Submission No 34

INQUIRY INTO BENEFICIAL AND PRODUCTIVE POST-MINING LAND USE

Organisation: SEATA Group and Global Product Stewardship Council

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NSW Parliamentary Enquiry into Beneficial and Productive Post-mining Land Use
Standing Committee on State Development
NSW Parliament Legislative Council

Submitted via the online portal and also via email: state.development@parliament.nsw.gov.au

Attention: Hon Emily Suvaal MLC, Chair of the Standing Committee on State Development

Dear Ms Suvaal,

Re: Submission to NSW Parliamentary Inquiry into Beneficial and Productive Post-mining Land Use: opportunities for biochar

Thank you for the opportunity to provide this submission jointly prepared by SEATA Group and the Global Product Stewardship Council (GlobalPSC).

About Us

SEATA Group (SEATA) has developed a new advanced thermal technology (currently at field pilot in the New England Renewable Energy Zone) designed to produce high quality biochar and concentrated high grade syngas capable of producing valuable derivatives such as carbon *negative* hydrogen, at commercial and industrial scales. A single 5 tph SEATA plant is designed to provide the equivalent of the *entire* 2025 hydrogen target set by the NSW Government (3000 tpa), along with all the co-benefits of biochar. The technology is designed up to 40 tph infeed (8-40x larger than conventional pyrolysis plants for biochar to date), and in theory can provide significantly larger capacities. This could provide a genuine renewable and sustainable alternative superior to conventional large combustion and incineration for baseload energy, at a fraction of the cost and with many environmental, economic and social benefits. The potential for the technology to be deployed in the mining sector is high, with multiple companies in discussions with SEATA for such.

GlobalPSC is an independent, not-for-profit forum for product stewardship development and an online resource for information on product stewardship and extended producer responsibility (EPR) policies and programs across the world, reducing the impacts of products on the environment throughout their lifecycle, including more efficient resource and energy use, and less pollution. GlobalPSC members includes producers, product recovery organisations, reprocessors, NGOs and governments at federal, state and local levels from over 40 countries.

Our joint submission has been informed by engaging with the broader biochar bioenergy industry extensively over a number of years, within which the undersigned representatives from SEATA and GlobalPSC are very active, holding executive and advisory board positions within the **ANZ Biochar Industry Group (ANZBIG)**. The undersigned have both also played central roles in the development of the ***Australian Biochar Industry 2030 Roadmap*** (ANZ Biochar Industry Group, 2023), and have been active in promoting the excellent work of the NSW Department of Primary Industry's ***Biomass for Bioenergy project*** which has significant potential to assist mine rehabilitation.

Relevant background information and proposed recommendations for consideration are provided below, followed by detailed tabulated comments for each term of reference, with appendices providing supporting information and key references.

We thank the Standing Committee on State Development for the opportunity to provide a submission into beneficial and productive post-mining land use, and we look forward to further opportunities to contribute to this important work and potentially to present to the inquiry hearings in August 2024.

