INVESTMENT APPRAISAL REPORT FOR THE PROPOSED ESTABLISHMENT OF CARBON DIOXIDE EXTRACTION AND PROCESSING PLANT WITHIN BUSONA AND NDITU VILLAGES, SUMA WARD, RUNGWE DISTRICT IN MBEYA REGION

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DECEMBER 2022

Simba Gas Company Limited is a
Subsidiary Of Simba Group Of Companies

SIMBA GROUP OF COMPANIES

Simba Group of Companies (SGC) ambition is to be a leader in Sub-Sahara Africa towards service delivery and manufacturing industry, deliver long term performance and contribute to sustainability - with a solid commitment to climate change and energy transition at the heart of its strategy. The company's customer-centric transformation strategy aims at profitable, regular, and responsible growth over the long term. It relies on operational excellence, selective investments, open innovation, and a network organization implemented by the Group worldwide. Through the commitment and inventiveness of its people, Simba Group leverages logistics supply chain experience, technological transitions changes, and improvements in industrial automation and digitization and delivers more excellent value to all its stakeholders

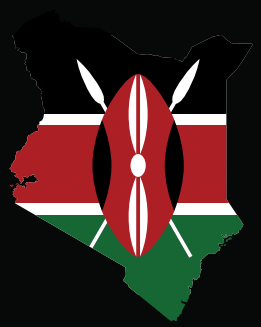
Simba Group of Companies does business in more than five countries worldwide. It employs over 1000+ people and operates in Tanzania, Zambia, Kenya, Ireland, and UAE. It plans on expanding its borders to other countries.

Simba Group has various chains of businesses, including; Oil and Gas, Logistics and Supply, Cash crops, Horticulture Products Exports, International Freight Forwarding, Money Transfer services, Manufacturing of processed foods, constructions materials, and Distribution of industrial Products. Provision of Managed services, Insurance, Equipment, and forecourt Maintenance services as well as ICT and Technology

OPERATIONAL BASE

TANZANIA

Oil & Gas,
Logistics Supply chain
Food Processing
Cash In Transit
Custom Clearing and Forwarding
Industrial Manufacturing



KENYA

Oil & Gas,
Logistics Supply chain
Food Processing
Cash In Transit
Custom Clearing and Forwarding
Industrial Manufacturing

ZAMBIA

Oil & Gas,
Logistics Supply chain
Food Processing
Cash In Transit
Custom Clearing and Forwarding
Industrial Manufacturing

UAE

Money transfers
Card business
& Retail Payment Systems
Payroll solutions
Cargo Consolidation
Freight Forwarding

LITHUANIA

Money Transfers &
Remitance

SIMBA GROUP EVOLUTION

SIMBA GROUP PORTFOLIO

OUR SOLUTIONS

- Oil & Gas
- Logistic Supply chain
- Manufacturing and Food processing
- Fintech
- Healthcare
- Banking services and CIT
- Food reserve and Storage


Simbagas

EXECUTIVESUMMARY

This study attempted to assess the feasibility of establishment of Carbon dioxide extraction and processing plant within Busona and Nditu villages, Suma ward, Rungwe district in Mbeya region. It used desk review information, site analysis and financial analysis to examine the economic, social and environmental viability of the project.

Since its establishment in 2000, Simba Gas Company has undertaken several steps towards business expansion and addressing constraints across the sectors. Given the observed high market demand for gas products and the opportunity of available reserves of natural gas in Tanzania, this motivates Simba Gas Company to invest in the sector.

The feasibility study analyzed the current situation with regards to the gas industry as well as a site full analysis of CO2 feed Gas, the pre-environmental impact assessment and economic viability of the project.
The study employed several techniques and tools to collect primary and secondary data from various sources including Government authorities and private sector stakeholders. Desk review of information regarding the proposed investment was done through the information given by the client and from other relevance sources including Government offices responsible to the Gas sector. The full site analysis of CO2 feed Gas was carried out in accordance with the ISBT specification to analyze hazardous gas.

Cost benefit analysis was also used to illustrate the financial gains or losses through the implementation of the proposed project. Specifically, the analysis examined the financial viability, the Net Present Value, Internal rate of return (IRR), Benefit cost ratio and Payback period.
The pre-environmental impact assessment was also undertaken to assess the environmental feasibility of the project.

The findings showed that despite global shocks in the industry following the lockdown during and after COVID-19 pandemic outbreak in 2019 through 2021 which resulted in slow down of various economic activities and this later followed by the disputes in Ukraine and Russia resulting in uncalled for War circumstances, the potential future demand of gas industry is strongly yet expected to improve.
This study found that the determinants of the ever increasing demand of gas products are increase in population, GDP, energy prices and the development of processing industries (especially Beverages).

EXECUTIVE SUMMARY

The conclusions drawn from the full site analysis of CO2 feed gas carried out in accordance with the ISBT specification was that "All Parameters are within a range, no Hazardous Gas detected"
The analysis of the economic feasibility of the project revealed that the project is economically feasible with payback period of 7 years, BC Ratio of greater than one; project IRR of 15% and a positive NPV of USD 1,590,281. With this analysis and considering the nature of the project, financing the project is therefore highly recommended.
In assessing the pre-environmental impacts of the project it was showed that the implementation of the project has less negative environmental impacts and has positive benefits that would improve community wellbeing. The benefits to be realized from the proposed project are expected to outweigh environmental and social costs. The Project presents opportunities for employment and improvement of the local economic conditions and will contribute to the national income. Furthermore, it will contribute to increased stability of the deficit supply and distribution of carbon dioxide gas products both domestically and exportation to neighboring countries, thus building on forex serves for the country through various charges, levies and appropriate taxes.
This study therefore concluded that the project is considered to be technically, environmentally and economically feasible. It is hoped that the establishment of the Carbon dioxide extraction and processing plant will propel fast economic development for the communities and the national at large.
This study also recommends that;

1) given the existing products and foreseen products resulting from the new plant, the company is highly recommended to focus on the following CO2 Gas products:

- Beverage Grade Carbon Dioxide (CO2) Gas
- dry Ice
- Fire Extinguisher and Compressed Carbon Dioxide (Co2) Cylinder
- Blast Cleaning Services

However the following approach should be taken into consideration while focusing to the above recommended products:

- Review market size in Tanzania and across East African and SADC blocks
- Capitalize on existing and improve customers base
- Leverage on improved scale, quality and better prices
- Use media and agents across countries
- Weekly and quarterly performance reviews with formal annual key performance indicators (KPIs) and key performance assessments (KPAs).

2) Furthermore, Simba Gas company should also:

- Furnish a detailed technical design for the plant, including water treatment/disposal system.
- Develop an extensive monitoring programme of the plant.
- Undertake a full Environmental Impact Assessment.
- Intensify communication with the public to bring confidence in the technology at stake.

CHAPTER 1

INTRODUCTION AND RATIONALE

INTRODUCTION AND RATIONALE

1.1 Background information

Simba Gas Company Limited is a Subsidiary of Simba Group of Companies with its operations more than five countries worldwide. The operations of Simba Group of Companies in Tanzania started in 2000 and the company has undergone a significant business evolution where with other business lines Simba Gas Company Limited was established in 2021. The company employs over 1000 people and operates in Tanzania, Zambia, Kenya, Ireland, and UAE. It plans on expanding its borders to other countries. Simba Group has various chains of businesses, including; Oil and Gas, Logistics and Supply, Cash crops, Horticulture Products Exports, International Freight Forwarding, Money Transfer services, Manufacturing of processed foods, constructions materials, and Distribution of industrial Products. Provision of Managed services, Insurance, Equipment, and forecourt Maintenance services as well as ICT and Technology.

