2024 NORTH AMERICAN BIOCHAR CONFERENCE

— USBI —

CALIFORNIA, USA

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The Next Level: Scaling the biochar market by educating carbon-smart customers

Fernando Migliassi
Co-Founder & CEO
The Biochar Impact Company

THE Biochar Impact CO.

The Next Level: Scaling the biochar market by educating carbon-smart customers

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THE Biochar Impact

Our Team

Fernando Migliassi
Co-Founder & CEO

Jeff Wallin
Co-Founder & Chief Growth Officer

Doug Guyer
Chief Impact Officer

Bob Cirino
Biochar Advisor

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Our Biochar Roots

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Project "Catalyst"

1 of 5 | State economic initiatives Ag is 1 of Top-5

$500M | County Ag economic value

350K TONS | Ag industry residual "waste"

10:1 | **Up-cycled Compost : Biochar blends**

45K ACRES | County-wide Ag acres

1,100 FARMS | County-wide farms

$ Millions | Revenue + Grants $ → Conservation Coupon

The Biochar Paradox

Industrial agriculture has prioritized predictability, standardization and financial returns at the cost of depleting soils

What the biochar industry has been challenged by, in order to scale, has been greater predictability, standardization and financial returns

~~Being all things to all people~~

The Kiss of Death

Megaton to Gigaton Impact Creation

4

4 tons of Biomass

1

Creates
1 ton of Biochar

3

Sequestering
3 tons of CO_2
+
Creating
3 Carbon Credits

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Lab Analysis

International BioChar Initiative (IBI) Laboratory Tests for Certification Program

	Dry Basis Unless Stated:	Range	Units	Method
Moisture (time of analysis)	78.0		% wet wt.	ASTM D1762-84 (105c)
Bulk Density	8.5		lb/cu ft	
Organic Carbon	80.5		% of total dry mass	Dry Combust-ASTM D 4373
Hydrogen/Carbon (H:C)	0.23	0.7 Max	Molar Ratio	H dry combustion/C(above)
Total Ash	19.0		% of total dry mass	ASTM D-1762-84
Total Nitrogen	0.73		% of total dry mass	Dry Combustion
pH value	9.13		units	4.11USCC:dil. Rajkovich
Electrical Conductivity (EC20 w/w)	0.471		dS/m	4.10USCC:dil. Rajkovich
Liming (neut. Value as-CaCO3)	7.9		%CaCO3	AOAC 955.01
Carbonates (as-CaCO3)	2.3		%CaCO3	ASTM D 4373
Butane Act.	4.7		g/100g dry	ASTM D 5742-95
Surface Area Correlation	283		m2/g dry	G

All units mg/kg dry unless stated:		Results	Range of Max. Levels	Reporting Limit (ppm)	Method
Arsenic	(As)	**ND**	13 to 100	0.49	J
Cadmium	(Cd)	**ND**	1.4 to 39	0.20	J
Chromium	(Cr)	21.9	93 to 1200	0.49	J
Cobalt	(Co)	1.1	34 to 100	0.49	J
Copper	(Cu)	7.1	143 to 6000	0.49	J
Lead	(Pb)	1.2	121 to 300	0.20	J
Molybdenum	(Mo)	5.1	5 to 75	0.49	J
Mercury	(Hg)	**ND**	1 to 17	0.001	EPA 7471
Nickel	(Ni)	10.1	47 to 420	0.49	J
Selenium	(Se)	**ND**	2 to 200	0.98	J
Zinc	(Zn)	7.5	416 to 7400	0.98	J
Boron	(B)	20.3	Declaration	4.9	TMECC
Chlorine	(Cl)	1132	Declaration	20.0	TMECC
Sodium	(Na)	871	Declaration	489	E
Iron	(Fe)	1818	Declaration	24.5	E
Manganese	(Mn)	414	Declaration	0.49	J

Particle Size Distribution	Results	Units	Method
< 0.5mm	16.9	percent	F
0.5-1mm	4.0	percent	F
1-2mm	15.2	percent	F
2-4mm	46.6	percent	F
4-8mm	13.6	percent	F
8-16mm	3.7	percent	F
16-25mm	0.0	percent	F
25-50mm	0.0	percent	F
>50mm	0.0	percent	F

Basic Soil Enhancement Properties			
Total (K)	4651	mg/kg	E
Total (P)	661	mg/kg	E
Ammonia (NH4-N)	61.9	mg/kg	A
Nitrate (NO3-N)	1.3	mg/kg	A
Organic (Org-N)	7224	mg/kg	Calc.
Volatile Matter	10.1	percent dw	D

* "ND" stands for "not detected" which means the result is below the reporting limit.

