

ANTICIPATING DIGITAL TRANSFORMATION

THE EVOLUTION OF RESIDENTIAL WATER EFFICIENCY TECHNOLOGIES AND OPTIONS

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Abstract

Ongoing investment in water efficiency has been proven to drive sustained reductions in average and peak water demands. However, the nearly decade-long period of inaction between 2009-2019 has left a gap in water efficiency capacity and capability across Australia, including NSW. Developments across fixture and fittings efficiency, digital control, data analytics and program design mean there are opportunities to revisit previous programs and/or design new programs that will save water.

Our aim was to understand the types of digital water technologies both on the market and in development and categorise the types of practice changes they are promoting. From this review, patterns of emerging innovations, potential water efficiency options, and the types of practice changes digital transformation is affecting were identified.

Beyond water efficiency, digital transformation within the water sector also has the potential to affect how societies use and reuse resources, enact water regulation, understand social practices, respond to risk and demand, increase community engagement and water literacy and realise sustainability objectives.

Disclaimer

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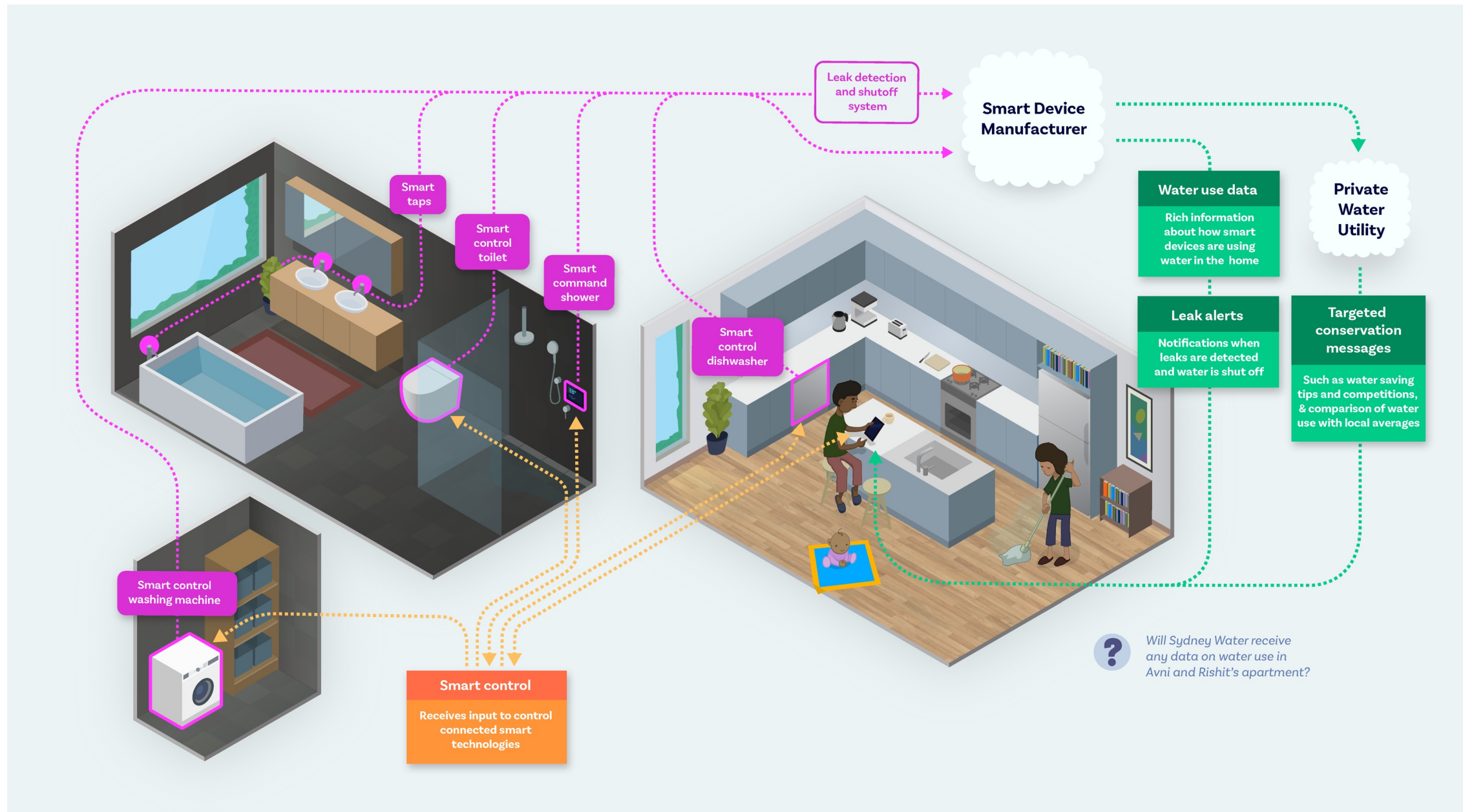
A photograph of a modern rooftop terrace. The terrace features a curved walkway with a dark metal railing and a large, curved, dark metal structure that supports a lush green wall of plants. The ground is paved with light-colored tiles. In the background, there are several buildings, including one with a distinctive perforated metal facade. The sky is a clear, light blue. On the right side, there is a building with a dark facade and a glass door. The door has a sign that says "ELECTRICAL" and a fire extinguisher symbol. There are also some signs on the wall, including a "NO SMOKING" sign and a "FIRE HOSE WHEEL" sign.

