

# MACCY BIOCHAR

December 2020

Auspiced by the Macclesfield Community Association Inc.

Email: [maccybiochar@adam.com.au](mailto:maccybiochar@adam.com.au)

Website: <https://www.maccybiochar.com>

## WHAT IS MACCY BIOCHAR ABOUT?

Maccy Biochar is all about:

- fighting climate change by reducing atmospheric carbon dioxide
- making Macclesfield carbon neutral and
- improving local soils.

Carbon is captured (temporarily) by all plants by the process of photosynthesis.



The carbon dioxide (CO<sub>2</sub>) in the air is split into carbon and oxygen. The carbon goes into building the wood. And the oxygen is emitted for us to breathe. However sooner or later plants give back carbon to the atmosphere (eg. when they are burned and when they die and rot); whereas biochar is stable and lasts for thousands of years in the soil (as proved by the Terra Preta soils of South America).

## SO WHAT IS BIOCHAR?

Physically biochar is the same as charcoal made from wood. But unlike charcoal biochar is not used as a fuel. If it was we would simply be recombining the carbon with oxygen to make carbon dioxide again. But like most charcoal, biochar is made from biomass eg tree litter. Here is a typical wood pile on a local farm.



## HOW IS IT MADE?

Biochar is made by cooking dry wood with little or no air (so-called pyrolysis) at high temperature (400-600°C).



There are many different ways to do this. Some are high tech, some low tech. We use a low-tech method using flame-capped kilns.



During pyrolysis the combustible gases (methane, carbon monoxide and hydrogen) emitted are burned **cleanly with no smoke** at high temperature (eg 2000 degrees C). This leaves behind a char consisting only of carbon, ash (the mineral content) and some residual volatiles. When the kiln is full the contents are thoroughly quenched with water. Here is the finished char after quenching.



Biochar is approx. 75% carbon depending on the type of wood that is pyrolysed. (Hardwood is best).

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And here is the finished char after bagging.

## HOW DOES BIOCHAR REDUCE GREENHOUSE GASES?

Each Carbon molecule captured has diverted one molecule of CO<sub>2</sub> from the atmosphere. Because of the atomic structure of CO<sub>2</sub> this means that each mass unit of Carbon captured has diverted just over 3½ mass units of CO<sub>2</sub>.

(Atomic weights: C =12; O =16; So CO<sub>2</sub> = 44; So 12 units of C divert 44 units of CO<sub>2</sub>. So 1 unit of C diverts 3.66 units of CO<sub>2</sub>.)

**So 1 tonne of carbon diverts 3.66 tonnes of CO<sub>2</sub>.**

And because we can easily measure the carbon content of the biochar (75 – 80%) then we can calculate how much CO<sub>2</sub> each tonne of biochar has diverted from the atmosphere. **Typically 1 tonne of biochar diverts 2½ tonnes of CO<sub>2</sub>.**

## HOW DOES THIS HELP MAKE MACCY CARBON NEUTRAL?

If we know how much electricity a household has purchased from the grid then we can calculate how much CO<sub>2</sub> they have effectively generated. Then we can allocate some of the CO<sub>2</sub> we have diverted to that household to help them become carbon neutral.

## HOW DOES BIOCHAR HELP THE SOIL?

Biochar holds about 3 times its own weight of water. So when mixed into the soil in small proportions (1-5%) moisture and nutrients are held and encourage growth of microfungi and other living organisms. This helps to improve plant yields; reduce water consumption; and reduce the need for inorganic fertilisers.

## OTHER BENEFITS OF BIOCHAR

Biochar has become very prominent in recent years; the advantage of its production is widely recognised as a way to capture carbon (as mentioned previously); and the end product is quickly becoming accepted as having many environmental benefits, including pasture improvement in agriculture, feed supplement in livestock; which will also help to reduce the greenhouse gas emissions from meat production; soil improvement for home and commercial gardeners; water filtering; and as an odour absorbing product both for domestic and commercial composting.

## WHAT HAVE WE DONE SO FAR?

A steering committee was formed at a public meeting in January 2019 to drive the project in Macclesfield. The committee has since then:

- undertaken extensive community consultation;
- made a presentation to the Mount Barker Council;
- set up a website <https://www.maccybiochar.com>;
- held an Open Day to demonstrate the operation of the kilns;



Here is Greg Marlu at our 2019 Open Day.

