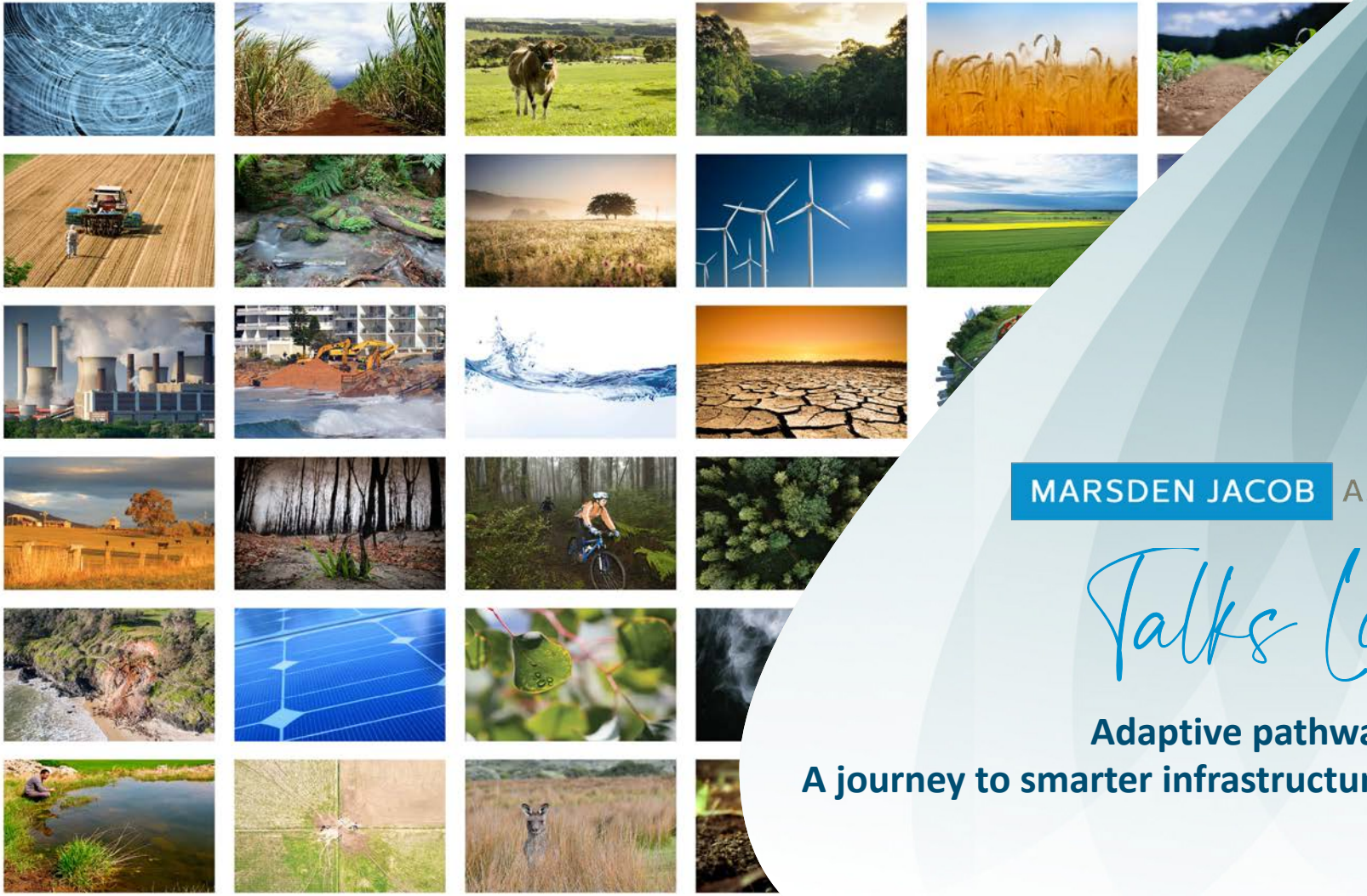

economics
public policy
markets
strategy

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Talks Live

Adaptive pathways approach: A journey to smarter infrastructure investment

27 June 2023

Talks Live

The **Marsden Jacob Talks Live** webinar series brings people together to discuss pressing issues across environment, energy, water, circular economy and recycling, agriculture and earth resources and other sectors in Australia and internationally.

These free webinars are open to everyone. We aim to share best practices and bring you the latest research and thinking. Our focus in these events is on encouraging open, positive and collaborative discussion.

We encourage you to share your questions, opinions, experience and interests. We also welcome your thoughts on future topics for our webinar series.

Each live event includes a presentation hosted by Marsden Jacob experts, followed by an open Q&A session.

Marsden Jacob Associates acknowledges the Traditional Custodians of the lands and waters across Australia where we conduct our business. We also pay our respects to their Ancestors and Elders past and present, and leaders emerging.

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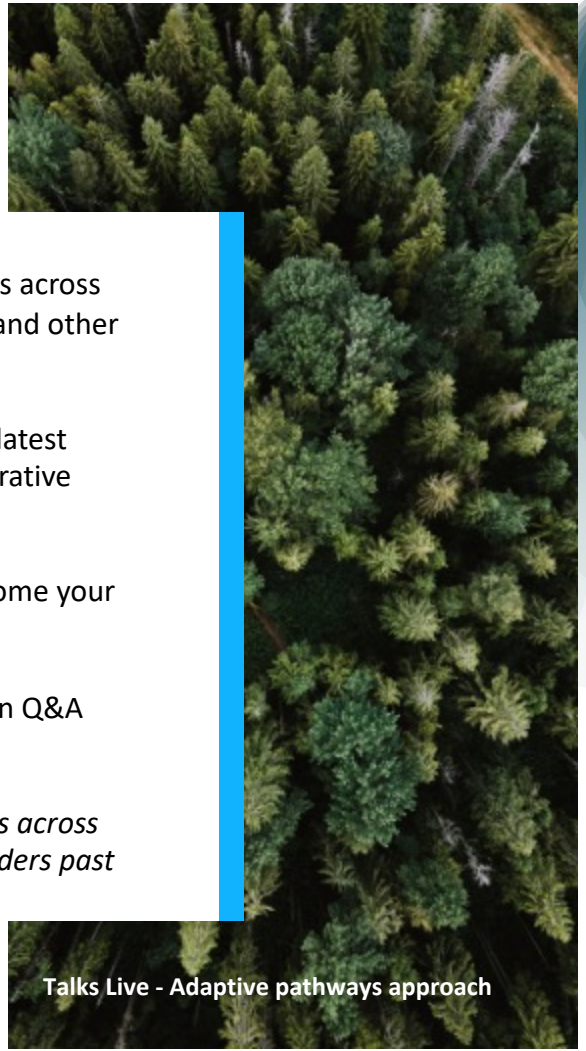