Anticipating sustainable futures



The future does not exist in the present, but anticipation does. The form the future takes in the present is anticipation – Riel Miller (2018)

What did we do? What were we looking for?




Water efficiency options of the past and present

	UTILITY			RESIDENTIAL					GENERAL			NON-RESIDENTIAL			
	L/c/d	ML/a	ELWC	Building codes	Tenancy Acts			Planning instruments	Plumbing code	Water budget	Green star		NABERS		
BENCHMARKING/TARGETS													Benchmarks		
	ILI	ELL	RW use	Target 155	Comparative use bills			WELS	SAWM						
EDUCATIONAL MESSAGING				Education	Smart metering	Meter read tutorial		Smart fixtures	Water Wise developers	High bill notification	Smart metering (large customers)	WEMPS			
				Drought campaign	Behavioural insights	Shower songs		Best practice Pricing	Waterwise Rules		Data loggers	Public high demand lists	SWEP / EDC Schools		
											Education / self audit	Best practice guidelines			
UTILITY PROVIDED / CONTRACTED SERVICES	Intelligent Networks	Pressure Mgmt		Household Retrofit	StrataFix	Essential Plumbing		Open reservoirs loss reduction			Cooling tower efficiency	1:1 Audits		Irrigation efficiency	
	Leak detection	Leak detection dogs		High user audits/retrofit	Leak repair	Water flow monitors						BizFix (showers / taps / toilets)			
	3 rd pipe supply (RW)	Open space irrigation with RW		Rainwater tank check	Rainwater tank repair	Toilet replace						Leak detection		Council partnerships	
	WWTP RW use	WTP back-washing with RW		Greywater treatment	Hydropanels	Evap. Cooler maintenance								Kitchen retrofit	
	Audit utility water use			Garden program / advice	Irrigation check									Cooling tower maintenance	
REBATES AND INCENTIVES	<div style="border: 1px solid black; padding: 5px;"> <p align="center">KEY</p> <p align="center">General opportunities</p> <p align="center">Alternative sources and leakage</p> <p align="center">Specific end uses/products</p> </div>			DIY kits	Basket of goods	Leak fix	Concealed leaks	Leak sensors	Water banking		Innovation funds	Alternative water supply	Toilets / urinals	Taps / showers	
				Smart appliances	Shower exchange	Shower timers	Recycling shower units				Grants	Rainwater tanks	Spray rinse valves	Dish-washers	
				Hot water circulator	Washing machine	Toilet exchange	Toilet displace. devices	Toilet dye			Loans	Public pools	Waterless Woks	Washing machines	
				High pressure cleaners	Pool covers	Greywater diversion	Outdoor RW tanks	Indoor + Outdoor RW tanks			Pay for performance loans	On site wastewater treatment system	Smart irrigation	Trigger nozzles	
				Smart irrigation	Irrigation timers	Rain gauges	Trigger nozzles				Reverse auctions		High pressure cleaning		
				Water smart plants	Xenoscape	Lawn buy backs	Tap timers								


