A-One Products & Bottlers Ltd

Business Plan

Establishment of
Food Grade CO2 Recovery Plant

Kiwalani Industrial Area,
Ilala Municipality, Dare-es-salaam Region

Tanzania

Presented By:

A-One Products & Bottlers Ltd
P.O. Box 20660,
DAR-ES-SALAAM
TANZANIA

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Project Summary

A-One Products & Bottlers Limited

Nature of Project	**:**	Manufacturing Industry
Project Concept	**:**	Establish Food Grade CO2 Recovery Plant
Main Raw Materials	:	Flue Gas
Project Size	**:**	CO2 Recovery capacity - • 2,000 kg per hour • 16,000 MT per Annum
Project Output	**:**	Food Grade CO2 Gas
Investment Costs	**:**	Capital Expenditure..... USD 6.2 mn. Working Capital ..... USD 0.7 mn. Total Investment ..... USD 6.9 mn.
Project Site	**:**	Kiwalani Industrial Area, Ilala Municipality, Dar-es-salaam Region
Country of Operation	**:**	TANZANIA
Implementing Agency	**:**	A-One Products & Bottlers Ltd Tanzania's Private Limited Liability Company
Project Promoters	:	A-One Products & Bottlers Ltd P.O. Box 20660, Dar-es-salaam TANZANIA Web: www.metl.net
Contact Person	**:**	C B Reddy **Chief Executive Officer**

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1.1 Introduction

- Carbonated beverages are the highest consumed drinks around the globe, and include soft drinks, energy drinks, juices, carbonated water, and coffee. Carbon dioxide, CO2, is a colourless, odourless, non-flammable gas with a slightly sour taste
- Carbon dioxide gas is incorporated into beverages at high pressure, which makes the drink fizzy. The most important parameter to detect the quality of carbonated beverage is bubble size, which is also responsible to provide better sensory attributes to the drink, especially appearance and mouthfeel.
- To keep up competitiveness, soft drink bottlers need reliable and high-performing CO_2 plants. CO_2 is crucial for delivering sparkling beverages. With on-site CO_2 generation, a carbonated beverage factory does not have to worry about an insufficient supply of purified, food-grade CO_2, potential volatile pricing, or even a CO_2 shortage crisis.
- This Business Plan has been prepared by A-ONE PRODUCTS & BOTTLERS Limited (shortly, 'A-ONE Products') for a proposed investment in Food Grade CO2 Recovery plant that will produce CO2 for use in the production of carbonated soft drinks.

1.2 Proposed Project

- The project has been conceived on the premises of the growing internal demand for food grade CO2 resulting from increased investments in carbonated soft drinks producing plants under **A-One Products**.
- **A-One Products**, a soft drink manufacturing company in Dar-es-salaam, is positioning to capitalize on the opportunities in Food grade CO2 gas market within the local market.
- A-One Products is investing in a CO2 gas recovery plant to produce food grade CO2 gas from flue gasses extracted from the company's beverages plant. The plant is located in Kiwalani Industrial Area, Ilala Municipality in Dar-es-salaam region. The plant will have capacity to recover 2,000 Kg per hour of CO2 gas.
- The project is investing in a fully automatic system plant designed for 24/7 operation and based on an amine absorption solvent where it uses flue gas by means of interconnecting flue piping to the flue gas.

1.2 Investment Plan

- The project will invest in the machinery and equipment for food grade CO2 Recovery for use in the carbonated soft drinks.
- The project will, further, invest in the support facilities including utilities (electricity and steam), motor vehicles for office use, office furniture and equipment and other support facilities. At commissioning, the project will require working capital for purchase of the chemicals and meet the initial operating expenses.
- The total project cost is estimated at USD 6.2 million for the capital expenditure and an additional USD 0.7 million for working capital as summarized below:

A-One Products & Bottlers Ltd
Food Grade CO2 Recovery Plant
PROJECTED INVESTMENT AND FINANCING PLANS

Investment Plan	**Amount in USD**			
	Additional Investment			**TZS '000' Equivalents**
	Year 1	**Year 2**	**Total Additional**	
Exchange Rate (USD/TZS)	2,500.00	2,500.00		
Land & Land Development	-	-	**-**	**-**
Buildings & Civil works	385,000	-	**385,000**	**962,500**
Plant & Machinery	4,375,824	-	**4,375,824**	**10,939,560**
Utilities	505,560	-	**505,560**	**1,263,900**
Motor Vehicles	526,900	-	**526,900**	**1,317,250**
Office Furniture & equipment	82,500	-	**82,500**	**206,250**
Pre-Operating costs	331,000	-	**331,000**	**827,500**
Total Capital Expenditure	**6,206,784**	**-**	**6,206,784**	**15,516,960**
Working Capital	-	705,293	705,293	**1,763,232**
Total Investment	**6,206,784**	**705,293**	**6,912,077**	**17,280,192**

1.3 Project Financing

- The project will be financed through equity from shareholders and external financing in the form of loans. The shareholders' contribution to the project will be about 46% of the total project cost and the balance of 54% will be sourced from lending institutions.
- The project financing structure is as summarized below.

Financing Plan	Amount in USD			
	Additional Financing			TZS '000' Equivalents
	Year 1	Year 2	Total Additional	
Equity Financing				
Shareholders funds (capex)	3,206,784	-	3,206,784	**8,016,960**
Shareholders funds (W/capital)	-	-	-	**-**
Total Equity	**3,206,784**	**-**	**3,206,784**	**8,016,960**
External Financing				
Medium Term Loans				
Medium-Term Loan 1	3,000,000	-	3,000,000	**7,500,000**
Medium-Term Loan 2	-	-	-	**-**
Short-term Loans				
Bank Overdrafts	-	705,293	705,293	**1,763,232**
Other Short-term Facilities	-	-	-	**-**
Total External Financing	**3,000,000**	**705,293**	**3,705,293**	**9,263,232**
Total Financing	**6,206,784**	**705,293**	**6,912,077**	**17,280,192**
Exposure				
Equity Financing	52%	0%	46%	46%
External Financing	48%	100%	54%	54%

1.6 Proposed Loans

- The proposed long-term loan facility of USD 3,000,000 earmarked to part-finance capital expenditure will be payable in 5-years including one-year of grace period on principal and interest. The loan is assumed to attract 8.0% annual interest expense.
- The short-term loans facility of USD 0.7 million is assumed to attract about 6% interest rate. The sources and uses of the project funds are as summarized below.

Food Grade CO2 Recovery Plant			
Sources and Uses of Funds			
	Amount in USD		
	Year 1	Year 2	Total
Equity Financing			
Land & Land Development	-	-	-
Buildings & Civil works	385,000	-	385,000
Plant & Machinery	1,375,824	-	1,375,824
Utilities	505,560	-	505,560
Motor Vehicles	526,900	-	526,900
Office Furniture & equipment	82,500	-	82,500
Pre-Operating costs	331,000	-	331,000
Working Capital	-	-	-
Equity Financing	**3,206,784**	**-**	**3,206,784**
External Financing			
Land & Land Development	-	-	-
Buildings & Civil works	-	-	-
Plant & Machinery	3,000,000	-	3,000,000
Utilities	-	-	-
Motor Vehicles	-	-	-
Office Furniture & equipment	-	-	-
Pre-Operating costs	-	-	-
Working Capital	-	705,293	705,293
External Financing	**3,000,000**	**705,293**	**3,705,293**
Total Financing	**6,206,784**	**705,293**	**6,912,077**
Exposure			
Equity Financing	52%	0%	46%
External Financing	48%	100%	54%

1.7 Project Location

- The project will be situated in Kiwalani Industrial Area, Ilala Municipality in Dar-es-salaam Region.

1.8 Implementation and Organization

- The CO2 Recovering project establishment will be done based on a turn-key project where the plant suppliers will undertake to provide the machinery; undertake the installations works; and commissioning of the project.
- The project is estimated to take 12-month of implementation and production is assumed to commence in the second year of the project.
- Upon completion of the implementation works, the project will be under the management of A-One Products with a technical assistance from the technology partners.

1.9 Projected Profitability

- The analysis of the profitability of the overall project indicates that the project is a profitable undertaking with short-term returns to the investors.
- The overall gross margins are projected to average 64% and the net margins are projected at 40% over the first 10-years of operation as summarized below.

Projected Profitability	**Amount in USD**					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Revenues						
Food Grade CO2	-	1,996,800	1,960,358	1,739,882	1,774,679	1,810,173
Other Revenues	-	-	-	-	-	-
Less: Value Added Tax (VAT)		(359,424)	(352,865)	(313,179)	(319,442)	(325,831)
Savings - (Internal Uses)		2,496,000	2,927,808	3,246,048	3,310,969	3,377,188
Net Revenues	**-**	**4,133,376**	**4,535,302**	**4,672,751**	**4,766,206**	**4,861,530**
Revenues Growth	-	-	10%	3%	2%	2%
Gross Profits/(Loss)	-	3,584,206	3,996,154	4,194,240	4,278,125	4,363,687
Gross Margins	-	87%	88%	90%	90%	90%
EBITDA	-	2,411,806	2,800,306	2,974,475	3,033,965	3,094,644
EBITDA Margins	-	58%	62%	64%	64%	64%
Other Costs						
Depreciation & Amortisation	-	315,185	283,621	257,454	262,041	238,622
Loans Interest Expenses	-	310,529	256,757	197,880	139,438	81,027
Provision Corporate Tax	-	535,827	677,978	755,742	789,746	832,499
Net Profits	**-**	**1,250,264**	**1,581,950**	**1,763,399**	**1,842,740**	**1,942,497**
Net Margins	-	30%	35%	38%	39%	40%

Net Present Value (NPV)	USD 7,283,902
Internal Rate of Return (IRR)	27.0%
Return on Investment	29.2%
Normal Payback Period	3 Years

1.10 Projected Cashflows

- The projected cash flow statements indicate that the company will have positive cash balances in the first year of operation which will partly be financed by the proposed short-term facilities of USD 0.7 million.
- The projected cashflows statements are as summarized below.

