



Pre-feasibility Study

PRODUCTION UNIT FOR PRINTED CIRCUIT BOARD

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

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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 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

Printed circuit board (PCB) is a non-conductive material with conductive lines printed or etched through it. It provides the foundation on which all other electronic components such as semiconductors, connectors, resistors, diodes, capacitors and radio devices are mounted and assembled through conductive lines. These components are mounted on the board and the copper traces and conductive lines connect the components together to form a working circuit. The most common circuit boards are made of plastic or glass-fiber and resin composites and use copper traces, but a wide variety of other materials may also be used. In the proposed project, fiber glass is used as a main material for production of PCB.

PCBs are an essential part of almost all electric and electronic equipment, and they have revolutionized the electronics industry. For different devices or equipment, there needs to be a different design and layout for circuit on a PCB, hence they are available in various different designs, depending upon the requirements of the equipment or devices.

A PCB has a thin baseboard (about 1.5-2 mm thick) of insulating material such as resin-bonded paper or fiberglass, with an even thinner layer of copper (about 0.2-0.3 mm thick) on one or both surfaces. Different types of PCBs are:

- **Single Sided Circuit Board** is made of baseboard with copper on one side of baseboard of varying thickness.
- **Double Sided Circuit Board** is made of baseboard with copper on both sides of baseboard of varying thicknesses.
- **Multi-Layer Circuit Board** is made from the same base material with copper foil on the top and bottom and one or more “inner layer” “cores. The number of “layers” corresponds to the number of copper foil layers.

The single sided PCBs are more common and more popular choices for a wide variety of electronics due to their low cost and the relative ease with which they can be produced. The single-sided PCBs are made of a single layer of base material where the conductive copper is mounted on one side of the board and after completion of PCB, the components are also assembled on the same side as copper; whereas conductive wiring is connected on the other side. For the proposed project, single-sided PCBs for LED bulbs, Computer Mouse and UPS are selected.

The primary materials used in the manufacture of PCBs are fiberglass or plastic substrates, copper, solder mask, and nomenclature ink. Different substrates include rigid, flexible, rigid-flex and consist of various laminate types such as paper, FR-4, polyimide and others. The printed circuit boards are used by various manufacturing industries such as industrial electronics, healthcare, aerospace & defense, automotive, IT and telecom, consumer electronics, and many others.

This “Pre-feasibility Document” provides details for setting up a “Production Unit for Printed Circuit Boards”. There are still very few producers of printed circuit boards in

Pakistan but their demand is constantly increasing due to which it appears to be a good investment opportunity. The proposed project has a capacity of manufacturing 990,904 LED Bulb PCBs, 505,774 Mouse PCBs and 15,805 UPS PCBs in a year at the maximum capacity of 100%. The production capacity in “Year One” is assumed to be 50%, with a production of 495,452 LED Bulb PCBs, 252,887 Mouse PCBs and 7,903 UPS PCBs annually.

The unit is proposed to be ideally located in metropolitan cities like Karachi, Lahore, Islamabad, or other large cities such as Faisalabad, Rawalpindi, Peshawar, Quetta, Hyderabad, Multan, Gujranwala, Sialkot, etc. 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.

The “Production Unit for Printed Circuit Boards” will be set up in a rented building with area of 2,700 square feet. The project requires a total investment of PKR 14.68 million. This includes capital investment of PKR 12.03 million and working capital of PKR 2.65 million. This project is financed through 100% equity. The Net Present Value (NPV) of project is PKR 44.90 million with an Internal Rate of Return (IRR) of 55% and a Payback period of 2.50 years. Further, this project is expected to generate Gross Annual Revenues of PKR 50.69 million during 1st year, with Gross Profit (GP) ratio ranging from 44% to 51% and Net Profit (NP) ratio ranging from 7% to 20% during the projection period of ten years. The proposed project will achieve its estimated breakeven point at capacity of 35% (527,440 PCB Units) with breakeven revenue of PKR 35.36 million.

The proposed project will provide employment opportunities to 26 people. High return on investment and steady growth of business is expected with the entrepreneur having some prior experience or education in the related field of business. The legal business status of this project is proposed as “Sole Proprietorship”. Further, the proposed project may also be established as a “Partnership Concern”.

3. INTRODUCTION TO SMEDA

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

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

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

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

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

4. PURPOSE OF THE DOCUMENT

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

The purpose of this document is to provide information to the potential investors about "Production Unit for Printed Circuit Boards". 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

Printed circuit boards (PCBs) are used to mechanically support and electrically connect electronic components using conductive pathways, tracks or signal traces etched from copper sheets laminated onto a non-conductive substrate. These are employed in the manufacturing of business machines and computers, as well as communication, control and home entertainment equipment.

A printed circuit board is a non-conductive material with conductive lines printed on it. They are found in virtually all electronic products. They are the physical platform upon which microelectronic components such as semiconductor chips and capacitors are mounted and interconnected. The semiconductors and other pieces of hardware and software found in every electronic system cannot function without the PCBs that interconnect them. The manufacturers of end products attach these microelectronic components according to product quality and specification. The products quality and specification are usually different according to the target customer.

The term printed is not exactly an accurate description of how the copper on the surface of a printed circuit board is formed. In fact, all printed circuit boards start their life with a complete layer of copper on one or both sides of the insulating board. Then, unwanted copper is removed from the board, leaving behind the wanted copper pattern. Typically, this copper removal is done by etching the copper away using strong chemicals.

Figure 1 shows a cross-section of a simple printed circuit board in which the insulating board, the copper track, and the holes for component leads can be seen. The components fit to the printed circuit boards when their leads are inserted through the board holes, and are then soldered to the copper track.

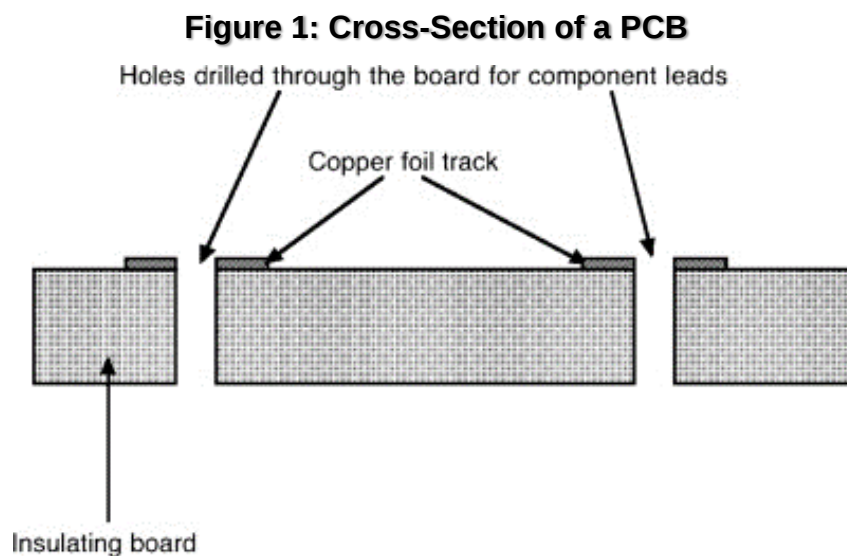
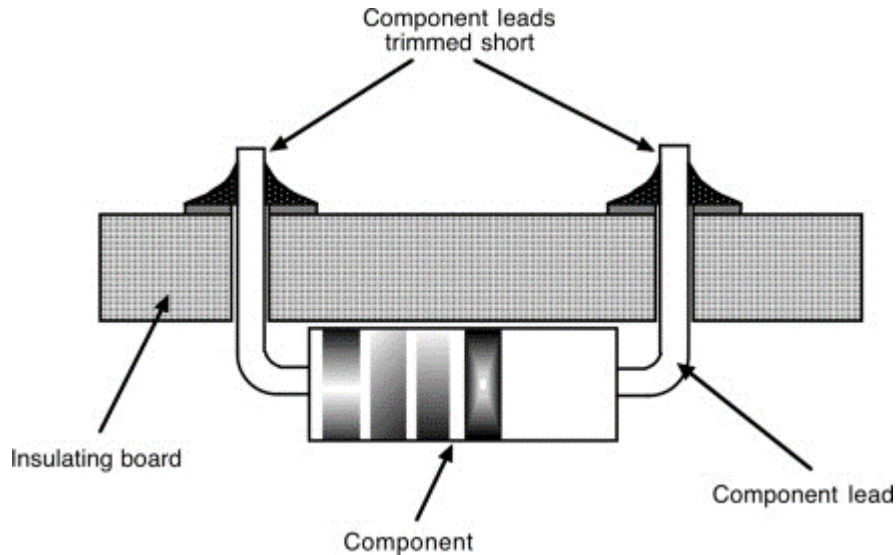


Figure 2 shows cross section of a printed circuit board showing a component fitted. The component leads pass through the holes in the board and are soldered to the copper track.

