

Pre-Feasibility Study

CANOLA AND SOYBEAN OIL REFINING AND PACKAGING UNIT



Small and Medium Enterprises Development Authority

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1. DISCLAIMER

This information memorandum is to introduce the subject matter and provide a general idea and information on the said matter. Although, the material included in this document is based on data/information gathered from various reliable sources; however, it is based upon certain assumptions, which may differ from case to case. The information has been provided on, as is where is basis without any warranties or assertions as to the correctness or soundness thereof. Although, due care and diligence has been taken to compile this document, the contained information may vary due to any change in any of the concerned factors, and the actual results may differ substantially from the presented information. SMEDA, its employees or agents do not assume any liability for any financial or other loss resulting from this memorandum in consequence of undertaking this activity. The contained information does not preclude any further professional advice to be obtained by the user. The prospective user of this memorandum is encouraged to carry out additional diligence and gather any information which is necessary for making an informed decision, including taking professional advice from a qualified consultant/technical expert before taking any decision to act upon the information.

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2. EXECUTIVE SUMMARY

Vegetable oils and fats are important constituents of foods and are essential components of daily human diet. Vegetable oils are obtained by mechanical expelling or solvent extraction of oleaginous¹ seeds (soybeans, canola, sunflower seeds, etc.). The proposed project is a refining and packaging unit to process Canola and Soybean crude oils. Canola is a crop, having three to five feet tall plants that produce seeds (in the pods) which are harvested and crushed to produce canola oil and meal. The soybean is an erect branching plant and which can reach attain a height of around more than 2 meters (6.5 feet) in height.

Canola and Soybean oils are similar in terms of their nutritive value since they provide roughly same calories per gram and both are good sources of vitamin E and K. They also provide Omega-3² and Omega-6 fatty acids. Canola oil's non-distinctive flavor makes it suitable for general cooking and should be avoided for deep-frying as it has a relatively low smoke point of 204 C. On the other hand, Soybean oil is low in saturated fat and high in unsaturated fats. Its high smoke point (256 C) and inexpensive price make it ideal for deep-frying.

Crude oil needs to be refined to remove unwanted minor components that make oils unappealing to consumers. All glycerides and non-glyceridic compounds that are harmful to the flavor, color, stability, or safety of refined oils are removed during refining process. Phosphoacyl glycerols, free fatty acids, pigments, volatiles, and contaminants are the main materials in this regard. During cooking oils refining, the approach is to retain as many beneficial nutrients of oil as possible and incur the least amount of refining loss.

Refining of crude oil can be done either by chemical or physical method. Chemical refining procedure includes caustic soda treatment to neutralize the oil while, in physical refining, free fatty acids are eliminated by distillation during deodorization. The proposed project refines Canola and Soybean crude oils through chemical refining, since it is cost and time efficient as compared to physical refining. In physical refining, manual labor is required for deodorization process, which increases the overall cost, whereas in chemical refining, costly machinery is required, but the operational cost in this process is lower and the final product is also of higher quality and has a longer shelf life.

This "Pre-feasibility Document" provides details for setting up a "Canola and Soybean Oil Refining and Packaging Unit". The products produced by the proposed unit include refined canola oil and refined Soybean oils in pouch and bottle packaging. Health considerations make Canola and Soybean oils popular in the masses. An increasing consumption trends of Canola and Soybean in the country makes the proposed project an attractive investment proposition.

¹ Seeds/Foods from which oil can be extracted.

² Omega are nutrients obtained from food (or supplements) that help build and maintain a healthy body.

The proposed unit may be established in industrial areas of large to medium cities of the country; like Lahore, Karachi, Islamabad, Peshawar, Quetta, Faisalabad, Hyderabad, Multan, Rawalpindi, Bahawalpur, Sargodha, Sukkur, Sialkot, Gujranwala, Mardan, Lasbela, Sahiwal, Gujrat, etc. These cities are good locations due to the availability of strong supply chain and industrial infrastructure. Availability of skilled and low-cost labor is also a major factor to select these cities.

The production unit will be set up in a rented building having an area of 9,076 square feet. The proposed business will have maximum capacity of refining 2,027,130 liters of Canola and Soybean oils, which include 1,013,565 liters of Canola oil and 1,013,565 liters of Soybean oil. The refined oil for both Canola and Soybean will be sold in four types of packagings which include 413,700 1-liter packets, 310,276 1-liter bottles, 68,950 3-Liter bottles and 20,685 5-liter bottles of Canola oil and 413,700 1-liter packets, 310,276 1-liter bottles, 68,950 3-liter bottles and 20,685 5-liter bottles of Soybean oil.

The project is assumed to attain 60% capacity utilization during the first year of operations; which is equal to 1,216,278 liters of both the oils, 608,139 liters of Canola oil and 608,139 liters of Soybean oil. Canola oil production includes 248,220 1-liter packets, 186,166 1-liter bottles, 41,370 3-liter bottles and 12,411 5-liter bottles. Soybean oil production includes 248,220 1-liter packets, 186,166 1-liter bottles, 41,370 3-liter bottles and 12,411 5-liter bottles. Further, this project is expected to generate Gross Annual Revenues of PKR 449.88 million during the first year of operations.

The project requires a total investment of PKR 85.88 million. This includes capital investment of PKR 55.72 million and working capital of PKR 30.16 million. It is proposed that the project shall be financed through 100% equity. The Net Present Value (NPV) of project is PKR 113.32 million with an Internal Rate of Return (IRR) of 43% and a Payback period of 4.05 years, Gross Profit (GP) ratio ranging from 19% to 27% and Net Profit (NP) ratio ranging from 4% to 12% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 44% (711,201 packets and bottles) with annual breakeven revenue of PKR 327.71 million.

The proposed project may also be established using leveraged financing. At 50% financing at a cost of KIBOR+3%, the proposed business provides Net Present Value (NPV) of PKR 143.92 million, Internal Rate of Return (IRR) of 42% and Payback period of 4.14 years. Further, this project is expected to generate Net Profit (NP) ratio ranging from 3% to 12% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity utilization of 46% (745,595 packets and bottles) with breakeven revenue of PKR 343.56 million.

The proposed project will provide employment opportunities to 90 people, working in 3 shift of 7 hours for 280 days in a year. 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 business”. Further, the proposed project may also be established as a “Partnership Concern” or “Private Limited Company”.

3. INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with the 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 ‘sectorial 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 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 establishing a “Canola and Soybean Oil Refining and Packaging unit”. 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

Soybean, also known as Soja Bean or Soya Bean, is one of the most important bean in the world, acting as a source of vegetable protein to feed millions of people around the world. It is also an important ingredient of hundreds of chemical products. It is considered as one of the richest and cheapest sources of protein and is widely consumed throughout the world by humans as well as by animals. The seed contains 17% oil and 63% meal, 50% of which is protein. As Soybeans do not contain starch, they are a good source of protein for diabetic and cancer patients as well. Soybean oil consists of polyunsaturated fatty acids, which help reduce bad cholesterol levels in blood, lowering the risk of heart diseases and strokes. They also provide nutrients to help develop and maintain human body's cells. Soybean oil also contains vitamin E, an anti-inflammatory nutrient that can support skin health. Vitamin E protects against skin damage and helps treat certain skin conditions, such as acne.