Projected Cash Flow Satements	Amount in USD					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Cash Inflows						
Equity Financing	3,206,784	-	-	-	-	-
External Financing	3,000,000	-	-	-	-	-
Sales revenues						
Food Grade CO2	-	1,996,800	1,960,358	1,739,882	1,774,679	1,810,173
Other Revenues	-	-	-	-	-	-
Less: Value Added Tax (VAT)	-	(359,424)	(352,865)	(313,179)	(319,442)	(325,831)
Savings - (Internal Uses)	-	2,496,000	2,927,808	3,246,048	3,310,969	3,377,188
Net Sales Revenues	**-**	**4,133,376**	**4,535,302**	**4,672,751**	**4,766,206**	**4,861,530**
Total Inflaws	**6,206,784**	**4,133,376**	**4,535,302**	**4,672,751**	**4,766,206**	**4,861,530**
Cash Outflows						
Capital Investment	6,206,784	-	-	131,725	-	-
Change in Working Capital	-	705,293	62,278	11,231	15,576	15,888
Operating Expenses						
Direct Operating Costs	-	549,170	539,148	478,511	488,081	497,843
Indirect Operating Costs	-	1,172,400	1,195,848	1,219,765	1,244,160	1,269,043
Finance Costs						
Loans Interest Expenses	-	310,529	256,757	197,880	139,438	81,027
Loans Principal Repayment	-	750,000	750,000	750,000	750,000	0
Corporate Tax	-	535,827	677,978	755,742	789,746	832,499
Dividends	-	0	0	0	0	0
Total Cash Outflows	**6,206,784**	**4,023,219**	**3,482,009**	**3,544,855**	**3,427,001**	**2,696,299**
Net Cash Flows	**-**	**110,157**	**1,053,293**	**1,127,896**	**1,339,205**	**2,165,231**
Opening Cash Balance	-	0	110,157	1,163,449	2,291,346	3,630,551
Closing Cash Balance	**-**	**110,157**	**1,163,449**	**2,291,346**	**3,630,551**	**5,795,782**

1.11 Project Viability

- The projected is a viable investment with Internal Rate of Return (IRR) of 27% which is greater than the current cost of funds; and a positive Net Present Value (NPV). The project Normal Payback Period is within three-year period.

1.12 Economic Benefits

- Tax Income – the project will pay income taxes, property taxes, corporate taxes and other taxes to the Tanzania government.
- Jobs Creation – the project will create over 28 direct jobs and over 100-indirect employment.

1.13 Conclusion And Recommendations

- Besides addressing environmental threats from CO2 emissions, the project analysis suggests that it is financially and economically viable and technically feasible. The project will be able to meet its financial obligations from the project sales revenues.

The Project Promoters

2.1 Background

- A-ONE PRODUCTS AND BOTTLES LIMITED ("**A-One Products**") is a soft-drinks manufacturing company. It is one of the leading local producers and distributors of soft drinks in Tanzania.
- A-One Products is an associate company of the MeTL Group of companies of Dar-es-salaam, Tanzania. MeTL Group, through A-One Products, has positioned itself to capture Tanzania's opportunities in the soft drinks industry.
- Currently, A-One Products is MeTL Group's third largest company, and primarily produces beverages (soft drinks) and plastic packages. The company has grown to become one of the leading producers of drinking bottled water and flavoured drinks in Tanzania.

2.2 Company Legal Status

- Registration –
  - A-One Products is a local Tanzania company registered under Tanzania's company law and is recognised by the Tanzania's Business Registration and Licencing Agency (BRELA). A-One Products is a private limited liability company by shares.
- Shareholding –
  - A-One Products is a corporate firm, an associate company of the MeTL Group of companies. The registered shareholders of the company are family members of the MeTL Group. The company's shareholding structure is as presented below:

Shareholders' name	Number of Shares	% Shareholding	Position
Mr. Gulam Dewji	50	50%	Executive Director
Mrs. Dixita Mohammed Dewji	30	30%	None-Executive
Mr. Hussein Gulam Dewji	20	20%	Executive Director
Total	**100**	**100.00%**	

- All the shareholders are Tanzanian nationals

2.3 Company Business

Products Development

- A-One Products started with a mere small-sized plastic packages manufacturing line in 1997 to become a medium-sized drinking water and flavoured juice company in 2000 before emerging as the leading beverages company in Tanzania.
- With the growing demand for soft drinks, in year 2000, A-One Products introduced new packages for bottled water by investing in a new production line to meet the demand for bottled water in the city of Dar-es-salaam.
- Different product pack-sizes for bottled water and juice were introduced using new technology machines in the period between year 2000 and 2014. This went parallel with the replacement of old beverage production plants.
- Overtime, through use of the Group's well-equipped marketing and distribution networks, A-One Products quickly established itself with a strong brand presence in the market with products such as *Masafi*, *Maisha,* and *Just Chill* drinking water and *Pride* juices - all upheld as trusted household names across the country.

Products Diversification

- **Plastic Packages**
  - New bottled water producing plants were installed simultaneously with the installation of plastic packages manufacturing plant. In 2003, the company installed new lines to enhance bottles manufacturing for water and juice packing.
  - Further, in year 2006, A-One Products ventured into manufacturing of plastic packages for refined cooking oil for supply to a sister company, **East Coast Oil and Fats Ltd** (ECOF) which manufactures refined cooking oil, margarine and cooking fats, laundry soap and cosmetics.
  - ECOF, the largest palm oil refinery plant in East and Central Africa and with 60% market share for refined palm oil in Tanzania, consumes plastic buckets and jerry cans for packing refined palm and sunflower oil. The company, also, uses containers for packing margarine and cooking fats as well small bottles for packing cosmetics. Most of the packages are produced by A-One Products.
  - As a sole supplier to ECOF, A-One Products produced over 12 million PP buckets and more than four million HDPE jerry cans per annum for ECOF. In the beverages,

the plant had a filling capacity of 20 million cases of water and flavoured drinks per annum and the plant produced the same amount of PET pre-forms/ bottles/ cups for filling beverages.

- Later on, A-One Products introduced machinery line to produce plastic packages for cosmetics to supply to ECOF, as an internal market.

- **Carbonated Soft Drinks**
  - In 2014, A-One Products introduced carbonated soft drinks (CSD) plant producing a variety of CSD flavours. The CSD plant had production capacity of 36 million crates per annum. A year later, all products were branded the name "MO" which afforded the products to become households' products throughout the country.

- **Other Investments**
  - A-One Products, also, invested in a modern Reverse Osmosis Plant that delivers $100M^3$ of mineral-rich water per hour. This is one of the largest water treatment plants in the East African region.
  - In 2006, A-One Products invested in a larger plastic bottles recycling plant.
  - Further, a mobile sales unit was established after the company purchased over 300-motor vehicles, 50-Trycycles and over 10,000-cooler bags for door-to-door delivery of its beverage products.

2.4 Continued Expansion

- Positive market response on "MO" branded products and the growing market competition was behind company desire for continued investment to stay aloof.
- Year-on-year, since 2017 through to 2020, A-One Products undertook expansion and modernisation program for its production facilities with the aim to bring production efficiency and match with the ever-growing demand. Currently, plastic packages contribute about 35% of the company revenues.
- In the beverages market, the company's Energy Drink ("MO Bomba and now MO Xtra") became the most preferred energy drinks in the market, swooping over 70 percent market share for Energy drinks in the country.

The Project Concept

3.1 Introduction

- Carbonated soft drinks (CSD) represent the second largest volume segment of non-alcoholic drinks, after water, worldwide.
- Carbon dioxide (CO2) gas is incorporated into beverages at high pressure, which gives them an effervescent taste.
- The carbonated soft drinks market in Tanzania is set to grow by USD 393 million during 2021-2027, growing at a compound annual growth rate (CAGR) of 5.1% during the forecast period.
- To keep up competitiveness, soft drink bottlers need reliable and high-performing CO_2 plants. CO_2 is crucial for delivering sparkling beverages. With on-site CO_2 generation, a carbonated beverage factory does not have to worry about an insufficient supply of purified, food-grade CO_2, potential volatile pricing, or even a CO_2 shortage crisis.

3.2 The Concept

- A-One Products is investing in a CO2 gas recovery plant to produce food grade CO2 gas from flue gasses extracted from the company's beverages plant. The plant is located in Kiwalani Industrial Area, Ilala Municipality in Dar-es-salaam region. The plant will have capacity to recover 2,000 Kg per hour of CO2 gas.
- The project is investing in a fully automatic system plant designed for 24/7 operation and based on an amine absorption solvent where it uses flue gas by means of interconnecting flue piping to the flue gas.
- The CO2 gas will be for use in the production of carbonated beverages for the company and other carbonated beverages producing companies.

The Project Components

4.1 Introduction

- Carbon dioxide is a component of all flue gases produced by the complete combustion of carbonaceous fuels. Typical concentrations of carbon dioxide in such gases are 10–18 vol%. The flue gases, after being cooled and cleaned by passing through a water scrubber, are passed through an alkaline carbonate solution or an amine solution that absorbs carbon dioxide.
- CO_2 recovery technology generates 99.998% pure, food-grade CO_2, which can be used in house for carbonating your own carbonated beverages, and may completely remove the need to purchase CO_2 from external suppliers.

- Further, the recovered CO_2 can represent an additional revenue stream, and be sold to the beverage industry for use in carbonation, for example, or marketed to the food and other industries for use in manufacturing dry ice.