Method A Rayment & Higginson
D ASTM D1762-84
E EPA3050B/EPA 6010
F ASTM D 2862 Granular
G Butane Activity Surface Area Correlation Based on McLaughlin, Shields, Jagiello, & Thiele's 2012 paper: Analytical Options for Biochar Adsorption and Surface Area
J EPA3050B/EPA 6020

The Keystone Property

Just as ecosystems have keystone species, **Adsorption is the "Keystone Property"** for confirming biochar quality

The reason adsorption is the best indicator of biochar quality is that **it is virtually impossible to make a bad biochar and still have reasonable levels of adsorption present**

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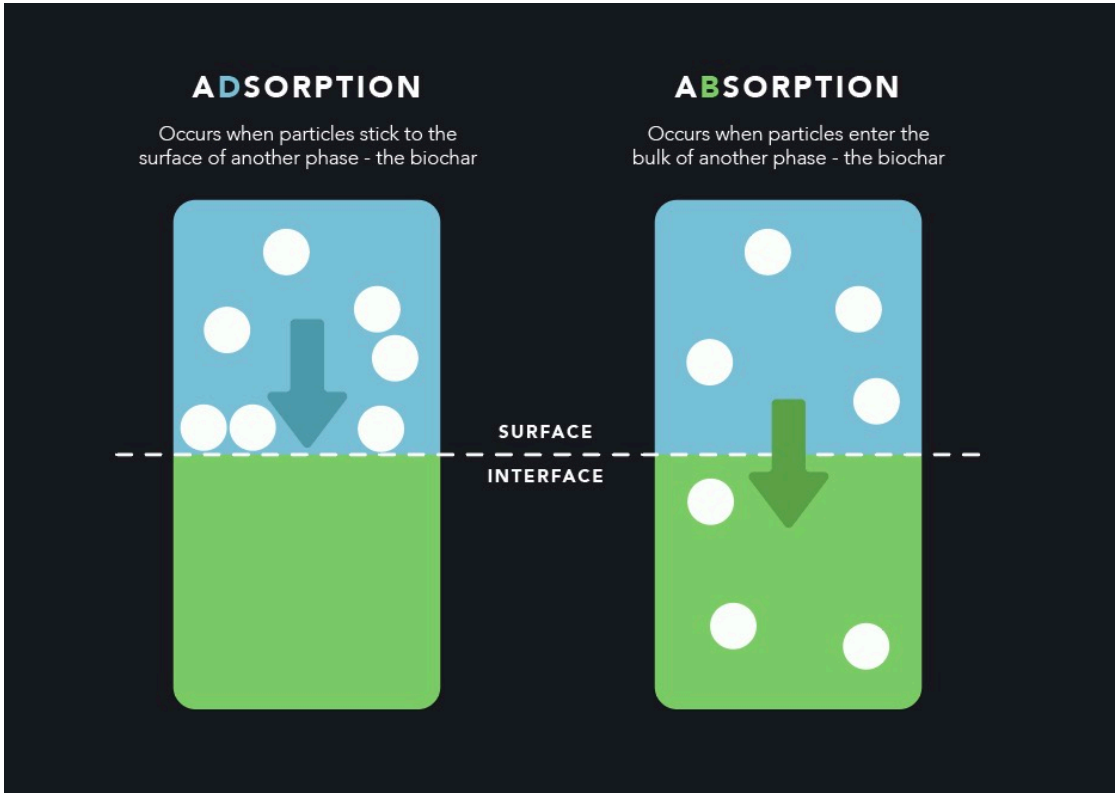
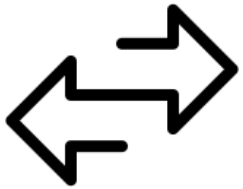
Adsorption & Absorption



Holding & Exchange Capacity



As the **The Quality Indicator,** Adsorption is a corollary to a host of other characteristics

- A soil's ability to **hold water and retain and exchange nutrients** are its most important qualities
- **More adsorption, more performance**
- Adsorptive capacity is one, effective expedient test that **captures biochar's complexity** and **tells customers if their biochar works**

Performance & Value Creation

Agricultural practices are shaped by adopting methods that **reduce costs relative to the value of crops produced**

- Biochar delivers value by **correcting and compensating for soil deficiencies** and **improving soil properties** to benefit the crop
- Biochar can **reduce the need for other inputs** like fertilizers and water
- Biochar is **stable for decades**