Key Messages

- Mine rehabilitation offers a significant opportunity for productive post-mining land use through the sustainable supply of biomass required to build a bioenergy industry of significant scale.
- Mine rehabilitation also offers a significant opportunity for broadacre use of biochar, with many flow on benefits.
- Many mines have very poor surface soils (overburden/spoil) and often have deficits in available topsoil for use in post-mining rehabilitation. Opportunities to increase the carbon content of mine spoil to assist revegetation, increase water holding capacity and nutrients, and stabilize highly erodible soils are worthy of pursuit to improve post-mining outcomes.
- Biochar improves soil health through positive physical and chemical interactions, improving nutrient and water retention whilst providing a long term store of carbon (sequestration for climate action), making it an ideal solution for restoring degraded lands.
- Biochar is one of the key Carbon Dioxide Removal (CDR) methods recognised by the UN Intergovernmental Panel on Climate Change (IPCC). Importantly, biochar bioenergy systems have the potential to concurrently provide both clean renewable energy to displace fossil fuels (Emissions Reduction, ER) *and* sequester existing CO_2 from the atmosphere into soil (and non-soil) applications that are durable in the long term (CDR).
- An Australian biochar industry would produce valuable carbon and energy products for agriculture and industry and in the process generate jobs with ongoing employment, economic opportunities and sequester carbon.
- Biomass for bioenergy and biochar are complimentary and enablers of a decarbonised economy, renewable technology and other clean energy industries.
- SEATA's new advanced thermal technology is designed to provide industrially scalable production of high-quality biochar and concentrated syngas capable of direct use for renewable energy or for valuable derivatives such as carbon *negative* hydrogen. The potential for the technology to be deployed in the mining sector is high, with companies in discussions with SEATA for such.
- NSW DPI has established a *Biomass for Bioenergy project* which is showing significant potential for application in mine rehabilitation. Subject to obtaining supportive resourcing for trials, SEATA is intending to process harvested material from a number of NSWDPI's short-rotation 3 year crop trials at SEATA's NSW pilot facility.
- The current regulatory framework for mine rehabilitation in NSW, whilst commendable for its pursuit of *progressive rehabilitation* to avoid legacy issues to the public that have historically occurred, is currently inflexible to new innovation for positive alternative land uses which **effectively precludes** the participation of biomass cropping *and* biochar bioenergy within mine rehabilitation areas (only possible currently on

surrounding buffer lands, rather than within the large areas of disturbed mining land). We advocate for reform which provides flexibility allowing adoption of emerging positive land uses, allowing participation of the biochar bioenergy industry to contribute to critical climate, economic and social benefits.

- Supportive amendments to other related NSW policy and regulatory frameworks (including waste to energy and resource recovery), particularly providing ***innovation pathways*** to enable biochar bioenergy deployment among others, need should be considered and enabled. We have been engaging with NSW EPA positively on this front for some time and welcome further engagement for provision of the above to facilitate the emergence of this important renewables industry in NSW.

Introduction and Background – What is *Biochar*?

Biochar is *"a carbon rich, charcoal-like product made by heating any form of organic matter (biomass) in a controlled process with limited oxygen. This product is called "biochar" when it is used as a soil amendment or for other* ***uses that store the carbon in a durable form"*** (ANZ Biochar Industry Group (ANZBIG), 2023). A fact sheet is available *here* and link to a brief introductory video *"What is Biochar?"* provided *here*.

Sustainable biochar production is a powerful tool that is being recognised globally for its potential to produce clean renewable energy, sequester CO_2 from the atmosphere, improve soil health, and support sustainable agriculture. The circular carbon and low-climate footprint of biochar can be used to displace fossil carbon currently used in a wide range of industries across the economy, with scores of fully commercialized soil and non-soil/industrial applications already available here and overseas, from supplements to minimize synthetic fertilizer use through to water filtration, roads, bioplastics and concrete among many others as outlined in the *ANZ Biochar Industry Roadmap* (2023). Additionally, the carbon product can be used in other oxidative/fuel uses to displace fossil fuels (no CDR but avoids fossil carbon emissions) such as reductants to help hard to abate industries transition such as steel, with Bluescope Steel seeking to use volumes equivalent to several times current national production of biochar (further information can be provided upon request). Accordingly, there is significant demand and potential for large scale beneficial use of disturbed mining land to provide valuable purpose-grown biomass to provide biochar and bioenergy to help decarbonize multiple industries, providing jobs and significant economic stimulus into regions transitioning into a post-mining economy.

The biochar industry is poised to play a vital role in sustainable land use, particularly in post-mining rehabilitation. Through its 2030 Roadmap[1], ANZBIG outlines the steps needed to scale the biochar industry to a multibillion-dollar sector, highlighting the significant potential to displace fossil carbon used in a wide range of materials and uses across the entire economy in both soil and non-soil/industrial applications, and make potentially significant contributions toward national and state decarbonisation and circular economy goals.