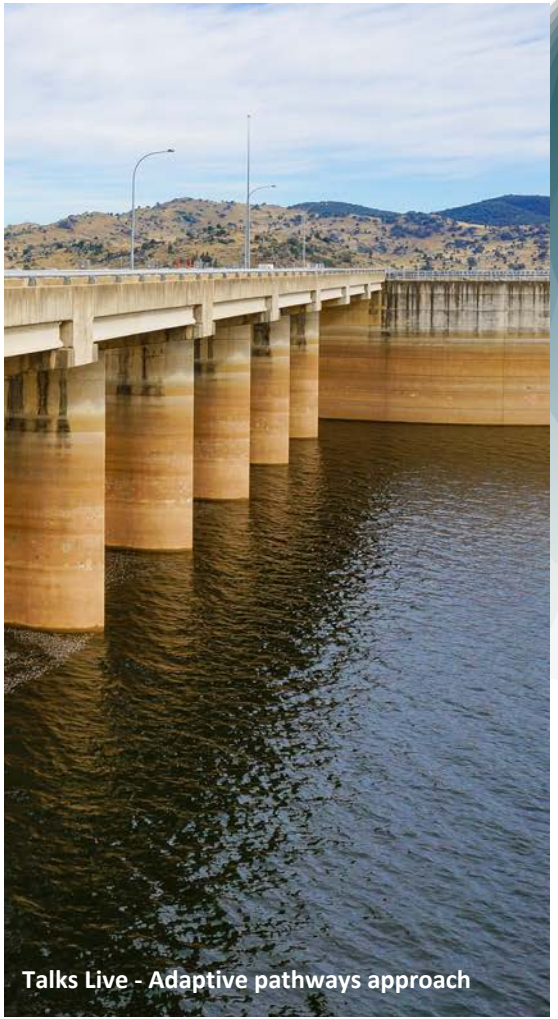
Initial questions…

1. What is your level of experience with infrastructure investment techniques?

- ❑ Completely new
- ❑ Some knowledge
- ❑ Expert

2. Based on your experience what are the key elements that are useful for decision makers?

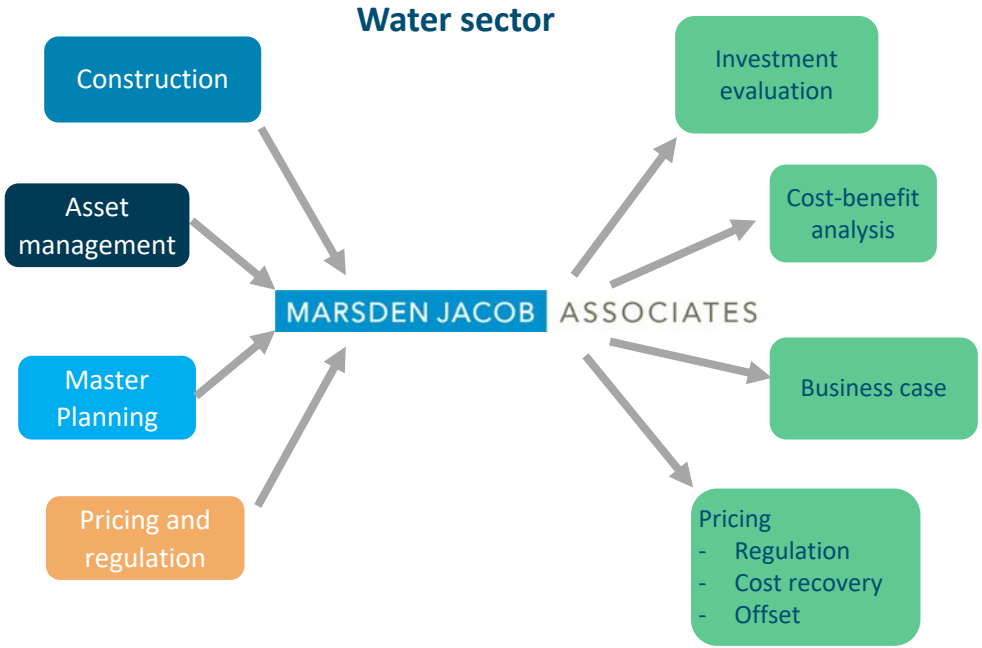
- ❑ Accurate and reliable information
- ❑ Clear goals and objectives
- ❑ Stakeholder engagement
- ❑ Flexibility and adaptability
- ❑ Ethical considerations
- ❑ Long-term vision
- ❑ Risk management



Who am I?

Kanchana Karunaratna
Associate Director
MBA, (Uni Melb), BEng (Hons) (Curtin)

- Strong track record of advising senior executives to enable robust decision-making across water, public policy, environment and climate change.
- Advised on urban and rural water cycle infrastructure investments and regulatory pricing. Led strategic reviews to enable clients to achieve sustainable environmental, financial and performance goals.
- An Australian Water Association Branch Committee member with a passion for driving toward a sustainable water future.



Who are we?

We work with investors, policy makers, regulators and water businesses, including:

- lead regional planning and investment evaluation
- economic and financial analysis of urban and rural water supply augmentations and efficiency improvements, including integrating hydrological modelling (including stochastic modelling)
- develop supply/demand forecasts for resource planning
- support or lead the development of pricing submissions across all states and territories
- develop long-term regulatory frameworks including pricing principles
- evidence of willingness to pay for discretionary expenditure
- develop building block models, LRMC models, trade waste pricing structures, developer charges, canal pricing and more.