4.2 Project Components

✓ Investment in production facilities –

- Land and land Development –
  - The project has already rented industrial premises which is adequate for the development of the CO2 Recovery plant operation. The land is under the names of Mohammed Enterprises (Tanzania) Limited.
  - The land is located in Kiwalani Industrial Area, Ilala Municipality in Dar-es-salaam.

- Buildings and Civil Works –
  - The project has already prepared the design works for the industrial building which accommodates the main CO2 plant.
  - The project, also, involves construction of concrete perimeter wall, drainage system, internal roads and storage tanks area.

- Machinery and Equipment –
  - The project has identified machinery supplier of CO2 Recovery system from Switzerland, named ASCO Carbon Dioxide Ltd. The project will procure and install an innovative CO_2 stack gas recovery technology that turns vent flue gas into a usable and profitable source of CO_2.
  - CO_2 gas produced by a CO_2 Stack Gas Recovery System is a by-product of flue gas production from boilers as well as from other flue gas sources offering an economic CO_2 source to any CO_2 consumer or reseller.
  - The machinery components include the following:

Base Plant - (2,000 Kg/Hour CO2 Gas Recovery System)	
	CO2 gas recovery system-process front end
	CO2 gas compression, purificataion, drying and liquification
	CO2 plant combined electrcial and PLC panel
	Project management and design engineering
Equipment & Services	
	Set interconnecting material- co2 engine room
	MCC/control panel air conditioning
	Operation test kit
	Purity and quality test kit

  - The project will further procure 8 gas tanks for distribution to wholesale customers of food grade CO2 gas.

- Support Facilities
  - Motor vehicles – the project will procure trucks to aid in the transportation of food grade CO2 gas to customers
  - Office furniture and equipment – the project will procure office furniture and equipment including security equipment and other equipment.

✓ Working capital –

- The project will require initial working capital to finance the operating expenses including purchase of chemicals, processing costs, labour charges and other expenses.
- The working capital is, also, required to finance current assets of the project including trade debtors, stocks of finished goods and other inventories.

Carbon Dioxide

5.1 Introduction

- There are two primary sources of carbon dioxide: natural carbon dioxide (CO_2) sources and man-made (anthropogenic) CO_2 sources.
- Natural CO_2 sources
    - Natural CO_2 sources account for the majority of CO_2 released into the atmosphere. Oceans provide the greatest annual amount of CO_2 of any natural or anthropogenic source.
    - Other sources of natural CO_2 include animal and plant respiration, decomposition of organic matter, forest fires, and emissions from volcanic eruptions. There are, also, naturally occurring CO_2 deposits found in formation layers within the Earth's crust that could serve as CO_2 sources.

- Anthropogenic Co_2 Sources
    - Anthropogenic CO_2 sources are part of our everyday activities and include those from power generation, transportation, industrial sources, chemical production, petroleum production, and agricultural practices.
    - Many of these source types burn fossil fuels (coal, oil, and natural gas), with CO_2 emissions as a by-product.
    - Of these CO_2 sources, electric power generation contributes the greatest amount of anthropogenic CO_2 to the atmosphere.

5.2 Features of Carbon Dioxide Gas

- In order to manufacture a carbonated beverage, it is necessary to inject carbon dioxide gas (CO_2) into the liquid product before packaging.
- Carbon dioxide gas is heavier than air having a density of 1.98 kg m^{-3} at 298 K. It is colourless, odourless and nontoxic although can cause death by suffocation if present at high levels. The gas is easily liquefied by compression and cooling.
- A quick decompression of liquid CO_2 causes rapid expansion with some evaporation. This removes sufficient heat to allow the reminder to become solid carbon dioxide or 'dry ice.'

- The gas is very soluble in water; the amount increasing with reducing temperature. When CO_2 is dissolved in water, it produces carbonic acid which gives products their characteristic acidic and biting taste. An essential requirement for successful carbonation is to exclude air/oxygen as far as possible.
- Air has only about 2% of the solubility in water of CO_2 which means that any air contained within the beverage will exclude some 50 times its own volume of CO_2.

5.3 CO2 Production

- The level of carbonation varies with product types with around 4.0–7.0 g per l (2–3.5 volumes) of added CO_2 being typical. For so called mixer drinks mostly intended to be added to alcoholic spirits such as gin, 9–10 g CO_2 per l is normally added. These high levels of CO_2 are only achievable by paying scrupulous attention to removing as much air/oxygen as possible from the product during both manufacture and packaging.
- Except in the case of naturally carbonated mineral water, CO_2 is obtained from commercial suppliers. The gas is manufactured or obtained as a by-product from a number of different industrial processes as summarised below.

Carbon Dioxide Production Systems

Feedstock		By-Product from	Throughput (MT/Hour)
1	• CO_2 from fermentation	• Brewing fuel ethanol distilleries	≤8
2	• CO_2 from solvent-based acid gas removal systems	• Hydrogen • Ammonia • Methanol • Other syngas processing • Natural gas sweetening	1–20
3	• CO_2 rich off-gas	• Pressure swing adsorption (PSA) • Hydrogen • Mineral processing	0.1–20
4	• CO_2 lean gas	• PSA hydrogen purification • Direct iron ore reduction	0.1–20
5	• Flue gas	• Process steam boilers • Power plants • Gas engines	0.1–20
6	• Oil or natural gas	• n/a	0.1–1
7	Landgas processing	• n/a	

Project Rationale

6.1 CO2 Emissions

- Industrially manufactured CO2 is used in solid, liquid, gas, and supercritical forms in widely diversified commercial applications such as making explosive gas atmospheres inert, beverage carbonation, chemical manufacturing, firefighting, food preservation, foundry-mould preparation, greenhouses, mining operations, oil well secondary recovery, rubber tumbling, pH depression for wastewaters, welding, therapeutical work, and medical industry applications.
- Fossil fuel fired plants are responsible for the one third of the CO2 emissions which are thought to be a major contributor to the current rise in the earth's surface temperature. Reducing CO2 atmospheric concentrations by capturing emissions at the source (power plants and chemical industries) and then storing them in subsurface reservoirs is thought to be a reliable solution.
- The captured CO2 could also be utilized for enhanced oil recovery, enhanced coal bed methane recovery, enhanced gas recovery, food processing applications, manufacturing minerals and fertilizer (e.g., urea production), promoting algae growth, and enhanced plant growth in greenhouses.
- Currently, technologies are available to purify naturally occurring CO2 into products suitable for the above applications.
- **A-One Products** planned investment in the CO2 recovery aims to support government initiatives for environmental protection in the country.

6.2 Application in Carbonated Beverages

- The most common and oldest application of CO2 is in producing carbonated soft drinks and soda water. To some extent, this application extends to beer and sparkling wine, though CO2 is naturally produced during fermentation.
- The largest use of CO2 gas is in the manufacture of carbonated beverages.

- Carbon dioxide contributes to the characteristic pungent taste or "bite" to the soft drinks because CO2 has a marked stimulating effect on the olfactory and gustatory nerves.
- The carbonation of a beverage helps to prevent mould growth. It, also, inhibits the growth of bacteria, in some instances, destroys bacteria depending on the extent of carbonation used. The acid used in the beverage and the CO2 content satisfactorily preserve carbonated beverages for a long time.
- The project will produce quality food grade CO2 gas for use in carbonated beverages manufacturing companies.

6.3 Reduction in Operating Costs

- A-One Products is one of the largest industrial producers of carbonated soft drinks which uses food grade CO2 gas. The project will reduce the company's operating costs resulting from outsourcing of CO2 gas.
- Rather than purchasing CO2 gas, the company will extract the gas from own operation which eventually save a good deal of costs.

6.4 Employment Generation

- The project will generate direct and indirect employment. The project is set to employ a total of 26 permanent workers and more than 100 indirect workers.

6.5 Industrial Development

- The CO2 Recovery plant would create suppliers of direct inputs to the recovery plant including suppliers of chemicals, utilities, and other consumables.
- The project will increase the stock of manufacturing entities in the country.

Tanzania's Soft Drinks History

7.1 Introduction

- The beverage sector comprises alcoholic and non-alcoholic drinks. The alcohol sub-sector includes the distilling of ethyl alcohol, the distilling and blending of spirits and the brewing of wines, cider and beer.
- The soft drinks sub-sector comprises the processing and bottling of juices, carbonated drinks, natural spring water and mineral water. According to a 2009 survey of manufacturing firms by the National Bureau of Statistics, there were 37 large and medium-sized establishments in the sector, of which 10 are foreign-owned and seven are owned jointly by Tanzanian and foreign investors.
- About 15 firms were located in Dar es Salaam, including most of the larger ones. About a third of the firms were established after 2000.

7.2 Early Players

- In the soft drinks area, the first entrants, who remain dominant in the sector, were franchisees of Coca-Cola and PepsiCo. The first soft drink bottling plant was set up in 1952 when Greek businessman Aris Cassolis established Tanganyika Bottlers Limited to make Coca-Cola products.
- Renamed as Tanzania Bottlers in 1964, it was bought by the Mac Group in 1986. The business remained in private hands during the socialist period.
- In 1995 the South African Bottling Company bought Tanzania Bottlers from Mac Group. SBC Tanzania, a producer of Pepsi soft drinks, began its operations in 2001. In the juices sub-sector, a number of government-owned processors were established in the 1970s. These ventures were already in financial distress at the time when they were privatized. Subsequently, a number of new private firms entered the sector, using concentrates to make juices. Only recently has one firm, Bakhresa Food Products, begun making juices from fresh fruit as opposed to concentrates.
- Bonite Bottlers Ltd was the first Tanzanian company to bottle mineral water; it began its operations in 1990. Several firms entered the market later; these included both small and large firms, and some PepsiCo and Coca-Cola franchisees. A-ONE joined the sector in 1997.

