Carbon Offsets & Markets

Intro to Cool Planet

October 15, 2013

Rick Wilson
rw@coolplanet.com

The Cool Planet Difference – A Quick Overview

Ground breaking technology

- ✓ Renewable high octane gasoline for under $1.50/gallon
- ✓ Lowest capex in the industry – $20MM for 10MM gallons
- ✓ Carbon negative fuel – reverse global warming
- ✓ Unique biochar technology – improves agriculture
- ✓ ***World class strategic investors – GE, BP, ConocoPhillips, Constellation (Exelon), NRG Energy,*** *and* ***Google***
- ✓ Blistering pace – 14 patents and a pilot facility in 3 years

Low risk - high return business model

- ✓ Over 50% product margin without government support
- ✓ $3 trillion addressable market
- ✓ Distributed facilities
- ✓ Drop-in fuel – use present infrastructure and vehicles

Recent Progress

- ✓ Moved world headquarters to Denver, CO
- ✓ Announced first commercial plant in Alexandria, LA
- ✓ Awarded URS EPC contract for first commercial plant
- ✓ Completed vehicle road test with Ventura County, CA
- ✓ Added Archie Dunham (*former ConocoPhillips Chairman/CEO, Chairman of Chesapeake Energy)* to Cool Planet board
- ✓ Announced two international collaborations, more to come
- ✓ Raised $49MM in D round, total commitments now exceed $60MM

Gov. John Hickenlooper and Cool Planet CEO Howard Janzen on the steps of the Colorado State Capitol on July 10, announcing Cool Planet Energy Systems is moving its headquarters to Greenwood Village, CO

Gov. Bobby Jindal and the Cool Planet team - (from left to right: Howard Janzen CEO, Al Rettenmaier, Gov. Bobby Jindal, Wes Bolsen, Mike Rocke and Barry Rowan CFO) in Alexandria, Louisiana, on August 23

Archie Dunham, former ConocoPhillips Chairman / CEO, current Chesapeake Chairman

Unprecedented Value Through the Combination of Fuel and Biochar Co-Production

Drop-in gasoline product

- Renewable and sustainable gasoline
- High octane (105-110 RON), low vapor pressure product

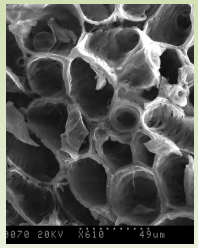
Third party analysis (SWRI)

99.98% of the components present in the Cool Planet fuel are compounds found in standard gasoline

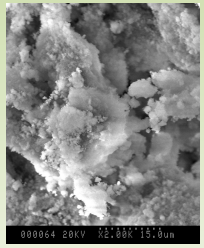
Gas chromatograph output

Biochar

- Enhances water and nutrient absorption in soil
- Biochar soil enhancer removes carbon

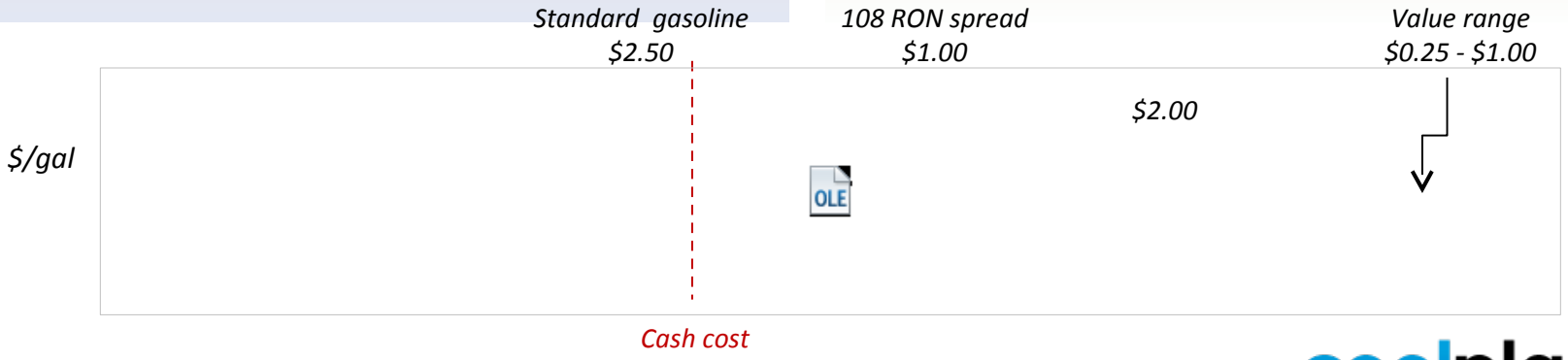


As produced from the fractionator



Treated (activated) biochar

Comparative growth control experiment



coolplanet ENERGY SYSTEMS

Can We Use the Free Market to Decarbonize the Atmosphere with Biochar?

