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# Pre-Feasibility Study

## CLAY BRICKS MANUFACTURING KILN (ZIGZAG TECHNOLOGY)



### Small and Medium Enterprises Development Authority

#### Ministry of Industries & Production Government of Pakistan

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## 1 DISCLAIMER

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## 2 EXECUTIVE SUMMARY

Clay Bricks are widely used in construction of buildings, houses, factories, bridges, tunnels etc. Bricks are the basic raw material used for construction since centuries. Predominantly, clay bricks in Pakistan are made using traditional brick kilns, which are fuel inefficient and major cause of environmental pollution and smog. Recently, Zigzag technology has been introduced for brick kiln, which is supposed to be more efficient as well as eco-friendly. Environmental Protection Authority and Government of Pakistan is emphasizing brick kiln owners to switch from traditional kiln to kiln equipped with Zigzag technology.

This particular pre-feasibility study is for setting up a 'Clay Bricks Manufacturing Kiln (Zigzag Technology)' to produce high quality clay bricks of brick size of 9" x 4". The produced bricks of 9" X 4" are widely used as material for construction of different types of buildings / projects in both urban and rural areas in Pakistan. The target customers for the produced bricks will be construction material suppliers, builders and contractors.

The proposed 'Clay Bricks Manufacturing Kiln' will have installed capacity of producing 11.680 million bricks per annum based on 365 working days. Around, 80% of the produced bricks will be of A Grade Quality (Darja Awal) and 18% will be of B Grade Quality (Darja Doom), while 2% will be wastage. However, starting operational capacity is assumed at 92% and unit will operate at 100% capacity from the 2<sup>nd</sup> year. Entrepreneur's knowledge of the construction industry, competitive pricing, and strong linkage with building contractors are key factors for the success of this business.

The total project cost for setting up the Clay Bricks Manufacturing Kiln is estimated at Rs. 33.744 million out of which Rs. 28.856 million is capital cost and Rs. 4.888 million is working capital. The project is proposed to be financed through 100% equity. The NPV is projected around Rs. 28.333 million, with an IRR of 33% and Payback Period of 3.57 years. The project will provide permanent employment opportunities to 9 people, apart from that around 40 contractual labor per shift will be hired. The legal business status of this project is proposed as a 'Sole Proprietorship'.

## 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.

## **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 facilitate potential investors in **Clay Bricks Manufacturing Kiln (Zigzag Technology)** by providing them with a general understanding of the business with the intention of supporting potential investors in crucial 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 set-up and its successful management.

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

## **5 BRIEF DESCRIPTION OF PROJECT & PRODUCT**

Clay bricks are produced by the drying and firing of clay or shale raw material, forming a sintered porous structure. These bricks are used in a wide range of buildings from housing to factories, and in the construction of tunnels, waterways, bridges etc. Their properties vary according to the purpose for which they are intended, but clays have provided the basic material of construction for centuries. The industry developed on traditional lines, using hand-making processes for the most part.

The traditional kilns are not only inefficient but also a major cause of environmental pollution and smog in the country. Due to these reasons, the kiln industry faces a closure period of 3-4 months during the winter season by the Environment Protection Authority, Government of Pakistan, especially to curb the smog effect in the cities. This has resulted the industry in great losses as well as halt the construction activities in the countries. Recently, Zigzag technology based kiln has been introduced, which are

more efficient and eco-friendly. In order to encourage the brick manufacturers to switch to Zigzag technology, Government of Pakistan has also initiated incentive schemes.

