The Case for Soil Restoration with the Use of Biochar

Citizens Climate Lobby (CCL) – WA, 2nd district, Whidbey Island

Paul E Belanger, Geologist, Ph.D.

pebelanger@glassdesignresources.com

12/14/2019

See BIOCHAR PAGE:

https://denverclimatestudygroup.com/?page_id=28

A Synthesis from 2 talks

The Case for Soil Restoration with the Use of Biochar

Paul E Belanger, Geologist, Ph.D.
pebelanger@glassdesignresources.com
11/20/2019

Truth In Action with Unitarian Universalists - 24 Hours of Reality

https://www.facebook.com/events/441689836539682

NATURAL CLIMATE SOLUTIONS

David Carlson
Ethics and Ecological Economics Forum
davidcarlson824@gmail.com

Why Carbon Pricing Isn't Enough to Stop Climate Change

Paul Belanger

ILIFF School of Theology, Denver CO
March 26, 2018

If you are Wondering WHY

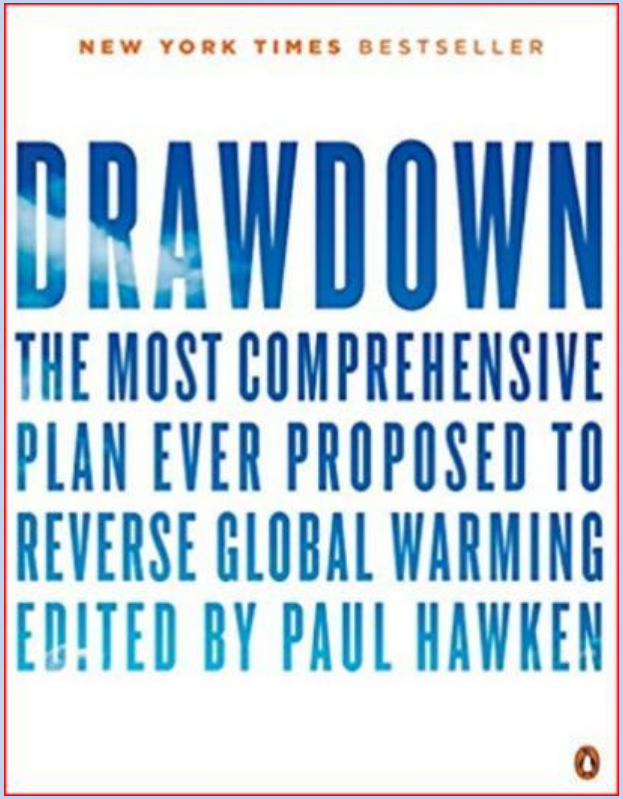
1. Decarbonizing energy, transportation, manufacturing is NOT going to happen fast enough
2. Because pricing won't stop carbon emissions fast enough
3. Ocean acidification
4. Extreme weather events are going to become even more extreme and/or frequent
5. …etc…