- obtained an operating site on private property courtesy of Greg & Jacqui Goding;
- enlisted a membership of over 30 volunteers;
- exhibited our product at the Macclesfield Strawberry Fete;
- enabled our members to make over 20,000 litres of biochar resulting in a net capture of over 8.8 tonnes of CO<sub>2</sub>;
- sold our biochar in bulk bags;

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Making Biochar for carbon capture and soil improvement*



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Despatching our first bulk bag of raw biochar.

- Conducted training courses and workshops on how to make biochar;
- Ended the 2019-20 year with a small profit.

Below is a summary of our modest, but significant, achievement so far:

MACCYBIOCHAR	SCOREBOARD at		25/11/2020	
YEAR	2019	2020	TOTAL	Units
BIOCHAR PRODUCED	1720	18451 **	20171	Litres
CARBON CAPTURED	222 *	2388	2610	Kg
NET CO2 AVOIDED	0.775	8.042	8.817	Tonnes
ELECTRICITY OFFSET or PETROL OFFSET	1.520 352	15.769 3655	17.289 3951	MWHR Litres
* Re-calculated based on 3rd party biochar analysis dated 19/4/20				
** Includes 3180L from members.				

## WHAT DO WE WANT NEXT?

- We want to inspire other local communities to set up their own biochar centres using a similar business model to ours so that together we can capture more carbon from the atmosphere and build a viable biochar industry.
- We want to see accurate and credible measurements of community carbon emissions that will allow us to assess how much biochar we need to make to help our community become carbon neutral.
- We want to establish a central site where we can demonstrate our methods and results and thereby support the District Council of Mount Barker in its efforts to achieve carbon neutrality.
- We want to co-operate with local land-care and bush-care groups on their tree planting programs and in assisting landowners to capture carbon with biochar.
- We want to establish a credible reputation as a wholesale supplier of bulk biochar.
- We want politicians to better understand what they can do to help us fight climate change. Eg. Enact legislation to enforce transparency of CO<sub>2</sub> emissions by towns, regions etc.
- We want to see local communities acting together to achieve 5% reduction in emissions each year for the next 10 years.

- worked with local vineyards;



- applied for and received a \$2000 Community Grant from the Mount Barker Council that enabled us to have a larger kiln (shown below) made for us by a local engineering fabricator.



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## WOOD COLLECTION & DELIVERY

Our wood collection team has done a fantastic job picking up tree litter from under trees on Macclesfield properties. These trees are a wonderful resource and we are grateful for them. Converting their litter to biochar ensures that the carbon they contain is captured while reducing the fire risk they pose during summer.



Delivery and drop-off of dry tree litter (from twigs to 100mm dia.) is free of charge to Macclesfield residents and anyone with a Macclesfield PO Box and



only a small fee for people outside Macclesfield.



Our site at Shadygrove road, near Macclesfield.

## HOW CAN YOU HELP?

**Become a member!** Join the Group to stay informed about progress and help us with this initiative. Membership forms are available from the website or call Brian on 041 148 0935.

**Enlist** as a Volunteer.

**Drop off your tree litter** to our Shadygrove road site.

**Advertise** on our website.

**Enrol** in one of our Training Courses.

**Engage** us to run a Biochar Workshop for your group.

**Register** as a household supplier of woody waste and have your emissions offset.

**Engage** us to make biochar on your property.

**Encourage** friends to follow our progress.

**Forward** this brochure to friends and colleagues.

**Contact** us to receive future brochures and newsletters if you did not receive this one from us.

## ABOUT US

Maccy Biochar is a community-based, non-profit, group set up to help make Macclesfield carbon neutral and is run entirely by volunteers. Our primary activity is the production of biochar from woody tree litter sourced from local households, businesses and landowners. The carbon credits created by making biochar are used to offset the greenhouse gas emissions of local households. The biochar we make on behalf of our customers is sold in bulk for local agricultural and other similar uses thereby ensuring that the carbon we have captured is properly sequestered and helping to improve soil fertility for years to come. We are based in Macclesfield, South Australia.

## OUR COMMITTEE:

Brian Lewis – Chairman

Kelvin Williams – Deputy Chairman

Fiona Williams – Membership Secretary

John Agnew, Greg Marlu, Stephen Heading, Geoff Brockhouse, Ivars Eglitis, Dean Hewlett and Meegan Semple.

## CONTACT DETAILS:

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