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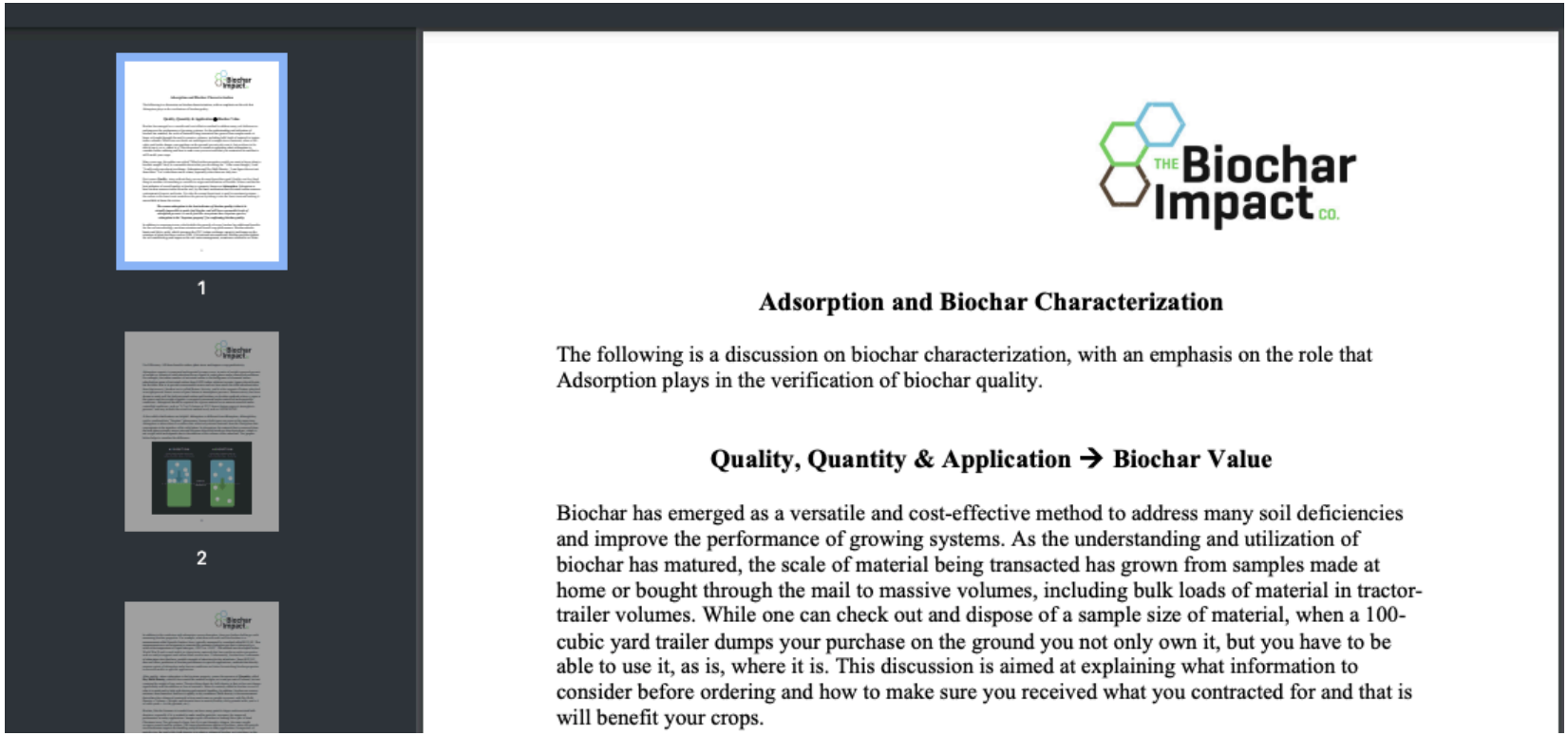
Carbon-Smart Agriculture

By furthering the market's understanding of biochar's key property of **Adsorption** – in addition to **Dry Bulk Density** and **Application** – as well as their combined **economic and environmental value**, our company uses well-supported science to improve the advancement of the industry with **transparency and understanding**

Adsorption Paper



Adsorption and Biochar Characterization

The following is a discussion on biochar characterization, with an emphasis on the role that Adsorption plays in the verification of biochar quality.