THUS IT'S FOR CLIMATE MITIGATION

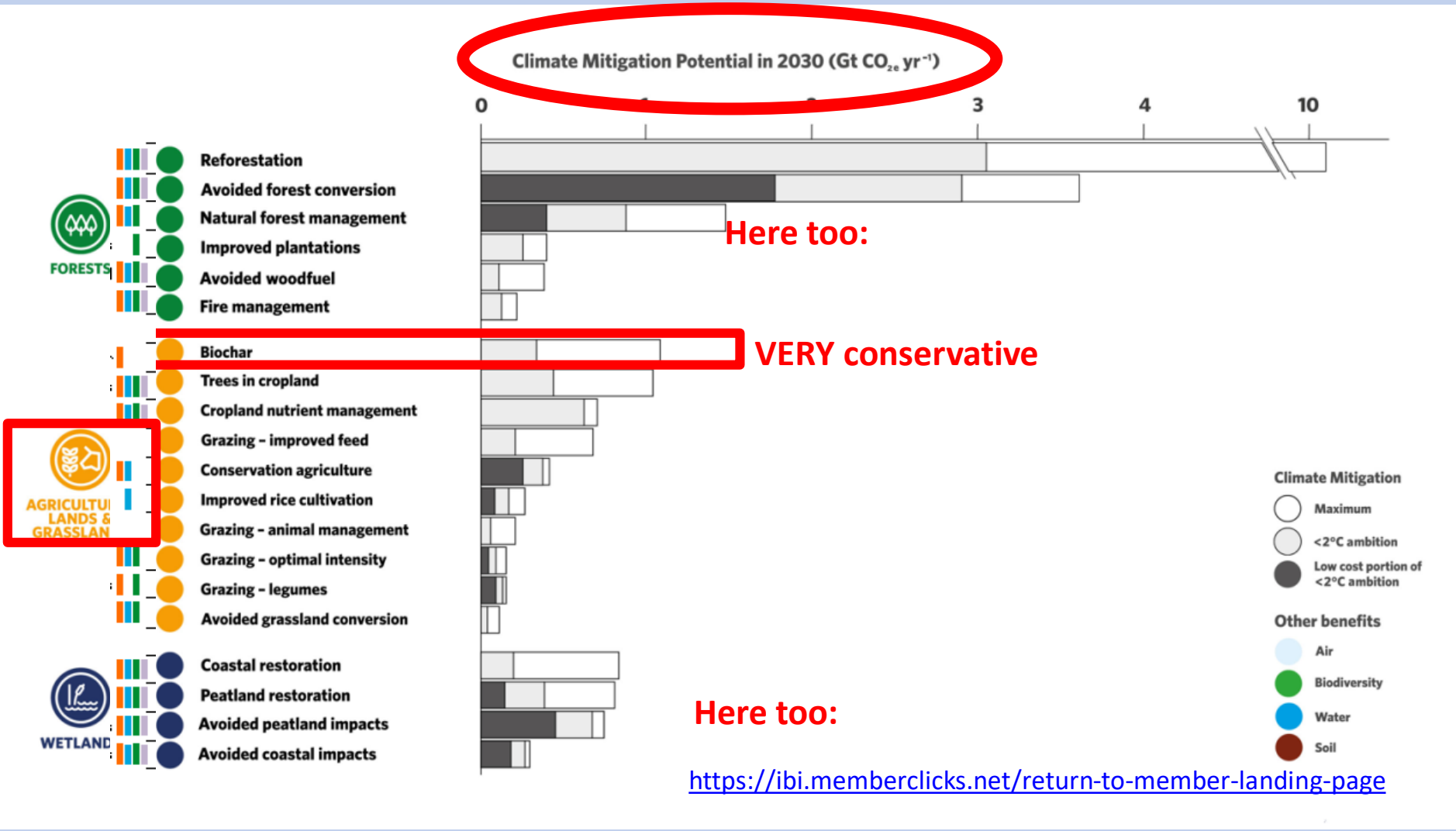
IN THIS CASE

CARBON SEQUESTRATION!

Popular Book by Paul Hawken (editor) DRAWDOWN



FOR CLIMATE MITIGATION



https://ibi.memberclicks.net/return-to-member-landing-page

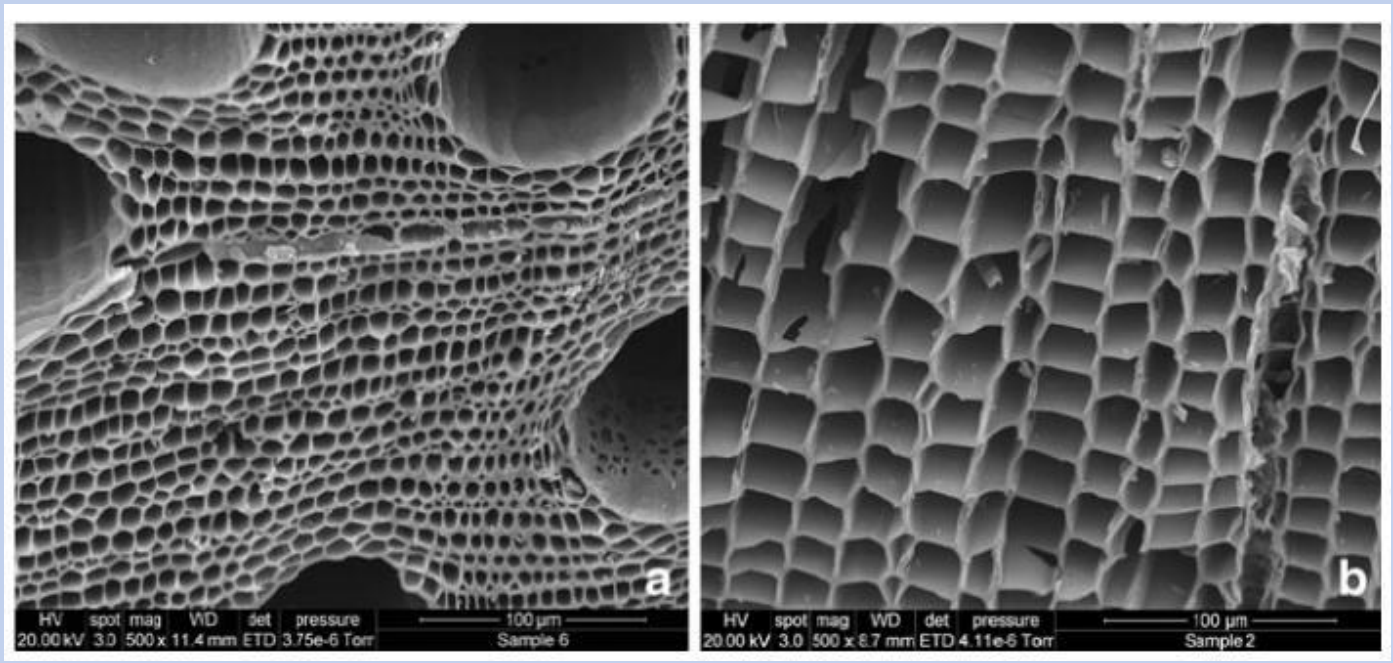
- PROMOTES SOIL RESTORATION
- INCLUDES BIOCHAR BENEFITS
- SOMEWHAT NEGLECTS CARBON SEQUESTRATION