Simba Gas is specialized in Natural Carbon Dioxide (CO2) Gas extraction; its gas is food grade and world standard (99.99% purity). The company offers a complete line of Carbon Dioxide (CO2) products to beverage, food, and brewery industries throughout the Region. The CO2 is Halal certified and the company can offer quality Carbone Dioxide (CO2) Gas at affordable prices. provides gas cylinders for cooking in residential, restaurants and hotels. It also offer gas for industrial applications in powering industrial ovens,

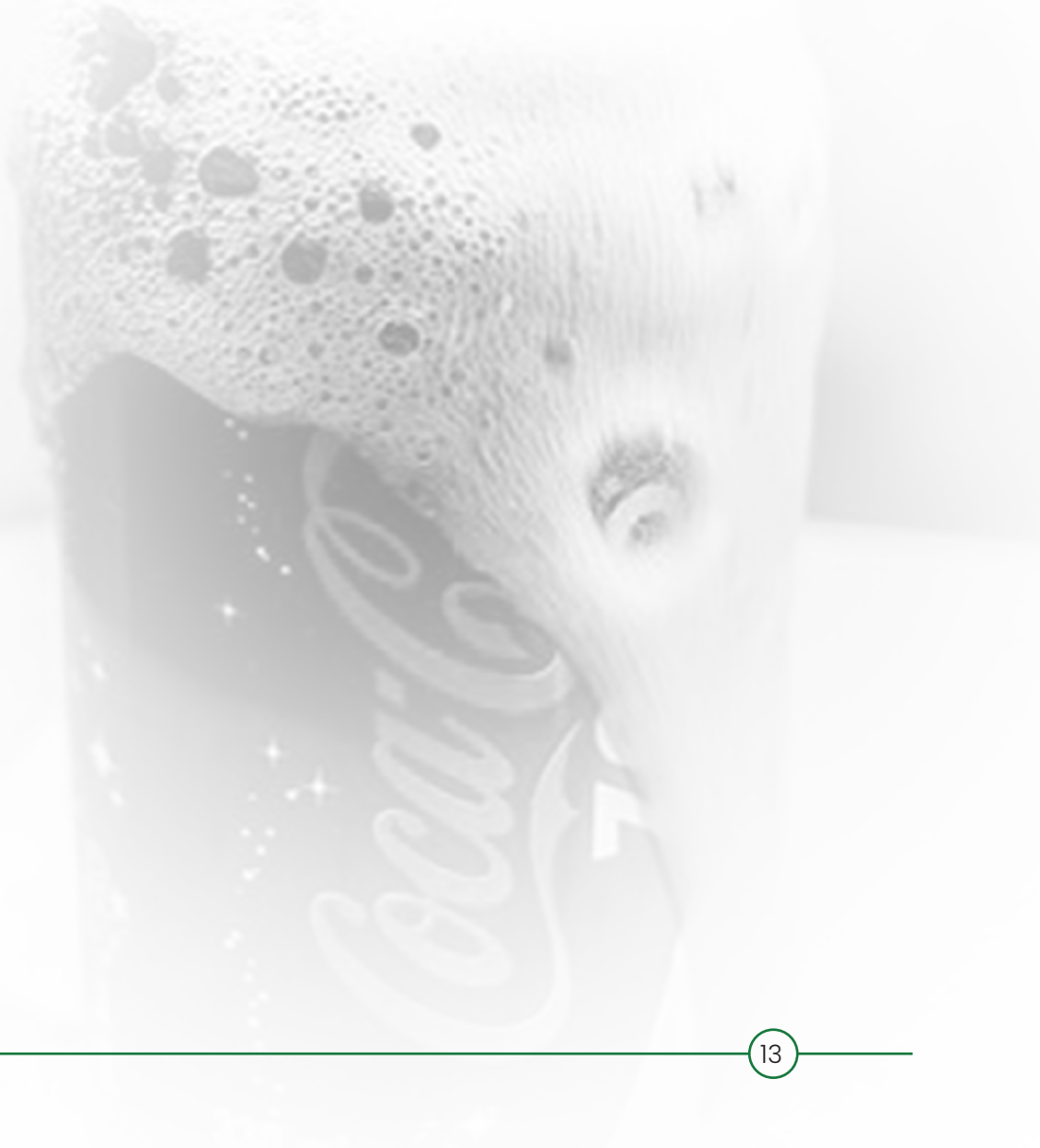
INTRODUCTION AND RATIONALE

1.2 Company Products

The company produces and sales a range of products which include:

- Liquefied Petroleum Gas (LPG): The LP Gas is the most versatile, portable, clean, accessible, and efficient energy source, readily available to consumers around the region and used in thousands of applications.
- LPG cylinder: The Company heating, metal melting and steam generation
- Carbon Dioxide (CO2) Gas: Simba Gas provides Carbon Dioxide (CO2) with colourless, odourless and non-flammable gas. The company also offers compressed carbon dioxide and liquid Carbon Dioxide (CO2) of world standard with a purity of 99.99%.

Simba Gas Company Limited is currently focused on supplying its products in 9 African countries and will be extending the market to reach many more countries within EAC and SADC region. The targeted countries are Zambia, Congo, Zimbabwe, South Africa, Botswana, Malawi, Rwanda, Burundi and Uganda.



1.3 Rationale for the proposed Project

Gas industry is undergoing rapid transformations across the world. Innovations of new technologies have allowed unconventional drilling that enhances gas production. New business models and services are rapidly evolving and assisting to reduce the cost of operations in upstream gas, which in turn promotes the market growth. Increasing exports and imports of gas on the account of surged demand across the world are fueling the market growth. The Global gas demand is expected to expand its share
across major markets. The gas companies will need to expand their production to meet emerging demand in the foreseeable future.

In Tanzania industrial trends, the desire of industrial economy and social-political environment, policies, government support, the recovering gas prices, strong demand from the transportation industry and fairly receptive population growth. Recently there have been reasonably mass awareness, sustained and steady consumption trends of gas energy, understanding of business requirements by market players and the modern developments of gas exploration and production activities. Overall some of the major factors driving the gas industry and encouraging the companies to boost their investments as the market continues to adopt and fully utilize gas products. What remains now is for local and international investors to continue accessing investments sources with well-calculated risks and sustainably approach gas industry investments; this is exactly what SIMBA Gas is doing and welldetermined to implement the same for many years to come.

According to EWURA Report (2020), Puma and Total were the main leaders on oil marketing companies (OMCs) operating in Tanzania. Their market shares were 13.6% and 12.6% respectively. Oryx Energy and GBP were third and fourth in terms of market shares; these two companies were commanding 8.9 % and 8.7% respectively. The top eight lists was made up by Moil 8.5%, Oil com 6.8% and Camel oil 6.7% while the rest companies all put together count for 34.2% of market share. Overall competition in the gas and oil business has intensified, showing that eight oil and marketing companies (OMCs) control around 65.8% of the Tanzanian market. The dominance driven by the major players is largely attributed to robust investments in the downstream of supply chains and distributions, ownership of storage terminals, retails networks with logistic companies as well as branding and loyalty in the market.

Over the last few years, Tanzania has attracted a great deal of global attention following the discovery of huge reserves of natural gas. As such in accordance with EWURA and national plans, the gas energy is assumed as an essential lifeline of sustainable development across different sectors. Precisely speaking, recently, the industry has recorded various dynamics following the lockdown during and after COVID-19 pandemic outbreak in 2019 through 2021 which resulted in slow down of various economic activities and this later followed by the disputes in Ukraine and Russia resulting in uncalled for War circumstances. Despite such global shocks, the potential future demand of gas industry is strongly yet expected to improve.

Given the observed high market demand for gas products and the opportunity of available reserves of natural gas in Tanzania, requirement of a serious investment is a necessity. This is what motivates Simba Gas Company to invest in the sector.

Therefore, Simba Gas Company commissioned EMMAC Investments Consulting Limited to conduct a feasibility study on the establishment of carbon dioxide extraction and processing plant within Busona and Nditu villages, Suma ward, Rungwe district in Mbeya region.

