SEQUANA

AUSTRALIAN DESALINATION

PROJECTS, PAST, PRESENT AND EMERGING
MARKET OUTLOOK AND OPPORTUNITIES

2025

AUSTRALIAN WATER SECURITY CHALLENGES

MARKET CONTEXT

Australia has always been a land of extremes, where the climate and weather dances between drought and deluge.

Water supply for Australian cities has traditionally relied on rainfall-dependent sources like rivers, dams and groundwater. However, Australia's climate is changing.

Since the early 1900s, the nation has already warmed by 1.2°C. Rainfall patterns have shifted, and extreme weather events — including heatwaves, bushfires and droughts — are becoming more frequent and more severe.

These severe weather events don't just reduce water availability — they can also damage our infrastructure, catchments, waterways, degrade water quality in dams and reservoirs, and impact ecosystems.

The challenge is clear: Future climate risks and extreme events mean we cannot meet our water needs by using traditional water supplies alone.

Now is the time to innovate, and that's exactly what Australia is doing. As a nation, we are continuing to invest in understanding the risks posed by climate change, while developing and implementing climate-independent solutions that utilise the best and most up-to-date science.

The Australian water industry is facing an era of unprecedented challenges.

DESALINATION EMERGES IN COMPLEX WATER LANDSCAPE

Australia's water sector operates at the intersection of environmental, political, social and economic forces. These competing interests shape water management policies and decisions.

The dynamics of delivering water projects have evolved dramatically due to ageing municipal assets, accelerating climate impacts, rising community expectations, and complex regulatory requirements.

Amidst this complexity, desalination plants have emerged as crucial tools in augmenting water supplies for communities facing water scarcity challenges. They offer what traditional systems cannot—water security disconnected from rainfall patterns.

Building system resilience will be key to managing future climate variability. To provide a secure water future, supply system augmentation with manufactured water will be required within the next 10 years, with potentially multiple additional augmentations needed over the next 50 years.

THE CLIMATE FORECAST: PROJECTED CHALLENGES

- **Significant reductions in runoff** across major city catchments, with even small decreases in rainfall causing significant declines in runoff
- **Droughts twice as likely** and significantly more intense
- **More frequented higher-than-average and extreme temperatures,** with the highest temperature increases in our bushfire-prone catchments
- **Increased severity and frequency of severe weather events,** including storms, bushfires and heatwaves
- **Sea level rise of 1 metre by 2100,** with ongoing increases expected into the next century.

MELBOURNE — A CASE STUDY

A CITY AT WATER CROSSROADS

Melbourne, Australia's second-largest city, may need to double its water supply over the next 50 years. This would require adding an average of 12 gigalitres (12 million m^3) of water to the Melbourne supply system each year.

Using climate guidelines published by the Victorian Government in 2020 (Department of Energy, Environment and Climate Action — DEECA), combined with three demand growth projection scenarios, Sequana has assessed how climate change could impact water availability from the current supply system over the next 50 years. The three future scenarios:

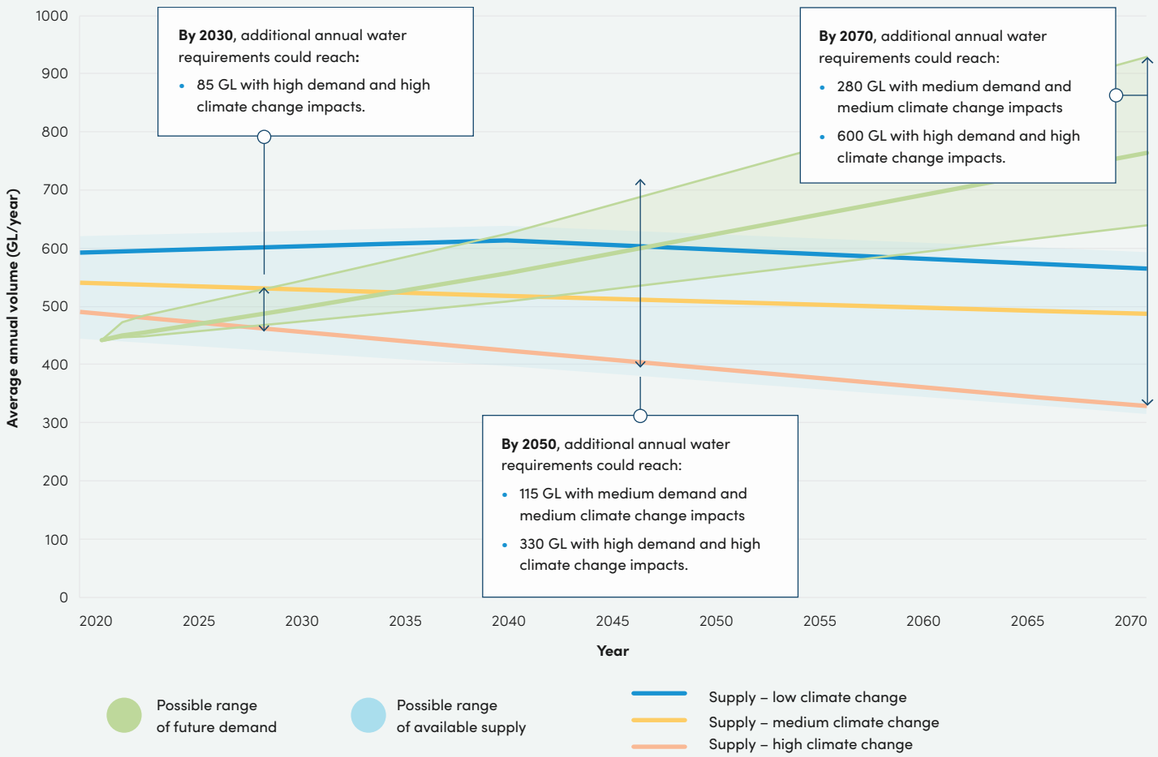
1. High climate change impact, high demand growth
2. Medium climate change impact, medium demand growth
3. Low climate change impact, low demand growth.