The Products & Services

8.1 Product

- The project will provide the market with CO2 Stack Gas Recovery Technology turns the vent flue gas into a usable and profitable source of CO2.
- CO2 gas won by a ASCO Stack Gas Recovery System is a by-product of flue gas production from boilers as well as from other flue gas sources offering an economic CO2 source to any CO2 consumer or reseller. ASCO, as a provider of complete CO2 solutions, offers CO2 Stack Gas Recovery Systems with various capacities.

8.2 Food Grade CO2 Recovered

- The project will produce food grade CO2 gas for use in the carbonated beverages. The revolutionary ASCOSORB CO2 Stack Gas Recovery Technology features the following key benefits:
    - Reliable and economic source of CO2 to the end user as opposed to self-burning processes or purchasing liquid CO2;
    - The ASCOSORB Technology brings to the ASCO CO2 Stack Gas Recovery Plant tremendous reduction in total energy usage offering greatly reduced OPEX: only approx. 1.3 MWth /MT produced CO2;
    - The ASCOSORB Technology brings to the CO2 stack gas recovery plant innovations such as reduced solvent consumption again contributing reduced operating cost to the already reduced operating costs;
    - The specially formulated ASCOSORB solvent utilized with the ASCO CO2 Stack Gas Recovery System is resistant to any level of oxygen typical of flue gas sources allowing greater system efficiencies and longevity of the plant;
    - Liquid CO2 quality produced by an ASCO CO2 Stack Gas Recovery System meets specifications of ISBT, food and beverage, and customer final liquid quality specifications;
    - ASCO CO2 Stack Gas Recovery Systems offer a capacity range from 500 to 2'000 kg/h (1'100 to 4'400 lb/h).

Market Overview

9.1 Introduction

- Soft drinks are produced around the world and they are widely available. Carbonated beverages (CBs) make up the bulk of the global soft drink industry. The market for these products is still continuing to show outstanding growing potential.
- The global market of CBs is anticipated to reach more than USD 410 billion by 2023, at a compound annual growth rate of 2.8%. The CB product category includes soft drinks, energy drinks, and others. Olfactory sensations of CBs, marketing, and branding are all factors that contribute to the products' success.
- Not long ago, the industry experienced major changes regarding product innovations and offerings. To face the growing market challenges, companies are bringing in new flavours taking into account the well-being and health concerns of consumers.

9.2 Carbonated Drinks

- Carbonated beverages are drinks that contain dissolved CO_2 for various reasons. From the consumer perspective, many find a fizzy sensation to be pleasant and like the slightly different taste that carbon dioxide provides.
- Carbonation process produces the characteristics fizziness and bubbling in these drinks and this is due to the dissolved CO_2 in a liquid under pressure. However, the carbon dioxide used must be free of odour and flavour.
- The main ingredients used in carbonated drinks are water, carbon dioxide, sweeteners, flavouring, colours, and acids. The sweeteners may be nutritive sweeteners such as sucrose and fructose or low-calorie non-nutritive sweeteners.
- Carbonated drinks can be classified into different groups based on many aspects. There are nonflavoured carbonated beverages, flavoured carbonated beverages with natural extracts, flavoured carbonated beverages with artificial flavours, and carbonated beverages with fruit juice.
- In the production of a carbonated beverage, the concentrated flavouring (beverage base) is combined with a nutritive or non-nutritive sweetener and water to form a syrup. The syrup is mixed with a proportioned quantity of carbonated water followed by filling and sealing the beverage in a container.

9.3 Global Demand for CO2 Gas

- The carbon dioxide market is estimated to grow at a CAGR of 4.32% between 2022 and 2027. The size of the market is forecast to increase by USD 1.91 billion.
- CO2 market will likely experience a significant rise and reach approximately 520 million tonnes in 2035, at an expected CAGR of 6.50% by 2035. The rising demand from the Food and Beverages, Medical, Oil & Gas, Rubber, and other end-use industries, is anticipated to hike up the need for the CO2 market in the forecast period.
- The growth of the market will, also, depends on other factors such as advancements in carbon capturing and storage technologies.

9.4 Key factors driving market growth

- **Food And Beverage Industry –**
    - The Carbon Dioxide (CO2) market globally is primarily driven by the Food & Beverages Industry. In this industry, Carbon Dioxide finds application in Carbonation of Beverages, Food processing, and Food packaging.
    - This industry is expected to see an expansion due to growing demand for ready to eat food items and carbonated beverages owing to the growing population.
    - The expansion of the global CO2 market in the food and beverage sector for producing carbonated beverages and improving shelf life of packed food items.

- **Medical Industry –**
    - Besides the Food and Beverage Industry, the demand from the medical industry for applications of Carbon Dioxide for an inhalation gas in various medical procedures, surgeries, and therapies may increase the demand for carbon dioxide in the future.

- **Technology Advancement –**
    - To address the control of carbon dioxide emissions, several R&D&I efforts are conducted in order to mitigate this gas emission.
    - Aiming its capture for industrial usages, the technologies are directed to capture this gas in the purest, economical and environmentally viable way. The carbon dioxide capture can be carried out during three stages:

- Pre-combustion,
- Combustion,
- Post-combustion

- Pre-combustion is based on a gasification process through which the fuel passes and is intended to produce a synthesis gas, mainly composed of hydrogen and carbon monoxide. Subsequently, hydrogen and carbon monoxide are converted into carbon dioxide and then this goes through the gas separation process.
- The capture of gases that occurs during combustion is called oxycombustion and its principle is the burning of fuel in an oxygen-enriched environment.
- Post-combustion is the capture in the final phase of release of the combustion gases. It is ideal for capturing CO_2 from energy generation sources, such as thermoelectric plants and other plants that use waste to generate energy. After the combustion gases exit, they go through the process of separating CO_2 from the other gases using the appropriate technology.

9.5 Local Demand for CO2 Gas

- Tanzania's soft drinks supply chain includes soft drinks manufacturers, importers, wholesalers and retailers. In terms of soft drinks categories, there are three major categories of soft drinks produced and distributed in the Tanzania market:

  - **Carbonated soft drinks**
    - Tanzanian firms produce local brands of carbonated drinks. The most prominent of these are Azam Cola, produced by Bakhresa Food Products, and Sayona Cola, produced by Sayona Drinks (part of Motisun Holdings) and Mo-Cola produced by A-One Products.

  - **Fruit juices**
    - Until 2015, domestic production met only 8% of demand. However, this has changed, in large part due to the entry of the Bakhresa Group into large-scale fruit juice processing. The juices available in Tanzania include orange, guava, coco-pine, peach, tropical plum and passion fruit.

- **Bottled water**
  - Bottled water is produced by Coca-Cola and PepsiCo franchisees as well as by large, medium and small-sized local companies. The larger local firms include Sayona Drinks, Bakhresa Food Products, A-One Products, Kilimanjaro Water and Jambo.
  - In recent years, local small-scale producers have emerged producing local brands including Hill Water and other brands.

9.6 Major Soft Drinks Producers

Besides A-One Products, other major producers of soft drinks in Tanzania include the following:

(a) Coca-Cola Brands

- Created and developed in Atlanta, Georgia in 1886, Coca-cola is a US-based soft drinks giant. The Coca-Cola Company (TCCC) is the largest beverage company in the world, serving 1.7 billion consumers a day in more than 200 countries. The production and distribution of Coca-Cola follows a franchising model in which TCCC provides a syrup concentrate to its bottling partners who then manufacture, package, distribute, and sell products for local consumption.
- The US-based TCCC in conjunction with its Tanzanian bottling partners is involved in marketing, manufacturing and distribution of soft drinks in Tanzania.
- Coca-Cola's three bottling partners in Tanzania are **Coca-cola Kwanza Bottlers** in Dar es Salaam, **Bonite Bottlers** in Moshi and **Nyanza Bottlers** in Mwanza.
- Over the last three years Coca-Cola has invested in excess of USD 358 million in Tanzania. In the past decade, the company invested over USD 6.0 billion in the African continent and intends to invest another USD 12 billion by 2020. The investments are part of its ambitious long-term plans to double its net revenues globally, from USD 100 billion in 2010 to over USD 200 billion by 2020.
- Coca-cola brands in Tanzania include the following:
  - Coca-cola – favoured carbonated soft drink
  - Sprite – lemon-lime flavoured soft-drink
  - Fanta – fruit-testing flavoured soft drink
  - Coce Diet - sugar and calorie-free soft drink

- Coca-cola Zero – zero sugar flavoured soft drink
- Sparlleta – flavoured carbonated soft drink
- Dasani – flavoured mineral water
- Krest – digestive carbonated soft-drink

(b) Pepsi-Cola Brands

- Created and developed in 1893, Pepsi-Cola is a carbonated soft drink that is produced and manufactured by PepsiCo, an American multinational food and beverage corporation headquartered in New York, United States.
- SBC Tanzania Ltd is the sole franchisee and bottler of the Pepsi Cola range of products in Tanzania. In 2010, the company recorded an annual turnover of more than US USD 93 million.
- SBC Tanzania Limited was incorporated in 2001 with the mission to "revive the Pepsi Cola business in Tanzania and to transform Pepsi brands into sizeable and serious contenders for volume and share of mind in the Tanzanian market.
- The company has its headquarters in Dar es Salaam and operates plants in Mwanza, Arusha and Mbeya. It has distribution depots in Moshi, Shinyanga, Dodoma, Iringa and Morogoro. The company has a sophisticated distribution network, with agents, wholesalers and retailers throughout the country.
- SBC Tanzania produces, distributes and markets various product brands including Pepsi, 7UP, Mirinda, MountainDew and Evervess in the following pack sizes:

	Products	Pack sizes			
1	Pepsi	200ml	350ml		
2	Pepsi PET			500ml	1.5 litre
3	Pepsi Light PET			500ml	
4	Pepsi Max PET				
5	Pepsi Can	300ml			
6	Pepsi Diet Can	300ml			
7	7up		350ml		
8	7 up PET			500ml	1.5 litre
9	7Up can	300ml			
10	Mirinda Orange		350ml		
11	Mirinda Orange PET			500ml	1.5 litre
12	Mirinda Fruity		350ml		
13	Mirinda Mango		350ml		
14	Mirinda Pineapple		350ml		
15	Mirinda Can	300ml			
16	Mountain Dew		350ml		
17	Mountain Dew PET			500ml	

18	Mountain Dew Can	300ml	
19	Evervess Club Soda	300ml	
20	Evervess Tonic Water	300ml	
21	Evervess Tonic Water PET		500ml
22	Evervess Tonic water can	300ml	
23	Evervess Club Soda Can	300ml	

(c) Bonite Bottlers Limited

- Bonite Bottlers Ltd was the first Tanzanian company to bottle mineral water; it began its operations in 1990. Several firms entered the market later; these included both small and large firms, and some PepsiCo and Coca-Cola franchisees.
- Bonite Bottlers, part of the IPP Group of Companies, produces Kilimanjaro Drinking Water, the leading bottled water in Tanzania selling under its own brand, Kilimanjaro Drinking Water.
- The company operates in four regions of Northern Tanzania: Kilimanjaro, Arusha, Manyara and Singida.
- Bonite Bottlers Ltd also bottles and distributes coca-cola soft-drinks brands.

