have implemented purified recycled water schemes for decades. It could be successfully implemented in Australia, if circumstances warrant.

- The three 'T's:
- Trust
 - Transparency
 - Time

LESSON 2

Trust is critical for securing support for purified recycled water

Transparency and open information sharing will help to develop and maintain this trust.

LESSON 3

Establishing purified recycled water is complex and takes time

It takes time – up to a decade. People need to be taken on a journey to be comfortable with it. Rushing or imposing deadlines increases the risk of rejection or backlash.

LESSON 4

Seeing is believing

Investing in a demonstration plant, visitor centre and tour program for 'place based learning' will greatly improve community understanding and support. It can showcase and prove the reliability of the technology, and pre-empt stigma reactions through calm, engaging learning environments.

The experience should be carefully crafted with sequenced messaging to build overall awareness and understanding, and may include sampling the water.

LESSON 5

Wording and imagery are critical

This will be somewhat specific for each community, so local research is important. Choose words and branding that resonate and do not alienate. Technical jargon confuses people and doesn't build trust.

LESSON 6

News media coverage has a profound impact on public acceptance

It can make or break a scheme. Proactively engaging key influencers and the media, leveraging social media, and using expert testimony and third party advocacy can help build trust and transparency.

'Water should be judged by its quality and not its history.'

Lucas van Vuuren,
South Africa

LESSON 7

Political support is essential

Political cycles can polarise an issue, and force people to take a side. Good engagement across the full political spectrum, to gain and keep support, is critical.

LESSON 8

Grass roots education and engagement

Can be more effective than high profile marketing activity or 'above the line' presence.

LESSON 9

General education around the urban water cycle and context

Will help prevent stigma and encourage acceptance. Provide information on the range of long-term supply options, climate trends and cost.

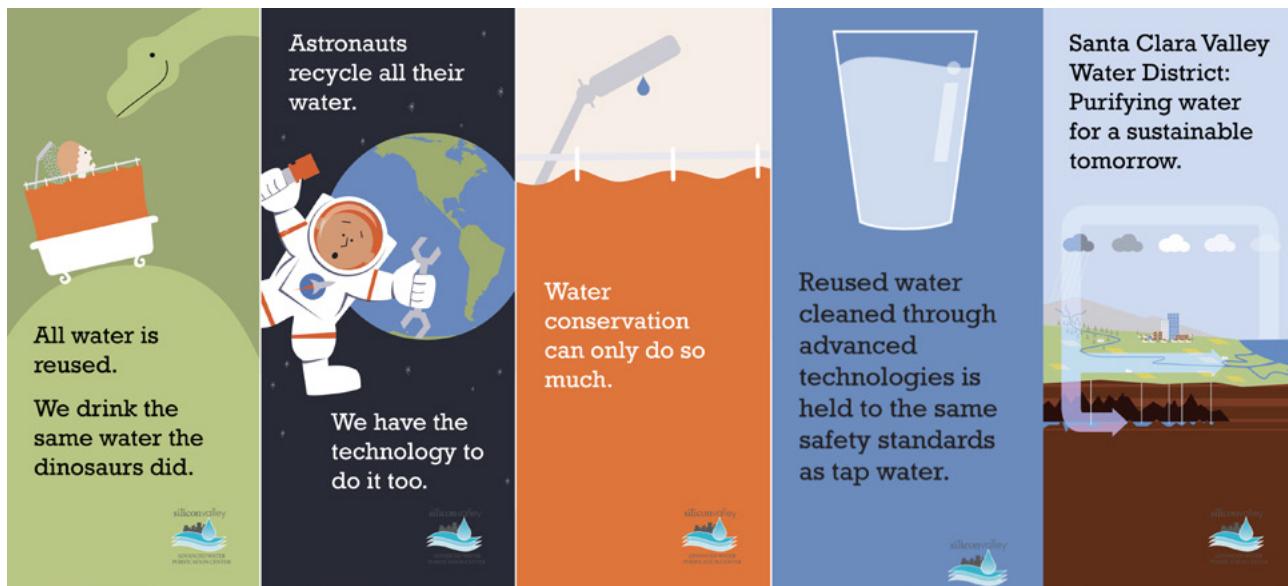
LESSON 10

Regulators play a powerful role

They will lead government and community perception, and have the authority to determine whether purified recycled water can proceed. It is their role to take a conservative approach to risk management, so it may take a long time for them to become comfortable and produce a regulatory framework. Good regulatory engagement, and high transparency, are essential.

FIGURE 3

'Think and Drink' banners in the Santa Clara Valley Water District visitor space (Courtesy of Linda Macpherson).



Actions

All the actions have potential value and are intertwined, but WSAA believes that one stands out as the most important to begin now:

To start (or increase) providing information about the existing recycling that occurs within the urban water cycle.