October 15, 2013

Rick Wilson, PhD
rw@coolplanet.com

CERA Energy Innovation Pioneer 2011

Motivation

"The most important single central fact about a free market is that no exchange takes place unless both parties benefit."

- *Milton Friedman, 1976 Nobel Price in Economics*

"American professors Eugene Fama, Lars Peter Hansen and Robert Shiller have won the 2013 Nobel Prize in Economic Sciences "for their empirical analysis of asset prices."
- Yesterday

Key Questions

- Is it possible to generate the returns and value in use demanded by producers and consumers which drive the development of a biochar market?
- Are free market forces sufficient to deploy biochar at a scale that has a material impact on carbon emissions?

Required Returns to Producers

Production Cost

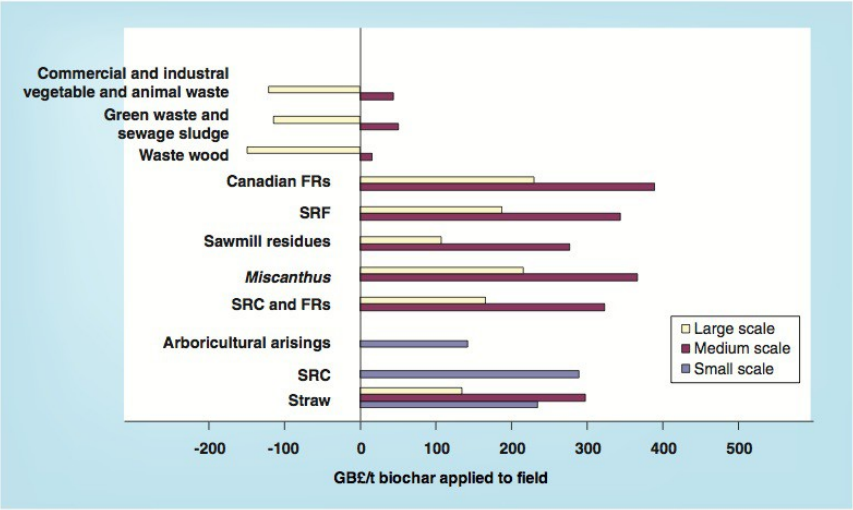


Figure 2. Net cost of biochars produced with small-, medium- and large-scale pyrolysis.
FR: Forestry residue; SRC: Short rotation coppice; SRF: Short rotation forestry.

Delivered Cost

Production Cost	*$385/ton*
Transportation	$70/ton
Distributor Cost @ 30%	195/ton
Delivered Cost	**$650/ton**

