Development of the rainwater and mains water interconnection market in Australia

M. Ekins
Market Manager Davey Water Products. max@davey.com.au

Abstract
Demand exceeding supply is a classic economic and marketing driver for change. This is the case with metropolitan water supplies in Australia. Rainfall patterns have changed, lowering catchment inflows and storage levels, while demand from consumers has continued to rise. As a result, alternative water sources are being considered as one of a number of solutions to the shortfall in supply. Rainwater has taken a leading position, principally because of our cultural connection to the corrugated tank in our backyards, and because it offers an abundant, safe and economic water source. However, the paradigm shift required in the minds of regulators and water authorities to facilitate its uptake was significant. How can this alternative supply be safely and economically integrated into the existing regime? Davey Water Products has recently completed the journey through this landscape from a banned concept to a nationally approved product that helps bridge this gap in supply. An account of the steps required, friends made and lessons learnt offers revealing insights into the water industry.

Introduction
Alternative water supplies being used to supplement traditional centralized water supply schemes need to be able to offer benefits to consumers and also to the centralized system for their uptake to be successful. Davey Water products concept of interconnection the two supplies offered these benefits but the concept was considered to only offer disadvantages to the centralized system.

The basic principle for an interconnection between rainwater and a mains water supply is to provide security of supply for sanitary flushing and other essential uses inside the home. Metro rainwater tanks, because of their installed location need to be small in comparison to their rural cousins. This means that the tank will inevitably be empty for at least some of the time. The most efficient method of providing a continuity of water supply is with an automatic switch that is activated when rainwater is not available.

The principle benefits of this concept over traditional air gap top up systems are:
- No double handling or re-pumping of mains water saving energy.
- The pump is not a critical part of the system so can be removed for servicing.
- As the pump isn’t critical the system can function without power.
- Visible air gaps and simple pressure operated pump systems can be noisy for neighbours.

The drivers that encourage interconnection include:
- Consumers with little or no experience of pumps or rainwater tanks by default, expect a reliable water supply with little adjustment or involvement.
- Builders installing rainwater tanks on new homes want simple and reliable systems that minimize the chance of a call back.
- Plumbers want a quick prepackaged solution – with a manufacturers backup and easy approval.
- Plumbing inspectors want an approved, recognized product.

The disadvantages interconnection concept offered to the centralized system were simply a higher potential degree of risk of contamination to the water. While the advantages to the
system included, an automated way for rainwater to be used as the priority supply to non potable water uses. Energy imparted to the treated mains water was also not wasted.

**The journey from a banned concept to approval**

Davey Water Products journey toward developing a metro rainwater market started with an idea from one of our dealers that suggested there was an opportunity to provide a packaged backup for increasingly popular rainwater tanks in areas that had mains water reticulation systems. The prototypes were quickly assembled with off the shelf parts and trialed – it was a simple device to make. We had a catchy name – RainBank. What could possibly slow us down now?

We began to realize how long this road could be when the first versions of RainBank were on public display and one of the most senior plumbers in Victoria showed interest and asked how it worked – it was explained that the rainwater came in the base – mains water came in from the side and they both went this way to wards toilets, washing machines and gardens with rainwater the priority. His reaction was strongly against the concept. It wasn’t until it was made apparent that because the units would be installed permanently to mains water system a licensed plumber would be required – and this was the break thru – all metro rainwater tanks could be additional work for plumbers! He provided his endorsement and his team explained to us a road map for the important plumbing product approval process.

Other examples of similar concepts & approaches happening across the country include Dr Peter Coombes’s experiences documented in his thesis XXXXX¹. Dr Coombes explains the resistance he encountered on several levels – including vague plumbing rules, incompetent installers & obstructive water regulators. The obstruction proved significant enough to dissuade Peter from trying this method again as evident in the subsequent Maryville House Experiment²

Similar activity was also being undertaken to develop the interconnection concept by a start up company that was focused on regulation and government policy and included arguments about ownership of rainwater. Fascinating concepts, for water authorities and all levels of government. However, the focus was on a broader use of rainwater including potable and non applications. While their activity was admirable and very positive for the awareness of rainwater as a potential metropolitan water supply, not limiting the potential uses of the water presented too big a change in current practices in the minds of regulators and they were foiled.

At the start of our journey there were no specific standards for rainwater plumbing or rainwater harvesting systems – principally because they were considered ‘off the grid’ or outside the scope of existing standards, most of which have been developed by interested stake holders. There were simply too few interested stakeholders in metro rainwater harvesting in 2003.

The closest standard was ASNZS 3500. 1.1998³ which dealt ASNZS3500.1.2003⁴ ASNZS 2845⁵

---

1 Dr Peter Coombes. The Fgtree Place Experiment  
2 Dr Peter Coombes. The Maryville House Experiment  
3 AS3500. Standards Australia  
4 AS3500. Standards Australia  
5 AS2845. Standards Australia
Changing and influencing these standards was a critical step to introducing change. The standards form the basis for the state plumbing codes across the country.

Early discussions with plumbing regulators revealed the critical role Water Mark certification played in ensuring potable water safety and reliability. All we had to do was develop an technical specification – the precursor to an Australian Standard. Our draft of the tech spec was to be peer reviewed by other potential stakeholders. The tech spec including references to other Standards that would apply to the device and a testing regime to qualify the products function, quality and durability. and experience – letter from Paul Grieg.

