

28M

Consumers of
carbonated
beverages

Our production
capacity of eco-friendly
food grade CO₂ is
sufficient to quench the
thirst of beverage
drinkers across Ghana



TEAM

Strong leadership with relevant experience in engineering, start-ups, project management & finance

Charles Boatın

CEO

Managing Director at Adenia Partners, Private Equity Pan-Africa. Sr Manager at BCG focused on energy and industrial goods sectors, including sustainability and socioeconomic impact assessment. Product development with Applied Materials incl. new product development and release, training & new product startup.

- MBA, Finance, Harvard Business School
- BS, Chemical Engineering, MIT



Charles Nimako

Advisory Board

Director Safe Water Network's field programs, forums, and workshops in Ghana, and coordinates with partners in the public and private sectors. **CEO of the PepsiCo bottler in Ghana.** Consultant for McKinsey & Company in South Africa, where he helped both private and public sector organizations take advantage of the changing political and business landscape. Charles has worked in the United States, Kenya, South Africa, Uganda, Angola, and Ghana.

- MBA, Stanford University.

Dieudonne Mair, PhD

CTO

Supply Chain Engineer at Intel, semiconductor manufacturing. Prototyped tactical devices for US Army in Afghanistan. Co-Founded technology start-up to help NASA detect signs of life on Titan.

- PhD, Chemical Engineering, Berkeley
- BS, Chemical Engineering, University of Minnesota
- BS, Chemistry, University of Minnesota



Francis Kemausuor, PhD

Advisory Board

Sr Lecturer, KNUST University in biomass and bioenergy technology, energy policy & planning. Consultant for renewable energy projects based on biomass & agriculture. Developed biofuel projects in Italy with ICS-UNIDO

- PhD, Bioengineering, Technical University of Denmark
- M Phil, Engineering for Sustainable Development, Cambridge
- BS, Agricultural Engineering, KNUST

Opportunity

*CO₂ in Ghana is too expensive, >5X more than USA
Why? Cost is driven by source & production method

What is in a bottle of Soda?



Cost of Key Ingredients

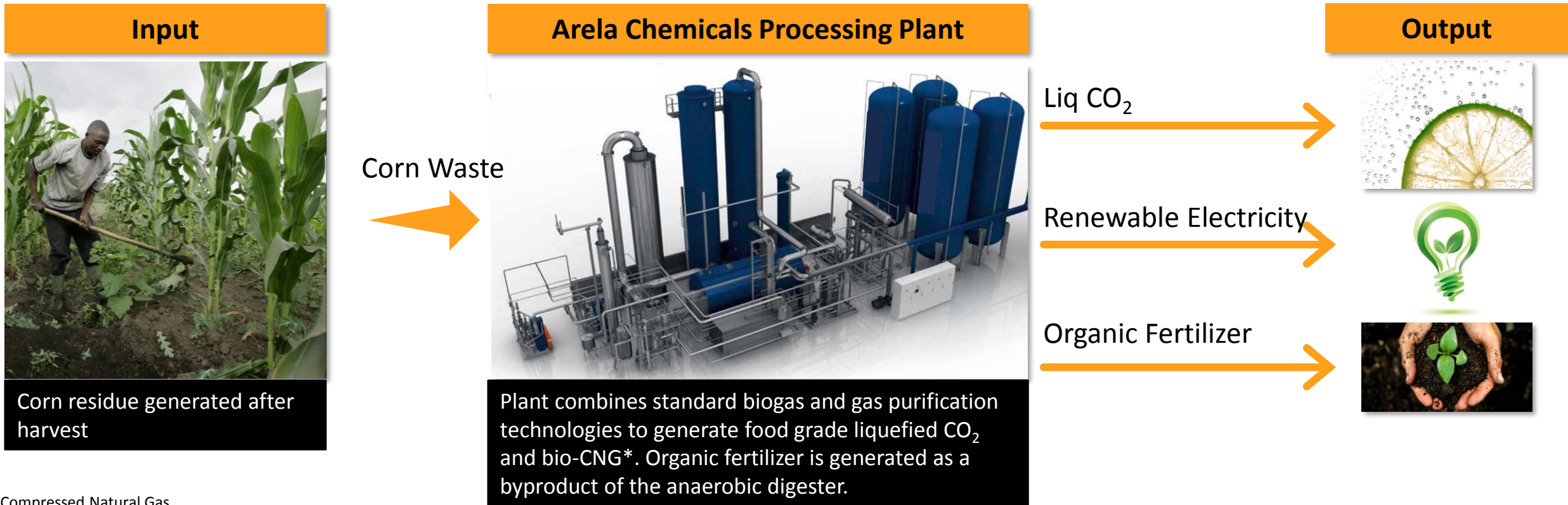


Cost	< \$100 /ton	> \$500 /ton
Source	Captured as byproduct from oil refinery	Imported or produced by combustion of fossil fuel

