



Pre-feasibility Study

MANUFACTURING UNIT FOR RESIDENTIAL ELECTRIC LIGHTING FIXTURES

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. Machines used in Production	13
5.2. Production Process	17
5.3. Installed and Operational Capacities	21
6. Critical Factors	24
7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT	24
8. POTENTIAL TARGET MARKETS	24
9. PROJECT COST SUMMARY	26
9.1. Project Economics	26
9.2. Project Cost	26
9.2.1. Land	27
9.2.2. Building	27
9.2.3. Machinery and Equipment	28
9.2.4. Furniture & Fixtures	28
9.2.5. Office Equipment	29
9.2.6. Office Vehicles	29
9.2.7. Pre-Operating Cost	30
9.2.8. Security against Building	30
9.3. Financial Feasibility Analysis	30
9.4. Financial Feasibility Debt Financing	31
9.4.1. Breakeven Analysis	31
9.4.2. Revenue Generation	32
9.4.3. Variable Cost Estimate	32
9.4.4. Fixed Cost Estimate	43
9.4.5. Human Resource Requirement	43
10. CONTACT DETAILS	45
11. USEFUL LINKS	46
12. ANNEXURES	47
12.1. Income Statement	47
12.2. Balance Sheet	48
12.3. Cash Flow Statement	49

13. KEY ASSUMPTIONS.....	50
13.1. Operating Cost Assumptions.....	50
13.2. Revenue Assumptions	50
13.3. Financial Assumptions	50
13.4. Cash Flow Assumptions.....	50
13.5. Debt Related Assumptions	51

Table of Tables

Table 1: Injection Molding Machine Capacity	22
Table 2: Installed and Operational Capacity	22
Table 3: Project Cost	26
Table 4: Breakup of Space Requirement	27
Table 5: Building Renovation Cost	27
Table 6: Machinery and Equipment	28
Table 7: Furniture and Fixtures	28
Table 8: Office Equipment	29
Table 9: Office Vehicles	29
Table 10: Pre-Operating Cost	30
Table 11: Security against Building	30
Table 12: Financial Feasibility Analysis	30
Table 13: Financial Feasibility Debt Financing	31
Table 14: Breakeven Analysis	31
Table 15: Revenue Generation	32
Table 16: Variable Cost Estimate	32
Table 17: Material Cost	33
Table 18: Total Material Cost	33
Table 19: Raw Material Cost per Unit	35
Table 20: Cost of Components	38
Table 21: Packing Cost	41
Table 22: Fixed Cost Estimate	43
Table 23: Human Resource Requirement	43
Table 24: Contact Details of Suppliers	45
Table 25: Useful Links	46
Table 26: Operating Cost Assumptions	50
Table 27: Revenue Assumptions	50
Table 28: Financial Assumptions	50
Table 29 Cash Flow Assumptions	50
Table 30: Debt Related Assumptions	51

Table of Figures

Figure 1: Switchboards.....	10
Figure 2: Sockets	10
Figure 3: Power Plug	10
Figure 4: Bulb Holders.....	11
Figure 5: Ceiling Rose	11
Figure 6: SMD Light Holder	11
Figure 7: Telephone Socket	12
Figure 8: Television Socket	12
Figure 9: Europlug.....	12
Figure 10: Multiplug	13
Figure 11 Granules Mixing Machine	13
Figure 12: Injection Molding Machine	14
Figure 13: Crushing Machine	15
Figure 14: Mold for Injection molding	15
Figure 15: Electric Chain Pulley.....	16
Figure 16: Weighing Scale.....	16
Figure 17: Process Flow	17
Figure 18: Injection Molding Process.....	18
Figure 19: Injection Molding Product	19
Figure 20: Before and After Grinding	19
Figure 21: Assembling.....	20
Figure 22 Packed Electric Fixtures.....	20

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 users. 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

Electrical fixtures and accessories are the necessary components of households, offices, industrial and commercial buildings. These are used to connect the electric devices to the power supply and to operate and control them. Common electrical fixtures include switches, sockets, switch boards, light holders, power plugs, pin shoes, dimmers, etc.

These fixtures are manufactured by using different types of electric and heat resistant plastics such as Bakelite (Phenol Formaldehyde resin), Polypropylene (PP), Polycarbonate (PC) and Acrylonitrile Butadiene Styrene (ABS).

Nowadays, traditional lighting fixtures are being replaced with smart lighting fixtures owing to the advancement of technology. Residential lighting fixtures are illumination solutions that are created to provide customized lighting to residential places such as apartments, villas, houses, and other setups based on consumer requirements.

Over decades, Bakelite has been the most commonly used material for manufacturing electrical fixtures. However, with the advancement in materials sciences, over time, PP, PC and ABS fixtures have taken over as the alternate of bakelite products. Main reasons for this change are the drawbacks of bakelite as being non recycleable material. Also, the production process of bakelite fixtures is manual, and consequently labor intensive; as compared to those of other products which can be produced in large volumes at high production rates using hi-tech machines. As a result of such benefits, PP, PC and ABS fixtures have quickly captured a large share of the local electrical fixtures market.

This pre-feasibility study provides information for setting up a Manufacturing Unit for Residential Electric Lighting Fixtures. The major raw material used in this study is Polypropylene (PP) as it is cheaper than other raw materials. The proposed products are Switch Boards, Sockets and Power Plugs, SMD¹ Light Holders, Bulb holders, Multi Plug, Power Plug, Europlug, Television sockets, Telephone Sockets and Ceiling Rose. These products have been selected as these are the most commonly used fixtures in a residential building.

Most of the electric fixtures manufacturing units are small and medium scale industries and are operating in Karachi, Lahore, and Sargodha. Easy availability of raw materials, access to market, availability of low-cost labor, and presence of good industrial infrastructure in these cities make these locations suitable to establish this business. Ability to generate orders through strong networking, direct marketing, and negotiating long-term contracts with institutional buyers, such as residential societies, are the key success factors of the proposed business.

The maximum production capacity of the unit is 1,036,800 fixtures, operating in a single shift of 8 hours for 300 days per year. Capacity utilization in “Year One” is assumed to be 60%, which translates into production of 622,080 fixtures.

¹ SMD means Surface Mounted Diode. This is a better technology than the first generation LED lights.

The proposed “Manufacturing Unit for Residential Electric Lighting Fixtures” will be set up in a rented building with an area of 4,650 square feet. The project requires a total investment of PKR 21.56 million. This includes capital investment of PKR 18.94 million and working capital of PKR 2.61 million. This project is financed through 100% equity. The Net Present Value (NPV) of the project is PKR 81.54 million with an Internal Rate of Return (IRR) of 54% and a Payback period of 2.67 years. Further, this project is expected to generate Gross Annual Revenues of PKR 62.78 million during 1st year, with Gross Profit (GP) ratio ranging from 36% to 41% and Net Profit (NP) ratio ranging from 6% to 22% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at the capacity of 46% (475,587 number of fixtures) with breakeven revenues of PKR 48 million.

The proposed project may also be established using leveraged financing. With 50% debt financing, at a cost of KIBOR+3%, the proposed manufacturing unit provides Net Present Value (NPV) of PKR 95.40 million, Internal Rate of Return (IRR) of 53%, and Payback period of 2.75 years. Further, this project is expected to generate Net Profit (NP) ratio ranging from 6% to 22% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 46% (479,703 fixtures) with breakeven revenues of PKR 48.41 million.

The proposed project will provide employment opportunities to 31 people including the owner. High return on investment and steady growth of the 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 establishing a "Manufacturing Unit for Residential Electric Lighting Fixtures". 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

The proposed project involves setting up a Manufacturing Unit for Residential Electric Lighting Fixtures. Hundreds of lighting and light fixtures can be seen by everyone on a daily basis. These fixtures vary with respect to their types, their intended uses, and their electrical requirements. Lighting fixtures are used in residential, industrial and commercial buildings and come in a variety of styles, including indoor, outdoor, emergency lighting, task lights, hazardous location fixtures, recessed fixtures and more.

