

## **PROFILE ON BLEACHING POWDER**

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## **I. SUMMARY**

This profile envisages the establishment of a plant for the production of bleaching powder with a capacity of 103 tones per annum. Bleaching powder is used to remove color from natural or artificial products. It is a crucial input of the textile industry.

The raw materials used in the manufacturing of bleaching powder are calcium oxide which is obtained from calcium carbonate burning and chlorine gas from sodium chloride electrolysis process. Calcium oxide can be obtained from Caustic Soda Share Company while chlorine will be imported.

The present demand for the proposed product is estimated at 85 tones per annum. The demand is expected to reach at 267 tones by the year 2020.

The total investment requirement is estimated at Birr 4.85 million, out of which Birr 420 thousand is required for plant and machinery. The plant will create employment opportunities for 15 persons.

The project is financially viable with an internal rate of return (IRR) of 22.75 % and a net present value (NPV) of Birr 2.80 million, discounted at 8.5%.

The project will have a backward linkage effect with chemical industry and a forward linkage effect with the textile sector. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.

## **II. PRODUCT DESCRIPTION AND APPLICATION**

Bleaching Powder is an oxidizing agent and the activity is measured in terms of available chlorine, which is, by definition, the same weight as that of gaseous or liquid chlorine that would exert the same action as the chlorine compound in question. In the bleaching powder ( $\text{CaOCl}_2$ ), the available chlorine is the same as the percentage of chlorine.

Bleaching powder contains about 35% or less of available chlorine when freshly manufactured. Bleaching powder is partially soluble in water, the hypochlorite dissolving and being responsible for oxidizing and bleaching power.

Bleaching powder is used to whitening or removing the natural color of textile fibers, yarns, wood pulp, paper and other products by chemical reaction and also is an additive in the scouring powder preparation as germicide.

### **III. MARKET STUDY AND PLANT CAPACITY**

#### **A. MARKET STUDY**

##### **1. Past Supply and Present Demand**

Bleaching powder is used to remove color from natural or artificial products. The product is a crucial input of the textile industry. Since there is no a plant that produces bleaching powder locally the country's requirement for the product is entirely met through import. However, import statistics from Customs Authority lumps up bleaching powder with other finishing agents used by textile industries. However, opinion of knowledgeable persons indicates that from the total textile finishing agents imported the share of bleaching powder is 15%. Accordingly the quantity of textile finishing agents imported and the share of bleaching powder in the past seven years i.e. 2000-2006 is presented in Table 3.1.

**Table 3.1**  
**IMPORT OF BLEACHING POWDER (TONNES)**

<b>Year</b>	<b>Textile Finishing Agents</b>	<b>Bleaching Powder</b>
2000	344	51.6
2001	347	52.05
2002	368	55.2
2003	334	50.1
2004	992	148.8
2005	304	45.6
2006	108	16.2

*Source:- Ethiopian Customs Authority*

As could be seen from Table 3.1., Import of bleaching powder fluctuates from year to year with out any trend. However, during the period of analyses import of bleaching powder has registered an average annual growth rate of 10%.

To estimate the present (2008) demand for the product the recent three years (2004 – 2006) average is assumed to reflect demand for the product in year 2006. Moreover, assuming that past trends will also continue in the near future a 10% growth rate is used.

Accordingly, by taking the average of 2004 - 2006 import as a base and applying a growth rate of 10% the present demand for bleaching powder is estimated at 85 tons.

## 2. Projected Demand

Demand for the product is directly related with the development of the manufacturing industries in the country specifically the textile sector. According to a Plan for Accelerated and Sustained Development to End Poverty (PASDEP), Sept, 2006, value added in industrial out put grew by 7% on average during the last three years (2002/03-2004/05). The target set for the industrial sector during the period of the PASDEP i.e. 2005/06-2009/10, is to register and average annual growth rate of 11.5%. Considering this situation the demand for bleaching powder is assumed to grow by 10% per annum. The projected demand is shown in Table 3.2.

**Table 3.2**

**PROJECTED DEMAND FOR BLEACHING POWER (TONNES)**

<b>Year</b>	<b>Projected Demand</b>
2009	93
2010	103
2011	113
2012	124
2013	137
2014	150
2015	166
2016	182
2017	200
2018	220
2019	242
2020	267

### 3. Pricing and Distribution

Based on the average price of import a factory gate price of Birr 27,000 per ton is recommended. Since the product is required by the manufacturing sector it can be sold directly to the end users.

#### B. PLANT CAPACITY AND PRODUCTION PROGRAMME

##### 1. Plant Capacity

The annual production capacity of the proposed project is 103 ton per annum based on 300 working days and a single shift per day.