Figure 2: Cross-Section Showing a Component Fitted



Furthermore, generally the printed circuit boards are of three types, single sided PCB, double sided PCB and multi-layer PCB. The single sided have copper on one side double sided have on both sides and multi-layer has copper on both sides as well as one or more inner core layers.

In the world of electronics, printed circuit boards (PCBs) play a vital role in connecting the components and routing voltage. An LED printed circuit board is used to mount the diode(s) and power the LED for the application. Whereas in the computer mouse, it is the skeleton to which all the internal workings of the mouse are attached. The integrated circuit, or computer chip, collects the information from the switches and the signals from the phototransistors and sends a data stream to the computer. Whereas in a UPS, the capacitors are mounted on PCB which filter and store energy and provide smooth uninterruptible power supply.

Benefits of PCB

There are other alternatives such as breadboards¹ or point-to-point construction², but PCBs are more widely used. The reasons are:

- Compact size and saving of wire
- Easily repairable
- Lesser chances of short circuits
- Little or no electronic noise
- Lower cost
- Reliability

¹ A breadboard, or protoboard, is a construction base for prototyping of electronics.

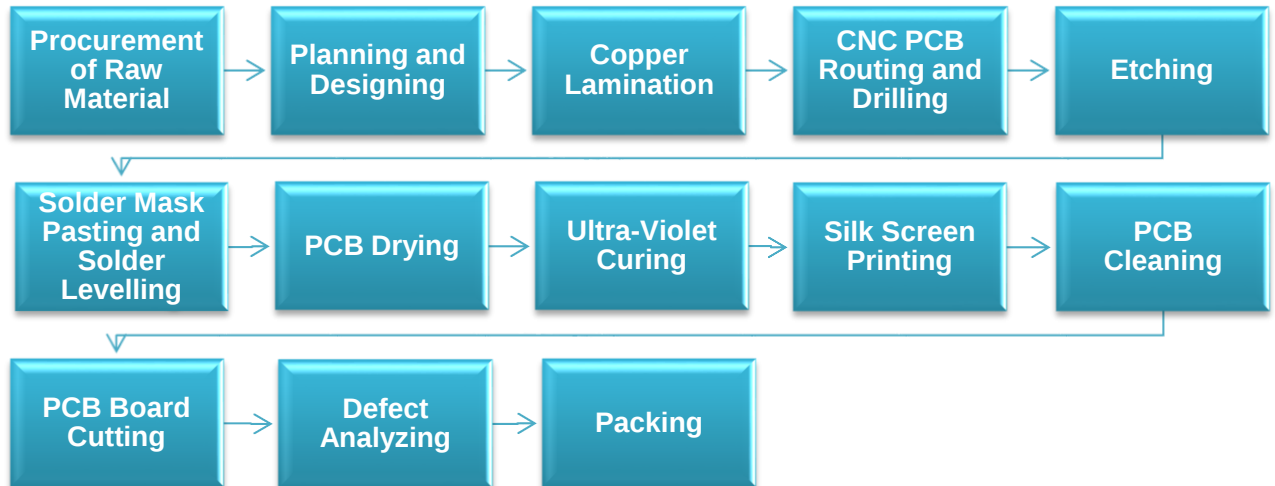
² Point-to-point construction is a non-automated method of construction of electronic circuits.

5.1. Production Process Flow

Process Flow

The production process flow of printed circuit boards is shown in Figure 3.

Figure 3: Process Flow



Procurement of Raw Materials

The raw material required for production of printed circuit boards includes an FR4³ fiberglass sheet, copper foil sheet, PCB design film, epoxy resin glue, green solder and mask ink. All these materials are procured from the local market. The FR4 fiberglass sheet is the main body of the PCB board on which the rest of the materials are attached or mounted according to the process. The fiberglass sheets of 4 square feet each will be procured on order. Designs of multiple units are made on one sheet and at the end they are cut according to the design.

Planning and Designing

The process of manufacturing printed circuit board is started with planning and design. The planning and design department, in coordination with the engineers, finalize the design according to the requirements of the product.

Two steps are involved in this process. At initial stage, schematic diagram is drawn showing the PCB layout design. Schematic diagram gives clear overview of what kind of components would be used in the design and how they will be connected with different paths and traces once the PCB will be made. This diagram does not indicate the actual path that would be transferred on the actual copper board, because lines and paths used in creating a schematic diagram can be differently aligned on the PCB

³ FR4 is a standard defined by the NEMA (USA National Electrical Manufacturers Association) for a glass-reinforced epoxy resin laminate. FR stands for "flame retardant" and indicates that the material is compliant with the UL94V-0 standard on plastic material flammability.

board. The PCB layout design will define the actual circuit design that will be incorporated on the copper board. For this process, Computer Aided Design (CAD) software is used. The finalized designs are then printed on the PCB design films. In the proposed project, printed circuit boards used in LED Bulb, UPS and Computer Mouse are being produced. Figure 4, Figure 5 and Figure 6 show the layout designs and schematic diagrams of these products.