This prefeasibility study provides information about manufacturing of residential electric lighting fixtures. The raw material used in the manufacturing of these products is synthetic plastic with properties of good heat resistance and non-conductivity of

electricity. Such products include Bakelite (Phenol-Formaldehyde resin), Polypropylene (PP), Polycarbonate (PC) and Acrylonitrile Butadiene Styrene (ABS). Majority of the raw materials are smoky white colored, but pre-colored granules are mixed in a mixer with these granules to give different colors to the final products; according to the customers' demand.

Before the introduction of PP, PC and ABS, Bakelite was extensively used in manufacturing of electrical fixtures and fittings. The manufacturing process of bakelite products require conventional ways involving manual work which increases the production time and limits the production capacity. Moreover, bakelite cannot be recycled or melted once it is used which makes it an unfriendly material for the environment. Due to these constraints, manufacturing of bakelite products is decreasing with the passage of time and most of the manufacturers have started to shift their production towards more advanced technologies of mass production using injection molding machines. All raw materials including PP, PC and ABS, except bakelite, can be processed through these machines. Moreover, these newer raw materials can also be reused in the production. The raw material used in the proposed unit is PP (Polypropylene) plastic as it is among the cheapest plastics available today. PC is durable, strong and have a high heat resistance and low electrical conductivity. It can be easily procured from the local market.

There are hundreds of electric fixtures used in a residential building from door bell switch to the parking area fixtures and multiple types of electric components used in different parts of the house. The products to be manufactured in the proposed unit are Switch Boards, Sockets and Power Plugs, SMD² Light Holders, Bulb holders, Multi Plug, Power Plug, Europlug, Television sockets, Telephone Sockets and Ceiling Rose. These products have been selected since these are the most commonly used fixtures in a residential building. A brief description of the proposed products is given below.

Switchboard

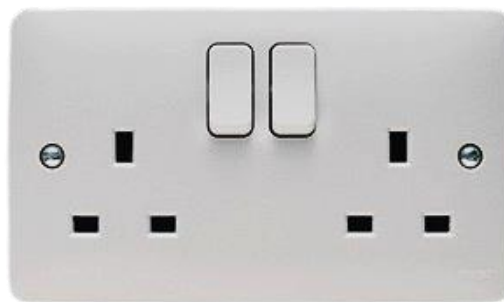
Switchboard is a multipurpose fixture consisting of a panel on which electric switches are mounted; arranged in a manner that more than one circuits may be connected, combined, and controlled. Residential electrical switch boards controls lights, fans and other appliances. Two types of switchboards are produced in the proposed project. One switch board contains ten switches and other one contains six switches and four sockets. Figure 1 shows electrical switchboards.

² SMD means surface mounted diode. This is a better technology than the first generation LED lights.

Figure 1: Switchboards

Sockets and Power Plugs

Sockets and Power Plugs connect electric equipment to the alternating current (AC) main electricity power supply in the buildings. Electrical plugs and sockets differ from one another in voltage and current rating, shape, size, and connector types. Different standard systems of plugs and sockets are used around the world. Figure 2 shows an electrical socket and Figure 3 shows a power plug.

Figure 2: Sockets**Figure 3: Power Plug**

Bulb Holders

A bulb holder is a device which mechanically supports and provides electrical connection for a compatible light. There are different types of bulb holders. There are

LED, SMD,³ Energy Saver and fluorescent bulb holders. some bulb holders are fancy while some other ones are simple. Fancy and simple bulb holder are shown in Figure 4.

Figure 4: Bulb Holders



Ceiling Rose

Ceiling rose light fittings are used to conceal the entry point of wiring for a hanging light, chandelier, ceiling fan or any other electrical appliance installed onto the ceiling. Figure 5 shows a simple, easy-to-fit ceiling rose.

Figure 5: Ceiling Rose



SMD Lights Holders

SMD light holders are just like simple bulb holders. The only difference is that, SMD light holders do not need any screws to attach to the ceiling. It comes with clips that automatically plugs to the ceiling. Figure 6 shows an SMD light holder.

Figure 6: SMD Light Holder



³ SMD means surface mounted diode. This is a better technology than the first generation LED lights.

Telephone Sockets

A telephone socket is a fixture that can be used to connect phones and other modular equipment to the local telephone network through a wired connection. A telephone socket is shown in Figure 7.

Figure 7: Telephone Socket



Television socket

Television sockets are used to provide the connection between a television or signal receiver and the cable that runs to the aerial. A television socket is shown in Figure 8.

Figure 8: Television Socket



Europlug

The Europlug is a flat, two-pole, round-pin domestic AC power plug, rated for voltages up to 250 V. It is a compromise design intended to connect low-power appliances safely. Figure 9 shows a europlug.

Figure 9: Europlug



Multiplug

Multiplug is a device that allows more than one plug to connect to a single socket by containing multiple sockets. Figure 10 shows a multiplug.

Figure 10: Multiplug

**5.1. Machines used in Production**

The machines used in the production of electric lighting fixtures are as follows:

Granules Mixing Machine

Mixing of plastic granules is done in a vertical mixing machine, made of stainless steel. The mixing machine uses a motor and a spiral mixer to mix the smokey white granules with the recycled ones (coming from the crusher) and with the colored granules to give color to the end product. The spiral at the center elevates materials to the top of the tank and then throws them outwards all around in the tank to achieve uniform blending. The granules mixing machine is shown in Figure 11.

Figure 11 Granules Mixing Machine



Injection Molding Machine

Injection molding is a process to manufacture molded products by injecting plastic materials, melted by heat, into a mold, and then cooling and solidifying them. The method is suitable for mass production of products with complicated shapes.

The functions of the injection unit are to melt PP by heat and inject the molten material into the mold. The screw is rotated to melt plastic granules introduced from the hopper and to accumulate molten plastic in front of the screw. After the required amount of molten plastic is accumulated, the injection process is started. While molten plastic is flowing in a mold, the machine controls the moving speed of the screw or injection speed. On the other hand, it controls dwell pressure⁴ after molten plastic fills out cavities.

In the proposed project, a 268 Ton Injection molding machine having a capacity of 50 seconds per cycle and a screw diameter of 30 mm, and loaded with clamping force of 800 KN⁵ has been used. The machine has injection pressure of 213 MPa⁶ and heating power of 5.4 KW.⁷

4 types of molds are used in the proposed project for different types of lighting fixtures. The machine has a running capacity of 432 cycles per day at 6 hours per shift (excluding 2 hours for preparation) that accounts for production capacity of 3,456 fittings per day (8 hours shift). An Injection Molding machine is shown in Figure 12.

Figure 12: Injection Molding Machine



⁴ Dwell pressure is the pressure that is applied during the period after the entire cavity has been filled with molten plastic until the gate has been sealed so that the plastic does not flow back from the gate.

⁵ Kilo Newton

⁶ Mega Pascal

⁷ www.hitech-machinery.com/servo-hybrid-pvc-pc-special-injection-molding-machine/#specification

Crushing Machine

Plastic crushers are specialized in crushing leftovers and waste materials into granules or flakes. Crushed granules or flakes are reused in production as the recycled raw materials. This machine can help reduce the volume of plastic waste, and save costs and resources. Crushing machine is shown in Figure 13.

Figure 13: Crushing Machine



Molds for Injection Molding

A mold is a hollow metal block into which molten plastic is injected to form a certain fixed shape. There are many holes drilled in the block for temperature control by circulating water or oil or by using heaters. Molten plastic flows into the mold through a sprue and fills the cavities by way of runners and gates. The mold is then opened after cooling and the ejector rod of the injection molding machine pushes the ejector plate of the mold to further eject moldings. The molds used in the proposed project have multiple cavities, and are made locally. These molds are made of aluminum alloy and have a useful life of 500,000 cycles. A four-cavity mold for injection molding is shown in Figure 14.

