



Pre-feasibility Study

PRODUCTION UNIT FOR BOTTLED CARBONATED WATERS

November 2021

“The figures and financial projections are approximate due to fluctuations in exchange rates, energy costs, and fuel prices etc. Users are advised to focus on understanding essential elements such as production processes and capacities, space, machinery, human resources, and raw material etc. requirements. Project investment, operating costs, and revenues can change daily. For accurate financial calculations, utilize financial calculators on SMEDA’s website and consult financial experts to stay current with market conditions.”

Small and Medium Enterprises Development Authority
Ministry of Industries and Production
Government of Pakistan

Table of Contents

1. DISCLAIMER	5
2. EXECUTIVE SUMMARY	6
3. INTRODUCTION TO SMEDA	7
4. PURPOSE OF THE DOCUMENT	8
5. BRIEF DESCRIPTION OF PROJECT & PRODUCTS	8
5.1. Production Process Flow	10
5.2. Installed and Operational Capacities	13
6. CRITICAL FACTORS	15
7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT	15
8. POTENTIAL TARGET MARKETS	15
9. PROJECT COST SUMMARY	17
9.1. Project Economics	17
9.2. Project Cost.....	17
9.2.1. Land	18
9.2.2. Building.....	18
9.2.3. Plant and Machinery Requirement	19
9.2.1. Lab Equipment.....	19
9.2.2. Furniture & Fixtures Requirement.....	20
9.2.3. Office Equipment Requirement.....	20
9.2.4. Office Vehicle Requirement	21
9.2.5. Pre-Operating Cost.....	21
9.2.6. Security against Building Rent.....	21
9.3. Financial Feasibility Analysis.....	21
9.4. Financial Feasibility Debt Financing.....	22
9.5. Breakeven Analysis	22
9.6. Revenue Generation.....	23
9.7. Variable Cost Estimate	23
9.8. Fixed Cost Estimate.....	27
9.9. Human Resource Requirement	27
10. CONTACT DETAILS.....	29
11. USEFUL LINKS	30
12. ANNEXURES	31
12.1. Income Statement	31
12.2. Balance Sheet	32
12.3. Cash Flow Statement	33

13. KEY ASSUMPTIONS.....	34
13.1. Operating Cost Assumptions.....	34
13.2. Revenue Assumptions	34
13.3. Financial Assumptions	34
13.4. Cash Flow Assumptions.....	35
13.5. Debt Related Assumptions	35

Table of Tables

Table 1: Installed and Operational Capacity	14
Table 2: Installed and Operational Capacity	14
Table 3: Project Cost	17
Table 4 Breakup of Space Requirement	18
Table 5 Building Renovation Cost	18
Table 6: Plant and Machinery Requirement	19
Table 8: Lab Equipment Requirement	19
Table 7: Furniture and Fixtures Requirement	20
Table 9: Office Equipment Requirement	20
Table 10: Office Vehicle Requirement	21
Table 11: Pre-Operating Cost	21
Table 12: Security against Building Rent	21
Table 13: Financial Feasibility Analysis	21
Table 14: Financial Feasibility Debt Financing	22
Table 15: Breakeven Analysis	22
Table 16: Revenue Generation	23
Table 17: Variable Cost Estimate	23
Table 18: Material Cost (With Sugar)	24
Table 19: Material Cost (Without Sugar)	24
Table 20: Crate and Crown Capping Cost	25
Table 21: Lab Consumables	26
Table 22: Fixed Cost Estimate	27
Table 23: Human Resource Requirement	27
Table 24 Contact Details of Suppliers	29
Table 25: Useful Links	30
Table 26: Operating Cost Assumptions	34
Table 27: Revenue Assumptions	34
Table 28: Financial Assumptions	34

Table of Figures

Figure 1: Bottled Carbonated Water Process Flow	10
Figure 2: Bottle Brushing and Rinsing Machine	10
Figure 3: Water Filtration Plant	11
Figure 4: Mixing Machine	11
Figure 5: Sugar Melting Pot	12
Figure 6: Carbonation Machine	12
Figure 7: Bottle Filling and Crown Capping Machine	13
Figure 8: Revenue from Bottled Water Market	16

1. DISCLAIMER

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Document Control

Document No.	241
Prepared by	SMEDA-Punjab (OS)
Revision Date	November 2021
For information	helpdesk.punjab@smeda.org.pk

2. EXECUTIVE SUMMARY

Carbonated water is the water that has been infused with carbon dioxide gas under pressure. Carbonated waters are bubbly drinks also known as sparkling water, soda water and fizzy water. Mainly, carbon dioxide gas is infused into the water along with some other ingredients which may include citric acid, sodium citrate, sodium benzoate, sodium bicarbonate and sugar. Carbon dioxide and water react chemically to produce carbonic acid; hence their pH is slightly acidic, between 3 and 4.

Drinking carbonated water can help one stay more hydrated throughout the day. Many people find that carbonated water tastes better and is easier to drink than regular tap or spring water. Considering that the human body is 60% water, it is critical to stay hydrated throughout the day. Hydration allows a person to perform to his best, both physically and mentally. Even the slightest bit of dehydration can impact a person's concentration and mood. Dehydration can also lead to becoming more prone to headache. Drinking carbonated water can help prevent these from occurring.

In the proposed project, two products of carbonated water are produced. One of products is without sugar and the other is with sugar. Primary customers of these products are the small shops and street hawkers who use these two products to make ready-to-drink soda water; which is consumed by the people commonly during the summer season. In addition to these unbranded products, in the years to come, the proposed project can also consider the opportunity to launch a brand of ready-to-drink, consumer-focused, premier carbonated water product for the local elite class. Such a product can be launched at much higher price; supported by high marketing and branding cost. A current example of such a product in the local market, targeted at the high-income customers, is 'Perrier water' marketed by the multinational company Nestle.

This "Pre-feasibility Document" provides details for setting up "Production Unit for Bottled Carbonated Waters" which has a capacity to produce 74,667 crates each of carbonated water bottles with and without sugar annually which translates into 1,792,000 bottles (250 ml) each of the two products in a year; at 100% capacity. The production capacity in "Year One" is assumed to be 50%, producing 37,333 crates each of carbonated water bottles with and without sugar which translates into an annual production of 895,992 bottles of each of the two products.