Why this topic? And why now?

Making large investment and policy choices without careful consideration of future uncertainties can be financially, environmentally and socially costly.

Challenges include:

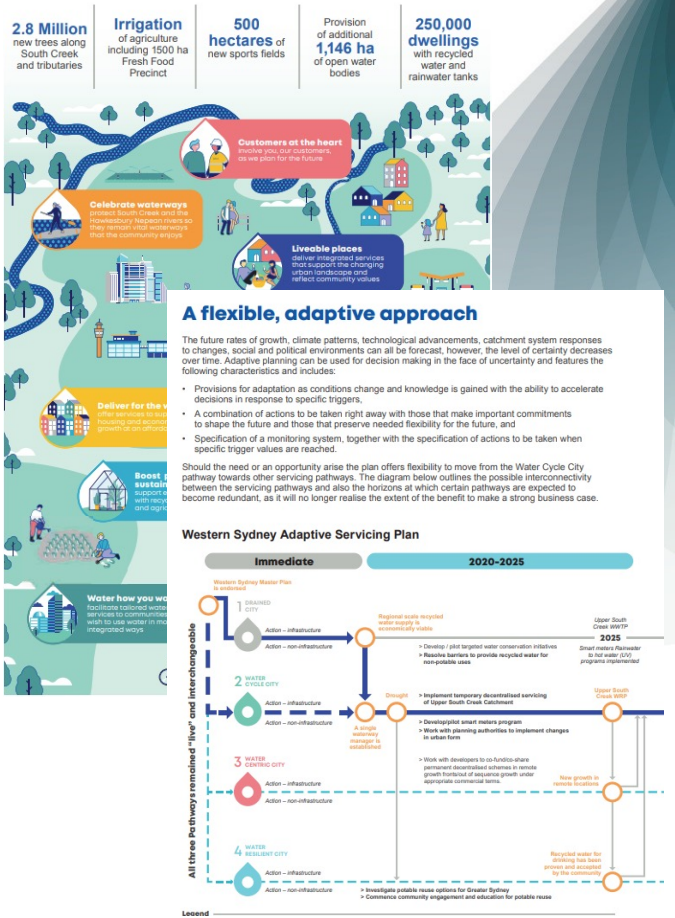
- climate change
- population growth
- changing technologies
- greater scrutiny
- economic uncertainty.

To optimise infrastructure investment and policy decision-making, it's crucial to take a strategic approach that works for today, while also building in the flexibility to respond to future opportunities and risks.

Enhancing investment decision-making

The adaptive pathway evaluation approach extends the traditional cost-benefit analysis (CBA).

- **Equips decision-makers with additional insights** to make sound investment decisions.
- **Can be applied to long-term servicing plans**, providing decision makers with additional insight for implementing and sequencing shorter term ‘no regrets’ activities.
- **Can be applied to different stages of planning** and is scalable.



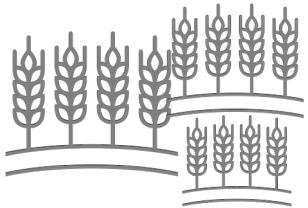
What we'll discuss

Over the past two years, Marsden Jacob Associates has successfully applied this approach with clients in the urban and rural water sectors. We'll explore why it has proven to be a valuable inclusion to the evaluation toolbox.

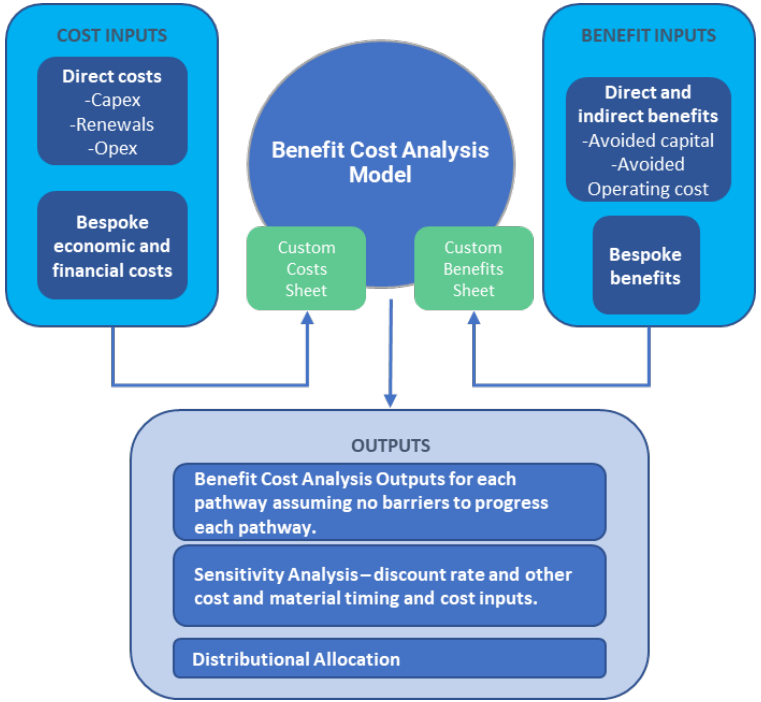
We will discuss the adaptive pathways approach using two case study examples.