Canola is an oilseed crop that was created in Canada through crossbreeding of the rapeseed plant. The name "Canola." comes from "Canada" and "Ola," denoting oil. Canola is one of the most important oilseed crops in the world. Extracted from Canola seeds, Canola oil is considered to be one of the healthiest edible vegetable oil, which is a high content of healthier unsaturated fats. In comparison with other oils, it contains a higher amount of Omega-3 fatty acid-alpha-linolenic acid (ALA). ALA is particularly important to have in diet because human body cannot make it. ALA helps in protecting the heart through its positive effects on blood pressure, cholesterol, and inflammation. Canola oil is also a very good source of vitamins E and K. Furthermore, it contains phytosterols, molecules that reduce the absorption of cholesterol in the human body.

The oil directly recovered from the Soybean/Canola seeds, whether through solvent extraction or mechanical expelling, is "crude" and contains impurities, such as lecithins, free fatty acids, and undesirable color and odor. These impurities are removed in a series of processes to yield "refined" oil.

Crude oil can be refined through physical or chemical/conventional refining. In physical refining, the free fatty acids in the oil are removed using single-stage distillation during the deodorization process. It can only be used with certain types of crude oils such as palm oil and also requires skilled labor. The crude oil refined through physical refining has shorter shelf life. In chemical refining, caustic soda is used to neutralize the free fatty acids in the oil through chemical reaction. Chemical refining can be used with a

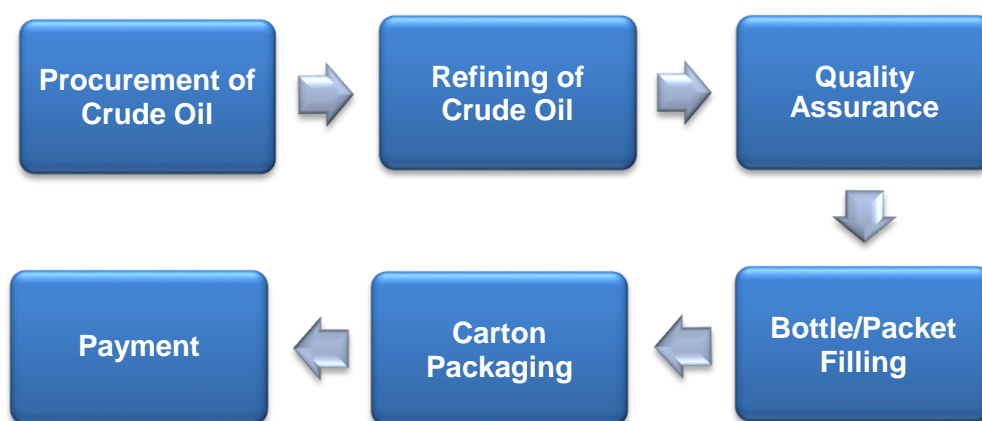
wider variety of crude oils, including Soybean, sunflower and rapeseed oils. In this process, the refined oil is more chemically stable and has a longer shelf life.

Commercially, chemical refining of crude oil is preferred because it requires one-time investment for machinery and other equipments. Through chemical refining, shelf life of oil is increased and it also has a reduced need for skilled labor. Hence, in the proposed project, crude Canola and Soybean is refined through chemical/conventional refining.

5.1. Process Flow

A general process flow of refining crude Canola and crude Soybean oil is shown in Figure 1.

Figure 1: Refining Process



Procurement of Crude oil

The first step is to procure the raw materials. Crude Canola and Soybean oils are the major raw materials required in the proposed project. The crude oils of both Soybean and Canola can be procured from the importers of crude oil. Along with crude oils, other additives required for the refining process are Vitamin A, B & E, nickel, Anti Oxidant, Phosphoric Acid, Citric Acid, Caustic soda, Fuller Earth, and Flavors. These can be easily procured from the local market.

The procured crude oils are stored in storage tanks, each with a storage capacity of 10,000 liters. A storage tank for crude oil is shown in Figure 2. The storage tanks are connected with the refining plants through piping systems, to transfer crude oils for refining. A refining Plant is shown in Figure 3. In the proposed project, one separate refining plant, each for Canola and Soybean Oil, has been recommended. Furthermore, raw materials inventory of 1 months has been assumed, since the import of crude oils takes considerable time. Hence, 5 storage tanks each for Canola and Soybean crude oil have been assumed in this project.

Figure 2: Storage Tank



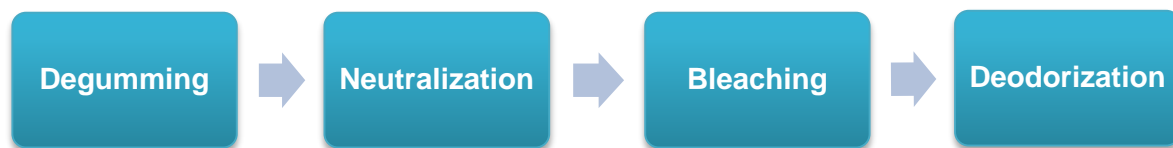
Figure 3: Refining Plant



Refining of Crude Oil

The crude oil contains impurities such as as lecithin, free fatty acids, and undesirable color and odor. In order to produce "refined" oil, these impurities are removed by a series of processes. Both Canola and Soybean oils are refined by a process known as chemical refining. Chemical refining plants for both Soybean and Canola have been assumed to be imported from China. This process involves number of steps, including degumming, neutralization, bleaching and deodorization. Figure 4 shows the flow chart of refining process.

Figure 4: Refining Process



These processes are explained in the following paragraphs.

- ***Degumming***

Chemical refining of crude oil starts with the process of degumming which commences with heating of crude oil. Storage tanks for crude oil are connected with refining plants through pipelines. Crude oil moves to refining plant through these pipelines, where the temperature of oil is raised slowly. The purpose of degumming, is the removal of any seed particles, impurities and most of the phosphatides, carbohydrates, proteins and traces of any metals.

Degumming removes phosphatides which tend to separate from the oil and form a sludge during storage. The phosphatide content of oil varies but is typically around 1.25%, which equates to a phosphorus content of around 500 ppm. The presence of high phosphorus content is undesirable as it reacts with other metals generating residues that interrupt further normal operations in the refinery. There are generally two types of phosphatides present in the crude oil, depending upon their hydration levels i.e., hydratable and non-hydratable. Hydratable phosphatides can be removed by the addition of water known as water degumming, whereas non-hydratable phosphatides can be removed by addition of acids such as phosphoric acid or citric acid, followed by a water wash to ensure total degumming. Acid de-gumming reduces phosphorus to less than 50 ppm.

- ***Neutralization***

Neutralization is the second process in the oil refining which commences after degumming completion. The heating temperature range is kept at 55-70 C depending on the type of crude oil. The main purpose of neutralization is to remove the Free Fatty Acids (FFA) present in the crude oils. In chemical refining, an alkali is used to neutralize FFA and to remove the oil acidity.

In the most common method of neutralizing oil, caustic soda is mixed with oil in calculated amounts to react with the FFA. The soap stock formed by the action of caustic soda is allowed to settle at the bottom of the tank and is then drained. The remaining oil contains trace amounts of soap. These traces of soap can be removed by washing the oil with hot water and discarding the wash water. Washing is repeated three or four times in a batch operation for maximum removal of the soap from the oil. The residual soap content in the oil can be reduced to an almost zero level by washing the oil with citric acid. Extracted soap is sold as sludge to the soap manufacturing companies.

- **Bleaching**

Bleaching is performed to remove color pigments from the oil. Neutralized and washed oil contains a moisture level of 0.2 to 0.5 percent. This oil is transferred to the bleacher vessel, where it is heated to 90C under a vacuum to remove the moisture. Once water is removed, bleaching agents such as Fuller's earth, Nickel and/or activated carbon are mixed with the oil to remove the color pigments. The quantities of bleaching agents depend upon the initial color of the oil and the desired bleaching level. After a certain time, the oil is cooled to 70C for filtration.