The unit is proposed to be ideally located in large cities like Lahore, Karachi, Islamabad, Faisalabad, Gujranwala, Hyderabad, Peshawar, Quetta and Multan. These cities are preferred due to their closeness to consumer markets and convenient availability of raw materials and skilled labor.

A small size "Production Unit for Bottled Carbonated Waters" will be set up in a rented building with an area of 2,850 square feet. The project requires a total investment of PKR 9.26 million. This includes a capital investment of PKR 8.15 million and working capital of PKR 1.12 million. This project is financed through

100% equity. The Net Present Value (NPV) of the project is PKR 47.13 million with an Internal Rate of Return (IRR) of 60% and a Payback period of 2.52 years. Further, this project is expected to generate Gross Annual Revenues of PKR 29.86 million during 1st year, with Gross Profit (GP) ratio ranging from 62% to 74% and Net Profit (NP) ratio ranging from 3% to 24% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at a capacity of 46% (34,112 crates) with annual breakeven revenues of PKR 27.29 million.

The proposed project may also be established using leveraged financing. With 50% debt financing, at a cost of KIBOR+3%, the proposed Production Unit for Bottled Carbonated Waters provides Net Present Value (NPV) of PKR 53.80 million, Internal Rate of Return (IRR) of 61% and Payback period of 2.49 years. Further, this project is expected to generate a Net Profit (NP) ratio ranging from 2% to 24% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 46% (34,120 crates) with annual break-even revenue of PKR 27.3 million.

The proposed project will provide employment opportunities to 31 people including the owner. High return on investment and steady growth of business is expected with the entrepreneur having some prior experience or education in the related field of business. The legal business status of this project is proposed as "Sole Proprietorship". Further, the proposed project may also be established as a "Partnership Concern".

3. INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with an objective to provide fresh impetus to the economy through development of Small and Medium Enterprises (SMEs).

With a mission "to assist in employment generation and value addition to the national income, through development of the SME sector, by helping increase the number, scale and competitiveness of SMEs", SMEDA has carried out 'sectoral research' to identify policy, access to finance, business development services, strategic initiatives and institutional collaboration and networking initiatives. Preparation and dissemination of prefeasibility studies in key areas of investment has been a successful hallmark of SME facilitation by SMEDA.

Concurrent to the prefeasibility studies, a broad spectrum of business development services is also offered to the SMEs by SMEDA. These services include identification of experts and consultants and delivery of need-based capacity building programs of different types in addition to business guidance through help desk services.

National Business Development Program for SMEs (NBDP) is a project of SMEDA, funded through Public Sector Development Program of Government of Pakistan.

The NBDP envisages provision of handholding support / business development services to SMEs to promote business startup, improvement of efficiencies in existing SME value chains to make them globally competitive and provide conducive business environment through evidence-based policy-assistance to the Government of Pakistan. The Project is objectively designed to support SMEDA's capacity of providing an effective handholding to SMEs. The proposed program is aimed at facilitating around 314,000 SME beneficiaries over a period of five years.

4. PURPOSE OF THE DOCUMENT

The objective of the pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. The project pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management.

The purpose of this document is to provide information to the potential investors about "Production Unit for Bottled Carbonated Waters". The document provides a general understanding of the business to facilitate potential investors in crucial and effective investment decisions.

The need to come up with pre-feasibility reports for undocumented or minimally documented sectors attains greater imminence as the research that precedes such reports reveal certain thumb rules; best practices developed by existing enterprises by trial and error, and certain industrial norms that become a guiding source regarding various aspects of business setup and its successful management.

Apart from carefully studying the whole document one must consider critical aspects provided later on, which form the basis of any investment decision.

5. BRIEF DESCRIPTION OF PROJECT & PRODUCTS

Carbonated waters are the drinks that contain dissolved Carbon Dioxide (CO₂). Carbonation process produces the characteristics of fizziness and bubbling in these drinks due to the dissolved CO₂ in a liquid under pressure. From the consumer perspective, they find the fizzy sensation to be pleasant and they like the slightly different taste that carbon dioxide provides. However, the carbon dioxide used must be free of odor and flavor. The main ingredients used in producing carbonated waters are water, carbon dioxide, sugar, citric acid, sodium citrate, sodium benzoate and sodium bicarbonate.

Carbonated waters have unique properties. The temperature and pressure influence the rate of carbon dioxide dissolution to make carbonic acid and its conversion back into carbon dioxide gas when the bottle is opened. Carbonated waters are acidic in nature with varying pH values. Acidity comes from the dissolution of carbon dioxide

(CO₂) into water (H₂O), producing bicarbonate (HCO₃⁻) and hydrogen ions (H⁺). Moreover, some chemicals like citric acid also contribute towards its acidity. However, consumption of an acidic beverage like carbonated water does not make one's body more acidic. The kidneys and lungs remove excess carbon dioxide. Sugars and artificial sweeteners are also added in order to improve the taste.

Shelf life¹ of carbonated waters is directly related to the loss of carbonation and oxidation. Loss of carbonation is largely a function of the effectiveness of the package in providing a barrier to gas permeation, while oxidation can be largely prevented by use of high-quality flavorings and antioxidants, de-aerating the mixture before carbonation and minimizing exposure of the product to light.

Carbonated water is a healthier alternative to juice or sports drinks; which contain added sugars or artificial sweeteners and can add calories, harm teeth and trigger different health issues.

The benefits of Carbonated Waters include:

- increases feeling of fullness after meals
- may help relieve constipation
- stimulates nerves responsible for swallowing to improve swallowing ability
- may improve heart health
- may help lose weight

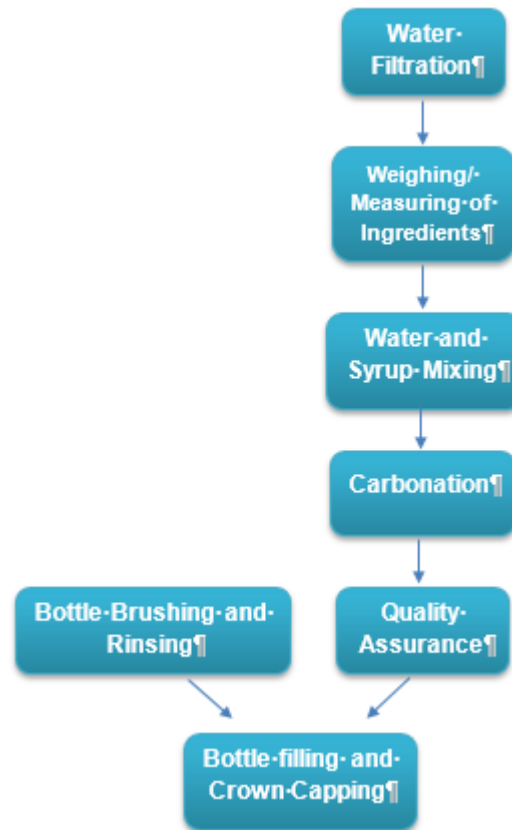
¹Shelf life is the length of time that a product may be stored without becoming unsuitable for consumption.