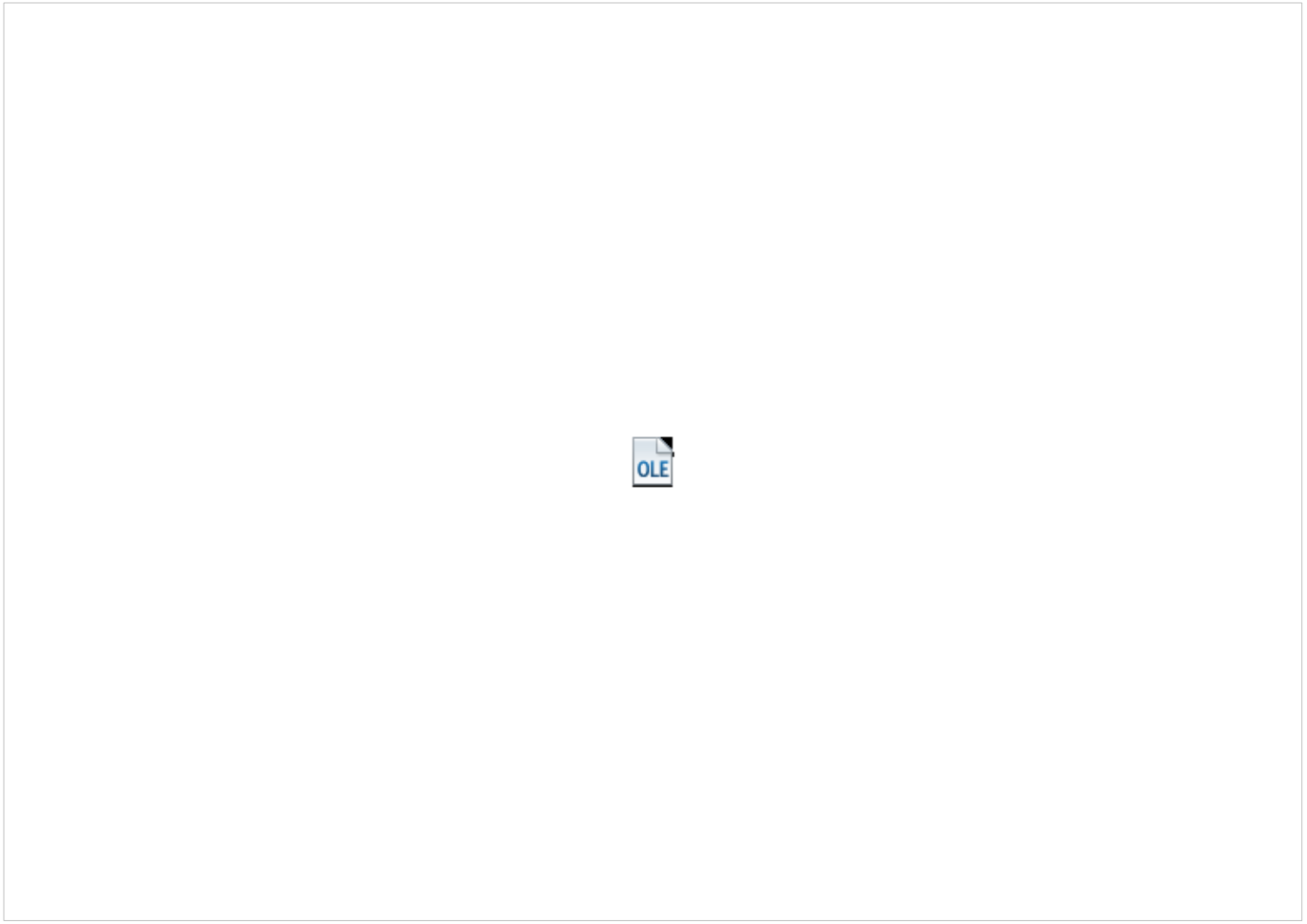
Production cost 50 KTA = $385/ton

Production 5KTA = $675/ton

(includes 8% cost of capital)