- **Deodorization**

Deodorization has a big impact on the refined oil quality and is often considered as the most important step of the entire edible oil refining process.

It is a vacuum steam distillation process that removes the components that give rise to undesirable flavors, colors and odors in oils. Careful execution of this process also improves the stability and the color of the oil, while preserving its nutritional value. In deodorization, stripping process is performed in which a measured amount of a stripping agent is allowed to pass for a defined time. Most commonly used stripping agent is live steam. The oil is subjected to steam distillation under high temperature and vacuum which evaporate all the volatile, odor-generating and flavor-generating substances.

Quality Assurance

The main quality factors for cooking oil are colour, clarity, flavour and odour. The flavour and odour of oil depend on the type of raw materials used and the extent of rancidity. The refined oil is examined through oil quality detector by quality assurance department. The cooking oil quality detector is used for measuring TPM³ percentage which is a generic term for free fatty acids present in oil. The percentage of free fatty acids should not exceed 5%. Figure 5 shows the oil quality detector in the proposed project. Furthermore, the colour of crude and refined oils is a significant factor. In the oil color test kits, oil colour samples are provided in pre-filled two sample bottles that show acceptable and below acceptable oil colour. With an eyedropper, an oil sample is taken and matched against the given guide colours. Figure 6 shows a frying oil color

³ TPM stands for Total Polar Materials

test kit. Moreover, an acid test value test isto be performed which is an important indicator of vegetable oil quality. Acid value is expressed as the amount of potassium hydroxide (KOH, in milligrams) necessary to neutralize free fatty acids contained in 1 g of oil. The permissible level of acid value for all edible oils should be below 0.6 mgKOH/g. The equipment required to perform this test are Erlenmeyer flasks (250 ml), magnetic stirring devices, burette(10 ml) and an analytical balance. Figure 7 shows the lab equipment required for the Acid Value Test.

Figure 5: Oil Quality Detector



Figure 6: Frying Oil Color Test Kit



Figure 7: Lab Equipment Required for Acid Value Test

Bottle / Packet Filling

The refined oil is then transferred to the refined oil storage tanks, which are connected with bottle and pouch filling machines. In the proposed project, there are two filling machines, one for pouches and the other for bottles. Refined oil is packed in 1 kg pouch, 1 liter bottle, 3 liter bottle and 5 liter bottle. Figure 8 and Figure 9 Show a pouch filling a bottle filling machine respectively.

Figure 8: Oil Pouch Filling Machine

Figure 9: Oil Bottle Filling Machine**Carton Packaging**

Bottles and pouches are further packed in cartons packaging. For packaging of 1 liter pouches, each carton has capacity of storing 5 pouches of oil. For packaging of one liter bottles, each carton has capacity of storing six bottles of oil, and for packaging of five liter bottles each carton has capacity of storing 4 bottles of oil.

Payment and delivery

Packed cartons are stored in finished goods store. In the proposed project, cartons are transferred to the wholesaler from the packing department. Credit period of 20 days is allowed to the customers for the payment of cartons of oil.

5.2. Installed and Operational Capacities

The proposed production unit runs in three shift of 7 hours for 280 days in a year and produces finished products in the packings of pouches and bottles. The proposed business will have maximum capacity of producing 1,013,565 liters of Canola oil and 1,013,565 of Soybean oil in a year. As per the assumed distribution, 40% of oil packed in 1-liter pouch 30% packed in 1-liter bottles, 20% in 3-liter bottles and 10% in 5-liter bottles which translate into of 413,700 1-liter packets, 310,276 1-liter bottles, 68,950 3-liter bottles and 20,685 5-liter bottles of Canola oil, and 413,700 1-liter packets, 310,276 1-liter bottles, 68,950 3-liter bottles and 20,685 5-liter bottles of Soybean oil.

The project is assumed to attain 60% capacity utilization during the first year of operations; which is equal to producing 608,139 liters of refined canola oil and 608,139 of refined Soybean oil. 40% of the refined oil is packed in 1-liter pouch, 30% is packed in 1-liter bottles, 20% in 3-liter bottles and 10% in 5-liter bottles which translate into 248,220 1-liter packets, 186,166 1-liter bottles, 41,370 3-liter bottles and 12,411 5-liter bottles of Canola oil and 248,220 1-liter packets, 186,166 1-liter bottles, 41,370 3-liter bottles and 12,411 5-liter bottles of of Soybean oil. The operational capacity utilization is assumed to increase at the rate of 5% per annum to reach a maximum of 95% in the 8th year of operations.

Table 3 shows details of maximum annual capacity and operational capacity utilized during 1st year of operations. The total production capacity of Canola and Soybean oil is shown in Table 1. Wastage calculation is shown in Table 2, and total capacity calculation, with respect to pouch and bottles production is shown in Table 3.

Table 1: Installed and Operational Capacity

Particulars	No. of Machines	Refining Capacity Per Hour (Liter)	Refining Capacity Per Shift (Liter)	Refining Capacity of Crude oil Per day (Liters)	Process Loss	Production Capacity per day (Liters)	Annual Production Capacity @ 100% (in liters)	Annual Production Capacity @ 60%(in liters)
Canola oil	1	175	1,225	3,675	1.5%	3,620	1,013,565	608,139
Soybean oil	1	175	1,225	3,675	1.5%	3,620	1,013,565	608,139
Total						7,240	2,027,130	1,216,278

Table 2: Wastage Calculation

Particulars	Refining Capacity of Crude oil Per day (Liters)	Process Loss	Annual Sludge Wastage	Annual Sludge Wastage @ 60%
Canola oil	3,675	1.5%	15,435	9,261
Soybean oil	3,675	1.5%	15,435	9,261
Total				18,522

Table 3: Capacity Calculations in Bottle/Packets

Products	Proportion of Packaging (%)	Bifurcation in Liters	Packet/Bottle Capacity (Liters)	Filling Capacity Of Packet/Bottle (Liters)	No. of Packets/Bottle @ 100% Production Capacity	No. Of Packets/Bottle @ 60% Initial Production Capacity
Canola oil						
1 liter Packet	40%	405,426	1	0.98	413,700	248,220
1 liter bottle	30%	304,070	1	0.98	310,276	186,166
3 liter bottle	20%	202,713	3	2.94	68,950	41,370
5 liter bottle	10%	101,357	5	4.90	20,685	12,411
Sub Total		1,013,566			813,611	488,167
Soybean oil						
1 liter Packet	40%	405,426	1	0.98	413,700	248,220
1 liter bottle	30%	304,070	1	0.98	310,276	186,166
3 liter bottle	20%	202,713	3	2.94	68,950	41,370
5 liter bottle	10%	101,357	5	4.90	20,685	12,411
Sub Total		1,013,566			813,611	488,167
Total		2,027,130			1,627,222	976,334

6. CRITICAL FACTORS

Before making the decision to invest in Canola and Soybean Oil Refining and Packaging Unit, one should carefully analyze the associated risk factors. The important considerations in this regard include the following:

- Use of trusted crude oil suppliers who can deliver high quality should be ensured. This is the key to produce high quality final products.
- Extensive marketing and advertising campaign is required to overcome the entry barriers in the local market.
- Proper cleaning of equipment is very important to ensure strict compliance with the required standards of hygiene and safety.
- Strong aggressive and efficient, distribution agents are required to ensure a visible presence and high sales in this highly competitive market.