Figure 4: LED Bulb Layout and Diagram

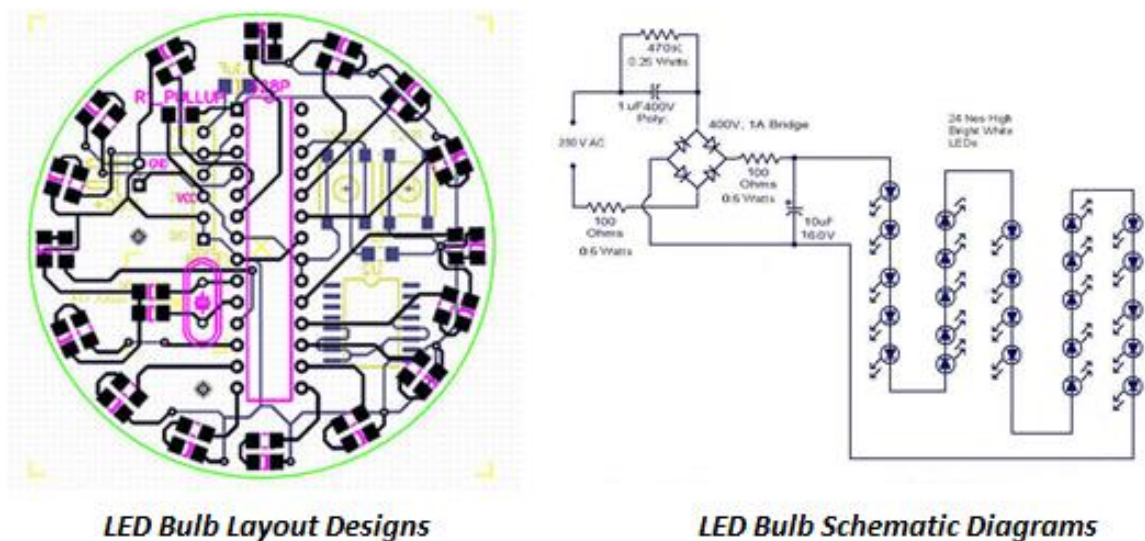


Figure 5: UPS Layout and Diagram

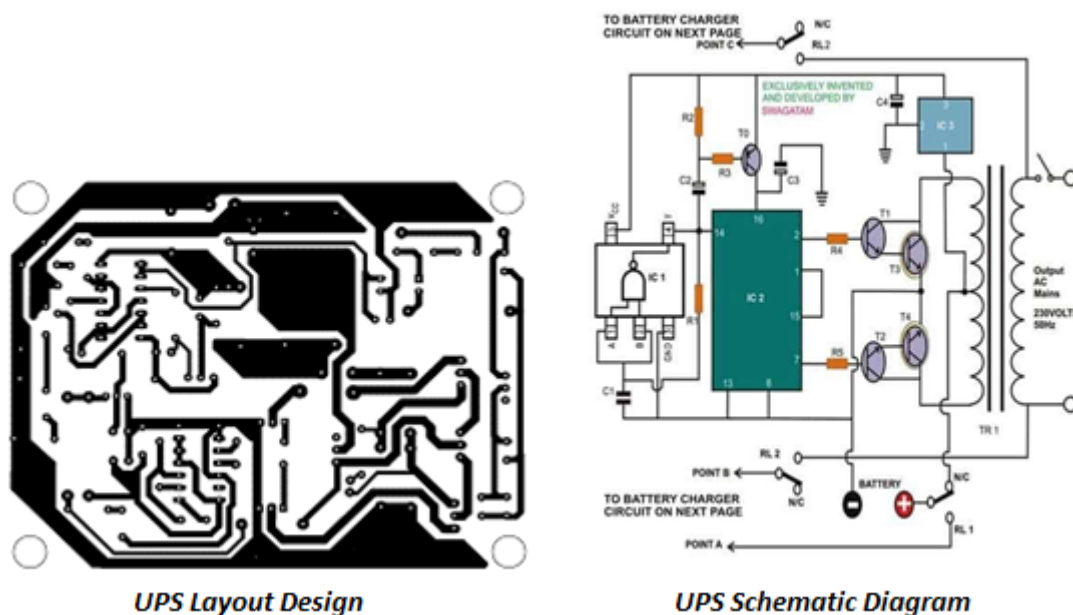
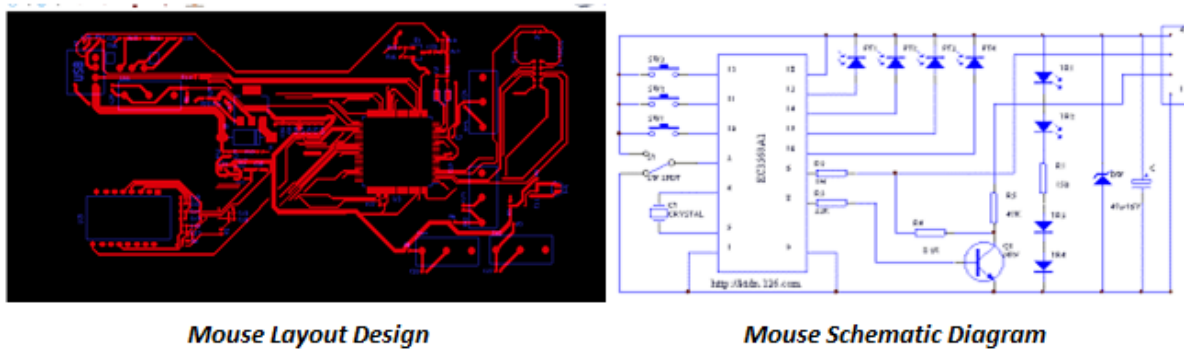
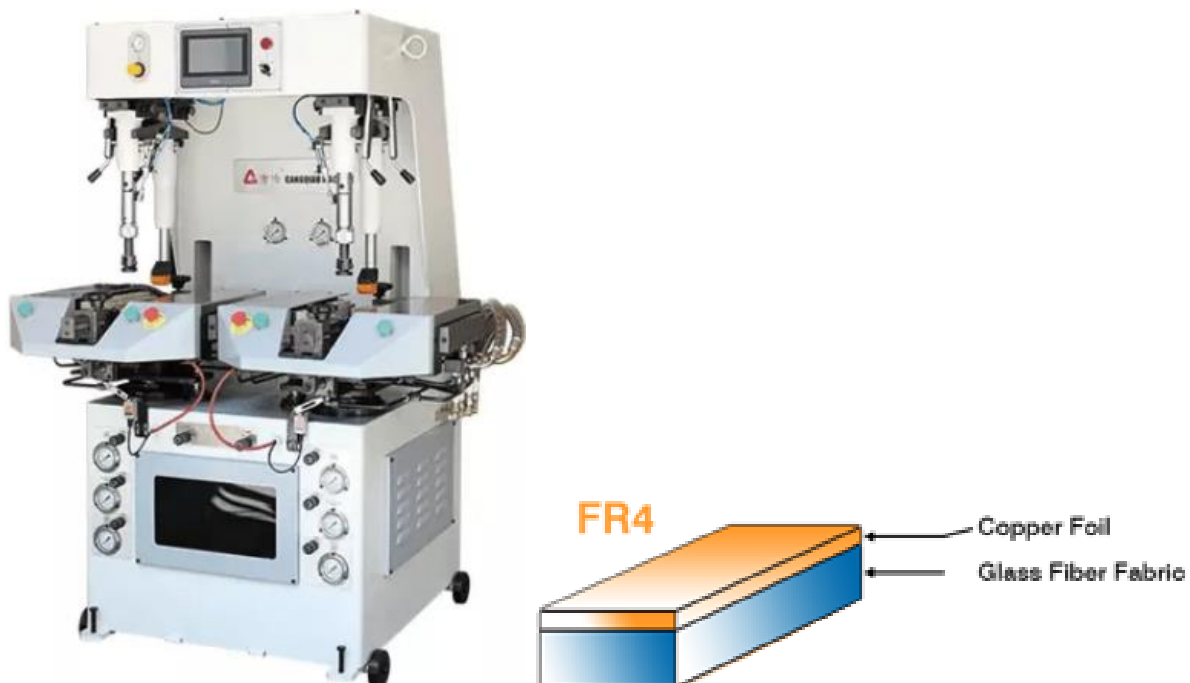


Figure 6: Mouse Layout and Diagram**Copper Lamination**

About 0.2-0.3 mm thick copper foil layer is attached on fiberglass sheet through PCB laminating press machine. PCB laminating press machine uses high temperature and high pressure to laminate copper foil layer on fiber glass sheet. The fiber glass sheet and copper foil layer are placed in the PCB lamination press machine where they are subjected to temperature of about 150°C and pressure of 1500 psi (pounds per square inch). This process fully bonds the copper foil to the fiberglass sheet to make FR4 fiberglass sheet. Figure 7 shows a PCB lamination press machine and the FR4 fiberglass sheet.

Figure 7: PCB Laminating Press Machine**CNC PCB Routing and Drilling**

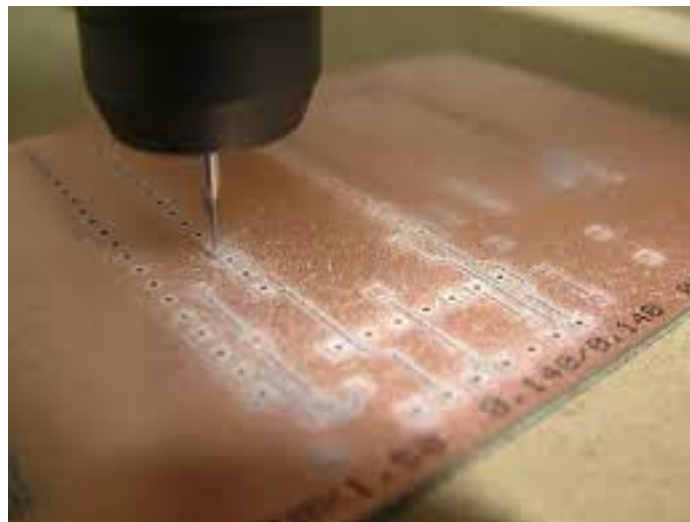
In this process, the CNC machine is used to route the layout pattern and drill holes on the copper laminated PCB board according to the finalized layout. The machine receives the layout design and drills holes and routes the pattern by using etching

resist ink according to the layout provided. Etching resist ink is a colored solution to protect the copper underneath from the etching process (explained below) so that the circuit remains unbroken routed on the board. As one sheet of size 4 square feet is being used at a time, the layout design of multiple PCBs can be drilled on one sheet according to the product's PCB's sizes. Figure 8 shows a CNC PCB routing and drilling machine.

Figure 8: CNC PCB Routing



Figure 9: Drilling on FR4 Fiber Glass



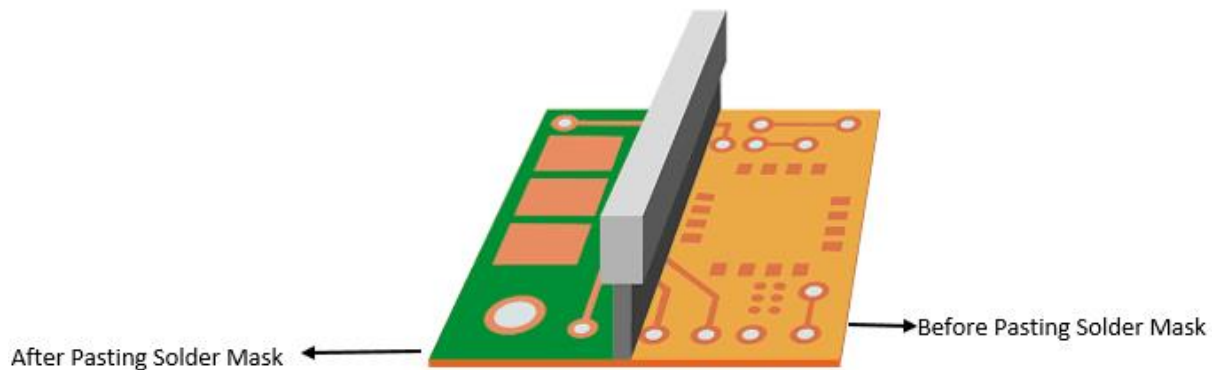
Etching

It is the process of removing excess copper from a circuit board that is not protected by the etching resist ink, by immersing the circuit board in an alkaline solution in the etching machine. Figure 10 shows an etching machine.