5.1. Production Process Flow

Process Flow

The process flow chart to produce Bottled Carbonated Waters is shown in Figure 1.

Figure 1: Bottled Carbonated Water Process Flow



Bottle Brushing and Rinsing

To ensure cleanliness and meet food-grade requirements, the bottles are brushed and rinsed using an automatic machine shown in Figure 2. This machine has a capacity of brushing and rinsing 2,500 bottles per hour.

Figure 2: Bottle Brushing and Rinsing Machine



Water Filtration Reverse Osmosis (RO) Plant

The main purpose of the water filtration RO plant is to produce water that meets the standards of drinking water quality. It filters the water and removes any dissolved chemicals, total dissolved solids (TDS)², bacteria, etc. present in the water. Figure 3 shows the water filtration plant used for proposed project having a capacity of filtering water at a rate of 1000 liters per hour.

Figure 3: Water Filtration Plant



Weighing / Measuring of Ingredients

An electronic weigh scale and an electronic measuring cup is used to add the required quantities of the required ingredients, in the syrup mixing machine.

Water and Syrup Mixing

The syrup is made in a syrup making machine. The syrup for Carbonated Waters includes melted sugar, citric acid, sodium citrate, sodium benzoate and sodium bicarbonate. Sugar is added in the mixture after melting it in the sugar melting pot. All these ingredients along with water are added in the mixing machine for processing. The proposed machine mixes all ingredients along with filtered water. Figure 4 shows mixing machine and Figure 5 shows sugar melting pot.

Figure 4: Mixing Machine



² **Total dissolved solids (TDS)**, refers to the amount of minerals, metals, organic material and salts that are dissolved in a certain volume of water.

Figure 5: Sugar Melting Pot

Carbonation

In this process, Carbon Dioxide is injected into the mixture of syrup and filtered water with pressure. It is filled in a tank containing carbon dioxide (either as dry ice or a liquid) under pressure. The conditions ideal for maximizing gas absorption are high pressure and low temperature. Figure 6 shows the carbonation machine having a capacity of producing 500 liters per hour of carbonated water.

Figure 6: Carbonation Machine

Quality Assurance

After syrup mixing and carbonation, the carbonated water goes through a quality check. Using a brix hydrometer, the sugar level/percentage is checked to ensure that it is within the acceptable range of 5-6%. Any difference in sugar level can be adjusted with addition of water or sugar.

pH meter is used to check pH value; the acceptable acidic range is between 3 and 4. If the pH value is above 4, it is adjusted by adding acetic acid and if it is below 3, it is adjusted by adding water.

Furthermore, a CO₂ tester is used to detect the concentration of CO₂ in the carbonated water. The CO₂ concentration should be around 3-4%.

Bottle Filling and Crown Capping

This is a batch wise process where the bottles are filled with carbonated water using a semi-automatic machine shown in Figure 7. This machine has a capacity of filling and capping 3000 bottles per hour. Furthermore, the bottles are capped with crown to maintain the product quality.

Figure 7: Bottle Filling and Crown Capping Machine



5.2. Installed and Operational Capacities

The proposed production unit at maximum capacity of 90%, will produce 67,200 crates each of carbonated water bottles with and without sugar annually which translates to 1,612,800 bottles each. The unit would operate for 8 hours per day, working in single shift for 280 working days in a year. During initial year of operation, the proposed unit is expected to obtain 50% of its installed capacity at which it will produce 37,333 crates each of carbonated water bottles with and without sugar annually which translates to 895,992 bottles each. It is assumed that during the projected period of 10 years, the facility will continue to operate with 5% annual increase annually reaching 90% during Year 9 of its operations.

Table 1 and Table 2 depicts installed and operational capacity of proposed production unit for Bottled Carbonated Waters.

Table 1: Installed and Operational Capacity

Particulars	Time per Batch (Hours)	Annual Available Working Hours	Batch Process Annually	Production Ratio	Batch Processed Annually
	<i>A</i>	$B=280*8$	$C=A*B$	<i>D</i>	$D=C*D$
Carbonated Water- With Sugar	1.25	2,240	1,792	50%	896
Carbonated Water- Without Sugar				50%	896
Total					1,792

Table 2: Installed and Operational Capacity

Particulars	Batch Processed Annually	Batch Size (Liters)	Annual Capacity (Liters)	Volume Per Bottles (Liters)	Annual Capacity (Bottles)	Number of Bottles per Crate	Annual Capacity (Crates)
	(Table 1) <i>A</i>	<i>B</i>	$C=A*B$	<i>D</i>	$E=C/D$	<i>F</i>	$G=E/F$
Carbonated Water- With Sugar	896	500	448,000	0.25	1,792,000	24	74,667
Carbonated Water- Without Sugar	896	500	448,000	0.25	1,792,000	24	74,667
Total	1,792	1,000	896,000		3,584,000		149,334

6. CRITICAL FACTORS

The following factors should be taken into account while making this investment decision:

- Sound technical knowhow and knowledge of the industry
- Production of a quality product, specific to user need and satisfaction
- Availability of skilled workforce
- Efficient process management: safety and hygiene ensured
- Up-to-date knowledge of market needs
- Selection of appropriate machinery
- Rigorous supervision of the production
- Ability to generate work orders through market networking
- Assurance of timely order fulfillment
- Demand management by accurate demand forecasting
- Quality products and customer satisfaction

7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT

Larger cities like Karachi, Lahore, Faisalabad, Gujranwala, Hyderabad, Peshawar, Quetta, Multan, Sukkur, Sialkot, Bahawalpur, Islamabad, Rawalpindi, etc. have good potential for investment in Bottled Carbonated Water production unit. Other medium cities and sub-urban areas of all cities of Pakistan also have potential for this investment. Availability of skilled labor is vital while selecting a location. All the above-mentioned cities have adequate availability of skilled labor, raw material and other support infrastructure.