So, What is Biochar?

1. Main: Biochar is “ordinary” charcoal - after placement in the ground. (Not for combustion.)

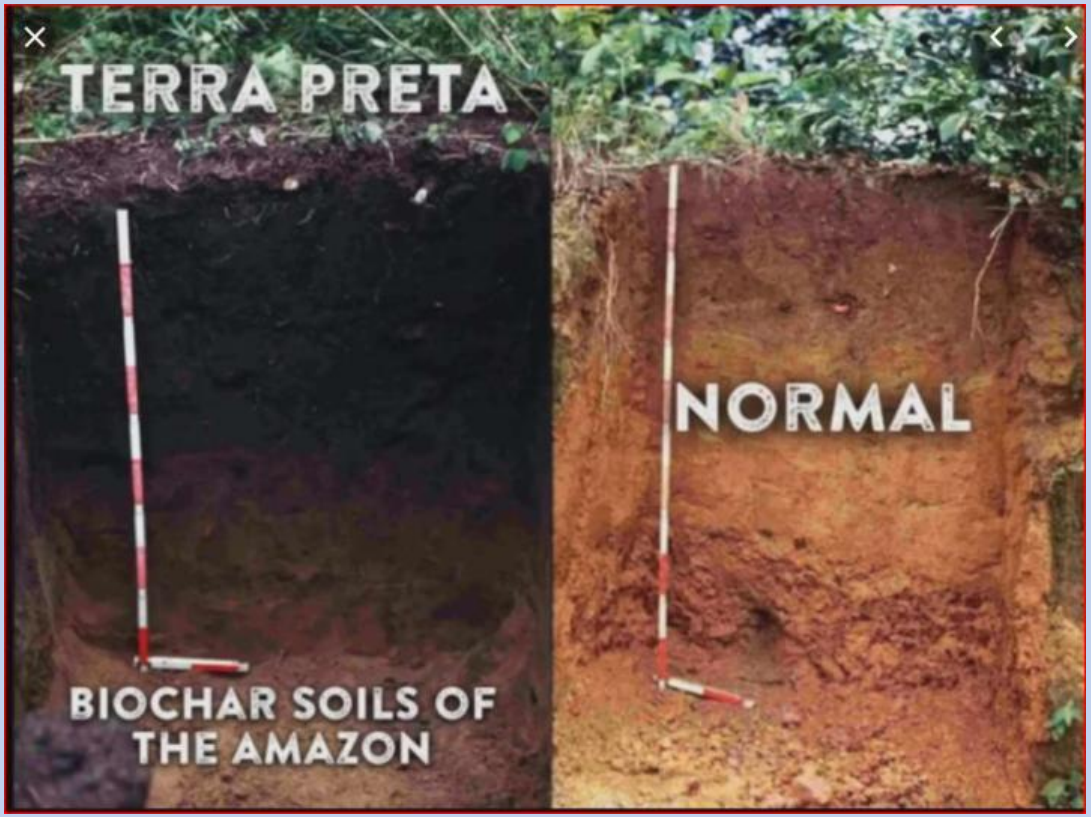
2. Also - dozens of other [long-life] uses of charcoal (cattle feed, water quality, construction materials,……)