Figure 14: Mold for Injection molding



Electric Chain Pulley

An electric chain pulley is used for lifting or moving heavy objects. An electric motor and controller are used to lift, lower and accelerate or decelerate the speed of the pulley. Electric chain pulleys are ideal for use in industrial production lines and small machine shops where more frequent and faster lifting is required. The electric chain pulley used in the proposed project is used to lift molds for injection molding machine and other heavy objects. Electric chain Pulley is shown in Figure 15.

Figure 15: Electric Chain Pulley



Weigh Scale

Weigh Scale is a device used to measure quantities of raw materials, which afterwards are mixed together in the mixer in specific ratios. Weigh scale used in the proposed project is shown in Figure 16.

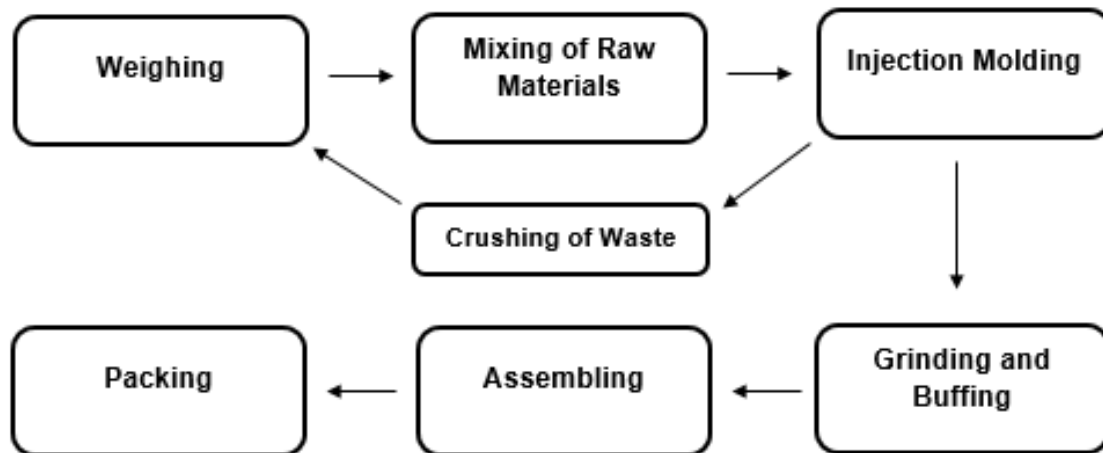
Figure 16: Weighing Scale



5.2. Production Process

The production process flow of the electric lighting fixtures is shown in Figure 17.

Figure 17: Process Flow



Raw Materials

Pastic is a polymeric material that has the capability of being molded or shaped, usually by the application of heat and pressure. It have other special properties such as low density, low electrical and heat conductivity, transparency, and toughness, which allows plastics to be made into a great variety of products. Depending on properties there are two type of plastics

- *Thermoplastic:* Plastics that can be deformed easily upon heating and can be bent easily. Linear polymers and a combination of linear and cross-linked polymers come under thermoplastics. Example are PP, PVC, nylon, polythene, etc.
- *Thermosetting:* Plastics that cannot be softened again by heating once they are moulded. Heavily cross-linked polymers come under the category of thermosetting plastics. Examples are Bakelite, melamine, etc.

The plastic used in the proposed project is Polypropylene (PP). It is a tough, rigid and crystalline thermoplastic produced from propene (or propylene) monomer. It is a linear hydrocarbon resin. It is available in 25 kg bags. PP is among the cheapest and one of the most widely used plastics available today. It is highly heat resistant which leads to good safety parameters.

Weighing

A weigh scale is used to measure the quantities of raw materials for processing. Recycled, fresh and colored granules are measured in proportional quantities based on the required color, ready to be mixed and processed afterwards.

Mixing Process

The raw materials are loaded in the hopper of the mixing machine and it evenly mixes the recycled and fresh granules by spinning the hopper. The machine uses gear driven mechanism to rotate the blades which leads to mixing.

Injection Molding Process

The mixed material is loaded to the hopper of injection molding machine. The working principle of the injection molding machine is similar to the syringe used for injection. It uses the thrust of the screw (or plunger) to inject the molten plastic into the closed cavity. Injection molding is a cycled process; each cycle mainly includes:

- **Quantitative feeding**

Granules are injected from the mixer machine into the barrel through the hopper of the Injection Molding machine to melt them.

- **Melt Plasticizing**

The granules are melted, by electric heaters, in the barrel to be injected into the molds.

- **Pressure injection**

The molten plastic is then injected into the molds. As the melt enters the die, the displaced air escapes through vents in the injection pins and along the parting line. It must be ensured that the dies are properly filled to give a proper and smooth shape to the product.

- **Mold Cooling**

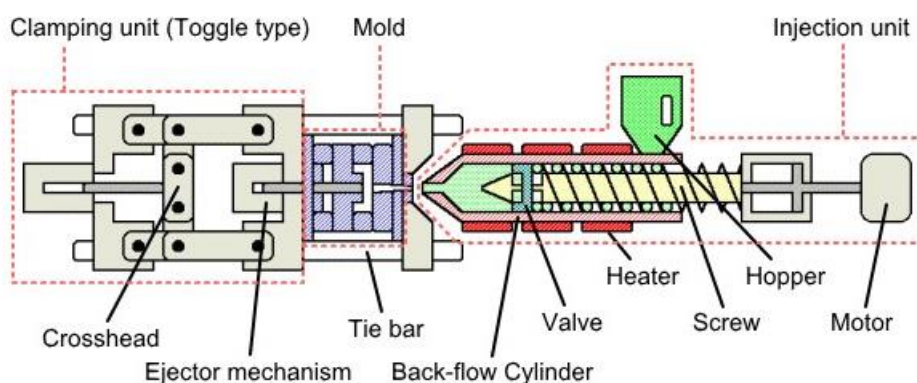
The filled dies are cooled through cycled water to harden the product. Cooling time is dependent on the type of material and the thickness of the part.

- **Mold Opening**

After cooling the product, the mold is opened and the molded products are ejected and collected in baskets. Mold is closed and the machine is ready for the next cycle.

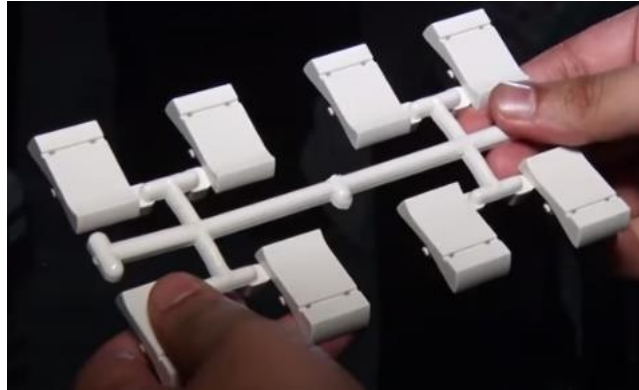
The Injection Molding machine used in the proposed project is a 268 Ton machine. The molds used in this business usually have more than one cavity. Such multi-cavity molds can be used to produce different numbers and types of fixtures in one cycle of the machine. Injection molding process is shown in the Figure 18.

Figure 18: Injection Molding Process



Quality check is performed by workers at this point. Rejected pieces and excess material is then sent back to the crusher. Cleaned products are sent to the assembly section of the production hall. An electrical fixture product ejected from injection molding machine is shown in Figure 19.

Figure 19: Injection Molding Product



Grinding and Buffing

The products from injection molding are further processed to remove any excess material. The individual molded products are separated by a cutter manually by a worker and the excess material from the products is also removed manually and then these are ground and buffed to give a smooth and shining look. After grinding and buffing, these parts are ready for assembling. Figure 20 shows a ceiling rose before and after grinding and buffing.