8. POTENTIAL TARGET MARKETS

The younger generation, under 35 years of age, is the main consumer group of carbonated water drinks. Rising disposable incomes and the hot and humid local climate are some of the key drivers of the positive growth trend in the carbonated water market. Furthermore, the local beverage companies who use carbonated water as a raw material for their finished ready-to-drink products such as soft drinks, may also be the target customers of the proposed production unit.

The global carbonated water market size was valued at USD 29.71 billion in 2020 and is expected to expand at a compound annual growth rate (CAGR) of 12.6% from 2021 to 2028. It is expected to reach USD 76.95 billion by 2028.³ A positive trend can

³ <https://www.grandviewresearch.com/industry-analysis/sparkling-water-market>

be seen in Figure 8 in revenue from bottled water industry⁴ of Pakistan from 2015-2020 due to growing demand.

Figure 8: Revenue from Bottled Water Market⁵



Currently in Pakistan, this industry is mainly operating as a small industry. There are many small-scale production units whose target customers are small scale retail shops, kiosks and refreshment points. Nestle is producing a premium product for the elite class under the name Perrier water. Such a product has a very limited market; however, the proposed project can diversify in the coming years to introduce a branded carbonated water product for the high-income segment of the local market.

⁴ The bottled water market consists of sales of bottled water services and related goods by entities that provide bottled water. The market is segmented into water, Sparkling water, and others.

⁵ <https://www.mordorintelligence.com/industry-reports/pakistan-bottled-water-market>

9. PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of Production Unit for Bottled Carbonated Water. Various costs and revenue related assumptions along with results of the analysis are outlined in this section.

The projected Income Statement, Cost of Goods Sold, Cash Flow Statement and Balance Sheet are attached as Annexure.

9.1. Project Economics

All the figures in this financial model have been calculated after carefully taking into account the relevant assumptions and target market.

9.2. Project Cost

Total cost of the project has been calculated to be PKR. 9.26 million. The project will be financed through 100% Equity. Table 3 provides the details of the costs calculated for the proposed production unit.

Table 3: Project Cost

Description of Costs	Amount (PKR)	Reference
Land	-	9.2.1
Building / Infrastructure	1,132,750	9.2.2
Machinery & Equipment	2,445,000	9.2.3
Furniture & Fixtures	770,000	9.2.2
Lab Equipment	43,000	
Office Equipment	1,691,000	9.2.3
Office Vehicles	1,151,800	9.2.4
Pre-operating Costs	399,966	9.2.5
Security against building	513,000	9.2.6
Total Capital Cost	8,146,516	
Working Capital		
Equipment Spare Part Inventory	20,375	
Consumables Material Inventory	360,442	
Upfront Building Rent	171,000	
Upfront Insurance Payment	65,470	
Cash	500,000	
Total Working Capital	1,117,287	
Total Project Cost	9,263,803	

9.2.1. Land

The Production Unit for Bottled Carbonated Waters will be established in a rented building to avoid the high cost of land. Suitable locations for setting up a production business like this can be easily available on rent. Therefore, no land cost has been added to the project cost. Total space requirement for the proposed unit has been estimated as 2,850 sq. ft. The breakup of the space requirement is provided in Table 4.

Table 4 Breakup of Space Requirement

Break-up of Land Area	% Break-up	Area (Sq. Ft.)
Executive Office	8%	210
Production Area	52%	1,400
Admin & Accounts Area	9%	255
Marketing Office	7%	195
Store	19%	500
Kitchen	3%	90
Washrooms	2%	50
Total Area	100%	2,700

9.2.2. Building

There will be no cost of building since the unit will be started in a rented premise. However, there will be a renovation cost; required to make the building usable for the business. The proposed project requires electricity load of 25 KW for which an electricity connection under the General Supply Tariff-Industrial three phase will be required. Building rent of PKR 171,000 per month has been included in the operating cost. Building renovation cost is shown in Table 5.

Table 5 Building Renovation Cost

Cost Item	Unit of Measurement	Total Units	Cost/Unit (PKR)	Total Cost (PKR)
Paint Cost	Liter	51	500	25,450
Labour Cost- Paint	Feet	5,090	10	50,900
Tiles Cost	Sq. Feet	605	120	72,600
Labour Cost- Tiles	Sq. Feet	605	40	24,200
Wall Racks	No.	10	15,000	150,000
Curtains	No.	6	5,000	30,000
Blinds	No.	6	5,000	30,000
Glass Door and Partitions	Sq. Feet	937	800	749,600
Total				1,132,750

9.2.3. Plant and Machinery Requirement

Table 6 provides details of machinery and equipment required for the project.

Table 6: Plant and Machinery Requirement

Cost Item	Unit	Unit Cost (PKR)	Total Cost (PKR)
Filtration Water Reverse Osmosis (RO) Plant (1000 Liter Per Hour)	1	500,000	500,000
Bottle brushing and Rinsing Machine (1000 bottles per Hour)	1	100,000	100,000
Carbonation Machine (500 liter per hour)	1	1,000,000	1,000,000
Syrup Mixing Machine (500 liter per hour)	1	200,000	200,000
Sugar Melting Machine (20 Kg)	1	100,000	100,000
Bottle Filling & Crown Capping Machine (1000 Bottles per hour)	1	200,000	200,000
Gas Cylinder (45 KG)	2	50,000	100,000
Platform Trolley	5	30,000	150,000
Plastic Buckets	10	500	5,000
Steel Containers (5 liters)	10	5,000	50,000
Electric Tool Kit	1	20,000	20,000
Mechanical Tool Kit	1	20,000	20,000
Total			2,445,000

9.2.1. Lab Equipment

Details of lab equipment required for the project is provided in **Error! Reference source not found..**

Table 7: Lab Equipment Requirement

Cost Item	Units	Unit Cost (PKR)	Total Cost (PKR)
pH Meter	2	1,000	2,000
Brix Meter	2	2,000	4,000
CO ₂ Tester	2	5,000	10,000
Electronic Weigh Scale (100 kg)	1	20,000	20,000
Electronic Measuring Cup	1	7,000	7,000
Total			43,000

9.2.2. Furniture & Fixtures Requirement

Table 8 provides details of the furniture and fixture requirement of the project.

