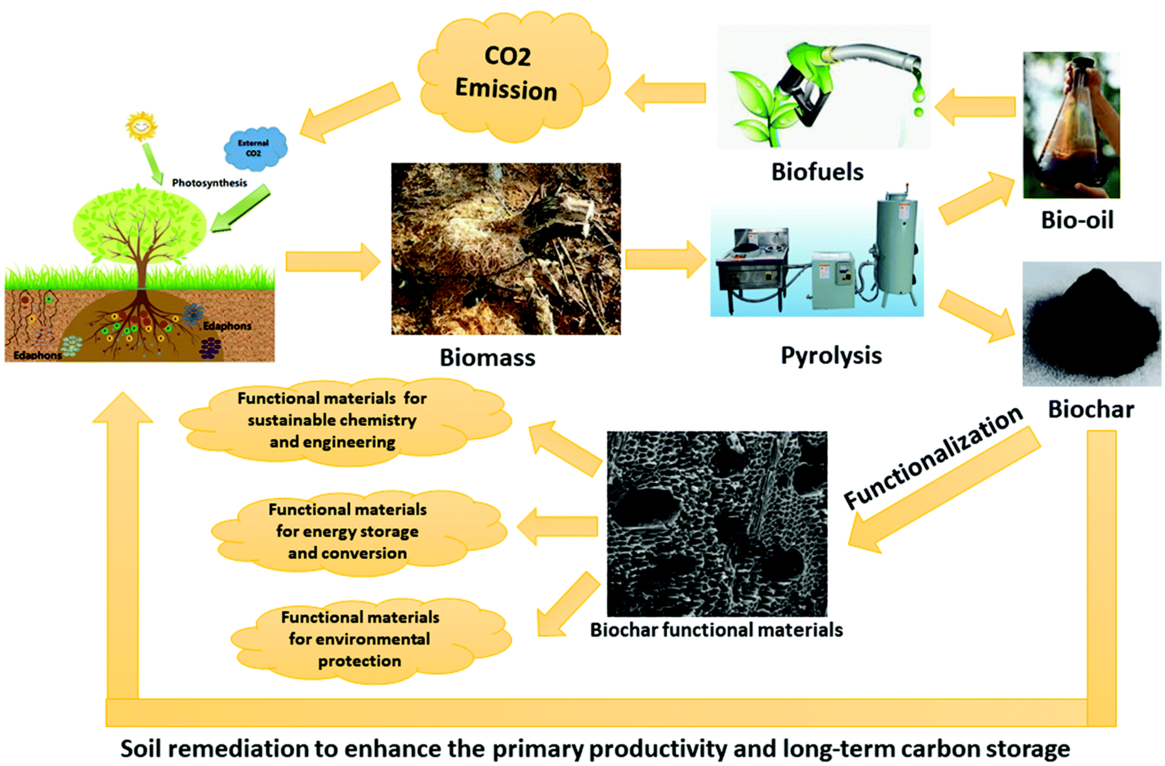
NuCarbon LLC

Investor Portfolio



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1. Climate Change Problem Definition & Proposed Technological Solution:

Background:

The global Climate Science community has concluded that carbon dioxide emissions from human activities are the largest contributor to greenhouse gases causing climate change on earth. Fossil fuels and industrial activity account for about 2/3 of total global emissions of carbon dioxide (28 billion tons per year). The current atmospheric content of carbon dioxide at 414 PPM is growing by about 2 PPM per year. The climate change models predict catastrophic weather beyond 450 PPM carbon dioxide in the earth's atmosphere. Based on the current trends, we can reach that break point within 18 years. If the global fossil fuel consumption and industrial activities keep growing to meet the needs of developing countries and rising world population, that 18-year period could be cut short significantly. If the world's water bodies start releasing carbon dioxide because of global warming instead of absorbing it, we can reach 450 PPM within 10 years or less.

Motivation:

Something drastic needs to be done to reverse this dangerous trend in atmospheric content of carbon dioxide before catastrophic weather patterns destroy the global economy and life as we know it. This is a strong motivator for action. The question is – what can we do that is based on scientific logic and informed by the economic realities in which we live?