7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT

The proposed Canola and Soybean Refining and Packaging Unit has potential to provide good entrepreneurship opportunity if the business is established in large to medium cities, such as Karachi, Lahore, Islamabad, Peshawar, Quetta, Hyderabad, Gujranwala, Faisalabad, Sialkot, Sukkur, Rawalpindi, Multan, Bahawalpur, Gujrat, Sargodha, Lasbela, Mardan, Sahiwal, Gujrat, etc. These cities are suitable locations to establish the proposed unit due to easy access to availability of skilled and low-cost labor and better industrial infrastructure.

These locations offer good potential for Canola and Soybean oil refining business, because these areas have retail, cosmetics and chemical sectors, and the businesses that use it as biofuel. There are also large number of restaurants and households in such cities which is the other large market segment

8. POTENTIAL TARGET MARKETS / CUSTOMERS

The prime target markets of canola and soybean oil are food industry, cosmetics industry for skin and hair care products, chemical industry, retail sector, restaurants and companies using it for biofuels. Canola oil is currently also used to produce bio-diesel. Refined canola and soybean oils are mostly required by hotels, restaurants and households on daily basis for cooking processes. such as frying, baking saucemaking, etc

The proposed project targets wholesalers as its major customers. The potential target markets or customers for Canola and Soybean oil include general consumers. In urban areas, people have more concerns about their health. Diet conscious consumers consume both Canola and Soybean because of lower fats. It also helps to control the risk of heart diseases.

Pakistan is heavily dependent on import of oilseeds and edible oil to meet local demand. Pakistan has become the third largest importer of cooking oil. Imports help the country meet around 75% of its domestic needs. The remaining need is met through locally produced cooking oils. Hence, there is huge potential in this industry to grab the market of refined edible oil, most of the demand of which is currently fulfilled through imports. In 2020-2021, import of Canola seeds under HS code 120590 increased from \$431,354 to \$615,961, and Soybean seeds under HS code 120810 increased from \$101,869 to \$180,649.⁴

There are around 150 edible oil processing plants in Pakistan.⁵ Demand of oil is increasing day by day but due to undocumented nature of economy it is difficult to know the exact number of units in the country. In Pakistan, most of the oil refining units exist in major cities such as Karachi, Lahore, Faisalabad, Rawalpindi, Gujranwala, Hyderabad, Peshawar, Quetta and Multan.

The major brands in Pakistan of edible oil are Dalda, Meezan, Kausar, Habib, Sufi, Eva, Kisan, Kashmir, and Seasons. Such oil companies play an important role to meet the local demand. The local market of edible oil is expected to grow annually by 9.37% (CAGR 2023-2027)⁶ which shows potential for this business.

9. PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of Canola and Soybean Oil Refining and Packaging Unit. Various assumptions relevant to revenue and costs along with the results of the analysis are outlined in this section.

The projected Income Statement, Cash Flow Statement and Balance Sheet are attached as annexures of this document.

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

9.1. Initial Project Cost

Table 4 provides fixed and working capital requirements for establishment and operations of Canola and Soybean Oil Refining and Packaging Unit.

Table 4: Initial Project Cost estimates

Particulars	Cost (PKR)	Reference
Land		9.1.1
Building / Infrastructure	1,586,412	9.1.2
Machinery & equipment	11,600,000	9.1.3
Allied Equipment	30,724,500	9.1.4

⁴ <https://comtrade.un.org/data>

⁵ <https://www.researchgate.net/publication/279545575> The vegetable oil industry in Pakistan

⁶ <https://www.statista.com/outlook/cmo/food/oils-fats/edible-oils/pakistan>

Office equipment	1,692,000	9.1.5
Furniture & fixtures	1,146,000	9.1.6
IT Equipment	1,862,000	9.1.7
Office vehicles	3,753,500	9.1.8
Advance against building rent	1,497,540	9.1.9
Pre-operating costs	1,861,638	9.1.10
Total Capital Cost – (A)	55,723,590	
Working Capital		
Raw Material Inventory	26,623,268	
Packing Material Inventory	534,285	
Upfront Building Rent	499,180	
Consumables Inventory	1,817	
Cash	2,500,000	
Total Working Capital Requirement - (B)	30,158,550	
Total Project Cost - (A+B)	85,882,140	

9.1.1. Land

The proposed unit will be established in a rented building to avoid the high cost of land. Suitable location for setting up a Canola and Soybean Oil Refining and Packaging Unit can easily found on rent. Therefore, no land cost has been added to the project cost. Total space requirement for the proposed center has been estimated as 9,076 sq. feet. The breakup of the space requirement is provided in Table 5.

Table 5: Breakup of Space Requirement

Description	% Break-Up	Numbers	Area(Sq. feet.)
Raw Material Store	15%	1	1,400
Production and Packing Area	30%	1	2,750
Finished Goods Store	33%	1	3,000
Quality Assurance Lab	1%	1	120
Workers' Rest Area	2%	1	150
Washroom	2%	3	144
Office Block			
Executive Office	2%	1	180
Admin and HR Office	3%	1	270
Accounts Office	2%	1	180
Procurement Department	2%	1	180

Sales and Marketing Department	3%	1	270
Reception Area	1%	1	100
Parking Area	2%	1	140
Washroom	2%	4	192
Total	100%		9,076

9.1.2. Building and Renovation Cost

There will be no cost of building construction since the refining unit will be started in a rented premises. However, there will be a renovation cost required to make the building usable for the business. The proposed project requires electricity load of around 70 KW, for which an industrial electricity connection will be required. Building rent of PKR 499,180 per month has been included in the operating cost. Table 6 provide details of building renovation cost.

Table 6: Building Renovation Cost

Cost Item	Unit of Measurement	Total Units	Cost per Unit (PKR)	Total Cost (PKR)
Paint Cost	Liter	180	800	144,032
Labour Cost-Paint	Square Feet	18,004	15	270,060
Glass partition	Square Feet	840	550	462,000
Blinds	Units	10	7,000	70,000
Curtains	Units	4	6,000	24,000
Wall Racks	Units	30	15,000	450,000
Ceramic Floor Tiles-12*12 inch	Square Feet	1,512	110	166,320
Total				1,586,412

9.1.3. Machinery and Equipment

Table 7 provides details of machinery and equipment for the proposed project.

Table 7: Machinery Cost Details

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Refining Plant (2 ton per day , 10KW)	2	2,000,000	4,000,000
Refining Plant (2 ton per day , 10KW)	2	2,000,000	4,000,000
Pouch Packing Machine (5 bags/min, 4KW)	1	1,600,000	1,600,000
Packing Machine(5 Bottles/min)	1	800,000	800,000

Generator 30 KVA	1	1,200,000	1,200,000
Total			11,600,000

9.1.4. Allied Equipment

Table 8 provides details of the Allied Equipment required along with their cost for the proposed project.

Table 8: Allied Equipment Details

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Canola Crude Oil Mild Steel Storage Tanks (10,000 Ltr)	10	1,200,000	12,000,000
Soybean Crude Oil Mild Steel Storage Tanks (10,000 Ltr)	10	1,200,000	12,000,000
Refined Oil Stainless Steel Storage Tank (2,000 Ltr)	4	1,600,000	6,400,000
Lab Equipment			0
Cooking Oil Quality Detector	2	90,000	180,000
Frying Oil Color Testing Kit	5	9,500	47,500
Erlenmeyer Flasks (250 ml)	3	7,000	21,000
Magnetic Stirring Device	2	30,000	60,000
Analytical Balance	2	8,000	16,000
Total			30,724,500

9.1.5. Office Equipment

Table 9 shows details of equipment cost required for the production unit.