Figure 10: Etching Machine**Solder Mask Pasting**

Solder mask pasting is done on the board after etching, by using the solder mask ink in semi-automated machine. The primary purpose of the mask is to restrict the areas that will be covered with solder. It also protects panels from contamination to handle any damage and possible electrical shorting during assembly and installation processes. They provide a connecting medium between the PCB and the components that are to be mounted afterwards. Solders are commonly used to create electrical connections and mechanical bonds between printed circuit board pads and surface mount devices or components, such as resistors and capacitors. Figure 11 shows a solder pasting/coating machine and Figure 12 shows a diagram showing a PCB with and without solder mask.

Figure 11: Solder Mask Pasting and Solder Coating Machine

Figure 12: PCB With and Without Solder Mask**PCB Drying**

This is a continuous process for drying the solder mask ink on the PCBs one by one. The conveyor belt stops for a few seconds under the heaters for the ink on the board to dry and then moves forward to allow the next board to come under the heaters. Figure 13 shows a drying tunnel conveyor being used in the proposed unit.

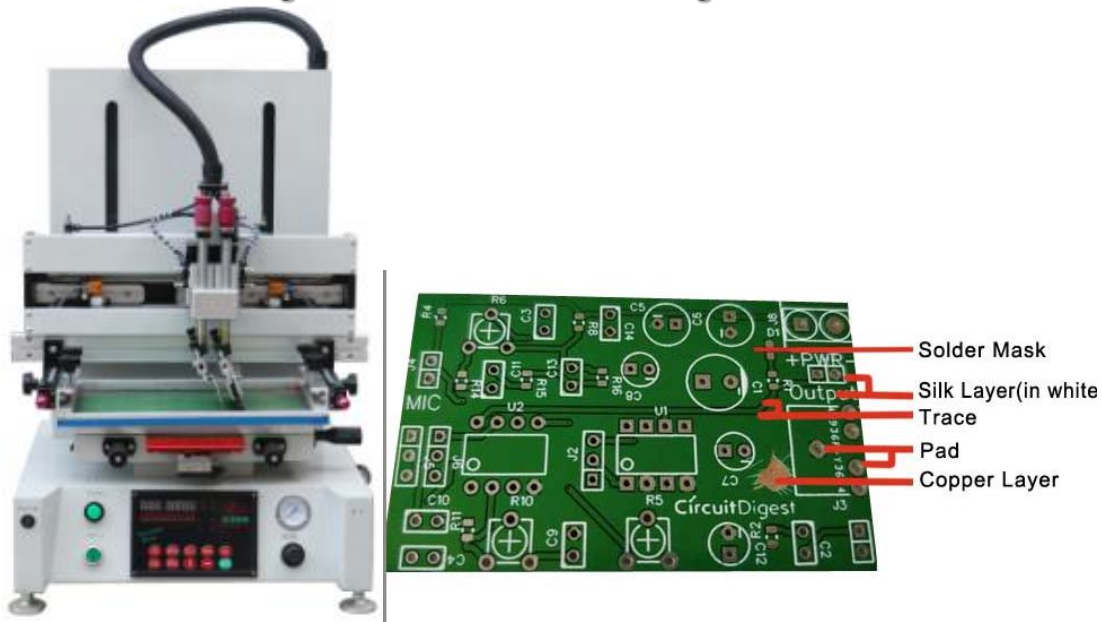
Figure 13: Drying Tunnel Conveyor**Ultraviolet Curing**

Ultraviolet curing process for PCBs is done to make the layout pattern visible as it is hidden post the solder coating process of the printed circuit boards. Ultraviolet curing (commonly known as UV curing) is a photochemical process in which high-intensity ultraviolet rays are reflected upon a PCB for about 10 to 15 minutes. Figure 14 shows an Ultra Violet Curing Machine.

Figure 14: UV Curing Machine

Silk Screen Printing

The silkscreen is a layer of ink trace used to identify the components to be mounted on the PCB, marks, logos and symbols etc. It is done on the back side of the printed circuit board so as to know where the different components are to be attached. Figure 15 shows a silk screen printing machine and a silk layer in white on a printed circuit board.

Figure 15: Silk Screen Printing Machine

PCB Cleaning

Cleaning the PCB after soldering is an important part of the manufacturing process, and can affect the overall durability, reliability, effectiveness and lifetime of a device. During assembly and the manufacturing process, PCBs can become soiled with flux or solder, dirt from handling or from the environment, like residues, dust, moisture, colophony or resin, fingerprints or oxides. Some contaminants may even possess

erosive properties, leading to the damage of circuits and connections, causing shorts and failures, shortening the lifespan of the device. Cleaning away these types of debris will ensure there are no faults in functionality over time and prolong the life of the device. Figure 16 shows a PCB brushing and cleaning machine used to remove resin and flux residues from the printed circuit boards.

Figure 16: PCB Brushing and Cleaning Machine



PCB Board Cutting

In this process the PCBs are cut according to the required size. The size of the PCB varies according to the design and product requested by the customer. In the proposed unit, PCB for LED Bulb of size 3.06 square inches, for Mouse of size 4.5 square inches and for UPS of size 144 square inches are being produced. Figure 17 shows the PCB board cutting machine used to cut the PCBs. It is a semi-automatic machine having an average speed of cutting about 400mm per second of fiberglass sheet.

Figure 17: PCB Board Cutting Machine



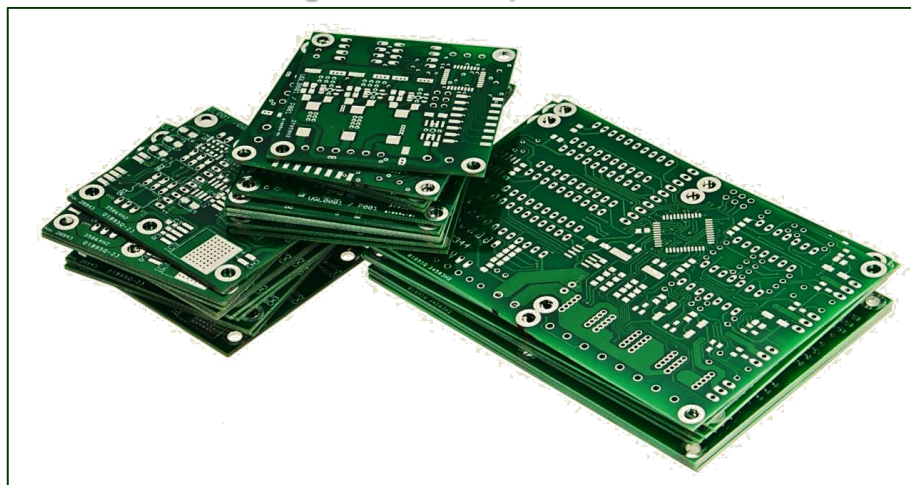
Defect Analyzing

After the production is complete the printed circuit boards need to be tested and analyzed for any defects if any present in their working. Figure 18 shows a manufacturing defect analyzer. 2% average loss of the total production is accounted for in case of any defected and damaged printed circuit boards. Figure 19 shows a complete printed circuit board.

Figure 18: Manufacturing Defect Analyzer



Figure 19: Complete PCB



Packaging

In the proposed unit, packaging is done manually. On each printed circuit board's top and bottom, a foil laminate sheet is placed and they are packaged in cartons for delivery to customers. The foil laminate sheet helps in separating the boards from each other as well as protecting them from moisture and dirt etc.

5.2. Installed and Operational Capacities

The proposed production unit shall, at maximum capacity of 100%, annually produce 990,904 LED Bulb PCBs, 505,774 Computer Mouse PCBs and 15,805 UPS PCBs. The project is assumed to attain 50% capacity utilization during the first year of

operations; which translates into an annual production of 495,452 LED Bulb PCBs, 252,887 Computer Mouse PCBs and 7,903 UPS PCBs. The operational capacity utilization is assumed to increase at the rate of 5% per annum to reach a maximum of 95% in the 10th year of operations. The unit operates for 8 hours a day, working in one shift per day for 280 days in a year. Table 1 and Table 2 show the production assumptions and production capacity respectively.