Some renewable energy advocates have suggested that if we make massive investments in energy efficiency and renewable energy (solar, wind, hydro, and electric storage) immediately we can reduce the carbon footprint of human activity to the point where we can stop the increase of atmospheric carbon dioxide content or even reverse it. The challenge with this recommendation is that is fails to address four uncomfortable economic and scientific realities:

1. 80% of primary energy use in the world today comes from fossil fuels.
2. There are trillions of dollars of invested infrastructure in fossil fuel-based power generation and industrial processes that has not reached end of life.
3. The demand for raw materials to fabricate the solar, wind and electric storage infrastructure to meet global energy needs will exhaust the supply of many precious and semi-precious metals and other minerals in short supply (not to forget the carbon footprint associated with the mining, processing, and transportation of these raw materials).
4. In the absence of sufficient electric storage, the intermittency of solar and wind power will force natural gas peaker plants to remain in operation to provide ancillary services to meet customer demand to maintain a stable electric grid (locking in a permanent carbon footprint).

The nuclear industry is advocating building several Gen III and Gen IV nuclear power plants globally to reverse the trajectory of atmospheric carbon dioxide content. While this is a good idea in principle, the time frame to build and commission enough nuclear power plants to offset the increase in carbon dioxide emissions from fossil fuel plants and industrial activity globally is too long to have any real impact for the short time left. Additionally, the economic price for such a change is not practical in a world coming out of the COVID-19 pandemic.

The key conclusion from these observations is that:

- real impact on the carbon footprint from human activity in the short run is only possible if something were done to capture and recycle the carbon dioxide from the fossil fuel plants and industrial processes before they are released into the atmosphere.

Two additional opportunities exist to further reduce the atmospheric content of carbon dioxide:

- using pyrolysis to trap the carbon dioxide and other greenhouse gases from organic waste that would normally be released into the atmosphere from composting and decay in farmlands and landfills (from municipal solid waste and agricultural residue from harvesting crops).
- direct air capture of the carbon dioxide from the atmosphere.

The world emits about 42 billion tons of carbon dioxide per year from human activity. The volcanoes and other natural events release another 1 billion tons per year of carbon dioxide into the atmosphere. The trees and oceans are absorbing about 28 billion tons of carbon dioxide per year. The net increase of carbon dioxide in the earth's atmosphere is about 15 billion tons per year (~ 2 PPM). If 2/3 of the 42 billion tons (28 billion tons) of carbon dioxide that is coming from fossil fuel and industrial activity is captured and recycled, there will be a net decrease of 13 billion tons (15 billion minus 28 billion tons) of carbon dioxide in the earth's atmosphere each year (~1.73 PPM per year). The capture and recycling of carbon dioxide and other greenhouse gases from pyrolytic organic waste remediation and direct air capture will make the carbon dioxide content in the atmosphere decrease even further to avoid catastrophic climate change.

Recommendation

A global campaign to capture and recycle the carbon dioxide from fossil fuel plants and industrial processes combined with pyrolysis of organic waste and direct air capture of carbon dioxide from the atmosphere can collectively reduce the carbon content of the earth's atmosphere to mitigate the effects of climate change in the 10-year time frame without excessive expenditures and disruption to the economy. All the technologies to accomplish this feat exist today. It is simply a matter of will and action to make it happen. An integrated approach for doing all 3 will prove to be far more energy efficient and cost effective than doing them separately.

Additionally, the high value carbon-based products from these 3 processes (biochar, charcoal, carbon black, synthetic liquid fuels and synthesis gases) will create a manmade carbon cycle alongside photosynthesis of plants to recycle some of the atmospheric carbon dioxide to ensure long term climate stability. This is a much better alternative than largescale carbon capture and sequestration – a costly and potentially risky option.

Benefits of Recommendation:

The 3-prong carbon dioxide capture, and recycling strategy described above protects the current energy and industrial process infrastructure investment, gives developing nations more time to move to cleaner and more efficient energy sources and processes and gives the nuclear, solar, wind, hydrogen, and storage technologies more time to develop to replace fossil fuels reliably and cost effectively. Additionally, there are several cutting-edge carbon-based technologies under development that can convert the captured carbon dioxide into high value products such as carbon fiber and carbon nanotubes. This will reduce the dependence on graphite mining and create new economic opportunities in multiple industrial sectors globally.

