ANZBIG SUBMISSION:

EMISSIONS REDUCTION FUND - METHOD SCOPING PAPER (CCS / CCUS)

7th August 2020

Thank you for the opportunity to provide comments to the Commonwealth Department of Industry, Science, Energy and Resources on the Methods Scoping Paper on Carbon Capture and Storage / Carbon Capture, Utilisation and Storage (CCS/CCUS) for the Emissions Reduction Fund (ERF), on behalf of the ***Australian New Zealand Biochar Industry Group (ANZBIG)***.

ANZBIG[1] was recently launched at the 2020 ANZ biochar conference as a formal industry cluster to facilitate the growth of the Australian biochar industry. Biochar has been recognised by the IPCC (Intergovernmental Panel on Climate Change, 2018) as **one of six key Negative Emissions Technologies (NETs) recommended to be implemented at scale** to help remove the 1000 Gigatons of excess carbon dioxide in our atmosphere by 2100. Nature has perfected the *capture* of CO_2 through biomass, however it normally biodegrades back into the atmosphere via the carbon cycle. Alternatively, modern industrial technology is now used to sustainably convert unused biomass into biochar via pyrolysis, providing a *carbon-rich solid product - biochar* for numerous utilisation and storage applications. These include (but are not limited to) applications in agriculture, construction and roads, steel reductants, and biomaterials for the new *carbon economy* - replacing fossil-fuel derived carbon in solid carbon materials, such as carbon fibre. Accordingly, biochar applications are now globally recognised as an important mechanism for climate change mitigation via Carbon Capture, Utilisation and Storage, particularly in Europe, China and the US.

ANZBIG has reviewed the Method Scoping Paper and, in particular notes that, in addition to the target CCS applications identified:

- There are **readily available opportunities *now* for <u>additional</u> CCU applications using biochar** to be included under the ERF that offer **significant socio-economic and environmental co-benefits** to Australia (in contrast with conventional CCS methods with geo-sequestration). These industries can be readily expanded and accelerated through ERF support.
- The recent King Review recommended (R1 and R26) that processes for additional methods be provided for under the ERF. Consistent with this objective, as a priority ANZBIG recommends development of a framework for CCU methods, in consultation with industry, to enable rapid development of additional CCU methods.
- Importantly, **a proposed ERF method for an example CCU application using biochar has already been developed** through a process for ERF method development previously facilitated by the Department This proposed method complies with all aspects of the ERF Offsets Integrity Standards, including measurability, eligibility and conservativeness (including permanence) requirements among others**.** A strong scientific evidence base has been developed, as noted in requirements of the CCUS Method Scoping Paper on page 9. This is outlined further in our submission separately below. Further supporting information can also

[1] formerly known as the Australia New Zealand Biochar Initiative (ANZBI)

be provided by ANZBIG upon request (Biochar science is an intensively-studied subject, with around 20,000 papers published in 2019.). A copy of the proposed method will be provided separately to the Department for reference.

- Additionally, Bioenergy with Carbon Capture and Storage **(BECCS)** and Bioenergy with Carbon Capture Utilisation and Storage **(BECCUS)** are both not mentioned at all in the scoping paper. Nor is Pyrogenic Carbon Capture and Storage (**PyCCS**) which, when energy is recovered, can be a form of BECCUS. Biochar can play a role in all of these. BECCS is being developed in other parts of the world including Europe and the US and to date has often included bioenergy production combined with geo-sequestration as CCS (Global CCS Institute, 2019). **However**, there are also currently available bioenergy technologies at commercial and industrial scale (globally and in Australia) for CO_2 ***utilisation***, including (but not limited to) bioenergy with biochar production. Accordingly, consideration by the ERF could and *should* also include applications for both storage *and* utilisation, and beyond geo-sequestration alone, i.e. **BECCUS**. BECCUS applications include bioenergy with biochar, among many others. For example utilisation of recovered CO_2 in the beverage industry in the USA (the beverage industry is currently one of the largest users of CO_2 globally, however many other markets for recovered carbon in the new carbon economy (including biomaterials and 'carbontech') are available and growing.
- Accordingly, **the development of approved CCUS methods for biochar and bioenergy applications under the ERF could significantly, quickly, and cost-effectively increase emissions reduction benefits**, providing significant 'bang for buck' to leverage government investment into CCS methods. The fact that ANZBIG has already established a method for review can accelerate the realisation of these benefits, and provide a platform for government to leverage the development of other similar methods. **ANZBIG would welcome the opportunity to discuss this further with the Department.**
- Considering the above points, ANZBIG makes the following recommendations with respect to key design issues presented in the discussion paper:
    - ANZBIG disagrees that fossil-CCS could be considered sequestration, as it does not involve the removal of CO_2 from the atmosphere; rather, it is an option for emission reduction, and should be considered as such under the ERF, with additional requirements to ensure permanence.
    - ANZBIG strongly recommends full life cycle accounting, in order to accurately reflect impact on the climate, and therefore cradle to well system boundary;
    - ANZBIG strongly recommends separate methods for CCS (where carbon storage is effected by geosequestration) from CCU (where carbon is captured into useful products);
    - Due to the dissimilarities between fossil-CCS and other CCS (e.g. BECCS) and CCU technologies, ANZBIG recommends that separate methods be developed for different types CCU and CCS technologies. However, to streamline method development, ANZBIG recommends a modular approach under an umbrella framework.
- **ANZBIG representatives attended the recent CCUS workshop held by the Department and ERAC in April 2020**. Both ERAC and Department representatives acknowledged that their awareness of commercially and industrially ready CCU applications was not strong and would welcome further education from the industry. With the recent launch of ANZBIG we would welcome the opportunity to provide further discussions with the Department and ERAC on that basis. Further resources detailing these are also on our website noted immediately below.