Table 1: Production Assumptions

Products	Avg CNC PCB Drilling Machine Time / Fiber Glass Sheet (Minutes)	Annual Time (Minutes)	Number of Sheets Processed Annually	Production Ratio	Annual Production (Sheets)	Area Per Sheet (Sq.ft.)	Production / Annum (Sq. Ft.)
	A	$B=280*8*60$	$C=A/B$	D	$E=C*D$	F	$G=E*F$
LED Bulb PCB	10	134,400	13,440	40%	5,376	4	21,504
Mouse PCB				30%	4,032		16,128
UPS PCB				30%	4,032		16,128
				100%	13,440		53,760

Table 2: Production Capacity

Products	Production / Annum (Sq. Feet)	Size / Sheet (Sq.Inches)	Gross Annual Production (Units)	2% Average Loss	Net Annual Production (Units)	Initial Production Capacity Utilization@ 50%
	A (Table 1)	B (Table 22)	$C=(A*144^4)/B$	D	$E=C*D$	$F=E*50\%$
LED Bulb PCB	21,504	3.06	1,011,127	20,223	990,904	495,452
Mouse PCB	16,128	4.50	516,096	10,322	505,774	252,887
UPS PCB	16,128	144.00	16,128	323	15,805	7,903
Total	53,760		1,543,351	30,868	1,512,483	756,242

⁴ 1 Sq. ft = 144 Sq. Inches

6. CRITICAL FACTORS

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

- Sound technical knowhow and knowledge of the industry
- Availability of specialized workforce
- Up-to-date knowledge of market needs
- Selection of appropriate machinery and human resources
- Rigorous supervision of production
- Ability to generate work orders through networking
- Assurance of timely order fulfillment

7. GEOGRAPHICAL POTENTIAL FOR INVESTMENT

A production unit for Printed Circuit Board can be set up in any major city with sizeable population such as Karachi, Lahore, Rawalpindi, Islamabad, Peshawar, Sargodha, Quetta, Multan, Faisalabad, Hyderabad, Gujranwala, Sialkot, etc. Availability of skilled labor is vital while selecting a location. All the above-mentioned cities have good availability of skilled labor, raw materials and other support infrastructure. In addition, there is a high demand for printed circuit boards in larger cities due to presence of manufacturing units and higher use of electronic devices.

8. POTENTIAL TARGET MARKETS

The target market for the proposed Production Unit for Printed Circuit Boards will be the electrical devices and equipment's manufacturing and repairing units. The global electronic products market grew from \$948.78 billion in 2020 to \$1055.29 billion in 2021 at a compound annual growth rate (CAGR) of 11.2%. The market is expected to reach \$1291.14 billion in 2025 at a CAGR of 5%.⁵

The global printed circuit board market grew from \$50.88 billion in 2020 to \$54.30 billion in 2021; at a growth rate of 6.7%. The growth was mainly due to the companies resuming their operations and adapting to the new normal while recovering from the COVID-19 impact, which had earlier led to restrictive containment measures involving social distancing, remote working, and the closure of commercial activities that resulted in operational challenges. The market is expected to reach \$68.38 billion in 2025 at a CAGR of 5.9%. Asia Pacific was the largest region in the printed circuit board market in 2020. Furthermore, it is also expected to be the fastest-growing region in the forecast period.⁶

⁵ <https://www.globenewswire.com/news-release/2021/08/12/2279981/0/en/Electronics-Industry-Analysis-Shows-A-Slow-Recovery-Of-The-Global-Electronics-Market-From-The-Pandemic-Effect.html>

⁶ <https://www.globenewswire.com/news-release/2021/10/12/2312276/0/en/Printed-Circuit-Board-Global-Market-Report-2021-COVID-19-Growth-And-Change.html>

Changing lifestyle preferences, rise in middle-class income segment, growing inclination toward using smart electronic devices are the primary factors increasing the growth of the global consumer electronics market. Furthermore, high disposable income of consumers, along with the growing Internet users is likely to further expand the growth of electronic devices in the future.

Sargodha is a major electrical devices and components cluster in Pakistan where several manufacturing units are engaged in manufacturing of variety of electrical devices and components. Large manufacturers include Hero Pak Electrical Industries, Mughal Electrical Accessories, Crystal Electronics Company, TJ Switches, JSKO Electrical Accessories and Pearl Electrical Industry. Keeping in view the above information, Pakistan's electrical components and devices industry is expected to witness a high growth in the coming years. There are viable opportunities for the potential investors in this business. As a printed circuit board is a major component of an electrical device their demand will increase with increase in manufacturing units of electrical devices and components as well.

Currently in Pakistan, large scale manufacturers of electronic appliances mostly import the printed circuit boards required for their production. However, some small units are operating in Pakistan which manually produce PCBs and their target customers are mostly the repair markets in the country.

9. PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of a Production Unit for Printed Circuit Boards. 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 14.9 million. The project will be financed through 100% Equity. Table 3 provides the details of the costs calculated for the proposed production unit.

Table 3: Project Cost

Description	Amount (PKR)	Reference
Land	-	9.2.1
Building Renovation Cost	1,075,450	9.2.2
Machinery & Equipment	5,840,000	9.2.3

Electrical and Mechanical Tool Kit	130,220	9.2.4
Furniture & Fixtures	925,000	9.2.5
Office Equipment	1,400,000	9.2.6
Office Vehicles	1,141,300	9.2.7
Pre-operating Costs	630,688	9.2.8
PCB Design Software	400,000	9.2.9
Security against building	486,000	9.2.10
Total Capital Cost	12,028,658	
Working capital		
Consumables inventory	40,242	
Raw material inventory	1,595,793	
Upfront insurance payment	17,120	
Cash	1,000,000	
Total Working capital	2,653,155	
Total Project Cost (PKR)	14,681,812	

9.2.1. Land

The proposed printed circuit board manufacturing unit will be established in a rented building to avoid the high cost of land. Suitable locations for setting up a manufacturing 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 2,700 sq. ft. The breakup of the space requirement is provided in Table 4.

Table 4: Breakup of Space Requirement

Break-up of Land Area	Number	% Break-up	Area (Sq. Ft.)
Executive Office	1	7%	180
Accounts Office	1	6%	150
HR and Admin Office	1	6%	150
Sales and Marketing Office	1	7%	180
Planning and Designing Department	1	6%	150
Production Area	1	39%	1,050
Raw Material Store	1	11%	300
Finished Goods Store	1	7%	180
Electrical and Mechanical Workshop	1	6%	150

Washrooms	5	8%	210
Total Area		100%	2,700

9.2.2. Building

There will be no cost of building since the unit will be started in a rented premises. However, there will be a renovation cost; required to make the building usable for the business. The proposed project requires electricity load of 26 KW for which an electricity connection under the General Supply Tariff-Industrial three phase will be required. Building rent of PKR 162,000 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	26	500	13,200
Labour Cost - Paint	Sq. Feet	2,640	10	26,400
Wall Racks - Production	No.	10	15,000	150,000
Wall Racks - Store Rooms	No.	10	10,000	100,000
Wall Racks - Offices	No.	12	10,000	120,000
Curtains	No.	12	5,000	60,000
Blinds	No.	6	5,000	30,000
Tiles	Sq. Feet	810	300	243,000
Labor Cost - Tiles	Sq. Feet	810	30	24,300
Glass doors and Partition	Sq. Feet	561	550	308,550
Total (PKR)				1,075,450

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	Number	Unit Cost (PKR)	Total Cost (PKR)
PCB Board Cutting Machine (3KW)	1	175,000	175,000
PCB Lamination Press Machine	1	200,000	200,000

CNC PCB Drilling Machine (1.5KW)	1	875,000	875,000
Etching Machine (500W)	1	315,000	315,000
Solder Pasting/Coating Machine (Plate thickness:0.05mm~3.2mm, Coating thickness: 8~15um, 4KW)	1	700,000	700,000
Drying Tunnel Conveyor (5KW)	1	900,000	900,000
UV Curing Machine(15KW)	1	300,000	300,000
Silk Screen Printing Machine (40W, Max. Print Area: 400*500mm)	1	275,000	275,000
Brushing Machine (3KW)	1	950,000	950,000
Manufacturing Defect Analyzer (MDA) (2KW)	1	1,150,000	1,150,000
Total (PKR)			5,840,000

9.2.4. Electrical and Mechanical Tool Kit

Table 7 provides details of electrical and mechanical tool kit required for the project.