Urban

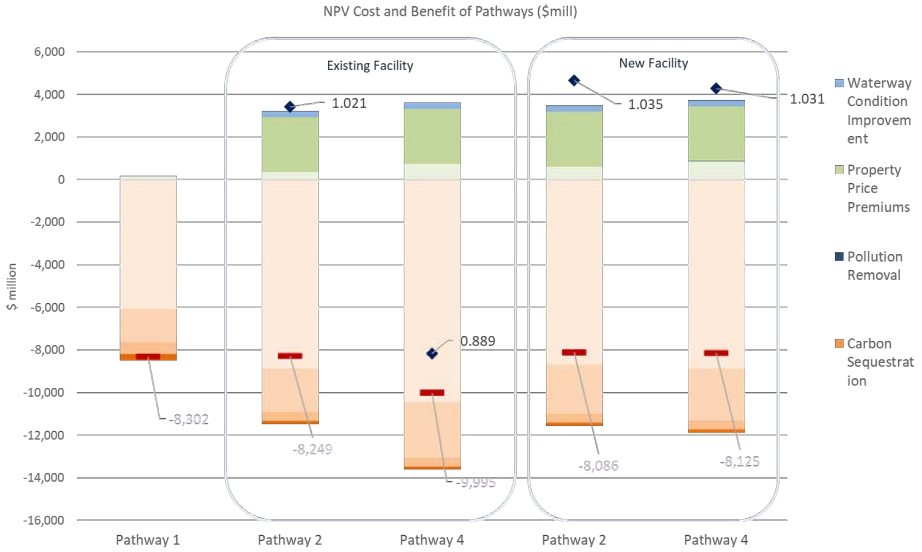
Rural



Static evaluation

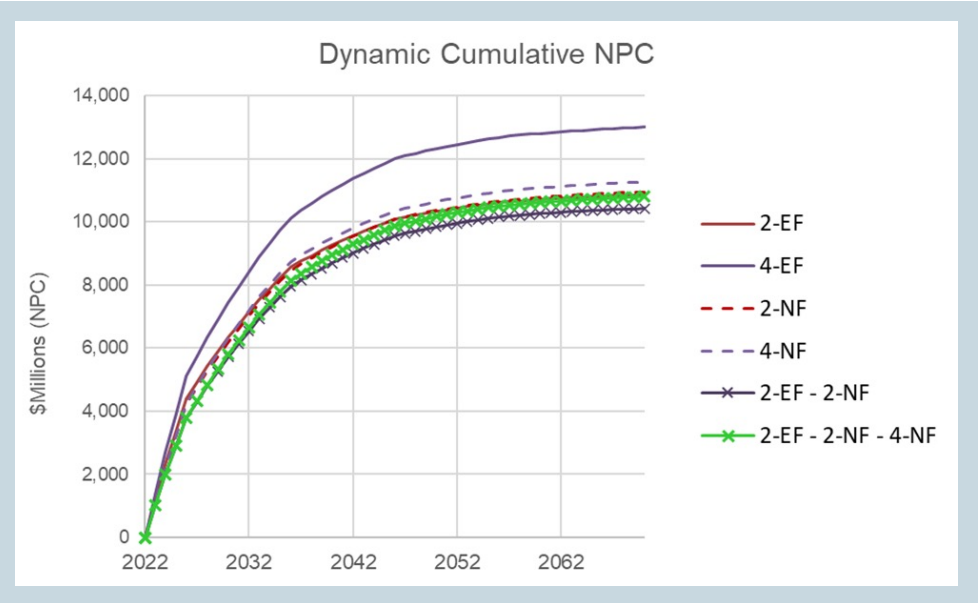


Assumes a future end state for each pathway is possible with no barriers.



Source: Marsden Jacob Associates

Adaptive evaluation



Source: Marsden Jacob Associates

We ask the question:

What must be true for us to transition from the base case to other pathways?

Urban – water infrastructure for growth

POPULATION INCREASING
IN 30+ YEARS

LIVEABILITY
RATING
DECLINING

HEAT STRESS
INCREASING

DEVELOPMENT PRESSURES ON
WATERWAYS

DECLINING
TREE CANOPY

Challenges

Opportunity

To deliver Water differently

Smart irrigation
Cooling urban areas

Water Servicing
Recover resources and diversify water sources

Building resilience
Integrated water cycle management

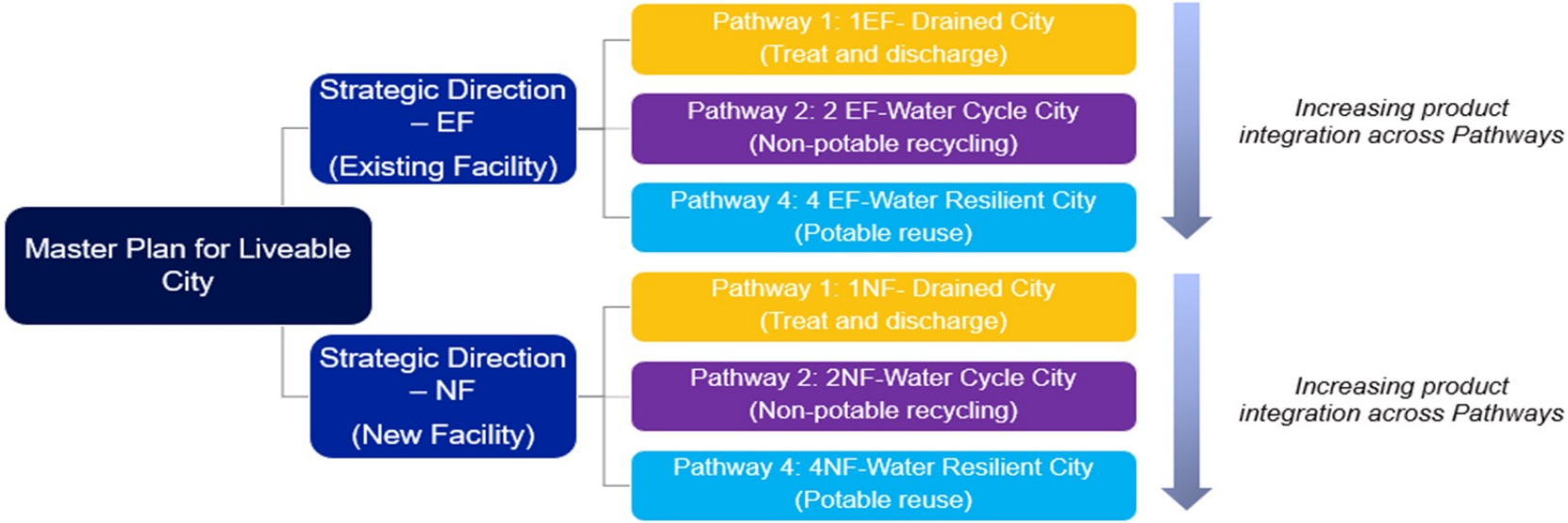
Circular economy
A hub for water, waste and energy