3. Terra Preta (1000’s of years, Amazon)


a
HV spot mag WD det pressure
20.00 kV 3.0 500 x 11.4 mm ETD 3.75e-6 Torr
100 µm
Sample 6
b
HV spot mag WD det pressure
20.00 kV 3.0 500 x 8.7 mm ETD 4.11e-6 Torr
100 µm
Sample 2


www.permaculture.co.uk

Buried in the Soil it looks like this:



Why is BIOCHAR Important ?

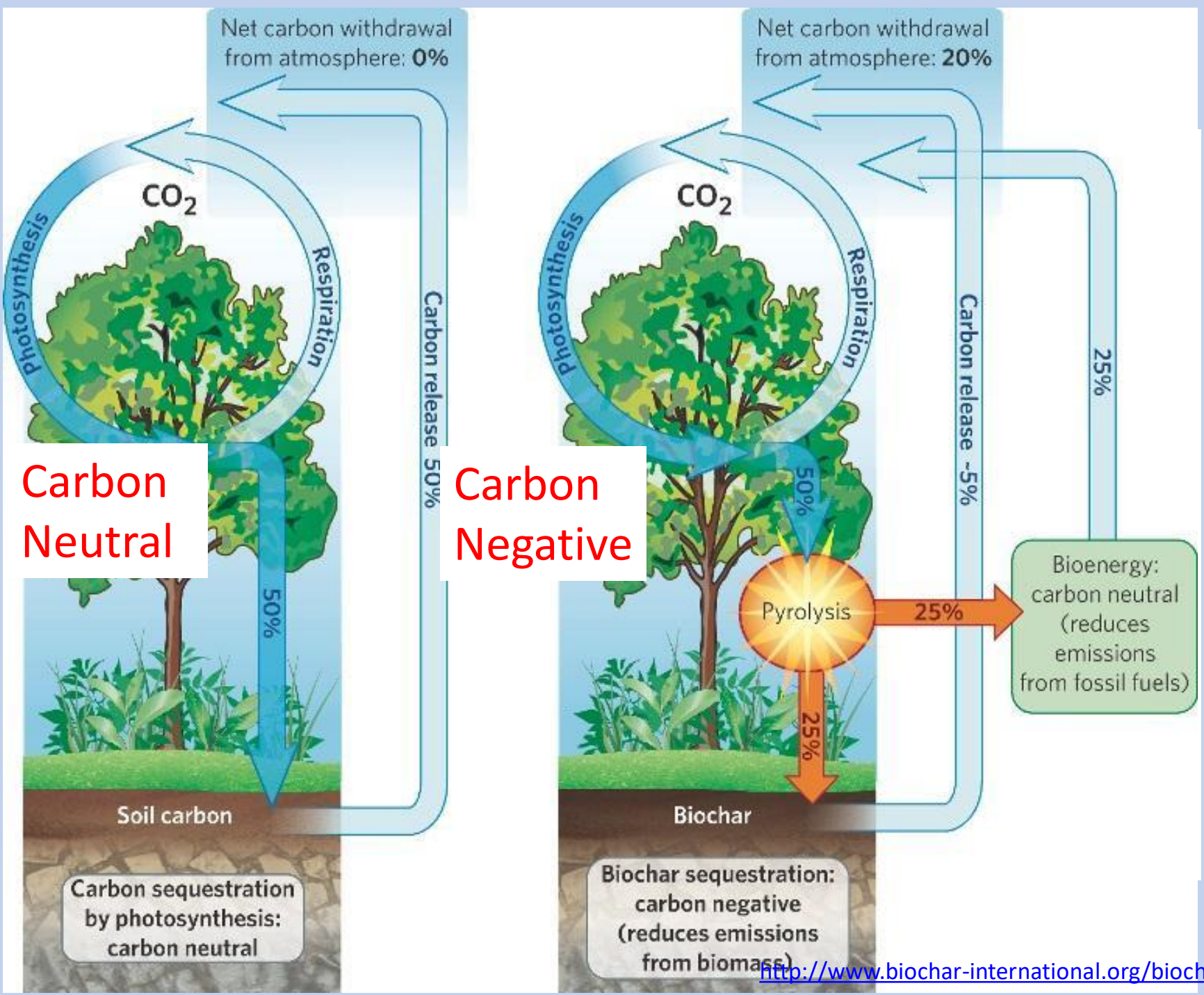
Carbon negativity (CO2, CH4, N2O) - How?

