82. MARBLE

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I. SUMMARY

This profile envisages the establishment of a plant for the production of Marble with a capacity of 79,130 m^2 per annum.

The present demand for the proposed product is estimated at 187.53 m^2 per annum. The demand is expected to reach at 302,056 by the year 2010.

The plant will create employment opportunities for 34 persons.

The total investment requirement is estimated at Birr 11.6 million, out of which Birr 2.2 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 65.8% and a net present value (NPV) of Birr 29.6 million, discounted at 8.5 %.

II. PRODUCT DESCRIPTION AND APPLICATION

Marble is a rock composed of granular limestone or dolomite, which is recrystalized by the influence of heat, pressure and aqueous solutions. This Metamorphic rock can be found in nature with different attractive colours and varieties as well as quality.

Marbles can be processed in industries to produce various kinds of marble stones. The products of marble processing industries can be used for monuments, interiors decoration, statuary, table tops and novelties. But the principal application of marbles is for exterior building works to provide a lasting endurance to walls.

III. MARKET STUDY AND PLANT CAPACITY

A. MAREKET STUDY

1. Past Supply And Present Demand

Marble is capable of taking polish and is used in the construction of churches, public buildings, private homes, sculptures, marble carpets and indoors and outdoors in church construction and designs. Special elements of marble production include: basins, cornices, pillars, rims, mantelpieces, countertops, special intels, arches, unique decorative piece, kitchen tops, vanity tops and stairs.

Commercially, the term is rather broad to include rocks composed of calcium carbonate, granite and other types of stones. The purest form of marble is, however, statuary marble, which is white with visible crystalline structure.

The supply of marble is met through domestic production and import. Though imported marble is observed in the market, the official import statistics obtained from the External

Trade Statistics of Customs Authority indicates that the supply of marble is almost met through domestic production.

The latest domestic production of marble is presented in Table 3.1. As can be seen from the table, the four years average marble production in the country was 153,099 square meters.

The construction sector being one of the fastest growing sector, there will be a growing demand for marble. This is evidenced through the highest production attained in year 2002.

Table 3.1
DOMESTIC PRODUCTION OF MARBLE IN SQUARE METERS

Year	Domestic Production of Marble
1999	152,235
2000	135,875
2001	114,182
2002	209,803
Average	153,099

Source : *CSA, Annual Survey of Manufacturing Industries.*

The recent construction boom in the country will further increase the demand for marbles. Therefore, the current effective demand estimation is made using the 1994/95 growth rate attained in the construction sector. Thus, at an average rate of 7% the demand for marble in year 2005 is estimated at 187, 553 square meter.

2. Projected Demand

The principal usage of marble and marble products is the construction of buildings. The existing building construction observed is facing the shortage of basic construction materials like cement. Due to the construction activities carried out all over the country, price for construction materials is increasing. The overall building construction growth as one of the major construction sector, will have a direct impact on the demand for marble. Thus, the demand for marble, based on the expectations of the growth, in construction sector, is projected at an annual 7 % growth rate. The projected demand for marble is presented in Table 3.2.

Table 3.2
PROJECTED DEMAND FOR MARBLE

Year	Demand (m^2)
2006	206,308
2007	226,939
2008	249,633
2009	274,596
2010	302,056
2011	332,261
2012	365,487
2013	402,036
2014	442,240
2015	486,464

3. Pricing and Distribution

The price of marble and marble products varies depending upon the type, colour and other factors. The average price for the new project is Birr 200 per square meter. The product will be distributed through the existing outlets of construction material retail shops as well as a distribution and storage warehouse at least in major cities, most importantly at Addis Ababa.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Considering the projected demand, competition and minimum economy of scale, the annual rated capacity of the plant will be 79,130 square meters on a single shift of 8 hours a day and 300 working days per year.

2. Production Programme

The plant is expected to operate in 3 shifts a day for a total of 300 working days a year. It's capacity utilization will be 70%, 85% and 100% in the first, second and third years, respectively.

IV. MATERIALS AND INPUTS

A. RAW MATERIALS

The raw materials used in polished marble production will be mainly blocks of marbles. Marble is one of the dimension stones used for construction purposes. Dimension stone is a broader term which incorporates varieties of rocks such as Granites, Limestones, Sandstones and Marble. These stones must posses specific qualities demanded for dimension-stone use. The stone must be obtainable in large, sound blocks, free from incipient cracks, seams and blemishes and must be without mineral grains that might cause

stains as a result of weathering. It must have an attractive colour and generally a uniform texture. The annual requirement of marble or other dimension stones is indicated in Table 4.1.

Table 4.1
RAW MATERIAL REQUIREMENT AND COST

Description	Qty.	Cost ('000 Birr)
Marble or dimension stones (Tonnes)	6825	8190
Total	**6825**	**8190**

B. UTILITIES

The two major utilities required by the marble polishing/processing plant include electric power and water. Electric power is mainly used for the electric motor drive of heavy-duty machines and lighting of the entire facility while water is used in polishing process. The annual requirement of these utilities are indicated in Table 4.2.

Table 4.2
UTILITIES REQUIREMENT AND COST

Description	Qty.	Cost '000 Birr)
Electricity, kWh	360,000	432
Water, m^3	1500	3.0
Total		**435**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Process Description

The processing of marble dimension stones essentially involves the following three major operations. These include :-

- Cutting of marble blocks into a number of small size blocks by heavy duty;
- Cutting machines such as gang saws and diamond saws;
- Shapping of smaller size marble blocks by equipment's like planers and turning lathes; and
- Surface finishing or polishing of shaped marble blocks by rubbing beds and polishing machines inorder to attain attractive colour and uniform texture.