Source: Aurecon and Marsden Jacob Associates

Two possible servicing directions

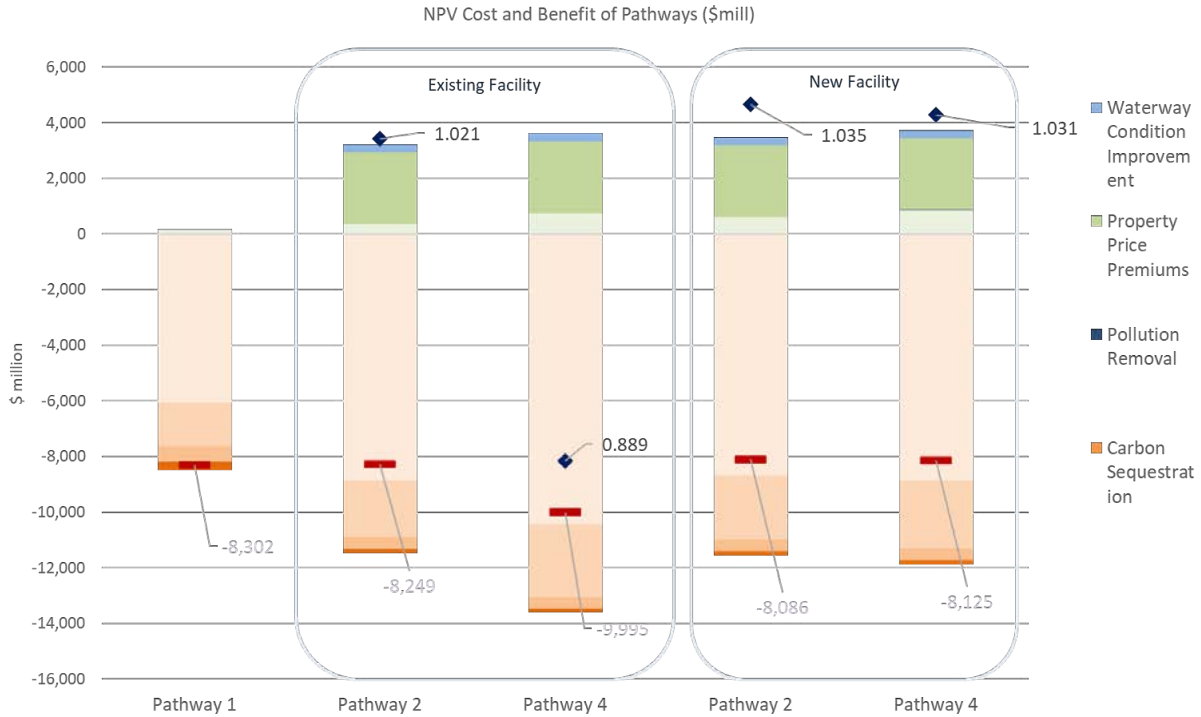
Key considerations for servicing:

- Is it efficient to deliver a new facility or service from an existing facility?
- What innovation opportunities arise from a new local facility?