- **NGERS reporting frameworks** could, and should, consider and **include CCUS.** Importantly this should enable effective integration with international reporting and accounting frameworks including (but not limited to) private sector markets that have emerged for NETs with their own accounting frameworks, and additional emerging initiatives (e.g. under the GHG Protocol, used by 9 out of 10 Fortune 500 Companies, and the Verified Carbon Standard). With many large companies committing to Net Zero 2050, but unable to achieve this with emissions cuts alone, NETs applications such as biochar (recognised by the IPCC) for CCUS are expected to experience increasing demand over the coming years. This approach would assist both government and private sector markets to grow appropriately and avoid double-counting risk across international borders. ANZBIG would welcome further discussions with the department to this end.
- ANZBIG respectfully requests further direct consultation with the Department if possible, and our email contact details added to Department circulars please (execdirect@anzbig.org.au) .

An outline of some key benefits of biochar as a CCU technology, and relevant information for context to the ERF are provided in the following sections below. Further details are provided within ANZBIG's recent submissions to government on the national ***Bioenergy Roadmap*** and ***Technology Investment Roadmap*** in 2020 on our website www.anzbig.org/resources.

1. Carbon Abatement Potential

The growth of biomass is considered the most efficient method currently available to extract carbon dioxide from the atmosphere. However, natural biomass is easily degraded by microorganisms releasing carbon back to the atmosphere in the form of greenhouse gases (the *carbon cycle*). Alternatively, when biomass is pyrolyzed, the organic carbon is converted into **solid** (biochar), **liquid** (bio-oil/wood vinegar), and **gaseous** (pyrogas/syngas) **carbonaceous products for various uses**.

Depending on the specific technology type and process settings, **for every tonne of infeed biomass** around **a third (and up to a half)** of the carbon **can be sequestered into solid biochar**. Biochar bioenergy systems are currently the only available technologies that can concurrently provide both energy (and/or syngas for valuable industrial derivatives including ammonia) *and* significant carbon sequestration.

Significant biomass resources are currently being wasted which could potentially be diverted to beneficial biochar and bioenergy. For relative current context, global biochar production capacity (led by China) is ~<1% of the volume of biomass being wasted annually in Australia alone.

The mode comprehensive study of the global potential for abatement through biochar, published in the prestigious journal *Nature*, found that producing **biochar from biomass** (such as organic waste that does not compete with food production or increase land use) **could sequester the carbon equivalent to 12% of total global CO_2 emissions**, which is **on par with (offsetting) emissions from the entire global transport sector**.

The **feasible abatement potential** of biochar in NSW alone has been estimated at **1.6 Million tonnes CO_2e per year** (Prof. Annette Cowie pers.comm), equivalent to 1.2% of NSW total annual emissions or taking nearly 350,000 passenger vehicles off the roads (USEPA, 2018). This is based on the conservative assumed use of 10% of crop residues, 50% of feedlot manure and poultry litter, and 90% of processing residues (nut shells, gin trash, rice hulls) and urban greenwaste.