With more uses for biochar emerging, the global market is growing and is estimated to be worth $USD 3.82 billion by 2025. Potential and existing biochar industries in Asia, the US and Europe are rapidly expanding.

A variety of biochar bioenergy technologies and applications are commercially available or rapidly approaching commercialisation, and a more welcoming regulatory framework should be pursued to encourage innovation and higher-order principles whilst minimising their risks. These approaches are different than basic combustion.

[1] https://anzbig.org/biochar-industry-2030-roadmap/

Opportunity 1 – Biomass for Bioenergy and Biochar

In the context of mine rehabilitation and productive post-mining land use, there is a significant opportunity for sustainable revegetation using biomass crops (including native species being trialled by NSW DPI[2]) combined withbiochar, bioenergy and associated bioeconomy in a circular and regenerative approach. *Regenerating nature* is the important 'third pillar' of circular economy which is too commonly overlooked, and can be significantly assisted via biomass cropping and biochar bioenergy to help restore degraded mining lands.

Sustainable revegetation of mine sites using biomass cropping for biochar bioenergy also has potential to improve the ecological, agricultural, economic, aesthetic and recreational value of post-mining landscapes, further benefiting local communities. Mine site rehabilitation and revegetation using native species bioenergy crops are one of the many biomass feedstocks suitable for producing biochar, along with existing forestry and wood processing residues, crop straw, manure, urban green wastes. Trials conducted by NSW DPI have indicated that native biomass crops for bioenergy and biochar can be grown at significant density on degraded soils (and with low water use) with yields exceeding **45 tonnes per hectare (Ha)** through short rotation cropping over three years. Once harvested and processed, approximately a third by mass (15 tonnes/ha) can be converted into biochar currently worth around **$9000/ha** as a physical commodity (@$600/tonne), **plus** approximately **$3,750/ha** in associated CO_2 Removal credits (each tonne of biochar can typically sequester approximately 2.5 tCO_2e, currently valued at well over $100/t CO_2e in voluntary markets such as Puro, owned by the NASDAQ). Additionally, the remaining two thirds of the infeed mass (30 tonnes per hectare) can be converted into syngas for renewable energy via SEATA technology and used to displace fossil fuel energy (currently worth over $12/GJ as energy), and/or turned into hydrogen currently worth around $6,000/tonne (typically comprising >50% of SEATA syngas by volume) and food and medical grade CO_2 typically worth over $100/t (displacing fossil-derived food and medical grade CO_2 conventionally used in many industries). Biochar bioenergy could also facilitate relatively similar job transition for existing workers in conventional coal fired power generation as these close. When you consider each of the commodities produced, biomass cropping for biochar and bioenergy offers a potential **high value land use for mine rehabilitation areas** and a significant opportunity for sustainable **and regenerative** approach for economic transition that provides ongoing employment in regional mining areas.

Additionally, currently 'problematic' wastes such as municipal biosolids containing emerging organic contaminants (such as PFAS, microplastics and pharmaceuticals, among others) can be safely thermally treated by pyrolysis and gasification to provide energy, biochar and a range of other products with commercial value, safely deconstructing organic contaminants to facilitate continued use in soil applications such as mine rehabilitation. At least three countries in Europe (including Denmark) have approved biosolids-derived biochars for use agricultural soils. Such an approach could concurrently solve critical problems facing the water industry and the mining sector. Biomass and biosolids co-feeds can also be used to produce regenerative natural fertilisers to replace expensive (and typically imported) fossil-fuel based synthetic fertilisers, providing further climate and economic benefits and resilience.