Table 7: Electrical and Mechanical Tool Kit

Cost Item	Number of Items	Unit Cost (PKR)	Total Cost (PKR)
Electrical Tool Kit			
Wire strippers	2	780	1,560
Insulated screwdrivers	2	750	1,500
Insulated pliers	2	1,500	3,000
Electrical tape	2	60	120
Cable cutters	2	560	1,120
Spanners	2	160	320
Voltage tester	2	800	1,600
Safety knife	2	170	340
Hex keys	2	600	1,200
Claw Hammer	2	660	1,320
Tape Measure	2	350	700
Electric Soldering Gun	2	4,000	8,000
Torch	2	300	600

Mechanical Tool Kit			
Screwdrivers	2	750	1,500
Wrenches	2	800	1,600
Pliers	2	1,500	3,000
Ratchet and Socket Sets	2	2,200	4,400
Allen Wrenches	2	2,890	5,780
Mechanical gloves	2	160	320
Multimeter	2	450	900
Digital Vernier Caliper	2	670	1,340
Manual Pallet Jack (Load Capacity 1000 kg)	3	30,000	90,000
Total			130,220

9.2.5. Furniture & Fixtures

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

Table 8: Furniture and Fixtures

Cost Item	No.	Unit Cost (PKR)	Total Cost (PKR)
Executive Tables	6	35,000	210,000
Executive Chairs	6	20,000	120,000
Office Tables	8	15,000	120,000
Office Chairs	12	10,000	120,000
Visitor Chairs	20	10,000	200,000
Sofa Set	1	35,000	35,000
Racks	15	8,000	120,000
Total Cost (PKR)			925,000

9.2.6. Office Equipment

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

Table 9: Office Equipment

Cost Item	Units	Unit Cost(PKR)	Total Cost (PKR)
Laptop	7	80,000	560,000
Desktop Computer	11	40,000	440,000
Ceiling Fan	16	5,000	80,000

Exhaust Fan	13	1,000	13,000
Bracket Fan	13	7,000	91,000
Water Dispenser	2	20,000	40,000
Printer	2	40,000	80,000
CCTV Cameras	16	2,000	32,000
DVR	2	12,000	24,000
LED / LCD	2	15,000	30,000
Wi-Fi	2	5,000	10,000
Total Cost (PKR)			1,400,000

9.2.7. Office Vehicle

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

Table 10: Office Vehicles

Cost Item	Units	Unit Cost (PKR)	Total Cost (PKR)
Motorcycle	1	80,000	80,000
Pickup	1	1,050,000	1,050,000
Registration Charges		1%	11,300
Total Cost (PKR)			1,141,300

9.2.8. Pre-Operating Cost

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

Table 11: Pre-Operating Cost

Cost Item	Number of Months	Total Cost (PKR)
Administration expense	2	490,000
Utilities expense	1	140,688
Total		630,688

9.2.9. Software

Details of software cost for the project are provided in Table 12.

Table 12: Software

Cost Item	Number of Items	Unit Cost (PKR)	Total Cost (PKR)
PCB Design Software	1	400,000	400,000
Annual Subscription			80,000

9.2.10. Security against Building

Details of pre-operating cost for the project are provided in Table 13.

Table 13: Security against Building

Cost Item	Months	Unit Cost / Month (PKR)	Total Cost (PKR)
Security against Building	3	162,000	486,000

9.3. Financial Feasibility Analysis

The financial feasibility analysis given in Table 14 provides the information regarding projected IRR, NPV and payback period of the study based on 100% equity.

Table 14: Financial Feasibility Analysis

Description	Project
IRR	55%
NPV (PKR)	44,895,910
Payback Period (years)	2.50
Projection Years	10
Discount Rate used for NPV	18%

9.4. Financial Feasibility Debt Financing

Table 15 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 15: Financial Feasibility Debt Financing

Description	Project
IRR	55%
NPV (PKR)	57,086,245
Payback Period (years)	2.47
Projection Years	10
Discount Rate used for NPV	15%

9.4.1. Breakeven Analysis

Breakeven analysis is provided in Table 16.

Table 16: Breakeven Analysis

Particulars	Amount First Year (PKR)	Ratio
Sales (PKR) – A	50,693,255	100%
Variable Cost (PKR) – B	27,756,993	55%
Contribution (PKR) (A-B) = C	22,936,262	45%
Fixed Cost (PKR) – D	15,996,878	32%
Break Even Revenue (PKR) (D/CM) =E	35,355,971	
Breakeven Units (PCB Units)	527,440	
Breakeven Capacity	35%	

9.4.2. Revenue Generation

Based on the 50% capacity utilization of the unit, sales revenues during the first year of operations is estimated in Table 17.

Table 17: Revenue Generation

Product	Quantity Sold (Units)(A)	Sale Price Per Pack (PKR) (B)	Total Revenue (PKR) (A*B)
Revenue from LED Bulb PCB	495,452	50	24,772,600
Revenue from Mouse PCB	252,887	65	16,437,655
Revenue from UPS PCB	7,903	1,200	9,483,000
Total	756,242		50,693,255

9.4.3. Variable Cost Estimate

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

Table 18: Variable Cost Estimate

Variable Cost	Cost (PKR)
Material and Packing Cost (Table 19)	22,164,695
Labor	4,920,000
Electricity	1,321,051
Consumables (Table 25)	81,520

Vehicle maintenance and running cost	401,380
Travelling expense	627,840
Communications expense (phone, fax, mail, internet etc.)	523,200
Office expenses (stationery, entertainment, janitorial services, etc.)	732,480
Total Variable Cost (PKR)	30,772,166

9.4.4. Raw Material Cost

Table 19 provides detail of total material cost used.

Table 19: Total Material Cost

Product	Raw Material Cost (PKR)	Packing Cost (PKR)	Total Material Cost (PKR)
	<i>Table 20</i>	<i>Table 23</i>	
LED Bulb PCB	16.81	3.47	20.27
Mouse PCB	23.75	4.37	28.12
UPS	561.0	16.83	577.83

Table 20: Raw Material Cost Breakup

Cost Item	Unit of Measurement	Material Required per Unit (Sq. Inches) (Table 22)			Cost / Unit (PKR) (Table 21)		
		<i>LED Bulb PCB</i>	<i>Mouse PCB</i>	<i>UPS PCB</i>	<i>LED Bulb PCB</i>	<i>Mouse PCB</i>	<i>UPS PCB</i>
		<i>A</i>	<i>B</i>	<i>C</i>	$(Cost/144) * A$	$(Cost/144) * B$	$(Cost/144) * C$
FR4 Fiberglass Sheet (2 mm)	Sq.Inches	3.063	4.50	144.00	0.64	0.94	30.00
Copper Foil Sheet (0.25 mm)	Sq.Inches	3.063	4.50	144.00	5.95	8.75	280.00
PCB Design Film	Sq.Inches	3.063	4.50	144.00	1.91	2.81	90.00
		<i>A</i>	<i>B</i>	<i>C</i>	$(Cost/1000) * A$	$(Cost/1000) * B$	$(Cost/1000) * C$
Green Solder Mask Ink	Grams	4	5.0	80.00	4.80	6.00	96.00
Resin glue or Epoxy glue	Grams	2	3.0	50.00	2.00	3.00	50.00
Etching Resist Ink	Grams	1	2	10	1.50	2.25	15.00
Total Cost (PKR)					16.81	23.75	561.00

Table 21: Material Cost in Kg and Sq. Feet

Cost Item	Unit of Measurement	Cost / Unit (PKR)
Fiberglass Sheet (2mm)	Sq.feet	30
Copper Foil Sheet (0.25mm)	Sq.feet	280
PCB Design Film	Sq.feet	90
Green Solder Mask Ink	kg	1,200
Resin glue or Epoxy glue	kg	1,000

Table 22: Size of PCB

Product Name	Length (Inches)	Width (Inches)	Size (Sq.inches)
LED Bulb PCB	1.75	1.75	3.06
Mouse PCB	3	1.5	4.5
UPS PCB	12	12	144

Table 23: Total Packing Cost

Product	Consumption / Unit (Grams)	Laminate Cost / Unit (Table 24)	PCB Units / Box	Box Cost / Unit (Table 24)	Total Packing Cost
	A	$B = (\text{Cost per Kg}/1000) * A$	C	$D = \text{Cost per Unit}/C$	$E = B + D$
LED Bulb PCB	2	1.8	12	1.67	3.47
Mouse PCB	3	2.7	12	1.67	4.37
UPS PCB	15	13.5	6	3.33	16.83

Table 24: Packing Assumptions

Cost Item	Unit of Measurement	Cost per Unit (PKR)
Poly/Foil Laminate Sheet (1mm)	kg	900
Corrugated Box cost	Unit	20

Table 25: Consumables

Particulars	Unit of Measurement	Consumption / Annum (Units or Kgs)	Cost / Unit or Kg (PKR)	Total Cost (PKR)
PCB Drill Bits Set	Units	12	5,000	60,000
Chemicals				
Alkaline Amonia (NH ₃)	kg	269	80	21,520
Total				81,520

9.4.5. Fixed Cost Estimate

Table 26 provides details of fixed cost for the project.

