

Consultation response from the Institution of Chemical Engineers (IChemE)

The Institution of Chemical Engineers (IChemE) is pleased to make this submission on Australia’s Draft Principles of a National Water Agreement. IChemE has responded to the three conversation starter questions. The responses below will also help with addressing the current and future environmental challenges as outlined in the Government’s 2021 Intergenerational Report - Australia over the next 40 years¹.

Question 1. Having agreed national objectives, outcomes and principles on water is important for managing Australia’s water resources.

A safe, secure water supply is essential not only for life and public health but for all process industries. Thus, IChemE believes that managing Australia’s Water Resources, for providing services in an efficient manner and for enabling a consistent approach to incorporating Traditional Owner values is absolutely critical for a sustainable future. This aligns well to our organisation’s goals with “Engineering a Sustainable World the Chemical Engineering Challenge”.

We note the following greatest challenges:

- Climate change (and associated resilience, carbon management).
- Food / Water / Energy Nexus (and the interfaces with water resource management and provision of sustainable energy sources and in particular the linkages to government Hydrogen targets).
- Cyber security.
- Effective integration with Traditional Owners.

We believe Australia needs to link to global best practice with the likes of the following:

- Further focus is required on quantifying, controlling and then reducing emissions, and then on mitigating the effects / improving overall resilience. CReDo (Climate Resilience Demonstrator) is an example of best practice for this (Britain, n.d.).
- Changing the carbon narrative using the UK Infrastructure Carbon Review² is a great example of the benefits for adopting a mature approach to Scope 3 emissions.
- Best practice for the food / water / energy Nexus with the likes of the Tuas Nexus in Singapore³.
- Adoption of the “biorefinery” concept to recover values such as Struvite fertiliser, metals and biodegradable plastics from wastewater to contribute to the circular economy.

¹ <https://treasury.gov.au/publication/2021-intergenerational-report>

² Government, U. (n.d.). <https://www.ignz.co.nz/stories/mana-whenua-at-the-decision-making-table/>

³ Singapore, N. (n.d.). <https://www.nea.gov.sg/media/news/news/index/tuas-nexus-singapore-s-first-integrated-water-and-solid-waste-treatment-facility-begins-construction>.

Question 2. Climate Change – Objective 6 - Is there anything you would add, change or remove in the principles that deal with climate change? Please give a reason for your response.

IChemE agree with the principles, however there are items we would like to see the following additions:

- Water Planning mandated and aligned to ISO55000 principles as required through OFWAT in the UK. The UK has created an environment for greater efficiency in delivery which has led to innovations such as creation of Carbon Baselines as outlined in the UK Infrastructure Carbon Review. Without mandating service providers creating water plans, there can be no clear direction to achieve Climate Change Objectives.
- We would like to see Carbon calculations used through planning and delivery phases. This should include Scope 3 emissions (as outlined in the UK Infrastructure Carbon Review (Government, n.d.)). This reduces carbon and cost of infrastructure and places a different lens on value engineering and be aligned to PAS2080 which is a globally recognised standard for measuring and managing carbon.
- Encouragement for Design for Manufacture and Assembly (DfMA) approaches which are widely used in the UK. This reduces time on site, cost and waste and provides significant resilience and rapid emergency deployment for products when affected by bush fires / floods etc (Royal Institute of British Architects, 2016).

The intentions of this policy are excellent; however, we note the following key risks based on our members working for and with Water Infrastructure Delivery.

- Working with Traditional Owners is in early stages (and maturity varies from state to state) and often the Registered Aboriginal Party (RAP) is not able to resource the collaborative working in a time that aligns to the service providers project risk profile. This may require additional assistance from government to help create the structures to enable the objectives in this policy to be met.
- Data – we note the resilience pilot developed through Digital Built Britain - CReDo (Climate Resilience Demonstrator). Many water companies and councils are investing in and attempting to develop tools for managing climate risk. This is a costly exercise and may be better served with a regulator (EPA for example) being funded to develop tools across a jurisdiction which can double as a communication tool to the public and a planning tool for Councils and Water Companies. SafeSwim is an example of this developed by Auckland Council (<https://www.safeswim.org.nz/>) where this was developed to provide water quality information to customers as well as justify infrastructure spend with the Central Interceptor project (to educate customers and encourage willingness to pay).