Figure 20: Before and After Grinding



Assembling

The manufactured components are assembled with other mechanical and electrical components to make complete product. Different types of fixtures require different types of components. Commonly used components include screws, nuts, springs, brass strips, brass connectors, iron ball switches, washers, iron strips, metallic pins, etc. Assembly operation is shown in Figure 21.

Figure 21: Assembling**Packing**

Finished products are packed first in polythene bags and then in corrugated boxes by the workers manually. After packing the fixtures, they are sent for storage in the finished goods store. Packed electric switches are shown in Figure 22.

Figure 22 Packed Electric Fixtures**Crushing of Waste**

The leftover, waste material or fixtures produced in the first batch (products not meeting the required specifications) are crushed into small pieces. These pieces are mixed and reused with the fresh raw material directly. Due to its purity, it is easy to re-use.

5.3. Installed and Operational Capacities

The proposed manufacturing unit shall, at maximum capacity of 100%, produce 1,036,800 residential electric lighting fixtures. The unit would operate for 8 hours per day, working in one shift per day for 300 working days in a year. The project is assumed to attain a capacity utilization of 60% during first year of operations, to produce 622,080 residential electric lighting fixtures. During the projected period of 10 years, the facility will continue to operate with 5% annual increase in capacity utilization each year with a cap at 95%. Table 1 and Table 2 shows installed and operational capacities of the proposed manufacturing unit.

Table 1: Injection Molding Machine Capacity

Machine hours per day	Machine Preparation Time (Hours)	Available Machine Time per day	Available time per day (seconds)	Cycle time per batch (seconds)	Cavities per mold	Machine Capacity/ Day (Units)
<i>A</i>	<i>B</i>	$C=(A-B)$	$D=(B*60*60)$	<i>E</i>	<i>F</i>	$G=(D/E*F)$
8	2	6	21,600	50	8	3,456

Table 2: Installed and Operational Capacity

Products	Machine Capacity/ day (units)	Machine Capacity / Annum (units)	Production Ratio	Production of Complete Set/ Annum (units) @100%	Production of Complete Set/ Annum (units) @ 60%
<i>Calculations</i>	<i>A (Table 1)</i>	$B=(A*300)$	<i>C</i>	$D=(B*C)$	$E=(D*60\%)$
Switch Board (10 Switches)	3,456	1,036,800	15%	155,520	93,312
Switch Board (4 socket+ 6 switches)			15%	155,520	93,312
SMD Light Holders 1			10%	103,680	62,208
SMD Light Holders 2			10%	103,680	62,208
Bulb Holder			5%	51,840	31,104
Multi Plug			10%	103,680	62,208
Power Plug(30Amp)			10%	103,680	62,208
Europlug			10%	103,680	62,208

Telephone Socket			5%	51,840	31,104
Television Socket			5%	51,840	31,104
Ceiling Rose			5%	51,840	31,104
Total			100%	1,036,800	622,080

6. CRITICAL FACTORS

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

- Good technical knowhow and knowledge of the industry
- Availability of specialized workforce
- Knowledge of market demand and supply
- Government policies encouraging import over localization
- Selection of appropriate machinery and human resources
- Rigorous supervision of the production
- Ability to generate work orders through networking
- Assurance of timely order fulfillment
- Compliance with international quality control standards

7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT

Majority of the electric lighting fixtures-manufacturing units in the country are located in Lahore, Karachi and Sargodha. Therefore, any of the above cities would be suitable for setting up a electric fixtures manufacturing unit. In addition, this industry may also be set up in any other large to medium cities where raw material, low-cost labor and industrial infrastructure is easily available. The ideal location for the project may be outside municipal and cantonment limits, preferably in small industrial clusters/estates. The areas in Pakistan where major construction-related activities are being carried out and have the availability of raw material are suitable locations for this manufacturing business.

8. POTENTIAL TARGET MARKETS

Houses, both new and existing, constitute the major segment of the target market for electrical lighting fixtures.

According to the Board of Investment, Pakistan's annual demand of housing units is estimated to be around 700,000 units, while only about half of this demand is currently being met. On the whole, the housing deficit is estimated to be ten million units, which is growing every year. Further, the Government of Pakistan has accorded the status of priority to Housing Sector with a plan to construct 5 million units over the next five years.⁸

Mostly, the electric fittings and fixtures used in residential buildings may also be used in commercial and industrial buildings. Therefore, in addition to residential electric

⁸ <https://invest.gov.pk/housing-and-construction-portal>

fixtures demand, the proposed unit can also be a supplier of these products to fulfill the demand of electric fixtures required in industrial and commercial buildings, shopping centers, hotels, entertainment halls, theaters, schools, hospitals, offices, etc.

According to the Observatory of Economic Complexity, light fixtures are the world's 64th most traded product. In addition to local market, there is potential global market as well for export including Sri Lanka, Afghanistan, Bangladesh etc. Pakistan is an exporter of electric lighting fixtures. In 2018 and 2019, the export value of Pakistan's lighting fixtures was USD 25.6 million and USD 16.6 million respectively.⁹

Sargodha is the major electrical fittings cluster in Pakistan where around 360 manufacturing units are engaged in manufacturing of variety of electrical fittings and fixtures. Large manufacturers include Hero Pak Electrical Industries, Mughal Electrical Accessories, Crystal Electronics Company, TJ Switches, JSKO Electrical Accessories and Pearl Electrical Industry. Imported products are also available in Pakistan, which are costlier than local brands due to their high quality. Some popular international brands are Philips, Schneider and Panasonic.

Keeping in view the above statistics, Pakistan's electric fittings industry is expected to witness a high growth in the coming years. There are viable opportunities for the potential investors in this business.

⁹ <https://oec.world/en/profile/hs92/light-fixtures>

9. PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of “Manufacturing Unit for Electric Lighting Fixtures”. 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 21.56 million. The project will be financed through 100% Equity. Table 3 provides the details of the costs calculated for the proposed manufacturing unit.

Table 3: Project Cost

Description of Costs	Amount (PKR)	Reference
Land	-	9.2.1
Building / Infrastructure	861,040	9.2.2
Machinery & Equipment	13,020,000	9.2.3
Furniture & Fixtures	1,230,000	9.2.4
Office Equipment	1,940,000	9.2.5
Office Vehicle	333,300	9.2.6
Pre-operating Costs	723,643	9.2.7
Security against building	837,000	9.2.8
Total Capital Cost	18,944,983	
Working Capital		
Spares inventory	54,250	
Raw material inventory	1,352,949	
Upfront insurance payment	203,633	
Cash	1,000,000	
Working Capital	2,610,831	
Total Project Cost	21,555,815	

9.2.1. Land

The manufacturing unit will be established in a rented building to avoid the high cost of land. Suitable units for setting up a business like this can be easily found on rent. Therefore, no land cost has been added to the project cost. Total space requirement for the proposed unit has been estimated as 4,650 sq. ft. The required space breakup is shown in Table 4.