Table 26: Fixed Cost Estimate

Fixed Cost	Cost (PKR)
Staff Salaries	10,464,000
Administration benefits expense	769,200
Building rental expense	1,944,000
Annual Subscription- Software	80,000
Promotional expense	1,013,865
Insurance expense	17,120
Depreciation expense	1,542,556
Amortization of pre-operating costs	126,138
Amortization of Software	40,000
Total Cost (PKR)	15,996,879

9.4.6. Human Resource Requirement

For the 1st year of operations, the production unit shall require the workforce at a salary cost as projected in Table 27.

Table 27: Human Resource Requirement

Designation	No of Persons	Average Monthly Salary (PKR)	Total Salary (PKR)
Owner	1	150,000	1,800,000
Electronics Engineer	1	80,000	960,000
Associate Engineer	2	45,000	1,080,000
HR and Admin Manager	1	70,000	840,000

Assistant HR and Admin	1	40,000	480,000
Accounts and Finance Manager	1	70,000	840,000
Assistant Accountant	1	40,000	480,000
Planning and Design Engineer	1	70,000	840,000
Assistant Planning and Design	1	40,000	480,000
Sales & Marketing Officer	1	70,000	840,000
Assistant Sales & Marketing Officer	1	40,000	480,000
Electronics Technician	1	40,000	480,000
Mechanical Technician	1	40,000	480,000
Skilled Labors	8	30,000	2,880,000
Driver	1	30,000	360,000
Store Incharge	1	40,000	480,000
Store Helper	1	22,000	264,000
Office Boy	1	22,000	264,000
Security Guard	4	22,000	1,056,000
Total	26		15,384,000

10. CONTACT DETAILS

Details of suppliers of machinery and pet food are provided in Table 28.

Table 28: Suppliers of Raw Material

Supplier Name	Item	Origin	Contact / Email	Website
Syed Fiberglass	Fiberglass Sheet	Lahore	0300 8470397	https://syedfiberglass.com/
Prime Fiberglass	Fiberglass Sheet	Karachi	0333 3392486	http://www.primefiberglass.com/
Peshawar fiberglass	Fiberglass Sheet	Peshawar	0341 1816875	
USAImported.pk	Cooper Foil Sheet	Lahore	0344 4537712	https://www.usaimported.pk/shop/cooper-foil.html
NAASPAK Metal Trading	Cooper Foil Sheet	Rawalpindi	051 5750528	http://naaspak.com/products/cooper

				r/copper-sheet-plate.html
Epoxy Industries	Epoxy Glue	Karachi	021 3500061 6	https://www.epoxy.com.pk/
The Epoxy Resin	Epoxy Glue	Pakistan	0336386 0336	https://theepoxyresin.com/
Electrobes	Green Solder Mask Ink	Islamabad	051 2741714	https://electrobes.com/
E Pro	Green Solder Mask Ink	Lahore	042 3723358 6	https://epro.pk/

11. USEFUL LINKS

Table 29: Useful Links

Organization	Link
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
Trade Development Authority of Pakistan	www.tdap.gov.pk
Securities and Exchange Commission of Pakistan	www.secp.gov.pk
State Bank of Pakistan	www.sbp.gov.pk
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	www.fpcci.com.pk
Punjab Small Industries Corporation	www.psic.gop.pk
Sindh Small Industries Corporation	www.ssic.gos.pk/
Khyber Pakhtunkhwa Small Industries Corporation	www.small_industries_de.kp.gov.pk/
Azad Kashmir Small Industries Corporation	www.sic.ajk.gov.pk/
Industries and Commerce Department Balochistan	www.dgicd.gob.pk/
Pakistan Industrial Development Corporation	https://pidc.com.pk/

Pakistan Electronics Manufacturers Association	
Pakistan Electrical Manufacturers Association	

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 from LED Bulb PCB	24,772,600	29,511,598	34,866,612	40,907,253	47,710,443	55,361,154	63,953,205	73,590,153	84,386,262	96,467,562
Revenue from Mouse PCB	16,437,655	19,582,178	23,135,454	27,143,671	31,657,872	36,734,438	42,435,623	48,830,141	55,993,810	64,010,257
Revenue from UPS PCB	9,483,000	11,297,098	13,347,008	15,659,377	18,263,652	21,192,359	24,481,413	28,170,455	32,303,227	36,927,972
Total Revenue	50,693,255	60,390,875	71,349,073	83,710,300	97,631,967	113,287,951	130,870,240	150,590,750	172,683,299	197,405,791
<i>Cost of sales</i>										
Material Cost - LED Bulb PCB	8,496,978	10,122,449	11,959,214	14,031,148	16,364,636	18,988,822	21,935,887	25,241,351	28,944,406	33,088,280
Material Cost - Mouse PCB	6,128,640	7,301,049	8,625,857	10,120,287	11,803,369	13,696,123	15,821,762	18,205,903	20,876,816	23,865,680
Material Cost - UPS PCB	4,523,904	5,389,327	6,367,245	7,470,370	8,712,750	10,109,901	11,678,958	13,438,831	15,410,387	17,616,640
Packing Cost - LED Bulb PCB	1,752,620	1,898,088	2,055,629	2,226,246	2,411,024	2,611,140	2,827,864	3,062,577	3,316,771	3,592,063
Packing Cost - Mouse PCB	1,126,810	1,342,368	1,585,947	1,860,712	2,170,163	2,518,164	2,908,984	3,347,331	3,838,404	4,387,936
Packing Cost - UPS PCB	135,744	147,011	159,213	172,427	186,739	202,238	219,024	237,203	256,891	278,213
Direct Labour	4,920,000	5,279,160	5,664,539	6,078,050	7,317,083	7,851,230	8,424,370	9,039,349	9,699,221	10,407,264
Direct Electricity	796,768	866,629	942,638	1,025,335	1,115,310	1,213,203	1,319,710	1,435,589	1,561,666	1,698,838
Consumables	81,520	88,286	95,614	103,550	112,145	121,452	131,533	142,450	154,274	167,078
Vehicle maintenance and running cost	401,380	436,701	475,131	516,943	562,434	611,928	665,777	724,366	788,110	857,464
Total cost of sales	28,364,364	32,871,069	37,931,026	43,605,068	50,755,652	57,924,201	65,933,868	74,874,950	84,846,945	95,959,456
Gross Profit	22,328,891	27,519,806	33,418,047	40,105,232	46,876,316	55,363,749	64,936,373	75,715,800	87,836,353	101,446,335
<i>General administration & selling expenses</i>										
Administration expense	10,464,000	11,227,872	12,047,507	12,926,975	16,558,876	17,767,674	19,064,715	20,456,439	21,949,759	23,552,091
Administration benefits expense	769,200	825,352	885,602	950,251	1,193,798	1,280,945	1,374,454	1,474,789	1,582,449	1,697,968
Building rental expense	1,944,000	2,138,400	2,352,240	2,587,464	2,846,210	3,130,831	3,443,915	3,788,306	4,167,137	4,583,850
Electricity	524,283	570,252	620,267	674,682	733,887	798,301	868,384	944,634	1,027,594	1,117,855
Annual Subscription- Software	80,000	86,640	93,831	101,619	110,053	119,188	129,081	139,794	151,397	163,963
Travelling expense	627,840	673,672	722,850	775,618	993,533	1,066,060	1,143,883	1,227,386	1,316,986	1,413,125
Communications expense (phone, fax, mail, internet etc.)	523,200	561,394	602,375	646,349	827,944	888,384	953,236	1,022,822	1,097,488	1,177,605
Office expenses (stationery, entertainment, janitorial services, etc.)	732,480	785,951	843,325	904,888	1,159,121	1,243,737	1,334,530	1,431,951	1,536,483	1,648,646
Promotional expense	1,013,865	1,207,817	1,426,981	1,674,206	1,952,639	2,265,759	2,617,405	3,011,815	3,453,666	3,948,116
Insurance expense	17,120	14,552	11,984	9,416	6,848	4,280	1,712	34,876	29,644	24,413
Depreciation expense	1,542,556	1,542,556	1,542,556	1,565,724	1,552,702	1,552,702	1,116,572	2,617,302	2,617,302	2,654,067
Amortization of pre-operating costs	126,138	126,138	126,138	126,138	126,138	-	-	-	-	-
Amortization of Software	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
Subtotal	18,404,681	19,800,595	21,315,656	22,983,330	28,101,749	30,157,862	32,087,885	36,190,115	38,969,905	42,021,700
Operating Income	3,924,210	7,719,211	12,102,391	17,121,902	18,774,566	25,205,887	32,848,487	39,525,685	48,866,448	59,424,635
Gain / (loss) on sale of machinery & equipment	-	-	-	-	-	-	1,460,000	-	-	-
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	350,000	-	-	-
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	285,325	-	-	-
Earnings Before Interest & Taxes	3,924,210	7,719,211	12,102,391	17,121,902	18,774,566	25,205,887	34,943,812	39,525,685	48,866,448	59,424,635
Earnings Before Tax	3,924,210	7,719,211	12,102,391	17,121,902	18,774,566	25,205,887	34,943,812	39,525,685	48,866,448	59,424,635
Tax	601,052	1,821,723	3,355,836	5,112,665	5,691,098	7,942,060	11,350,334	12,953,989	16,223,256	19,918,622
NET PROFIT/(LOSS) AFTER TAX	3,323,158	5,897,488	8,746,555	12,009,237	13,083,469	17,263,827	23,593,479	26,571,696	32,643,192	39,506,014