Examples of best practice policy where the natural environment and climate change is linked to infrastructure development can be found through the Centre for Digital Build Britain (<https://www.cdbb.cam.ac.uk/news/industry-unites-behind-vision-built-environment>) and the UK Government (<https://www.gov.uk/government/publications/transforming-infrastructure-performance-roadmap-to-2030>).

Question 3. Urban Water Reform – Objective 1 - Is there anything you would add, change or remove in the principles that deal with climate change? Please give a reason for your response.

IChemE agree with the principles, however, we would like to see the following additions:

- Providing a consistent Level of Service requires consistency in approach to Asset Management which provides consistency in approach to Infrastructure Investment. The PREMO model has driven Water Companies to be project focused rather than outcome focused. This is driven by AMAF as a mechanism for Asset Management (which requires systems and documents to be in place) where ISO55000 requires the systems to be embedded across the business. The UK model encourages Water Companies to be outcome focused and has driven innovation and markedly improved efficiencies. The Water Companies in Australia are often unable to deliver on their program of works or exceed budget (or both).
- Infrastructure Australia Infrastructure highlighted a number of key items and blockers for delivery efficiency in Australia. The commercial contracts in Australia do not enable collaboration and in the few cases where more collaborative contracts are being used these are not producing the benefits seen in other jurisdictions as they are often not being managed to the intent of the contract. New Engineering Contract (NEC), IChemE Green Book and similar mature alliance type approaches have resulted in significant savings. As an example, in the Water sector in the UK efficiencies in the order of 30 – 50% have been achieved over the last ten years whilst, in Victoria, water bills have increased by around 70%. This needs to come through government agencies and provision of appropriate training to ensure the intent of these collaborative contracts is met.
- Our current approach to delivery is on a contract-by-contract basis and there is a lack of maturity and understanding of where risk should be apportioned. With the current commercial arrangements this leads to risk being passed on to delivery partners that place a cost element to the risk or a lack of knowledge transfer which leads to delays and variations.
- In the likes of the UK and Singapore the use of BIM is mandated on government projects. Water companies in Australia are resourced to continue with Business as Usual and the likes of the Victoria Digital Asset Strategy is seen as a nice to have. Sydney Water is a leader in this in the water industry, however they have relied on the supply chain to provide systems for implementing BIM. We believe this needs to be mandated on government projects and the use of ISO19650 as standard across Australia. Councils and Water Companies will require resourcing and assistance to implement this and gain the efficiencies as an outcome.

Question 4. Science, Knowledge and Partnerships – Objective 4 - Is there anything you would add, change or remove in the principles that deal with climate change? Please give a reason for your response.

There are three key elements we would recommend:

- Building on our educational sector strengths to create efficiencies by ensuring we don't repeat R&D and that we learn by cross-fertilisation from other sectors. An example of this is the LITSoN project through the UK Water Partnership - <https://www.theukwaterpartnership.org/news/is-the-uk-water-industry-prepared-to-tackle-the-challenges-of-the-future>. This gathers research being undertaken around the UK and ensures that any overlap or duplication is highlighted to enable collaboration.

- Making approaches consistent across Australia. An example is recycled water where Victoria is more conservative than the rest of the country in its approach, and this has led to reduced competition to the point where validated membranes are no longer available to the market, as they are not efficient, and it is not cost effective to produce them for a market as small as Victoria. Global best practice in the likes of Singapore and the United States should be integrated into planning and delivery across Australia. The next stage for this is the communications around Potable Recycling and whether this can be achieved as it was in Singapore.
- Engineering Registration – IChemE supports engineering registration and sign off on projects to manage quality and risk. Nationwide legislation for registration would support consistency across the industry. As a relatively small industry, the State-by-State approach may discourage registration due to the additional cost and time it would involve.

Question 5. Overall - Considering the draft principles as a whole, do you agree the draft principles are sufficient to support the achievement of the outcomes and objectives?

We **disagree** that the principles will support the achievement of the outcomes and objectives. The intention of this document is excellent, however the nature of the industry (with Water Companies in some states, councils in others and a mix in others) and the lack of linkage to global best practice will mean the outcomes and objectives are unlikely to be achieved.

IChemE believes strong policy action is required to enable the industry to make the changes it requires to improve productivity Together with investment to protect water resources in keeping with the needs of the environment and Traditional Owners.

Question 6. Overall - With regard to the principles, are there any gaps or changes required?

Please see responses to questions 1 – 5.