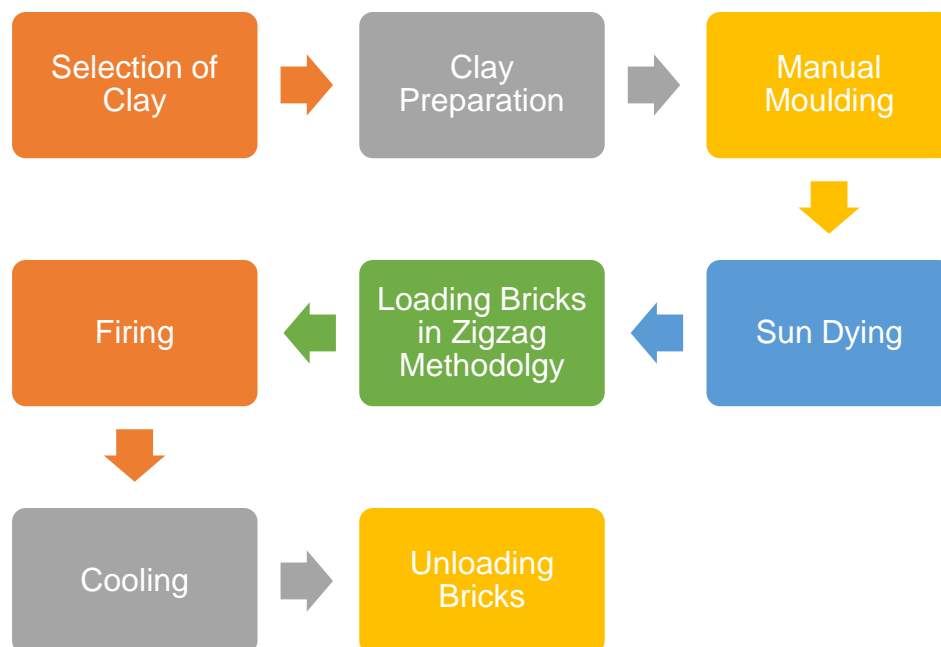
In zigzag kilns, bricks are arranged to allow hot air to travel in a zigzag path. The length of the zigzag air path is about three times that of a straight line, and this improves the heat transfer from the fuel to the bricks, making the entire operation more efficient. In addition, better mixing of air and fuel allows complete combustion, reducing coal consumption to about 20 per cent. The zigzag design also ensures uniform distribution of heat, increasing the share of high quality bricks to up to 85 percent. It also reduces emissions considerably. The eco-friendly technology also helped in turning the black soot coming out of the old brick kiln into white colored smoke with less air pollutants. The zig-zag technology kiln also had a fan, providing an air control system and turning the coal burning process even more efficient.

This particular pre-feasibility study is about establishing 'Clay Brick Manufacturing Kiln' based on Zigzag Technology. The unit would initially produce bricks of 9" X 4" size, which is commonly used in construction. But this kiln can also produce other brick sizes like 12" X 6" along with roof and floor bricks of different sizes according to the need and demands. The major raw material for bricks manufacturing is clay, which will be procured from the local suppliers. Clay bricks are cheap and ideal building material which is commonly used in construction, civil engineering works as well as for constructions of sidewalls, footpaths, floors etc. This building material is equally important for constructions in rural as well as in urban and semi-urban areas.

Proposed kiln can be set-up in any major city, where good quality of clay or mud, water and trained or semi trained labour are easily available. This business can also be done in all small second tier towns in addition to suburban towns of large cities.

## **5.1 Production Process Flow**

The production process of Clay Brick Manufacturing starts with the purchase of clay and coal from the market. The key steps involved in the manufacturing process are clay preparation, molding in brick form, drying and afterwards placing in the kiln. Once the bricks are placed in the kiln, the coal fire is used to burn and harden the dried clay. Later on cooling and inspection is carried out. The process flow diagram of the brick manufacturing using is as follows.

**Figure 1: Production Process Flow**

## 5.2 Installed and Operational Capacity

Total installed capacity of the project is assumed at 11.68 million bricks per year. The initial operational capacity of the project will be 92% and will operate at 100% capacity during the 2<sup>nd</sup> year of operation.

**Table 1: Installed and Operational Capacity**

Description of Product	Production Percentage	Operational Capacity 92 % (Year 1) No. of Bricks	Max Operational Capacity 100% (Year 2 ) No. of Brick
Bricks Grade 1	80%	8,596,480	9,344,000
Bricks Grade 2	18%	1,934,208	2,102,400
Wastage	2%	214,912	233,600
<b>Total</b>	<b>100%</b>	<b>10,745,600</b>	<b>11,680,000</b>

## 6 CRITICAL FACTORS

Following are the factors critical for the success of this business venture:

- ⇒ Background knowledge and related experience of the entrepreneur in the field of construction material manufacturing, clay bricks manufacturing.
- ⇒ Selection of quality clay on the basis of best analysis of cost and revenues

for a given season; cost efficiency through better management.