A clear illustration of how interesting rainwater harvesting had just become is the Water Services Association of Australia Code\(^6\) for rainwater harvesting. It was a document that appeared to be more about obstructing and constricting the metro rainwater industry than providing guidance and encouragement for the developing industry. During industry consultations discussions on disinfecting and purifying rainwater were refused or referred to ‘someone who might know something about that’ – intimating that WSAA didn’t. Possibly the clearest illustration of how the interests of the centralized system can be self interested is the relative size of the document. At draft stage it had grown to a XXX page document compared to XXX for AS/NZS3500. Examples of the restrictive ideas being put forward as a code included the specific references to interconnection devices that were extensive and included variations on design specifics that limited options for manufacturers and had safety for backflow prevention that were similar to interconnections of poisons and fuel! The code was effectively drafted by a very small number of people with Luckily the effective jurisdictions of water authorities finished at domestic property boundaries and a sensible concensus

Now we had an ‘officially’ approved product, the Water Authority & council by council education process started.

Water Authorities were already under some pressure to answer the long term supply issues and consideration to demand management measures such as restrictions were well under way.

The different paces of public education on the water issue reflected to a large extent the internal level of understanding that the regulator had in rainwater harvesting in metro areas and the potential that it had to mitigate water supply limitations.

So far in our journey any resistance we had met was reasonable and would listen to our arguements with interest, and they had regard for the products approval process. That’s when we discovered the combination of local government operating their own water supply system. This combination made the plumbing inspector a very influential person indeed. A few of these combination organisations were also leaders in mandating rainwater harvesting on new homes, are were in the process of themselves learning the pitfalls of rainwater harvesting in a metro area. Their understanding of desirable systems were based on established air gap practices. The plans were broad in their allowable design approaches – mainly because of the lack of detail that they contained – definitely not enough detail to exclude interconnection. These organisations came to embody the change that was happening right across the country – how can you encourage alternative water supplies while ensuring consumer compliance with

\(^6\) WSAA Rainwater Harvesting Code 2005
your new rules?. One of the solutions proposed was to force compliance onto the consumer by effectively removing key benefits of interconnection. After protracted meetings and many suggested design changes we were able to agree on hardwiring the interconnection devices to the homes power supply so that they couldn’t just be switched off and run on mains.

The second most surprising part of the experience with the small council and water authority was to discover how determined some members of their team were to place obstacles in front of our work. They used their positions and titles to travel interstate in an effort to influence other councils that were in the process of formulating plans to mandate rainwater harvesting.

The resistance to change was met at all levels. In fact several times officials who perhaps going from telling us does not need to rain for 15 years to personal invitations to help the same government to write a plan to introduce mandatory rainwater harvesting virtually overnight.

In fact the rebuff we received on at least three occasions made Davey believe that plan for the Queensland introduction of rainwater to be up to five years over the horizon and consider approval of the interconnection concept to be in the too hard basket.

A confirming re-election of the Beatie Government late in 2006 seemed to have given them the confidence to move quickly and without public comment on the introduction of their plans to mandate rainwater harvesting.

An early aspect of rainwater design overlays for suburb wide systems that included recycled water such as Pimpama Coomera was to only allow air gap – or trickle top mains water backup – principally to encourage smaller mains water pipes. The householders have been retro fitting interconnection devices to enjoy the benefits of interconnection over air gap.

**Market size estimates in Australia**

With approximately 37 million Australian and New Zealanders already drinking rainwater as their primary potable water comprehensive studies on rural and metropolitan rainwater quality are well overdue. With an additional estimated 100,000 rainwater tanks being installed in the Australian metropolitan area each year the number of people deciding to go ‘whole of house’ and drink the rainwater will no doubt grow.

The next hurdle for rainwater in metro areas is to be the supply of choice for unrestricted applications such as drinking, showering and cooking. Interconnection then makes far more sense as a retro fit option as plumbing complexity and therefore cost is greatly decreased – fitting a rainwater tanks and interconnection device becomes, a basic cut and shut right behind the water meter, with no rerouting of the internal plumbing systems. This is the biggest obstacle to higher uptakes of rainwater tank on existing homes.

Work has been done in Newcastle (Coombes, Figtree Place) for the use of rainwater to supply household hot water services as a low risk option since the high water temperature can inactivate enteric pathogens. The research at Figtree Place showed that microbiological water quality is substantially improved by passage of rainwater through hot water services, although

---

7 ABS 2005
9 Savewater. ‘Survey into attitudes towards rainwater tank’ 2004
10 Dr Peter Coombes. The Figtree Place Experiment
further work is required to confirm the required minimum temperature. More research is required on drinking untreated rainwater to improve its cost effectiveness as current UV disinfection systems will offset the cost savings in plumbing mentioned previously.

**Conclusion**

In Australia Davey and other water industry suppliers are experiencing an unprecedented increase in demand for rainwater interconnection systems, rainwater pumps, pressurizing systems and rainwater treatment systems. This is driven by demand created by political will looking for an answer to decreased supplies of essential water and XXXXXXX

Australia’s consensus based voluntary system for developing standards and product approvals has allowed a wide spectrum of stakeholders to develop innovative plumbing solutions to a critical demand issue that had challenged the status quo and the established centralized regime. Unrelated organisations can come together to shape wide reaching changes to established practices for the benefit of consumers and the environment. These changes can be swift when prompted by political pressure and consumer demand. The changes need to provide easily demonstrated benefits to all stakeholders.

The same product approval journey Davey has taken with RainBank, should provide a clear path for innovators in the grey water arena.

The rainwater journey Davey Water Products has undertaken is continuing with a very similar tempo and agenda in a number of countries that are facing similar drivers. The experience of introducing a better way of integrating rainwater into a centrally managed water supply network has given us the belief that alternative water sources have a place alongside and connected to centralized systems everywhere in the world there is a water shortage.