Table 9: Office Equipment

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Inverter AC (1Ton Converter)	8	105,000	840,000
Exhaust Fan	7	4,500	31,500
Ceiling Fan	30	8,000	240,000
Bracket Fan	25	10,500	262,500
LED 32'	2	36,000	72,000
Pedestal Fan	15	10,000	150,000
Water Dispenser	4	24,000	96,000
Total			1,692,000

9.1.6. Furniture and Fixture

Table 10 provides details of furniture and fixtures.

Table 10: Furniture & Fixtures Cost Details

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Executive Table	1	60,000	60,000
Executive Chairs	1	30,000	30,000
Office Chairs	12	13,500	162,000
Office Table	24	15,000	360,000
Visitor Chairs	12	25,000	300,000
Plastic Chairs (For rest area)	12	2,000	24,000
Sofa Set	4	45,000	180,000
Reception Desk	1	30,000	30,000
Total			1,146,000

9.1.7. IT Equipment

Table 11 provides details of the IT Equipment required along with their cost for the proposed project.

Table 11: IT Equipment

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Laptop	8	150,000	1,200,000
Desktop Computers	7	50,000	350,000
Printers	2	41,500	83,000
CCTV Cameras (2 MP)	32	2,500	80,000
DVR (16 channel)	2	17,000	34,000
LED TV	3	36,000	108,000
Wi-Fi / Internet Router	2	3,500	7,000
Total			1,862,000

9.1.8. Office Vehicles

Table 12 provides details of the vehicles required along with their cost for the proposed project.

Table 12: Office Vehicle Cost Details

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Motorcycle	1	120,000	120,000
Loader Rikshaw	1	350,000	350,000
Hyundai H-100 Loader Truck	1	3,200,000	3,200,000
Registration Charges-Motorcycle		6,500	6,500
Registration Charges-Loader Rikshaw		13,000	13,000
Registration Charges-H-100 Loader Truck		2%	64,000
Total			3,753,500

9.1.9. Security against Building

Table 13 provides details of security against building.

Table 13: Security against Building

Costs Item	No.of Months	Unit Cost (PKR)	Total Cost (PKR)
Security Against Building	3	499,180	1,497,540
Total			1,497,540

9.1.10. Pre-Operating Costs

Table 14 provides details of estimated pre-operating costs.

Table 14: Pre-Operating Cost Details

Costs Item	Total Cost (PKR)
Administration expenses	1,500,000
Utilities expenses	361,638
Total Cost (PKR)	1,861,638

9.2. Breakeven Analysis

Table 15 shows calculation of breakeven analysis.

Table 15: Breakeven Analysis

Particulars	Amount First Year (PKR)	Profitability Ratio
Sales (PKR) – A	449,882,880	100%
Variable Cost (PKR) – B	368,553,438	82%
Contribution (PKR) (A-B) = C	81,329,442	18%
Fixed Cost (PKR) – D	59,243,656	13%
Breakeven		
Breakeven Revenue (PKR)		327,712,891
Breakeven Units		711,201
Breakeven Capacity		44%

9.3. Revenue Generation

Table 16 provides details for revenue generation of the production during the first year of operations.

Table 16: Revenue Generation

Particulars	Price Per Unit (PKR)	Units Sold	Revenue (PKR)
Canola Oil			
1 Liter Packet	375	243,049	91,143,375
1 Liter Bottle	385	182,288	70,180,880
3 Liter bottle	1,030	40,508	41,723,240
5 Liter Bottle	1,570	12,152	19,078,640
Sub-Total			222,126,135
Soybean Oil			
1 liter Packet	385	243,049	93,573,865
1 liter bottle	395	182,288	72,003,760
3 liter bottle	1,040	40,508	42,128,320
5 liter bottle	1,650	12,152	20,050,800
Sub-Total			227,756,745
TOTAL (PKR)			449,882,880

Table 17: Sludge Sales

Particulars	Annual Sludge Wastage @ 60% (Liters)	Sale Price per Liter (PKR)	Proceeds from Sale of Sludge (PKR)
Canola Oil	9,261	35	324,135
Soybean oil	9,261	35	324,135
TOTAL (PKR)			648,270

9.4. Variable Cost Estimate

Variable costs of the project have been provided in Table 18.

Table 18: Variable Cost Estimate

Description of Costs	Amount (PKR)
Crude Canola Oil	156,701,505
Crude Soybean Oil	162,777,715
Pouch Packing	1,458,294

Plastic Bottle Cost	8,668,736
Carton Cost	2,695,818
Direct Electricity	3,583,906
Direct Labor	28,260,000
Direct Fuel Cost-Generator	358,391
Lab Consumables	43,600
Machinery Maintenance - Cost	1,160,000
Communications Expense (phone,mail, internet, etc.)	864,000
Annual vehicles running and maintenance expense	944,673
Office expenses (stationery, entertainment, janitorial services, etc.)	1,036,800
Total Variable Cost	368,553,438

Table 19: Raw Material Cost-Canola Oil

Particulars	Total Material Cost per Liter/KG
Canola Crude Oil (Table 20)	256
Additives (Table 21)	2
Total (PKR)	258

Table 20: Canola Crude Oil Cost

Raw material / Input name	Unit of Measurement	Price Per Kg (PKR)	Conversion Factor (Table 25)	Price Per Liter (PKR)
Crude Oil (Canola)	Kg	275	0.932	256

Table 21: Additives Cost – Canola Oil

Raw material / Input name	Unit of Measurement	Quantity of Additives Required Per Ton of Crude Oil (PKR)	Quantity of Additives Required Per KG of Crude Oil (PKR)	Unit Price Per Kg (PKR)	Price of Additives Per KG of Crude Oil (PKR)
Additives					
Vitamin A&D	Kg	0.040	0.00004	9,500	0.38
Citric Acid	Kg	0.200	0.00020	150	0.03
Anti Oxidant	Kg	0.166	0.00017	1,778	0.29515
Anti Form	Kg	0.008	0.00001	5,800	0.04640

Vitamin E	Kg	0.003	0.000003	650	0.00195
Phosphoric Acid	Kg	1.00	0.001	150	0.150
Powder Salt	Kg	2.00	0.002	20	0.040
Caustic Soda	Kg	3.00	0.003	70	0.210
Fuller Earth	Kg	10.00	0.01	45	0.45
Flavor	Kg	0.010	0.00001	2,000	0.02
Nickel	Kg	0.150	0.00015	1,800	0.27
Total					1.8935

Table 22: Raw Material Cost-Soybean Oil

Particulars	Total Material Cost per Liter/KG
Soybean Crude Oil (Table 23)	266
Additives (Table 24)	2
Total (PKR)	268

Table 23: Soybean Crude Oil Cost

Raw material / Input name	Unit of Measurement	Price Per Kg (PKR)	Conversion Factor (Table 25)	Price Per Liter (PKR)
Crude Oil (Canola)	Kg	285	0.932	266

Table 24: Additives Cost – Soybean Oil

Raw material / Input name	Unit of Measurement	Quantity of Additives Required Per Ton of Crude Oil (PKR)	Quantity of Additives Required Per KG of Crude Oil (PKR)	Unit Price Per Kg (PKR)	Price of Additives Per KG of Crude Oil (PKR)
Additives					
Vitamin A&D	Kg	0.040	0.00004	9,500	0.38
Citric Acid	Kg	0.200	0.00020	150	0.03
Anti Oxidant	Kg	0.166	0.00017	1,778	0.29515
Anti Form	Kg	0.008	0.00001	5,800	0.04640
Vitamin E	Kg	0.003	0.000003	650	0.00195
Phosphoric Acid	Kg	1.00	0.001	150	0.150