##### 2. Production Programme

Table 3.3 below shows the production programme of Bleaching powder production at the initial stage of the production period, the plant requires some years to penetrate the market. Therefore in the first and second year of production, the capacity utilization rate will be 70% and 90%, respectively. In the third year and then after full capacity production shall be attained.

**Table 3.3**

#### **PRODUCTION PROGRAMME**

Sr. No.	Description	Production Year		
		1	2	3
1	Capacity Utilization (%)	70	90	100
2	Bleaching Powder(Ton)	72.1	92.7	103

#### IV. MATERIALS AND INPUTS

##### A. RAW AND AUXILIARY MATERIALS

The raw materials used in the manufacturing of Bleaching powder are calcium oxide that is obtained from calcium carbonate burning and chlorine gas from sodium chloride electrolysis process. Calcium oxide can be obtained from Caustic Soda Share Company while chlorine will be imported. The plant also requires polyethylene woven bags with inner lined plastic for packing of the finished product. The annual requirement of Calcium oxide, Chlorine gas and polyethylene woven bags with inner lined plastic estimated cost are indicated in Table 4.1.

**Table 4.1**

##### **ANNUAL CONSUMPTION OF RAW-MATERIALS & COST**

No.	Description	Unit Of Meas.	Qty	Unit Cost (Birr)	Cost In '000 (Birr)		
					F.C	L.C	Total
1	Calcium Oxide	Ton	70	3,000	-	210.000	210.000
2	Chlorine gas	m <sup>3</sup>	44	3,200	140.800	-	140.800
3	PP woven bag with inner lined plastic	Pcs	2,226	3	-	6.798	6.798
<b>Total cost</b>							<b>357.598</b>

##### B. UTILITIES

Utilities required for manufacturing of Bleaching powder include electric power and water. The detail of utilities consumption and their costs is given in Table 4.2.



**Table 4.2****ANNUAL CONSUMPTION OF UTILITIES**

Description	Unit of Measure	Qty.	Cost In '000 Birr		
			F.C	L.C	T.C
Electricity	kwh	85,000	-	40.25	40.25
Water	m <sup>3</sup>	6,000	-	19.50	19.50
<b>Total Cost</b>			<b>-</b>	<b>59.75</b>	<b>59.75</b>

**V. ECHNOLOGY AND ENGINEERING****A. TECHNOLOGY****1. Process description**

Nearly dry slaked lime readily absorbs chlorine to form bleaching powder. In commercial production, electrolytic chlorine, diluted with air, passes up a rotating inclined cylinder down which slaked lime falls. The rotating inclined cylinder ensures that the slaked lime is constantly being stirred to expose afresh uncombed surface. Water cooling regulates the temperature of the system. The product, bleaching powder or” chloride of lime”, is an off- white solid, which smell of chlorine.

Chlorine gas is harmful to the environment so it must be properly handled in a closed system. The recommended technology considers this environmental impact.

## 2. Source of Technology

The technical data and information related to this technology can be obtained from China.

One of the machineries and equipment supplier address is given below:-

Asia Chemical Engineering co.,Ltd

ADD.: 9 Road Qingchun Hangzhou China p.c:310009

Tel: 0086-571-87228886 Fax: 0086-571-87242887

## B. ENGINEERING

### 1. Machinery and Equipment

The list of production machinery and equipment required for the plant is provided in Table 5.1. The total cost of plant machinery and equipment is estimated at Birr 420,000 out of which Birr 357,000 will be in foreign currency.

**Table 5.1**  
**LIST OF MACHINERY & EQUIPMENT**

Sr. No.	Description	Qty	Cost in Birr'000		
			FC	LC	TC
1	Rotating steel cylinder	1	107.100	-	107.100
2	Calcium oxide storage tank	1	-	34.650	34.650
3	Hopper for calcium oxide	1	-	25.200	25.200
4	Steel tanker for chlorine gas storage	1	178.500	-	178.500
5	Conveyor and accessories	1 set	71.400	-	71.400
6	Pump	1	-	3.150	3.150
<b>Total Cost</b>			<b>357.000</b>	<b>63.000</b>	<b>420.000</b>

## 2. Land, Building and Civil Works

The total land requirement for the envisaged plant is estimated at 1,000 m<sup>2</sup> out of this 550 m<sup>2</sup> is built-up. Out of the total built up area 300 m<sup>2</sup> is used for production hall, 150m<sup>2</sup> for store and 100m<sup>2</sup> for office . Cost of building construction with at rate of Birr 2400 per m<sup>2</sup> amounts to Birr 1,320,000.

According to the Federal Legislation on the Lease Holding of Urban Land (Proclamation No 272/2002) in principle, urban land permit by lease is on auction or negotiation basis, however, the time and condition of applying the proclamation shall be determined by the concerned regional or city government depending on the level of development.