Table 8: Furniture and Fixtures Requirement

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Executive Chairs	5	20,000	100,000
Executive Table	5	35,000	175,000
Office Chairs	9	10,000	90,000
Office Table	8	25,000	200,000
Sofa Sets	3	10,000	30,000
Visitors Chairs	10	10,000	100,000
Wall racks for office	5	15,000	75,000
Total			770,000

9.2.3. Office Equipment Requirement

Details of office equipment required for the project is provided in Table 9.

Table 9: Office Equipment Requirement

Cost Item	Units	Unit Cost (PKR)	Total Cost (PKR)
Laptop Computer	5	90,000	450,000
Desktop Computer	8	40,000	320,000
Printer	2	40,000	80,000
Air Conditioners (1.5 Ton Inverter)	7	90,000	630,000
LED TV 32"	1	40,000	40,000
Water Dispenser	2	20,000	40,000
Ceiling Fan	11	5,000	55,000
Pedestal Fan	4	10,000	40,000
Security Cameras - 2MP	12	2,000	24,000
Digital Video Recorder (DVR)	1	12,000	12,000
Total			1,691,000

9.2.4. Office Vehicle Requirement

Details of office vehicle required for the project is provided in Table 10.

Table 10: Office Vehicle Requirement

Cost Item	Unit(s)	Unit Cost (PKR)	Total Cost (PKR)
Carry Van (1000 CC)	1	1,050,000	1,050,000
Registration Fee – Carrier		2%	21,000
Motorcycle	1	80,000	80,000
Registration Fee - Motorcycle		1%	8,000
Total	2		1,151,800

9.2.5. Pre-Operating Cost

Details of pre-operating cost for the project are provided in Table 11.

Table 11: Pre-Operating Cost

Cost Item	Number of Months	Total Cost (PKR)
Administration expense	2	334,000
Utilities expense	1	65,966
Total		399,966

9.2.6. Security against Building Rent

Details of pre-operating cost for the project are provided in Table 12.

Table 12: Security against Building Rent

Cost Item	Months	Unit Cos/Month (PKR)	Total Cost (PKR)
Security against Building Rent	3	171,000	513,000
Total			513,000

9.3. Financial Feasibility Analysis

The financial feasibility analysis given in Table 13 provides the information regarding projected IRR, NPV and payback period of the study based on 100% equity.

Table 13: Financial Feasibility Analysis

Description	Project
IRR	60%
NPV (PKR)	47,126,217

Payback Period (years)	2.52
Projection Years	10
Discount Rate used for NPV	15%

9.4. Financial Feasibility Debt Financing

Table 14 provides the information regarding projected IRR, NPV and payback period of the study based on combination of equity (50%) and debt (50%) financing for the proposed project.

Table 14: Financial Feasibility Debt Financing

Description	Project
IRR	61%
NPV (PKR)	53,806,271
Payback Period (years)	2.49
Projection Years	10
Discount Rate used for NPV	13%

9.5. Breakeven Analysis

Breakeven analysis is provided in Table 15.

Table 15: Breakeven Analysis

Particulars	Amount First Year (PKR)	Ratio
Sales (PKR) – A	29,866,400	100%
Variable Cost (PKR) – B	14,139,399	47%
Contribution (PKR) (A-B) = C	15,727,001	53%
Fixed Cost (PKR) – D	14,370,246	48%
Break Even Revenue (D/CM) =E	27,289,851	
Breakeven Units	34,112	
Breakeven Capacity	46%	

9.6. Revenue Generation

Based on the 50% capacity utilization of the unit, sales revenue during the first year of operations is estimated in Table 16.

Table 16: Revenue Generation

Product	Production @ 50% Capacity (Crates)(A)	Sale Price Per Crate (PKR) (B)	Total Revenue (PKR)–(A*B)=D
Carbonated Water (with sugar)	37,333	450	16,799,850
Carbonated Water (without sugar)	37,333	350	13,066,550
Total			29,866,400

9.7. Variable Cost Estimate

Variable costs of the project have been provided in detail in Table 17.

Table 17: Variable Cost Estimate

Variable Cost	Cost (PKR)
Material Cost (with sugar) (Table 18)	2,203,264
Material Cost (Without Sugar) (Table 19)	740,723
Crown Caping Cost (Table 20)	447,996
Bottling and Crate cost (Table 20)	933,325
Lab Consumables (Table 21)	20,400
Electricity Cost	791,591
Water expense	480,000
Direct Labor	5,820,000
Machinery Maintenance - Cost	244,500
Travelling expense	614,400
Communications expense (phone, fax, mail, internet, etc.)	460,800
Office vehicles running expense	614,400
Office expenses (stationery, entertainment, janitorial services, etc.)	768,000
Total Variable Cost	14,139,399

Table 18 and Table 17 provides detail of raw materials.

Table 18: Material Cost (With Sugar)

Particulars	Consumption per Batch (kg)	Cost Per kg (PKR)	Total Cost per Batch (PKR)	Batch Processed Annually	Total Annual Cost (PKR)	Total Annual Cost @ 50% Initial Year Capacity Utilization(PKR)
	A	B	C=(A*B)	D	E=(C*D)	F=E*50%
Sugar	30.00	110	3,300.00	896	2,956,800	1,478,400
Citric acid	1.60	250	400.00		358,400	179,200
Sodium citrate	0.80	380	304.00		272,384	136,192
Sodium Benzoate	0.40	550	220.00		197,120	98,560
Sodium Bicarbonate	0.20	150	30.00		26,880	13,440
CO2	16.60	40	664.00		594,944	297,472
Total	50		4,918		4,406,528	2,203,264

Table 19: Material Cost (Without Sugar)

Particulars	Consumption per Batch(KGs)	Cost Per Kg (PKR)	Total Cost per Batch(PKR)	Batch Processed Annually	Total Annual Cost (PKR)	Total Annual Cost @ 50% Initial Year Capacity Utilization(PKR)
	A	B	C=(A*B)	D	E=(C*D)	F=E*50%
Citric acid	1.67	250	417.50	896	374,080	187,040
Sodium citrate	0.83	380	315.40		282,598	141,299
Sodium Benzoate	0.42	550	231.00		206,976	103,488

Sodium Bicarbonate	0.17	150	25.50		22,848	11,424
CO2	16.60	40	664.00		594,944	297,472
Total			1,653		1,481,446	740,723

Table 20: Crate and Crown Capping Cost

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
	<i>A</i>	<i>B</i>	$C=(A*B)$
Plastic Bottle Crate with 24 bottles*	1	100	100
Capping Cost	24	0.5	12

The glass bottles and crates are normally reused in this industry. The manufacturers normally recollect the crates and bottles from their distributors or retailer shops. That is why it has been assumed that in the 1st year, this cost is only incurred for three months. Post that period, bottles and crates bought during period are available for reuse. In the subsequent years, only 25% of the 1st year cost will be incurred; of which 5% is due to growth in production and 20% is allocated to breakage, etc.