- ⇒ Exceed customer expectations by offering high quality product at reasonable prices with quick turnaround times.
- ⇒ Business location is the key to success for the Brick Kiln, in order to have greater reach to its customers.
- ⇒ Availability of trained labor to produce high quality bricks.
- ⇒ Availability of cheap burning material to make this business profitable.
- ⇒ This project should not establish in heavy rainy areas.
- ⇒ Effective marketing and distribution of the product.
- ⇒ Employ careful financial and accounting analysis to ensure efficiency and proper controls.

## **7 GEOGRAPHICAL POTENTIAL FOR INVESTMENT**

Construction activities and its output is an integral part of a country's economy and industrial development. The construction industry is often seen as a driver of economic growth especially in developing countries. This industry can mobilize and effectively utilize local human and material resources in the development and maintenance of housing and infrastructure to promote local employment and improve economic efficiency. The clay bricks are used in a large number of construction projects including non-traditional / traditional housing, community centers, warehouses and factories etc. It is also suitable for schools and other public buildings especially in the rural areas.

Demand for such type mainly exists for housing projects in villages, towns, urban, semi-urban and smaller cities. Additionally, in larger cities the low cost construction materials are used in suburban housing schemes and in many other public or private projects. The clay bricks manufacturing unit can be established anywhere in the country or near the towns or cities where main access to basic raw materials and requirements for this project are easily available, like Gujranwala, Hyderabad, Sargodha, Larkana, Sukkur, Bahawalpur, Lahore, Rawalpindi, Multan, Faisalabad and Peshawar.

## **8 POTENTIAL TARGET CUSTOMERS / MARKETS**

Market for the clay bricks exist almost in all over the country. Investors can find demand of clay bricks round the year. Therefore, Clay Bricks Manufacturing Unit can be established at any time of the year. Expected potential customers are given below:

- Contractors of construction industry.
- Government's construction projects.



- Building material suppliers.
- Individuals of rural & urban areas.

## 9 PROJECT COST SUMMARY

A detailed financial model has been developed to analyse the commercial viability of Clay Brick Manufacturing Kiln (Zigzag Technology). Various cost and revenue related assumptions along with results of the analysis are outlined in this section.

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

### 9.1 Project Economics

All the figures in this financial model have been calculated for estimated sales of Rs.88.178 Million in the year one. The capacity utilization during year one is worked out at 92%.

The following table shows internal rate of return, payback period and net present value of the proposed venture.

**Table 2: Project Economics**

Description	Details
Internal Rate of Return (IRR)	33%
Payback Period (Yrs.)	3.57
Net Present Value (Rs.)	28,333,180

Calculation of break-even analysis is as follows:

**Table 3: Breakeven (100% Equity Based)**

Break-Even Analysis	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Break-Even Revenue	34,566,626	30,440,591	32,601,264	35,039,354	37,743,703	40,467,581	43,835,176	47,547,701	51,661,866	56,232,309
Break-Even Units	4,212,360	3,372,321	3,283,353	3,208,090	3,141,537	3,062,050	3,015,332	2,973,372	2,936,954	2,906,165
Margin of Safety	61%	71%	72%	73%	73%	74%	74%	75%	75%	75%

However, for the purposes of further explanation the Project Economics based on Debt:Equity (i.e. 50:50) Model has also been computed. Based on Debt:Equity model

the Internal Rate of Return, Payback Period and Net Present Value of the proposed project are provide in the table below.

**Table 4: Project Economics Based on Debt (50%):Equity (50%)**

Description	Details
Internal Rate of Return (IRR)	33%
Payback Period (Yrs.)	3.45
Net Present Value (Rs.)	37,872,824

The financial assumptions for Debt: Equity are as follows:

**Table 5: Financial Assumptions for Debt:Equity Model**

Description	Details
Debt (50%)	16,872,226
Equity (50%)	16,872,226
Interest Rate on Debt	12%
Debt Tenure	5
Debt Payment / Year	2

The projected Income Statement, Cash Flow Statement and Balance Sheet enclosed as annexures are based on 100% Equity Based Business Model

## 9.2 Project Cost

Following fixed and working capital requirements have been identified for operations of the proposed business.