The IPCC has also stated that ***lack of action to address land degradation will increase emissions and reduce carbon sinks, and is inconsistent with the emissions reductions required to limit global warming to 1.5°C or 2°C. Better management of soils can offset 5–20% of current global anthropogenic GHG emissions****. Measures to avoid, reduce and reverse land degradation are available but economic, political, institutional, legal and socio-cultural barriers, including lack of access to resources and knowledge, restrict their uptake.*

Soil carbon (Soil Organic Carbon) plays a key role in soil productivity and represents the largest terrestrial sink for carbon. Improving agriculture to build soil carbon is one of the best options for reversing climate change while supporting sustainable farming. ***A 1% increase in SOC in the top 30 cm of soil translates to sequestration of approximately 165 tCO_2e per hectare*** assuming bulk density of 1.5t Soil/m^3 *(Soil Carbon Industry Group, 2020)*.

Additionally, biochar has also been shown to **increase soil carbon in excess of the carbon added in biochar itself** ('negative priming'), as demonstrated in this decadal study published in the respected scientific journal *Nature* (Weng et al 2017).

Theoretical Potential For Biomass to Biochar and Bioenergy in Australia:

The theoretical potential for unused biomass conversion to biochar and its co-products in Australia is estimated further below (ANZBIG 2020):

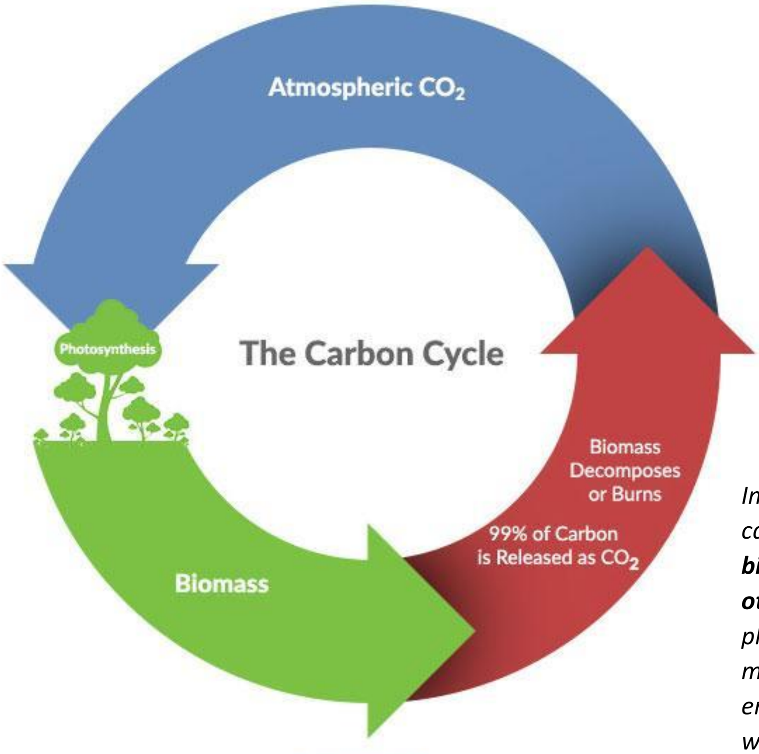
Up to ~50-100 Million metric tonnes per year of **residues no longer burned/landfilled***

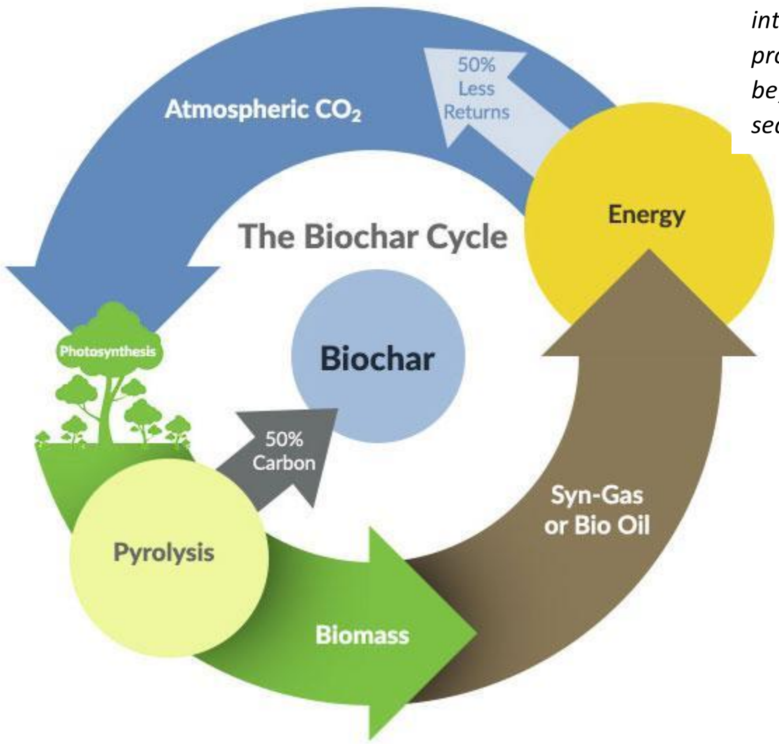
- **Up to ~15-30 Million** metric tonnes per year of **biochar potentially produced**
  - Biochar saleable economic value **$7.5B-$15 Billion** (@AUD $500/t)
  - Additional carbon credit value (current market value) **$1.5-$3 Billion** (@ AUD$100/t)**
- **>Up to ~30-60 Million** metric tonnes/y CO_2e of **CO_2 removal (Negative Emissions/Drawdown)**
  (i.e. equivalent of **up to several % of Australia's 2019 total GHG emissions**)
- **Up to ~50-100 Pj/year** of Biogas (syngas) for national energy security
- **Up to ~50, 000 jobs** (rural and regional focused)