The modelling below demonstrates these projections, showing the impact of climate variability on available supply across all scenarios. In all climate scenarios, the possible future demands for water cannot be met with the current supply system, even when assuming the lowest projections for demand.

In the near term...

Manufactured water is most likely to come from **desalination**. It can be connected directly to the drinking water system, is completely rainfall-independent, and can operate at full design capacity immediately after construction[1].

HIGH, MEDIUM AND LOW DEMAND GROWTH AND CLIMATE CHANGE SCENARIOS FOR 2020-2070[2]



1. Department of Energy, Environment and Climate Action — DEECA 2020
2. References: Greater Melbourne Urban Water & System Strategy: Water for Life (Melbourne Water, 2022)

1903
First recorded desalination plant in Australia at Eucla

1950-70s
Small-scale thermal desalination plants in remote areas

1980-90s
Emergence of current Reverse Osmosis technology

2001
The Millennium Drought prompts investment in desalination

2006
Completion of first major Australian desalination plant in Western Australia

2009
Large scale desalination projects completed in several major Australian cities

2019
Reduced rainfall prompts increased reliance on desalination in Western Australia

2025-30s
Expansion of desalination plants in all major cities to support reducing inflow from natural sources

2030-40s
Renewable energy and new desalination technologies improve efficiency and reduce environmental impact

2050+
Desalination becomes the primary water source in all coastal urban areas due to climate change

AUSTRALIAN DESALINATION HISTORY

FROM INNOVATION TO INTEGRATION

Desalination has long played a role in addressing Australia's unique water security challenges — particularly in arid, drought-prone regions where rainfall is unreliable and freshwater sources are limited.

The country's journey with desalination dates back to the early 20th century, when small-scale distillation units were used to treat brackish groundwater and supply remote settlements. These early plants laid the groundwork for a more sophisticated, climate-resilient approach to water management.

The role of desalination in Australia shifted dramatically during the 'Millennium Drought' of the early 2000s. Faced with record-low inflows and plummeting dam levels in major cities — including Perth, Melbourne, Sydney and Brisbane — governments urgently turned to climate-independent water sources.

In 2006, Perth commissioned the country's first large-scale seawater desalination plant, using reverse osmosis technology to deliver drinking water directly into the city's supply. At the time, it was the largest desalination facility in the Southern Hemisphere and signalled a new era in Australia's urban water security planning. Since then, desalination has become an essential component of integrated water resource strategies.

These plants provide a reliable, rainfall-independent supply, acting as critical buffers during droughts and allowing greater flexibility in managing variable surface water systems.

Today, desalination plants are recognised as strategic infrastructure for Australia's water management— not just emergency solutions. As Australia plans for a hotter, drier climate with more frequent extremes, desalination continues to underpin long-term resilience and water supply certainty.

The 'Millennium Drought' (2001-2009) led to severe water shortages across Australia, prompting significant investment in desalination.