Recommendation/s:

Develop and implement policies and regulatory reforms that support the production and use of biochar and biomass for bioenergy in post-mining land rehabilitation. Address existing regulatory barriers including decoupling the thermal

[2] NSW Biomass for Bioenergy Project, NSW Department of Primary industries (NSW DPI)

treatment methods for biochar (pyrolysis and gasification) from incineration/combustion (linear 'single-use' waste to energy), allowing a higher order use for biochar bioenergy (circular waste to energy) under the waste hierarchy.

Opportunity 2 – Use of Biochar in Restoration of Degraded Soils

Many mines have very poor surface soils (overburden/spoil) and often have deficits in available topsoil recovered prior to mining for use in post-mining rehabilitation. Biochar can enhance soil structure, increase water retention, and reduce soil erosion, which are critical for restoring degraded mine lands. The biochar industry is being approached by international companies with interests in agroforestry, biochar and carbon sequestration for potential participation and investment in mine rehabilitation.

Production and use of biochar offers long-term carbon storage and other co-benefits. While the carbon within biochar itself is CDR, further emissions avoidance and CDR can occur through the use of biochar in soil- and non-soil applications. When applied to soils, biochar persists in a long-term stable form. Additional mitigation benefits can be delivered through lower soil N_2O emissions; reduced synthetic fertiliser requirements; "negative priming" where biochar facilitates growth in stable Soil Organic Carbon; and reduced GHG emissions from compost when biochar is added.

The existing, and future, agricultural industries, including wine, beef, dairying and cropping, would benefit and be enhanced by a local biochar industry.

Recommendation/s:

Establish a supportive regulatory framework which provides for inclusion of sustainable and safe production and use of biochar, including the use of post-mining lands for production of biomass and biochar bioenergy for a genuine circular new carbon economy. This should consider the significant potential for currently 'external'/3rd party investment into mine rehabilitation by companies (including globally) seeking opportunities for carbon sequestration to meet their internal net zero commitments and carbon management strategies.

In regards to facilitating 'fit for purpose' quality control for biochar for land application, it is noted that ANZBIG has established an existing biochar quality classification and grading system within its *Industry Code of Practice* developed in 2021, which defines three primary grades (categories) of biochars. These classifications meet and exceed international best practice standards for biochar quality and were specifically designed to help facilitate *'fit-for-purpose'* uptake in soil and non-soil/industrial applications. The three classifications include: *Feed Grade* (the premium grade), *Standard Grade* (suitable for use in soil), and *Industrial Grades*. The industry stands ready to work with agencies in all states to further enhance and align its Code of Practice and regulatory resource recovery mechanisms (such as End of Waste Codes), which could provide substantial benefits to biochar markets nationally through cross-border regulatory harmonization sought wherever practicable.

Opportunity 3 – Biochar, Carbon Dioxide Removal and Net Zero

The *NSW Climate Change Policy Framework* commits NSW to achieving net zero emissions by 2050, starting with a 50 per cent cut in emissions by 2030 compared to 2005 levels. This includes *Net Zero Plan Stage 1: 2020 – 2030*, which outlines plans to reduce emissions while growing the economy, creating jobs and reducing household costs. The *Hunter*

Regional Plan 2041, a 20-year land use plan prepared under the *Environmental Planning and Assessment Act 1979* (**EP&A Act**), introduces net zero emissions as a guiding principle for all planning decisions.

The UN Intergovernmental Panel on Climate Change (**IPCC**)[3] emphasises the critical role of biochar in climate mitigation strategies. Biochar is highlighted as a promising carbon dioxide removal (**CDR**) method, also known as Negative Emission Technologies (**NETs**), due to its ability to sequester carbon in a long-term stable form[4], thus contributing to long-term carbon storage and reducing atmospheric CO_2 levels.

Biochar is considered to be one of the lower-cost and scalable NETs, with the IPCC estimating that up to 6.6 Gt per year of CDR could be sustainably attained via biochar without competing for food production (and indeed enhancing it), with up to 1.8 Gt CO_2e per year achieved for under USD \$100/tCO_2e *right now* (considered low cost abatement, equivalent to the US government's 2030 'Earthshot' goal for CDR).