**Table 6: Project Cost**

Description	Amount Rs.
<b>Capital Cost</b>	
Land	20,000,000
Building / Infrastructure	3,922,000
Machinery & Equipment	4,008,000
Furniture & Fixtures	287,800
Office & Computer Equipment	43,500

Industrial Connection Charges	345,100
Pre-Operating Costs	250,000
<b>Total Capital Cost</b>	<b>28,856,400</b>
Equipment Spare Part Inventory	8,955
Raw Material Inventory	1,614,638
Cash	3,264,459
<b>Total Working Capital</b>	<b>4,888,052</b>
<b>Total Project Cost</b>	<b>33,744,452</b>

### 9.3 Space Requirement

Approximately 5 acres of land would be required for establishment of proposed brick kiln. It is recommended that required land should be procured in the outskirts of identified city / area. The cost of land is estimated at the rate of Rs. 4 million per acre.

The infrastructural requirements of the project mainly comprise the construction of various facilities including management office, brick kiln construction, raw material mixing, storage area, work in process area and miscellaneous open space, etc. The cost of construction of building for the proposed unit is provided in the table below:

**Table 7: Space Requirement**

Description	Estimated Area (Sq. ft)	Unit Cost (Rs.)	Total Cost (Rs.)
Owner/Manager Office	100	1,400	140,000
Accounts office	72	1,400	100,800
Brick kiln Construction	23,680	150	3,552,000
Raw Material Mixing Area	1,600	-	-
Storage Area	12,000	-	-
Work in Process Area	11,000	-	-
Wash Rooms	72	850	61,200
Security Guard Room	80	850	68,000
Miscellaneous open area	131,396	-	-
<b>Total Construction Cost</b>	<b>180,000</b>		<b>3,922,000</b>
Cost of Land			<b>20,000,000</b>

<b>Total Cost of Land &amp; Construction</b>			<b>23,922,000</b>
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#### 9.4 Machinery & Equipment Requirement

Plant, machinery and equipment for the proposed project are stated below.

**Table 8: Machinery & Equipment**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Blowers	2	180,000	360,000
Tawa Hundi	100	1,500	150,000
Shent	2	25,000	50,000
Tub	12	4,167	50,000
Generator	1	180,000	180,000
Coal Grinder	1	150,000	150,000
Mold	100	100	10,000
Iron Bucket	100	400	40,000
Shovels	100	600	60,000
Tractor Trolley	1	1,750,000	1,750,000
Tube well	1	1,200,000	1,200,000
Water Pipe	400	20	8,000
<b>Total</b>			<b>4,008,000</b>

#### 9.5 Furniture & Fixtures Requirement

Details of the furniture and fixture required for the project are given below.

**Table 9: Furniture & Fixture**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Table & Chairs	2	20,000	40,000
Visitor Chairs	6	4,000	24,000
Cupboard	1	15,000	15,000

Labour Area Benches	8	1,500	12,000
Miscellaneous Furniture	1	30,000	30,000
Bracket Fans	3	3,800	11,400
Exhaust Fans	2	2,200	4,400
LED Bulbs (18 Watts)	18	1,000	18,000
LED Search Lights (150 Watts)	38	3,500	133,000
<b>Total</b>			<b>287,800</b>

## 9.6 Office & Computer Equipment Requirement

Following office and computer equipment will be required for the project.

**Table 10: Office Equipment**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Computer	1	25,000	25,000
Computer printer (s)	1	17,000	17,000
Telephones	1	1,500	1,500
<b>Total</b>			<b>43,500</b>

## 9.7 Raw Material Requirement

Clay and coal are the main raw materials for the proposed business, which will be procured directly from local market. The following table provides the details for the raw material requirements for first year of operations for the proposed brick kiln manufacturing unit using zigzag technology.