(d) Bakhresa Food Products Limited

- Bakhresa Food Products Ltd was established by the Bakhresa group in 1998 and it's based in Dar es Salaam. Backhresa Food Products Ltd is involved in the production and marketing of a range of food products including dairy products, ice-cream products, bottled water, juices and carbonated drinks.
- The company's fruit juice processing plant is the first aseptic packing facility for fruit juices in Tanzania, with a capacity of 41 million litres per annum.

#	Products	Pack sizes	
1	Azam Cola	300ml	500ml
2	Azam Cola Orange	300ml	500ml
3	Azam Soda Orange	300ml	500ml
4	Azam Soda Fursana	300ml	500ml
5	Azam Soda Apolina		500ml
6	Azam Soda Komamanga	300ml	
7	Azam Cream Soda	300ml	
8	Azam Energy Drink	300ml	
9	Azam Malti Apple	300ml	500ml

10	Azam Malti Pineapple	300ml	500ml	
11	Azam Malti Coffee	300ml		
12	Azam Malti Ginger & Lime-Lemon	300ml		
13	Azam Embe	300ml		
14	Tropical	300ml		
15	Safina Premium Drinking Water		500ml	1000ml
16	Safina Sparkling Drinking Water		500ml	

(e) Sayona Drinks Ltd

- **Sayona Drinks Limited** is part of the Motisun Holding Group and was the first Tanzanian firm to produce carbonated soft drinks in plastic bottles. It produces cola soda, orange soda, lemon soda and mango juice.
- Motisun Group is a privately owned diversified business conglomerate based in Tanzania with various manufacturing companies in steel and roofing products, mining and power, cement, plastic tanks and pipes, hospitality, paint, industrial products, beverage and food processing, construction and logistics. The company has presence in Zambia, Mozambique and Uganda.
- Sayona Drinks Limited produces quality beverages ranging from carbonated soft drinks to ready to drink juice and packaged drinking water under the brands – Twist and Sayona. These are local brands of soft drinks.
- The company's manufacturing facility has capacity to produce 300 Bottles Per Minute (BPM) of carbonated drinks and 200 BPM of packaged drinking water.
- The company produces the following products:
    i. Sayona water available in various pack sizes: 350ml, 500ml, 600ml, 1000ml, and 1,500ml and in bulk water jars of 5Litre, 10 Litres and 20 Litres.
    ii. Sayona "twist" carbonated soda available in 350ml PET bottles with 7 different varieties of flavours.
    iii. Sayona juice, artificial juice available in different flavours.

(f) Jambo Food Products Limited

- Jambo Food Products is a limited company incorporated in Tanzania. It is a subsidiary of the Jambo Group of Companies Limited located in Shinyanga, a strategic location in the Lake Region.

- The company is a new entrant in the beverages industry in the country. Its CSD plant was launched in June 2016.
- The company has installed capacity consists of three bottling lines with an average total capacity of 96,000 Bottles per Hour or 80,000 cartons per day of 24 bottles for carbonated soft drinks, fruit juice drinks and drinking water.
- The company produces Jambo Soda, Jambo Malta, Jambo Juices, Jambo Energy, and Jambo Drinking Water. From these brands mix the plant is producing an average of 44 SKUs in 300ml, 500ml, 1Litre and 1.5 Litre pack sizes.

9.7 Other Players

- Besides the major players, there are small players in the market of the beverage products particularly in the bottled water sub-sector.
- There are also imported juices in market.

CO2 Production Process

10.1 Introduction

- The project will procure and install ASCO's CO2 Stack Gas Recovery Technology that extracts nearly the total volume of CO2 gas content in flue gas streams. Key is the specially formulated extraction solvent which provides the CO2 Stack Gas Recovery Plant with reduced operating costs as a result of its CO2 gas extraction and loading capability compared to other competitive solvent mixtures.
- Combined with the specially formulated solvent, the CO2 Stack Gas Recovery System utilizes stainless steel process towers and pumps to ensure long and effective equipment life and reliable performance for years to come.

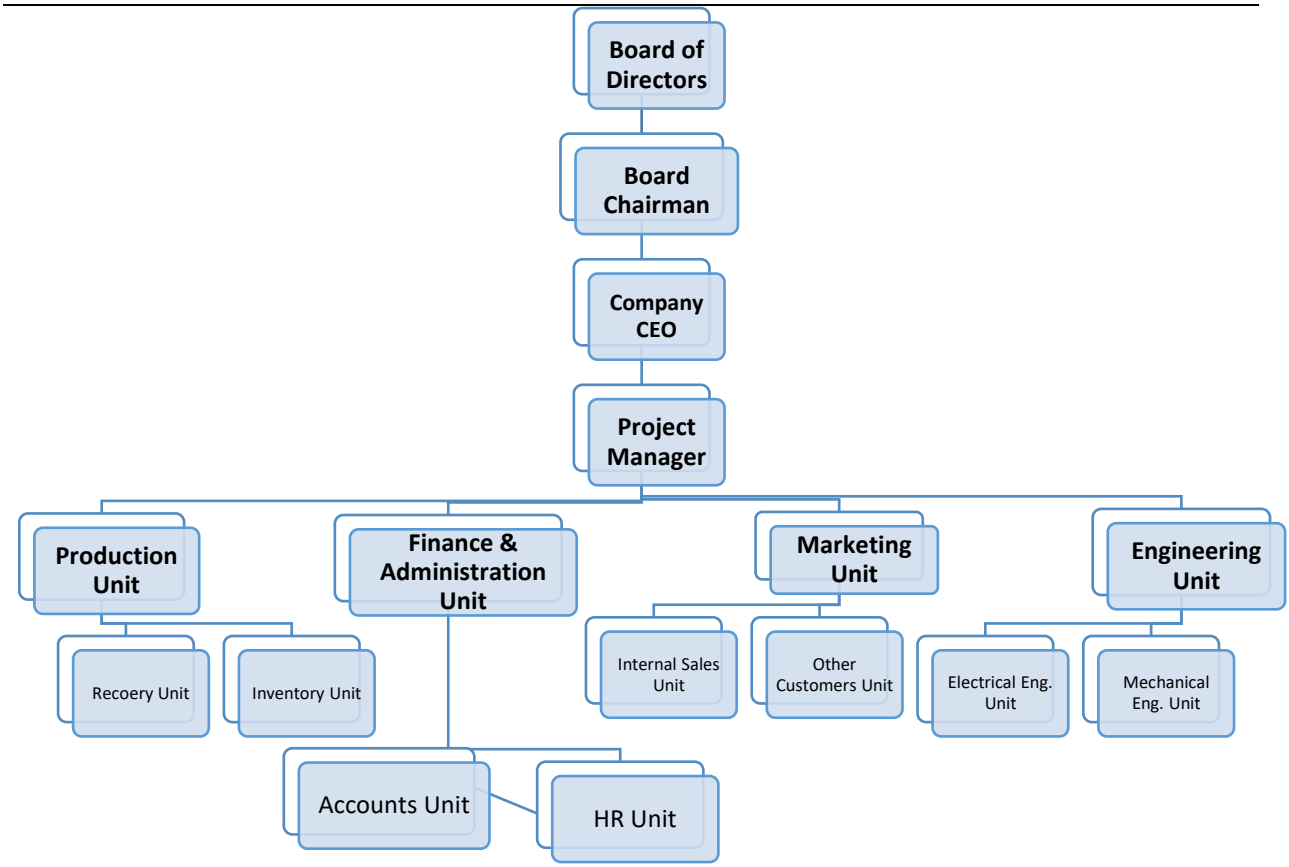
10.2 Production Process

- The Flue gas from boiler exhausts (be it existing, new or even power generators) contain combustion products like CO2, water vapor, N2, O2, CO, and possibly SO2 depending on the fuel being used.
- This flue gas, under the process, is first cooled and treated for SO2 effectively rendering a flue gas to a proper operating temperature and reaching an acceptable level of SO2 prior to entering the process of CO2 Gas extraction.
- Once cooled and treated the flue gas enters the CO2 stack gas recovery system for extraction of CO2 gas from the flue gas, using specially formulated absorption solvent combined with process towers and packing for best overall efficiency. These towers include the CO2 gas absorber and CO2 stripper.
- Once absorbed, the CO2 gas is carried away within the special solvent, and remaining products of combustion are vented off the top of the absorber tower.
- The solvent, enriched with CO2, is passed to the stripper tower which uses re-boiled lean solvent combined with tower and structured packing material to liberate the CO2 gas from the enriched solvent stream. The exit CO2 gas from the stripper is at a controlled temperature and pressure ready for further processing.
- CO2 gas processing from the CO2 Stack Gas Recovery System is completed with the efficient and high-quality supply of compression, purification, drying and liquefaction equipment typical of supply with the production and by-product recovery plants.