Quality, Quantity & Application → Biochar Value

Biochar has emerged as a versatile and cost-effective method to address many soil deficiencies and improve the performance of growing systems. As the understanding and utilization of biochar has matured, the scale of material being transacted has grown from samples made at home or bought through the mail to massive volumes, including bulk loads of material in tractor-trailer volumes. While one can check out and dispose of a sample size of material, when a 100-cubic yard trailer dumps your purchase on the ground you not only own it, but you have to be able to use it, as is, where it is. This discussion is aimed at explaining what information to consider before ordering and how to make sure you received what you contracted for and that is will benefit your crops.

www.BiocharImpact.com

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A thru Z

Increase Revenue

Improve Resilience

Reduce Costs

Build and Quantify Soil Carbon Inventories

ROI
Return On Investment
Return On Impact

$ Yield Conversion from Inputs

Price I Performance I Duration

Opening The "Black Box"

α

Δ

β

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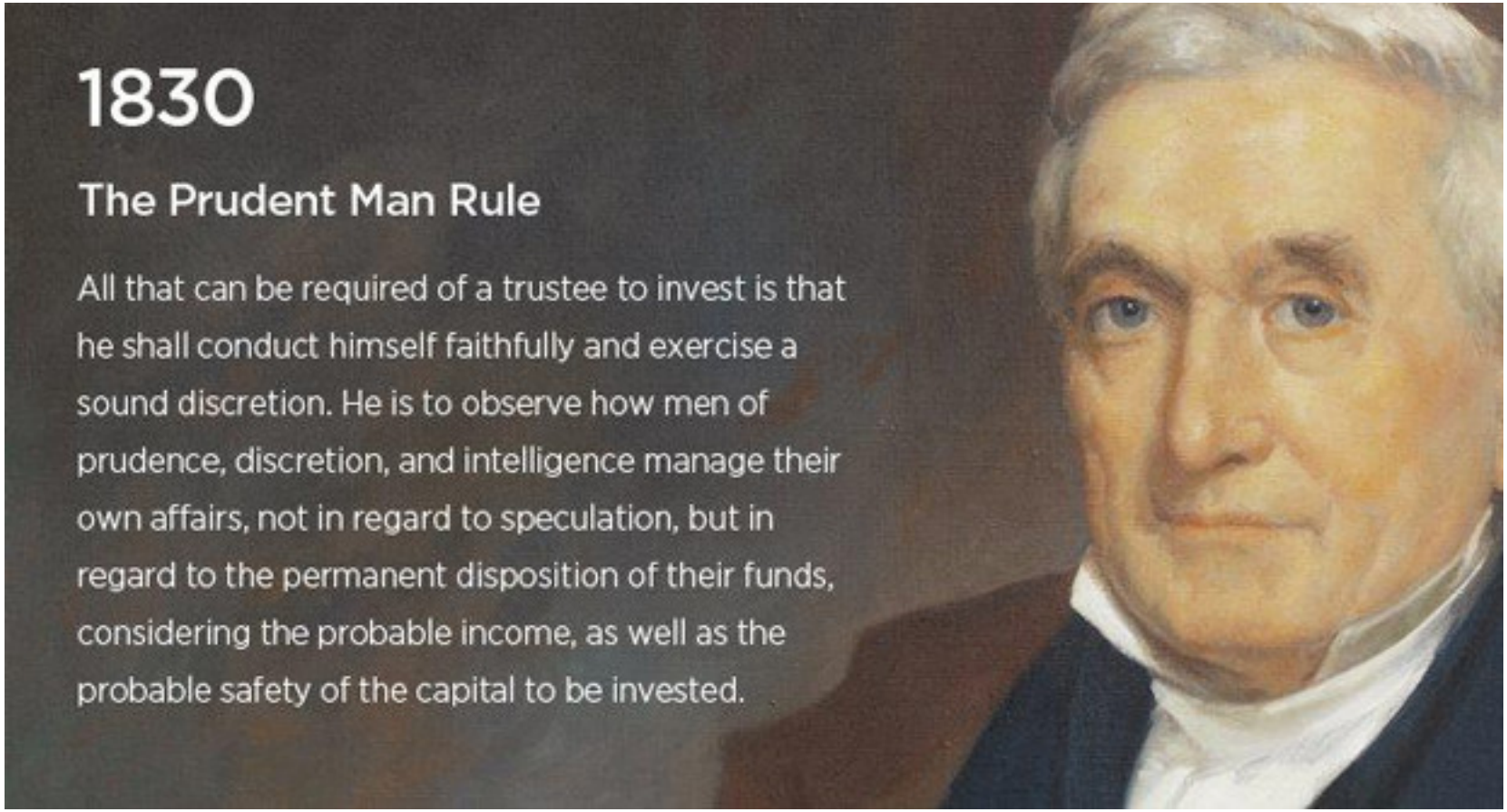
Prudent Man Rule