- **Fossil fuels are carbon positive; they add more carbon dioxide (CO_2) and other greenhouse gasses to the air and thus exacerbate global warming.**

- **Compost and Ordinary biomass fuels are carbon neutral; the carbon captured in the biomass by photosynthesis would have eventually returned to the atmosphere through natural processes like decomposition.**

- **Sustainable biochar systems can be carbon negative by transforming the carbon in biomass into stable carbon structures in biochar which can remain sequestered in soils for hundreds and even thousands of years. The result is a net reduction of CO_2 in the atmosphere, as illustrated in the diagram.**

http://www.biochar-international.org/biochar/carbon



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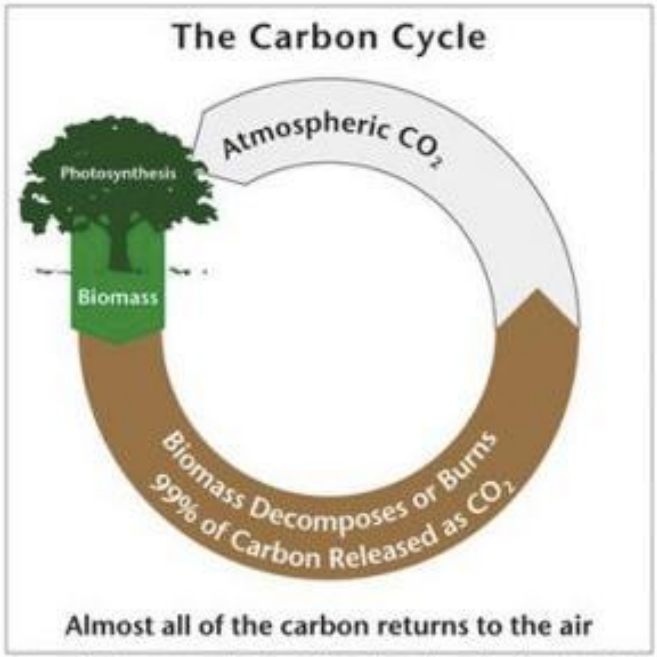
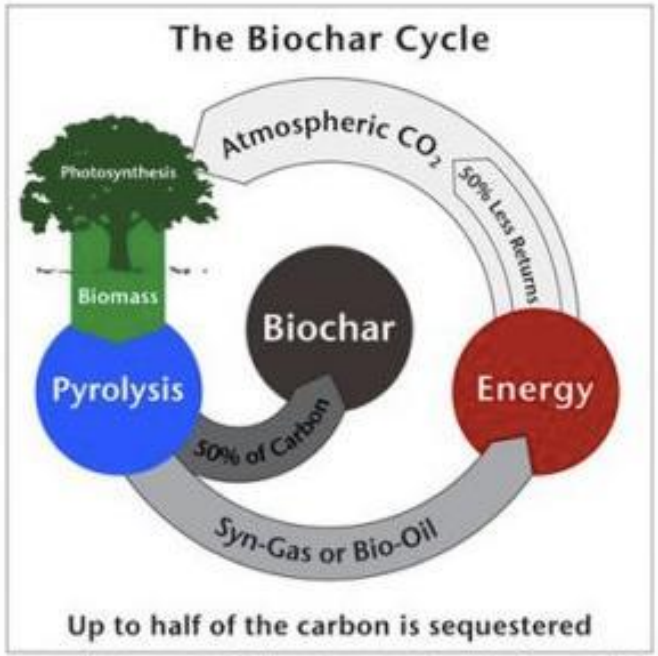


Green plants remove CO_2 from the atmophere via photosynthesis and convert it into biomass. Virtually all of that carbon is returned to the atmosphere when plants die and decay, or immediately if the biomass is burned as a renewable substitute for fossil fuels.



Green plants remove CO_2 from the atmophere via photosynthesis and convert it into biomass. Up to half of that carbon is removed and sequestered as biochar, while the other half is converted to renewable energy co-products before being returned to the atmosphere.