Management And Organisation

11.1 Organisation Structure

- The project will be under the general management of A-One Products. The company has a Board of Directors responsible for the major policy and strategic issues. The Board is comprised of members representing the shareholders and other non-shareholders.
- The daily management issues will be under the Project Manager (PM) who will be in-charge of all matters of the project. The PM will report to the company Chief Executive Officer (CEO).
- The PM will be assisted by different functional staff in Production, Finance and Administration, Marketing, and Engineering.
- The company's Organisation Chart is presented below:



11.2 Staffing

- The company is projecting to employ a total of 26-staff contingent excluding casual labourers. The staff contingent will comprise of the following:

    - Top management …..…… 2
    - Technical Staff ……. …….. 6
    - Workers ……. 18

- The project is expected to employ 60% women and 40% men.

11.3 Remuneration

- The project will pay salaries and wages to the workers at competitive rates. Additionally, the project will provide the workers with other benefits including lunch at work place, transport services and other benefits.

11.4 Manpower Training on Factory Operation

- The management will mostly employ experienced workers so that they can easily adopt the system and good practices involved in efficient running of the plant.
- The management will identify the training needs of all the technical staff and will install systematic and focused training programs and refresher courses.

11.5 Human Resources Development

- A-One Products in collaboration with other relevant stakeholders will provide training programs to workers on issues such as:
    - Plant maintenance
    - Plant operation and materials handling
    - CO2 Marketing and logistics
    - And other training courses

Implementation And Operational Plan

12.1 Implementing Agency

- The project will be implemented by A-One Products. The management of the company will undertake to organize all the aspects of the project including the following:
  - Undertake construction of buildings and civil works
  - Procurement of machinery and equipment
  - Arrange for installation and commissioning of the project.
  - Procurement of office equipment, furniture and fittings, utilities and motor vehicles.
  - Provide for payment of the pre-operating expenses and initial working capital for the proposed project.
  - Provide working capital for the variable and fixed costs of the project.
  - Finance all cost over-runs resulting from the project.

12.2 Implementation Plan

- The company sought to obtained the Proforma Invoices from suppliers of all the plant; and machinery; and installed of the plant.
- The buildings and civil works have been built using building specifications from the machinery supplier
- Except for the plant, the rest of the physical assets will be procured locally.

12.3 Operational Plan

- Upon completion of the implementation, A-One Products will undertake to manage and operate the project.
- The shareholders of the company will provide strategic and policy directives to the project.

Risks And Uncertainties

13.1 Delays in Project Implementation

- A number of factors may lead to delays in project commissioning including statutory documentations, funds mobilisation and timely disbursement as well as machinery delivery and installation works.
- The shareholders have great experience in the industrial sector and will follow closely with the government technocrats and policy makers to reduce delays in the project implementation. The company will ensure all conditions with the financing partners are timely addressed. On the machinery procurement and installations, the risks are minimized by the choice of the turnkey structure.

13.2 Inflation risks

There is a potential risk that inflation might increase at higher rates than projected. This may increase the price of the final products hence reduce the demand for the product. While this risk usually prevails in Developing Countries like Tanzania, the government appears committed to continue maintaining the macroeconomic stability and bring inflation further down.

13.3 Political risks

The government may from time-to-time issue new directives (on issues such as regulations of environmental safety) which may negatively impact on the project implementation and operations. This risk is strongly addressed by the fact that the Tanzania government has maintained long-term commitment of involving the private sector in policy decisions.

13.4 Managerial risks

Managerial risks – The management of CO2 gas recovery industry requires close supervision and expertise in production and marketing. The company will employ personnel with experience in the CO2 recovery industry in the fields of production and marketing.

Economic And Social Justification

14.1 Contribution to National Output

- The manufacturing sector in Tanzania is still relatively small but has a significant contribution to the country's overall GDP. Over the past decade the sector has averaged 8% of GDP and 4% annual growth rate.
- Most of the manufacturing activities is centered on simple consumer products such as foods, beverages, tobacco, textiles, chemicals, plastic, wood and steel allied products.
- The project will produce high-quality food grade CO2 gas for use in the food and beverage producing industries in the country.

14.2 Reduction of CO2 Emissions

- The growing concerns about climate change are intensifying interest in advanced technologies to reduce emissions in hard-to-abate sectors, such as cement, and also to draw down CO_2 levels in the atmosphere.
- High on the list is carbon capture, use, and storage (CCUS), the term for a family of technologies and techniques that do exactly what they say: they capture CO_2 and use or store it to prevent its release into the atmosphere.
- Through direct air capture (DAC) or bioenergy with carbon capture and storage (BECCS), CCUS can actually draw down CO_2 concentrations in the atmosphere—"negative emissions," as this is called. In some cases, that CO_2 can be used to create products ranging from cement to synthetic fuels.
- The project will draw CO2 generated from the company's beverage factory to produce value added food grade CO2 gas.

14.3 Employment Creation

- The project will generate direct and indirect employment. The project will create direct employment from direct workers to the CO2 recovery plant.
- Besides the local inputs, the project will create employment from the value chain including transporters of CO2 gas and suppliers of consumables to the proposed CO2 gas recovery project.

Financial And Economic Evaluation

15. Introduction

- This section presents the financial plan.
- The main objective of the financial analysis is to examine both commercial profitability and economic viability of the proposed project.
- The financial projections are divided into the following sections:
  - Investment and Financing Plans
  - Financial Results –
  - Machinery & Equipment Assumptions
  - Operations Assumptions

15.2 Financial Goals

The immediate financial goals of the company are as follows**:**

- Finance the investment costs through equity financing and external financing.
- Obtain funds from lending institutions to part-finance additional working capital.

15.3 Financial Assumptions

(i) General Financial Assumptions

- The currency of accounting is US Dollar
- The exchange rate of TZS to USD is assumed at TZS 2,500 to 1 USD.
- Financial projections for the first 10-years of operation have been worked out.
- Project Commissioning is within 1-year of project implementation.
- The project entails procurement and installation of machinery plants for producing food grade CO2 gas.

(ii) Investment Plan

- Projected Investment costs and financing plan are presented in Annex 5 (i), and the detailed investment plans are presented in Annexes 5 (ii)
- The total investment costs are estimated at USD 6.9 million which include the fixed assets, pre-operating costs and initial working capital as summarized below:

Annex 5 (i)

A-One Products & Bottlers Ltd

Food Grade CO2 Recovery Plant

PROJECTED INVESTMENT AND FINANCING PLANS

Investment Plan	Amount in USD			
	Additional Investment			TZS '000' Equivalents
	Year 1	Year 2	Total Additional	
Exchange Rate (USD/TZS)	2,500.00	2,500.00		
Land & Land Development	-	-	**-**	**-**
Buildings & Civil works	385,000	-	**385,000**	**962,500**
Plant & Machinery	4,375,824	-	**4,375,824**	**10,939,560**
Utilities	505,560	-	**505,560**	**1,263,900**
Motor Vehicles	526,900	-	**526,900**	**1,317,250**
Office Furniture & equipment	82,500	-	**82,500**	**206,250**
Pre-Operating costs	331,000	-	**331,000**	**827,500**
Total Capital Expenditure	**6,206,784**	**-**	**6,206,784**	**15,516,960**
Working Capital	-	705,293	705,293	**1,763,232**
Total Investment	**6,206,784**	**705,293**	**6,912,077**	**17,280,192**

(iii) Financing Plan

- The proposed financing structure of the project include shareholders' equity and external financing.
- The external financing shall include long-term loan and short-term working capital loan facilities. The external financing will account for about 54% of the total financing requirements and the shareholders will account for 46%.
- The external loans financing amount to USD 3.7 million and equity financing of USD 3.2 million as follows:

Financing Plan	Amount in USD			
	Additional Financing			TZS '000' Equivalents
	Year 1	Year 2	Total Additional	
Equity Financing				
Shareholders funds (capex)	3,206,784	-	3,206,784	**8,016,960**
Shareholders funds (W/capital)	-	-	-	**-**
Total Equity	**3,206,784**	**-**	**3,206,784**	**8,016,960**
External Financing				
Medium Term Loans				
Medium-Term Loan 1	3,000,000	-	3,000,000	**7,500,000**
Medium-Term Loan 2	-	-	-	**-**
Short-term Loans				
Bank Overdrafts	-	705,293	705,293	**1,763,232**
Other Short-term Facilities	-	-	-	**-**
Total External Financing	**3,000,000**	**705,293**	**3,705,293**	**9,263,232**
Total Financing	**6,206,784**	**705,293**	**6,912,077**	**17,280,192**
Exposure				
Equity Financing	52%	0%	46%	46%
External Financing	48%	100%	54%	54%

15.4 Operating Assumptions

(i) Depreciation Assumptions

- The Depreciation Schedules are presented in Annex 6.
- The depreciation and amortization rates are as indicated in the schedule.