2. **NuCarbon Vision & Mission Statement:**

Vision:

Enable a manmade carbon cycle on earth to reverse climate change.

Mission:

To build and operate facilities globally that leverage innovative technologies to capture carbon from fossil fuel plant and industrial emissions, organic waste, and the atmosphere and recycle into high value “new” carbon-based materials to reverse climate change while enhancing the world’s economy and ecology.

3. NuCarbon Team:

Patrick Furlotti – Founder & Chairman

Erfan Ibrahim, PhD – Co-Founder & CEO

Gordon Fuller - Advisor

4. Business Plan

Phase 1:
Seek investment capital to purchase a revenue generating pyrolytic waste remediation technology company whose designs will be used to build and operate waste remediation plants in different municipalities and island communities across the US and ultimately around the world. The plants would generate revenue from the tipping fees on the waste and the sale of finished products such as biochar, charcoal, synthetic liquid fuels (jet fuel, diesel, kerosene) and propane gas (Figure 1). There is over 243 billion dollars market potential in the US from landfill waste and agricultural residue alone as of 2018 (Appendix A). It can reach over 285 billion dollars by 2030 based on EPA forecast!

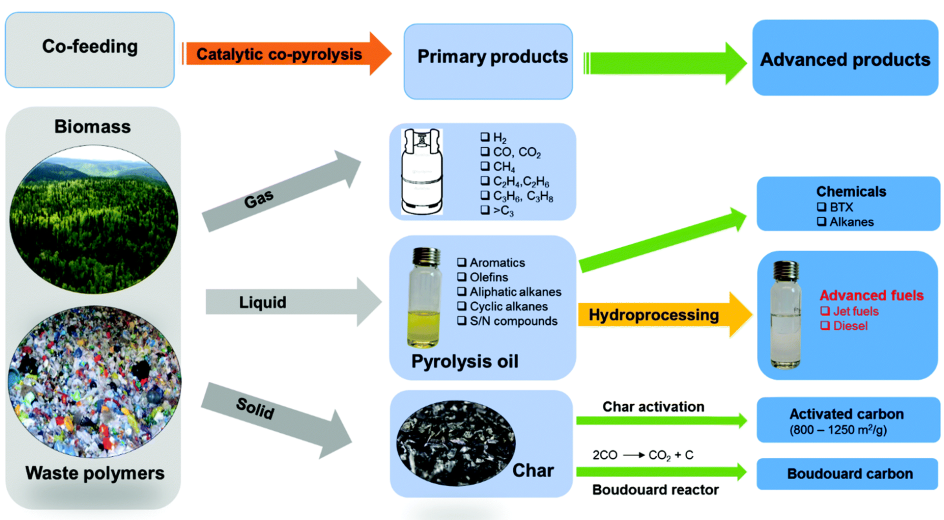


Figure 1

Phase 2:
Reinvest some of the profits from Phase 1 and seek additional investment capital to buy a cutting-edge revenue generating technology company that can economically convert carbon black powder from the waste remediation plants into advanced carbon-based materials such as graphene, carbon fiber and carbon nanotubes (Figure 2). The sale of these advanced high-value carbon-based materials would create a healthy new revenue stream in the waste remediation plants of Phase 1.

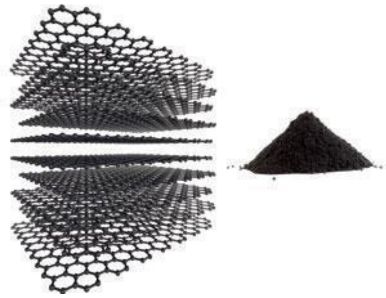


Figure 2

Phase 3:
Reinvest profits from waste remediation plants and advanced carbon materials manufacturing facilities from Phase 1 and Phase 2 to purchase a carbon dioxide capture technology that can be integrated with fossil fuel plants and use direct air capture to supply carbon dioxide to the waste remediation plants from Phase 1 to increase the yield of carbon-based products.