Advantages

a) Soil & Food (long life in soil, not an expense)
b) Carbon negativity (CO_2, CH_4, N_2O)
c) Energy (solar & woodstove backup, stored energy)
d) Water quantity/quality
e) Waste disposal (biogas competitor)
f) Lowered fertilizer, irrigation costs
g) Jobs, rural income (and land value)
h) Forest health (Fires)
i) Ocean and HTC potential
j) Other (including sustainability)

Examples

Flame Cap/TLUD?

Don't Flame Caps and TLUDs
Function Differently?
Ethos/2019
Norman T. Baker

Slide courtesy of Norm Baker


0:15
0:34
1:07
0:56

Related images

See more

Biochar Retort vs Pit Trials, Ah...
terrapreta.bioenergylists.org

Note on Terminology: Flame C...
greenyourhead.typepad.com

How to Make Biochar With Onl...
pacificbiochar.com

Resources - permachar
permachar.net

TERRA: Carbon Negative
carbon-negative.us

Pyrolizer |150L Biochar Kiln - A...
activevista.com.au

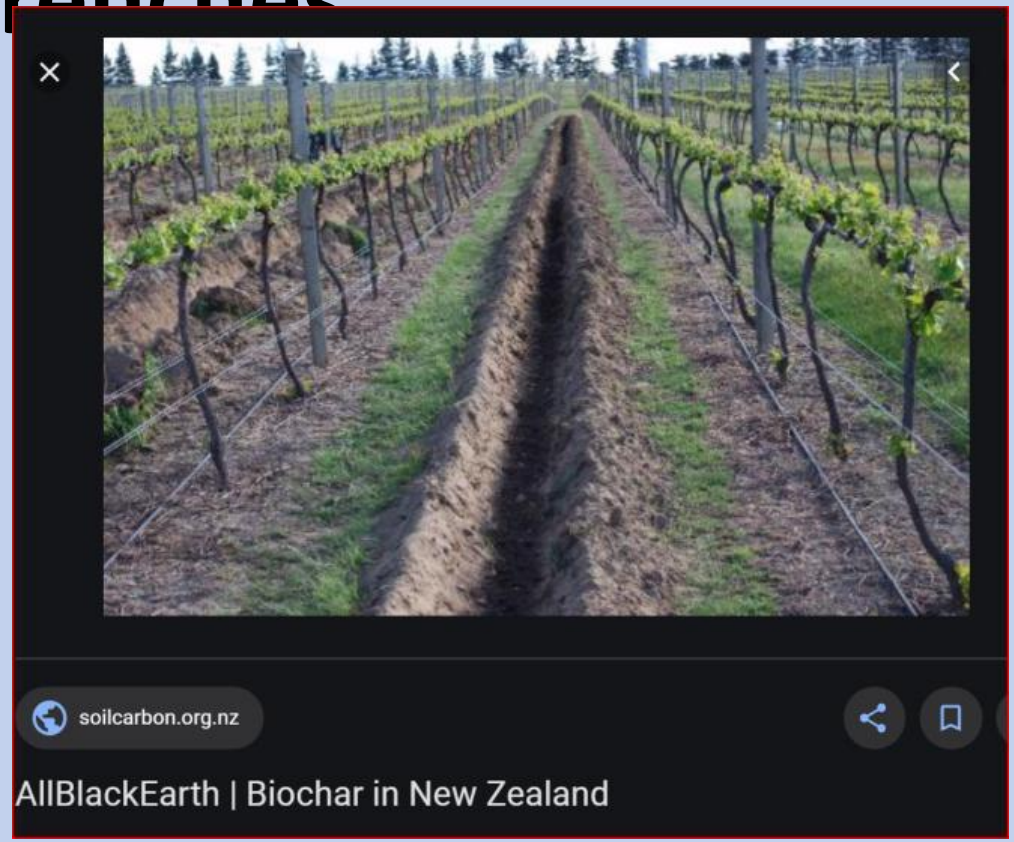
Biochar Kilns Australia - Bioch...
thebiocharsolution.com