Powder Salt	Kg	2.00	0.002	20	0.040
Caustic Soda	Kg	3.00	0.003	70	0.210
Fuller Earth	Kg	10.00	0.01	45	0.45
Flavor	Kg	0.010	0.00001	2,000	0.02
Nickel	Kg	0.150	0.00015	1,800	0.27
Total					1.8935

Table 25: Conversion Factor

1 liter Oil =	0.918 Kgs
1.015 liter =	0.932 Kgs

Raw material input adjustment with regards to 1.5% process loss

Table 26: Pouch (Polybag) Packing Cost

Particulars	Cost per Pouch (PKR)	No of packets	Total Cost (PKR)
1 Liter Pouch	3	486,098	1,458,294

Table 27: Plastic Bottles Cost

Particulars	Cost Per Bottle (PKR)	No of packets sold	Total Cost(PKR)
1 Liter Plastic Bottle	16	364,576	5,833,216
3 Liter Plastic Bottle	20	81,016	1,620,320
5 Liter Plastic Bottle	50	24,304	1,215,200
Total			8,668,736

Table 28: Carton Cost

Particular	Cost per Carton (PKR)	No. of Packets/ Bottle	Packet per Bottle per carton	No. of Cartons	Total Cost (PKR)
1 Liter Pouch	12	486,098	5	97,220	1,166,640
1 Liter Plastic Bottle	16	364,576	6	60,763	972,208
3 Liter Plastic Bottle	20	81,016	4	20,254	405,080

5 Liter Plastic Bottle	25	24,304	4	6,076	151,900
Total					2,695,828

Table 29: Lab Consumables

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Glass Test Tubes	20	50	1,000
Burette (10 ml)	3	1,200	3,600
Glass Beakers (100 ml)	15	500	7,500
Test Tube Holder	20	80	1,600
Test Tube Rack (24 Piece Holder)	2	1,500	3,000
Spatula	10	300	3,000
Disposable Gloves(Pack of 20)	2	500	1,000
Face Masks (50 Masks)	4	150	600
Lab Coat	8	750	6,000
Disposable Plastic Shoe Cover(Pack of 50)	5	200	1,000
Test Tube Brusher (10 Pieces)	3	1,100	3,300
pH Meter	2	1,500	3,000
Stopwatch	3	3,000	9,000
Total			43,600

9.5. Fixed Cost Estimate

Table 30 shows the estimated fixed cost of the project.

Table 30: Fixed Cost Estimate

Description of Costs	Amount (PKR)
Management Staff	17,280,000
Administration benefits expense	1,366,200
Building rental expense	5,990,160
Indirect Electricity	755,745

Promotional expense	22,494,144
Depreciation expense	10,453,991
Amortization of pre-operating costs	372,328
Bad debt expense	455,513
Total	59,168,081

9.6. Financial Feasibility Analysis

The financial feasibility analysis provides the information regarding projected Internal Rate of Return (IRR), Net Present Value (NPV) and Payback period of the study, which is shown in Table 31.

Table 31: Financial Feasibility Analysis

Description	Project
IRR	43%
NPV (PKR)	113,317,205
Payback Period (years)	4.05
Projection Years	10
Discount rate used for NPV	25%

9.7. Financial Feasibility Analysis with 50% Debt

The financial feasibility analysis provides the information regarding projected IRR, NPV and payback period of the study on the basis of Debt: Equity Model (50:50), which is shown in Table 32.

Table 32: Financial Feasibility Analysis with 50% Debt

Description	Project
IRR	42%
NPV (PKR)	143,915,230
Payback Period (years)	4.14
Projection Years	10
Discount rate used for NPV	22%

9.8. Human Resource Requirement

The proposed production will work in three shifts. Total number of personnel required for the unit is provided in Table 33.

Table 33: Human Resource

Personnel	Number of Personnel	Salary Per Month (PKR)	Annual Salaries (PKR)
General Manager	1	150,000	1,800,000
Production Supervisor	3	100,000	3,600,000
Production Manager	1	120,000	1,440,000
Admin & HR Manager	1	80,000	960,000
Admin Officer	3	40,000	1,440,000
Procurement Officer	1	80,000	960,000
Procurement Assistant	1	50,000	600,000
Finance & Account Manager	1	100,000	1,200,000
Accountant	1	40,000	480,000
Sales and Marketing Manager	1	120,000	1,440,000
Sales and Marketing Staff	3	60,000	2,160,000
Electric technician	3	45,000	1,620,000
Mechanical technician	3	45,000	1,620,000
Refining	0		0
Labor Skilled	9	40,000	4,320,000
Labor Unskilled	9	30,000	3,240,000
Quality Control Officer	3	70,000	2,520,000
Packing	0		0
Skilled	9	35,000	3,780,000
Unskilled	9	30,000	3,240,000
Raw Material Store Incharge	3	35,000	1,260,000
Store Helper - Raw Material	3	25,000	900,000
Finished Goods Store Incharge	3	35,000	1,260,000
Store Helper - Finished Goods	3	25,000	900,000
Office Boy	9	25,000	2,700,000
Security Guards	7	25,000	2,100,000
Total	90		45,540,000

10. CONTACT DETAILS

The contact details of all the major suppliers of machinery and equipment and raw material are given in Table 34.

Table 34: Contact Details

Name of Supplier	Supplies	Contact	Website/ Email
U.S. Canola Association	Canola crude oil	202-969-8113	info@uscanola.com
AAA Oils and Fats Pte LTD	Canola & Soybean crude oil	+603 7661 6200	https://rspo.org/contact-us/
Anyang Gemco Energy Machinery Co., Ltd.	Refining Plant	86 0571 85022088	https://www.abcmach.com
Qinglei Environmental Technology Co.Ltd.	Storage tanks(Crude oil)	086-0571-85022088	http://www.qingleikeji.com
Guangzhou Promake Machinery Equipment Co., Ltd	Storage Tanks (Refined oil)	086-0571-85022088	http://www.promake.com.cn
Rosh Pack	Carton boxes	0347 6747225	sales@roshpack.com
Mithani Industry Pvt.Ltd	Polythene Bag	03212211410	https://mithaniindustry.com/
Packaging Exemplar Technology (Pvt) Ltd	Plastic Bottles	(042) 35126124	

11. USEFUL LINKS

Table 35: Useful Links

Name of Organization	E-mail Address
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
Trade Development Authority of Pakistan	www.tdap.gov.pk
Federal Board of Revenue	www.fbr.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 Jammu and Kashmir	www.ajk.gov.pk
Government of Gilgit Baltistan	www.gilgitbaltistan.gov.pk
Punjab Food Authority	www.pfa.gop.pk
Sindh Food Authority	www.sfa.gos.pk
Food Department Government of Balochistan	www.balochistan.gov.pk/departments/food-department/
Khyber Pakhtunkhwa Food Safety & Halal Food Authority	www.kpfsa.gov.pk
Small Industries Development Board, Khyber Pakhtunkhwa	www.sidbkgp.com
Sindh Small Industries Corporation	www.ssic.gos.pk
Punjab Small Industries Corporation	www.psic.gop.pk
Pakistan Food Association	www.facebook.com/pfa.com.pk
Pakistan Vanaspati Manufacturers Association (PVMA)	https://pvma.com.pk/
All Pakistan Solvent Extractors' Association (APSEA)	http://apsea.com.pk/
Pakistan Edible Oil Refiners Association (PEORA)	http://peora.com.pk/

