

MACCY BIOCHAR

June 2021

A Task Group of the Macclesfield Community Association Inc.

Email: maccybiochar@adam.com.au

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

25,771 litres of biochar = 13.8 tonnes CO₂ avoided.

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 (CO₂) 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 similar to 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. such as retorts and screw feeders, and some are 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 and bagging.



Our biochar is typically 75% - 80% carbon depending on the type of wood that is pyrolysed. (Hardwood is best). The remainder is residual ash (the mineral content that does not burn) and residual volatiles (hydrocarbons that have not completely burned away).

MACCY BIOCHAR

June 2021

HOW DOES BIOCHAR REDUCE GREENHOUSE GASES?

Each Carbon molecule captured has diverted one molecule of CO₂ from the atmosphere. Because of the atomic structure of CO₂ this means that each mass unit of Carbon captured has diverted just over 3½ mass units of CO₂.

(Atomic weights: C =12; O =16; So CO₂ = 44; So 12 units of C divert 44 units of CO₂. So 1 unit of C diverts 3.66 units of CO₂.)

So 1 tonne of carbon diverts 3.66 tonnes of CO₂.

And because we can easily measure the carbon content of the biochar (75 – 80%) then we can calculate how much CO₂ each tonne of biochar has diverted from the atmosphere. **Typically 1 tonne of biochar diverts 2½ tonnes of CO₂.**

HOW DOES THIS HELP MAKE MACCY CARBON NEUTRAL?

Currently the biochar we make is not able to be accredited as a legal carbon offset. There is simply no accreditation body in Australia that is set up to do that. So we can only “claim” carbon offsets in the figurative sense. We use the Australian National Greenhouse Accounts Factor for South Australia (currently 0.43kgCO₂/kWh) and average household electricity consumption (6000kWh/annum) to estimate the number of local households we have rendered carbon neutral.

HOW DOES BIOCHAR HELP THE SOIL?

Biochar holds about 3-5 times its own weight of water. So when mixed into the soil in small proportions (1-5% by volume) moisture and water-borne nutrients are held and encourage growth of micro-fungi and other living organisms. Thus soil life is increased and therefore so also is soil fertility.

This helps to improve plant yields; reduce water consumption; and reduce the need for fertilisers. In turn the multiplier effect of increasing soil life is to further increase soil carbon and therefore fertility. And so on.

The carbon in biochar does not readily break down and so will remain in the soil for many hundreds of years. So the benefits to the soil will continue.

OTHER BENEFITS OF BIOCHAR

Other benefits include:

- reduction of methane emissions from compost and mulch;
- reduction of methane emissions from cattle when added to cattle feed;
- reduction of nitrous oxide emissions from soils when used to reduce inorganic fertiliser use;
- reduction of animal disease when added to the diet;
- adsorption of contaminants from drinking water (an old bushman’s trick);
- adsorption of odours (eg from food scraps for composting; smelly socks; vent pipes etc, etc).

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;
- 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 some 50 people of whom approximately 12 are active volunteers;
- produced over 24,000 litres of biochar resulting in a net capture of over 12 tonnes of CO₂;
- sold our raw biochar in bulk bags to local Councils, market gardeners, biochar retailers, and others;

MACCY BIOCHAR

June 2021



Despatching our first bulk bag of raw biochar.

- Conducted training courses and workshops on how to make biochar to various community groups and secondary school students;
- Donated biochar to local Biggest Morning Tea charity auction;
- Ended the 2020-21 year with a small profit.

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

MACCYBIOCHAR SCOREBOARD at 30/06/21					
YEAR	2019	2020	2021	TOTAL	Units
BIOCHAR PRODUCED	1720	18451 ²	5600	25771	Litres
CARBON CAPTURED	222 ¹	2939 ³	889	4050	Kg
NET CO2 AVOIDED	0.775	10.048	3.030	13.853	Tonnes
ELECTRICITY OFFSET	1.520	23.369 ⁴	7.0	31.889	MWHR

1. Re-calculated based on 3rd party biochar analysis dated 19/4/20
 2. Includes 3180L from members.
 3. Re-calculated based on 3rd party biochar analysis dated 28/1/21
 4. Calculated based on Australian National Greenhouse Accounts Factors Oct. '20 (SA: 0.43 kgCO₂/kWh)

- worked with local vineyards;



- 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.



WOOD COLLECTION & DELIVERY

Our wood collection team provides a valuable community service by picking up tree litter from under trees on Macclesfield properties. These trees are a wonderful resource and we are grateful to have 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.

Without the wood we cannot make biochar!

*Making Maccy Carbon Neutral
 Making Biochar for carbon capture and soil improvement*

MACCY BIOCHAR

June 2021

WHAT DO WE WANT NEXT?

- **More of the same:** 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.
- **Accreditation:** We want to see government action to establish accreditation bodies for biochar producers to claim carbon credits.
- **Demonstration site:** We want to establish a central site where we can demonstrate our methods to the wider community and provide further education on carbon negative technologies.
- **Soil improvement:** We want to help local land-care and bush-care groups and more landowners to improve the biodiversity of their land and increase their soil carbon using biochar.
- **Biochar industry:** We want to cooperate with other biochar producers to establish a credible local biochar industry.
- **Emissions reduction:** We want to see local communities acting together to achieve 5% reduction in emissions each year for the next 10 years.
- **Carbon neutral clarity:** We want to see accurate and credible measurements of township carbon emissions that will allow us to assess how much biochar we need to make to help our community become carbon neutral.

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 simply call us. Member benefits include discount price for biochar; monthly biochar news bulletins; free wood litter drop-off; loan of small kilns for home use.
- **Volunteer** to collect wood and/or make biochar.
- **Drop off** your tree litter to our Shadygrove road site. Call Brian or Kelvin to arrange a time for drop-off.
- **Enrol** in one of our Training Courses.
- **Engage** us to run a Biochar Workshop for your group and/or advise on setting up a biochar group of your own.

- **Engage** us to make biochar on your property and avoid having to set fire to your waste wood heap.



- **Follow us on Facebook** to follow our progress.
- **Forward** this brochure to friends and colleagues.
- **Buy enhanced biochar** for home use from Godings Farm Supplies, Macclesfield.

ABOUT US

Maccy Biochar is a community-based, not-for-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 figuratively offset against the greenhouse gas emissions of local households. The biochar we make 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 local soil fertility for years to come.

OUR COMMITTEE:

Brian Lewis – Chairman
Kelvin Williams – Deputy Chairman
Fiona Williams – Membership Secretary
John Agnew – Schools and Ag. Science liaison.
Stephen Heading – Technology liaison.
Geoff Brockhouse – Wood collection coordinator.
Ivars Eglitis and Dean Hewlett.

Ex Officio Advisors:

Greg Marlu – Operations; Meegan Semple – Horticulture; Tony Huppertz – Carbon credits.

CONTACT DETAILS:

Mob: 0411 480 935 or 0423 198 345.

Email: maccybiochar@adam.com.au

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

Facebook: www.facebook.com/maccybiochar

*Making Maccy Carbon Neutral
Making Biochar for carbon capture and soil improvement*