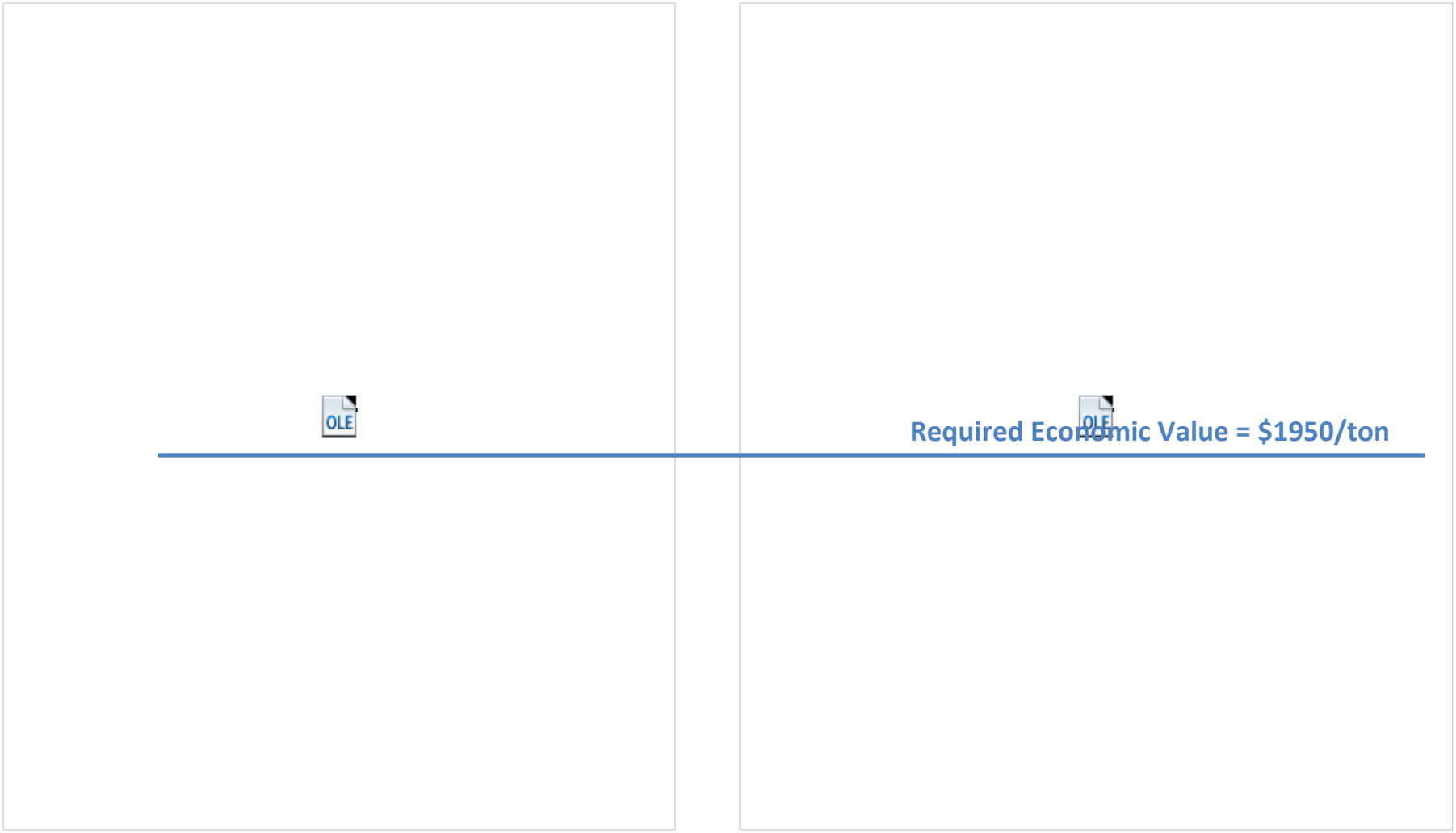
Figure from: Shackley, S., Hammond, J., Gaunt, J., & Ibarrola, R. (2011). The feasibility and costs of biochar deployment in the UK. Carbon Management, 2(3), 335–356.

Returns to Consumers
Amendment Users Require 3X to 10X Upgrade Value



~ $2000/Ton of Economic Value Needed for Transactions to Occur

Crop Value and Dosage Drive Value In Use



Market is Feasible for High Value Applications

US Biochar Market Opportunity (per year)

High Value Opportunities

Use	Applied To	Biochar (tons)
High Value Crops – high dose	2.01 M Acres	4.02 M
High Value Crops – medium dose	4.33 M Acres	4.33 M
Specialty Horticulture	10.60 MT	1.59 M
Packaged Soil	3.09 MT	0.46 M
Dairy	23 M Head	8.05 M
Feedlot Cattle	11.3 M Head	3.96 M
Marginal Land Improvement	0.2M Acres	2.00 M
TOTAL Biochar applied per year		**24.4 M**

Low Value Opportunities

Opportunity	Applied To
Low Value Crops	800 Million Acres
Marginal Land	300 Million Acres
Remediation	20 Million Acres
TOTAL Opportunity	**> 1.1 BILLION Acres**

Our Estimates Show Improving Efficacy of Biochar by a Factor of Five Could Enable These Markets to Be Served Economically

Potential for a 16 Billion Dollar Industry in the US Alone

~640 Million Acres Per Year Additional Opportunity with x 5 Biochar Efficacy

coolplanet ENERGY SYSTEMS

US Carbon Emissions Mitigation Potential

Biochar + Cool Planet Fuels Production

	MTCO2e
High Value Biochar Applications 24 MT biochar	-48
Cool Planet Avoided Fossil Fuel Production (20 Billion Gallons of Fuel – 13% Market)	-185
Total US Carbon Mitigation Potential	**-233 per Year**

Biochar: Avoided Carbon Emissions:

- Stabilized Carbon = 1.95 tCO2e/ton Biochar
- N2O = 0.25 tCO2e/acre
- Avoided Fertilizer GHG = 0.25 tCO2/acre
- Enteric Emissions 1.42 tCO2e/ton Biochar