** Australian Energy Resources Assessment estimated in 2016 that biomass residues/waste nationally were >75M tpa. Crawford et al 2015 estimated biomass residues conservatively at 80Mtpa, which could grow to 110-115Mtpa by 2050.*
***** Conservative estimate on current markets.*** *Puro Earth CORCs credit value June 2020: Euro €30/t CO_2e (~AUD $48/t CO_2e @ exchange rate 1.6) and typical >3t CO_2e per tonne of biochar, ➔ i.e. current credit value June 2020 AUD* ***~$140/t biochar****. For further relative context, the Stripe project in USA recently paid over* ***USD $100/t CO_2e*** *for (non-biochar) voluntary market carbon sink products,* ***nearly triple*** *the conservative estimate above. https://stripe.com/blog/first-negative-emissions-purchases*

Current global biochar production is estimated in the range of 500,000 tpa led by China, Europe and the US. Further details are provided in Section 4, Part 1 within ANZBIG's submissions on the ***Bioenergy Roadmap*** and *Technology Investment Roadmap* (see www.anzbig.org/resources). **Biochar production and use in Australia is still emerging at around 5,000 tpa**, but is growing and has significant potential, as indicated by commercial benefits provided in a Users Report / White Paper prepared by ANZBIG available on our website, and also detailed further in Part 1 of our submissions on the Bioenergy Roadmap and Technology Investment Roadmap noted above.

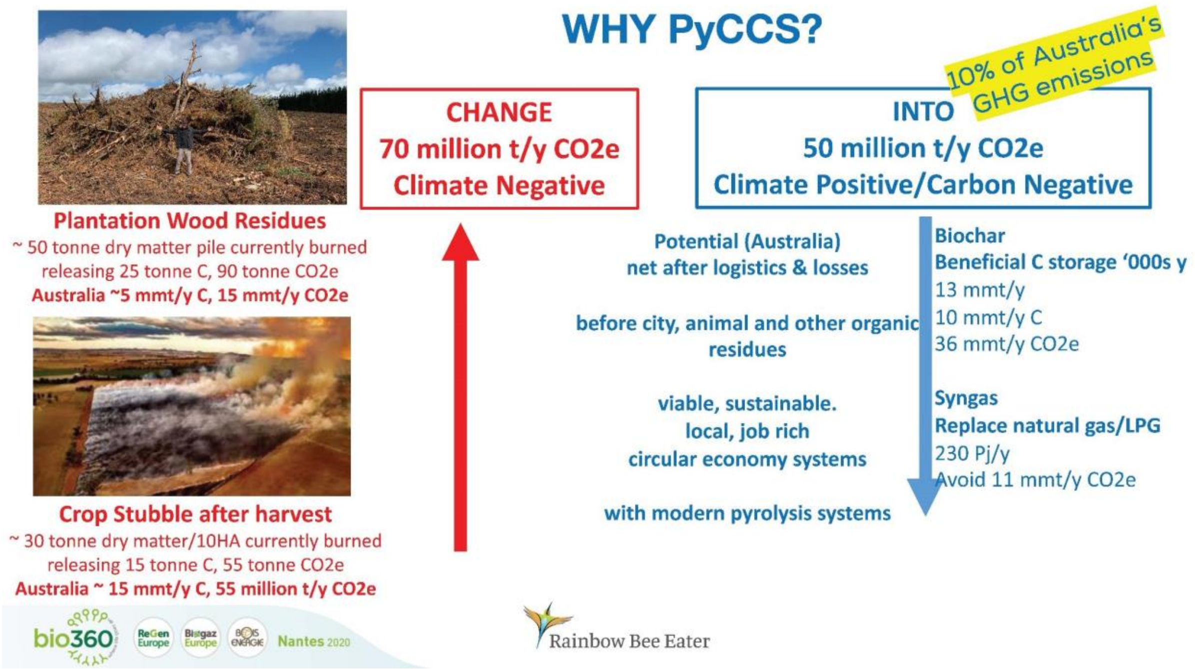
Below: The natural Carbon Cycle, and the context of biochar to provide carbon removal (sequestration)