The capping cost is incurred throughout the production.

Table 21: Lab Consumables

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Test Tubes	20	100	2,000
Plastic Weighing Dishes	20	20	400
Sanitizers	10	250	2,500
Hygiene chemicals (phenyl)	10	600	6,000
Detergents	10	200	2,000
Insecticides	10	150	1,500
Polythene Gloves	20	50	1,000
Tissue Rolls	10	250	2,500
Laboratory Coat	5	500	2,500
Total			20,400

9.8. Fixed Cost Estimate

Table 22 provides details of fixed cost for the project.

Table 22: Fixed Cost Estimate

Fixed Cost	Cost (PKR)
Management Staff	7,680,000
Administration benefits expense	1,350,000
Building rental expense	2,052,000
Distribution cost	1,194,656
Promotional expense	746,660
Insurance expense	65,470
Depreciation expense	1,036,135
Amortization of pre-operating costs	79,993
Legal and licensing costs	16,000
Bad Debt Expense	149,332
Total	14,370,246

9.9. Human Resource Requirement

For the 1st year of operations, the Production Unit for Bottled Carbonated Waters shall require the workforce at a salary cost as projected in Table 23.

Table 23: Human Resource Requirement

Designation	No of Persons	Average Monthly Salary (PKR)	Total Salary (PKR)
Owner/Manager	1	100,000	1,200,000
Production Manager	1	75,000	900,000
Production Supervisor	1	50,000	600,000
Labour Skilled-Filtration Water Plant	1	35,000	420,000
Labour Skilled-Bottle brushing and Rinsing Machine	1	35,000	420,000
Labour Skilled-Carbonation Machine	1	35,000	420,000
Labour Skilled-Syrup Mixing Machine	1	35,000	420,000
Labour Skilled-Sugar Melting Machine	1	35,000	420,000
Labour Skilled-Bottle Filling & Crown Capping Machine	1	35,000	420,000

Labour Un-skilled-Bottle Filling & Crown Capping Machine	6	25,000	1,800,000
Procurement Officer	1	40,000	480,000
Store Keeper	2	35,000	840,000
Marketing officer	1	50,000	600,000
Asistant Marketing Officer	2	40,000	960,000
Admin and Accounts officer	1	60,000	720,000
Assistant admin annd accounts officer	2	35,000	840,000
Quality Controller	1	35,000	420,000
Assistant Quality Controller	1	25,000	300,000
Office Boy	2	22,000	528,000
Security Guard	3	22,000	792,000
Total	31		13,500,000

10. CONTACT DETAILS

Details of suppliers of Machinery and Equipment are provided in Table 24.

Table 24 Contact Details of Suppliers

Cost Item	Origin	Supplier Name	Contact Details	Website
Citric acid, Sodium citrate, Sodium Benzoate, Sodium Bicarbonate	Lahore	Ittehad Chemicals	042 3630 658 688	https://ittehadchemicals.com/
Citric acid, Sodium citrate, Sodium Benzoate, Sodium Bicarbonate	Sindh	Asiatic Chemicals Pakistan	0-21-32422537	https://www.asiatic.com.pk/
Syrup Mixing	China	Wenzhou Flowtam Light Industry Machinery	86-577-8680 1878	https://www.flowtam.com/
Bottle Brushing and Rinsing machine	New Zealand	JMP Engineering	+64 9-828 3304	https://www.jmp.co.nz/
Bottle Filling and Crown Cover Machine	China	Sky Machine	+8615151503 519	https://www.sky-machine.com/
Carbonation Machine	Pakistan	Made in China		https://kcsheetmetal.en.made-in-china.com/
Water Filtration Plant	Pakistan	Hydro nix Water Technology	03000777366	https://hydronixwater.com.pk/
CO ₂ gas and Cylinder	Pakistan	Prime Gases	+92-021-35055182	https://www.primegases.net/
CO ₂	Pakistan	UNICOL	+92-21 111-354-111	http://www.unicol.com.pk/products/co2/

11. USEFUL LINKS

Table 25: Useful Links

Organization Name	Website
Small and Medium Enterprises Development Authority (SMEDA)	www.smeda.org.pk
National Business Development Program (NBDP)	www.nbdp.org.pk
Government of Pakistan	www.pakistan.gov.pk
Ministry of Industries and Production	www.moip.gov.pk
Government of Punjab	www.punjab.gov.pk
Government of Sindh	www.sindh.gov.pk
Government of Khyber Pakhtunkhwa	www.kp.gov.pk
Government of Balochistan	www.balochistan.gov.pk
Government of Azad Kashmir	www.ajk.gov.pk
Government of Gilgit-Baltistan	www.gilgitbaltistan.gov.pk
Trade Development Authority of Pakistan	www.tdap.gov.pk
Securities and Exchange Commission of Pakistan	www.secp.gov.pk
State Bank of Pakistan	www.sbp.gov.pk
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	www.fpcci.com.pk
Punjab Small Industries Corporation	www.psic.gop.pk
Sindh Small Industries Corporation	www.ssic.gos.pk
KPK Small Industries Development Board	https://small_industries_de.kp.gov.pk
Directorate of Small Industries Balochistan	http://btevt.gob.pk/directorate-of-small-industries/
Sindh Food Authority	https://sfa.gos.pk/
Punjab Food Authority	https://www.pfa.gop.pk/
Balochistan Food Authority	https://balochistan.gov.pk/departments/food-department/
KPK Food Authority	https://kpfsa.gov.pk/

