



**WATER SERVICES  
ASSOCIATION OF AUSTRALIA**



# WSAA BIOCHAR SEMINAR 2023

## KEY INSIGHTS



On 26th and 27th June 2023, WSAA convened a forum to explore the potential of biosolids-derived biochar, which has the potential to revolutionise the role of water utilities in carbon and waste management, and significantly scale up our contribution to the circular economy.

The forum brought together around 80 participants, both in-person and online, including representatives from utilities across Australia and New Zealand, environmental regulators, government stakeholders, the Australian New Zealand Biosolids Partnership (ANZBP), and the Australian and New Zealand Biochar Industry Group (ANZBIG). It provided a platform to discuss shared policy, market, and regulatory issues, and to educate policy-makers on biochar's potential contribution to the national economy and waste and carbon emission targets.

The aim was to bring together the water and biochar peak industry bodies, water utilities, regulators and policy makers to build a common understanding of the goals and challenges of the water industry in the biochar space, as well as the alignment with government policy.

WSAA is committed to advancing this crucial conversation, in partnership with the water industry, ANZBP, ANZBIG, government, regulators, and the industry supply chain.

## Key insights from the forum included:

- Biosolids to land application is becoming more difficult with increasing regulatory issues around emerging contaminants, as well as increasing operational expenditure.
- Australia has significant underutilised biomass: around 50-100 million tonnes of agricultural and forestry residue, and 300,000 dry tonnes of biosolids which could be converted into biochar, reducing emissions and serving various beneficial end uses.
- Biochar properties and applications enable a higher market value than biosolids– though demand and supply are not always linked up.
- Utilities want to explore the potential of biochar further, but need support across key policy and regulatory areas and improved understanding of markets.
- Specific challenges include biochar's classification as waste, difficulty in obtaining Australian Carbon Credit Units (ACCUs) to offset high setup costs, and understanding of local market conditions.



# WHAT IS BIOCHAR?

Biochar is a stable, carbon-rich material produced by heating biomass under controlled low oxygen conditions using a thermal treatment technology such as pyrolysis and gasification. Biochar can be made from many biomass feedstocks, such as forestry residues, crop straw, manure, urban green-waste and biosolids from sewage treatment.

Biochar can be used as a soil amendment and a range of other non-soil applications (water management, road construction, cement, building materials) that provide multiple benefits. Biochar is recognised by the IPCC as an effective method for climate change mitigation, providing a double benefit from emissions reduction and CO<sub>2</sub> removal, with a potential abatement of up to 6.6 Gt CO<sub>2</sub>e per year globally (IPCC, 2022).

Disposals of biosolids is a growing challenge for water utilities globally, due to increasing operational expenditure such as transport costs, and increasing regulatory attention to contaminants of emerging concern, such as PFAS and microplastics.

Water utilities have a major opportunity to turn this problem into a benefit for emissions reduction, soil and waterway health, and for our revenue base through the production of biochar.



## **BENEFITS & ALIGNMENT WITH THE CIRCULAR ECONOMY**

### **Biochar helps deliver on all three principles of a circular economy (Ellen MacArthur Foundation):**

- It eliminates waste by reusing the biosolids and any other feedstock used to produce it, and destroys micropollutants found in biosolids feedstock such as microplastics and PFAS
- It enhances circularity in the economy at a range of price points, for both soil and non-soil uses, depending on the feedstock and technology used to produce the biochar
- When used in soil amelioration it helps add carbon to soils, reducing air emissions, and improves soil fertility and productivity yield through reduced nitrogen leaching and stabilising of new organic matter, increased water holding capacity and pollutant removal



# SCOPE OF BENEFITS ACROSS AUSTRALIA

Modern biochar systems could reduce Australia's national carbon footprint by 10-15%, provide 10,000 -20,000 permanent jobs, improve soil health and the value of an additional 10-20 million ha of farmland each year and provide high quality environmental, social and governance (ESG) investment and offsetting opportunities in the order of billions of dollars (ANZBIG, 2022).

It also supports State/Territory and Commonwealth Circular Economy and waste reduction targets, as indicated in the National Waste Policy Action Plan 2019.

In Australia the water industry produces about 300,000 dry tonnes of biosolids annually (1.4m wet tonnes) of which around 75% is beneficially reused in agriculture, 12% stockpiled around 3% sent to landfill ([ANZ Biosolids Partnership 2021](#)). Biosolids are also a consistent and reliable renewable energy source capable of generating surplus energy during their management.

Energy efficient biochar production presents the industry with an opportunity to advance the wastewater circular economy, provide a high value resource to other industries and reduce the dependence upon landfill and land spreading.

Water utilities can leverage highly efficient pyrolysis and gasification technology to reduce the risk of human health and environmental impacts from land spreading, in an environment of increasing regulatory attention on biosolids management (PFAS, pathogens, pharmaceuticals, microplastics). Advanced thermal treatment processes producing biochar have demonstrated the destruction of PFAS, pathogens and pharmaceuticals and a significant reduction of microplastics.

# WSAA ADVOCACY

One of WSAA's fundamental roles is to advocate in Canberra and with the state and territory governments on behalf of the water industry, in order to stimulate a beneficial policy and regulatory environment.

