

The Case for Soil Restoration with the Use of Biochar

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

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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

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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

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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

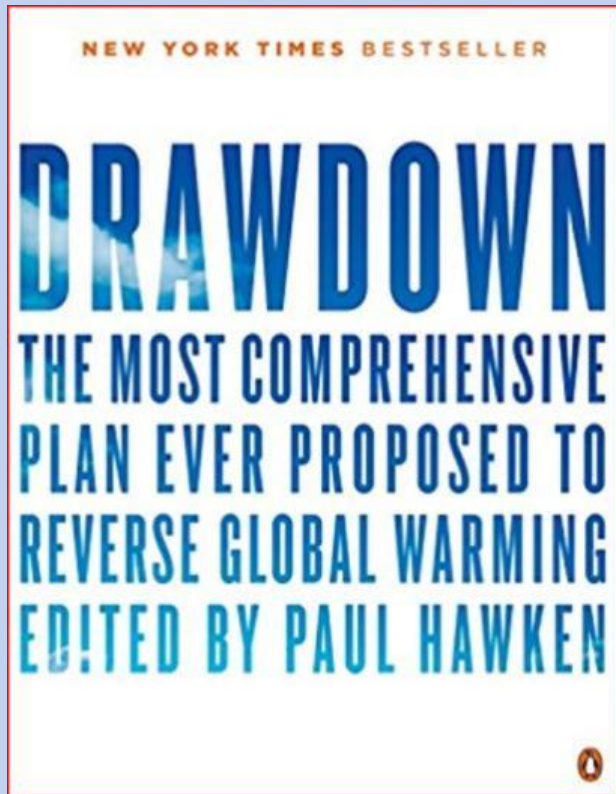
1. Decarbonizing energy, transportation, manufacturing is NOT going to happen fast enough
2. Because pricing won't stop carbon emissions fast enough
3. Ocean acidification
4. Extreme weather events are going to become even more extreme and/or frequent
5. ...etc...

THUS IT'S FOR CLIMATE MITIGATION

IN THIS CASE

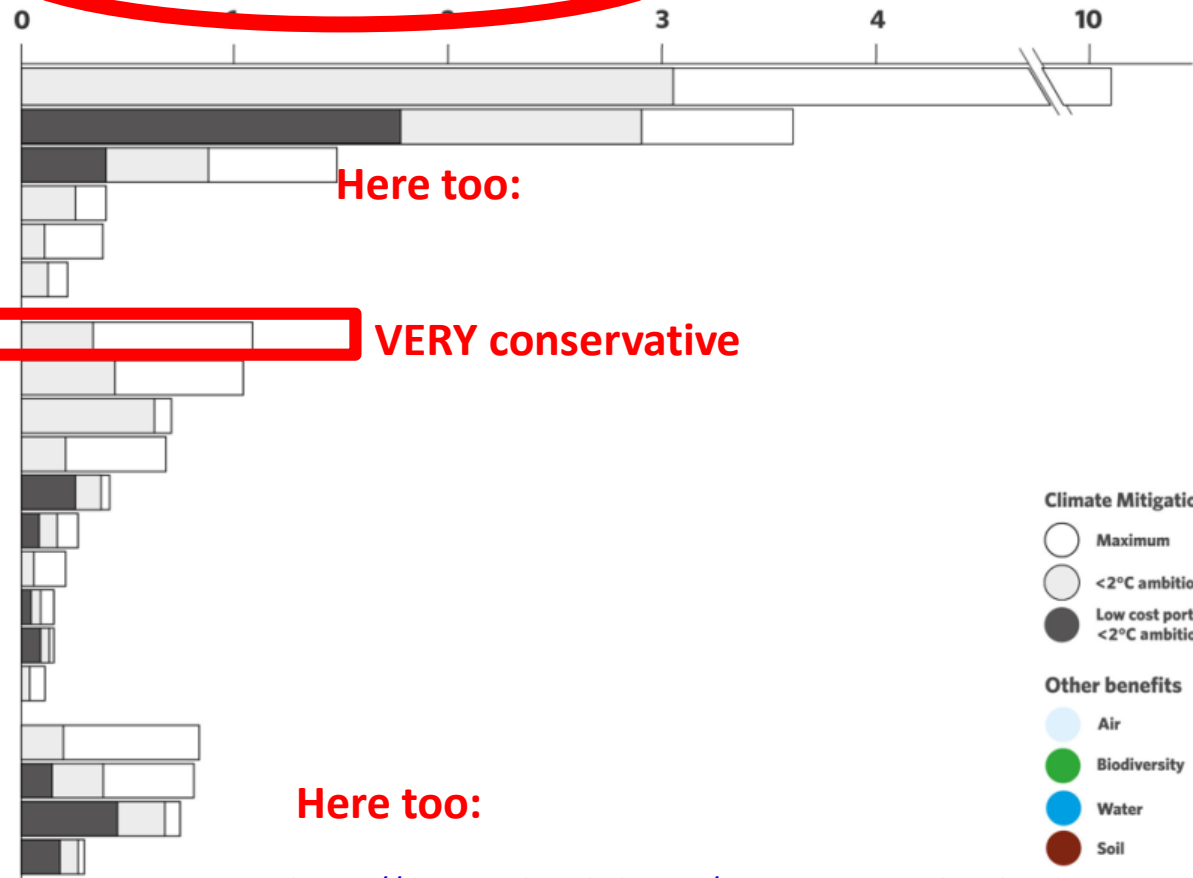
CARBON SEQUESTRATION!