Emerging water-efficient technologies of the future

Metering and sensing


Smart rainwater tank system




Smart water meter with shut-off sensors



buoy



Weather based irrigation controllers



Water reduction, recycling and avoidance

Waterless urinals



Waterblade taps



Tankless toilets



Influencing user behavior

Recirculating showers with flow prompts



Irrigation controls and prompts




Community wide water battle app



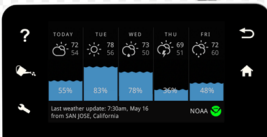
Examples of emerging water efficient technology

Control and display


Shower attachments with flow display



Smart control for outdoor water

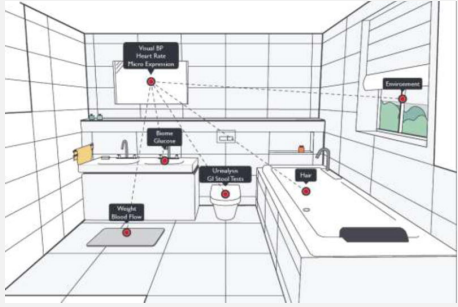


Smart toilets with LED display




Appliance integration

Healthy bathroom systems




Recycling, alternate source and quality


Greywater recycling



Air to water technology



In home wastewater treatment



So where does this take us?

Best practice water efficiency options of the past + present (targeted / piloted / evaluated)

Emerging water-efficient technologies of the future (smart meters / customer control / data analytics / integrated)

Next gen demand management options

	UTILITY	RESIDENTIAL	GENERAL	GENERAL	NON-RESIDENTIAL
BEHAVIOURAL TARGETS	Licd ML/a ELWC	Building codes Tenancy Acts	Planning instruments Plumbing code Water budget	Green star	LARGE USER NABERS Benchmarks
BEHAVIOURAL MESSAGES	ILI ELL RW use	Target 155 Comparative use bills	WELS SAWM	Smart metering (large customers) Data loggers Education / self audit	WEMPS SWEP / EDC Schools Best practice guidelines
UTILITY SERVICES / CONTRACTED SERVICES	Intelligent Networks Leak detection dogs 3rd pipe supply (RW) WWTP RW use Audit utility water use	Pressure Mgmt Leak detection dogs High user audits/retrofit Rainwater tank check WTP back-washing with RW Garden program / advice	Household Retrofit Stratafix Essential Plumbing Leak repair Water flow monitors Toilet replace Evap. Cooler maintenance Irrigation check	Open reservoirs loss reduction Cooling tower efficiency	1:1 Audits Irrigation efficiency Bizfix (showers / taps / toilets) Council partnerships Kitchen retrofit Cooling tower maintenance
REBATES AND INCENTIVES	KEY General opportunities Specific end use products	DIY kits Smart appliances Hot water circulator High pressure Smart irrigation Water smart plants	Basket of goods Leak fix Shower fittings Shower exchange Toilet exchange Toilet eye device Toilet dye Outdoor RW tanks Indoor RW tanks Tap timers	Water banking Innovation funds Grants Loans Pay for performance loans Reverse auctions	Alternative water supply Rainwater tanks Public pools On site wastewater treatment system Toilets / Taps / showers Spray rinse valves Waterless Washing machines Smart irrigation Trigger nozzles High pressure cleaning



Examples of emerging water efficient technology

Metering and sensing

- Smart rainwater tank system
- Smart water meter with shut-off sensors
- Weather based irrigation controllers

Water reduction, recycling and avoidance

- Waterblade taps
- Waterless urinals
- Tankless toilets

Influencing user behavior

- Irrigation controls and prompts
- Recirculating showers with flow prompts
- Community wide water battle app