(ii) Production Assumptions

- The projected production schedule is presented in Annex 7.
- The CO2 Recovery plant is assumed to operate for 12-months in a year and 30-days a month.
- The project will produce food grade CO2 gas for use in the beverages industries particularly industries producing carbonated soft drinks.
- The plant will have CO2 recovery capacity of 2,000 kg per hour, and the plant is projected to produce close to 12,000 MT of food grade CO2 gas per annum as summarized below:

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Production Assumptions							
CO2 Recovery							
Plant Operation	Hours/Day	-	24	24.0	24.0	24.0	24.0
	Days/Month	-	26	26	26	26	26
	Month/Year	-	12	12	12	12	12
	Days/Year	-	312	312	312	312	312
	Hours/Year	-	7,488	7,488	7,488	7,488	7,488
Plant Capacity		-					
CO2 Recovery	Kg/Hour	-	2,000	2,000	2,000	2,000	2,000
	Kg/Day	-	48,000	48,000	48,000	48,000	48,000
	MT/Month	-	1,248	1,248	1,248	1,248	1,248
	MT/Year	-	14,976	14,976	14,976	14,976	14,976
Plant Capacity Utilisation	%	-	75.0%	80.0%	80.0%	80.0%	80.0%
CO2 Recovered	Kg/Hour	-	1,500	1,600	1,600	1,600	1,600
	Kg/Day	-	36,000	38,400	38,400	38,400	38,400
	MT/Month	-	936	998	998	998	998
	MT/Year	**-**	**11,232**	**11,981**	**11,981**	**11,981**	**11,981**
Uses of Recovered CO2							
Internal Uses	MT/Day	-	20	23	25	25	25
	MT/Year	-	6,240	7,176	7,800	7,800	7,800
Commercial Sell of CO2 Gas	MT/Day	-	16	15	13	13	13
	MT/Year	-	4,992	4,805	4,181	4,181	4,181

(iii) Revenues Assumptions

- The projected revenues assumptions are presented in Annex 7.
- Product Pricing and prices –
    - The project has assumed the prices to increase by 2% annually and the initial ex-factory price of USD 450 per ton of CO2 gas.
    - The revenues are subjected to 18% Value Added Tax
    - The revenues are projected to increase by 2% annually due to the projected increase in annual price increases because production is assumed to remain at the same level throughout the years.

Projected Production							
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
CO2 Recovery							
Plant Capacity							
CO2 Recovery	Kg/Hour	-	2,000	2,000	2,000	2,000	2,000
	Kg/Day	-	48,000	48,000	48,000	48,000	48,000
	MT/Month	-	1,248	1,248	1,248	1,248	1,248
	MT/Year	-	14,976	14,976	14,976	14,976	14,976
Plant Capacity Utilisation	%	-	75.00%	80.00%	80.00%	80.00%	80.00%
CO2 Recovered	MT/Year	-	4,992	4,805	4,181	4,181	4,181

(iv) Operating Costs Assumptions

- The projected operating costs assumptions include direct and indirect operating costs and have been presented in Annex 8 and 9 respectively.
- The direct operating costs include costs related to purchase of chemicals (MEA Solvent), Soda Ash and KmNO4), utilities costs (electricity and steam), plant maintenance), labour and other direct costs.

Direct Operating Costs		
Chemicals -		
MEA Solvent	2.40	Kg/MT of CO2
Soda Ash	4.50	Kg/MT of CO2
KmNO4	0.27	Kg/MT of CO2
Utilities		
Electricity Consumed	244.00	KWh/MT of CO2
Steam Consumed	1,300.00	Kg/kg of CO2
Other Direct Costs		
Maintenance & Repair	7.50	USD/MT of CO2
Direct Labour Costs	18.00	USD/MT of CO2
Miscellaneous Costs	3.00	USD/MT of CO2

- The indirect operating costs include salaries and staff benefits, administration expenses and marketing and selling costs.
- The projected operating costs are as summarized below.

Projected Operating Costs		Amount in USD					
		Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Direct Operating Costs							
Chemicals -							
MEA Solvent	USD/Year	-	61,102	59,987	53,240	54,305	55,391
Soda Ash	USD/Year	-	33,696	33,081	29,361	29,948	30,547
KmNO4	USD/Year	-	21,565	21,172	18,791	19,167	19,550
Utilities							
Electricity	USD/Year	-	121,805	119,582	106,133	108,255	110,421
Steam	USD/Year	-	168,730	165,650	147,020	149,960	152,960
Other Direct Costs							
Maintenance & Repair	USD/Year	-	37,440	36,757	32,623	33,275	33,941
Direct Labour Costs	USD/Year	-	89,856	88,216	78,295	79,861	81,458
Miscellaneous Costs	USD/Year	-	14,976	14,703	13,049	13,310	13,576
Direct Operating Costs	**USD/Year**	**-**	**534,194**	**524,445**	**465,462**	**474,771**	**484,267**
Indirect Operating Costs							
Salaries & Staff Benefits	USD/Year	-	164,400	167,688	171,042	174,463	177,952
Administrative Expenses	USD/Year	-	426,000	434,520	443,210	452,075	461,116
Marketing & Selling expenses	USD/Year	-	582,000	593,640	605,513	617,623	629,976
Indirect Operating Costs	**USD/Year**	**-**	**1,172,400**	**1,195,848**	**1,219,765**	**1,244,160**	**1,269,043**
Operating Costs	**USD/Year**	**-**	**1,706,594**	**1,720,293**	**1,685,227**	**1,718,931**	**1,753,310**
Operating Costs/MT of CO2	USD/MT	-	345	361	406	414	423
% of Revenues	%	-	42%	38%	36%	36%	36%

15.5 Financial Results

- The financial results are presented in the Profit and Loss Statements and Cash-flow Statements and Balance Sheets.

(i) Projected Profitability

- Profitability of the project has been carried out and presented in Annex 1.
- The analysis of the profitability of the overall project indicates that the project is a profitable undertaking with short-term returns to the investors.
- The summary of the projected Profit and Loss Statements for the first 10-years of operation is presented.

ANNEX 1

A-One Products & Bottlers Ltd

Food Grade CO2 Recovery Plant

Projected Profit &Loss Statements

Amount in USD

	Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Projected Revenues							
Commercial Sell of CO2 Gas		-	1,996,800	1,960,358	1,739,882	1,774,679	1,810,173
Less: Value Added Tax (VAT)	18%	-	(359,424)	(352,865)	(313,179)	(319,442)	(325,831)
Savings - (Internal Uses)		-	2,496,000	2,927,808	3,246,048	3,310,969	3,377,188
Net Revenues		**-**	**4,133,376**	**4,535,302**	**4,672,751**	**4,766,206**	**4,861,530**
Revenue Growth		-	-	10%	3%	2%	2%
Direct Operating Costs							
Chemicals -		-	116,364	114,240	101,392	103,419	105,488
Utilities		-	290,534	285,232	253,153	258,216	263,380
Maintenance & Repair		-	37,440	36,757	32,623	33,275	33,941
Direct Labour Costs		-	89,856	88,216	78,295	79,861	81,458
Miscellaneous Costs		-	14,976	14,703	13,049	13,310	13,576
Total Direct Operating Costs		**-**	**549,170**	**539,148**	**478,511**	**488,081**	**497,843**
Gross Profits/(Loss)		**-**	**3,584,206**	**3,996,154**	**4,194,240**	**4,278,125**	**4,363,687**
Gross Margins		-	87%	88%	90%	90%	90%
Indirect Operating Costs							
Salaries & Staff Benefits		-	164,400	167,688	171,042	174,463	177,952
Administrative Expenses		-	426,000	434,520	443,210	452,075	461,116
Marketing & Selling expenses		-	582,000	593,640	605,513	617,623	629,976
Exchange Loss		-	-	-	-	-	-
Total Indirect Operating Costs		**-**	**1,172,400**	**1,195,848**	**1,219,765**	**1,244,160**	**1,269,043**
EBITDA		**-**	**2,411,806**	**2,800,306**	**2,974,475**	**3,033,965**	**3,094,644**
EBITDA Margins		-	58%	62%	64%	64%	64%
Depreciation & Amortisation		-	315,185	283,621	257,454	262,041	238,622
Profit Before Interest + Tax		**-**	**2,096,621**	**2,516,685**	**2,717,021**	**2,771,924**	**2,856,022**
Loans Interest Expenses							
Medium Term Loans							
Medium-Term Loan 1		-	240,000	180,000	120,000	60,000	-
Medium-Term Loan 2		-	-	-	-	-	-
Short-term Facilities		-	70,529	76,757	77,880	79,438	81,027
Total Interest Expenses		**-**	**310,529**	**256,757**	**197,880**	**139,438**	**81,027**
Profit/(Loss) Before Tax		**-**	**1,786,092**	**2,259,928**	**2,519,141**	**2,632,486**	**2,774,995**
Provision Corporate Tax	30%	-	535,827	677,978	755,742	789,746	832,499
Net Profit/(Loss)		**-**	**1,250,264**	**1,581,950**	**1,763,399**	**1,842,740**	**1,942,497**
Net Margins		-	30%	35%	38%	39%	40%

(ii) Projected cash flow Statements

- The projected cash flows statements are presented in Annex 2.
- The project will have cashflow surplus from the first year of operation and will continue to be positive in the subsequent years.