Popular Book by Paul Hawken (editor) DRAWDOWN



FOR CLIMATE MITIGATION

Climate Mitigation Potential in 2030 (Gt CO_{2e} yr⁻¹)



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

JOURNALISM FOR PEOPLE
BUILDING A BETTER WORLD

yes!
SPRING 2019



There's Science Behind Mud's Healing Magic
p38

Beautiful

DIRT

By Reconnecting With Soil,
We Heal the Planet and Ourselves

+
EARLY NATIVE
TRADITIONS
THAT LEAD TO
GOOD HEALTH

The Climate Solution Right Under Our Feet
Simple Steps for Cultivating a Revolution in Your Backyard

Gifts of Good Soil: "I Believe Food Should Be Free"

History of Racial Injustice Revealed by Dirt

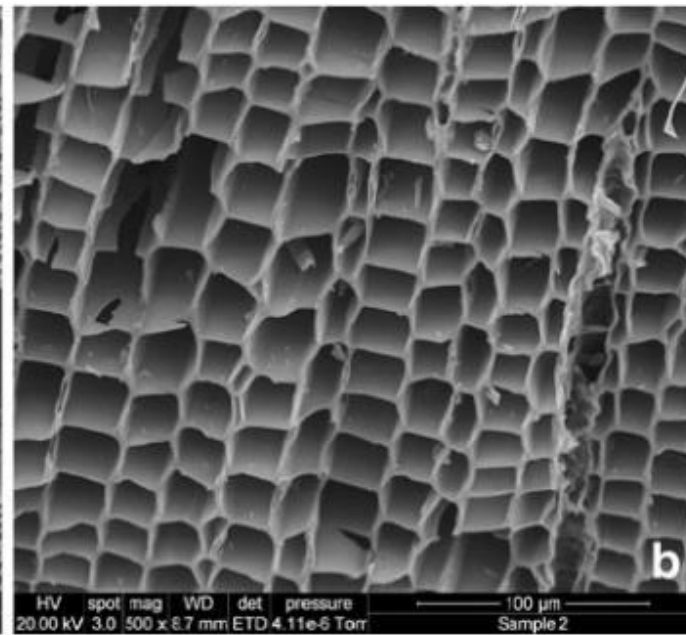
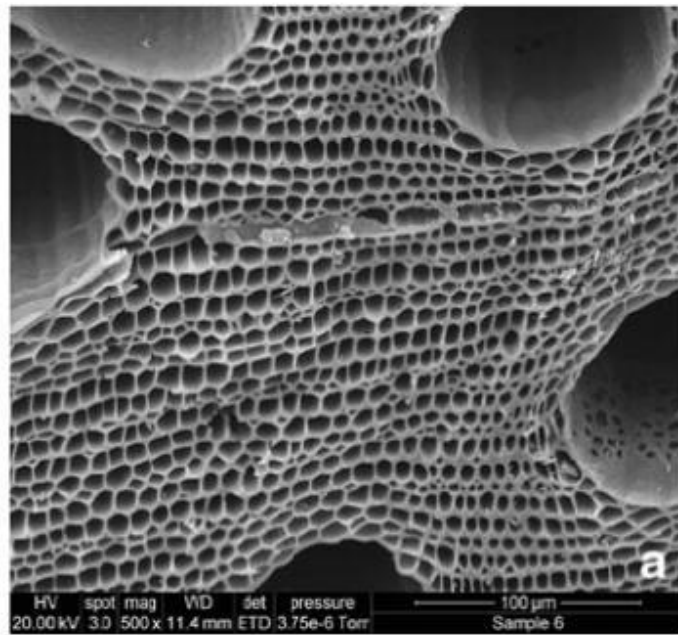


Issue 89 YesMagazine.org

- 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)**





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 (CO₂) 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 CO₂ in the atmosphere, as illustrated in the diagram.