Table 4: Breakup of Space Requirement

Break-up of Land Area	% Break-up	Area (Sq. Ft.)
Raw Material Store Room	6%	300
Production Department	52%	2,400
Finished Goods Store Room	13%	600
Executive Office	4%	180
Admin and Accounts Department	5%	225
Sales and marketing Department	5%	225
Kitchen	2%	80
Parking and Gate area	9%	440
Washroom	4%	200
Total Area	100%	4,650

9.2.2. Building

There will be no cost of building since the 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 34 KW for which an electricity connection under the General Supply Tariff-Industrial will be required. Building rent of PKR 279,000 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	120	500	59,880
Labour Cost	Sq. Feet	11,976	10	119,760
Curtains	No.	7	5,000	35,000
Blinds	No.	4	5,000	20,000
Glass Partition and Doors	Sq. Feet	783	800	626,400
Total				861,040

9.2.3. Machinery and Equipment

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

Table 6: Machinery and Equipment

Cost Item	Units	Unit Cost (PKR)	Total Cost (PKR)
Injection Molding Machine 268 ton – 50 sec/ Cycle (Chinese origin)	1	10,000,000	10,000,000
Mixer Machine – 150 kg/ Hour	1	350,000	350,000
Crusher Machine – 100 kg/Hour	1	300,000	300,000
Molds for Injection Molding Machine	4	450,000	1,800,000
Electric (static) Chain Pulley 500 kg	1	150,000	150,000
Material Handling Trolleys	4	20,000	80,000
Weigh Scale	1	40,000	40,000
Mechanical Tool Kits	3	30,000	90,000
Electrical Tool Kits	10	20,000	200,000
Plastic Baskets	10	1,000	10,000
Total Cost (PKR)			13,020,000

9.2.4. Furniture & Fixtures

Table 7 provides details of the furniture and fixture requirement of the project.

Table 7: Furniture and Fixtures

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Executive Tables	1	35,000	35,000
Executive Chairs	1	20,000	20,000
Office Table	10	25,000	250,000
Office Chairs	16	10,000	160,000
Visitor Chairs	12	10,000	120,000
Sofa Set	2	45,000	90,000
Racks	37	15,000	555,000
Total			1,230,000

9.2.5. Office Equipment

Details of office equipment required for the project is provided in Table 8.

Table 8: Office Equipment

Cost Item	Units	Unit Cost (PKR)	Total Cost (PKR)
Laptops	7	90,000	630,000
Desktop Computers	4	40,000	160,000
Printer	2	40,000	80,000
CCTV Cameras (2MP)	16	2,000	32,000
DVR	2	12,000	24,000
LED TV (32")	1	40,000	40,000
Air Conditioners	8	90,000	720,000
Exhaust Fan	12	4,000	48,000
Bracket Fan	8	4,500	36,000
Ceiling Fan	12	6,000	72,000
Pedastal Fan	6	8,000	48,000
Water Dispenser	2	20,000	40,000
Wi-Fi / Internet Router	2	5,000	10,000
Total			1,940,000

9.2.6. Office Vehicles

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

Table 9: Office Vehicles

Cost Item	Unit(s)	Unit Cost (PKR)	Registration fee @ 1%	Total Cost (PKR)
Loader – Rickshaw(150cc)	1	250,000	2,500	252,500
Motorcycle	1	80,000	800	80,800
Total				333,300

9.2.7. Pre-Operating Cost

Details of pre-operating cost for the project are provided in Table 10.

Table 10: Pre-Operating Cost

Cost Item	Number of Months	Total Cost (PKR)
Staff Salaries	2	594,000
Utilities	1	129,643
Total		723,643

9.2.8. Security against Building

Detail of security against rented building for the project is provided in Table 11.

Table 11: Security against Building

Cost Item	Months	Unit Cost/Month (PKR)	Total Cost (PKR)
Security against Building	3	279,000	837,000

9.3. Financial Feasibility Analysis

The financial feasibility analysis given in Table 12 provides the information regarding projected IRR, NPV and payback period of the study based on 100% equity.

Table 12: Financial Feasibility Analysis

Description	Project
IRR	54%
NPV (PKR)	81,538,758
Payback Period (years)	2.67
Projection Years	10
Discount Rate used for NPV	15%

9.4. Financial Feasibility Debt Financing

Table 13 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 13: Financial Feasibility Debt Financing

Description	Project
IRR	53%
NPV (PKR)	95,404,001
Payback Period (years)	2.75
Projection Years	10
Discount Rate used for NPV	13%

9.4.1. Breakeven Analysis

Breakeven analysis for “Manufacturing Unit for Residential Electric Lighting Fixtures” is provided in Table 14.

Table 14: Breakeven Analysis

Description	Amount First Year (PKR)	Ratios
Sales (PKR) – A	62,775,525	100%
Variable Cost (PKR) – B	42,450,440	68%
Contribution (PKR) (A-B) = C	20,325,085	32%
Fixed Cost (PKR) – D	15,538,760	25%
Contribution Margin		32%
Breakeven Revenue (PKR)		47,992,608
Number of units at Breakeven (Fixtures)		475,587
Breakeven Capacity		46%

9.4.2. Revenue Generation

Based on the 60% capacity utilization of the unit, sales revenue during the first year of operations is estimated in Table 15. Finished goods inventory in the proposed project is assumed to be kept for 8 days.

Table 15: Revenue Generation

Product	Quantity Sold (Units)	Sale Price Per Unit (PKR)	Total Revenue (PKR)
	A	B	A*B
Switch Board (10 Switches)	90,979	280	25,474,120
Switch Board (4 socket+ 6 switches)	90,979	250	22,744,750
SMD Light Holders 1	60,653	35	2,122,855
SMD Light Holders 2	60,653	40	2,426,120
Bulb Holder	30,326	20	606,520
Multi Plug	60,653	20	1,213,060
Power Plug(30Amp)	60,653	65	3,942,445
Europlug	60,653	15	909,795
Television Socket	30,326	20	606,520
Telephone Socket	30,326	20	606,520
Ceiling Rose	30,326	70	2,122,820
Total			62,775,525

9.4.3. Variable Cost Estimate

Variable costs of the project have been provided in detail in Table 16.

Table 16: Variable Cost Estimate

Variable Cost	Cost (PKR)
Material Cost (Table 17)	13,908,941
Other components Cost	17,136,493
Packing Cost	1,425,338
Electricity	1,495,722
Direct Labour	5,832,000
Machinery repair and maintenance	651,000

Vehicle running and maintenance cost	153,236
Distribution and selling expenses	627,755
Communications expense (phone, internet etc.)	592,200
Promotional expense	470,816
Bad debt expense	156,939
Total Variable Cost	42,450,440

Table 17: Material Cost

Material	Quantity Sold (Units)	Cost/Unit (PKR)	Total Cost (PKR)
	A	B (Table 18)	C=(A*B)
Switch Board (10 Switches)	90,979	21.19	1,928,156
Switch Board (4 socket+ 6 switches)	90,979	22.84	2,077,915
SMD Light Holders 1	60,653	39.20	2,377,448
SMD Light Holders 2	60,653	45.68	2,770,569
Bulb Holder	30,326	33.64	1,020,227
Multi Plug	60,653	7.10	430,561
Power Plug(30Amp)	60,653	19.14	1,160,644
Europlug	60,653	9.26	561,602
Television Socket	30,326	6.48	196,557
Telephone Socket	30,326	6.48	196,557
Ceiling Rose	30,326	39.20	1,188,704
Total			13,908,941

Table 18: Total Material Cost

Products	Material Cost /Unit (PKR)	Components Cost /Unit (PKR)	Packing Cost	Total Material Cost /Unit (PKR)
	(Table 19)	(Table 20)	(Table 21)	
Switch Board (10 Switches)	21.19	71.88	2.40	95.47

Switch Board (4 socket+ 6 switches)	22.84	71.88	2.40	97.11
SMD Light Holders 1	39.20	11.60	3.50	54.29
SMD Light Holders 2	45.68	12.43	3.50	61.61
Bulb Holder	33.64	12.43	3.50	49.57
Multi Plug	7.10	10.56	1.45	19.10
Power Plug(30Amp)	19.14	17.15	1.45	37.74
Europlug	9.26	1.67	1.45	12.38
Television Socket	6.48	2.99	1.45	10.92
Telephone Socket	6.48	2.57	1.45	10.50
Ceiling Rose	39.20	9.03	3.50	51.73