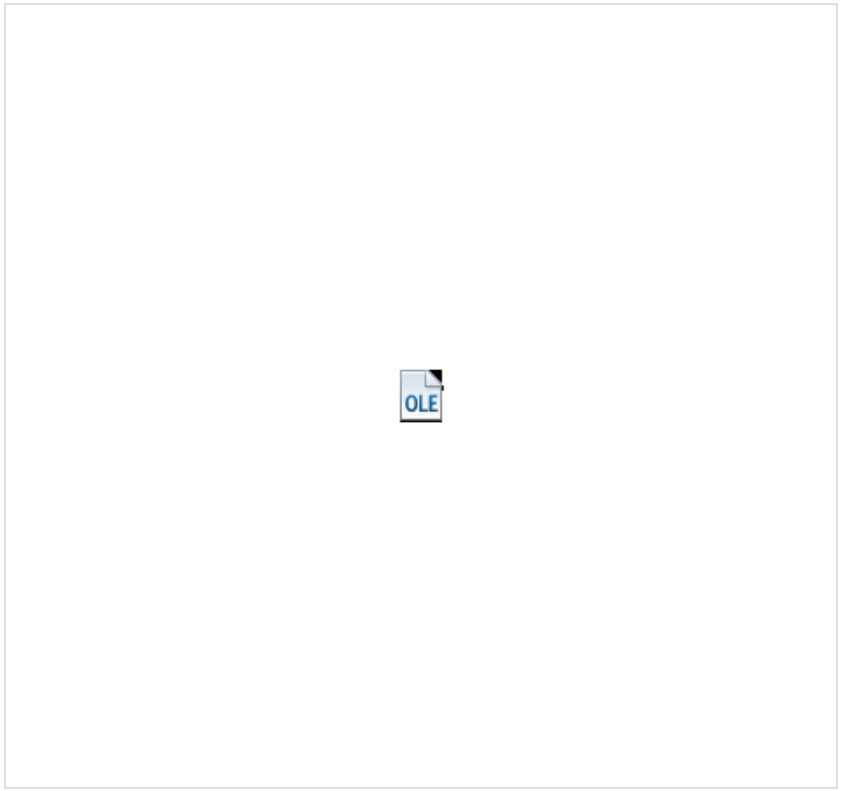
Fossil Fuel: Avoided Carbon Emissions (GREET)

- 3.7 Tons CO2e/Ton Gasoline

US Renewable Fuel Standard Does Not Recognize Biochar as Mitigating CO2

coolplanet ENERGY SYSTEMS

Materiality



	MTCO2e
US Current Yearly Carbon Excess	**3350**
High Value Biochar Applications 24 MT biochar	-48
Cool Planet Avoided Fossil Fuel Production (20 BGPY: 13% Gasoline)	-185
Potential Carbon Excess	**2744 (18% reduction)**
Low Value Biochar Applications 128 MT biochar 1/5 dosage	-373
Avoided Fossil Fuel Production (106 GPY: 76% Gasoline)	-987
Potential Carbon Excess - Low Value Biochar Applications	**1384 (~60% reduction**

Increasing the Efficacy of Biochar is Critical for Maximizing Its Impact

Barriers

- Heritage failed trials with commercial growers
- Commodity mentality for a specialty product
- Biochar uniqueness needs to be matched to the application requirements to eliminate variability and maximize value in use

Cool Planet is Offering Product for Trials That Overcomes These Barriers

Conclusions

Is it possible to generate the returns and value in use demanded by producers and consumers which drive the development of a biochar market.

- Everyone in the supply chain must earn a return
- Large pyrolysis units or other competitive advantage is needed to keep biochar costs down
- Current performance of biochar limits economic uses to high value agriculture, and possibly upgrading marginal land, dairy, and horticulture

Free market forces are sufficient to deploy biochar at a scale that has a material impact on carbon emissions

- Carbon emission benefits of biochar are synergistic with Fuel displacement efficiencies such as with Cool Planet Systems

Increasing the Efficacy of Biochar is the Key to Growing the Total Available Market

Acknowledgements

Kelpie Wilson, Wilson Biochar Associates, carried the load of our market economic analysis

Wilson Hago, Biochar Research Lead, making it happen

Richard Wilson Belcher, Microbiologist who catalyzed our thinking about our technology

Mike Rocke, marketer extraordinaire

My family. **Laurie & Molly Wilson,** who support me in all my adventures.

All here today

The People at this Conference, Who Care