Figure 3

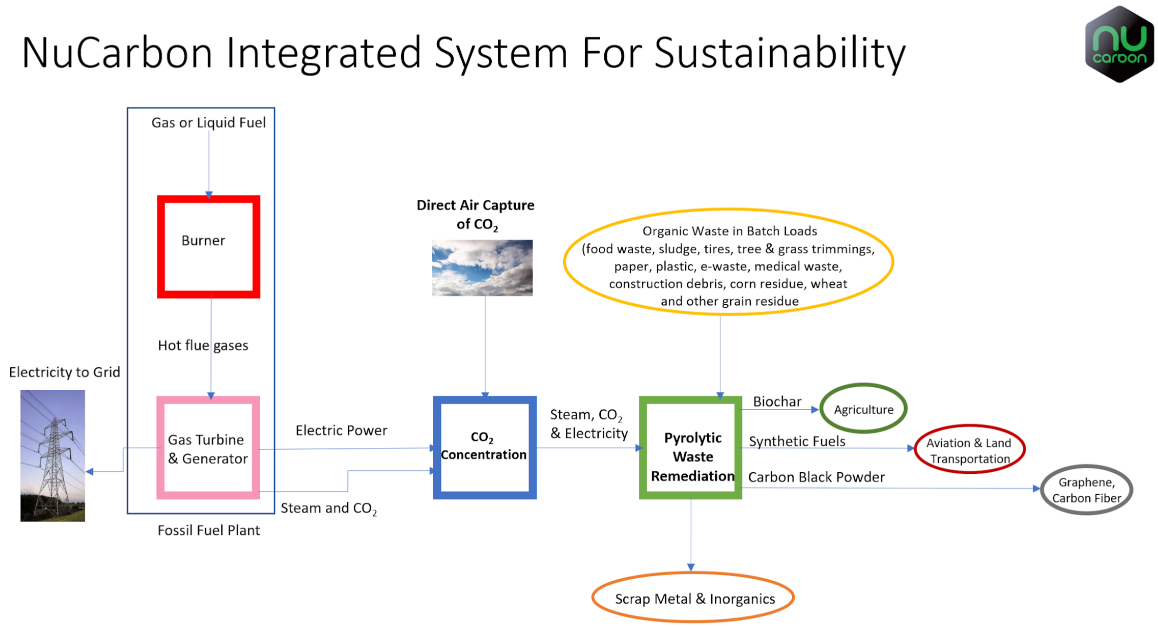


Figure 4

Once the 3 phases of NuCarbon are complete in the US, the plan is to build and operate plants globally with the NuCarbon proposed integrated systems (Figure 4) to directly combat Climate Change by actively capturing carbon dioxide from:

1. flue gases of fossil fuel plants
2. organic waste
3. the atmosphere

and repurposing it in a carbon-based economy of high-value finished goods that benefit agriculture, electronics, transportation, pharmaceutical, and other industrial sectors for economic prosperity, sustainability, resilience, and climate stability.

5. **Business Strategy:**

The NuCarbon business strategy is based on four core values:

- Build the company product portfolio in phases to reduce the financial risk on investors.
- Give the NuCarbon management ample time to do a thorough research of the market to identify the best of breed technologies in each category before acquiring them.
- Allow the NuCarbon technology team sufficient time to work out the kinks in each technology before integrating another technology to it.
- Ensure economic profitability of the existing business units before adding a new one.

The choice to acquire companies as opposed to seeking licensing agreements of the 3 core technologies from third party vendors is based on the notion that owning the intellectual property and retaining the skilled workforce for each technology will allow NuCarbon to maintain sustained competitive advantage and shape its offering to suit the market's needs in the long run.

NuCarbon will be able to modify the individual technologies and the integrated system without any external legal challenges about IP infringement. This will allow NuCarbon to bid and win projects globally based on competitive pricing and optimal technical specifications.

Additionally, the NuCarbon products and services will not be affected by the mergers and acquisitions of 3rd party vendors in this space. This will assure NuCarbon investors of long-term market presence and continued profitability even in volatile economic periods.