Focusing education programs and materials around water as a cycle, encompassing the total urban landscape and the people who live there, can build knowledge and understanding within the community. This will lay the groundwork and help the community participate in informed discussions about future water supply options down the track – whether or not purified recycled water is proposed as one of those options.



TABLE 1

Recommended actions BASED ON LESSONS FROM THE JOURNEYS OF OTHERS

| GENERAL EDUCATION AND AWARENESS BUILDING | PLANNING |
|---|---|
| <p>1.1 Make purified recycled water familiar by showing it is widespread around the world. Some 35 cities use it as part of their drinking water supply, and more are looking at it. Use a map like Figure 1, or the Global Connections Map.</p> <p>1.2 Access available information, and take media and opinion leaders for site visits, to Perth's groundwater replenishment scheme, NEWater in Singapore or other schemes. Arrange presentations by staff from SEQwater in relation to the Western Corridor Scheme. Engage with other Australian cities about their experience, views, learnings and consideration of purified recycled water.</p> <p>3.3 Explain the benefits of purified recycled water. Acceptance will depend on the perceived need, drivers and benefits.</p> <p>8.2 Develop a list of opportunities for grass roots engagement, such as community events, fairs, markets, Rotary and Lions clubs. Train staff in messaging and language.</p> <p>9.1 Invest in engaging, interactive, and easy to digest video footage and other materials and activities. WSAA has a range of video resources available in the Water 360 database.</p> <p>9.2 Build information on the urban water cycle including the unacknowledged recycling that happens everywhere, including in Australia, into ongoing education activities. This may include maps and animations of upstream discharges and downstream communities. Showcase that water treatment, and not water source, protects public health.</p> | <p>2.1 Develop an engagement plan to approach decision-makers, with key messages, data, costs and terminology. Include a community education and engagement plan centered on building trust in purified recycled water. Plan timeframes and implementation pathways.</p> <p>2.2 As part of the above, identify key influencers and target them early and often. For example, medical representative groups such as the state branch of the Australian Medical Association, Public Health/Health Consumers Council, GP associations; CSIRO; academics; representatives of culturally and linguistically diverse groups; environmental organisations; interest groups. The position of these groups will influence individuals and their members, so provide initial and ongoing briefings, answering all enquiries.</p> <p>2.3 Prepare a transition strategy for moving from any existing forms of recycling, to purifying recycled water for drinking, if it is warranted in future.</p> |
| | <p>3.1 Start education and engagement work early – education should precede consultation. Education about the urban water cycle – including the unacknowledged reuse that happens everywhere, including in Australia – is essential to understanding the importance of purified recycled water as a drinking water supply option.</p> <p>3.2 Map out appropriate goals and milestones that would test and measure progress towards community understanding and acceptance. Identify threshold indicators for moving forward. This may be quite incremental.</p> |
| <p>GOVERNMENT</p> <p>7.1 Brief Ministers, local Members of Parliament and advisers from all levels of government, and all parties.</p> <p>7.2 Arrange educational tours to visit other schemes if appropriate. Perth's groundwater replenishment scheme and SEQ's Western Corridor Scheme are good choices being in Australia. Reservoir augmentation schemes would also be worthwhile such as San Diego, Singapore.</p> | <p>4.1 Explore options for a demonstration plant and/or visitor centre, to demonstrate purified recycled water in action, showcase the technology, the results, the product, and provide a space for calm consideration. Bring together science and engineering in a fun and engaging way – create a new way to see, hear and interpret scientific data.</p> |