New biochar ideas from The W...
biocharproject.org

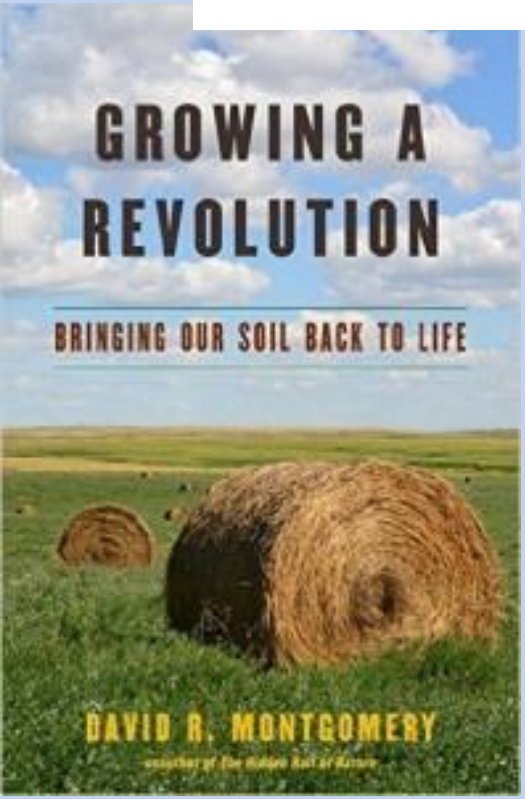
Mobile units:

The smaller batch unit

To Simply Incomplete burning and burial in Trenches



New book by UW's David R. Montgomery addresses how to rebuild Earth's soils



- PUT CARBON IN GROUND: IDEALLY 5-8% BIOCHAR WITH COMPOST/OTHER ORGANIC MATTER
- NO TILL - to allow soil to stabilize
- COVER: to control weeds
- ROTATE CROPS: to control pests

http://www.washington.edu/news/2017/05/02/new-book-by-uws-david-r-montgomery-addresses-how-to-rebuild-earths-soils/

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Innovations in Biochar

New CSP enhancement helps forest owners convert tree debris to soil-friendly, carbon-storing biochar

View Interactive StoryMap with More Photos

In Stockholm

reasons to be cheerful

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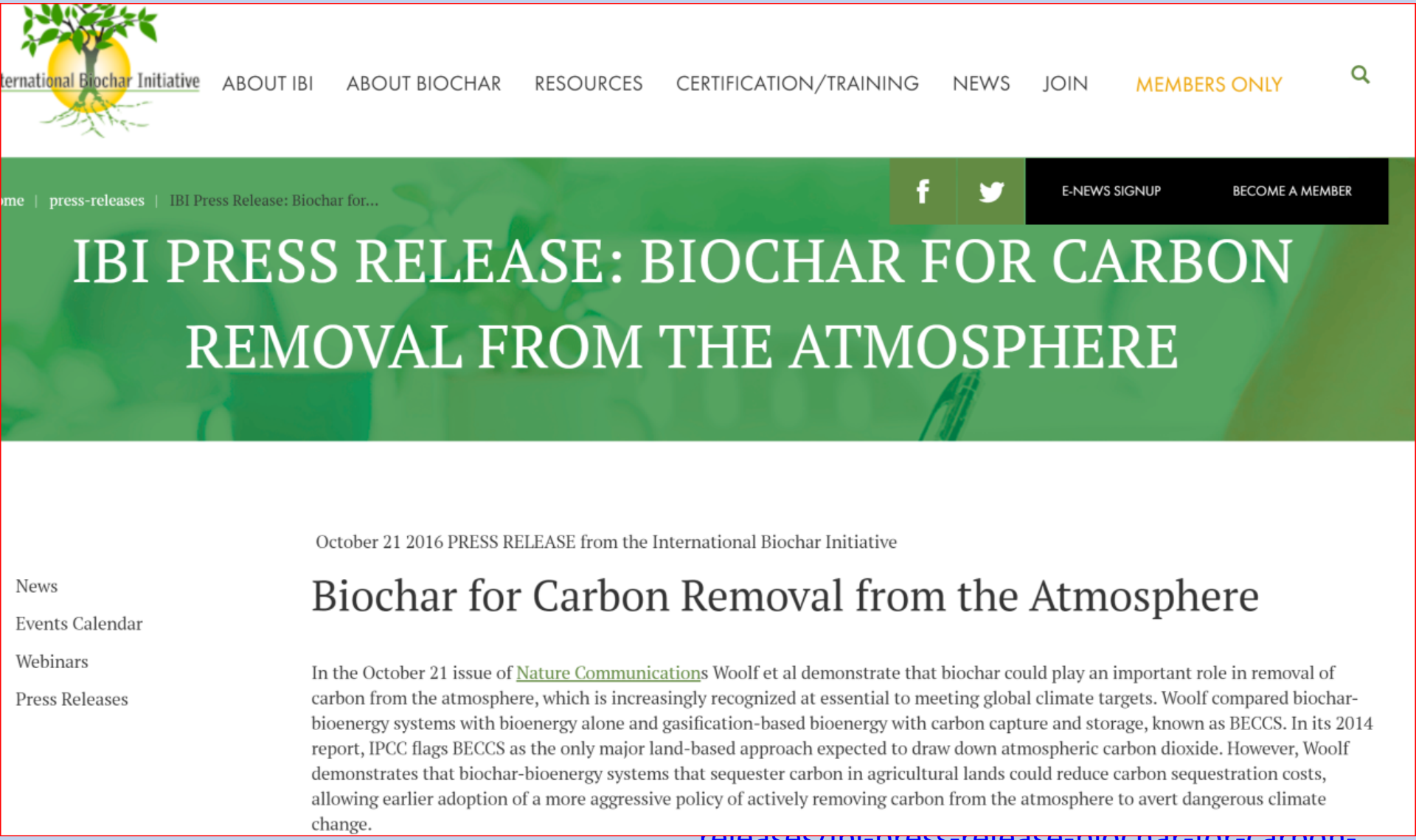
Dead Plants are Powering Stockholm