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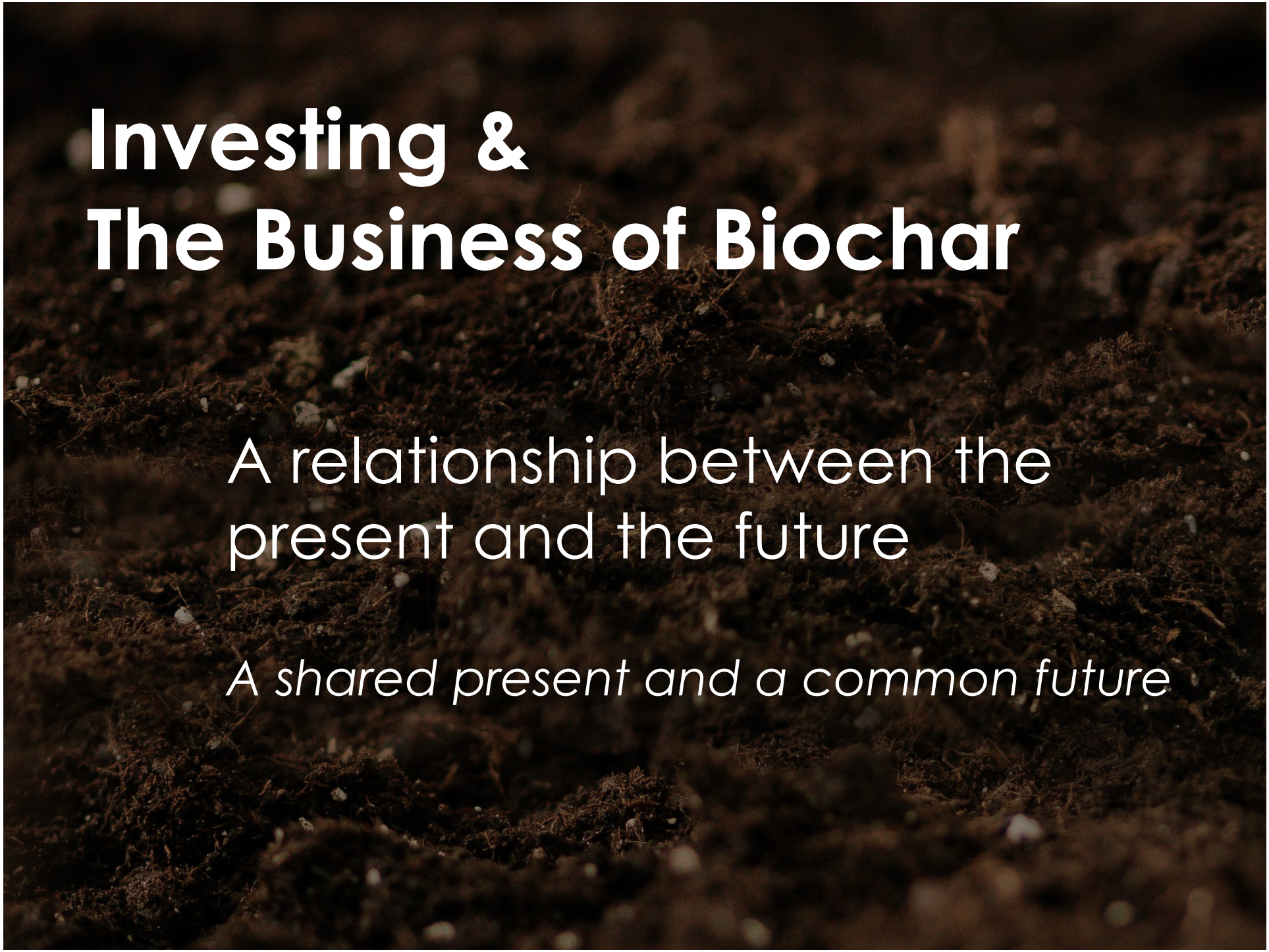
Our Guiding Principle

As co-stewards of the land, water and air we prudently guide our clients to fully understand the quality of their biochar, re-configure their portfolio of assets (land, crops, etc.) and expenses (water, fertilizer, and other inputs), in order to measurably drive performance, predictability, and scalability


Investing &
The Business of Biochar
A relationship between the present and the future
A shared present and a common future


Fernando Migliassi
Co-Founder & CEO
305.978.4692
FernandoM@BiocharImpact.com
www.BiocharImpact.com