Control and display

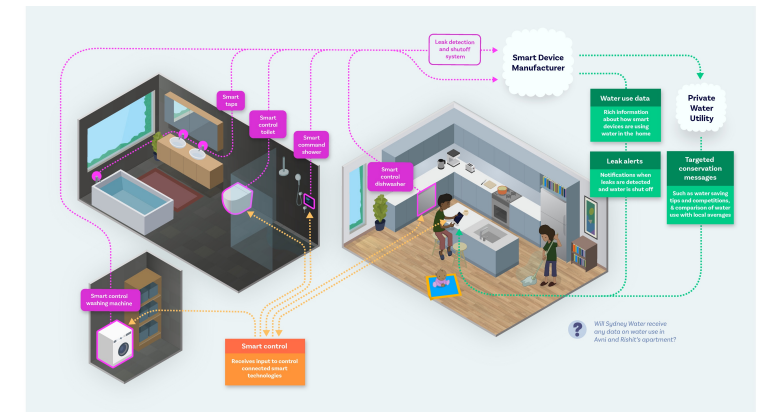
- Shower attachments with flow display
- Smart control for outdoor water
- Smart toilets with LED display

Appliance integration

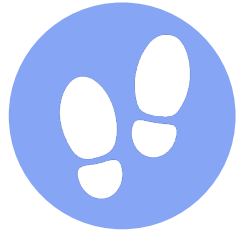
- Healthy bathroom systems

Recycling, alternate source and quality

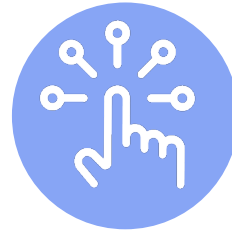
- Greywater recycling
- Air to water technology
- In home wastewater treatment



Next gen demand management options will...



Create step change in the market using multi-faceted approaches



Adopt digital control



Use digital analytics to better design, target and evaluate programs



Target programs to specific customer segments



Keep standards and regulations up to date with market advancements



Incentivise water efficiency

What ISF has in store...

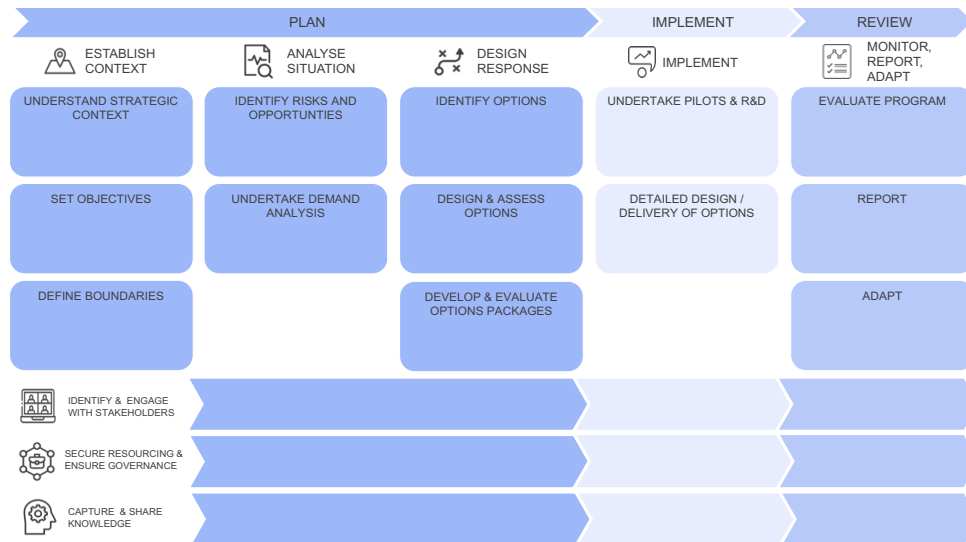
Smart command bathroom trial



Smart irrigation management



Water Efficiency Framework



Smart homes of the future



Thank you, questions?



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