ANNEX 2

A-One Products & Bottlers Ltd

Food Grade CO2 Recovery Plant

Projected Cash Flow Statements

	Amount in USD					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Cash Inflows						
Equity Financing						
Shareholders funds (capex)	3,206,784	-	0	0	0	0
Shareholders funds (W/capital)	-	-	0	0	0	0
Retained Earnings	-	-	-	-	-	-
Equity Financing	**3,206,784**	**-**	**0**	**0**	**0**	**0**
External Financing						
Medium-Term Loan 1	3,000,000	-	-	-	-	-
Medium-Term Loan 2	-	-	-	-	-	-
Short-term Loans	-	-	-	-	-	-
External Financing	**3,000,000**	**-**	**-**	**-**	**-**	**-**
Sales Revenues						
Commercial Sell of CO2 Gas	-	1,996,800	1,960,358	1,739,882	1,774,679	1,810,173
Less: Value Added Tax (VAT)	-	(359,424)	(352,865)	(313,179)	(319,442)	(325,831)
Savings - (Internal Uses)	-	2,496,000	2,927,808	3,246,048	3,310,969	3,377,188
Net Sales Revenues	**-**	**4,133,376**	**4,535,302**	**4,672,751**	**4,766,206**	**4,861,530**
Total Inflaws	**6,206,784**	**4,133,376**	**4,535,302**	**4,672,751**	**4,766,206**	**4,861,530**
Cash Outflows						
Capital Investment						
Land & Land Development	-	-	-	-	-	-
Buildings & Civil works	385,000	-	-	-	-	-
Plant & Machinery	4,375,824	-	-	-	-	-
Utilities	505,560	-	-	-	-	-
Motor Vehicles	526,900	-	-	131,725	-	-
Office Furniture & equipment	82,500	-	-	-	-	-
Pre-Operating Expenses	331,000	-	-	-	-	-
Capital Investment	**6,206,784**	**-**	**-**	**131,725**	**-**	**-**
Change in Working Capital	-	705,293	62,278	11,231	15,576	15,888
Operating Costs						
Direct Operating Costs	-	549,170	539,148	478,511	488,081	497,843
Indirect Operating Costs	-	1,172,400	1,195,848	1,219,765	1,244,160	1,269,043
Loans Interest Expenses						
Medium Term Loans						
Medium-Term Loan 1	-	240,000	180,000	120,000	60,000	-
Medium-Term Loan 2	-	-	-	-	-	-
Short-term Facilities	-	70,529	76,757	77,880	79,438	81,027
Total Interest Expenses	**-**	**310,529**	**256,757**	**197,880**	**139,438**	**81,027**
Loans Principal Repayment						
Medium-Term Loan 1	-	750,000	750,000	750,000	750,000	-
Medium-Term Loan 2	-	-	-	-	-	-
Total Principal Repayment	**-**	**750,000**	**750,000**	**750,000**	**750,000**	**-**
Corporate Tax	-	535,827	677,978	755,742	789,746	832,499
Dividends	**-**	**-**	**-**	**-**	**-**	**-**
Total Cash Outflows	**6,206,784**	**4,023,219**	**3,482,009**	**3,544,855**	**3,427,001**	**2,696,299**
Net Cash Flows	**-**	**110,157**	**1,053,293**	**1,127,896**	**1,339,205**	**2,165,231**
Opening Cash Balance	-	-	110,157	1,163,449	2,291,346	3,630,551
Closing Cash Balance	**-**	**110,157**	**1,163,449**	**2,291,346**	**3,630,551**	**5,795,782**
TZS Equivalents (in 'million')	-	275	2,909	5,728	9,076	14,489

(iii) Projected Balance Sheets

- The projected balance sheet is presented in Annex 3.
- The projected balance sheet shows that the net physical assets are decreasing overtime due to depreciation. The total net assets increase overtime due to increased net current assets over time. The project will have positive net current assets throughout the project life-time.

ANNEX 3

A-One Products & Bottlers Ltd

Food Grade CO2 Recovery Plant

Projected Balance Sheets

Amount in USD

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fixed Assets						
Fixed Assets	6,206,784	6,206,784	5,891,599	5,739,703	5,482,249	5,220,208
Less: Depreciation	-	315,185	283,621	257,454	262,041	238,622
Total Net Capital Assets	**6,206,784**	**5,891,599**	**5,607,978**	**5,482,249**	**5,220,208**	**4,981,586**
Current Assets:						
Cash Balances	-	110,157	1,163,449	2,291,346	3,630,551	5,795,782
Trade Debtors	-	509,594	559,147	576,093	587,614	599,367
Advance Payments	-	45,137	44,313	39,330	40,116	40,919
Inventories	-	190,114	205,322	208,369	212,536	216,787
Other Current assets	-	45,137	44,313	39,330	40,116	40,919
Total Current Assets	**-**	**900,139**	**2,016,546**	**3,154,467**	**4,510,934**	**6,693,773**
Current Liabilities:						
Trade Creditors	-	15,046	14,771	13,110	13,372	13,640
Administrative Expenses	-	35,014	35,714	36,428	37,157	37,900
Marketing & selling costs	-	7,973	8,132	8,295	8,461	8,630
Accruals	-	-	-	-	-	-
Direct Labour	-	7,385	7,251	6,435	6,564	6,695
Other Current Liabilities	-	19,272	19,658	20,051	20,452	20,861
Total Current Liabilities	**-**	**84,690**	**85,526**	**84,319**	**86,005**	**87,725**
Net Current Assets	**-**	**815,449**	**1,931,020**	**3,070,148**	**4,424,929**	**6,606,048**
Total Net Assets	**6,206,784**	**6,707,048**	**7,538,998**	**8,552,396**	**9,645,137**	**11,587,633**
Financed By:						
Equity Financing						
Shareholders funds (capex)	3,206,784	3,206,784	3,206,784	3,206,784	3,206,784	3,206,784
Shareholders funds (W/capital)	-	-	-	-	-	-
Profit/Loss Account	0	1,250,264	2,832,214	4,595,612	6,438,353	8,380,849
Total equity	**3,206,784**	**4,457,048**	**6,038,998**	**7,802,396**	**9,645,137**	**11,587,633**
External Financing						
Medium-Term Loan 1	3,000,000	2,250,000	1,500,000	750,000	-	-
Medium-Term Loan 2	-	-	-	-	-	-
Short-term facilities (O/D, etc.)	-	-	-	-	-	-
Total external financing	**3,000,000**	**2,250,000**	**1,500,000**	**750,000**	**-**	**-**
Total Financing	**6,206,784**	**6,707,048**	**7,538,998**	**8,552,396**	**9,645,137**	**11,587,633**

(iv) Other Economic Benefits

- Tax Income –
    - The project will pay income taxes, property taxes, corporate taxes and other taxes to the government.

- Dividends –
    - The shareholders will receive dividends from the project.

- Jobs Creation –
    - The project will create more than 26 direct jobs and 0ver 100 indirect employments.

- Industrial development –
    - The project will add to the stock of industries to the economy. Tanzania is in a great need for industrial development, an important factor for the country's economic growth and development.

(v) General Comments

- The project financial and economic analysis suggests that the project is financially viable and economically feasible. The project will be able to meet its financial obligations from internally generated incomes.
- The project will be able to pay-back to the equity investors from the incomes generated from sale of its finished products.

Finance Requirements

16.1 Introduction

- A-One Products is investing in the Food Grade CO2 Recovery by establishment of new CO2 extraction plant at an estimated cost of USD 6.2 million on capital expenditure and USD 0.7 million for initial working capital.
- The promoters will inject equity to the tune of USD 3.2 million to part-finance the project and the balance will come from external sources (USD 3.7 million).

16.2 Funds Required

- The project will require a total of USD 6.9 million as cash requirements for the project implementation. The project's funds requirements are as follows:

Annex 5 (i)

A-One Products & Bottlers Ltd

Food Grade CO2 Recovery Plant

Financing Plan	Amount in USD			
	Additional Financing			TZS '000' Equivalents
	Year 1	Year 2	Total Additional	
Equity Financing				
Shareholders funds (capex)	3,206,784	-	3,206,784	**8,016,960**
Shareholders funds (W/capital)	-	-	-	**-**
Total Equity	**3,206,784**	**-**	**3,206,784**	**8,016,960**
External Financing				
Medium Term Loans				
Medium-Term Loan 1	3,000,000	-	3,000,000	**7,500,000**
Medium-Term Loan 2	-	-	-	**-**
Short-term Loans				
Bank Overdrafts	-	705,293	705,293	**1,763,232**
Other Short-term Facilities	-	-	-	**-**
Total External Financing	**3,000,000**	**705,293**	**3,705,293**	**9,263,232**
Total Financing	**6,206,784**	**705,293**	**6,912,077**	**17,280,192**
Exposure				
Equity Financing	52%	0%	46%	46%
External Financing	48%	100%	54%	54%

16.3 Sources and Uses of Funds

- The project will utilize the equity and external sources of funds for buildings and civil works, plant and machinery, working capital and other support facilities as summarized below:

Food Grade CO2 Recovery Plant

Sources and Uses of Funds

	Amount in USD		
	Year 1	**Year 2**	**Total**
Equity Financing			
Land & Land Development	-	-	-
Buildings & Civil works	385,000	-	385,000
Plant & Machinery	1,375,824	-	1,375,824
Utilities	505,560	-	505,560
Motor Vehicles	526,900	-	526,900
Office Furniture & equipment	82,500	-	82,500
Pre-Operating costs	331,000	-	331,000
Working Capital	-	-	-
Equity Financing	**3,206,784**	**-**	**3,206,784**
External Financing			
Land & Land Development	-	-	-
Buildings & Civil works	-	-	-
Plant & Machinery	3,000,000	-	3,000,000
Utilities	-	-	-
Motor Vehicles	-	-	-
Office Furniture & equipment	-	-	-
Pre-Operating costs	-	-	-
Working Capital	-	705,293	705,293
External Financing	**3,000,000**	**705,293**	**3,705,293**
Total Financing	**6,206,784**	**705,293**	**6,912,077**
Exposure			
Equity Financing	52%	0%	46%
External Financing	48%	100%	54%

16.4 Proposed Terms and Conditions

- The project is seeking for USD 3,000,000 external finance facilities in the form of long-term loan and USD 0.705 million in the form of short-term working capital facilities including Bank Overdraft loans/Letters of credits and other facilities.
- The Loan Repayment Schedule is presented in Annex 10.
- The following are the proposed Terms and Conditions of the proposed Term Loan:

Type of facility	Long-term Loan
Loan Currency	➢ United States Dollar (USD)
Loan Amount	➢ 3,000,000
Moratorium period	➢ 12- months on Principal and Interest
Mode of disbursement	➢ Direct disbursement to the account of promoters/supplier/ contractors/consultants
Loan tenure	➢ 5-years excluding 1-year of grace on Principal
Mode of repayment	➢ Quarterly Payments from sale of the products
Interest rate	➢ Floating rate of 8% p.a.

16.5 Security of the loan

- The collateral offered against the requested loan is all assets of the proposed project.