The legislation has also set the maximum on lease period and the payment of lease prices. The lease period ranges from 99 years for education, cultural research health, sport, NGO , religious and residential area to 80 years for industry and 70 years for trade while the lease payment period ranges from 10 years to 60 years based on the towns grade and type of investment.

Moreover, advance payment of lease based on the type of investment ranges from 5% to 10%.The lease price is payable after the grace period annually. For those that pay the entire amount of the lease will receive 0.5% discount from the total lease value and those that pay in installments will be charged interest based on the prevailing interest rate of banks. Moreover, based on the type of investment, two to seven years grace period shall also be provided.

However, the Federal Legislation on the Lease Holding of Urban Land apart from setting the maximum has conferred on regional and city governments the power to issue regulations on the exact terms based on the development level of each region.

In Addis Ababa the City's Land Administration and Development Authority is directly responsible in dealing with matters concerning land. However, regarding the

manufacturing sector, industrial zone preparation is one of the strategic intervention measures adopted by the City Administration for the promotion of the sector and all manufacturing projects are assumed to be located in the developed industrial zones.

Regarding land allocation of industrial zones if the land requirement of the project is below 5,000 m<sup>2</sup> the land lease request is evaluated and decided upon by the Industrial Zone Development and Coordination Committee of the City's Investment Authority. However, if the land request is above 5,000 m<sup>2</sup> the request is evaluated by the City's Investment Authority and passed with recommendation to the Land Development and Administration Authority for decision, while the lease price is the same for both cases.

The land lease price in the industrial zones varies from one place to the other. For example, a land was allocated with a lease price of Birr 284 /m<sup>2</sup> in Akakai-Kalti and Birr 341/ m<sup>2</sup> in Lebu and recently the city's Investment Agency has proposed a lease price of Birr 346 per m<sup>2</sup> for all industrial zones.

Accordingly, in order to estimate the land lease cost of the project profiles it is assumed that all manufacturing projects will be located in the industrial zones. Therefore, for this profile, which is a manufacturing project a land lease rate of Birr 346 per m<sup>2</sup> is adopted.

On the other hand, some of the investment incentives arranged by the Addis Ababa City Administration on lease payment for industrial projects are granting longer grace period and extending the lease payment period. The criteria are creation of job opportunity, foreign exchange saving, investment capital and land utilization tendency etc. Accordingly, Table 5.2 shows incentives for lease payment.

**Table 5.2****INCENTIVES FOR LEASE PAYMENT OF INDUSTRIAL PROJECTS**

<b>Scored point</b>	<b>Grace period</b>	<b>Payment Completion Period</b>	<b>Down Payment</b>
Above 75%	5 Years	30 Years	10%
From 50 - 75%	5 Years	28 Years	10%
From 25 - 49%	4 Years	25 Years	10%

For the purpose of this project profile the average i.e. five years grace period, 28 years payment completion period and 10% down payment is used. The period of lease for industry is 60 years .

Accordingly, the total lease cost, for a period of 60 years with cost of Birr 346 per m<sup>2</sup>, is estimated at Birr 20.76 million of which 10% or Birr 2,076,000 will be paid in advance. The remaining Birr 18.68 million will be paid in equal installments with in 28 years i.e. Birr 667,286 annually.

## **VI. MANPOWER AND TRAINING REQUIREMENT**

### **A. MANPOWER REQUIREMENT**

In order to run the envisaged plant efficiently, it needs 15 employees. The estimated annual cost of manpower is Birr 207,750. The detail of which is shown in Table 6.1

**Table 6.1****MANPOWER REQUIREMENT AND ESTIMATED ANNUAL COST**

<b>Sr. No.</b>	<b>Description</b>	<b>Req. No.</b>	<b>Monthly Salary (Birr)</b>	<b>Annual Salary (Birr)</b>
1	Manager	1	3,000	36,000
2	Administration + Finance Head	1	2,500	30,000
3	Secretary	1	900	10,800
4	Sales and purchase Head	1	1,400	16,800
5	Production Supervisors	1	1,400	16,800
6	Operators	2	1,200	14,400
7	Technicians	1	600	7,200
9	Laborers	3	1,050	12,600
10	Store keeper	1	600	7,200
11	Guard	2	700	8,400
12	Driver	1	500	6,000
	<b>Sub-Total</b>	<b>15</b>	<b>11,400</b>	<b>166,200</b>
	Employees benefit 20 %		2,280	41,550
	<b>Grand Total</b>		<b>13,680</b>	<b>207,750</b>

**B. TRAINING REQUIREMENT**

Training of production worker is carried out during plant erection and commissioning by the experts of the machinery suppliers. The cost of training is estimated at Birr 30,000.

## VII. FINANCIAL ANALYSIS

The financial analysis of the belching powder project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	1 year
Source of finance	30 % equity
	70 % loan
Tax holidays	3 years
Bank interest	8.5%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30 days
Raw Material import	90 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days
Repair and maintenance	5% of machinery cost

### A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 4.85 million, of which 7 per cent will be required in foreign currency.