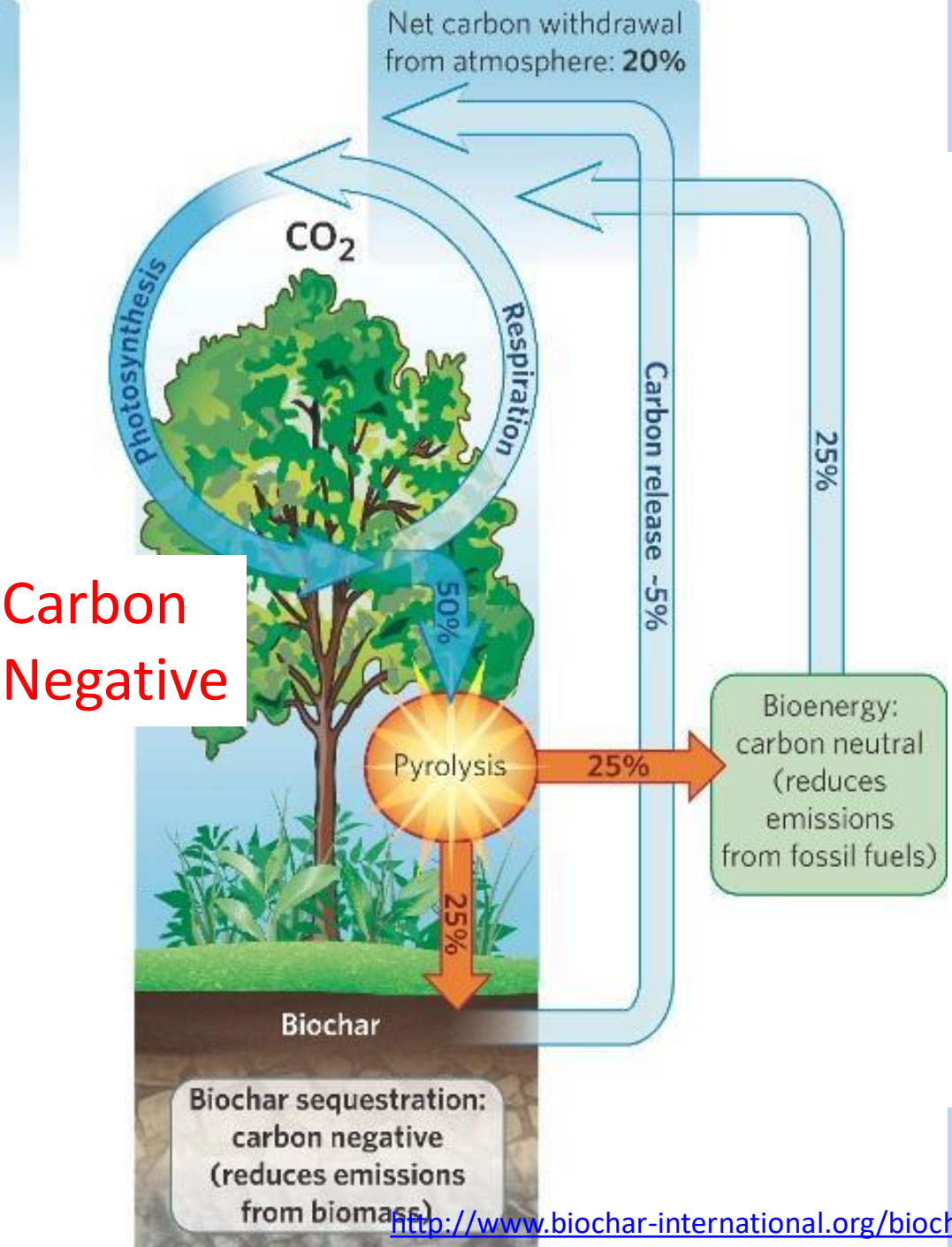
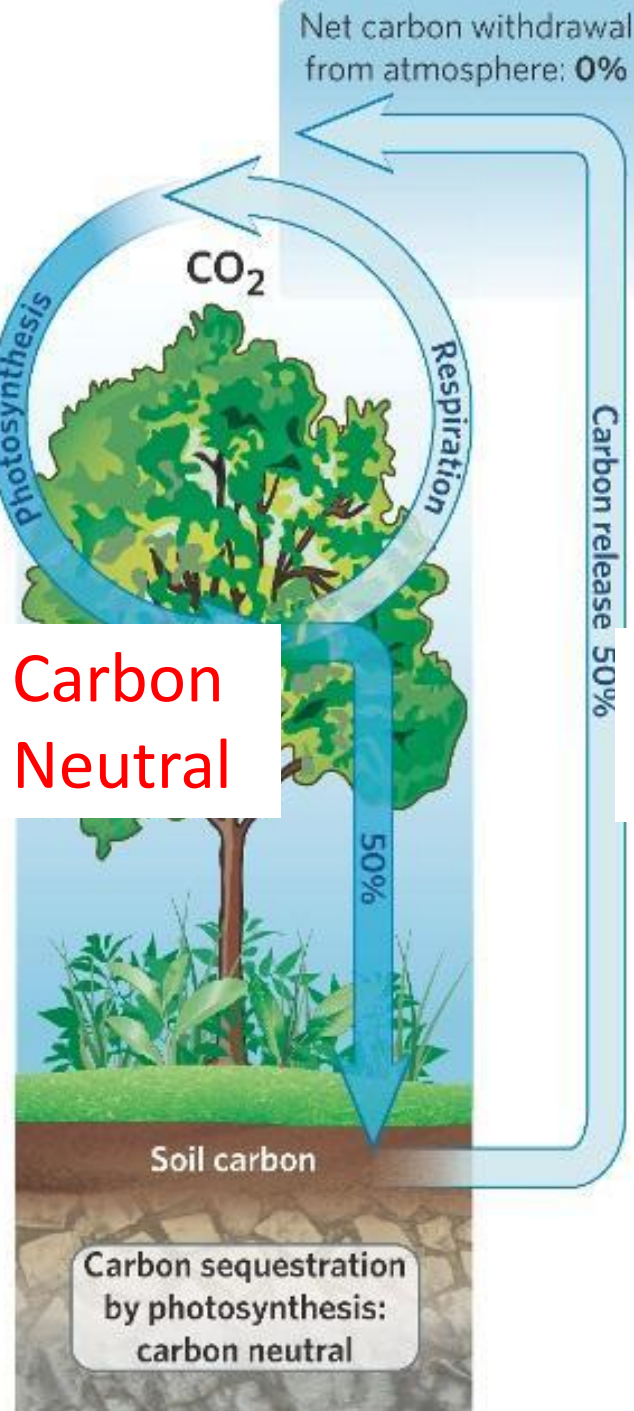
<http://www.biochar-international.org/biochar/carbon>

