



## Department of Energy, Environment and Climate Action

Productivity Commission  
[circular.economy@pc.gov.au](mailto:circular.economy@pc.gov.au)

Dear Joanne Chong and Alison Roberts,

**RE: SUBMISSION ON BEHALF OF THE WATER AND CATCHMENTS GROUP OF VICTORIA'S  
DEPARTMENT OF ENERGY, ENVIRONMENT AND CLIMATE ACTION (DEECA) FOR THE  
PRODUCTIVITY COMMISSION'S INQUIRY FOR OPPORTUNITIES IN THE CIRCULAR ECONOMY**

I am writing on behalf of DEECA's Water and Catchments Group to outline key challenges, trends and opportunities observed by the department when considering the Victorian water sector's contribution to a circular economy. A similar submission was provided to the Circular Economy Ministerial Advisory Group in July 2024.

**Water is central in a systems-based approach to circular economy**

Water is the central resource that connects sectors from agriculture to energy, industry and urban to the environment and Traditional Owners. Due to these interrelationships, opportunities for transition to a circular economy arise at every point where water, energy or materials intersect. The water sector can play a leadership role in improving existing water systems to be more resource efficient which creates cost savings for water users. The sector can also offer advanced water treatment to enable suitable reuse of wastewater to achieve multiple societal benefits and extract valuable products from wastewater to close the resource loop. A systems-thinking approach will identify these nexus points and the sectoral trade-offs that could negatively impact circular economy progress and result in a disorderly transition.

One example of water's vital role is the exploration of renewable hydrogen as a future energy source in a net zero circular economy. Early versions of state and national hydrogen strategies highlighted that water was the lowest cost input, therefore little consideration was given to how water would be sourced or how it would impact existing water users and future needs. In recent years, Victoria has worked to ensure that projections and investments for hydrogen are informed by the availability of water to support renewable hydrogen production, and to ensure that water is sustainably sourced (for example by explicitly creating policy to encourage recycled water for hydrogen production so we do not add pressure to already stressed river systems) to minimise the impact on other water users and the environment. This will mitigate future issues in a drying climate where we could be faced with a scenario of choosing between water security and energy security with potable water supplies and hydrogen production relying on the same source.

True systems thinking must consider the long-term interdependencies of water with other sectors in a functional net zero circular economy. Where appropriate, the Commonwealth should promote the water sector's valuable contribution and ensure that true systems-thinking is applied across the broader transition. Consideration should also be given to exploring the role of the water sector in regenerating nature to ensure all three principles of the circular economy are holistically considered. Victoria's Catchment Management Authorities and Traditional Owners already play an important role in catchment health and restoration and should also be valuable stakeholders in the circular economy transition.

## **New economic opportunities unlocked by circular economy initiatives**

Circular economy initiatives support the development of new revenue streams which have been traditionally unrealised by the water sector. Opportunities such as waste-to-energy facilities transform wastewater and other organics into valued products that can be sold to markets for additional revenue. These new revenue streams can support water corporations to maintain affordability for customers amid a cost-of-living crisis despite the cost pressures from climate adaptation. As operational costs to businesses and standard-of-living conditions continue to increase, these new economic opportunities have become a large driver for the water sector to undertake circular economy projects.

Yarra Valley Water's [ReWaste](#) facility is an example of a successful circular economy project undertaken by a Victorian water corporation. Based in Wollert and operational since 2017, the waste-to-energy facility has the capacity to process 30,000 tonnes of commercial food organics and produce approximately 7,500 MWh of clean, renewable electricity per year. The facility has helped Yarra Valley Water reduce its' carbon emissions and power its co-located wastewater treatment plant to reduce operational costs and keep pressure off customer's' water bills.

The Commonwealth should consider how to support the water sector in pursuing circular economy initiatives and ensure appropriate regulatory and policy pathways are established for new products to harness their full economic value, contribute to broader national economic productivity, and support downward pressure on utility bills at a time when there is national focus on the cost of living.