NuCarbon may choose to license auxiliary technologies from 3rd parties that can enhance its service offering as needed. Each project will be operated through a joint venture between NuCarbon, the investors and the municipal government or private sector client. The IP and the technical workforce will remain in the NuCarbon LLC.

NuCarbon will also be in a very advantageous position to sell carbon credits from its facilities as that market matures. This could prove to be as profitable as the tipping fees and advanced carbon material sales.

6. Long-term Plan:

NuCarbon team plans to build and operate so many facilities with the 3-prong integrated system globally that we could observe a slowdown in the rise of the carbon dioxide content in the atmosphere and eventually see it reversing once the trees and grasslands start absorbing more carbon dioxide than is being emitted from human activity, volcanoes, forest fires, oceans, and other natural phenomena.

With such a reversal, the world will have a "breathing" chance for transitioning from the fossil fuel-based energy sources of today to cleaner energy sources of tomorrow that are not just carbon dioxide neutral but are also not associated with polluting supply chains that lead to long-term ecological damage of the planet or deplete its mineral resources irreversibly.

7. Appendix A

Market Analysis for US Organic Waste from Municipal Solid Waste and Agricultural Residue

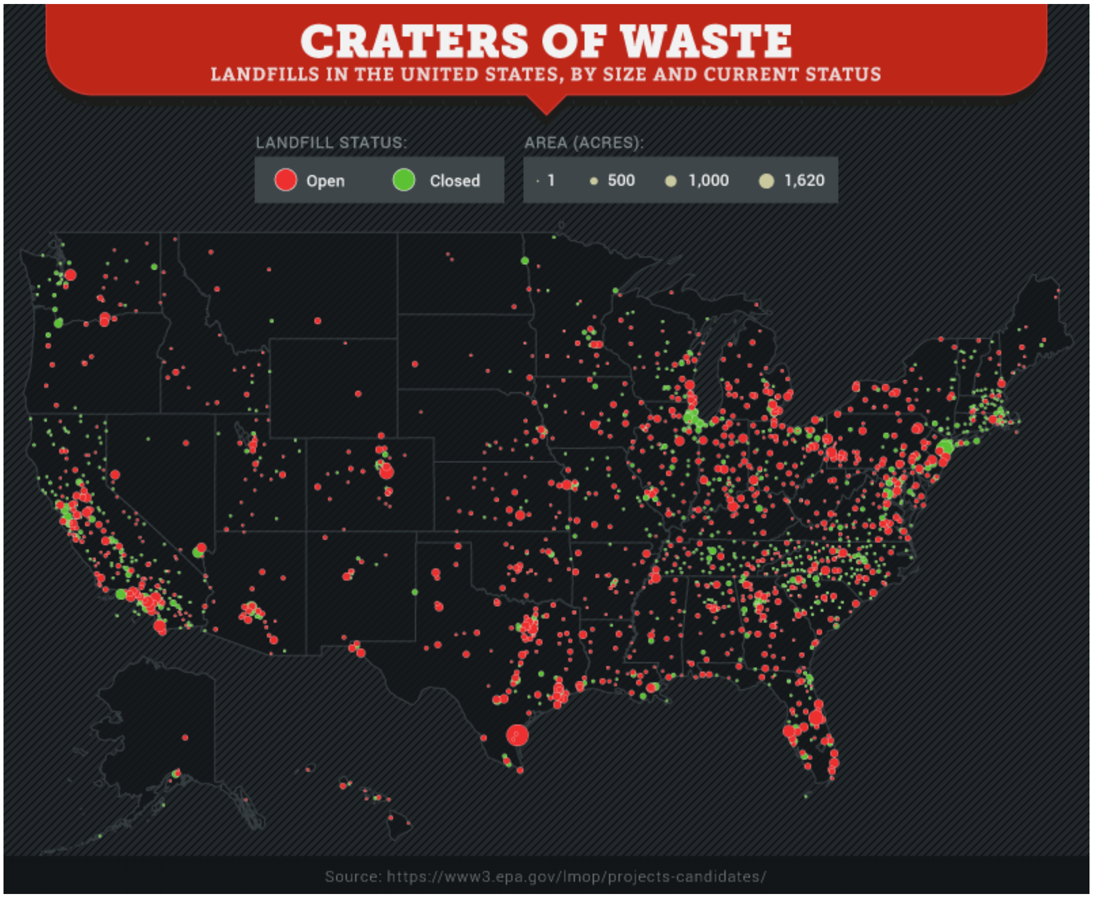

CRATERS OF WASTE
LANDFILLS IN THE UNITED STATES, BY SIZE AND CURRENT STATUS
LANDFILL STATUS:
Open
Closed
AREA (ACRES):
1
500
1,000
1,620
Source: https://www3.epa.gov/lmop/projects-candidates/

Figure 5

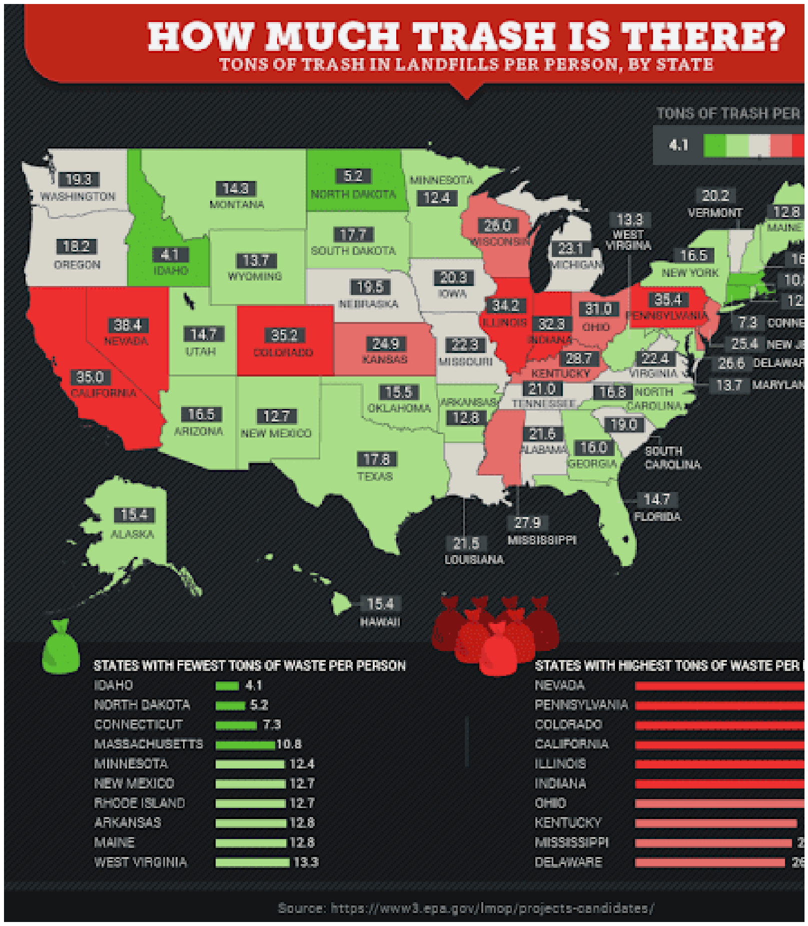
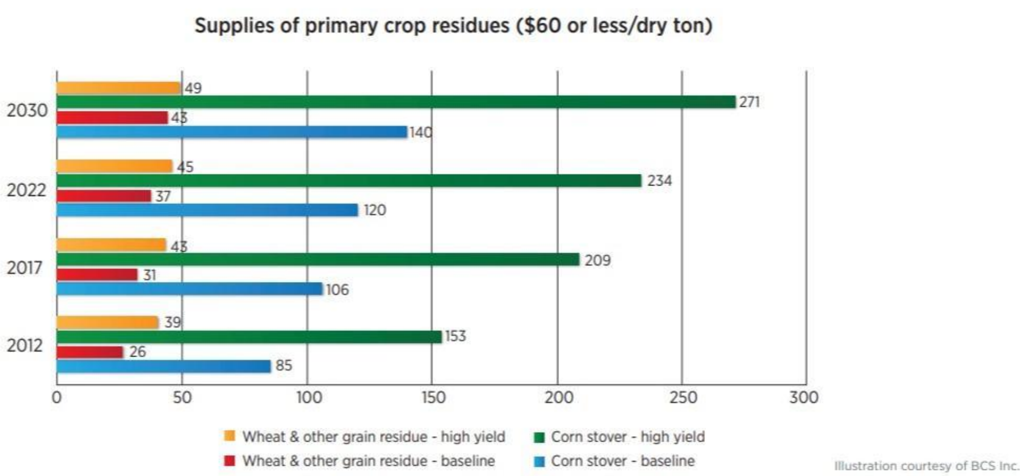