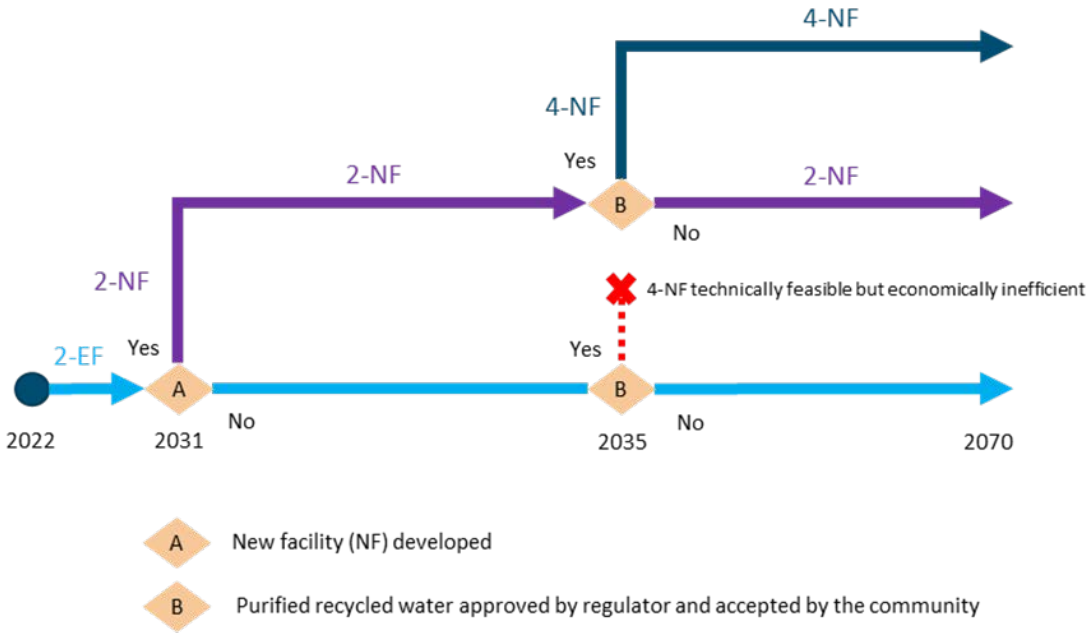
Source: Marsden Jacob Associates

Traditional CBA results



Source: Marsden Jacob Associates

Adaptive evaluation approach



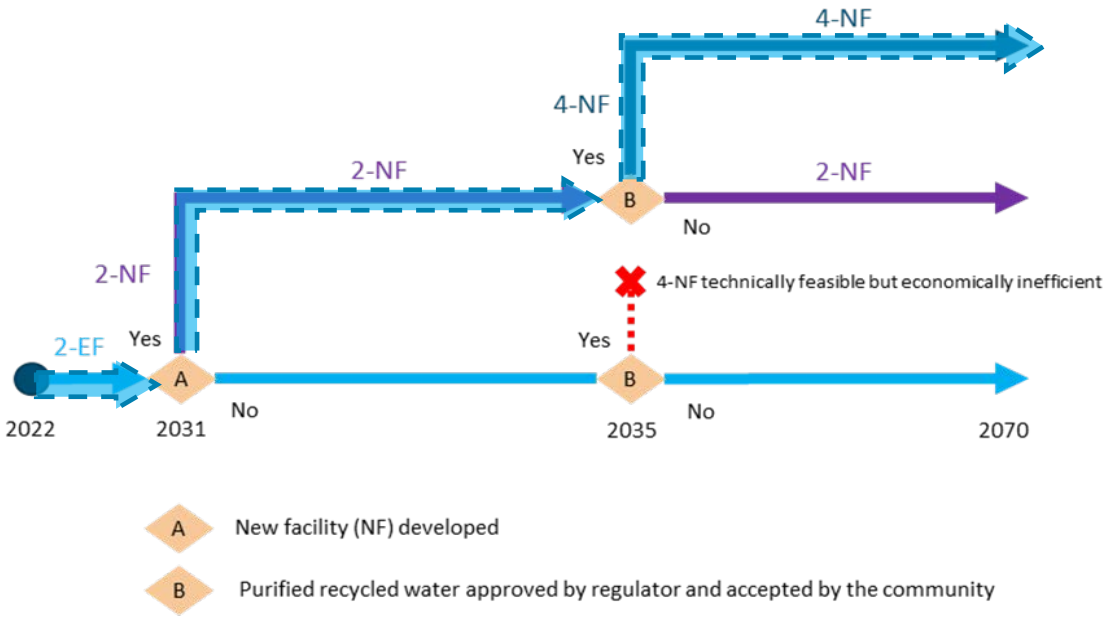
Source: Marsden Jacob Associates

Roadmap and key decisions

Key decisions tested:

- To simplify the evaluation, we tested two key barriers.
- The development of the new facility – external decision.
- Community and regulatory approval for purified recycled water.
- At each decision point we apply a binary switch.
- This approach is reasonable to use where strategic and policy decision points are concerned.

Adaptive evaluation results



Source: Marsden Jacob Associates

Results

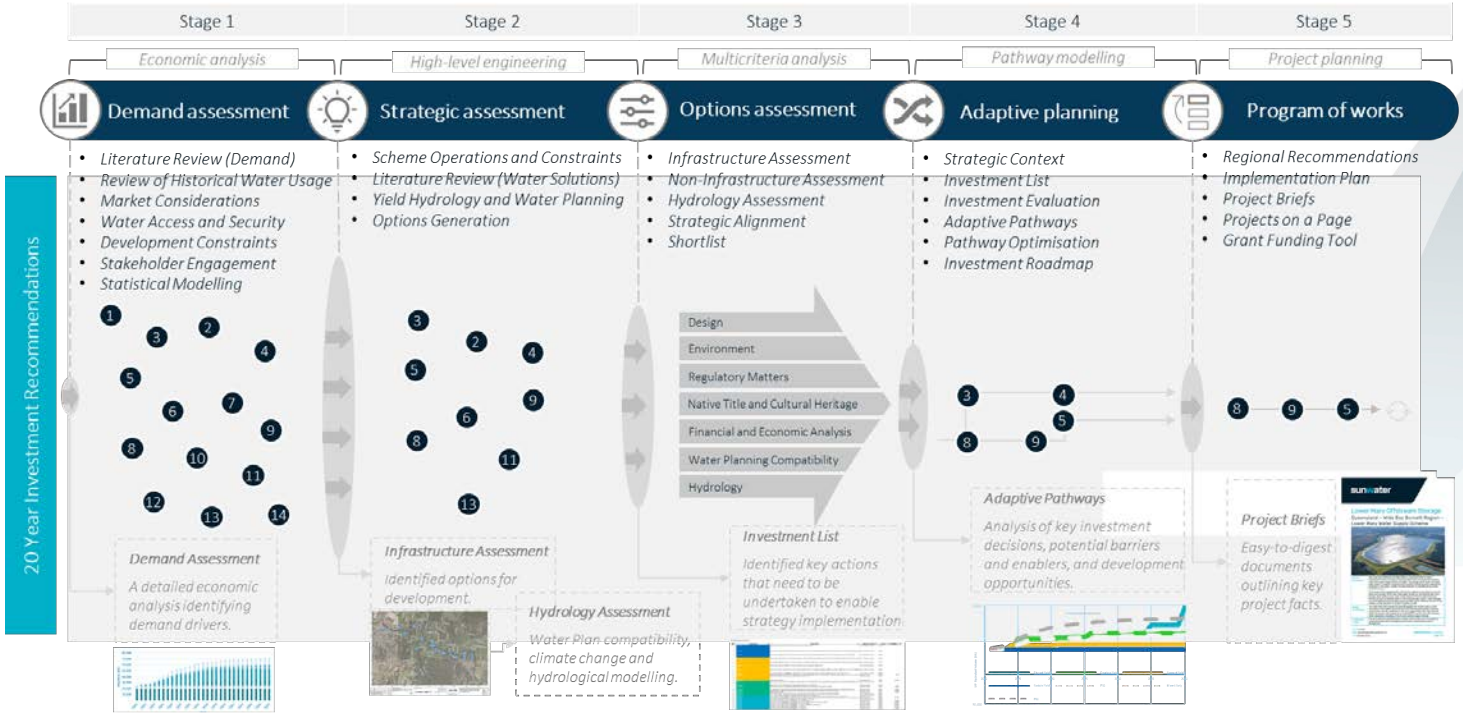
- No barriers to move from the Base Case.
- Commence investing in Pathway 2.
- New facility can be delayed up to 2031 – beyond this period it is inefficient to switch.
- The most efficient way to provide purified recycled water is through delivery of the new facility.
- The 'no regrets' approach is to progress along Pathway 2 and to influence the delivery of the new facility.
- This keeps the efficient delivery of purified recycled water open.