## **The water sector can attract investment to support change**

Victoria has 18 state-owned water corporations that provide essential water and wastewater services direct to households, businesses and industry. They undertake prescribed services listed under the [Water Industry Act 1994](#) and the [Water Industry Regulatory Order 2014](#), which define the boundaries of what water corporations are allowed to charge customers for - and therefore receive revenue from - on customer bills. Many circular economy projects and activities fall outside the defined prescribed services and so water corporations are limited in their ability to fund these innovative projects with cross-sector benefits. This creates a barrier for the water sector to contribute and invest in broader circular economy outcomes and creates a risk that the sector will be left behind in the broader transition. As state-based entities, water corporations are also not eligible for some external funding sources that could support the exploration of circular economy outcomes. However, an example where this has been successful is Gippsland Water receiving \$4.788 million from the Victorian Government under Circular Economy Organics Sector Transformation Fund and the Australian Government under the Food Waste for Healthy Soils Fund to expand the [Gippsland Regional Organics](#) facility. The expansion aims to increase the organics processing capacity of the facility to 250,000 tonnes and boost compost manufacturing capabilities to 70,000 tonnes per year. Since the project has been underway it has also created 33 jobs for the construction process and 8 new positions to be created at the facility once works are completed.

The Commonwealth can support the water sector by reviewing funding models that would assist water corporations to bridge the gap in financing circular economy projects, for example through eligibility of grant programs. Guidance on how circular economy benefits could be incorporated into business case development will also assist the water sector to demonstrate the value of circular economy projects within their own organisations and identify potential co-investors to assist in funding these ventures proportional to their benefits. Co-investors could include local councils, private industry, community groups or government agencies. International examples from Europe suggest economic models and incentives such as higher feed-in tariffs for sustainable energy sources can tip the scales to create commercially viable projects that also attract financial investment from third parties. Greater private investment could also be encouraged through more favourable policy frameworks such as tax incentives for certain investment activities.



### **Strengthening national standards can drive improved disclosure and circular economy opportunities in the water sector**

DEECA has made a start on measuring circularity within the Victorian water sector using data already collected across the water corporations and catchment management authorities. Nationally consistent methodologies and metrics to measure circularity would enable government agencies and individual organisations to better measure performance, track progress, and identify focus areas to drive improvement over time. A national measurement framework should include metrics that can be compared across different sectors while also including sector-specific measures to drive industry-level change. Metrics need to also consider the type of data collection required to reduce double-reporting and reporting burden on entities.

Emission reductions are a huge driver behind the transition to circular economy practices in the water sector. Victoria's water corporations have collectively committed to being net zero by no later than 2035. To meet this requirement, much of the sector's difficult-to-abate wastewater emissions will need to be addressed through cost-effective, high-benefit and high-integrity offset units. Water corporations are therefore looking for initiatives - including accepting third party organic waste (diverted from landfill) - to create beneficial by-products such as digestate, biogas/biomethane and biochar. Water corporations and catchment management authorities are also investigating delivery of nature-based solutions with multiple benefits. Examples include the Community Carbon pilot project being delivered with North Central Catchment Management Authority and the floating wetlands trials being undertaken by Westernport Water to manage treated effluent and emissions produced at their wastewater treatment plant at Cowes.

National standards for carbon accounting and generation of methodologies that help water corporations generate carbon credits and other certificates using new technologies and processes will support the water sector to identify new sources of revenue or attribute value to these projects. This expands to teal carbon, blue carbon and renewable energy projects. Collectively this will help water corporations to manage affordability of water bills while transitioning to net zero, by reducing their reliance on purchasing offsets from the market in perpetuity to offset their scope 1 emissions from wastewater treatment.

Water corporations are also exploring how they can decrease their demand of raw materials within their infrastructure assets and organisational activities to reduce scope 3 emissions and improve material efficiency. Although there is appetite across the sector, information gaps on various recycled products and a lack of standards have been identified as key barriers to greater uptake of products. National standards and/or certifications of recycled products in various infrastructure applications, including the water sector, can help to reduce these barriers by providing clear product information to water corporations to make informed decisions for their procurement processes.