The biochar process is ingenious, turning green waste into heat before returning it to the soil as an agricultural nutrient. No wonder it's turning a profit.

By: [illegible] O'Sullivan

September 16, 2019



releases/ibi-press-release-biochar-for-carbon-removal-from-the-atmosphere/

Local Applications

- Sedro-Woolley: Sedron Technologies
  - Janicki Omni Processor https://www.sedron.com/
  - https://en.wikipedia.org/wiki/Omni_Processor
  - Bill Gates 2 minute demo https://youtu.be/bVzppWSIFU0
- POTENTIALLY: Whidbey Island
  - FOR safe neutralizing of SEWAGE SLUDGE

BIOCHAR ATTRIBUTES

- http://www.biochar-international.org/biochar : Biochar is produced through pyrolysis or gasification — processes that heat biomass in the absence (or under reduction) of oxygen.
- ATTRIBUTES:
  - resists degradation
  - produce oil and gas byproducts that can be used as fuel, providing clean, renewable energy.
  - When buried in the ground as a soil enhancer, the system can become "**carbon negative**."
    - By burial and
    - By continued microhabitat support for microbes and bacteria to replenish the soil

Contact information:

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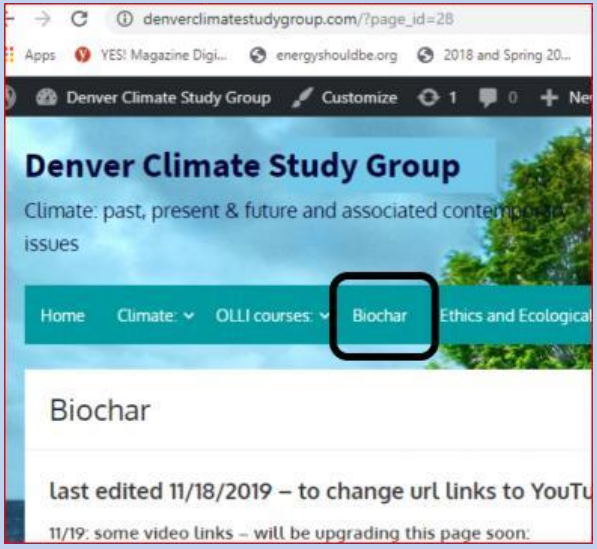
Web page on BIOCHAR:
https://denverclimatestudygroup.com/?page_id=28



CREDITS:

NATURAL CLIMATE SOLUTIONS

David Carlson
Ethics and Ecological Economics Forum
davidcarlson824@gmail.com

- 20 minutes –

Biochar and Related Soil Restoration Solutions

Paul Belanger and Ron Larson

(with contributions from Don Sorenson)

ILIFF School of Theology, Denver CO

March 26, 2018

IBI,

Ron Larson

Norm Baker

others

https://eeeforum.org/older-archives/