Urban case study poll

What are the key issues that inhibit efficient investment in urban water infrastructure?

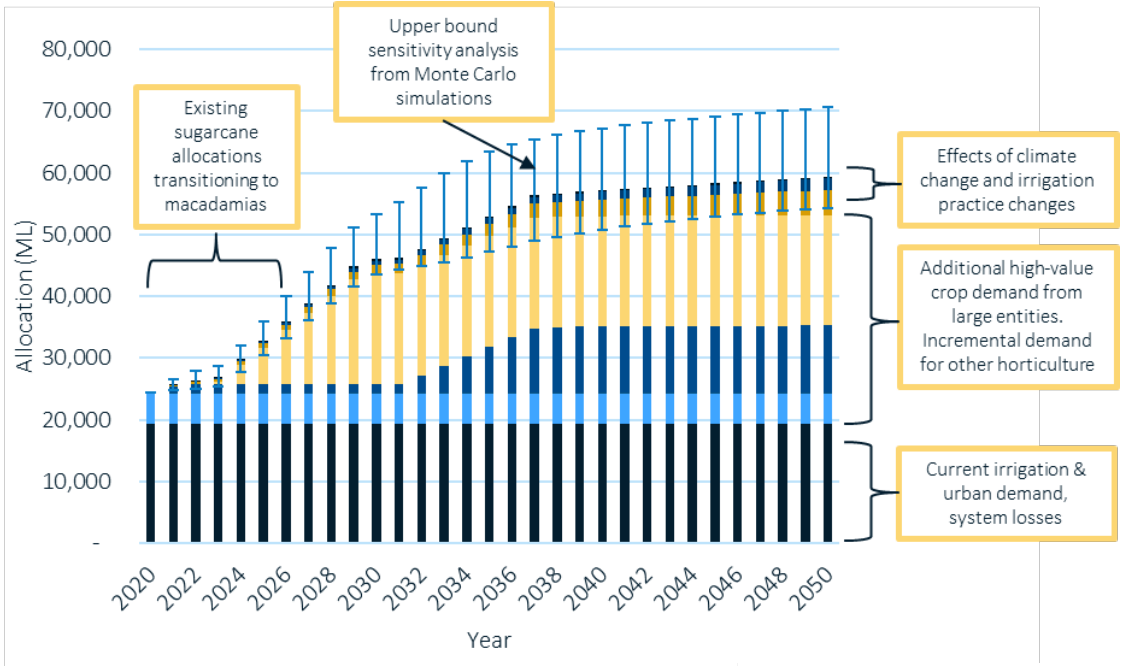
1. Shortcomings in technical evaluation.
2. Uncertainty about supply and demand expectations, including impacts of climate change.
3. Funding and financing.
4. Governance and regulatory.

Rural – system investment to cater for future demand



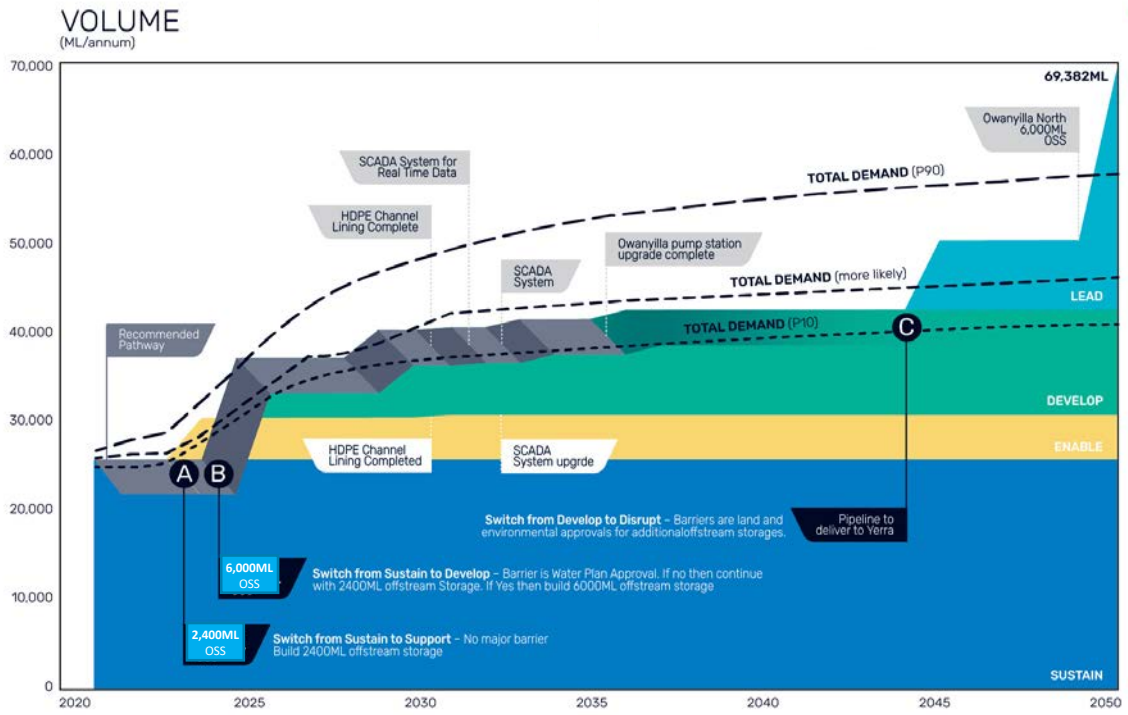
Source: Sunwater and Marsden Jacob Associates

Invest to cater for future demand



Source: Marsden Jacob Associates and NCE

What should we invest in first?