As part of this feasibility study, an evaluation of the current situation with regards to the gas industry as well as site full analysis of CO2 feed Gas, the pre-environmental impact assessment and economic analysis was conducted. This study will serve as the basis for future planning decisions relative to Simba Gas Company's operations.

1.4 Objectives of the Study

The purpose of this study is to investigate the viability of establishing of carbon dioxide extraction and processing plant within Busona and Nditu villages, Suma ward, Rungwe district in Mbeya region. The study will therefore assess the feasibility of establishing this plant and to make recommendations on the technical, legal, environmental and social-economic issues to be addressed.

Specifically, the key activities in undertaking the study included to:

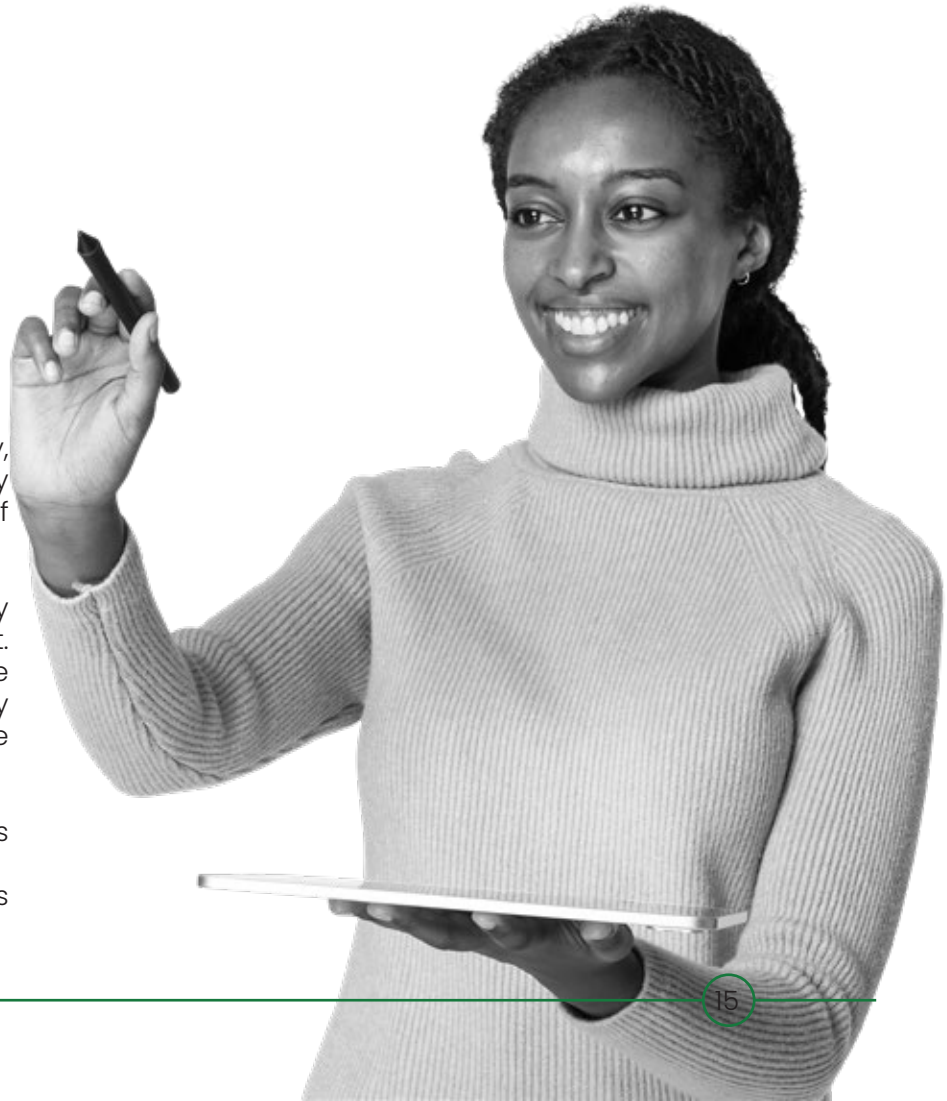
i) Analyse the current situation with regards to the Gas industry in Tanzania,
ii) Undertake a full site analysis of CO2 feed Gas,
iii) Analyze the emerging market of Gas products,
iv) Analyze the economic viability of the project,
v) Undertake pre-environmental impact assessment,
vi) Propose monitoring and follow-ups, and
vii) Draw recommendations.

1.5 Report Structure

The report is structured as follows:
Chapter one is an Introduction including background information of the Company, rationale and scope of the proposed project, Chapter 2 provide the study methodology employed. Chapter 3 describes the findings of a full site analysis of CO2 feed Gas.

Chapter 4 provides the analysis of the emerging market of Gas products globally and locally. Chapter 5 provides the analysis of the economic viability of the project. It details an assessment of the potential financial benefits of the project; the methodology used is the cost-benefit analysis and assesses the economic viability of the proposed project. The section presents the risk and sensitivity analysis of the proposed project.

Chapter 6 provides the pre-environmental Impact Assessment. Chapter 7 Presents the Monitoring and
follow-ups of the project. Chapter 8 draws the conclusions and recommendations of the study.



CHAPTER 2

METHODOLOGY

METHODOLOGY

The study used several techniques and tools to collect primary and secondary data from various sources including Government authorities and private sector stakeholders.

Desk review of information regarding the proposed investment was done through the information given by the client and from other relevance sources including Government offices responsible to the Gas sector.

The full site analysis of CO2 feed Gas was carried out accordance with the ISBT specification to analyze hazardous gas.

Cost benefit analysis was the second phase of the study focused on the Net Present Value, Internal rate of return (IRR), Benefit cost ratio and Payback period to illustrate the financial gains or losses through the implementation of the proposed project.

The pre-environmental impact assessment was also undertaken to assess the environmental feasibility of the project.

CHAPTER 3

FULL SITE ANALYSIS OF CO2 FEED GAS

FULL SITE ANALYSIS OF CO2 FEED GAS

3.1 Introduction

CO2 Feed Gas Profiling is an essential element of any study concerning the economic potential of new CO2 industrial source as well as monitoring if any changes in composition are occurring in an existing stream. Unexpected changes in feed gas composition are major cause of quality upset in the production of beverages-grade liquid CO2.a wide variety of Feed Gas sources are employed for worldwide, commercial production of liquid CO2. Each source its own unique potential impurities that must be identified and monitored by proper analysis program. Further information about potential impurities present in common CO2 Feed Gas streams can be obtained from ISBT, CGA and EIGA publication.

Not only is obtaining a % co2 value important in all cases, but thorough analysis can also provide critical information about the types present. The impurity data is crucial for the proper design of any new Co2 production plant and also vital for active plants in order to ensure that affective impurity removal can be maintained should the impurities load increase over time

For existing sources, ISBT 2010 Bulk co2 Quality Guideline recommends that at least 1 feed gas analysis be performed per year and more frequently depending source variability (exchange underground well source). Major beverage manufactures also mandate periodically feed gas monitoring from the co2 suppliers and established required analytical programs based upon potential impurities that can be encountered from a specific source.

Customer need to select a test program that is optimal for their feed gas source and program objective (ex. new plant design, evaluation of sources commercial viability, contractual, compliance of purchased stream, bottle requirement, risk assessment, etc.)