The Commonwealth should consider improving national standards on carbon accounting, certification schemes, circular measurement and recycled content policies that would drive circular economy efforts in the water sector. We recommend the Commonwealth prioritising:

- Establishment of a clear national circular economy measurement framework that includes methodologies and metrics that drive improvement in the water sector and work in tandem with existing state schemes and policies;
- Promotion and refinement of high value offset methods for water corporations, including but not limited to: blue carbon, teal carbon, and biochar methodologies;
- Better regulation of product information to improve informed procurement processes for the water sector and prevent greenwashing;

- Greater information sharing from jurisdictions that are more readily using recycled content and end-market data, particularly for industries such as the water sector that have industry-specific standards to maintain public health and safety;
- Supporting research to explore new market pathways for recycled materials for the water sector as both a consumer and producer of recycled content. A national body could support more streamlined approval of recycled material for use in construction nationally (in consultation with water industry peak bodies to ensure fit-for-purpose), while also facilitating innovation and information sharing across sectors.

### **Improve policy and regulatory alignment between jurisdictions to support place-based circular economy solutions.**

Each state and territory have their own regulations and policies for the many intersecting sectors with circular economy opportunities such as water, waste, energy and environment. While different state regulations are necessary, complexities can arise for areas near state borders where the flow of the materials may need to cross jurisdictions to create a practical circular economy hub.

The Commonwealth can continue to facilitate engagement between Australian states and territories to improve policy alignment and enable smoother translation of different regulations and systems across borders to reduce barriers in establishing place-based circular solutions across regional Australia.

### **The water sector is responding to changing environmental regulations and its role in preventing contamination to our environment**

Victoria's water corporations have an important role in managing wastewater to ensure contaminants do not enter and persist in the environment. Contaminants include per- and poly-fluoroalkyl substances (PFAS) that enter wastewater treatment processes primarily through industrial liquid trade waste. Updates to the National Environmental Management Plan 3.0 (NEMP3.0) are drastically reducing safe limits of contaminants in biosolids, which means current biosolids management solutions (such as land application aimed at reversing soil nutrient depletion) would be significantly impacted across the country. Surveys conducted by the Australian and New Zealand Biosolids Partnership estimate total biosolids production in Australia to be 372,000 tonnes of dry solids annually in 2023, with over 30 per cent coming from Victoria<sup>1</sup>. The cost associated with increased testing for contaminants and subsequent treatment of biosolids will increase pressure on customer water bills. Thermal treatment has been identified as the main process to reduce PFAS contamination with water corporations exploring pyrolysis and gasification technologies to create biochar as a new product.

Victoria's water corporations have partnered with RMIT University to patent [PYROCO](#) technology, which is demonstrating promising results in reducing PFAS (undetectable), microplastic, pesticides and pharmaceuticals in biochar products using biosolids and other organics as feedstock. This technology is an Australian-first using a new type of hyper-efficient reactor developed by RMIT to radically optimize heat and mass transfer and can be scaled down making it highly mobile for various potential applications in wastewater, biomass, plastics and coating industries<sup>2</sup>. DEECA has also financially supported a research project on functionalised biochar using PYROCO. In Victoria, biochar is currently treated as a reportable priority waste which limits its circular economy opportunities; it cannot be applied to land or other productive uses without a permit.

Coordinated engagement across jurisdictional EPAs to explore regulatory pathways for thermally treated biosolids (i.e. biochar) would help the water sector to address this environmental challenge and

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<sup>1</sup> ANZBP *Biosolids Production and End Use Survey – Australia 2022/23*

<sup>2</sup> *Australian-first tech: next step in waste transformation innovation* (<https://www.rmit.edu.au/news/all-news/2021/jul/biosolids-tech-trial>)

support the development of market opportunities for biochar to help finance the additional treatment of biosolids. This would directly help states to respond to the Commonwealth's incoming NEMP3.0 while minimising the impact on customer bills, supporting circular economy outcomes and growing local supply chains.