The major breakdown of the total initial investment cost is shown in Table 7.1.

**Table 7.1**  
**INITIAL INVESTMENT COST ( ‘ 000 Birr)**

<b>Sr. No.</b>	<b>Cost Items</b>	<b>Local Cost</b>	<b>Foreign Cost</b>	<b>Total Cost</b>
1	Land lease value	2,076.00	-	2,076.00
2	Building and Civil Work	1,320.00	-	1,320.00
3	Plant Machinery and Equipment	63.0	357.00	420.00
4	Office Furniture and Equipment	100.00	-	100.00
5	Vehicle	450.00	-	450.00
6	Pre-production Expenditure*	424.08	-	424.08
7	Working Capital	64.16	-	64.16
	<b>Total Investment cost</b>	<b>4,497.24</b>	<b>357.00</b>	<b>4,854.24</b>

\* *N.B Pre-production expenditure includes interest during construction ( Birr 294.08 thousand ) training (Birr 30 thousand ) and Birr 100 thousand costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

## **B. PRODUCTION COST**

The annual production cost at full operation capacity is estimated at Birr 976.72 thousand (see Table 7.2). The raw material cost accounts for 36.63 per cent of the production cost. The other major components of the production cost are financial cost , depreciation and direct labour which account for 18.66%, 15.16 % and 10.21% respectively. The remaining 19.34 % is the share of utility, repair and maintenance, labour over head and other administration cost.



**Table 7.2****ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)**

<b>Items</b>	<b>Cost</b>	<b>%</b>
Raw Material and Inputs	357.60	36.63
Utilities	59.76	6.12
Maintenance and repair	21.00	2.15
Labour direct	99.72	10.21
Labour overheads	41.55	4.26
Administration Costs	66.48	6.81
Land lease cost	-	-
<b>Total Operating Costs</b>	<b>646.11</b>	66.18
Depreciation	148.00	15.16
Cost of Finance	182.21	18.66
<b>Total Production Cost</b>	<b>976.32</b>	<b>100</b>

**C. FINANCIAL EVALUATION****1. Profitability**

Based on the projected profit and loss statement, the project will generate a profit through out its operation life. Annual net profit after tax will grow from Birr 555.68 thousand to Birr 1.12 million during the life of the project. Moreover, at the end of the project life the accumulated cash flow amounts to Birr 8.08 million.

**2. Ratios**

In financial analysis financial ratios and efficiency ratios are used as an index or yardstick for evaluating the financial position of a firm. It is also an indicator for the strength and weakness of the firm or a project. Using the year-end balance sheet figures and other relevant data, the most important ratios such as return on sales which is computed by

dividing net income by revenue, return on assets ( operating income divided by assets), return on equity ( net profit divided by equity) and return on total investment ( net profit plus interest divided by total investment) has been carried out over the period of the project life and all the results are found to be satisfactory.

### 3. Break-even Analysis

The break-even analysis establishes a relationship between operation costs and revenues. It indicates the level at which costs and revenue are in equilibrium. To this end, the break-even point of the project including cost of finance when it starts to operate at full capacity ( year 3) is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 24 \%$$

### 4. Payback Period

The pay back period, also called pay – off period is defined as the period required recovering the original investment outlay through the accumulated net cash flows earned by the project. Accordingly, based on the projected cash flow it is estimated that the project's initial investment will be fully recovered within 5 years.

### 5. Internal Rate of Return

The internal rate of return (IRR) is the annualized effective compounded return rate that can be earned on the invested capital, i.e., the yield on the investment. Put another way, the internal rate of return for an investment is the discount rate that makes the net present value of the investment's income stream total to zero. It is an indicator of the efficiency or quality of an investment. A project is a good investment proposition if its IRR is greater than the rate of return that could be earned by alternate investments or putting the money

in a bank account. Accordingly, the IRR of this project is computed to be 22.75 % indicating the viability of the project.

## **6. Net Present Value**

Net present value (NPV) is defined as the total present (discounted) value of a time series of cash flows. NPV aggregates cash flows that occur during different periods of time during the life of a project into a common measuring unit i.e. present value. It is a standard method for using the time value of money to appraise long-term projects. NPV is an indicator of how much value an investment or project adds to the capital invested. In principle a project is accepted if the NPV is non-negative.

Accordingly, the net present value of the project at 8.5% discount rate is found to be Birr 2.80 million which is acceptable.

## **D. ECONOMIC BENEFITS**

The project can create employment for 15 persons. In addition to supply of the domestic needs, the project will generate Birr 877.31 thousand in terms of tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports. The project will have a backward linkage effect with chemical industry and a forward linkage effect with the textile sector.