3.2 Measure equipment

Feed Gas are measured by four equipment

CARBOSCAN

TELEDYNE

ZAHM & NAGEL PURITY TESTER

3.3 Results

Full analysis report

Parameter	Result	Comments
Co2 Identification	+ Positive	RESULTS ARE GOOD
Nv & Nvor	Not Detected	RESULTS ARE GOOD
Sulfur Dioxide	O.076	RESULTS ARE GOOD
Carbonyl sulfide	Not Detected	RESULTS ARE GOOD
Mercury	Not Detected	RESULTS ARE GOOD
Benzene	Not Detected	RESULTS ARE GOOD
Toluene	Not Detected	RESULTS ARE GOOD
Xylene	Not Detected	RESULTS ARE GOOD
Total Hydrocarbon	210 PPM	RESULTS ARE GOOD
Total non –Methane	CH 0.2 PPM	RESULTS ARE GOOD
Methane	210 PPM	RESULTS ARE GOOD
Methanol	Not Detected	RESULTS ARE GOOD
Ethane	0.03 PPM	RESULTS ARE GOOD
Dimethyl Ether	Not Detector	RESULTS ARE GOOD
Acetaldehyde	0.06 PPM	RESULTS ARE GOOD
Propane	Not Detected	RESULTS ARE GOOD
Carbon Monoxide	Not Detected	RESULTS ARE GOOD
Co2 Percentage Purity %	98.1+%	RESULTS ARE GOOD
Ammonia	Not Detected	RESULTS ARE GOOD
Nitric Monoxide	Not Detected	RESULTS ARE GOOD
Nitric Dioxide	Not Detected	RESULTS ARE GOOD
Oxygen	65 PPM	RESULTS ARE GOOD
Moisture	35 PPM	RESULTS ARE GOOD
Radon	Not Detected	RESULTS ARE GOOD
M.P Xylene	Not Detected	RESULTS ARE GOOD
Ethylene Benzene	Not Detected	RESULTS ARE GOOD
Ethylene Glycol	Not Detected	RESULTS ARE GOOD
Vinyl Chloride	Not Detected	RESULTS ARE GOOD

3.4 Conclusion

The above analysis was carried out accordance with the ISBT specification.
ALL PARAMETER ARE WITHIN A RANGE, NO HAZARDOUS GAS DETECTED.

3.5 VALIDATION OF TASTE GAS RESULTS

PARAMETER	SPECIFICATION LIMIT	RESULTS
Carbonyl Sulfide	0.11-0.170	0.137
Methane	35.3-45.300	38.028
Sulfur Dioxide	1.24-1.510	1.294
Benzene	0.019-0.033	0.025
Total Sulfur	1.29-1.710	1.518
Carbon Monoxide	11.4-14.700	14.010

Machine validated.

O2 CALIBRATION

PARAMETER	SPECIFICATION LIMIT	RESULTS
OXYGEN	47.5-54.50	52.78

Oxygen Analyzer Calibrated

CHAPTER 4

ANALYSIS OF THE EMERGING MARKET OF GAS PRODUCTS

ANALYSIS OF THE EMERGING MARKET OF GAS PRODUCTS

4.1 Global Market

Overall, the carbon dioxide market consists of the sales of carbon dioxide by various entities that manufacture carbon dioxide gas in compressed, liquid, and solid forms. Carbon dioxide (CO2) is an odorless, colorless gas with a slightly pungent, acid taste. Commercial carbon dioxide is recovered from industrial plants, which produce hydrogen or ammonia from natural gas, coal and hydrocarbon feedstock. Corn-to-ethanol plants have been the most rapidly growing source of feed gas for CO2 recovery. CO2-rich natural gas reservoirs are another source of recoverable carbon dioxide.

ANALYSIS OF THE EMERGING MARKET OF GAS PRODUCTS

4.1.1 Carbon Dioxide Global Market Size

Global carbon dioxide market reached a value of nearly $9,682.1 million in 2020, having increased at a compound annual growth rate (CAGR) of 4.94% since 2015. The market is expected to reach $11,265.1 million by 2025, and $12,707.1 million by 2030. Source: Various readings in CO2 trends magazines.

Growth in the historic period resulted from emerging markets growth, and increased demand from the medical industry. Factors that negatively affected growth in the historic period were safety, and changing regulations. It is foreseen that going forward, growing demand for frozen food, and growing demand from the oil and gas industry will drive the growth. Factors that could hinder the growth of the carbon dioxide market in the future include high capital cost, impact of COVID-19, and reduction in free trade.

4.1.2 Carbon Dioxide Market Drivers

The key drivers of the carbon dioxide market include: Growing Demand for frozen Food especially in times of pandemic and busy schedules. The carbon dioxide market in the forecast period is expected to be supported by the growing demand for frozen food. Carbon dioxide is used as an integral part for storing and transporting frozen food, hence, the growing demand for frozen food is in turn supporting the carbon dioxide market. Carbon dioxide allows rapid cooling of food to help reduce contamination risks and preserve food quality. The major factors
driving the demand for frozen food includes the introduction of longer-shelf-life products and an increase in the working population worldwide. This demand for frozen food intensified during the pandemic. According to a study by the German Frozen Food Institute, one third of surveyed households confirmed that their uses of frozen products had intensified during the government mandated lockdowns. This can be attributed to the longer shelf life of frozen food.
Thus, growing demand for frozen food is expected to support the demand for the carbon dioxide market.

4.1.3 Carbon Dioxide Market Restraints

The key restraints on the carbon dioxide market include: High Capital Cost: The high cost for capturing, liquefying, and transporting carbon dioxide is a major challenge in the carbon dioxide market. Carbon dioxide can be transported either in solid, liquid or gas form and is available through various means including motor carriers, railway, ship and pipelines. Transporting carbon dioxide as a solid form is neither cost-effective nor feasible as it requires more energy compared with other alternatives. However, for larger quantities of carbon dioxide, pipelines are the lucrative mode of transport. The liquefaction of carbon dioxide for ship transport and compression for pipeline transport requires abundant electrical energy.
Globally, government agencies have formulated various regulations for the proper storage and transportation of carbon dioxide. These regulations also affect the cost of transportation. The high cost of transportation is expected to affect profit margins of carbon dioxide manufacturers and limit the growth of the market.

ANALYSIS OF THE EMERGING MARKET OF GAS PRODUCTS

4.1.3 Carbon Dioxide Market Restraints

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4.1.4 Carbon Dioxide Market Trends

Major trends influencing the carbon dioxide market include:
i) Carbon Dioxide Separation Technology: Companies in the carbon dioxide industry are focusing on the use of separation technology. The technology is based on using the CO2 emitted across various production processes to be further cleaned to ensure
that it is available for further use. For example, the partnership between Carbon Clean and Lafarge Holcim aims at capturing the CO2 emitted through the cement production process that will be further transformed, cleaned and reused locally.

ii) Carbon Capture and Utilization: CO2 manufacturing companies are focusing on carbon capture and utilization. Carbon Dioxide manufacturers are drawing in CO2 that is created by burning fossil fuels and the plants are using this CO2 for the production of sodium bicarbonate which can be used in the food, beverage and pharmaceutical industries. Manufacturing CO2 based chemicals was deemed
expensive or economically risky but now due to the carbon capture technology, it is becoming widely implemented among CO2 plants. This plant is one of a kind, it will specialize in using the CO2 from the burning of fossil fuels for the food, pharmaceutical and brewery industries.

4.1.5 Opportunities in the Carbon Dioxide Market

The top opportunities in the carbon dioxide market segmented by type will arise in the gas segment, which will gain $1,109.8 million of global annual sales by 2025. The top opportunities in the carbon dioxide market segmented by application will arise in the beverages segment, which will gain $426.9 million of global annual sales by 2025. The top opportunities in the carbon dioxide market segmented by grade type will arise in the segment, which will gain $805.0 million of global annual sales by 2025. SIMBA Gas is therefore well placed and the new plant is timely put in place.

ANALYSIS OF THE EMERGING MARKET OF GAS PRODUCTS

4.2 Local Market

The Tanzanian Gas industry is in a boom period. There is an ever increase of demand of gas products driven by a number of factors as elaborated hereunder:-

4.2.1 Population trend in Tanzania

According to National Economic Empowerment Council (1995), the population of Tanzania is assumed to maintain a steady growth of close to 2.7% per year (the average between 2000 and 2015) during the present decade. Thereafter the growth will gradually slow down as the economy develops with urbanization and modernization of lifestyle. The population will almost double in the coming three decades from 48.8 million in 2015 to 9317 95 million by 2045 and reach almost 100 million people in 2050. The population will be increasingly switched to modern gas energies and more electricity will be used as source of power for appliances as people move to cities and modernize their life style.

