

Pathways Call for Evidence Submission

18 July – 14 August 2026

Submission type	Upload
Submitter	Metamorf Engineering Pty Ltd
Response ID	385587

Disclaimer

This document is a submission to the Net Zero Commission’s 2026 Pathways Call for Evidence. As part of the consultation process, the commission has committed to publishing the submissions it receives. Submissions do not represent the views of the commission.

RESPONSE to Net Zero Commission – Decarbonisation Pathways

Public Call or Evidence

4th August 2026

Policies and market mechanisms - Opportunities or barriers could improve the effectiveness of NSW's transition to net zero

Pyrolysis of waste to biochar, carbon removal and renewable energy

The opportunity is to pyrolyse significant volumes of waste biomass residues to biochar, plus carbon removal within the biochar while also generating renewable energy. This is reflected within the [Australia & NZ Biochar Industry Groups Roadmap](#). The ANZBIG roadmap outlines how pyrolysis of this biomass could transform 50 million metric tonnes of available waste residues to 15 million tonnes of biochar, with permanent removal of 30–60 million tonnes of CO₂-e annually stored in the biochar. While pyrolysing the biomass to biochar would also generate around 300 million GJ of renewable energy per year. Collectively, this represents an estimated \$10 billion in annual economic value. There are further flow on effect opportunities of carbon sequestration, methane and nitrous oxide reduction or emission avoidance when biochar is used in agriculture and construction.

Metamorf Engineering's contribution to Australia's decarbonisation and circular-economy roadmap is substantial. As one of the country's leading manufacturers of advanced pyrolysis systems, Metamorf is scaling national biochar production capacity at a pace that aligns with international best practice. Over the next three years, Metamorf's deployment pipeline is positioned to process at least 100,000 tonnes per annum (tpa) of biomass into biochar—equivalent to roughly 2% of Australia's currently accessible waste biomass streams. Over a five-year horizon, this capacity is projected to exceed 5% of available feedstock, supporting both emissions reduction and regional economic development.

This scale-up aligns with global evidence showing that pyrolysis and biochar are among the most cost-effective and durable carbon removal pathways. The IPCC recognises biochar as a verified carbon removal technology, and the International Biochar Initiative (IBI) reports more than 70,000 peer-reviewed papers demonstrating benefits across soil health, emissions reduction, construction materials, and waste management.

Government support

To accelerate domestic deployment and ensure Australia remains competitive with global markets, government support could include:

- Market development mechanisms for biochar production and use, similar to US and EU programs that provide tax credits or direct procurement for carbon-negative materials.
- Incentives or subsidies for stakeholders who adopt pyrolysis or apply biochar in agriculture, construction, heavy industry, mine & contaminated sites remediation, or waste management.

- Emissions-linked taxation for manufacturers (e.g., fertiliser producers or importers), paired with subsidies for incorporating biochar. Research shows that fertiliser-related N₂O emissions can be reduced when biochar is incorporated.
- Waste-stream incentives or levies, encouraging waste producers to divert biomass into pyrolysis rather than landfill or open burning.
- Improved EPA regulatory pathways, including clear guidance for biochar production, environmental licensing, and application standards.
- Fast-tracked Development Application (DA) approvals for pyrolysis and carbon-removal infrastructure.
- Formal endorsement and implementation of the ACCU method for biochar, recognising the draft developed by the Australia & NZ Biochar Cross-Industry Working Group.
- R&D and demonstration funding, prioritising demonstrations rather than basic research, given the extensive scientific literature already available.

*Note governments should review other countries policies such as Denmark, the US and Europe who all subsidise biochar and or pyrolysis projects in some way. In addition all have a government backed carbon removal scheme recognising the carbon within the biochar as carbon removal. Most all have a standard they refer to for biochar production and use and ANZBIG has developed one soon to be endorsed by Standards Australia.

Technology and behaviour change - Opportunities and barriers to technology development, deployment for each sector

Biochar Market Support

Biochar is an exceptionally versatile material with properties that extend far beyond its stable carbon content. Its high surface area, electron-mediating capacity, and adsorptive and catalytic behaviour make it valuable across agriculture, construction, remediation, manufacturing, and carbon-removal markets. Despite this potential, Australia's current biochar production capacity—estimated at ~30,000 tpa—remains significantly below both domestic demand growth and international benchmarks.

Metamorf Engineering is positioned to scale production far beyond this baseline. As outlined above, Metamorf's technology pipeline will enable processing of 100,000 tpa of biomass within three years, with further expansion planned. However, a major barrier to rapid scale-up is the lack of mature, large-volume offtake markets comparable to those in the US and Europe. This creates commercial risk for purchasers investing in multimillion-dollar pyrolysis infrastructure.

The market-development supports and incentives listed earlier are essential to overcoming this barrier. International evidence is strong: more than 50,000 peer-reviewed papers document agricultural benefits, and a rapidly growing body of research demonstrates biochar's role in decarbonising the built environment, including its use in concrete, asphalt, insulation, composites, and industrial materials. Recent white papers (including the [IBI-aligned "Decarbonizing the Built Environment with Biochar: A Blueprint"](#)) summarise the emerging opportunities for biochar in manufacturing and construction.