CURRENT AUSTRALIAN DESALINATION PLANTS

A NATIONAL INFRASTRUCTURE NETWORK

Australia is home to an estimated 1,000 operational desalination plants, ranging from small-scale systems producing less than 10,000 litres per day (10 kL/day), to large scale infrastructure delivering over 450 million litres per day (450 ML/day). These facilities support a diverse range of uses, including:

Municipal purposes
i.e. drinking water

Industrial processes
in mining, power generation, oil and gas, food and beverage, and healthcare

Agricultural applications

While only a small number of Australia's desalination plants are used for agriculture, all of these have been established in the last decade.

The largest desalination plants in Australia are primarily municipal assets, commissioned to ensure urban water security. However, significant industrial-scale plants also exist — most notably the Cape Preston Seawater Desalination Plant in Western Australia, which supplies water to support magnetite mining operations.

Many of these plants were constructed in direct response to the Millennium Drought, a turning point that reshaped Australia's approach to long-term water planning. During this period, severe and prolonged water shortages prompted unprecedented investment in climate-independent supply infrastructure.

There is currently over 450 GL per annum of installed seawater reverse osmosis capacity in Australia.

AUSTRALIA'S LARGEST OPERATIONAL MUNICIPAL DESALINATION PLANTS

LEGEND	NAME	AUTHORITY	STATE	CURRENT CAPACITY (MLD)
1	Gold Coast Desalination Plant — Tugun (GCDP)	Seqwater	QLD	133
2	Perth Seawater Desalination Plant (PSDP)	Water Corporation	WA	150
3	Southern Seawater Desalination Plant (SSDP)	Water Corporation	WA	150
4	Sydney Desalination Plant	Sydney Water	NSW	250
5	Adelaide Desalination Plant (ADP)	SA Water	SA	300
6	Victorian Desalination Plant (VDP)	Department of Energy, Environment and Climate Action (DEECA)	VIC	450

EMERGING AUSTRALIAN DESALINATION PLANTS

PLANT STATUS

- Construction
- Procurement
- Business Case
- Planning

LEGEND	NAME	AUTHORITY	STATE	POSSIBLE CAPACITY (MLD)	USER	STATUS
1	Dampier Seawater Desalination Plant — Stage 1	Rio Tinto	WA	12	Industrial	Construction
2	Gold Coast Desalination Plant Expansion	Seqwater	QLD	12	Municipal	Business Case
3	Eyre Peninsula Desalination Plant — Stage 1	SA Water	SA	16	Municipal	Procurement
4	Belmont Desalination Plant	Hunter Water Corporation	NSW	30	Municipal	Procurement
5	Roy Hill Saline Water Reverse Osmosis Desalination Plant	Roy Hill Holdings Pty Ltd	WA	40	Industrial	Constructed
6	Sydney Water Desalination Project (Warriewood)	Sydney Water	NSW	125	Municipal	Planning
7	Northern Water Project — Stage 1	Office of Northern Water Delivery (ONWD)	SA	140	Industrial	Procurement
8	Ngarluma Water Desalination Project — Stage 1	Ngarluma Water*	WA	150	Industrial	Planning
9	New Victorian Desalination Plant	Department of Energy, Environment and Climate Action (DEECA)	VIC	150	Municipal	Planning
10	Alkimos Seawater Desalination Plant — Stage 1	Water Corporation	WA	150	Municipal	Construction
11	Alkimos Seawater Desalination Plant — Stage 2	Water Corporation	WA	150	Municipal	Planning
12	South East Queensland Desalination Plant	Seqwater	QLD	150	Municipal	Business Case
13	Sydney Water Desalination Project (Illawarra)	Sydney Water	NSW	150	Municipal	Planning
14	Victorian Desalination Plant Expansion	Department of Energy, Environment and Climate Action (DEECA)	VIC	150	Municipal	Planning
15	Perth Seawater Desalination Plant — Stage 2	Water Corporation	WA	150	Municipal	Planning
16	Western Green Energy Hub	Intercontinental Energy (ICE)	WA	150	Industrial	Planning
17	Gladstone Desalination Plant — Stage 1	Department of Regional Development, Manufacturing and Water (DRDMW)	QLD	190	Industrial	Planning
18	Sydney Water Desalination Project (Kurnell) — Stage 3	Sydney Desalination	NSW	250	Municipal	Planning

Above table indicative only. Subject to change.
*Legacie has partnered with Suez Water (Suez) and Ngarluma Aboriginal Corporation (NAC) to create Ngarluma Water

TYPICAL PROJECT DEVELOPMENT STEPS

1 PROJECT PLANNING

- Strategic, Concept & feasibility assessment
- Service Need
- Indicative Solution
- Other Preliminary Business Case (PBC) inputs
- Budget to deliver the PBC