12.2. Balance Sheet

Calculations											SMEDA
Balance Sheet											
Assets	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<i>Current assets</i>											
Cash & Bank	1,000,000	2,395,126	5,655,639	8,647,714	12,004,708	14,260,378	16,920,895	23,148,340	49,772,277	81,679,960	135,849,853
Accounts receivable		3,472,141	3,804,251	4,511,642	5,310,253	6,210,352	7,223,285	8,361,582	9,639,075	11,071,029	12,674,284
Consumables Inventory	40,242	47,249	55,476	65,137	76,480	89,798	105,436	123,798	145,357	170,672	-
Raw material inventory	1,595,793	2,068,363	2,658,720	3,393,846	4,306,596	5,436,942	6,833,462	8,555,139	10,673,528	13,275,364	-
Pre-paid building rent	-	178,200	196,020	215,622	237,184	260,903	286,993	315,692	347,261	381,988	-
Pre-paid insurance	17,120	14,552	11,984	9,416	6,848	4,280	1,712	34,876	29,644	24,413	-
Total Current Assets	2,653,155	8,175,630	12,382,090	16,843,377	21,942,068	26,262,653	31,371,783	40,539,426	70,607,143	106,603,427	148,524,137
<i>Fixed assets</i>											
Renovation Cost	1,075,450	967,905	860,360	752,815	645,270	537,725	430,180	322,635	215,090	107,545	-
Machinery & equipment	5,840,000	4,964,000	4,088,000	3,212,000	2,336,000	1,460,000	584,000	10,008,734	8,507,424	7,006,114	5,504,804
Electrical and mechanical tool kits	130,220	91,154	52,088	177,062	114,828	65,616	223,047	144,650	82,657	280,975	182,217
Furniture & fixtures	925,000	786,250	647,500	508,750	370,000	231,250	92,500	1,585,287	1,347,494	1,109,701	871,908
Office vehicles	1,141,300	970,105	798,910	627,715	456,520	285,325	114,130	2,325,055	1,976,296	1,627,538	1,278,780
Office equipment	1,400,000	1,190,000	980,000	770,000	560,000	350,000	140,000	2,399,354	2,039,451	1,679,548	1,319,645
Security Against Building	486,000	486,000	486,000	486,000	486,000	486,000	486,000	486,000	486,000	486,000	486,000
Total Fixed Assets	10,997,970	9,455,414	7,912,858	6,534,342	4,968,618	3,415,916	2,069,857	17,271,715	14,654,412	12,297,421	9,643,354
<i>Intangible assets</i>											
Software	400,000	360,000	320,000	280,000	240,000	200,000	160,000	120,000	80,000	40,000	-
Pre-operation costs	630,688	504,550	378,413	252,275	126,138	-	-	-	-	-	-
Total Intangible Assets	1,030,688	864,550	698,413	532,275	366,138	200,000	160,000	120,000	80,000	40,000	-
TOTAL ASSETS	14,681,812	18,495,594	20,993,360	23,909,993	27,276,824	29,878,568	33,601,640	57,931,141	85,341,555	118,940,847	158,167,491
Liabilities & Shareholders' Equity											
<i>Current liabilities</i>											
Accounts payable		2,152,203	2,532,015	2,965,137	3,458,871	4,086,952	4,733,012	5,469,034	6,307,752	7,263,852	6,984,482
Total Current Liabilities	-	2,152,203	2,532,015	2,965,137	3,458,871	4,086,952	4,733,012	5,469,034	6,307,752	7,263,852	6,984,482
<i>Shareholders' equity</i>											
Paid-up capital	14,681,812	14,681,812	14,681,812	14,681,812	14,681,812	14,681,812	14,681,812	14,681,812	14,681,812	14,681,812	14,681,812
Retained earnings		1,661,579	3,779,533	6,263,044	9,136,140	11,109,805	14,186,816	37,780,295	64,351,991	96,995,183	136,501,196
Total Equity	14,681,812	16,343,391	18,461,346	20,944,856	23,817,953	25,791,617	28,868,628	52,462,107	79,033,803	111,676,995	151,183,009
TOTAL CAPITAL AND LIABILITIES	14,681,812	18,495,594	20,993,360	23,909,993	27,276,824	29,878,568	33,601,640	57,931,141	85,341,555	118,940,847	158,167,491

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		3,323,158	5,897,488	8,746,555	12,009,237	13,083,469	17,263,827	23,593,479	26,571,696	32,643,192	39,506,014
Add: depreciation expense		1,542,556	1,542,556	1,542,556	1,565,724	1,552,702	1,552,702	1,116,572	2,617,302	2,617,302	2,654,067
amortization of pre-operating costs		126,138	126,138	126,138	126,138	126,138	-	-	-	-	-
amortization of Softwares		40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
Accounts receivable		(3,472,141)	(332,110)	(707,391)	(798,610)	(900,099)	(1,012,933)	(1,138,297)	(1,277,493)	(1,431,954)	(1,603,255)
Equipment inventory	(40,242)	(7,007)	(8,228)	(9,660)	(11,343)	(13,318)	(15,638)	(18,362)	(21,560)	(25,315)	170,672
Raw material inventory	(1,595,793)	(472,569)	(590,357)	(735,125)	(912,750)	(1,130,346)	(1,396,520)	(1,721,677)	(2,118,389)	(2,601,836)	13,275,364
Pre-paid building rent	-	(178,200)	(17,820)	(19,602)	(21,562)	(23,718)	(26,090)	(28,699)	(31,569)	(34,726)	381,988
Advance insurance premium	(17,120)	2,568	2,568	2,568	2,568	2,568	2,568	(33,164)	5,231	5,231	24,413
Accounts payable		2,152,203	379,812	433,122	493,734	628,081	646,060	736,022	838,718	956,100	(279,370)
Cash provided by operations	(1,653,155)	3,056,705	7,040,046	9,419,159	12,493,134	13,365,475	17,053,976	22,545,874	26,623,937	32,167,994	54,169,893
<i>Financing activities</i>											
Issuance of shares	14,681,812	-	-	-	-	-	-	-	-	-	-
Purchase of (treasury) shares											
Cash provided by / (used for) financing activities	14,681,812	-	-	-	-	-	-	-	-	-	-
<i>Investing activities</i>											
Capital expenditure	(12,028,658)	-	-	(164,040)	-	-	(206,643)	(16,318,430)	-	(260,310)	-
Acquisitions											
Cash (used for) / provided by investing activities	(12,028,658)	-	-	(164,040)	-	-	(206,643)	(16,318,430)	-	(260,310)	-
NET CASH	1,000,000	3,056,705	7,040,046	9,255,120	12,493,134	13,365,475	16,847,333	6,227,444	26,623,937	31,907,684	54,169,893

13. KEY ASSUMPTIONS

13.1. Operating Cost Assumptions

Table 30: Operating Cost Assumptions

Description	Details
Building rent growth rate	10%
Furniture and fixture depreciation	15%
Vehicle depreciation	15%
Office equipment depreciation	15%
Inflation rate	8.3%
Wage growth rate	7.3%
Electricity price growth rate	8.8%
Office equipment price growth rate	8.0%
Office vehicle price growth rate	10.7%

13.2. Revenue Assumptions

Table 31: Revenue Assumptions

Description	Details
Sale price growth rate	8.3%
Initial capacity utilization	50%
Capacity growth rate	5%
Maximum capacity utilization	95%

13.3. Financial Assumptions

Table 32: Financial Assumptions

Description	Details
Project life (Years)	10
Debt: Equity	0:100
Discount Rate used for NPV	18%

13.4. Debt related Assumptions

Table 33: Debt Related Assumptions

Description	Details
Project life (Years)	10

Debt: Equity	0:100
Discount Rate used for NPV	15%
Debt Tenure	5 years
Grace Period	1 Year
Interest Rate (KIBOR+3%)	11.3%

13.5. Cash Flow Assumptions

Table 34: Cash Flow Assumptions

Description	Details
Accounts receivable cycle (in days)	25
Accounts payable cycle (in days)	30

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