Recognition of Pyrolysis as a High-Value Economic and Carbon-Removal Technology

Public discourse in Australia often frames Net Zero as a cost to the economy, however Pyrolysis of waste biomass to biochar, carbon removal and thermal challenges this narrative. Metamorf's systems demonstrate how carbon-removal technology can strengthen regional economies by converting waste biomass into three revenue streams:

- Biochar (for agriculture, construction, remediation, heavy industries including cement & iron & steel manufacturing)
- Carbon removal (durable sequestration recognised internationally and under development in Australia's ACCU framework)
- Renewable thermal energy (displacing fossil fuels in industrial heat applications)

This model mirrors international experience, where pyrolysis is recognised as a profitable carbon-removal pathway that supports jobs, manufacturing, and regional development.

Evidence and Current Deployment

Metamorf has deployed multiple pyrolysis systems across Australia and one in New Zealand. Details of our technology are provided in the attached documentation. Our largest system, the CHARCELL™ FOUR, delivers:

- 20,000 tpa biomass throughput
- 5,000 tpa biochar production
- 10,000 tpa durable carbon-dioxide removal
- 100,000 GJ of renewable thermal energy

The first CHARCELL™ FOUR was recently installed at Ironwood, a timber mill near Taree, NSW.

Closing

Further information is available in the attached documents. We welcome engagement and are available to discuss how pyrolysis and biochar can contribute meaningfully to NSW's decarbonisation pathways, regional economic development, and carbon-removal leadership.



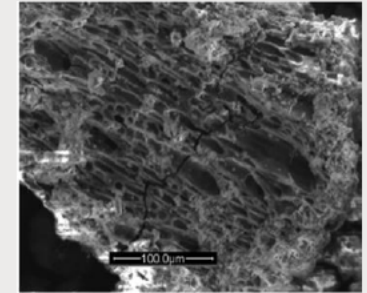
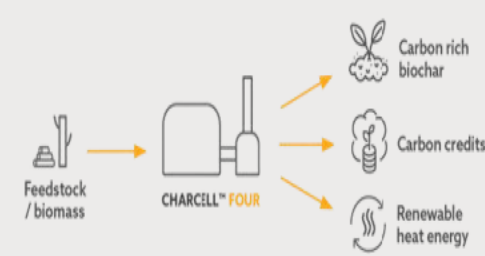
METAMORF™

www.metamorf.engineering

ABOUT METAMORF ENGINEERING

CHARCELL™ Technology providing three revenue streams from waste

1. Biochar to suit local applications
 2. Energy solutions
 3. Carbon removal
- Full turnkey project solutions
 - Biochar and carbon removal sales and advisory service
 - On going maintenance and support