In addition to the sequestered carbon within biochar itself, use of ***biochar can also "turbocharge" other key NETs*** *through enhancing plant growth, activating soil microbial growth (soil carbon), enhancing binding sites in weathered soils, and through new integrated roles in BECCS / BECCU providing additional methods beyond bioenergy with geo-sequestration.*

Below: Global Problem to Global Opportunity….



Above Sources: Rainbow Bee Eater Pty Ltd (2020)

2. Permanence

Detailed studies have been completed over the last decade to address the question of permanence of **pyrogenic carbon (PyC)**, particularly in soil application (refer Appendix 4 in Part 1 of ANZBIG's submission on the Bioenergy Roadmap). The **Mean Residence Time (MRT)** of biochar PyC is strongly related to its **H/Corg ratio** (which depends mainly on the pyrolysis temperature) and to the environmental conditions of its storage (Braadbaart et al., 2009; Camps-Arbestain, Amonette, Singh, Wang, & Schmidt, 2015). **H/Corg is a simple, practical and economical test** which allows the stable carbon sequestered *within* biochar to be reliably quantified, such as for quantifying abatement under the ERF, and used in the proposed ERF Method mentioned above. This approach also forms the basis for the IPCC method for quantifying persistent carbon in biochar, presented in Appendix 4 of Chapter 2, Volume 4 of the 2019 refinement of the 2006 IPCC Guidelines for national GHG inventories.

In a meta-analysis of **111 experiments on biochar persistence**, Lehmann et al. (2015) estimated that **biochars with a H/Corg ratio of <0.4 have**, when applied to soil, **an MRT of** <u>**>1,000 years**</u>, corresponding to half-life times of ~700 years. However, it has been recognised that the soil environment can also potentially play a key role in PyC persistence. While more research about mechanisms of PyC degradation and the fate of the degradation products are needed, three meta-analyses and all studies on biochar persistence in soil (based on **>120 experiments**) **confirmed that biochars are much more recalcitrant than their precursor materials and natural SOM**, and that <u>**MRTs exceed the centennial scale**</u> **(i.e.** <u>**conservatively**</u> **biochar persistence in soil exceeds >100 years)**. The European Biochar Certificate (EBC) has adopted a very conservative average degradation rate of 0.3% per year for biochar in <u>soils</u>, meaning that after 100 years after soil application, 74% of the original carbon in biochar would still be sequestered, considered very conservative as studies have determined significantly *lower* degradation rates. Other uses of biochar (eg in construction materials and biomaterials) carbon can be considered sequestered as long as the product itself remains stable. ANZBIG has adopted appropriate testing of H:Corg (and many other parameters) in our draft industry Code of Practice to characterise different commercial biochars.

The above applies for CCUS application of biochar alone where it is not stabilised further (as is the case in most agricultural/soil applications). Other CCU applications of biochar can provide *additional* permanence for captured carbon through encapsulation within a highly durable product (prevention/negligible degradation risk of release to the atmosphere), such as in roads, construction materials (e.g. green concrete) and biomaterials/'carbontech'.

3. Additionality

Additionality requirements of the ERF ensure that abatement would not have occurred under the normal course of events. Whilst biochar is advancing globally and has been promoted by the IPCC, it is still maturing globally toward its significant potential (and particularly in Australia) and requires assistance to scale and accelerate, bringing down product costs for broader uptake, as has occurred in other renewable sectors such as solar.

Cost, availability and awareness remain challenges in Australia, leading to minimal adoption to date. Indeed, whilst holding key resources and world leading expertise in biochar production and applications, Australia current lags the world significantly in both investment and production, with <5,000 tpa of the estimated global production of approximately 500,000 tpa. Thus, there is no question that biochar projects would meet the additionality criterion.