* Carbon dioxide is the gas in the bubbles of a carbonated drink

Solution: replace fossil fuel with plant waste

- ▶ Plant residue from the corn harvest is **renewable**, abundant and nearly free of cost
- ▶ Replacing expensive fossil fuels with plant waste makes us very cost competitive with local CO₂ suppliers
- ▶ We provide customers with up to **40% discount on their CO₂ cost**

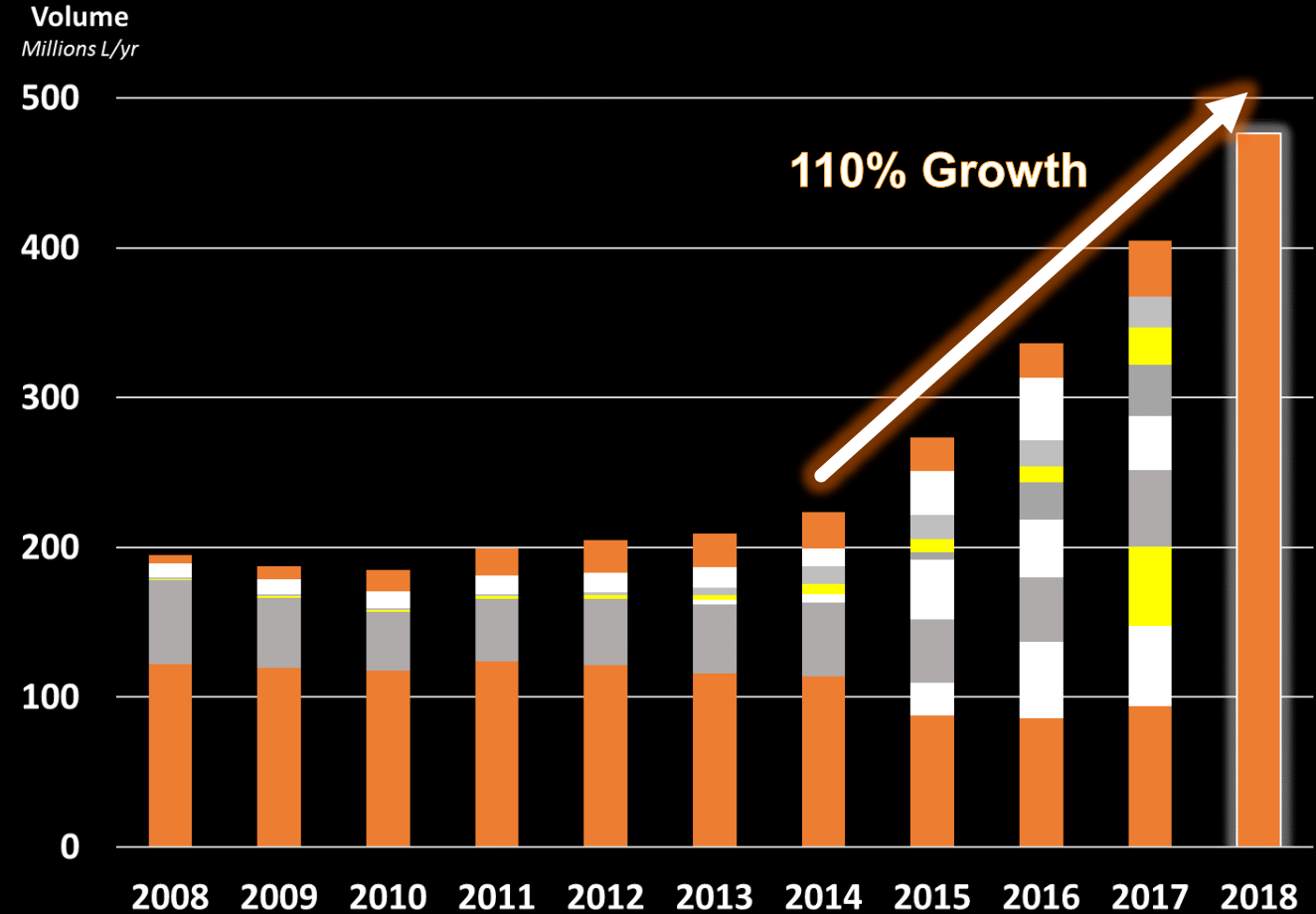


* Compressed Natural Gas

Market for food grade CO₂ is rapidly growing

- Market size: >4,000 tons/yr at a value of \$4-6m
- Non-beverage consumers include hospitals & steel foundries
- Several growth opportunities for CO₂ use which are not currently being served because it is too expensive
 - Dry ice for storage & transportation of frozen goods including fish, meat & medical products
 - Dry cleaning, sustainable replacement of perchloroethylene

Production of Non-Alcoholic Carbonated Beverages in Ghana



Key Challenges & Solutions



On-time Construction

Our technical partners reduce construction time by innovative assembly techniques and containerizing components.



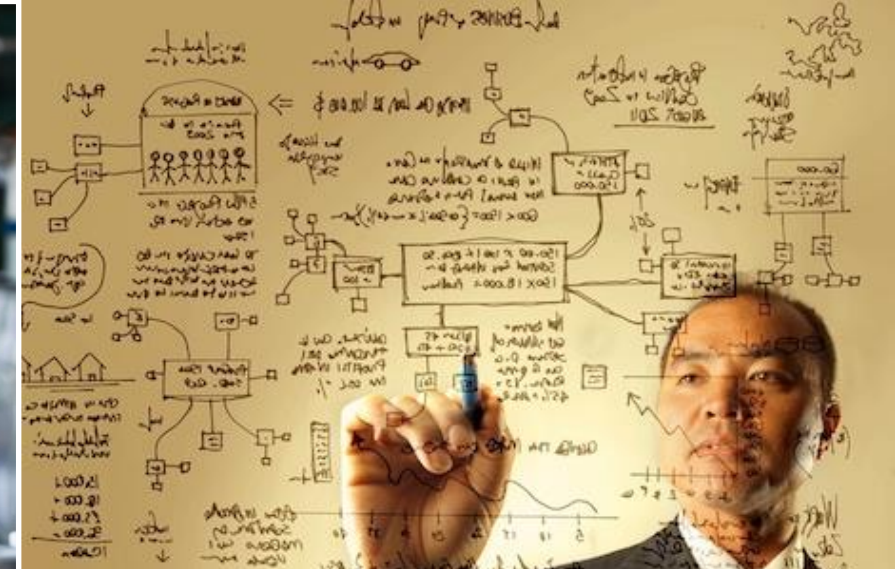
Collection of Plant Residue

Residue can be *efficiently aggregated* with standard agricultural equipment and logistical control



Quality

Plant is designed to *exceed* customer quality requirements



Employee Training

We leverage the rigorous and proven training programs from our technology partners to develop talent.

Triple Bottom Line