**Table 11: Raw Material Requirements (Year 1)**

Description	Raw Material Required	Unit Cost (Rs.)	Total Raw Material Cost (Rs.)
Clay (Trolleys)	5,373	1,200	6,447,360
Coal (Tonnes)	2,014.8	15,000	30,222,000
Diesel for Trolley (Liters)	9,462.7	106.46	1,007,400

Other Raw Material			1,074,560
<b>Total</b>			<b>38,751,320</b>

## 9.8 Human Resource Requirement

In order to run operations of Brick Kiln smoothly, details of human resources required along with number of employees and monthly salary are recommended as under.

**Table 12: Human Resource Requirement**

Description	No. of Employees	Monthly Salary per Person (Rs.)
Owner / Manager	1	60,000
Accountant	1	25,000
Tractor Driver	1	25,000
Supervisor	2	30,000
Helpers	3	20,000
Security Guards	1	20,000
<b>Total</b>	<b>9</b>	

Other than the above permanent employees, 40 person will be hired on contract.

## 9.9 Utilities and Other Cost

An essential cost to be borne by the project is the cost of electricity. The electricity expenses are estimated to be around Rs. 30,276 per month (Direct & Indirect). Furthermore, promotional expense being essential for marketing of brick kiln manufacturing unit is estimated as 0.5% of revenue.

## 9.10 Revenue Generation

Based on the capacity utilization of 92%, sales revenue during the first year of operations is provided in the table below.

**Table 13: Revenue Generation – Year 1**

Description	No. of Bricks Sold	Sale Price / Brick (Rs.)	Sales Revenue (Rs.)
Grade 1	8,596,480	8.75	75,219,200
Grade 2	1,934,208	6.2	11,992,090
Wastage	214,912	4.5	967,104
<b>Total</b>	<b>10,745,600</b>		<b>88,178,394</b>

## 10 CONTACT DETAILS

In order to facilitate potential investors, contact details of private sector Service Providers relevant to the proposed project be given.

**Table 14: Technical Experts / Consultants**

Name of Expert / Organization	Address	Phone
Mubasher Hussein Pervaiz & Brothers Brick Co.	2 km. Manga Mandi to Raiwind Road, Near Rocco Ice Cream Factory Lahore.	0301 4492212

## 11 USEFUL WEB LINKS

Small & Medium Enterprises Development Authority (SMEDA)	<a href="http://www.smeda.org.pk">www.smeda.org.pk</a>
Government of Pakistan	<a href="http://www.pakistan.gov.pk">www.pakistan.gov.pk</a>
Ministry of Industries & Production	<a href="http://www.moip.gov.pk">www.moip.gov.pk</a>
Government of Punjab	<a href="http://www.punjab.gov.pk">www.punjab.gov.pk</a>
Government of Sindh	<a href="http://www.sindh.gov.pk">www.sindh.gov.pk</a>
Government of Khyber Pakhtunkhwa	<a href="http://www.khyberpakhtunkhwa.gov.pk">www.khyberpakhtunkhwa.gov.pk</a>
Government of Baluchistan	<a href="http://www.balochistan.gov.pk">www.balochistan.gov.pk</a>
Government of Gilgit Baltistan	<a href="http://www.gilgitbaltistan.gov.pk">www.gilgitbaltistan.gov.pk</a>
Government of Azad Jammu Kashmir	<a href="http://www.ajk.gov.pk">www.ajk.gov.pk</a>
Trade Development Authority of Pakistan (TDAP)	<a href="http://www.tdap.gov.pk">www.tdap.gov.pk</a>
Security Commission of Pakistan (SECP)	<a href="http://www.secp.gov.pk">www.secp.gov.pk</a>
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	<a href="http://www.fpcci.com.pk">www.fpcci.com.pk</a>
State Bank of Pakistan (SBP)	<a href="http://www.sbp.org.pk">www.sbp.org.pk</a>
Punjab Small Industries Corporation	<a href="http://www.psic.gop.pk">www.psic.gop.pk</a>
Sindh Small Industries Corporation	<a href="http://www.ssic.gos.pk">www.ssic.gos.pk</a>
Punjab Vocational Training Council (PVTTC)	<a href="http://www.pvtc.gop.pk">www.pvtc.gop.pk</a>
Punjab Industrial Estates (PIE)	<a href="http://www.pie.com.pk">www.pie.com.pk</a>

Faisalabad Industrial Estate Development and Management Company (FIEDMC)