4. Regional Jobs and Post-Covid Economic Recovery

The biochar industry sector provides significant opportunity for an Australian-led economic recovery to the devastating economic impacts of Covid 19. Importantly the sector also provides for **regional** employment opportunity due to the nature of both the biomass feedstock and processing, and also various CCU applications including within the agricultural sector.

Biochar is an emerging new commodity in this changing world. **Biochar is a sustainable source of high value carbon**, **a <u>valuable commodity</u>** that finds widespread use in our society across many sectors of the economy. Many uses of biochar enable the biomass carbon to be **sequestered** for long term storage thereby mitigating global warming[1]. In 2019 ANZBI launched a white paper documenting a national survey of biochar users in Australia and New Zealand including key case studies providing economic analysis and viability across a range of agricultural applications, available on our website at www.anzbig.org/resources .

The socio-economic opportunity biochar presents for a post-Covid recovery includes:

- **Regional Employment** (direct and indirect multiplier effects through co-benefit sectors)
- **Enhances key strategic sectors** of the Australian economy (e.g. agriculture, mining (rehabilitation), construction (roads, concrete)
- **Develops potential new sectors (biomaterials / carbontech etc)**
- **Enhances related Renewables** (e.g. potential for biochar in Lithium Ion batteries for storage, dispatchable bioenergy for 24/7 reliable power and demand modulation).
- **Provides new 'green jobs'** – including helping keep young people in regional communities and preventing the "brain drain from the bush". It's a form of renewables with a direct relationship with the land and agriculture (perfect for regional employment).
- **Can assist with 'green' biogas / syngas for the proposed gas led recovery to Covid 19**
    - Morrison government's recent ***National Covid 19 Commission Report*** aims to stimulate economic recovery with a focus on energy (including biogas).
    - The Reports indicate up to 412,000 new jobs could be created by 2030 by boosting the Australian gas sector alone. Bioenergy from syngas, co-produced with biochar has the potential to contribute to this.

5. Opportunity to Accelerate Development of the *New Carbon Economy*

Biochar has traditionally been recognised and used as a soil amendment, but more and more the scientific and commercial community are discovering the cascading benefits in numerous other applications right across the economy including biomaterials ('*carbontech'*), animal feeds, water filtration and odour management (activated carbon), bio-concrete and asphalt among many other applications. The **world-wide market for biochar applications are estimated to reach USD $3.1 Billion by 2025** *(Grandview Research, 2019)*.

Recent reports from the USA (Carbon 180, 2019) including industry roundtables with the large global corporations such as Shell, Exxon Mobile, BASF and 3M (among many others) investigated the potential of **transitioning from fossil-carbon** based products **to renewable carbon-based products** (solid, liquid and gas). These reports indicate significant potential in the US domestic market alone as indicated in the figure below. Biochar, bio-oils and syngas could help Australia in the ***new carbon economy*** to provide renewable and/or recovered carbon for more sustainable production of carbon-based products. Sustainable use of *waste* biomass resources is important and is endorsed by ANZBIG's proposed industry *Code of Practice*.

Many CCUS applications (Carbon Capture Utilisation and Storage) are available. One example includes ***green graphite*** for use in lithium ion batteries (Banek et al, 2018), which are already playing a key role in *energy storage* for the renewables boom and world energy transition. Bioenergy produced with biochar could also potentially assist other renewables in other ways, including night-time cogeneration allowing 24/7 dispatchable energy on demand, and mitigating intermittency issues suffered by solar and wind that generate the need for grid stabilisation (e.g. frequency modulation etc).

6. Potential Leverage of Emissions Reduction Benefits for the Existing ERF Soil Carbon Method

The current approved method for soil carbon under the Emissions Reduction Fund (*"Measurement of soil carbon sequestration in agricultural systems method"*, known as the "measured soil carbon" method) does *recognise* use of biochar, **however** it does not currently **credit** the stable carbon contained **within** the biochar itself (only for change in soil carbon in time following biochar addition; i.e. as an ameliorant to encourage plant growth). As noted above, the stability of biochar carbon has been demonstrated with confidence at century to millennial timescales and can be easily and readily measured (much more easily than soil carbon itself).

To date the significant costs associated with measuring and verifying change in soil carbon over time have been a substantial constraint to market adoption of the soil carbon method (especially for large broad acre areas). It is understood that more project applications are under development, with advancing technologies for cost-effective measurement and other efficiencies combining to stimulate market interest in soil carbon as the largest terrestrial carbon sink for carbon dioxide removal (but also the most complex). Nonetheless, **there is currently opportunity under the ERF for the inherent sequestered carbon within biochar to be easily accounted for and credited**, addressing (past) queries regarding **permanence** (refer earlier above). If the ERF measured soil carbon method was amended to specifically account for sequestered carbon value within biochar, then **many additional applications of biochar could potentially become viable for carbon sequestration credit too,** further increasing the value of biochar and bioenergy projects, helping drive investment in the sector.