2 PRELIMINARY BUSINESS CASE

- Definition of the problem: Evidence, timing and broad context
- Benefits: Strategic response Options analysis
- Solution: Recommended option, estimates, procurement

3 DETAILED BUSINESS CASE

Revisits and validates;

- Problem
- Benefits
- Strategic Response
- Value for Money
- Options Assessment
- Solution deliverability

4 PROCUREMENT

- Procurement process for a new desalination project

5 DESIGN AND CONSTRUCTION

- Build phase for a new desalination project

6 OPERATIONS

- Operations and Maintenance phase for a new desalination project

TYPICAL TECHNICAL ACTIVITIES IN DEVELOPING A DESALINATION PROJECT

The development of a desalination project involves a complex sequence of technical assessments and planning tasks to ensure feasibility, environmental sustainability, and integration with existing infrastructure. Key activities typically include:

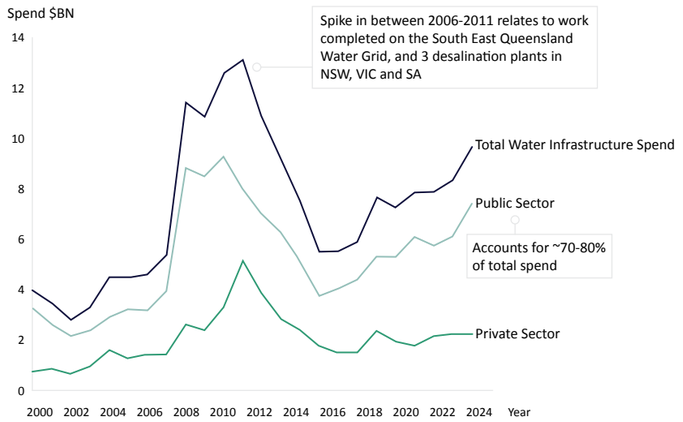
- **Supply-demand assessment** to confirm the need and timing for new water sources
- **Defining product water quality requirements** to meet end-use needs and regulatory standards
- **Determining preferred plant capacity** based on system modelling, projected demand, and redundancy needs
- **Site investigations**, including land availability, zoning, and suitability
- **Identification of potential locations,** considering proximity to coastlines, existing infrastructure, and environmental constraints
- **Marine surveys** to inform design of intake and outfall systems
- **Assessment of integration with existing networks,** including treatment, storage, and distribution infrastructure
- **Site-specific studies,** such as ecological, heritage, geotechnical and topographical assessments
- **Environmental impact assessments** aligned with state and federal requirements
- **Evaluation of marine infrastructure options –** seawater intake and brine discharge design, including consideration of hydrodynamic impacts
- **Modelling of seawater intake and brine dispersion,** to minimise environmental impacts
- **Assessment of energy needs and access to bulk power supply**
- **Logistics and infrastructure review,** including proximity to transport links, ports, roads, and rail
- **Site access and security assessments,** including physical, operational, and cybersecurity considerations

MARKET OUTLOOK AND OPPORTUNITIES

Australia's desalination market is entering a renewed growth phase, driven by increasing demand for secure water supplies and the escalating impacts of climate change. Future opportunities lie in expanding existing facilities, developing new plants in strategic locations, integrating renewable energy sources, and adopting emerging technologies to improve efficiency and reduce environmental impact.

While total water infrastructure investment peaked in 2012, recent trends indicate a clear return to growth—signalling renewed momentum in the sector.

TOTAL INFRASTRUCTURE SPEND PEAKED IN 2012, AND IS CURRENTLY BACK IN GROWTH PHASE
TAM — TOTAL CAPITAL EXPENDITURE: WATER AND WASTEWATER 2000 — 2023 ($BN)



- The majority of public infrastructure spend is on new infrastructure (e.g., VIC, NSW and QLD desalination plants) and infrastructure upgrades (e.g., QLD dam improvement program).
- The fall since 2012 is due to stats deferring necessary upgrades or replacements to delay capital expenditure. Infrastructure Australia estimates that there is 15 years of pent up demand that has been delayed but requires actioning.
- Spending has increased since 2017 as states have identified innovative solutions to funding necessary water infrastructure. NSW have created the NSW regional development program to support local water utilities in the delivery of affordable water supply and sewerage services to regional NSW.

1. Source: Australian Infrastructure and Transport Statistics Yearbook — Bureau of Infrastructure and Transport Research Economics 2023

A GROWING SKILLS GAP IN THE WATER SECTOR

The water sector in Australia faces a critical constraint: the ability to attract and retain a skilled workforce in an increasingly competitive labour market. The sector currently does not have the capacity to support the growth expected in delivering water infrastructure including desalination projects. Addressing this shortfall presents a significant opportunity for collaboration with the international water community.