[www.fiedmc.com.pk](http://www.fiedmc.com.pk)

Brick Kilns Owners' Association Pakistan

[www.bkoap.org](http://www.bkoap.org)



## 12 ANNEXURES

### 12.1 Income Statement

SMEDA										
Calculations										
Income Statement										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue	88,178,394	105,430,688	115,973,757	127,571,132	140,328,246	154,361,070	169,797,177	186,776,895	205,454,585	226,000,043
<i>Cost of sales</i>										
Raw Material Cost	38,751,320	46,333,100	50,966,410	56,063,051	61,669,356	67,836,292	74,619,921	82,081,913	90,290,104	99,319,115
Contractual Labour	35,040,000	38,544,000	42,398,400	46,638,240	51,302,064	56,432,270	62,075,497	68,283,047	75,111,352	82,622,487
Operation costs 1 (direct labor)	1,740,000	1,914,000	2,105,400	2,315,940	2,547,534	2,802,287	3,082,516	3,390,768	3,729,845	4,102,829
Operating costs 2 (machinery maintenance)	214,912	256,960	282,656	310,922	342,014	376,215	413,837	455,220	500,742	550,817
Operating costs 3 (direct electricity)	63,504	69,854	76,840	84,524	92,976	102,274	112,501	123,751	136,126	149,739
Operating costs 4 (direct water)	180,000	198,000	217,800	239,580	263,538	289,892	318,881	350,769	385,846	424,431
Total cost of sales	75,989,736	87,315,914	96,047,506	105,652,256	116,217,482	127,839,230	140,623,153	154,685,469	170,154,015	187,169,417
Gross Profit	12,188,658	18,114,774	19,926,251	21,918,876	24,110,764	26,521,840	29,174,024	32,091,426	35,300,569	38,830,626
<i>General administration &amp; selling expenses</i>										
Administration expense	1,260,000	1,386,000	1,524,600	1,677,060	1,844,766	2,029,243	2,232,167	2,455,384	2,700,922	2,971,014
Electricity expense	299,804	329,784	362,762	399,039	438,943	482,837	531,121	584,233	642,656	706,921
Water expense	8,700	9,570	10,527	11,580	12,738	14,011	15,413	16,954	18,649	20,514
Travelling expense	94,500	103,950	114,345	125,780	138,357	152,193	167,413	184,154	202,569	222,826
Communications expense (phone, fax, mail, internet, etc.)	26,100	28,710	31,581	34,739	38,213	42,034	46,238	50,862	55,948	61,542
Office expenses (stationary, entertainment, janitorial services, etc)	261,000	287,100	315,810	347,391	382,130	420,343	462,377	508,615	559,477	615,424
Promotional expense	440,892	396,803	357,122	321,410	289,269	260,342	234,308	210,877	189,790	170,811
Professional fees (legal, audit, consultants, etc.)	88,178	105,431	115,974	127,571	140,328	154,361	169,797	186,777	205,455	226,000
Depreciation expense	639,690	639,690	639,690	642,295	641,875	641,875	644,890	644,404	644,404	647,894
Amortization of pre-operating costs	50,000	50,000	50,000	50,000	50,000	-	-	-	-	-
Amortization of legal, licensing, and training costs	34,510	34,510	34,510	34,510	34,510	34,510	34,510	34,510	34,510	34,510
Bad debt expense	1,322,676	1,581,460	1,739,606	1,913,567	2,104,924	2,315,416	2,546,958	2,801,653	3,081,819	3,390,001
Miscellaneous expense 1	252,000	277,200	304,920	335,412	368,953	405,849	446,433	491,077	540,184	594,203
Subtotal	4,778,050	5,230,208	5,601,448	6,020,353	6,485,006	6,953,014	7,531,624	8,169,498	8,876,381	9,661,661
Operating Income	7,410,608	12,884,566	14,324,803	15,898,523	17,625,758	19,568,826	21,642,400	23,921,928	26,424,188	29,168,965
Other income (interest on cash)	153,952	330,700	540,070	752,219	968,879	1,189,894	1,416,904	1,651,785	1,894,519	2,271,042
Gain / (loss) on sale of computer equipment	-	-	10,500	-	-	22,655	-	-	36,726	29,320
Earnings Before Interest & Taxes	7,564,559	13,215,266	14,875,373	16,650,742	18,594,637	20,781,375	23,059,304	25,573,714	28,355,433	31,469,327
Tax	1,767,595	3,745,343	4,326,380	4,947,759	5,628,123	6,393,481	7,190,756	8,070,799	9,044,401	10,134,264
<b>NET PROFIT/(LOSS) AFTER TAX</b>	<b>5,796,964</b>	<b>9,469,923</b>	<b>10,548,993</b>	<b>11,702,982</b>	<b>12,966,514</b>	<b>14,387,894</b>	<b>15,868,548</b>	<b>17,502,914</b>	<b>19,311,032</b>	<b>21,335,063</b>