4.2.2 The GDP Projection

The government aims at an economic growth rate of more than 8% per annum through 2025 to realize a middle income country with a high level of human development. To this end, the economy should achieve an annual per capita income of at least US$3,000 by 2025 through transformation from a low productivity agricultural economy to a semi-industrialized one. This is a solid foundation for a competitive and dynamic economy with high productivity and adequate level of physical infrastructure which demand intensive use of gas energy.

4.2.3 The Energy Prices

While the population growth rate and economic growth rate will slightly slowdown in the later part of the period 2023 to 2045; the energy consumption growth rate will remain high as modern energy depletion will be stimulated through popularization of modern home and office appliances as well as progress of industrialization. Later on, the use of traditional energy will be replaced by modern fuels such as natural gas and LPG. Another determinant is the strong management readiness to support the project with cost-effective resources.

ANALYSIS OF
THE EMERGING MARKET OF GAS PRODUCTS

4.3 Recommended focus products line

4.3.1 Beverage Grade Carbon Dioxide (CO2) Gas

The recommended main target market is beverage industries in domestic and neighboring countries outlets due to huge demand for gas in international market especially within EAC and
SADC region.
The driven Carbon dioxide (CO2) gas demand portrayed on weekly and monthly trends basis have recorded a significant deficit supply by some major consumers; including Coca cola, SBC (Pepsi), TBL, MO, Afya, Sayona, Jambo, SSB, Serengeti etc. Likewise, the demand recorded by different Companies in neighboring countries is promising by far. Refe

ANALYSIS OF
THE EMERGING MARKET OF GAS PRODUCTS

4.3.2 Introduction of dry Ice

There is a huge opportunity for this new line of business in the market; whereby its market size is anticipated to reach the USD 300 million by 2030. The dry ice is highly recommending because it has proven to provide superior cooling that last longer, it does not melt into liquid when heated, also it is non-toxic and inflammable, the dry ice temperature is -780C as well as the ability to converts direct back to its gaseous state.

With that view, the potential market for this particular product is expected to take place on the following sectors comprising prime consumers:

ANALYSIS OF
THE EMERGING MARKET OF GAS PRODUCTS

Food Distribution Industry

- Azam Ice Cream
- Food delivery
- Picnic/Vacation/Travelling

Food Exportation Industry

- Avocado market
- Cashew Nut Market
- Cereal Crops & Meat

Airline catering Industry

- Air Tanzania
- Precision
- International flights

Fishing Industry

- Mwanza Ferry
- Dar es salaam Ferry
- Kigoma Ferry

ANALYSIS OF
THE EMERGING MARKET OF GAS PRODUCTS

Pharmaceutical Industry

- Transport Medicine
- Chemotherapy Treatment

Meat Processing Industry

- Game reserve hunting
- Meat butches
- Camping

Beverage Industry

- Hotel, Cafeteria
- Casino
- Bar, Grocery, Pub

Chemical Research

- Laboratory Uses
- Educational

ANALYSIS OF
THE EMERGING MARKET OF GAS PRODUCTS

4.3.3 Fire Extinguisher and Compressed Carbon Dioxide (Co2) Cylinder:

The potential use of CO2 fire extinguisher for class b & c used for flammable liquid/gases and electrical fires has increased due to safety purpose. On the other hand, the compressed CO2 cylinder is assumed to be a common reactive gases used in MIC or MAG welding, it provides an intense weld penetration useful for welding thick material and arc, it is cost-benefits with high welding speeds.

Class B Fire

- **Petroleum Grease**
- **Oils**
- **Oil based paints**
- **Solvents**
- **Alcohols**
- **Natural Gas**
- **Petrol**
- **Kerosene**

Class C Fire

- **Live electrical equipment wiring**
- **Motors**
- **Transformer**
- **Generators**
- **Computers**
- **Data Servers**
- **Electrical Panel**

ANALYSIS OF THE EMERGING MARKET OF GAS PRODUCTS

4.3.4 Blast Cleaning Services

Technically this is a leading edge in dry ice technology and the most effective means of removing loose surface and tightly bonded contaminants. Most importantly the cleaning process does not use water; which means it allow the equipment to be cleaned while online and still operating. That's why it is one of the preferred services today.

The huge demands are observed across different industries; namely Petrochemical industry, Food processing industry, Printing press, Aviation industries, Construction sites, Machinery, Power generation as well as Kitchen and tank.

Why such potential sectors) prefer dry ice cleaning services over the others: Essentially it is due to effectiveness and fastest nature, its ability to maximize safety and productivity is another angle those customers are looking for. Furthermore, there are no chemicals or abrasives that can damage the equipment, the decreased downturn and extended equipment life time is something you can't skip for logical, compliance and optimal business operation

Given the existing products and foreseen products resulting from the new plant as all analyzed in the preceding section, the company is highly recommended to approach the market as described hereunder:

- Review market size in Tanzania and across East African and SADC blocks
- Capitalize on existing and improve customers base
- Leverage on improved scale, quality and better prices
- Use media and agents across countries
- Weekly and quarterly performance reviews with formal annual key performance indicators (KPIs) and key performance assessments (KPAs).

CHAPTER 5

ANALYSIS OF THE ECONOMIC VIABILITY OF THE PROJECT

ANALYSIS OF THE ECONOMIC VIABILITY OF THE PROJECT

This section focuses on the economic feasibility analysis of the proposed CO2 extraction and processing plant. It details an assessment of the potential financial benefits of the project; the methodology used is the cost-benefit analysis and assesses the economic viability of the proposed project. The section presents the risk and sensitivity analysis of the proposed project.

5.1 Cost Benefit Analysis

In conducting the analysis of the potential benefits of the proposed project, specifically its financial viability, the Net Present Value, Internal rate of return (IRR), Benefit cost ratio and Payback period are calculated under the assumption that all proposed infrastructures at the CO2 plant facility operates as planned and that té following key underlying assumptions apply:
i) We assume a slow-growth economy, without major recession.
ii) We assume that there are no unforeseen changes in the consumer market to make products immediately obsolete or out of favor.
iii) It is assumed that, overhead costs and revenues will increase by 10% annually.

It is assumed that the CO2 extraction and processing plant is built in T=0 at the cost of USD 9,500,000 and that construction works are completed within T=0. After commissioning, it is assumed that Simba Gas Company is able to collect 100% of revenues from sales of products, valuing USD 2,194,557 and exhibit an annual operational cost of USD 970,555 once operational from T=1.

Using the Net Project cash flow, the Net Present value (NPV) and Project IRR are calculated over the time period, at discounted values of 10%. The Project has an NPV of USD 1,590,281 IRR of 15%, payback period of 7years and BC Ratio of 2.67. The estimated investment capital and the cash flow are presented in Table 5.1 and 5.2 respectively.