All are specific operations carried out in dimension stones preparation plant after the quarried blocks are delivered to the processing plant.

2. Source of Technology

The address of machinery supplier is given below:-

MOVERS (INDIA) PRIVATE LTD.
BASAVA BHAVAN, HIGH GROUND
FAX 91-802263606

B. ENGINEERING

1. Machinery and Equipment

Marble processing or dimensioning mill should be equipped with the following types of machines. The machines have to be purchased as a package to avoid compatibility. The total cost of the machines is estimated at Birr 2.1 million, out of which about 1.7 million will be required in foreign currency. The list of machinery and equipment required for the envisaged plant along with estimated cost is as presented in Table 5.1.

Table 5.1
MACHINERY AND EQUIPMENT AND COST

Sr. No.	Description	Qty. (No.)	Costs ' 000 Birr		
			FC	LC	Total
1	Diamond saws	2	372	74	446
2	Planers	2	144	80	172
3	Rubbing beds	2	168	34	202
4	Turning lathes	2	212	42	254
5	Polishing machines	5	800	56	336
6	Gang saws	2	72	14	86
7	Lifting equipments	2	144	80	172
8	Vehicles	2	-	432	432
	Grand Total		**1392**	**708**	**2100**

2. Land, Building and Civil Works

Total land space required is about 5000 m^2 and at the lease rate of Birr 1.2 per square meter, the total land lease value for 70 years holding will be Birr 420,000. A built-up area of about 1,500 square meter will be utilized for production, a storage for space parts and office rooms. The construction cost of the built-up area, at a rate of Birr 950 per m^2, is estimated to be Birr 1,425,000. Thus, the total investment cost for land, building ad civil works assuming that the total land lease cost will be paid in advance is estimated at Birr 1.84 million.

3. Proposed Location

Menge, Dalleti, Bulen & Mura towns in Assosa and Metekel zones are proposed locations for the envisaged plant due to proximity of natural resources and availability of infrastructure (if not sufficient that needs further development).

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The plant requires 11 administrative and 23 production personnel. Details of their position and annual labour costs including fringe benefits are indicated in Table 6.1.

Table 6.1
MANPOWER REQUIREMENT AND ANNUAL LABOUR COST

Description	Req. No.	Salary (Birr)	
		Monthly/Person	Annually
A. Administrative labour			
1. Manager	1	2500	30,000
2. Secretary	1	650	7800
3. Accountant	1	850	10200
4. Store keeper	1	600	7200
5. Marketing clerk	1	600	7200
6. Guards	4	220	10560
7. Driver	2	450	10800
Sub-total (A)	**11**		**83760**
B. Production			
1. Supervisor	1	1500	18000
2. Technicians	2	950	28000
3. Skilled Laborers	14	500	84000
4. Unskilled Laborers	6	300	21600
Sub-Total (B)	**23**		**146400**
Total A + B	**34**		**230160**
Benefits (20%)			**46032**
Grand Total	**34**		**276192**

B. TRAINING REQUIREMENT

Technical staffs should be given 15 to 20 days training in local companies. The cost of training is estimated at Birr 10,000.

VII. FINANCIAL ANALYSIS

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

Construction period	1 years
Source of finance	30 % equity
	70 % loan
Tax holidays	3 years
Bank interest	7.5 %
Discounted cashflow	8.5 %

Repair and maintenance	3 % of the total plant and machinery
Accounts receivable	30 days
Raw material, local	30 days
Raw materials, import	90 days
Work in progress	5 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total initial investment cost of the project including working capital is estimated at about 11.6 million of which 12 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

Sr. No.	Cost Items	Total ('000 BIRR)
1	Land lease value	420
2.	Building and Civil Work	1,425
3.	Plant Machinery and Equipment	2,200
4.	Office Furniture and Equipment	30
5.	Vehicle	-
6.	Pre-production Expenditure*	630.8
7	Working Capital	6906.5
	Total Investment cost	**11,612.2**
	Foreign share	**12%**

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 9.87 million (see Table 7.2). The material and utility cost accounts for 87.4 per cent, while depreciation and financial costs take 9.1 per cent of the production cost.

* *N.B Pre-production expenditure includes interest during construction (Birr 615 thousand), training (Birr 10 thousand), and (Birr 5 thousand) costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

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

Items	Cost	%
Raw Material and Inputs	8,190	83
Utilities	435	4.4
Maintenance and repair	40.8	0.4
Labour direct	230.2	2.3
Factory overheads	46.0	0.5
Administration Cost	30.0	0.3
Total Operating Costs	**8,972**	**90.9**
Depreciation	318.3	3.2
Cost of Finance	581.9	5.9
Total Production Cost	**9,872.1**	**100**

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life time of the project.

The income statement and the other indicators of profitability show that the project is viable.

2. Break-even Analysis

The break-even point of the project including cost of finance when it starts to operates at full capacity (year 3) is estimated by using income statement projection.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable cost}} = 13.3\ \%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment will be fully recovered within 2 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 65.8 % and the net present value at 8.5% discount rate is Birr 29.6 million.

D. ECONOMIC BENEFITS

The project can create employment for 34 persons. In addition to supply of the domestic needs, the project will generate Birr 1.8 million per annum in terms of tax revenue when it starts to operate at full capacity. Moreover, the Regional Government can collect employment, income tax and sales tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.