Table 19: Raw Material Cost per Unit

Types	Production/ Annum (Kg)	Plastic Granules/ Bag (kg)	Total bags to be purchased	Purchase price per bag (PKR)	Total Cost of Raw Material (PKR)	No. of Fixtures to be produced / Annum	Material Cost / Unit (PKR)
	A	B	C=(A/B)	D	E=(C*D)	F (Table 1 & Table 2)	G=(E/F)
Switch Board (10 Switches)		25		16,000			
Switch	1,983		79		1,264,000	155,520	8.13
Front Board	1,058		42		672,000		4.32
Box Cover	2,115		85		1,360,000		8.74
Total Material Cost							21.19
Switch Board (4 socket+ 6 switches)							
Socket	793		32		512,000	155,520	3.29
Switch	1,586		63		1,008,000		6.48
Front Board	1,058		42		672,000		4.32
Box Back Cover	2,115		85		1,360,000		8.74
Total Material Cost							22.84
Surface Mount Devices (SMD)Light Holders 1							
Body	6,345		254		4,064,000	103,680	39.20

Surface Mount Devices (SMD) Light Holder 2							
Body(better quality)	7,403		296		4,736,000	103,680	45.68
Bulb Holder							
Cover	881		35		560,000	51,840	10.80
Base	969		39		624,000		12.04
Pendant	881		35		560,000		10.80
Total Material Cost							33.64
Multi Plug							
Body(3 plug ins 2 shoe)	1,146		46		736,000	103,680	7.10
Power Plug(30Amp)							
Front Board	1,322		53		848,000	103,680	8.18
Box Back Cover	1,763		71		1,136,000		10.96
Total Material Cost							19.14
Europlug							
Body	1,322		53		848,000	103,680	8.18
Wire Holder	176		7		112,000		1.08
Total Material Cost							9.26
Television Socket							
Body	529		21		336,000	51,840	6.48
Total Material Cost							6.48

Telephone Socket							
Body	529		21		336,000	51,840	6.48
Total Material Cost							6.48
Ceiling Rose							
Body	1,322		53		848,000	51,840	16.36
Base	1,851		74		1,184,000		22.84
Total Material Cost							39.20
Grand Total	37,146		1,486		23,776,000	1,036,800	

Table 20: Cost of Components

Products	Number Required per Fixture	Price per Gross ¹⁰ (PKR)	Price per piece (PKR)	Components Cost (PKR)
	<i>A</i>	<i>B</i>	$C=(B/144)$	$D=(A*C)$
Switch Board 1				
Connector(Brass)	10	450	3.13	31.25
Point Connector(Brass)	10	400	2.78	27.78
Iron Nut and Screw 1	10	60	0.42	4.17
Iron Nut and Screw 2	10	60	0.42	4.17
Iron Spring	10	15	0.10	1.04
Iron ball Switch	10	50	0.35	3.47
Total (PKR)				71.88
Switch Board 2				
Connector(Brass)	10	450	3.13	31.25
Point Connector(Brass)	10	400	2.78	27.78
Iron Nut and Screw 1	10	60	0.42	4.17
Iron Nut and Screw 2	10	60	0.42	4.17
Iron Spring	10	15	0.10	1.04
Iron ball Switch	10	50	0.35	3.47
Total (PKR)				71.88

¹⁰ 1 Gross is equal to 144 units used in the electrical fixtures market

SMD Light Holders 1				
Iron Strip	1	360	2.50	2.50
Iron Connector (Gutka)	2	220	1.53	3.06
Screw	5	30	0.21	1.04
Spring	2	360	2.50	5.00
Total (PKR)				11.60
SMD Light Holders 2				
Iron Strip	1	480	3.33	3.33
Iron Connector (Gutka)	2	220	1.53	3.06
Nut and Screw	5	30	0.21	1.04
Spring	2	360	2.50	5.00
Total (PKR)				12.43
Bulb Holder				
Iron Strip	1	480	3.33	3.33
Iron Connector (Gutka)	2	220	1.53	3.06
Nut and Screw	5	30	0.21	1.04
Spring	2	360	2.50	5.00
Total (PKR)				12.43
Multi Plug				
Pin	2	350	2.43	4.86
Iron Connector (Gutka)	2	300	2.08	4.17

Locks	6	20	0.14	0.83
Screw 1	1	40	0.28	0.28
Nut and Scew 2	2	30	0.21	0.42
Total (PKR)				10.56
Power Plug(30 Amp)				
Big metal Pin	1	700	4.86	4.86
Small metal Pin	2	450	3.13	6.25
Iron Connector (Gutka)	3	220	1.53	4.58
Nut and Screw 1	3	45	0.31	0.94
Scew 2	1	60	0.42	0.42
Washel	1	15	0.10	0.10
Total (PKR)				17.15
2 Pin Shoe				
Nut and Screw 1	1	30	0.21	0.21
Screw 2	2	40	0.28	0.56
Screw 3	1	50	0.35	0.35
Pins	2	40	0.28	0.56
Total (PKR)				1.67
Television Socket				
Nut and Screw 1	1	30	0.21	0.21
Screw 2	2	40	0.28	0.56

Wire Socket	1	320	2.22	2.22
Total (PKR)				2.99
Telephone Socket				
Nut and Screw 1	1	30	0.21	0.21
Screw 2	2	40	0.28	0.56
Wire Socket	1	260	1.81	1.81
Total (PKR)				2.57
Ceiling Rose				
Iron Strip	1	580	4.03	4.03
Iron Connector (Gutka)	2	300	2.08	4.17
Nut and Screw	4	30	0.21	0.83
Total (PKR)				9.03

Table 21: Packing Cost

Products	Polythene Price bags/per piece	Corrugated Box price per 10 piece	Corrugated Box price per 1 piece	Total Packing Cost per Piece
Switch Board (10 Switches)	0.9	15	1.5	2.4
Switch Board (4 socket+ 6 switches)	0.9	15	1.5	2.4

SMD Light Holders 1	1.5	20	2	3.5
SMD Light Holders 2	1.5	20	2	3.5
Bulb Holder	1.5	20	2	3.5
Multi Plug	0.45	10	1	1.45
Power Plug(30Amp)	0.45	10	1	1.45
Europlug	0.45	10	1	1.45
Television Socket	0.45	10	1	1.45
Telephone Socket	0.45	10	1	1.45
Ceiling Rose	1.5	20	2	3.5

9.4.4. Fixed Cost Estimate

Table 22 provides details of fixed cost for the project.

Table 22: Fixed Cost Estimate

Fixed Cost	Cost (PKR)
Administration expense	7,896,000
Administration benefits expense	592,200
Building rental expense	3,348,000
Office expenses (stationery, entertainment, janitorial services, etc.)	789,600
Insurance expense	203,633
Depreciation expense	2,564,599
Amortization of pre-operating costs	144,729
Total	15,538,760

9.4.5. Human Resource Requirement

For the 1st year of operations, the residential electric lighting fixtures manufacturing unit 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	1	150,000	1,800,000
Admin and Accounts Manager	1	60,000	720,000
Admin Assistant	1	40,000	480,000
Accounts Assistant	1	40,000	480,000
Procurement Officer	1	50,000	600,000
Quality Controller	1	50,000	600,000
Sales and Marketing Manager	1	60,000	720,000
Assistants - Sales and Marketing	2	40,000	960,000
Mechanical Foreman	1	50,000	600,000
Production Supervisor	1	80,000	960,000
Production Department			
Unskilled Labor-crusher	2	22,000	528,000
Unskilled Labor-mixer	1	22,000	264,000

Injection Molding Machine Operator	2	35,000	840,000
Machine Operator Helper	2	22,000	528,000
Unskilled labor-Assembling	5	22,000	1,320,000
Unskilled labor-packing	3	22,000	792,000
Store In charge	1	40,000	480,000
Security Guard	3	22,000	792,000
Office Boy	1	22,000	264,000
Total	31		13,728,000