Table 5.1: CO2 Estimated Capital Expenditure and Working Capital

Capital Expenditure						
S/n	**Descriptions**	**Units**	**Unit Price**	**Source/ Country**	**Amount in EURO**	**Amount in USD**
1	Tankers and Storage tanks	7	Varies	Germany	750,000	
2	CO2 Recovery Plant	1	969,200	Italy	969,200	
3	Construction Components	1	3,631,939	Tanzania	3,631,935	
	Total Capital expenditure				**5,321,135**	**5,161,025**
Working Capital Requirements						
s/n	**Descriptions**	**Units**	**Unit Price**	**Details**		**Amount in USD**
	Cylinders and accessories, technicians, management and overheads	Varies	Varies	Plant management and related overheads		2,838,975
	Total Required Funding					**8,000,000**
	Project initial investment and all related logistics, compliance and registrations		varies	Already committed cost by management		1,500,000
	Total CAPEX and Working Capital					**9,500,000**

Table 5.2: Project Cash flow

	1	2	3	4	5	6	7	8	9	10
Revenues	$2,194,557	$2,414,012	$2,655,414	$2,920,955	$3,213,050	$3,534,356	$3,887,791	$4,276,570	$4,704,227	$5,174,650
Overheads	$11,757	$13,521	$15,549	$17,881	$20,563	$23,648	$27,195	$31,274	$35,965	$41,360
Technicians	$85,529	$98,358	$113,112	$130,079	$149,591	$172,029	$197,834	$227,509	$261,635	$300,880
Cylinders and other inputs	$695,054	$799,312	$919,209	$1,057,090	$1,215,654	$1,398,002	$1,607,702	$1,848,857	$2,126,186	$2,445,114
LCO2 transportation	$178,215	$124,406	$124,406	$124,406	$124,406	$124,406	$124,406	$124,406	$124,406	$124,406
Profit	$1,224,002	$1,378,415	$1,483,138	$1,591,499	$1,702,837	$1,816,271	$1,930,655	$2,044,524	$2,156,035	$2,262,890
Capital Investment	$9,500,000	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000
Cash Flow (Annual)	($8,275,998)	$1,378,415	$1,483,138	$1,591,499	$1,702,837	$1,816,271	$1,930,655	$2,044,524	$2,106,035	$2,212,890
Cash Flow (Cumulative)	($8,275,998)	($6,897,583)	($5,414,445)	($3,822,946)	($2,120,109)	($303,838)	$1,626,816	$3,671,340	$5,777,375	$7,990,265
NPV										
10%	$1,590,281									
15%	($97,451)									
20%	($1,241,173)									
IRR	15%									
Payback	7 Years									
BC Ratio	$2.67									

5.2 Risk and Sensitivity Analysis

5.2.1 Risk Analysis

The following table shows the risk matrix analysis that may face the project.

Table 5.3: Project Risk Matrix

Risks	Type of Risks	Risk Assessment
Financial Risks	**Liquidity Risk:** Liquidity risk is the risk resulting from the company's inability to meet its financial obligations at time. The company's liquidity management is to ensure as much as possible that the company always maintain enough liquidity to meet its obligations as they become due and payable in normal and emergency conditions without incurring unacceptable losses or risks that affect the company's reputation.	The financial risks that may face the project are minimal, Because Simba Gas company has good experience in financing arrangements.
	Risk of currency fluctuation: Currency risk is the risk of the fluctuation of the value of financial instrument, due to fluctuations in foreign currency exchange rates.	There will be no risk of currency exchange, because the project will sale and purchase by local currency
	Inflation risk: It is the risk associated with the possibility that the inflation or the rise in the cost of living might lead to the decrease of real value of the investment.	Delays in construction may impact project on investment cost as inflation might rise at higher rates than projected.

Risks	Type of Risks	Risk Assessment
Business risk (sector risk)	**Strategic Risk:** It is the risk resulting from taking bad decisions by the company's management, or implementing the decisions in a wrong way, or not taking the decisions at the right time; which leads to losses or causes loss of alternative opportunities.	Strategic Risk, Legal and Regulatory Risks are considered Moderate because decision making on any activities of the project will follow the Company's approval procedures.
	Legal and Regulatory Risks: These risks are reflected as a result of non compliance with laws, guidelines and instructions governing the work. Legal risks are caused by the company's break of the laws governing the work in the state in which the company operates. While regulatory risks arise from the company's violation of laws and standards issued by the regulatory authorities.	Reputational risk is very high as the project will deal with very sensitive community services issues. Therefore, Simba Gas company shall work in collaboration with key stakeholders in the sector.
	Reputation Risk: Reputation risk arises from influential negative public views which result in great losses of customers or money. It includes the actions of the business's management or its employees which project a negative image of the business, its performance and its relationships with customers and other stakeholders.	
Operational Risk	Operational risk involves losses resulting from the failure of internal operations. It includes: • Poor handling and operations • Human Resources Risk Losses caused by employees or related to them (intentionally or unintentionally). It also includes acts that are intended as methods of cheating, abusing property or circumvent the law, regulations or business policy by officials or employees, as well as losses arising from the relationship with the customer, shareholders, regulators and any third party	• Operational risks are moderate. • Training of project staff during project implementation and its life time is vital.
State Risk	State Risk includes politicians' interference, civil unrest, wars, financial and monetary policies.	State Risk is considered to Be minimal, due to security and Political stability in the project area and Nationwide

4.2.2 Sensitivity Analysis

The sensitivity analysis of the project was done to check the variation on the projected project performance under given circumstances. First, by increasing investment cost by 10%; Secondly, by reducing revenues by 10% and thirdly, increasing the Operating Costs by 10%.

First: Increase of Investment Cost By 10%

The following table shows the results of the sensitivity analysis when investment cost increases by 10%.

Index	Base	Impact	Change
Internal Rate of Return (IRR)	15%	12%	3%
Net Present Value at a discount rate of 10% (in USD)	1,590,281	726,645	863,636
Payback period (Year)	7	7	0
Benefit cost ratio - an average of 10 years	2.67	2.67	0

The above analysis refers to the feasibility of investment in the project, in light of the high cost of the total investment of the project, which increased by 10%. It is noted that:

- The internal rate of return dropped to 12%, which is still indicating good return.
- The Net Present Value dropped but still positive value indicating good return on the investment.
- The payback period didn't change and it is reasonable for recovery purposes.
- The Benefit Cost Ratio - for an average of 10 years is greater than 1 indicating that the accumulated benefits of the project outweigh the costs of the project.

Second: Reducing Revenues by 10%

The following table shows the results of the sensitivity analysis when reducing revenues by 10%.

Index	Base	Impact	Change
Internal Rate of Return (IRR)	15%	9%	6%
Net Present Value at a discount rate of 10% (in USD)	1,590,281	726,645	863,636
Payback period (Year)	7	8	1
Benefit cost ratio - an average of 10 years	2.67	2.41	0.26

The above analysis shows the low sensitivity of the project in case of reducing the revenues or demand by 10%. It indicates that:

- The internal rate of return dropped to 9%, which is relatively low.
- The Net Present Value dropped to negative value indicating undesirable return on the investment.
- The new payback period is 8 years, and it is reasonable for recovery purposes
- The Benefit Cost Ratio - for an average of 10 years is greater than 1 indicating that the accumulated benefits of the project outweigh the costs of the project.

Third: Increasing the Operating Costs by 10%

The following table shows the results of the sensitivity analysis when reducing revenues by 10%.

Index	Base	Impact	Change
Internal Rate of Return (IRR)	15%	12%	3%
Net Present Value at a discount rate of 10% (in USD)	1,590,281	726,645	863,636
Payback period (Year)	7	7	0
Benefit cost ratio - an average of 10 years	2.67	2.67	0

The above analysis refers to the feasibility of investment in the project, in light of the high cost of the total investment of the project, which increased by 10%. It is noted that:

- The internal rate of return dropped to 12%, which is still indicating good return.
- The Net Present Value dropped but still positive value indicating good return on the investment.
- The payback period didn't change and it is reasonable for recovery purposes.
- The Benefit Cost Ratio - for an average of 10 years is greater than 1 indicating that the accumulated benefits of the project outweigh the costs of the project.

Based on the sensitivity analysis, it can be concluded that the project has a payback period of not more than 8 years. The IRR, NPV and BC ratio indicates a promising return of the project even given a worse scenario. Generally the project is attractive to investors as it has good return on investment. With this analysis and considering the nature of the project, financing the project is therefore highly recommended.

CHAPTER 6

PRE-ENVIRONMENTAL IMPACT ASSESSMENT

PRE-ENVIRONMENTAL IMPACT ASSESSMENT

This section describes the potential environmental and social impacts that might result from the proposed CO2 extraction and processing plant during Mobilization, Designing, Construction, and commissioning and Operation phases. Environmental and social impacts along with Mitigation/enhancement measures in each phase are summarized in the sections below.