Figure 6



*This fact sheet refers to the following document: U.S. Department of Energy. 2011. *U.S. Billion-Ton Update: Biomass Supply for a Bioenergy and Bioproducts Industry.* R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, TN. 227p. Download the full report at eere.energy.gov/biomass/pdfs/billion_ton_update.pdf. View the report, explore its data, and discover additional resources at bioenergykdf.net.

Figure 7

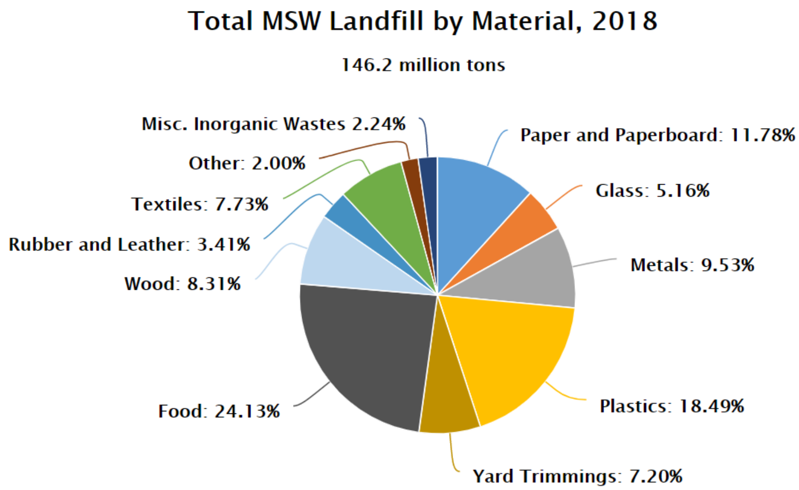


Figure 8

Table 1 – Market Potential from Organic Waste in US (MSW & Municipal Waste)

Type	Quantity
US Agricultural Primary Residue - 2017 High Yield Forecast (tons)	254,000,000
US MSW Contribution to Landfills - 2018 (tons)	146,200,000
Paper and Paperboard %	11.78%
Yard Trimmings %	7.20%
Food %	24.13%
Wood %	8.31%
Rubber & Leather	3.41%
Plastics %	18.49%
Textiles %	7.73%
Paper and Paperboard (tons)	17,222,360
Yard Trimmings (tons)	10,526,400
Food (tons)	35,278,060
Wood (tons)	12,149,220
Rubber & Leather (tons)	4,985,420
Plastics (tons)	27,032,380
Textiles (tons)	11,301,260
Carbon Yield from TCOM (tons)	**210,689,940**

Total Unrefined Synthesis Gas Yield from Pyrolytic Waste Remediation (tons)	126,156,540
Unrefined Synthetic Liquid Fuel from Pyrolytic Waste Remediation (tons)	107,233,059
Unrefined Propane Gas from Pyrolytic Waste Remediation (tons)	18,923,481
Refined Synthetic Liquid Fuels Output from Pyrolytic Waste Remediation (Jet Fuel, Diesel, Kerosene) tons	80,424,794
Refined Propane Gas Output from Pyrolytic Waste Remediation (tons)	14,192,611
Refined Synthetic Liquid Fuels Output from Pyrolytic Waste Remediation (Jet Fuel, Diesel, Kerosene) gallons	**23,971,622,727**
Refined Propane Gas Output from Pyrolytic Waste Remediation (1000 cf)	**251,981,640**
Total Value of Carbon Output from Pyrolytic Waste Remediation ($)	$ 210,689,940,000
Total Value of Synthetic Fuel Output from Pyrolytic Waste Remediation ($)	$ 40,751,758,636
Total Value of Propane Gas Output from Pyrolytic Waste Remediation ($)	$ 629,954,100
Annual Revenue Potential from Pyrolytic Waste Remediation of Organic Waste Designated for US Landfills and Primary Agricultural Residue ($)	$ 252,071,652,736
Annual Cost of Purchase of Primary Agricultural Residue ($)	$ 15,240,000,000
Potential Annual Revenue Diverting Organic Waste from Landfill ($)	$ 6,559,888,736
Total US Revenue Potential from MSW Related Organic Waste Designated for Landfills + Primary Agricultural Residue ($)	**$ 243,391,541,472**