10. CONTACT DETAILS

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

Table 24: Contact Details of Suppliers

Supplier Name	Origin	Product	Contact Details	Email	Website
High-tech Machinery	Lahore, Pakistan	Machinery	0315-4782666	info@hitech-machinery.com	www.hitech-machinery.com/
Shijiazhuang Forever Machinery	China	Machinery	0086-311-83839996	daisyli@frv.cn	www.tubemills.cn/
Prime Mechanical Works (PVT) Ltd	Karachi/Lahore,	Machinery	04235923024 03008443167	info@primemachines.net	www.primemachines.net
Qingdao fullwin Plastic machinery	China	Machinery	0086-15254294721	info@fullwinmachinery.com	www.fullwinmachinery.en.alibaba.com/
Euro Asia Trading	Karachi, Pakistan	Raw Material	0309-0955223	info@euroasiatrading.net	https://www.plastic1.com/plastic-suppliers/euro-asia-trading
Haidery Packages Pvt. Ltd.	Wah cant, Pakistan	Raw Material	0342-2228866		www.haiderypackages.com
Hero Pak Electrical Industries Pvt.Ltd	Sargodha	Manufacturer	0301-0000011	ict@heroelectric.com	https://heroelectric.com/
Dubai Electric Trading	Rawalpindi	Electric fixture Supplier	051-5775475		www.hooverlighting.com/
Khwaja Electric	Peshawar	Electric fixture Supplier	0313-9991264		
New Ittefaq Electric and Hardware Store	Quetta	Electric fixture Supplier	0332-0212774		

11. USEFUL LINKS

Table 25: Useful Links

Organization	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 Balochistan	www.balochistan.gov.pk/
Government of Khyber Pakhtunkhwa	www.kp.gov.pk/
Industries Department Government of Khyber Pakhtunkhwa	www.industries.kp.gov.pk
Industries and Commerce Department Sindh	www.industries.sindh.gov.pk
Department of Industries and Commerce, Azad Jammu and Kashmir	www.industries.ajk.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
Punjab Small Industries Corporation (PSIC)	www.psic.gop.pk
Sindh Small Industries Corporation (SSIC)	www.ssic.gos.pk/
Small Industries Development Board Khyber Pakhtunkhwa (KPSIDB)	www.small_industries_de.kp.gov.pk/
Industries and Commerce Department Balochistan (ICDB)	www.dgicd.gob.pk/
Azad Kashmir Small Industries Corporation (AJKSIC)	www.sic.ajk.gov.pk/
Electrical Concerns Manufacturers Association (ECMA) Sargodha	Informal Group Ph:(0483701766)
Pakistan Electronics Manufacturers Association - PEMA	www.pema.org.pk/
Technology Information Services (TIS)	https://www.pastic.gov.pk/

12. ANNEXURES

12.1. Income Statement

Calculations	SMDA									
Income Statement										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Total Revenue	62,775,525	74,875,790	88,779,347	104,728,088	122,992,837	143,878,160	167,728,531	194,928,026	214,615,757	236,291,948
<i>Cost of sales</i>										
Material Cost- Plastic Grannules	13,908,941	16,589,933	19,670,589	23,204,201	27,250,944	31,878,546	37,162,954	43,189,600	47,551,750	52,354,477
Other Components Cost	17,136,493	20,439,618	24,235,023	28,588,716	33,574,633	39,275,926	45,786,595	53,211,534	58,585,899	64,503,075
Packing Cost	1,425,338	1,676,851	1,963,217	2,289,087	2,659,710	3,080,990	3,559,559	4,102,855	4,483,295	4,902,160
Direct Electricity	766,615	835,610	910,815	992,789	1,082,140	1,179,532	1,285,690	1,401,402	1,527,529	1,665,006
Direct Labour	5,832,000	6,397,704	7,018,281	7,699,055	8,445,863	9,265,112	10,163,827	11,149,719	12,231,241	13,417,672
Machinery repair and maintenance	651,000	716,751	789,143	868,846	956,600	1,053,216	1,159,591	1,276,710	1,405,658	1,547,629
Vehicle running and maintenance cost	153,236	168,713	185,752	204,513	225,169	247,911	272,951	300,519	330,871	364,289
Total cost of sales	39,873,623	46,825,180	54,772,821	63,847,208	74,195,059	85,981,234	99,391,167	114,632,339	126,116,242	138,754,307
Gross Profit	22,901,902	28,050,609	34,006,526	40,880,880	48,797,777	57,896,925	68,337,364	80,295,688	88,499,514	97,537,641
<i>General administration & selling expenses</i>										
Administration expense	7,896,000	8,661,912	9,502,117	10,423,823	11,434,934	12,544,122	13,760,902	15,095,710	16,559,993	18,166,313
Administration benefits expense	592,200	649,643	712,659	781,787	857,620	940,809	1,032,068	1,132,178	1,242,000	1,362,473
Building rental expense	3,348,000	3,682,800	4,051,080	4,456,188	4,901,807	5,391,987	5,931,186	6,524,305	7,176,735	7,894,409
Electricity	729,107	794,726	866,252	944,214	1,029,194	1,121,821	1,222,785	1,332,835	1,452,791	1,583,542
Communications expense (phone, internet etc.)	592,200	649,643	712,659	781,787	857,620	940,809	1,032,068	1,132,178	1,242,000	1,362,473
Office expenses (stationery, entertainment, janitorial services, etc.)	789,600	866,191	950,212	1,042,382	1,143,493	1,254,412	1,376,090	1,509,571	1,655,999	1,816,631
Promotional expense	470,816	561,568	665,845	785,461	922,446	1,079,086	1,257,964	1,461,960	1,609,618	1,772,190
Distribution and selling expenses	627,755	748,758	887,793	1,047,281	1,229,928	1,438,782	1,677,285	1,949,280	2,146,158	2,362,919
Insurance expense	203,633	173,088	142,543	111,998	81,453	50,908	20,363	383,697	326,143	268,588
Depreciation expense	2,564,599	2,564,599	2,564,599	2,564,599	2,564,599	2,564,599	1,738,434	4,775,580	4,775,580	4,775,580
Amortization of pre-operating costs	144,729	144,729	144,729	144,729	144,729	-	-	-	-	-
Bad debt expense	156,939	187,189	221,948	261,820	307,482	359,695	419,321	487,320	536,539	590,730
Subtotal	18,115,577	19,684,847	21,422,436	23,346,068	25,475,305	27,687,032	29,468,467	35,784,615	38,723,555	41,955,848
Operating Income	4,786,325	8,365,762	12,584,090	17,534,812	23,322,473	30,209,894	38,868,898	44,511,073	49,775,959	55,581,793
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	485,000	-	-	-
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	83,325	-	-	-
Earnings Before Interest & Taxes	-	4,786,325	8,365,762	12,584,090	17,534,812	23,322,473	30,209,894	42,692,223	44,511,073	49,775,959
Earnings Before Tax	-	4,786,325	8,365,762	12,584,090	17,534,812	23,322,473	30,209,894	42,692,223	44,511,073	49,775,959
Tax	784,694	935,947	1,109,742	1,309,101	1,537,410	1,798,477	2,096,607	2,436,600	2,682,697	2,953,649
NET PROFIT/(LOSS) AFTER TAX	4,001,631	7,429,815	11,474,348	16,225,711	21,785,062	28,411,417	40,595,616	42,074,473	47,093,262	52,628,143