Recommendation/s:

Support creation of an ACCU method for biochar as outlined in Initiative 5 of the ANZ Biochar Industry Roadmap. The IPCC already recognises biochar as an emissions reduction and CO_2 removal pathway, and provides an *existing* recognized inventory method for biochar use in soil applications that could be readily used to include biochar in Australia's national greenhouse gas inventory[5], subsequently allowing eligible ACCU credit methods to be established. Methodologies for biochar have been developed for several *voluntary* emissions trading platforms, including Puro.earth[6], Verra[7], and Climate Action Reserve among others. A proposal for a biochar method was developed for ACCU's under the (then) Carbon Farming Initiative in 2016 which was not adopted at the time. A new proponent-led method is currently under development by a cross-industry working group (ANZBIT+G and multiple allied industries) for submission via an EOI to government due in mid July 2024. Support from the NSW Government toward such could significantly assist its establishment by the Federal government, which could further (substantially) assist deployment of biochar bioenergy in mine rehabilitation in NSW. It is also noted that state or federal support to resource implementation of the industry Roadmap has not yet been received and could significantly accelerate establishment of this beneficial industry, similar to that provided to accelerate other conventional renewables (and other industries)

[3] https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf
[4] Long-term stable can refer to decades to thousands of years and depends on feedstock and production conditions
[5] *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Agriculture, Forestry and Other Land Use Chapter 2 Appendix 4*, available at https://www.ipccnggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch02_Ap4_Biochar.pdf
[6] https://puro.earth/carbon-removal-methods/
[7] https://verra.org/methodology/methodology-for-biochar-utilization-in-soil-and-non-soil-applications/

Conclusion

In conclusion, biomass for bioenergy and biochar present significant opportunities for sustainable post-mining land use. The integration of these technologies can deliver economic, environmental, and social benefits, supporting the transition to a decarbonised economy. By adopting the recommendations outlined in this submission and supporting the implementation of the *Australian Biochar Industry Roadmap*, the NSW Government can promote innovative and productive land use solutions that benefit local communities and their economies, enhance environmental sustainability, and contribute to climate change mitigation. It is important that regulatory frameworks for post-mining landuse are updated to provide flexibility for inclusion of modern innovation which provides improved outcomes, such as biochar bioenergy.

SEATA and Global PSC would welcome the opportunity to engage further with the Enquiry on the potential economic, social and environmental benefits that the biochar bioenergy industry could bring to post mining regions in NSW as the important energy transition progresses..

We would also like to draw attention to the Enquiry of the related importance of the ***Australian Biochar Industry 2030 Roadmap*** which was recently launched by the ANZ Biochar Industry Group (ANZBIG). Biochar provides multiple co-benefits across many sectors of the economy including mining and allied industries. The roadmap developed by ANZBIG has significant potential to facilitate many related aspects for the production and use of biochar in post mining land uses, including within a circular economy producing the biomass feedstocks and returning carbon into depleted and degraded mine soils to restore degraded lands to higher value use than would otherwise be possible. A copy of an introductory presentation by ANZBIG is also enclosed for reference.

Thankyou again for the opportunity to make a submission. SEATA and Global PSC would be happy to expand on any aspects if/as required and would be pleased to present at the enquiring hearings in August. Please do not hesitate to contact us with any queries at all.