To this end, as noted above, a **proposed method** under the CFI for biochar from pyrolysis of poultry litter for application to soil was jointly developed in 2015 by the University of New England (UNE) and the NSW Department of Primary Industries (NSW DPI). Importantly, the proposed method leveraged on significant research to propose a **practical, scalable and cost-effective method for quantifying carbon sequestration within biochar** for its application to soil. This is also conservative in that it does not also include the additional *growth* in soil carbon attributable to biochar addition through *"negative priming effects"*, as research has since demonstrated (Weng et al., 2017).

Additionally, the proposed method also includes the GHG emissions avoided through pyrolysis of poultry litter, compared with direct application to land and subsequent decomposition.

The method can be expanded for other feedstocks beyond poultry litter, and additional methods for other biochar applications can also be developed.

7. Separation of Avoided Emissions and CO2 Removal (CDR / 'Drawdown')

Achieving the Paris Agreement goal will require both reductions in **emissions**, as well as **removal** of CO2 from the atmosphere (via NETs such as biochar). These are two separate processes and should be accounted for separately to ensure the actions in each are maximised and continued carbon emissions are not simply offset and allowed to grow, in order to drive genuine climate mitigation.

Accordingly, as international trading platforms advance and carbon generation and sequestration flows are traded, there is potential for accounting to benefit from reviewing potential synergies. For example, it is not unreasonable to think that large international companies preparing their carbon **emissions** footprint accounting via GHG Protocol standard methods would be seeking to align carbon **removal** credits easily through the same/similar platform wherever practicable (apples and apples). Therefore it is desirable to ensure alignment between the Australian NGERS framework for GHG accounting, generation and cancellation of ACCUs, the national registry of AAUs, with international frameworks such as GHG Protocol, and international platforms such as Verra and Gold Standard etc. Given the ERF is currently under review, this may be a timely opportunity for this overall systematic aspect to be considered and addressed if/where practicable.

8. Alignment with the UN Sustainable Development Goals (SDG's)

The well documented benefits of biochar across multiple sectors of the economy (detailed in Section 4 and Appendix 1 of ANZBIG's separate submissions on the Bioenergy Roadmap here) can play an important role in all three components of the triple bottom line of sustainability (environment, economic, social). Biochar production can also assist the Australian government and community toward meeting a number of the seventeen (17) international **Sustainable Development Goals (SDG's) established by the United Nations**.

ANZBIG have included sustainable supply of biomass for biochar bioenergy at the heart of the new draft Code of Practice proposed for the emerging industry cluster in Australia and New Zealand.

As discussed further in Section 8.4 of ANZBIG's submission on the Bioenergy Roadmap, a number of international (and national/state) bodies are providing frameworks to help guide sustainable use of biomass for bioenergy. For example the **United Nations Council on Sustainable Biomass Production - Draft Provisional Standard for Sustainable Production of Agricultural Biomass.** Other international organizations including in the European Commission (among others) have investigated sustainability indicators and criteria for biomass utilization for bioenergy (examples here).

Below: ***The potential role of Biochar to assist in meeting the UN SDGs:***

9. Opportunities: Protection & Enhancement of Strategic Agricultural Soils (Australia's Food Bowl) and Help to Minimise Land Degradation

This section illustrates the biochar industry's consideration of important related government policies that can help facilitate multiple government objectives including under the ERF through soil carbon and biochar as well as other renewables boosted under the ERF framework. As noted earlier, biochar can enhance both strategic agricultural soils and marginal land, however these lands are under significant and rapidly growing threat from competing land uses. Complementary government policy is needed to address this issue. Accordingly, our industry submissions to government for the Bioenergy Roadmap included (Section 1.4 in Part 2) detail for Commonwealth consideration of example policies to help protect and enhance strategic agricultural soils. ANZBIG would welcome further discussions on this with the Department regarding policy approaches to complement the ERF.

As the global population surges toward **10 Billion by 2050** (the same time the world seeks to reach net zero emissions), **the role of key food producers and net exporters such as Australia will become of major significance**. Forward land use planning for the **protection *and enhancement*** of the most productive agricultural soils for their highest order use becomes pivotal, in addition to improving and regenerating marginal lands. Australia is a leading food producer for the world and has both productive agricultural land, but also significant areas of degraded land as a result of two centuries of clearing and less sustainable agricultural practices.