To date, WSAA has put significant effort into supporting the industry on biochar through the following:

## SEPTEMBER 2022

- Promoted case studies such as Logan Water's gasification project, Greater Western/South East Water's Pyroco and Barwon Water's 'Biochar to Batteries' project, and the policy imperative within the water industry and with key government stakeholders

## JANUARY 2023

- Completed a submission to the Clean Energy Regulator (CER) on the need for a dedicated Emissions Reduction Fund method for biochar, with a biosolids-feedstock pathway

## MARCH 2023

- Discussed biochar's policy and regulatory issues with Senator Jenny McAlister, Assistant Minister for Climate Change and Energy
- Provided a letter of support to ANZBIG for the Biochar Industry Roadmap
- Developing a pitch to the Circular Economy Ministerial Advisory Group (MAG), which includes a piece on biosolids-derived biochar and the key issues needed to unlock stronger water utility participation in the market, as well as the benefits of doing so at a national level

## 2023

- WSAA has committed to developing an MOU with ANZBIG

WSAA will continue to work with the water industry and biochar peak body ANZBIG to progress an Emissions Reduction Fund method for biochar. This is expected to proceed once the Chubb Review Implementation Plan is fully embedded by the Federal government. Further Department of Climate Change, Energy, Environment and Water (DCCEEW) consultation on this is expected June-November 2023.

We also expect that close engagement with the Circular Economy MAG will lead to positive change for the water industry in the biochar space in 2023 and 2024.

# WORKSHOP INSIGHTS

## CHALLENGES



### Policy

- Lack of an Emissions Reduction Fund (ERF) method to recover some of the currently high upfront costs for biochar projects through Australian Carbon Credit Units (ACCUs)
- The commonly used waste hierarchy graph doesn't separate out pyrolysis and gasification from incineration / waste to energy as more circular alternatives that don't add non-biogenic carbon to the atmosphere
- Updating Australia's emissions inventory methods to account for biochar - currently biochar does not count towards Australia's Nationally Determined Contributions toward Paris climate goals, despite the IPCC concluding it should in their 2019 recommendation, and in the more recent 6th Assessment Report (2022)
- Lack of certification and standards for biosolids-derived and mixed feedstock biochar for different end uses
- Differing views on what the best end use is to lock up the carbon in biochar long term
- Siloed policy development inhibiting innovation in the circular economy space, for example government procurement policy affecting government-owned utilities
- Consistent policy support for biochar technology demonstrations and clear pathway from pilot to commercialisation

## ENABLERS

- Redefining the commonly understood waste hierarchy, separating out pyrolysis and gasification
- Advocating for biochar to be framed as an enabling product in the National Waste Policy Action plan targets
- Certification and standards developed for biosolids-derived biochar for different end uses and applications across states and territories
- An understanding of the net benefit of the water industry's circular economy contribution through biochar and the net impact to the environment and human health from emerging contaminant control, versus other control methods such as source control
- Support for innovative governance models such as water utility and local government wholly owned subsidiaries focused on circular economy opportunities



### Regulatory

- Biochar classified as a waste under state EPA regulations
- End-use based PFAS regulation
- Onerous approvals process for utility pilot trials of biochar technology

- Fit for purpose regulation of all end of waste products, especially to support ease of pilot/demonstration and movement to commercialisation
- A nationally consistent approach to classifying biochar as a resource
- Risk or rate-based application regulation for how biochar can be used (eg. soil or non-soil end uses)
- Leverage insights at a regulatory level from early adopters such as Logan with regulators around the country, for example through a WSAA-convened regulatory forum



### Market

- Investment uncertainty due to lack of end use and carbon market analysis, and internal capability to resource this
- Utility understanding and analysis of their biosolids resource - different feedstocks have different barriers to market
- Need to engage across other sectors of the feedstock market

- Market analysis in each utility's service area - engage the market to understand demand, price point and desired quality - this can be done collaboratively between utilities in similar regions
- All biosolids are different - utilities should invest in understanding the typical composition of their resource and matching it to desired biochar composition in their market locally
- Leverage existing biosolids markets to inform market strategy for biochar
- Leverage insights from early adopters such as Logan Water

# What does success look like?

**01**

**ERF method for biochar that enables scale up of biochar projects**

**02**

**Clearer utility understanding of their biosolids resource and local market dynamics before settling on a technology**

**03**

**Fit for purpose regulation of biosolids that supports biochar's classification as a resource and allow its movement across state borders**

**04**

**Exploring co-location of feedstocks and innovative governance models that support economies of scale across aligned sectors, eg, water, local government and waste**

**05**

**Business cases focusing on market potential not just solutions to emerging contaminants in biosolids**

**06**

**Work towards source control of PFAS**

**07**

**Revision to the waste management hierarchy that separates out pyrolysis and gasification from incineration**

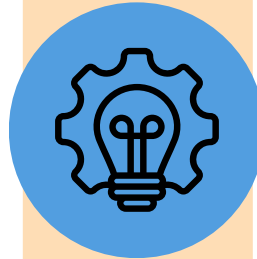


# Next steps



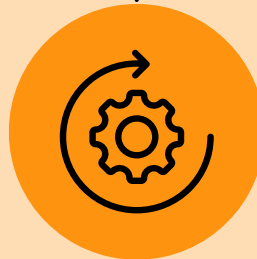
## 1. Promote

WSAA to continue to support the water industry - biosolids, biochar, emerging contaminants and the circular economy (eg.g at 'produce and use' opportunities and understanding 'all char options on the table' for market and product quality analysis)



## 2. Improve

Potential value chain forum to further explore biochar issues and opportunities



## 3. Maintain

Ongoing ability and willingness to engage further with regulators and policy makers to help ensure and support success for utilities in the biochar space