Yours sincerely,

Russ Martin	Craig Bagnall
CEO	Director, Environment & Regulatory
Global Product Stewardship Council	**SEATA Group**

List of Enclosures

Enclosure 1: *SEATA Submission to NSW Treasury - SEATA Carbon Negative Hydrogen: NSW Renewable Fuel Scheme Discussion Paper on Scheme Expansion (December 2023)*

Enclosure 2: *ANZBIG Biochar Fact Sheet*

Enclosure 3: *Soil and Non-Soil Uses and Markets for Biochars and Biocarbons (for more info refer Australian Biochar Industry 2030 Roadmap here)*

Enclosure 4: *ANZBIG Presentation: Introduction to Biochar and the Australian Biochar Industry 2030 Roadmap (ANZBIG, 2023)*

Enclosure 5: *SEATA Presentation: "Hydrogen with Benefits – Carbon Negative H2" (SEATA, 2023)*

Addressing the Enquiry Terms of Reference:

Term of Reference	Key Issues / Recommendations with Relevance to Biochar
(a): The benefits of having multiple successive land uses including the positive benefits for local communities and the economy, business, industry, and the broader state.	The integration of biochar and biomass for bioenergy into post-mining land use supports multiple successive land uses by transforming degraded lands into productive landscapes. This approach can generate positive economic, environmental, and social benefits, addressing the broader objectives outlined in the *Hunter Regional Plan 2041* and aligning with initiatives of the *Australian Biochar Industry 2030 Roadmap* (2023). **1. Economic Impact:** ***Job Creation:*** The development of a biochar industry is expected to create numerous jobs in rural and regional areas. This includes direct employment in biochar production facilities and indirect jobs in related sectors such as agriculture, forestry, and transportation. According to the Australian Biochar Industry 2030 Roadmap, the biochar industry could create up to 20,000 permanent jobs by 2030. ***Economic Diversification:*** Biochar production offers an opportunity to diversify the economy of regions traditionally reliant on mining. By developing new industries based on renewable resources, regions can reduce their economic dependence on finite resources and create a more resilient economic base. ***Investment Opportunities:*** Biochar and biomass for bioenergy present attractive investment opportunities for both public and private sectors. Investment in biochar production facilities, research, and development can stimulate local economies and attract funding from various sources. **2. Environmental Impact:** ***Soil Health Improvement:*** Biochar enhances soil structure, increases water retention, and promotes microbial activity, leading to improved soil fertility and agricultural productivity. These benefits are particularly valuable in rehabilitating degraded mine lands, making them suitable for successive land uses such as agriculture, forestry, and recreational spaces. ***Carbon Sequestration:*** Biochar's ability to sequester carbon in a stable form helps mitigate climate change by reducing greenhouse gas emissions. The IPCC Climate Change 2022 Mitigation of Climate Change report highlights biochar as a key CDR method. It states, "Biochar can improve soil quality and food production capacity, and ecosystem restoration and reforestation sequester carbon in plants and soil, providing additional biomass". ***Biodiversity Enhancement:*** Rehabilitated lands using biochar can support diverse plant and animal species, contributing to biodiversity conservation. This is crucial for restoring ecosystem functions and services, which can have long-term benefits. **3. Community Benefits:** ***Recreational and Aesthetic Value:*** Rehabilitated mine lands using biochar can be transformed into recreational areas, community gardens, and green spaces, enhancing the aesthetic and recreational value of the land. These spaces can serve as community hubs, promoting social cohesion and well-being.