Net carbon withdrawal from atmosphere: 0%

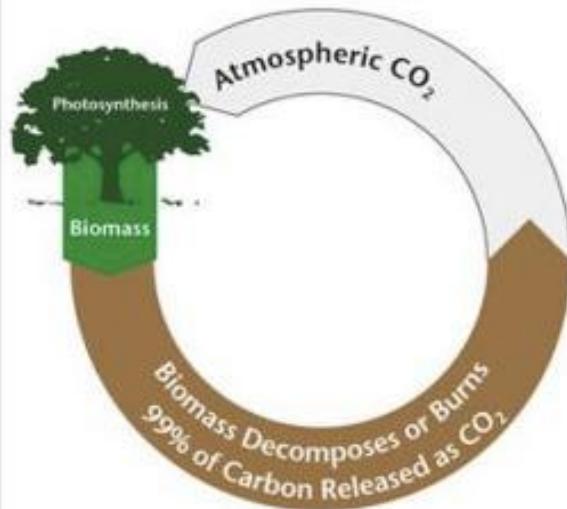
Net carbon withdrawal from atmosphere: 20%

Carbon Neutral

Carbon Negative



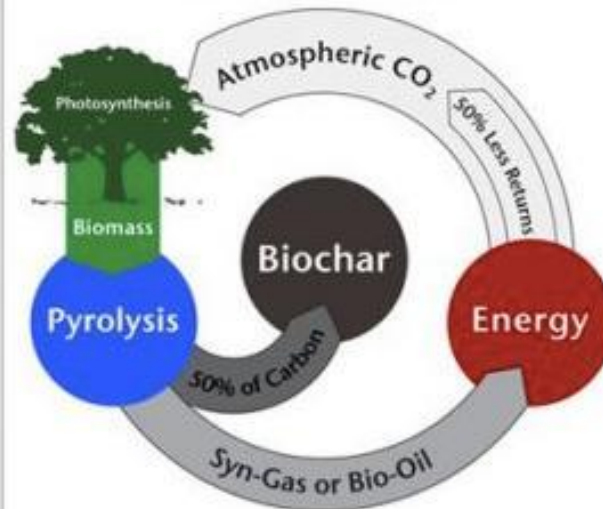
The Carbon Cycle



Almost all of the carbon returns to the air

Green plants remove CO₂ from the atmosphere 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.