### **Biochar and new end-market opportunities for the water sector**

The water sector is exploring the different end-market pathways of biochar. These include both agricultural (i.e. as a soil condition or enhancer) and non-agricultural applications (i.e. in road-base for construction or in advanced manufacturing). The [2023 Global Biochar Market Report](#) from the International Biochar Initiative and the US Biochar Initiative estimates the global revenue generated by the biochar industry to be over \$600 million USD in 2023<sup>3</sup>. Water corporations such as Barwon Water and North East Water are actively exploring projects for developing high-value biochar products from biosolids and municipal food and garden organics (FOGO). There is a significant opportunity for the Commonwealth to support the development of biochar markets in Australia to grow its economic potential which is currently underdeveloped and has low awareness.

To accelerate additional new end market opportunities, DEECA has seed funded research and development that has shown exciting potential for biochar to be included in alternatives to lithium-ion batteries as an advanced manufacturing end-use. We are happy to share the learnings from this exciting project with the Commonwealth and other jurisdictions to accelerate further developments in this space. We expect there are other novel uses that need further funding and support to be investigated to develop the scientific-evidence base for market development and product commercialisation. The Commonwealth should consider supporting further investigation into novel use research that will assist in diverting biochar from stockpiles or landfill to advance the creation of end-markets and export pathways for innovative Australian technology and expertise.

### **Building partnerships between the water sector and broader circular economy industry players**

Water corporations are new to the circular economy space and have less established relationships with key stakeholders in other sectors and industries. Utilising a collective impact model, DEECA has chaired a Water Sector Circular Economy and Energy Working Group for the past three years comprised of Victorian water corporations, catchment management authorities, relevant Victorian government agencies and water industry bodies to work towards agreed goals and priorities.

Supporting industry connections helps water corporations access much needed technological solutions and expertise to identify best practice place-based solutions to meet immediate challenges while ensuring that their primary role of delivering water and sanitation is not adversely impacted. Partnerships with research entities and private industry could also accelerate technology that supports greater use of alternative water sources to diversify water supplies and overcome potential water resource constraints in circular economy projects.

In addition, water corporations can offer expertise in recycled water, organic waste management and treatment technologies that can support other industries in their circular economy transition. Initiatives co-located near wastewater treatment plants can be strategically advantageous from both planning and investment perspectives due to the accessibility of suitable land with buffer zones, existing infrastructure and proximity to surrounding industry. Barwon Water's [Colac Renewable Organics Network](#) is an example of a beneficial partnership where organic waste from local manufactures is sent to the nearby Colac wastewater treatment plant to produce biogas which is used by Barwon Water for clean, renewable electricity. The hot water by-product is then sent back to the local manufactures to help offset their natural gas consumption. There are several other Victorian water

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<sup>3</sup> The 2023 Global Biochar Market Report estimates the total revenue generated from the biochar industry in 2023 to be \$610,260,000. This has increased from the 2021 total revenue estimate of \$156,380,000.

corporations exploring the co-location opportunities of circular economy initiatives with the sites of their wastewater treatment assets.

The Commonwealth can play an important role in providing sector-specific information platforms, working groups and industry meet-and-greets to widen these connections to a national scale and with stakeholder groups that may be more difficult for the sector to access.

### **Leveraging trust**

Victoria's water corporations are trusted organisations within the community and are well positioned to execute education campaigns and capability building programs that improve circular economy awareness. The water sector should be considered as a valuable partner in the multi-pronged approach to improving community awareness and engagement on circular economy matters.

I hope this letter has provided valuable insight into the unique challenges and opportunities of Victoria's water sector in Australia's circular economy transition. Victoria will continue to progress its own circular economy agenda through frameworks including *Recycling Victoria: A New Economy*. I look forward to seeing the outcomes from the Productivity Commission on how to further circular economy progress within Australia and how it works alongside recommendations made to the Commonwealth from the Circular Economy Ministerial Advisory Group.

Yours sincerely

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