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	1,000,000	2,309,033	7,140,585	11,982,749	17,240,798	22,917,611	28,957,378	39,209,576	83,243,613	131,883,012	200,602,701
Accounts receivable		5,159,632	5,656,903	6,725,554	7,952,360	9,358,394	10,967,301	12,805,754	14,903,694	16,830,566	18,530,454
Finished goods inventory		830,700	975,525	1,141,100	1,330,150	1,545,730	1,791,276	2,070,649	2,388,174	2,627,422	2,890,715
Spares Inventory	54,250	65,463	78,994	95,322	115,025	138,800	167,489	202,109	243,884	294,293	-
Raw material inventory	1,352,949	1,775,656	2,316,760	3,007,485	3,886,969	5,004,224	6,420,584	8,212,650	9,952,328	12,060,859	-
Pre-paid building rent	-	306,900	337,590	371,349	408,484	449,332	494,266	543,692	598,061	657,867	-
Pre-paid insurance	203,633	173,088	142,543	111,998	81,453	50,908	20,363	383,697	326,143	268,588	-
Total Current Assets	2,610,831	10,620,472	16,648,900	23,435,557	31,015,240	39,465,000	48,818,657	63,428,127	111,655,896	164,622,608	222,023,869
<i>Fixed assets</i>											
Land	-	-	-	-	-	-	-	-	-	-	-
Building Renovation	861,040	774,936	688,832	602,728	516,624	430,520	344,416	258,312	172,208	86,104	-
Machinery & equipment	13,020,000	11,067,000	9,114,000	7,161,000	5,208,000	3,255,000	1,302,000	24,733,459	21,023,440	17,313,422	13,603,403
Furniture & fixtures	1,230,000	1,045,500	861,000	676,500	492,000	307,500	123,000	2,336,571	1,986,085	1,635,600	1,285,114
Office vehicles	333,300	283,305	233,310	183,315	133,320	83,325	33,330	507,817	431,644	355,472	279,299
Office equipment	1,940,000	1,649,000	1,358,000	1,067,000	776,000	485,000	194,000	3,685,323	3,132,525	2,579,726	2,026,928
Security Against Building	837,000	837,000	837,000	837,000	837,000	837,000	837,000	837,000	837,000	837,000	837,000
Total Fixed Assets	18,221,340	15,656,741	13,092,142	10,527,543	7,962,944	5,398,345	2,833,746	32,358,482	27,582,903	22,807,323	18,031,744
<i>Intangible assets</i>											
Pre-operation costs	723,643	578,915	434,186	289,457	144,729	-	-	-	-	-	-
Legal, licensing, & training costs	-	-	-	-	-	-	-	-	-	-	-
Total Intangible Assets	723,643	578,915	434,186	289,457	144,729	-	-	-	-	-	-
TOTAL ASSETS	21,555,815	26,856,128	30,175,228	34,252,557	39,122,912	44,863,345	51,652,403	95,786,609	139,238,799	187,429,931	240,055,613
Liabilities & Shareholders' Equity											
<i>Current liabilities</i>											
Accounts payable		3,299,498	3,904,098	4,601,911	5,406,826	6,334,864	7,404,546	8,637,345	10,015,062	11,112,932	11,110,470
Other liabilities											
Total Current Liabilities	-	3,299,498	3,904,098	4,601,911	5,406,826	6,334,864	7,404,546	8,637,345	10,015,062	11,112,932	11,110,470
<i>Other liabilities</i>											
Total Long Term Liabilities	-	-	-	-	-	-	-	-	-	-	-
<i>Shareholders' equity</i>											
Paid-up capital	21,555,815	21,555,815	21,555,815	21,555,815	21,555,815	21,555,815	21,555,815	23,861,607	23,861,607	23,861,607	23,861,607
Retained earnings		2,000,815	4,715,315	8,094,832	12,160,271	16,972,667	22,692,042	63,287,658	105,362,130	152,455,392	205,083,536
Total Equity	21,555,815	23,556,630	26,271,130	29,650,646	33,716,086	38,528,481	44,247,856	87,149,265	129,223,737	176,317,000	228,945,143
TOTAL CAPITAL AND LIABILITIES	21,555,815	26,856,128	30,175,228	34,252,557	39,122,912	44,863,345	51,652,403	95,786,609	139,238,799	187,429,931	240,055,613

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		4,001,631	7,429,815	11,474,348	16,225,711	21,785,062	28,411,417	40,595,616	42,074,473	47,093,262	52,628,143
Add: depreciation expense		2,564,599	2,564,599	2,564,599	2,564,599	2,564,599	2,564,599	1,738,434	4,775,580	4,775,580	4,775,580
amortization of pre-operating costs		144,729	144,729	144,729	144,729	144,729	-	-	-	-	-
Accounts receivable		(5,159,632)	(497,271)	(1,068,650)	(1,226,807)	(1,406,034)	(1,608,907)	(1,838,453)	(2,097,940)	(1,926,872)	(1,699,887)
Finished goods inventory		(830,700)	(144,824)	(165,576)	(189,050)	(215,580)	(245,545)	(279,374)	(317,524)	(239,248)	(263,293)
Spares inventory	(54,250)	(11,213)	(13,531)	(16,328)	(19,703)	(23,775)	(28,689)	(34,619)	(41,775)	(50,410)	294,293
Raw material inventory	(1,352,949)	(422,707)	(541,104)	(690,725)	(879,484)	(1,117,255)	(1,416,359)	(1,792,066)	(1,739,678)	(2,108,531)	12,060,859
Pre-paid building rent	-	(306,900)	(30,690)	(33,759)	(37,135)	(40,848)	(44,933)	(49,427)	(54,369)	(59,806)	657,867
Advance insurance premium	(203,633)	30,545	30,545	30,545	30,545	30,545	30,545	(363,334)	57,555	57,555	268,588
Accounts payable		3,299,498	604,600	697,813	804,915	928,037	1,069,683	1,232,798	1,377,717	1,097,870	(2,462)
Other liabilities		-	-	-	-	-	-	-	-	-	-
Cash provided by operations	(1,610,831)	3,309,848	9,546,867	12,936,996	17,418,320	22,649,479	28,731,809	39,209,576	44,034,037	48,639,399	68,719,689
<i>Financing activities</i>											
Short term debt principal repayment		-	-	-	-	-	-	-	-	-	-
Issuance of shares	21,555,815	-	-	-	-	-	-	2,305,792	-	-	-
Cash provided by / (used for) financing activities	21,555,815	-	-	-	-	-	-	2,305,792	-	-	-
<i>Investing activities</i>											
Capital expenditure	(18,944,983)	-	-	-	-	-	-	(31,263,170)	-	-	-
Acquisitions											
Cash (used for) / provided by investing activities	(18,944,983)	-	-	-	-	-	-	(31,263,170)	-	-	-
NET CASH	1,000,000	3,309,848	9,546,867	12,936,996	17,418,320	22,649,479	28,731,809	10,252,198	44,034,037	48,639,399	68,719,689

13. KEY ASSUMPTIONS

13.1. Operating Cost Assumptions

Table 26: Operating Cost Assumptions

Description	Details
Inflation rate	10.1%
Electricity growth rate	9.0%
Machinery maintenance cost (% of machinery cost)	5.0%
Communications expense (% of administration expense)	7.5%
Promotional expense (% of revenue)	0.75%
Machinery & equipment insurance rate (% of machinery cost)	1.5%
Office equipment price growth rate	9.6%
Office vehicles price growth rate	6.2%

13.2. Revenue Assumptions

Table 27: Revenue Assumptions

Description	Details
Sale price growth rate	10.1%
Initial capacity utilization	60%
Capacity growth rate	10%
Maximum capacity utilization	100%

13.3. Financial Assumptions

Table 28: Financial Assumptions

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

13.4. Cash Flow Assumptions

Table 29 Cash Flow Assumptions

Description	Days
Account Receivable Days	30
Account Payable Days	30
Raw material Inventory Days	15

Finished Goods Inventory Days	7
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13.5. Debt Related Assumptions

Table 30: Debt Related Assumptions

Description of Cost	Details
Project Life (Years)	10
Debt: Equity	50:50
Discount Rate	13%
Debt Tenure	5 years
Grace Period	1 Year
Interest Rate (KIBOR+3%)	10.3%

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