6.1 Mobilization and Construction Phase

a) Positive Impacts

i) Benefits to communities resulting from employment and other economic activities

The proposed project development will benefit nearby communities in terms of employment and creating linkages with local economy through provision of goods and services during construction phase..

b) Negative Impacts

i) Increased noise/dust/air pollution

Site clearance and construction works normally generate a lot of noise, dust and hence air pollution. Noises from vehicles during the construction phase may rather be significant. Noises will also arise from construction machinery at the site. However, most of the deterrent noises will be during the construction period only, which is rather a shorter period compared with the lifetime of the proposed project.

The following measures shall be undertaken to minimize the impact;

- ☑ Whenever needed, workers will be provided with ear muffins/masks during construction and especially workers working in noisy areas.
- ☑ Work will be carried out during the day.
- ☑ Vehicles and equipment will be maintained and serviced as required to ensure they do not generate excessive noise.

ii) Safety and Health risks

Construction of the proposed project will expose the laborers to bronchial and other respiratory tract diseases due to increased dust. Also, poor use (or nonuse) of the safety gears during the construction phase might result into injuries or loss of lives during construction. The incidence rate of water borne diseases such as cholera and diarrhea might also increases if there will be no proper sanitation facilities at the construction site.

The following mitigation measures will minimize the risks:-

- ☑ Appropriate working gear (such as nose muffins, helmets, ear mask and safety clothing) and good construction site management shall be provided.
- ☑ The contractor shall ensure that the construction site is hygienically kept with adequate provision of facilities including waste disposal receptacles, clean toilets, firefighting and supply of clean and safe water
- ☑ A well-stocked First Aid kit (administered by qualified medical personnel) shall be maintained at the construction site..

iii) Occupational accidents at the work place

During construction phase, sources of occupational accidents at the work place would be construction machinery like concrete mixer, timber cutters, trucks and vehicles. Workers will be exposed to severe accidents if they are not being provided with appropriate personal safety gears when using such machinery and instrumentation.

The following measures will minimize Accidents:

- Proper maintenance of the machines, protecting or guarding the cutting edges, and awareness of the people including workers on the dangers and make them understand how to protect themselves and others.
- The supervisors shall ensure that safety measures are in place and are enforced (implemented) including safety equipment (PPEs).
- The contractor shall provide adequate training to construction workers on the health impacts of the construction and shall provide protective gear to construction workers.
- Approved working hours shall be observed in order to avoid careless mishandling due to fatigue.
- The contractor will emphasis on wearing of full body harness protecting gears such as an anchor extension or equalization, makeshift harnesses, carrying equipment (clipped to a sling worn over the shoulder), protecting a rope that hangs over a sharp edge (tubular webbing).

iv) Solid wastes from construction/installation activities

Construction and site clearance normally generate solid wastes, including construction materials, and food cans. The solid wastes resulting from materials used during the construction phase may rather be significant. Inadequate management of these wastes might create unsightly conditions in the project site.

The following measures will be undertaken to ensure these wastes do not have impact to the local environment of the area.

- Some wastes which are difficult to dispose will be minimized and where practicable avoided such as plastic wastes i.e. container/bottles and bags at the campsite.
- The contractor will also put in place different waste bins for segregation on site and to discourage uncontrolled waste disposal.
- All of the solid wastes which are biodegradable will be buried on appropriate area in the site or nearby.
- Non-biodegradable wastes will be collected, accumulated and sent to the nearest Disposal site.

v) Oil spills from vehicle and machinery refueling during construction with ultimate contaminations in soils environment

Machinery and vehicles operating at site will require fossil fuels i.e. gasoline and engine oil for their operation. Since construction will be conducted for longer periods or nearby the site, refueling/changing engine oil will be required. If appropriate measures are not put in place refueling and changing oil might result into oil spills that might contaminate the soil and cause far reaching impacts. To avoid this, the following measures will be done: -

Designated workshop at the project site will be used where all mechanical including changing engine oil will be done.

The surface of the workshop will be surfaced with concrete.

Designated area for refueling will be established and will have containment
bund with concrete surface.

vi) Liquid wastes

During construction works, a number of workers will be involved at site, if proper measures for handling liquid wastes generated by big number of people are not put in place. Environmental pollution from the liquid or sanitation wastes may occur. During construction phase the contractor will construct temporal sanitation facilities (toilets) to be used by workers at the site to minimize environmental pollution thacould occur.

6.2 Operation Phase

a) Positive Impacts

i) Stimulation of social economic activities
The project will generally improve the livelihoods of the people in the area. The project will stimulate micro and macro-economic entrepreneurial activities and improve social services delivery to the public.

ii) Employment opportunities
During its operation, the project will require both unskilled and skilled personnel. Thus, this will offer employment opportunities around the project area.

iii) Contribute to the Increased revenue of the Government
The project will be obliged to pay all taxes and fees including VAT, Service levy, etc., and also the stimulated small scale activities and businesses will likewise be required to pay a number of taxes. Furthermore, the people employed by the project will pay income tax to the government which will be deducted directly by the employer (the project) and sent to Treasury through the Workers Scheme Fund(s) to be used by the workers of the project. These benefits will be beneficial to the local and national economy.

b) Negative Impacts
i) Noise pollution from the operation of the plant. Since the plant will be well fenced, the impacts of noise pollution during operation will not result into significant negative impacts to the community.

ii) Waste management problems
During the operation phase it is expected that solid and liquid wastes will be generated from activities that will be taking place at the plant.

The following measures will be taken to minimize the risk:-

- The management will put in various places waste bins for segregation of wastes where by all of the solid wastes which are biodegradable will be buried on an appropriate designated area in the site or nearby.

- Non-biodegradable wastes will be collected, accumulated and sent to the nearby Disposal site.

6.3 Project Alternatives

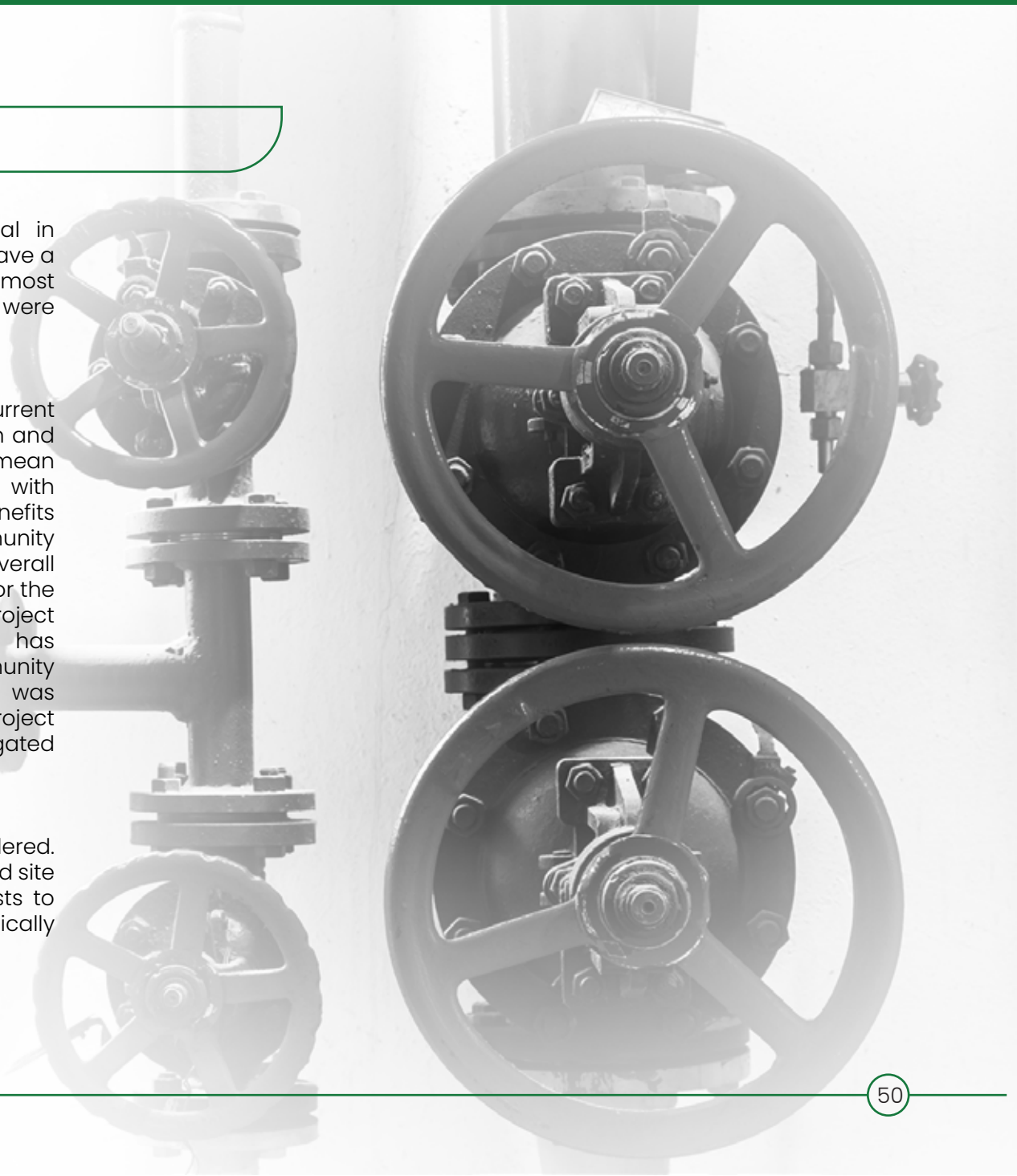
Consideration of project alternatives is essential in ensuring that the developer and decisionmakers have a wider base from which they can choose the most appropriate option. The following alternatives were considered;