| | |
|--|--|
| <h3>PLANNING CONTINUED</h3> | <h3>INTERNAL</h3> |
| <p>5.1 Develop a local glossary. Leverage examples like Perth and California, refine it through local research. Use terms that are precise, simple, clear, and not overlapping. Research shows that the general public mainly wants to know what water can be used for safely, not where it came from or exactly how it was treated; though it is important to make that information available.</p> | <p>8.5 Start by educating water staff, who can be key ambassadors and/or may need time to become familiar with a step-change in policy.</p> |
| <p>5.2 Build up local insights: Use the results for the Australian cohorts of Downstream and the Talking About Water. Also, research relevant local media coverage of purified recycled water.</p> | <h3>REGULATORY</h3> |
| <p>5.3 Review and update the marketing collateral, signage and terminology at water industry sites to align with learnings from research.</p> | <p>10.1 Maintain strong relationships with health, environmental and pricing regulators.</p> <p>10.2 Encourage regulators in different jurisdictions to liaise and share learnings.</p> <p>10.3 Begin preliminary consideration of what a local regulatory framework for purified recycled water for drinking might look like.</p> <p>10.4 Engage with regulators now to understand their resourcing, governance and information needs, and their current views.</p> |
| <p>8.1 Develop a stakeholder matrix for prioritising education activities, leveraging resources produced by the Australian Water Recycling Centre of Excellence.</p> | <h3>MEDIA</h3> |
| <p>8.3 Identify potential advocates (and critics) from different fields, including within government.</p> | <p>6.1 Prepare a response plan for proactive and reactive media coverage or issues.</p> |
| <p>9.3 Develop robust information about purified recycled water and other supply options, such as cost, energy, climate independence and environmental impact.</p> | <p>6.2 Have credible spokespeople and third party advocates available to comment if warranted. This may involve them entering media discussion at short notice, so advance preparation is valuable.</p> |
| <h3>APPROACH AND BEHAVIOURS</h3> | <p>6.3 Develop detailed Frequently Asked Questions. WSAA's Water 360 database has materials that can be leveraged.</p> |
| <p>2.4 Directly involve those who do not support purified recycled water, and never demonise their views. Inform, don't coerce. Show thought leadership but be accepting of the differing views of others, to avoid polarising the debate. Genuinely listen to concerns raised; two-way communication will build mutual trust. Recognise that some people will not change their minds – but focus on those who merely lack understanding.</p> | <p>6.4 Have video footage of various aspects ready to give TV media as background vision.</p> |
| <p>2.5 Try hard to involve the silent majority; to obtain its views, and provide them with information to develop understanding.</p> | <p>6.5 Provide information about the urban water cycle, that all water is used and reused, as part of general communications.</p> |
| <p>8.4 Identify champions for purified recycled water and never stop engaging and networking.</p> | <p>6.6 Keep the media proactively informed at every step of the way – media are a key information source for the community.</p> <p>6.7 Make social media a priority. Actively monitor and feed social media channels as well as traditional media.</p> |

TABLE 2

Summary of case studies and most effective tools/approaches for community engagement

This table provides a summary of the case studies which appear in full in Appendix A of the Report

| | CONFIGURATION | POPULATION SERVED | ML/DAY | SUPPLY BEGINS | MOST EFFECTIVE COMMUNITY ENGAGEMENT TOOLS OR APPROACHES |
|---|--|-------------------|--------|---|--|
| Orange County, California, USA | Groundwater Augmentation | 2.5 million | 492 | 1976 Factory 21 2008 GWRS | Started outreach early; Enlisted community leaders and key influencers as advocates; Used face-to-face presentations |
| Perth, Western Australia | Groundwater Augmentation | 1.9 million | 38 | 2017 | Took a slow, incremental approach; Built trust through transparency; Grass roots community engagement |
| NEWater, Singapore | Reservoir Water Augmentation | 5.6 million | 600 | 2003 | High investment, high profile, high technology; Visitor Centre and Demonstration Plant; Focus on vocabulary, imagery and sequencing of messages |
| San Diego, California, USA | Reservoir Water Augmentation | 1.3 million | 314 | 2023 | Showed people the technology at a demonstration plant; Provided context about upstream discharges and the water cycle; Used careful, slow, patient education and addressed 'toilet to tap' |
| El Paso, Texas, USA | Treated Water Augmentation | 683,500 | 38 | 2020 | Incremental steps over a long period of time; Proactively engaging with the media; Community understands urban water cycle and need for recycling |
| Toowoomba, Queensland, Australia | Reservoir Water Augmentation | 145,000 | 14 | N/A Purification was rejected | Highly politicised, with powerful scare campaign; Community engagement was rushed; Referendum forced a 'yes/no' answer |
| Western Corridor, South East Queensland, Australia | Reservoir Water Augmentation | 3.1 million | 180 | 2009 Scheme supplied power stations only, before being placed in care and maintenance mode in 2015 | Was caught up in the electoral cycle; Community support was linked to short term low dam levels; Health regulatory frameworks took time to establish |
| Upper Occoquan, Virginia, USA | Reservoir Water Augmentation | 2 million | 189 | 1978 | Not overt about recycling, but not silent either; Presenting holistic, consistent messaging requires coordination across multiple organisations |
| Orange, NSW, Australia (Stormwater) | Stormwater to Potable Reservoir Water Augmentation | 40,000 | 5.5 | 2009 | Made use of a drought 'crisis'; Strong leadership from visionaries and champions; Used site tours and consultation to bring people on board |
| San José, California, USA | Considering Groundwater or Raw Water Augmentation | 1.9 million | 152 | 2025 | Abundant information about the water cycle context; Involving business leaders from high profile companies; Websites that present clear and concise information |

REPORT: ALL OPTIONS ON THE TABLE

LESSONS FROM THE JOURNEYS OF OTHERS

WATER SERVICES ASSOCIATION OF AUSTRALIA SEPTEMBER 2019

Acknowledgement

In preparing this report, the Water Services Association of Australia has benefited extensively from discussions with various stakeholders. Special thanks go to Linda Macpherson, Founder, New Water ReSources, for sharing knowledge and perspectives. The conclusions drawn are the Association's own.

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