Term of Reference	Key Issues / Recommendations with Relevance to Biochar
	Health and Well-being: Improved soil health and reduced pollution from biochar applications can lead to better health outcomes for local communities. Clean air, water, and productive lands contribute to overall community well-being and quality of life. ***Educational Opportunities:*** Biochar projects can serve as educational sites for schools, universities, and research institutions. These projects provide hands-on learning experiences in sustainable land management, environmental science, and renewable energy, fostering a culture of sustainability and innovation.
(b): Changes in land use potential and demand in established or traditional mining areas, particularly those generated by the decarbonised economy, renewable technology, manufacturing, defence, skills, and training.	Biochar and biomass for bioenergy can play a significant role in transitioning traditional mining areas to new land uses that align with a decarbonised economy and renewable technology sectors. **Decarbonised Economy:** Biochar production supports a decarbonised economy by sequestering carbon and reducing greenhouse gas emissions. This aligns with global and national climate goals. **Renewable Technology:** Biomass for bioenergy provides a renewable energy source, supporting the growth of renewable technology industries in post-mining areas. **Skills and Training:** The development of a biochar and biomass industry will require reskilling and retraining the workforce, providing new employment opportunities in these regions.
(c): Opportunities for investment and growth in training and skills in established or traditional mining areas, including the need to reskill and retrain current workforces.	The biochar and biomass for bioenergy industry offers significant opportunities for investment in training and skills development, addressing the need to reskill and retrain current mining workforces. **Training Programs:** Investment in training programs specific to biochar production and biomass for bioenergy will equip the workforce with the necessary skills. **Job Creation:** The growth of the biochar industry is expected to create up to 20,000 permanent jobs by 2030, particularly in regional and rural areas. **Economic Growth:** The industry's expansion will stimulate local economies and provide new career opportunities for former mining workers.
(d): Opportunities to encourage innovative post-mining land uses including the planning and implementation of essential supporting infrastructure for future site use.	Biochar and biomass for bioenergy present innovative post-mining land use opportunities that can be supported by the necessary infrastructure. **Infrastructure Development:** Establishing biochar production facilities and biomass energy plants will require new infrastructure, contributing to regional development. **Innovative Land Use:** Biochar application in soil can restore fertility to degraded lands, making them suitable for agricultural and other productive uses. **Sustainable Practices:** The biochar industry promotes sustainable land management practices, enhancing the long-term viability of rehabilitated mining sites.

Term of Reference	Key Issues / Recommendations with Relevance to Biochar
(e): How to ensure the benefit from innovative post-mine land uses are shared between the community and mine operators.	The benefits of biochar and biomass for bioenergy can be equitably shared between the community and mine operators through collaborative initiatives and equitable policies. **Community Engagement:** Engaging local communities in biochar projects ensures their needs and perspectives are considered, fostering mutual benefits. **Economic Sharing:** Policies can be designed to ensure profits from biochar production are shared with local communities, supporting economic development. **Environmental Stewardship:** Mine operators and communities can collaborate on biochar projects that enhance environmental sustainability and community well-being.
(f): The expectations of mining communities in relation to post-mine land use, and how to balance this with innovative reuse of existing infrastructure.	Biochar and biomass projects can meet the expectations of mining communities by providing sustainable land use solutions while reusing existing infrastructure innovatively. **Community Expectations:** Mining communities often expect rehabilitated lands to provide economic and social benefits. Biochar projects can meet these expectations by creating jobs and improving land quality. **Reuse of Infrastructure:** Existing mining infrastructure can be repurposed for biochar production facilities, reducing the need for new construction and minimising environmental impact. **Sustainable Solutions:** Biochar offers a sustainable solution that aligns with community expectations for environmentally responsible land use.
(g): The need to develop a robust independent regulatory framework to maintain and advance best practice in this area.	A robust regulatory framework is essential for ensuring the sustainable and safe production and use of biochar, maintaining best practices in post-mining land use. **Regulatory Standards:** Establishing clear standards for biochar production and application will ensure environmental and social benefits are maximised. **Certification:** Developing certification programs for biochar producers can promote adherence to best practices and enhance market confidence. **Policy Support:** Government policies should support the biochar industry through incentives and regulations that promote sustainable practices.
(h): Any other related matters.	Biochar and biomass for bioenergy can address a range of related matters, including climate change mitigation, waste management, and renewable energy production. **Climate Mitigation:** Biochar sequesters carbon, helping to mitigate climate change and contribute to national and global climate goals.

Term of Reference	Key Issues / Recommendations with Relevance to Biochar
	Waste Management: Converting waste biomass into biochar reduces landfill use and uncontrolled burning, promoting a circular economy. **Renewable Energy:** Biomass for bioenergy provides a renewable energy source, reducing reliance on fossil fuels and supporting energy transition.