There are examples for both industry and government actions and policy which can assist the path toward achieving sustainable balance between regulation and all land development.

- **Industry Codes of Practice and Standards** can **adopt appropriate sustainability goals** including sourcing of biomass
  - International guidance exists (UN, European Commission etc) on sustainable use of biomass for bioenergy.
  - ANZBI has adopted sustainable sourcing of biomass in our draft Code of Practice released for comment in June 2020.
- **Government-led land use planning** can adopt approaches which appropriately protect resources, including:
  - **Adopting land use planning policies** which identify, protect and promote enhancement of strategic agricultural lands and the most productive soils, and regeneration /enhancement of marginal lands, through integrated land use planning at regional scale, that seeks to achieve multiple objectives for conservation and production.

  - **Sustainable Life Cycle Assessment** (LCA and SLCA) to assist land use planning and genuine integrated assessment across multiple environmental and social facets, including upstream, downstream and indirect effects of land use decisions.

However, the threat for degradation and 'loss' (opportunity cost) of strategic productive agricultural soils for other purposes, is already occurring in Australia, even within the important and rapidly accelerating renewables industry. Inadequate regulation has resulted already in sterilisation of strategic soils for *at least* the commercial life of those projects (typically decades), and potentially beyond as decommissioning and rehabilitation is not currently regulated under existing government policy (e.g. as required standard in the resources sector). i.e. both short term and long term risk exists to those lands. The figure below provides an example of policy effectiveness for a regulated industry (resources sector) in regards to Biophysical Strategic Agricultural Soils (BSAL) in NSW, compared to an unregulated industry in terms of BSAL assessment in planning approvals (rapidly expanding solar industry). ANZBIG supports equitable regulation of land development which protects and enhances strategic agricultural lands throughout Australia and New Zealand. It would be unfortunate to see the rapid development of such an important sector (all renewables) potentially compromise long term agricultural productivity and capacity at a time when its needed most, and further, can be easily avoided through effective policy.

An Industry Comparison of BSAL

NSW Mining (BSAL Regulated)

- 37 Projects
- BSAL Site Verification
- **647 ha** of proposed BSAL disturbance (6 years)
- 10 to 30 years BSAL out of service prior to rehabilitation
- Complete rehabilitation in line with BSAL criteria

NSW Solar Farms

- 38 Projects (17,652 ha)
- 14,335 ha (81%) used for cropping pre development
- No site verification
- **2,697 ha** of proposed BSAL disturbance (2018/19 only)
- 50 years BSAL out of service
- No commitment to rehabilitation to BSAL

Adapted from: NSW Mined Land Rehabilitation Conference, Minesoils Pty Ltd (June 2019)

10. Technical Working and Reference Groups

ANZBIG would be pleased to participate in a ***CCUS Reference Group*** if invited by the Department. Our members include some of the world's leading scientists in biochar and its CCU applications, with a number in the top 1% of citated scientists globally across *all* sciences, and who developed the proposed ERF methodology for biochar mentioned above. Accordingly, ANZBIG recommends that our technical representatives should also participate in the ***CCUS Technical Working Group***. Should the technical working group be split into CCU and CCS, we note that method development can be expedited and potentially with improved outcomes and consistency if there is coordinated involvement between both CCU and CCS Working Groups.

11. Industry Code of Practice

ANZBIG has recently developed and launched an **industry** ***Code of Practice (COP)*** which promotes the sustainable use of biomass residues as a *resource* rather than a waste typically burned or landfilled, and to provide regulatory, community and consumer confidence in the quality of biochar grades sold for different applications. The COP defines three primary grades of char (**Premium, Standard** and **Industrial Grade**) that help guide appropriate applications. Combined with the other strategic activities of ANZBIG (including working with regulators), the COP will help support and execute potential methods under the ERF, and guide the industry to reach full maturity to deliver economic, environmental, and social outcomes now and into the future.

ANZBIG therefore calls upon the government's current review of the ERF and the proposed Method for CCUS applications to recognise biochar (and the bioenergy technologies that produce it) as a significant emerging industry that will help Australia become a leader in carbon dioxide *removal* (CDR), in addition to emissions *avoidance*, whilst providing significant co-benefits including for the transition from linear uses of resources to the circular economy.

Thank you for taking this submission into account and we look forward further discussions with the Department on potential CCU applications our sector can bring to the table, and the proposed ERF methodology which has been developed for consideration.

Kind regards,

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On behalf of the ANZBIG Advisory Board

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