Lower Mary Adaptive Pathways

Source: Marsden Jacob Associates

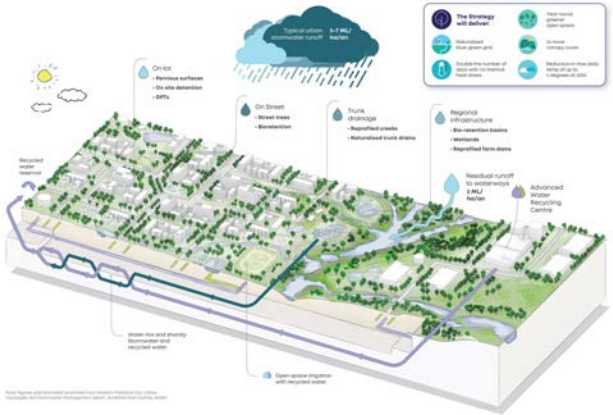
- Test asset sequencing based on barriers and enablers.
- Test option value of unique investment options.
- Evaluate benefit of marginal increase in crop production resulting from increased supply.

Key messages

- **No regrets**
  The adaptive pathways approach enables decision makers to evaluate 'no regrets/least regret' short-term investments to achieve long-term outcomes.
- **Customisable**
  Our approach is grounded in real options analysis theory and is customised to suit the industry context.
- **Scalable**
  Our approach is scalable, and we can run multiple iterations at relatively low cost.
- **Alignment**
  The approach aligns with Australian cost-benefit analysis and investment evaluation guidelines.

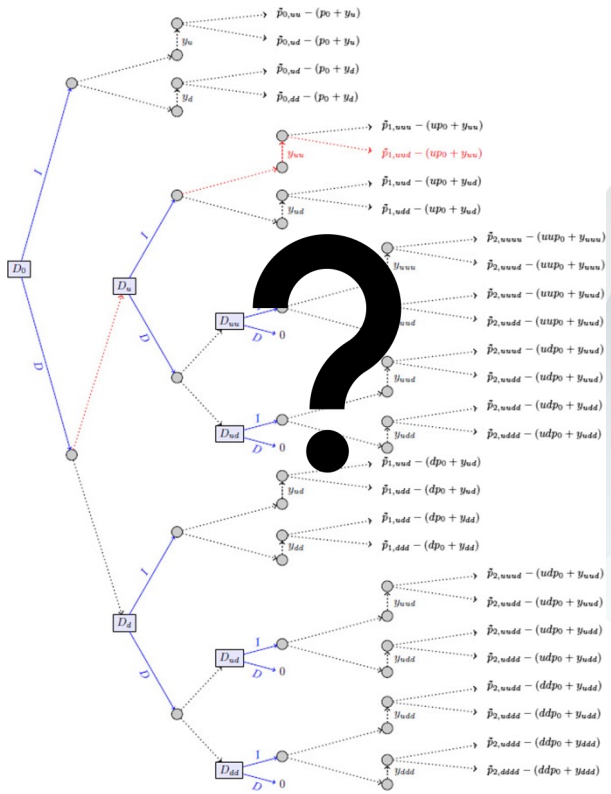
Who needs assistance with this issue?

- Master planners
- Urban planners
- Infrastructure system designers
- Asset managers
- Treatment plant planners
- Production managers
- Infrastructure investors



Some parting insights

- The model doesn't decide for you.
- Consider the expertise of the project team and subject matter experts.
- Introduce the appropriate level of complexity based on information available.
- Enable key decisions in the short term and continue iterative evaluation.



The team

We have a highly experienced water team located across Australia.
www.marsdenjacob.com.au/people

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Associate Director

Rod Carr
Director

Dr Jeremy Cheesman
Director

Erika van 't Veld
Senior Consultant

Rob Nolan
Associate Director

Dr Joel Byrnes
Associate Director

Rick Stankiewicz
Associate Director

Alex Marsden
Associate Director

Q&A and thank you

Adaptive pathways approach:
A journey to smarter infrastructure investment

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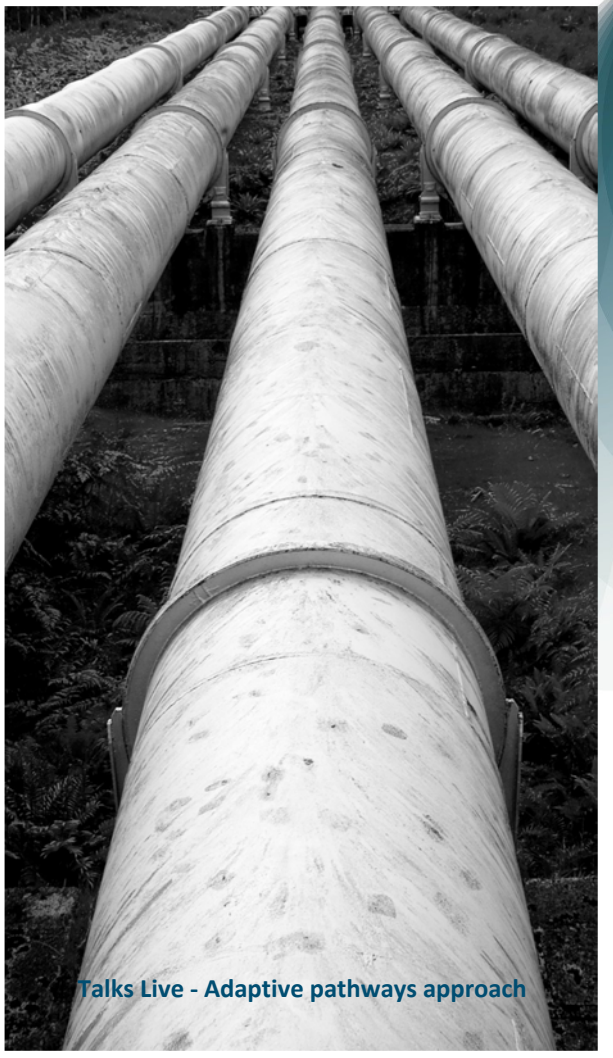

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2. Simplifying water markets
3. Constructing nature-positive RISs
4. European energy crisis: lessons for Australia
5. The real cost of carbon
6. Economics of coastal zone management
7. Adaptive pathways approach

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