## 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
<b>Assets</b>											
<i>Current assets</i>											
Cash & Bank	3,264,459	9,051,678	17,404,354	25,801,274	34,376,206	43,134,111	52,057,398	61,294,939	70,847,900	80,713,615	100,969,728
Equipment spare part inventory	8,955	11,242	12,985	14,997	17,322	20,007	23,108	26,689	30,826	35,604	-
Raw material inventory	1,614,638	1,766,600	2,137,586	2,586,479	3,129,640	3,786,864	4,582,105	5,544,348	6,708,661	8,117,479	-
<b>Total Current Assets</b>	<b>4,888,052</b>	<b>10,829,520</b>	<b>19,554,924</b>	<b>28,402,751</b>	<b>37,523,167</b>	<b>46,940,982</b>	<b>56,662,611</b>	<b>66,865,976</b>	<b>77,587,387</b>	<b>88,866,698</b>	<b>100,969,728</b>
<i>Fixed assets</i>											
Land	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000
Building/Infrastructure	3,922,000	3,725,900	3,529,800	3,333,700	3,137,600	2,941,500	2,745,400	2,549,300	2,353,200	2,157,100	1,961,000
Machinery & equipment	4,008,000	3,607,200	3,206,400	2,805,600	2,404,800	2,004,000	1,603,200	1,202,400	801,600	400,800	-
Furniture & fixtures	287,800	259,020	230,240	201,460	172,680	143,900	115,120	86,340	57,560	28,780	-
Computer equipment	42,000	28,140	14,280	49,040	32,576	16,531	56,770	37,710	19,137	65,719	43,654
Office equipment	1,500	1,350	1,200	1,050	900	750	600	450	300	150	-
<b>Total Fixed Assets</b>	<b>28,261,300</b>	<b>27,621,610</b>	<b>26,981,920</b>	<b>26,390,850</b>	<b>25,748,556</b>	<b>25,106,681</b>	<b>24,521,090</b>	<b>23,876,200</b>	<b>23,231,797</b>	<b>22,652,549</b>	<b>22,004,654</b>
<i>Intangible assets</i>											
Pre-operation costs	250,000	200,000	150,000	100,000	50,000	-	-	-	-	-	-
Legal, licensing, & training costs	345,100	310,590	276,080	241,570	207,060	172,550	138,040	103,530	69,020	34,510	-
<b>Total Intangible Assets</b>	<b>595,100</b>	<b>510,590</b>	<b>426,080</b>	<b>341,570</b>	<b>257,060</b>	<b>172,550</b>	<b>138,040</b>	<b>103,530</b>	<b>69,020</b>	<b>34,510</b>	<b>-</b>
<b>TOTAL ASSETS</b>	<b>33,744,452</b>	<b>38,961,720</b>	<b>46,962,924</b>	<b>55,135,171</b>	<b>63,528,783</b>	<b>72,220,213</b>	<b>81,321,741</b>	<b>90,845,706</b>	<b>100,888,203</b>	<b>111,553,757</b>	<b>122,974,383</b>
<b>Liabilities &amp; Shareholders' Equity</b>											
<i>Shareholders' equity</i>											
Paid-up capital	33,744,452	33,744,452	33,744,452	33,744,452	33,744,452	33,744,452	33,744,452	33,744,452	33,744,452	33,744,452	33,744,452
Retained earnings		5,217,268	13,218,472	21,390,718	29,784,331	38,475,760	47,577,289	57,101,253	67,143,751	77,809,304	89,229,930
<b>Total Equity</b>	<b>33,744,452</b>	<b>38,961,720</b>	<b>46,962,924</b>	<b>55,135,171</b>	<b>63,528,783</b>	<b>72,220,213</b>	<b>81,321,741</b>	<b>90,845,706</b>	<b>100,888,203</b>	<b>111,553,757</b>	<b>122,974,383</b>
<b>TOTAL CAPITAL AND LIABILITIES</b>	<b>33,744,452</b>	<b>38,961,720</b>	<b>46,962,924</b>	<b>55,135,171</b>	<b>63,528,783</b>	<b>72,220,213</b>	<b>81,321,741</b>	<b>90,845,706</b>	<b>100,888,203</b>	<b>111,553,757</b>	<b>122,974,383</b>