a) No project alternative

The no project alternative entails retaining the current status quo without establishing the CO2 extraction and processing plant. Adopting this option would mean avoiding most of the negative effects associated with the current situation and missing all the positive benefits that would accrue such as improved community wellbeing through the presence of the plant. The overall assessment on Environmental and Social Impact for the project showed that the implementation of the project has less negative environmental impacts and has positive benefits that would improve community wellbeing. Therefore the "No project alternative" was rejected as the overall expected benefits of the project outweigh the negative impacts which can be mitigated through the proposed mitigation measures.

b) Alternative Site

The option to use an alternative site was considered. However the feasibility study shows that the selected site has enough space and feasible construction costs to make the project technically feasible and economically viable than any other location.



CHAPTER 7

MONITORING AND FOLLOW-UPS

MONITORING
AND FOLLOW-UPS

Carbon dioxide is a natural gas present in the atmosphere at low concentrations (0.03 %), but can become a risk at higher concentrations. During the last years, the attention to requirements for monitoring of possible leaks of CO2 handling has been increasing. With monitoring techniques it is intended to get insight in the fate of injected CO2 during and after injection, to make sure the CO2 is at the intended location and to detect eventual leakages. This will be of major importance at the plant area to minimize such risk.

Several types of monitoring techniques could be applied, both in the subsurface (seismic monitoring) and at the surface (gas composition, CO2 flux at the surface, groundwater composition, etc.).

An extensive monitoring programme should be developed in order to build public confidence and social acceptance in CO2 storage. Both surface (gas (isotopic) composition of injected and produced gas, sensors at the surface, tracers, etc.) and subsurface monitoring technologies (seismic monitoring) should be taken into account.

Water treatment procedure and associated costs remains an important issue to be studied, also considering water quality standards for the surface water at which coalbed water can be discharged.

In this study, the technical feasibility and costs for monitoring are not accounted for. It is advised to give attention to the aspects of monitoring in the follow-up of this project.

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

This study attempted to assess the feasibility of establishment of Carbon dioxide extraction and processing plant within Busona and Nditu villages, Suma ward, Rungwe district in Mbeya region. It used desk review information, site analysis and financial analysis to examine the economic, social and environmental viability of the project.

Since its establishment in 2000, Simba Gas Company has undertaken several steps towards business expansion and addressing constraints across the sectors. Given the observed high market demand for gas products and the opportunity of available reserves of natural gas in Tanzania, this motivates Simba Gas Company to invest in the sector.

Therefore, Simba Gas Company commissioned EMMAC Investments Consulting Limited to conduct a feasibility study on the establishment of carbon dioxide extraction and processing plant within Busona and Nditu villages, Suma ward, Rungwe district in Mbeya region.

The feasibility study analyzed the current situation with regards to the gas industry as well as site full analysis of CO2 feed Gas, the pre-environmental impact assessment and economic viability of the project.

The study employed several techniques and tools to collect primary and secondary data from various sources including Government authorities and private sector stakeholders. Desk review of information regarding the proposed investment was done through the information given by the client and from other relevance sources including Government offices responsible to the Gas sector. The full site analysis of CO2 feed Gas was carried out accordance with the ISBT specification to analyze hazardous gas.

Cost benefit analysis was also used to illustrate the financial gains or losses through the implementation of the proposed project. Specifically the analysis examined the financial viability, the Net Present Value, Internal rate of return (IRR), Benefit cost ratio and Payback period.

The pre-environmental impact assessment was also undertaken to assess the environmental feasibility of the project.

The findings showed that despite of global shock in the industry following the lockdown during and after COVID-19 pandemic outbreak in 2019 through 2021 which resulted in slow down of various economic activities and this later followed by the disputes in Ukraine and Russia resulting in uncalled for War circumstances, the potential future demand of gas industry is strongly yet expected to improve.

This study found that the determinants of the ever increasing demand of gas products are increase in population, GDP, energy prices and the development of processing industries (especially Beverages).

The conclusions drawn from the full site analysis of CO2 feed gas carried out in accordance with the ISBT specification was that "All Parameters are within a range, no Hazardous Gas detected"

The analysis of the economic feasibility of the project revealed that the project is economically feasible with payback period of 7 years, BC Ratio of greater than one; project IRR of 15% and a positive NPV of USD 1,590,281. With this analysis and considering the nature of the project, financing the project is therefore highly recommended.

In assessing the pre-environmental impacts of the project it was showed that the implementation of the project has less negative environmental impacts and has positive benefits that would improve community wellbeing. The benefits to be realized from the proposed project are expected to outweigh environmental and social costs. The Project presents opportunities for employment and improvement of the local economic conditions and will contribute to the national income. Furthermore, it will contribute to increased stability of the deficit supply and distribution of carbon dioxide gas products both domestically and exportation to neighboring countries, thus building on forex serves for the country through various charges, levies and appropriate taxes.

This study therefore concluded that the project is considered to be technically, environmentally and economically feasible. It is hoped that the establishment of the Carbon dioxide extraction and processing plant will propel fast economic development for the communities and the national at large.

8.2 Recommendations

1) given the existing products and foreseen products resulting from the new plant, the company is highly recommended to focus on the following CO2 Gas products:

- Beverage Grade Carbon Dioxide (CO2) Gas
- dry Ice
- Fire Extinguisher and Compressed Carbon Dioxide (Co2) Cylinder
- Blast Cleaning Services

However the following approach should be taken into consideration while focusing to the above recommended products:

- Review market size in Tanzania and across East African and SADC blocks
- Capitalize on existing and improve customers base
- Leverage on improved scale, quality and better prices
- Use media and agents across countries
- Weekly and quarterly performance reviews with formal annual key performance indicators (KPIs) and key performance assessments (KPAs).

2) Furthermore, Simba Gas company should also:
- Furnish a detailed technical design for the plant, including water treatment/disposal system.
- Develop an extensive monitoring programme of the plant.
- Undertake a full Environmental Impact Assessment.

Intensify communication with the public to bring confidence in the technology at stake.

Simba gas

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