TBL is integrated into the very core of our operation and ensures positive social and environmental impact.

People

450

Rural farming households

We generate and donate organic fertilizer to local maize farmers. This increases their crop yield and revenue while improving the sustainability of their farming practices



Planet

7,000

Tons of GHG each year

Our operation saves the planet. We reduce GHG emissions by replacing fossil fuels with plant residue as a feedstock for CO₂ production. **We power the manufacturing plant with 100% renewable electricity generated on-site.**



Profit

>60%

Gross operating margin

Input costs are minimized by utilizing a low cost raw material. We eliminate high electricity costs from the grid by generating our own renewable electricity on-site. Fuel costs for transporting plant waste are eliminated by using the biogas to operate CNG vehicles.



CAPEX for Plant Construction

CAPEX is used to pay for equipment, engineering & construction labor.

CAPEX is itemized for the components of the manufacturing plant

Biogas production

3.2

Stover aggregation & transport

2.1

0.7

Electricity Generation

0.6

0.5

Bio-CNG Production

+ 0.4

CO₂ purification

Pre-construction site development

Quality Assurance

\$ 8.0 M



Arela Chemicals

www.arelchemicals.com
No. 91 Osu Badu Street
West Airport, Accra
Ghana

Charles Boatın
cboatın@arelchemicals.com
+233 242 781 1627

Dieudonne Mair, PhD
dmair@arelchemicals.com
+1 408 931 0141