Assumptions:
Purchase price of primary agricultural residue - $60 per ton
Tipping fees for MSW in US landfills - $55.36 per ton
Price of Carbon - $1000 per ton
Price of Refined Synthetic Fuel - $1.70 per gallon
Price of Refined Propane Gas - $2.50 per 1000 cf
Carbon yield from carbohydrates - 60%
Synthesis gas yield from carbohydrates - 30%
Carbon yield from hydrocarbons - 20%
Synthesis gas yield from hydrocarbons - 75%
Density of Jet Fuel - 6.71 pounds/gallon
Density of propane gas - 1.808 Kg/cubic meter
1 cubic meter = 35.31 cubic feet, 1 Kg = 2.2 lbs.

8. Appendix B: Bio of Erfan Ibrahim, PhD

Dr. Erfan Ibrahim is the co-Founder and CEO of NuCarbon, LLC since January 2021. NuCarbon is a technology and engineering services company that is focused on designing and building carbon capture and recycling infrastructure for smart communities to reverse climate change.

Erfan is also the Founder and CEO of The Bit Bazaar LLC (TBB) (http://tbbllc.com) since August 2001. TBB offers a full suite of professional services in IT, networking, communications, cybersecurity, and business management to service providers, corporate enterprises, academia, healthcare, and government agencies. Erfan's professional career spans over 32 years and includes hands-on experience in nuclear engineering, information technology, communications, networking, cybersecurity, smart grid, and renewable energy. He is an expert in helping organizations align their digital technology goals with their strategic business goals.

During his 3-decade career Erfan has worked for Lawrence Livermore National Lab, UCLA, Pacific Bell, Jyra Research, Electric Power Research Institute (EPRI) and National Renewable Energy Lab (NREL). At EPRI he led the Smart Meter and Cybersecurity R&D Programs during 2008 – 2011 for electric utility and high-tech companies.

While at EPRI, he organized and led the first 2 workshops for Smart Grid Interoperability Roadmap Project for the National Institute of Standards & Technology (NIST) in 2009 to build consensus on standards for interoperability in the smart grid. Those workshops led to the creation of a public-private partnership known as Smart Grid Interoperability Panel (part of Smart Electric Power Alliance today).

While at NREL he led the Cyber-Physical Systems Security & Resilience Center (CPSS&R) for 3 years (2015 – 2018) and pioneered the concept of a 9-layer cybersecurity architecture to protect power systems from insider and external cyber threats. He designed and built a Secure Distribution Grid Management testbed at NREL Energy Systems Integration Facility (ESIF) in Golden Colorado built on the 9-layer concept to demonstrate the effectiveness of this novel layered defense approach to protect critical infrastructure systemically without relying on protocol level security.

Erfan has also moderated a Smart Grid Educational Series webinar forum between October 2008 and January 2018. This monthly information sharing resource brought experts in power systems, renewable energy, energy efficiency and cybersecurity to discuss pertinent issues from a policy, business process and technology perspective. The SGES distribution grew to over 5000 people across 10+ nations globally in its 9-year tenure.

Erfan has a Bachelor of Science in Physics with honors from Syracuse University in 1983, a Master of Science in Mechanical Engineering with emphasis in Nuclear Engineering from University of Texas Austin in 1984 and a PhD in Nuclear Engineering from University of California Berkeley in 1987.