12. ANNEXURES

12.1. Income Statement

Calculations										
Income Statement										SMEDA
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue- With sugar	16,799,850	20,340,485	24,423,177	29,121,725	34,519,408	40,707,986	47,792,718	55,892,197	65,137,082	71,694,215
Revenue- Without sugar	13,066,550	15,820,377	18,995,804	22,650,230	26,848,429	31,661,767	37,172,114	43,471,709	50,662,175	55,762,167
Revenue	29,866,400	36,160,862	43,418,981	51,771,955	61,367,837	72,369,752	84,964,831	99,363,906	115,799,257	127,456,382
<i>Cost of sales</i>										
Material Cost (With Sugar)	2,203,264	2,695,033	3,269,319	3,938,440	4,716,434	5,619,294	6,665,232	7,874,971	9,272,084	10,310,557
Material Cost (Without Sugar)	740,723	906,053	1,099,124	1,324,078	1,585,635	1,889,170	2,240,808	2,647,515	3,117,215	3,466,343
Crown Caping Cost	447,996	547,998	664,766	800,816	959,021	1,142,597	1,355,265	1,601,263	1,885,336	2,096,494
Bottling and Crate cost	933,325	259,464	288,524	320,839	356,773	396,732	441,166	490,576	545,521	606,619
Lab Consumables	20,400	22,685	25,225	28,051	31,192	34,686	38,571	42,891	47,695	53,036
Electricity Cost	530,585	578,532	630,812	687,817	749,973	817,745	891,642	972,217	1,060,073	1,155,868
Water expense	480,000	523,376	570,672	622,241	678,471	739,783	806,634	879,527	959,007	1,045,669
Direct Labor	5,820,000	6,384,540	7,003,840	7,683,213	8,428,485	9,246,048	10,142,914	11,126,777	12,206,074	13,390,063
Machinery Maintenance - Cost	244,500	269,113	296,204	326,022	358,841	394,964	434,724	478,486	526,654	579,670
Total cost of sales	11,420,793	12,186,794	13,848,488	15,731,517	17,864,824	20,281,019	23,016,956	26,114,223	29,619,658	32,704,320
Gross Profit	18,445,607	23,974,069	29,570,493	36,040,438	43,503,013	52,088,733	61,947,875	73,249,683	86,179,599	94,752,062
<i>General administration & selling expenses</i>										
Management Staff	7,680,000	8,424,960	9,242,181	10,138,673	11,122,124	12,200,970	13,384,464	14,682,757	16,106,984	17,669,362
Administration benefits expense	1,350,000	1,480,950	1,624,602	1,782,189	1,955,061	2,144,702	2,352,738	2,580,953	2,831,306	3,105,943
Building rental expense	2,052,000	2,257,200	2,482,920	2,731,212	3,004,333	3,304,767	3,635,243	3,998,767	4,398,644	4,838,509
Distribution cost	1,194,656	1,592,042	2,104,027	2,761,353	3,602,667	4,676,233	6,042,742	7,778,204	9,977,283	12,087,150
Electricity Cost	261,006	284,592	310,309	338,351	368,927	402,265	438,617	478,253	521,471	568,595
Travelling expense	614,400	673,997	739,374	811,094	889,770	976,078	1,070,757	1,174,621	1,288,559	1,413,549
Communications expense (phone, fax, mail, internet, etc.)	460,800	505,498	554,531	608,320	667,327	732,058	803,068	880,965	966,419	1,060,162
Office vehicles running expense	614,400	676,250	744,325	819,254	901,726	992,499	1,092,411	1,202,380	1,323,420	1,456,644
Office expenses (stationery, entertainment, janitorial services, etc)	768,000	842,496	924,218	1,013,867	1,112,212	1,220,097	1,338,446	1,468,276	1,610,698	1,766,936
Promotional expense	746,660	904,022	1,085,475	1,294,299	1,534,196	1,809,244	2,124,121	2,484,098	2,894,981	3,186,410
Insurance expense	65,470	55,650	45,829	36,009	26,188	16,368	6,547	113,394	96,385	79,376
Depreciation expense	1,036,135	1,036,135	1,036,135	1,041,040	1,040,610	1,040,610	744,171	1,796,038	1,796,038	1,804,523
Amortization of pre-operating costs	79,993	79,993	79,993	79,993	79,993	-	-	-	-	-
Legal and licensing costs	16,000	17,611	19,383	21,335	23,482	25,846	28,448	31,312	34,464	37,933
Bad debt expense	149,332	180,804	217,095	258,860	306,839	361,849	424,824	496,820	578,996	637,282
Subtotal	17,088,852	19,012,198	21,210,398	23,735,848	26,635,455	29,903,585	33,486,597	39,166,838	44,425,649	49,712,373
Operating Income	1,356,755	4,961,870	8,360,095	12,304,590	16,867,558	22,185,149	28,461,278	34,082,845	41,753,950	45,039,689
Gain / (loss) on sale of machinery & equipment	-	-	-	-	-	-	611,250	-	-	-
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	422,750	-	-	-
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	287,950	-	-	-
Earnings Before Interest & Taxes	1,356,755	4,961,870	8,360,095	12,304,590	16,867,558	22,185,149	29,783,228	34,082,845	41,753,950	45,039,689
Subtotal	-	-	-	-	-	-	-	-	-	-
Earnings Before Tax	1,356,755	4,961,870	8,360,095	12,304,590	16,867,558	22,185,149	29,783,228	34,082,845	41,753,950	45,039,689
Tax	373,330	908,561	2,046,033	3,426,606	5,023,645	6,884,801	9,544,129	11,048,995	13,733,882	14,883,891
NET PROFIT/(LOSS) AFTER TAX	983,425	4,053,310	6,314,062	8,877,984	11,843,914	15,300,347	20,239,099	23,033,850	28,020,068	30,155,799