12. ANNEXURES

12.1. Income Statement

Calculations										SMEDA
Income Statement										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue - Canola Oil	222,126,135	272,844,195	326,778,299	389,375,546	461,885,943	545,763,184	642,628,659	754,353,841	839,760,349	933,813,730
Revenue -Soybean Oil	227,756,745	279,760,468	335,061,734	399,245,753	473,594,162	559,597,624	658,918,516	773,475,842	861,047,454	957,484,769
Total Revenue	449,882,880	552,604,664	661,840,033	788,621,299	935,480,106	1,105,360,808	1,301,547,174	1,527,829,683	1,700,808,003	1,891,298,499
<i>Cost of sales</i>										
Crude Canola Oil	156,701,505	190,923,524	226,813,260	268,074,235	315,421,456	369,684,942	431,775,756	502,740,924	555,130,609	612,309,062
Crude Soybean Oil	162,777,715	198,326,716	235,608,102	278,469,000	327,652,143	384,019,733	448,518,162	522,235,054	576,656,185	636,051,772
Pouch Packing	1,458,294	1,776,761	2,110,761	2,494,715	2,935,370	3,440,334	4,018,180	4,678,562	5,166,120	5,698,230
Plastic Bottle Cost	8,668,736	10,561,887	12,547,327	14,829,915	17,449,127	20,451,025	23,885,828	27,811,704	30,709,864	33,872,979
Carton Cost	2,695,818	3,284,545	3,901,979	4,611,796	5,426,357	6,359,865	7,428,047	8,648,880	9,550,173	10,533,841
Direct Electricity	3,583,906	4,189,288	4,867,952	5,627,701	6,477,108	7,425,600	8,483,529	9,662,269	10,425,588	11,249,209
Direct Labor	28,260,000	31,001,220	34,008,338	37,307,147	40,925,940	44,895,757	49,250,645	54,027,958	59,268,670	65,017,730
Lab Consumables	43,600	48,091	53,044	58,508	64,534	71,181	78,513	86,599	95,519	105,358
Direct Fuel Cost-Generator	358,391	418,929	486,795	562,770	647,711	742,560	848,353	966,227	1,042,559	1,124,921
Machinery Maintenance - Cost	1,160,000	1,279,480	1,411,266	1,556,627	1,716,959	1,893,806	2,088,868	2,304,022	2,541,336	2,803,094
Total Cost of Sales	365,707,965	441,810,440	521,808,825	613,592,413	718,716,707	838,984,803	976,375,880	1,133,162,198	1,250,586,622	1,378,766,196
Gross Profit	84,174,915	110,794,223	140,031,207	175,028,887	216,763,399	266,376,006	325,171,295	394,667,484	450,221,381	512,532,303
<i>General administration & selling expenses</i>										
Management Staff	17,280,000	18,956,160	20,794,908	22,812,014	25,024,779	27,452,182	30,115,044	33,036,203	36,240,715	39,756,064
Administration benefits expense	1,366,200	1,498,721	1,644,097	1,803,575	1,978,522	2,170,438	2,380,971	2,611,925	2,865,282	3,143,214
Building rental expense	5,990,160	6,589,176	7,248,094	7,972,903	8,770,193	9,647,213	10,611,934	11,673,127	12,840,440	14,124,484
Indirect Electricity	755,745	815,449	879,869	949,379	1,024,380	1,105,306	1,192,625	1,286,842	1,388,503	1,498,195
Indirect Fuel Cost-Generator	75,574	81,545	87,987	94,938	102,438	110,531	119,262	128,684	138,850	149,819
Communications expense (phone,mail, internet, etc.)	864,000	947,808	1,039,745	1,140,601	1,251,239	1,372,609	1,505,752	1,651,810	1,812,036	1,987,803
Annual vehicles running and maintenance expense	944,673	1,041,975	1,149,298	1,267,676	1,398,246	1,542,266	1,701,119	1,876,334	2,069,597	2,282,765
Office expenses (stationery, entertainment, janitorial services, etc.)	1,036,800	1,137,370	1,247,694	1,368,721	1,501,487	1,647,131	1,806,903	1,982,172	2,174,443	2,385,364
Promotional expense	22,494,144	27,630,233	33,092,002	39,431,065	46,774,005	55,268,040	65,077,359	76,391,484	85,040,400	94,564,925
Depreciation expense	10,453,991	10,453,991	10,453,991	10,453,991	14,062,293	14,062,293	13,732,718	15,095,978	20,302,469	20,302,469
Amortization of pre-operating costs	372,328	372,328	372,328	372,328	372,328	-	-	-	-	-
Bad debt expense	455,513	559,521	670,123	798,492	947,188	1,119,195	1,317,837	1,546,952	1,722,095	1,914,970
Subtotal	62,089,129	70,084,276	78,680,136	88,465,681	103,207,098	115,497,204	129,561,524	147,281,513	166,594,829	182,110,072
Operating Income	22,085,786	40,709,947	61,351,071	86,563,206	113,556,301	150,878,801	195,609,770	247,385,972	283,626,552	330,422,230
Other income (Proceeds from sludge sale)	555,660	669,385	801,614	955,066	1,132,836	1,338,446	1,575,902	1,849,758	2,056,931	2,287,308
Gain / (loss) on sale of machinery & equipment	-	-	-	15,362,250	-	-	-	28,311,396	-	-
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	423,000	-	-	-
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	938,375	-	-	-
Earnings Before Interest & Taxes	22,641,446	41,379,332	62,152,685	102,880,522	114,689,137	152,217,247	198,547,047	277,547,126	285,683,483	332,709,538
Subtotal	-	-	-	-	-	-	-	-	-	-
Earnings Before Tax	22,641,446	41,379,332	62,152,685	102,880,522	114,689,137	152,217,247	198,547,047	277,547,126	285,683,483	332,709,538
Tax	5,271,398	10,708,800	18,644,623	31,178,183	35,311,198	48,446,036	64,661,466	92,311,494	95,159,219	111,618,338
NET PROFIT/(LOSS) AFTER TAX	17,370,048	30,670,533	43,508,063	71,702,339	79,377,939	103,771,210	133,885,581	185,235,632	190,524,264	221,091,200