The Biochar Cycle



Up to half of the carbon is sequestered

Green plants remove CO₂ from the atmosphere 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 (CO₂, CH₄, N₂O)**
- 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





Related images

See more



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



Resources - permachar
permachar.net



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



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



TERRA: Carbon Negative
carbon-negative.us



Biochar Kilns Australia - Bioch...
thebiocharsolution.com



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



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



Mobile units:



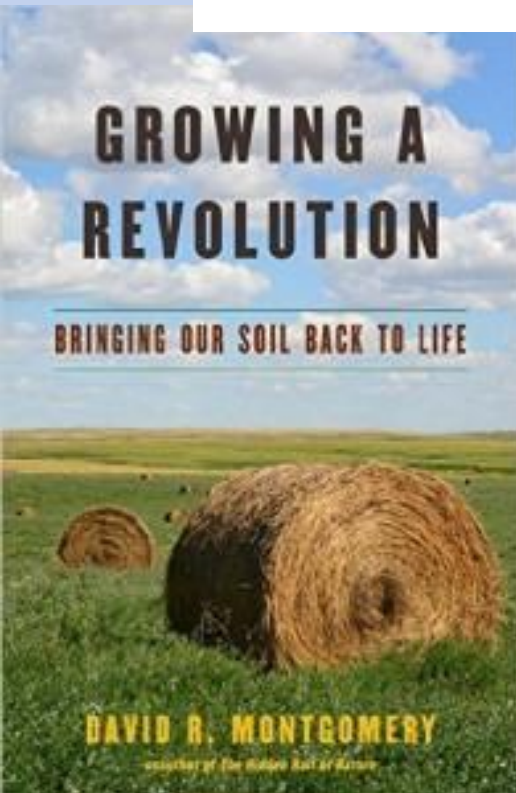
The smaller batch unit



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

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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: Feargus O'Sullivan

September 16, 2019



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IBI PRESS RELEASE: BIOCHAR FOR CARBON REMOVAL FROM THE ATMOSPHERE

October 21 2016 PRESS RELEASE from the International Biochar Initiative

Biochar for Carbon Removal from the Atmosphere

In the October 21 issue of [Nature Communications](#) Woolf et al demonstrate that biochar could play an important role in removal of carbon from the atmosphere, which is increasingly recognized as essential to meeting global climate targets. Woolf compared biochar-bioenergy systems with bioenergy alone and gasification-based bioenergy with carbon capture and storage, known as BECCS. In its 2014 report, IPCC flags BECCS as the only major land-based approach expected to draw down atmospheric carbon dioxide. However, Woolf demonstrates that biochar-bioenergy systems that sequester carbon in agricultural lands could reduce carbon sequestration costs, allowing earlier adoption of a more aggressive policy of actively removing carbon from the atmosphere to avert dangerous climate change.

[releases/ibi-press-release-biochar-for-carbon-removal-from-the-atmosphere/](#)

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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

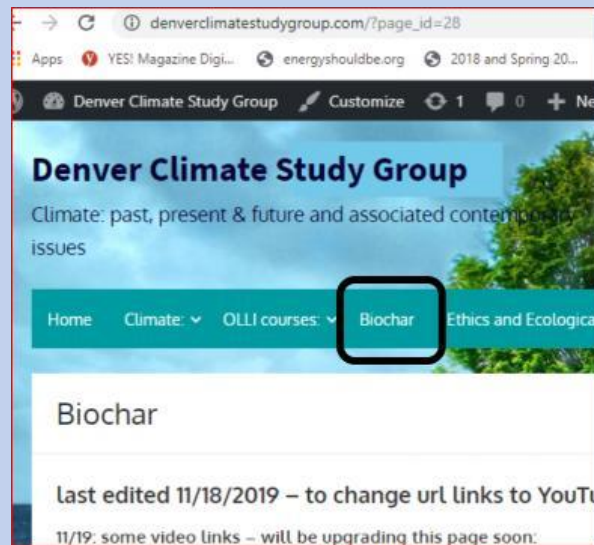
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Web page on BIOCHAR:

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



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- 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/>