12.2. Balance Sheet

Calculations	SMEDA										
Balance Sheet											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Assets											
<i>Current assets</i>											
Cash & Bank	500,000	988,039	3,427,152	6,049,396	8,914,332	12,006,955	15,227,995	24,093,742	47,793,142	76,304,115	113,140,925
Consumables material inventory	360,442	404,362	537,259	709,400	931,698	1,217,981	1,585,761	2,057,186	2,660,223	3,255,957	-
Pre-paid building rent	171,000	188,100	206,910	227,601	250,361	275,397	302,937	333,231	366,554	403,209	-
Total Current Assets	1,117,287	3,260,707	6,183,971	9,384,157	12,939,173	16,856,236	21,062,867	31,224,825	56,330,522	86,356,115	118,139,329
<i>Fixed assets</i>											
Land	-	-	-	-	-	-	-	-	-	-	-
Building/Infrastructure	1,132,750	1,019,475	906,200	792,925	679,650	566,375	453,100	339,825	226,550	113,275	-
Machinery & equipment	2,445,000	2,078,250	1,711,500	1,344,750	978,000	611,250	244,500	4,634,768	3,939,553	3,244,338	2,549,122
Furniture & fixtures	770,000	654,500	539,000	423,500	308,000	192,500	77,000	1,459,620	1,240,677	1,021,734	802,791
Office vehicles	1,151,800	979,030	806,260	633,490	460,720	287,950	115,180	1,754,885	1,491,652	1,228,420	965,187
Office equipment	1,691,000	1,437,350	1,183,700	930,050	676,400	422,750	169,100	3,205,478	2,724,656	2,243,834	1,763,013
Security against building	513,000	513,000	513,000	513,000	513,000	513,000	513,000	513,000	513,000	513,000	513,000
Total Fixed Assets	7,746,550	6,710,415	5,674,280	4,694,704	3,653,665	2,613,055	1,646,840	11,957,420	10,161,382	8,463,198	6,658,675
<i>Intangible assets</i>											
Pre-operation costs	399,966	319,973	239,980	159,986	79,993	-	-	-	-	-	-
Total Intangible Assets	399,966	319,973	239,980	159,986	79,993	-	-	-	-	-	-
TOTAL ASSETS	9,263,803	10,291,095	12,098,230	14,238,848	16,672,830	19,469,291	22,709,706	43,182,245	66,491,905	94,819,313	124,798,004
Liabilities & Shareholders' Equity											
<i>Current liabilities</i>											
Accounts payable		535,579	561,916	681,758	823,392	990,713	1,188,342	1,421,782	1,697,592	2,004,931	1,827,823
Other liabilities											
Total Current Liabilities	-	535,579	561,916	681,758	823,392	990,713	1,188,342	1,421,782	1,697,592	2,004,931	1,827,823
<i>Other liabilities</i>											
Total Long Term Liabilities	-	-	-	-	-	-	-	-	-	-	-
<i>Shareholders' equity</i>											
Paid-up capital	9,263,803	9,263,803	9,263,803	9,263,803	9,263,803	9,263,803	9,263,803	9,263,803	9,263,803	9,263,803	9,263,803
Retained earnings		491,712	2,272,511	4,293,287	6,585,636	9,214,775	12,257,561	32,496,660	55,530,510	83,550,578	113,706,377
Total Equity	9,263,803	9,755,516	11,536,314	13,557,090	15,849,439	18,478,578	21,521,364	41,760,463	64,794,313	92,814,382	122,970,180
TOTAL CAPITAL AND LIABILITIES	9,263,803	10,291,095	12,098,230	14,238,848	16,672,830	19,469,291	22,709,706	43,182,245	66,491,905	94,819,313	124,798,004

12.3. Cash Flow Statement

Calculations											SMEDA
Cash Flow Statement											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<i>Operating activities</i>											
Net profit		983,425	4,053,310	6,314,062	8,877,984	11,843,914	15,300,347	20,239,099	23,033,850	28,020,068	30,155,799
Add: depreciation expense		1,036,135	1,036,135	1,036,135	1,041,040	1,040,610	1,040,610	744,171	1,796,038	1,796,038	1,804,523
amortization of pre-operating costs		79,993	79,993	79,993	79,993	79,993	-	-	-	-	-
Equipment inventory	(20,375)	(4,197)	(5,061)	(6,103)	(7,360)	(8,876)	(10,704)	(12,909)	(15,568)	(18,774)	109,927
Consumables Inventory	(360,442)	(43,919)	(132,897)	(172,141)	(222,298)	(286,283)	(367,780)	(471,425)	(603,037)	(595,734)	3,255,957
Pre-paid building rent	(171,000)	(17,100)	(18,810)	(20,691)	(22,760)	(25,036)	(27,540)	(30,294)	(33,323)	(36,655)	403,209
Accounts payable		535,579	26,337	119,842	141,634	167,321	197,629	233,440	275,810	307,340	(177,108)
Cash provided by operations	(617,287)	979,751	4,711,624	6,972,090	9,450,572	12,307,398	15,552,994	19,920,499	23,699,399	28,608,826	36,836,811
<i>Financing activities</i>											
Issuance of shares	9,263,803	-	-	-	-	-	-	-	-	-	-
Cash provided by / (used for) financing activities	9,263,803	-	-	-	-	-	-	-	-	-	-
<i>Investing activities</i>											
Capital expenditure	(8,146,516)	-	-	(56,559)	-	-	(74,394)	(11,054,751)	-	(97,853)	-
Cash (used for) / provided by investing activities	(8,146,516)	-	-	(56,559)	-	-	(74,394)	(11,054,751)	-	(97,853)	-
NET CASH	500,000	979,751	4,711,624	6,915,531	9,450,572	12,307,398	15,478,600	8,865,748	23,699,399	28,510,973	36,836,811

13. KEY ASSUMPTIONS

13.1. Operating Cost Assumptions

Table 26: Operating Cost Assumptions

Description	Details
Building rent growth rate	10%
Furniture and fixture depreciation	15%
Vehicle depreciation	15%
Office equipment depreciation	15%
Inflation rate	11.3%
Wage growth rate	7.3%
Electricity price growth rate	8.8%
Office equipment price growth rate	8.0%
Office vehicle price growth rate	10.7%

13.2. Revenue Assumptions

Table 27: Revenue Assumptions

Description	Details
Sale price growth rate	11.3%
Initial capacity utilization	50%
Capacity growth rate	5%
Maximum capacity utilization	90%

13.3. Financial Assumptions

Table 28: Financial Assumptions

Description	Details
Project life (Years)	10
Debt: Equity	0:100
Discount Rate used for NPV (100% Equity)	15%
Discount Rate used for NPV (50:50 Debt: Equity)	13%

13.4. Cash Flow Assumptions

Description	Details
Accounts receivable cycle (in days)	15
Accounts payable cycle (in days)	30

13.5. Debt Related Assumptions

Description	Details
Debt tenure (years)	5
Debt grace period (years)	1
Interest rate (KIBOR+3%)	11.3%

Small and Medium Enterprises Development Authority

HEAD OFFICE

4th Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road, Lahore
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www.smeda.org.pk, helpdesk@smeda.org.pk

REGIONAL OFFICE PUNJAB	REGIONAL OFFICE SINDH	REGIONAL OFFICE KPK	REGIONAL OFFICE BALOCHISTAN
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