The sector is experiencing acute shortages across the entire project lifecycle—from planning and design through to delivery and operations. These gaps are most pronounced in:

KEY AREAS OF SKILLS SHORTAGE;

- **Science and engineering —** A shortage of skilled scientists and engineers limits the sector's ability to develop and implement innovative water management solutions.
- **Project and infrastructure management —** Delivering complex infrastructure projects, managing personnel and managing water systems effectively requires experienced leadership, which remains in short supply.
- **Technical and trades —** Maintaining, upgrading, and operating critical infrastructure depends on a skilled technical workforce, including tradespeople, technicians, and operators—roles that are currently difficult to fill.

At Sequana, we are committed to enhancing Australia's water security through innovative desalination solutions. Our expertise spans across multiple states and international locations, ensuring reliable and sustainable water sources for communities and industries.

As a leader in the water industry, Sequana is dedicated to providing innovative and sustainable desalination solutions. Our projects address water scarcity while supporting environmental sustainability and community resilience.

With a team of internationally recognised experts, Sequana has successfully delivered complex desalination projects across Australia. Our technical excellence and innovative approaches ensure reliable and high-quality water supply for communities and industries. With extensive experience in both public and private sectors, we bring a wealth of knowledge and expertise to every project.

BOUNDLESS POSSIBILITIES

75%
Jobs in the world dependent on water

3000+
Expected jobs to be created in water by 2026

24m
Australians with access to water and sewerage services

$10.6B
Annual national economic contribution of the urban water sector

SEQUANA'S SERVICES ACROSS THE PROJECT LIFECYCLE

INITIATION CAPABILITIES

- Investment policy development
- Business case writing and management
- Business case technical and financial input
- Project feasibility and planning
- Procurement and delivery strategy
- Project related policy development and implementation
- Governance and Project delivery framework development
- Capital investment strategy.

FEASIBILITY CAPABILITIES

- Transaction management
- Commercial framework and contract documentation development
- Risk profile development and analysis
- Financial and operational modelling
- Value for money, Public Sector Comparator analysis and economic appraisal
- Technical project due diligence
- Gateway Reviews project health checks and independent peer reviews
- Stakeholder and Community engagement
- Funding Deed negotiation and preparation.

DELIVERY CAPABILITIES

- Contract management and administration
- Development and implementation of risk mitigation strategies
- Analysis and negotiation of tenderer appointment, contract variations and amendments
- Project directorship and management
- Project governance design and analysis
- Time, budget, cost and financial control and reporting
- Risk management including qualitative and quantitative risk analysis
- Project pipeline and portfolio analysis
- Project budget and schedule development and assessment
- Asset management
- Operational readiness
- Gateway Reviews project health checks and independent peer reviews.

REVIEW CAPABILITIES

- Project performance reviews
- Project reset and restructure planning
- Project delivery assurance
- Dispute avoidance and guidance on client and contractor obligations
- Analysis, negotiation and settlement of variations and claims
- Claims management, preparation and defence
- Independent Expert opinions
- Preparation of submissions for dispute resolution processes
- Alternative dispute resolution support including expert determination and mediation
- Arbitration and litigation support
- Distressed project reviews and restructures.

SEQUANA

For more information or to discuss potential projects, please contact us at:

zoe.walsh@sequana.co

www.sequana.co

Head Office:
Level 31, 570 Bourke Street
Melbourne Australia 3000

MIKE WALSH – CHAIR

Mike Walsh is a seasoned professional in the water infrastructure sector.

With over 45 years' experience in the Australian and International water industry, Mike is a major projects specialist with a commercial and engineering background.

Throughout his career, Mike has played pivotal roles in the design, construction, commissioning and operation of water and wastewater assets.

Mike was the former Government Engineering Director for the $3.5 billion Victorian Desalination Project and advisor to three other State Government Agencies in the development of Queensland, New South Wales, and South Australian desalination projects.

GARY CRISP – CHIEF ENGINEER

Gary Crisp is a distinguished water engineer with over 46 years of experience and has specialised in desalination and water reuse for the past 24 years. Gary has played a pivotal role in significant projects, including the Perth Seawater Desalination Plant, and has been recognised as Western Australia's Professional Engineer of the Year in 2007. Gary played a crucial role in the success of membrane desalination plants, received industry awards, and actively contributed to industry associations. Currently, he serves as National Partner and Chief Engineer at Sequana, contributing his extensive expertise to advance water treatment solutions.