## 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		5,796,964	9,469,923	10,548,993	11,702,982	12,966,514	14,387,894	15,868,548	17,502,914	19,311,032	21,335,063
Add: depreciation expense		639,690	639,690	639,690	642,295	641,875	641,875	644,890	644,404	644,404	647,894
amortization of pre-operating costs		50,000	50,000	50,000	50,000	50,000	-	-	-	-	-
amortization of training costs		34,510	34,510	34,510	34,510	34,510	34,510	34,510	34,510	34,510	34,510
Equipment inventory	(8,955)	(2,287)	(1,743)	(2,013)	(2,325)	(2,685)	(3,101)	(3,582)	(4,137)	(4,778)	35,604
Raw material inventory	(1,614,638)	(151,962)	(370,986)	(448,893)	(543,161)	(657,224)	(795,241)	(962,242)	(1,164,313)	(1,408,819)	8,117,479
Cash provided by operations	(1,623,593)	6,366,915	9,821,395	10,822,287	11,884,302	13,032,990	14,265,936	15,582,124	17,013,378	18,576,349	30,170,551
<i>Financing activities</i>											
Issuance of shares	33,744,452	-	-	-	-	-	-	-	-	-	-
Cash provided by / (used for) financing activities	33,744,452	-	-	-	-	-	-	-	-	-	-
<i>Investing activities</i>											
Capital expenditure	(28,856,400)	-	-	(48,620)	-	-	(56,284)	-	-	(65,156)	-
Cash (used for) / provided by investing activities	(28,856,400)	-	-	(48,620)	-	-	(56,284)	-	-	(65,156)	-
<b>NET CASH</b>	<b>3,264,459</b>	<b>6,366,915</b>	<b>9,821,395</b>	<b>10,773,667</b>	<b>11,884,302</b>	<b>13,032,990</b>	<b>14,209,652</b>	<b>15,582,124</b>	<b>17,013,378</b>	<b>18,511,193</b>	<b>30,170,551</b>

## 13 KEY ASSUMPTIONS

### 13.1 Operating Cost Assumptions

Description	Details
Communication Expenses	1.5% of Direct staff salaries
Traveling Expenses	7.5% of Administration expenses
Promotional Expenses	0.5% of revenue
Depreciation Method	Straight line depreciation
Depreciation Rate	5% on Building / Infrastructure 10% on Machinery & Equipment 33% on Office Equipment 10% on Furniture & Fixture
Inflation Growth Rate	10%
Electricity Price Growth Rate	10%
Salaries Growth Rate	10%

### 13.2 Production Cost Assumptions

Description	Details
Raw Material Per Unit (i.e. Brick)	
Clay	Rs.0.60
Coal	Rs.2.81
Diesel	Rs.0.09
Other	Rs.0.10
Contractual Labour Per Shift	40 Laborers
No. of Shifts for Contractual Labor	2
Rate Per Person for Contractual Labor	Rs.1,200
Cost of Goods Sold Growth Rate (Annual)	10%

### 13.3 Revenue Assumptions

Description	Details
Sale Price Growth Rate	10%
Price Per Unit	Grade 1: Rs.8.75 Grade 1: Rs.6.2 Wastage: Rs.4.5
Capacity Utilization	92%
Capacity Utilization Growth Rate	8%
Maximum Capacity Utilization	100%