Question 7. Overall - If you would like to provide any other feedback on the principles included in the discussion paper, please do so here.

Please see responses to questions 1 – 5. We have identified a number of key items based on our members working with all aspects of the delivery of water services and our Institution’s global reach.

There are key areas where government, rather than the individual service providers, can provide leadership that would provide much greater benefit at much lower cost to the customer and provide greater transparency and improve the speed of development working with Traditional Owner groups.

These are:

- Digital working (presenting performance and compliance using data already captured more effectively and presenting this information to the public).
- Assistance with digital maturity with BIM (via a mandate and resources for assisting with consistent best practice implementation using global staff).
- A focus on construction carbon to drive innovation and reduce cost.
- Assistance with resourcing Traditional Owner groups to further enhance the current conversations with service providers (potentially a co – governance model such as proposed in New Zealand).

- A change in commercial arrangements and training resources to ensure the intent of revised contracts are met.
- Cyber risk – there isn't a coordinated response or understanding of cyber security. This also needs to integrate with commercial arrangements particularly with the future of AI.
- Rationalisation and long-term planning for dams, desalination and recycled water. Uncertainty around projects does not help the market plan.
- Promoting public awareness of the value of water and the need to protect this precious resource and using best practice for encouraging potable reuse such as in Singapore.

Question 8. Overall - Overall, the principles will be helpful in achieving the objectives of a new national agreement on water and enable better management of Australia's water resources.

IChemE **agrees** that the principles will be helpful in achieving the objectives. The implementation risks across the country need to be addressed as outlined in our responses to questions 1 – 5.

The Institution of Chemical Engineers (IChemE)

The Institution of Chemical Engineers (IChemE) is a professional association with 30,000 members. IChemE is a not-for-profit qualifying body and learned society that advances chemical engineering's contribution worldwide for the benefit of society. We support the development of chemical, biochemical and process engineering professionals and provide connections to a powerful network of over 30,000 members in more than 100 countries. The Institution of Chemical Engineers in Australia has a board and staff in Australia.

This response has been produced by IChemE members in Australia and draws on the Institution's position on climate change published in November 2020.⁴ In 2020-22, IChemE also produced sectoral plans to support climate change action in multiple industries and jurisdictions, including energy transition, clean energy, water, food and pharmaceuticals. IChemE has submitted a detailed formal submission to the Low Emissions Technology Statement 2022 consultation: Department of Industry, Science, Energy and Resources, Australian Government.

We support our members in applying their expertise and experience to make an influential contribution to solving major global challenges, including achieving the UN Sustainable Development goals.

IChemE would welcome the opportunity to provide more detailed information if required.

⁴ <https://bit.ly/3ptN8C9>

References

- Auckland Regional Council. (2023). *Safeswim*. Retrieved from Decide with Safeswim: <https://www.safeswim.org.nz/>
- Australia, I. (2022, March). *A roadmap to a more productive and resilient future*. Retrieved from Infrastructure Australia: <https://www.infrastructureaustralia.gov.au/publications/delivering-outcomes>
- Britain, C. f. (n.d.). <https://digitaltwinhub.co.uk/credo/>.
- Government, U. (n.d.). <https://www.gov.uk/government/publications/infrastructure-carbon-review>.
- <https://www.cdbb.cam.ac.uk/news/industry-unites-behind-vision-built-environment>, C. f. (2021). *Vision for the Built Environment*. Cambridge: Centre for Digital Built Britain.
- Institute of Chemical Engineers. (2024). *Engineering a Sustainable World, the Chemical Engineering Challenge* - <https://www.icheme.org/sustainable-world/engineering-a-sustainable-world-the-chemical-engineering-challenge/>. Rugby: IChemE.
- NZ, L. G. (n.d.). <https://www.lgnz.co.nz/stories/mana-whenua-at-the-decision-making-table/>.
- Royal Institute of British Architects. (2016). *DfMA Overlay Report* - <https://www.architecture.com/knowledge-and-resources/resources-landing-page/dfma-overlay-to-the-riba-plan-of-work>. London: RIBA.
- Singapore, N. (n.d.). <https://www.nea.gov.sg/media/news/news/index/tuas-nexus-singapore-s-first-integrated-water-and-solid-waste-treatment-facility-begins-construction>.
- UK Government, h.-i.-p.-r.-t.-2. (2021). *Transforming Infrastructure Performance: Roadmap to 2030*. London: UK Government.