METAMORF CHARCELL™ SYSTEMS



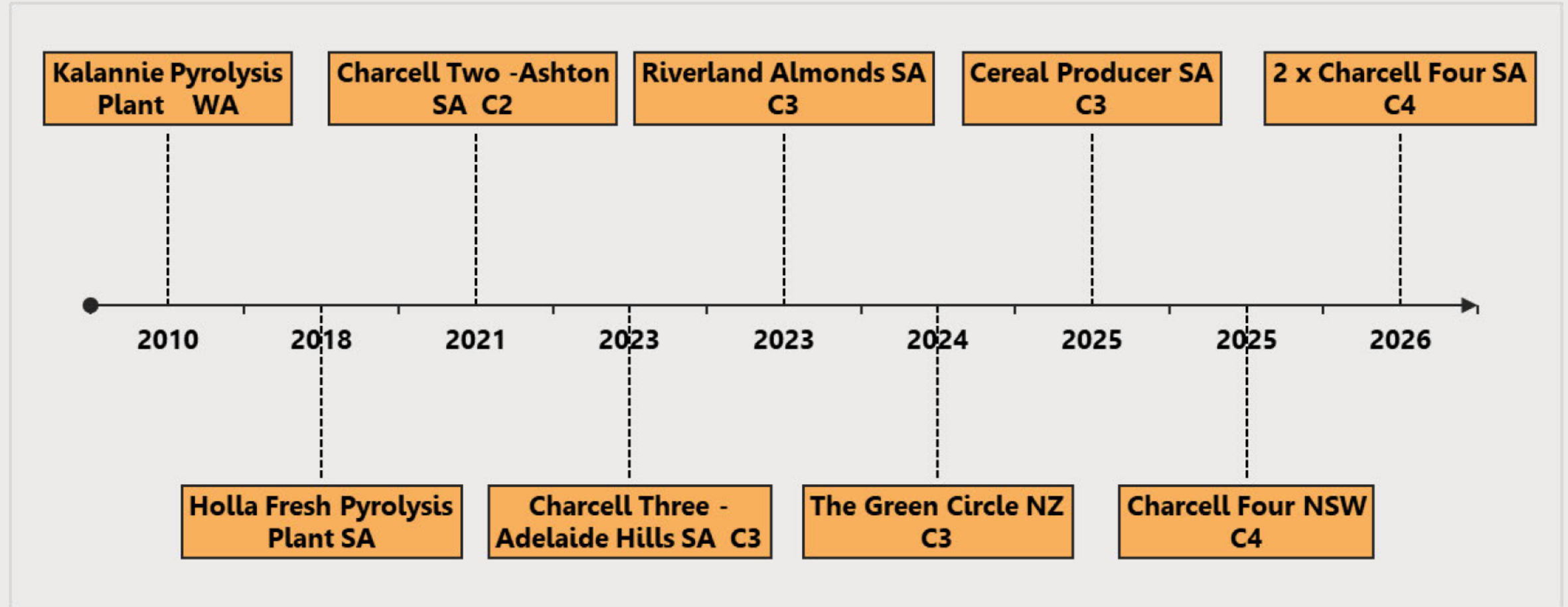
CHARCELL™ THREE



CHARCELL™ FOUR

INPUTS		
Feedstock Input, tpa	4800	20,000
OUTPUTS		
Biochar output, tpa	870 to 1450	3600 to 6050
CO ₂ e Removal output, tpa	1950 to 3200	8200 to 12700
GJ pa heat energy	14500 to 29,000	60,500 to 121,000

EXPERIENCE & ENGINEERING PYROLYSIS SYSTEMS TIMELINES



CASE STUDIES CHARCELL

CHARCELL™ THREE Cereal farm



Cereal Industry



CHARCELL™ THREE
Green Circle, Marlborough NZ,

Forestry

CHARCELL™ FOUR Ironwood, Taree NSW



CASE STUDIES GREEN ENERGY/COGEN

Simplot, 8MWe Gas Turbine with
Steam Cogeneration



RMIT City, Vic

2 x 1.6MWe Cogeneration



New RAH,

2x 2MWe Cogeneration



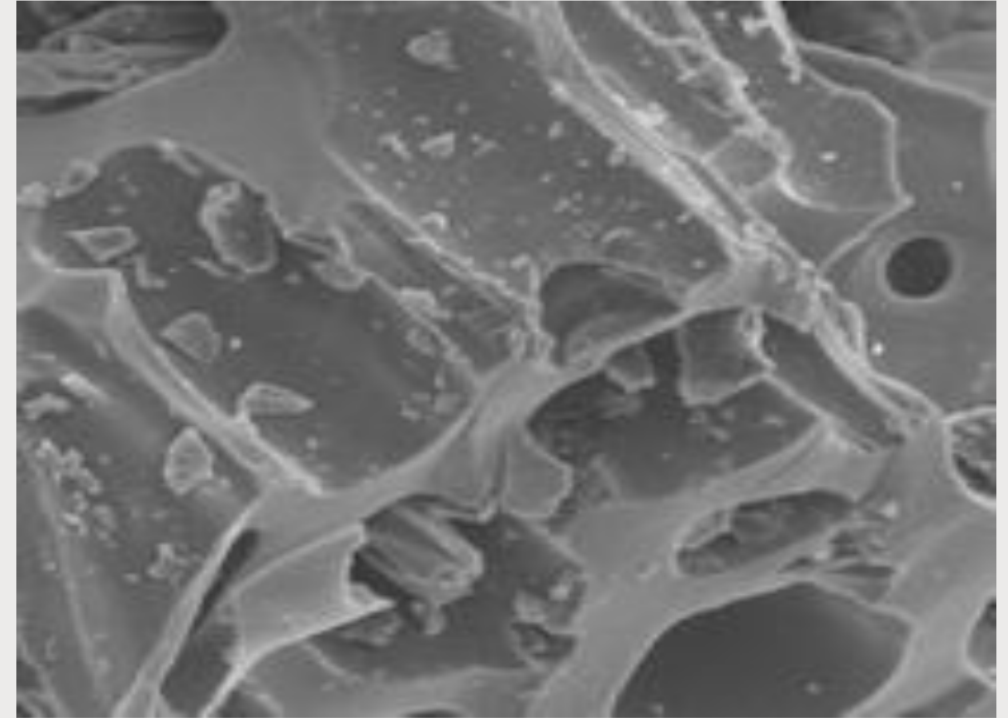
Werribee WWTP, Vic

4.2 MWe (biogas) Power Station.



METAMORF BIOCHAR PROPERTIES

- Large surface area
- Highly porous
- High carbon content of more than 90%
- Electron mediating surface
- High bulk density
- Lasts in the soil for centuries to millennia



METAMORF PROJECT FEASIBILITY SUPPORT

- Confidentiality protection
- Initial Project Scoping
- Budget Pricing
- Project Assessment, including a scope of works, and a financial model then:
 - Presentation of a Turn-Key Project written for decision-makers in mind, including:
 - Firm Pricing for the Project Financial Modelling, including project ROI and full projected project P&L Fixed Scope, including delivery





METAMORF™

www.metamorf.engineering