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	2,500,000	10,665,855	13,271,232	15,237,210	58,886,474	122,713,627	202,588,404	288,749,497	370,963,050	524,842,787	964,499,715
Accounts receivable		24,651,117	30,279,708	36,265,207	43,212,126	51,259,184	60,567,716	71,317,653	83,716,695	93,194,959	103,632,794
Raw material inventory	26,623,268	35,778,585	46,882,166	61,118,096	79,319,777	102,540,995	132,099,000	169,652,799	206,627,193	251,384,502	-
Packing Material Inventory	534,285	718,016	940,848	1,226,538	1,591,817	2,057,829	2,651,006	3,404,651	4,146,664	5,044,869	-
Consumable Inventory	1,817	2,196	2,655	3,209	3,880	4,690	5,670	6,855	8,286	10,017	-
Finished Goods inventory		8,403,664	11,198,137	14,588,032	18,920,857	24,445,226	31,475,014	40,402,142	51,719,574	62,938,178	76,560,456
Pre-paid building rent	499,180	549,098	604,008	664,409	730,849	803,934	884,328	972,761	1,070,037	1,177,040	-
Total Current Assets	30,158,550	80,768,530	103,178,752	129,102,702	202,665,780	303,825,485	430,271,137	574,506,357	718,251,499	938,612,353	1,144,692,966
<i>Fixed assets</i>											
Land	-	-	-	-	-	-	-	-	-	-	-
Building/Infrastructure	1,586,412	1,427,771	1,269,130	1,110,488	951,847	793,206	634,565	475,924	317,282	158,641	0
Machinery & Equipment	11,600,000	10,440,000	9,280,000	8,120,000	6,960,000	5,800,000	4,640,000	3,480,000	2,320,000	1,160,000	29,011,056
Allied Equipment	30,724,500	23,043,375	15,362,250	7,681,125	44,332,992	33,249,744	22,166,496	11,083,248	63,968,955	47,976,716	31,984,478
Furniture & fixtures	1,146,000	974,100	802,200	630,300	458,400	286,500	114,600	2,177,000	1,850,450	1,523,900	1,197,350
IT Equipment	1,862,000	1,396,500	931,000	465,500	2,686,717	2,015,038	1,343,358	671,679	3,876,717	2,907,538	1,938,359
Office vehicles	3,753,500	3,190,475	2,627,450	2,064,425	1,501,400	938,375	375,350	7,792,867	6,623,937	5,455,007	4,286,077
Office equipment	1,692,000	1,438,200	1,184,400	930,600	676,800	423,000	169,200	3,512,863	2,985,934	2,459,004	1,932,075
Advance Against Building Rent	1,497,540	1,497,540	1,497,540	1,497,540	1,497,540	1,497,540	1,497,540	1,497,540	1,497,540	1,497,540	1,497,540
Total Fixed Assets	53,861,952	43,407,961	32,953,970	22,499,978	59,065,696	45,003,402	30,941,109	30,691,121	83,440,816	63,138,347	71,846,933
<i>Intangible assets</i>											
Pre-operation costs	1,861,638	1,489,310	1,116,983	744,655	372,328	-	-	-	-	-	-
Total Intangible Assets	1,861,638	1,489,310	1,116,983	744,655	372,328	-	-	-	-	-	-
TOTAL ASSETS	85,882,140	125,665,801	137,249,704	152,347,335	262,103,803	348,828,888	461,212,246	605,197,479	801,692,315	1,001,750,700	1,216,539,900
Liabilities & Shareholders' Equity											
<i>Current liabilities</i>											
Accounts payable		22,413,612.89	27,347,273.74	32,701,018.93	38,972,648.69	46,319,794.12	54,931,942.22	65,031,594.10	76,290,798.23	85,824,919.16	79,522,919.48
Other liabilities											
Total Current Liabilities	-	22,413,613	27,347,274	32,701,019	38,972,649	46,319,794	54,931,942	65,031,594	76,290,798	85,824,919	79,522,919
Total Long Term Liabilities	-	-	-	-	-	-	-	-	-	-	-
<i>Shareholders' equity</i>											
Paid-up capital	85,882,140	85,882,140	85,882,140	85,882,140	117,664,638	117,664,638	117,664,638	117,664,638	117,664,638	117,664,638	117,664,638
Retained earnings		17,370,048	24,020,291	33,764,177	105,466,516	184,844,455	288,615,666	422,501,246	607,736,878	798,261,142	1,019,352,342
Total Equity	85,882,140	103,252,188	109,902,430	119,646,317	223,131,155	302,509,094	406,280,304	540,165,885	725,401,517	915,925,780	1,137,016,980
TOTAL CAPITAL AND LIABILITIES	85,882,140	125,665,801	137,249,704	152,347,335	262,103,803	348,828,888	461,212,246	605,197,479	801,692,315	1,001,750,700	1,216,539,900

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		17,370,048	30,670,533	43,508,063	71,702,339	79,377,939	103,771,210	133,885,581	185,235,632	190,524,264	221,091,200
Add: depreciation expense		10,453,991	10,453,991	10,453,991	10,453,991	14,062,293	14,062,293	13,732,718	15,095,978	20,302,469	20,302,469
amortization of pre-operating costs		372,328	372,328	372,328	372,328	372,328	-	-	-	-	-
Accounts receivable		(24,651,117)	(5,628,591)	(5,985,500)	(6,946,919)	(8,047,058)	(9,308,532)	(10,749,938)	(12,399,042)	(9,478,264)	(10,437,835)
Finished goods inventory		(8,403,664)	(2,794,472)	(3,389,896)	(4,332,824)	(5,524,370)	(7,029,787)	(8,927,128)	(11,317,432)	(11,238,604)	(13,602,278)
Raw Material Inventory	(26,623,268)	(9,155,316)	(11,103,581)	(14,235,930)	(18,201,681)	(23,221,218)	(29,558,005)	(37,553,799)	(36,974,394)	(44,757,310)	251,384,502
Packing Material Inventory	(534,285)	(183,731)	(222,832)	(285,691)	(365,279)	(466,012)	(593,177)	(753,645)	(742,013)	(898,205)	5,044,869
Pre-paid building rent	(499,180)	(49,918)	(54,910)	(60,401)	(66,441)	(73,085)	(80,393)	(88,433)	(97,276)	(107,004)	1,177,040
Accounts payable		22,413,613	4,933,661	5,353,745	6,271,630	7,347,145	8,612,148	10,099,652	11,259,204	9,534,121	(6,302,000)
Other liabilities		-	-	-	-	-	-	-	-	-	-
Cash provided by operations	(27,658,550)	8,165,855	26,625,667	35,730,155	58,886,474	63,827,153	79,874,777	99,643,824	150,059,225	153,879,736	468,667,984
<i>Financing activities</i>											
Issuance of shares	85,882,140	-	-	-	31,782,498	-	-	-	-	-	-
Purchase of (treasury) shares	-	-	-	-	-	-	-	-	-	-	-
Cash provided by / (used for) financing activities	85,882,140	-	-	-	31,782,498	-	-	-	-	-	-
<i>Investing activities</i>											
Capital expenditure	(55,723,590)	-	-	-	(47,019,709)	-	-	(13,482,730)	(67,845,672)	-	(29,011,056)
Acquisitions	-	-	-	-	-	-	-	-	-	-	-
Cash (used for) / provided by investing activities	(55,723,590)	-	-	-	(47,019,709)	-	-	(13,482,730)	(67,845,672)	-	(29,011,056)
NET CASH	2,500,000	8,165,855	26,625,667	35,730,155	43,649,264	63,827,153	79,874,777	86,161,093	82,213,553	153,879,736	439,656,929

13. KEY ASSUMPTIONS

13.1. Operating Cost Assumptions

Table 36: Operating Cost Assumptions

Description	Details
Inflation rate	10.3%
Electricity growth rate	7.9%
Water price growth rate	7.9%
Gas price growth rate	7.9%
Wage growth rate	9.7%
Office equipment price growth rate	9.6%
Office vehicles price growth rate	11%

13.2. Revenue Assumptions

Table 37: Revenue Assumptions

Description	Details
Sale price growth rate	11.2%
Capacity utilization	60%
Capacity utilization growth rate	5%
Maximum capacity	95%

13.3. Financial Assumptions

Table 38: Financial Assumptions

Description	Details
Project life (Years)	10
Debt: Equity	0:100
Discount Rate	25%
Interest Rate (KIBOR+3%)	19%

13.4. Cash Flow Assumptions

Table 39: Cash Flow Assumptions

Description	Days
Accounts receivable cycle	20
Accounts payable cycle	20

13.5. Debt-Related Assumptions

Table 40: Debt-Related Assumptions

Description of Cost	Details
Project Life (Years)	10
Debt: Equity	50:50
Discount Rate	22%
Interest Rate (KIBOR+3%)	19%