PROFILE ON MARBLE

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I.   SUMMARY

This profile envisages the establishment of a plant for the production of marble with a capacity of   160,000 sq.m per annum.

The present demand for the proposed product is estimated at 211,252 sq.m per annum. The demand is expected to reach at 729,299 sq.m   by the year 2020.

The total investment requirement is estimated at Birr 20.36 million, out of which Birr 4.2 million is required   for plant and machinery. The plant will create employment opportunities for 32 persons.

The project is financially viable with an internal rate of return (IRR) of 23.65 % and a net present value (NPV) of Birr 12.47 million, discounted at 8.5%.

The project will create a forwarded and backward linkage with the construction sector and mining sectors respectively.   Moreover, foreign exchange can be earned through exporting the product.

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

Commercial marble includes metamorphosed limestones and serpentine rocks, all of which are capable of taking a polish. There are few marble products, which are of a single color. Some are fine black and others are of white specimens, and even the most pure of these are often tinged with grey or brown. All other types are of various colours. There is red marble with its various shades, orange yellow and yellowish, green and greenish, blues, and violet. These last two colors are the most rare. The product application can be divided in to three broad categories i.e. structural, ornamental and residential fields.

The country's requirement of marble is largely met through local production. The data obtained from CSA on local production is given in Table 3.1.

Table 3.1
LOCAL PRODUCTION OF MARBLE(M^2)

Year	Production
1996	84,939
1997	83,811
1998	93,408
1999	152,235
2000	135,875
2001	114,182
2002	209,803
2003	128,918
2004	344,452
2005	161,002
2006	200,408
Average	**155,367**

Source; " Report on large and medium scale manufacturing and electricity industries survey" CSA, 2007.

During the period 1996 -2006, the maximum local production of marble was 344,452 m^2 (year 2005), while the minimum 83,811 m^2 was registered in year 1998. In the remaining years, production was fluctuating between these two extremes, around a mean figure of 155,367 m^2.

Ethiopia export high quality marbles to various countries. During the period 1997-2006 on average the country has exported 2,043 m^2 of marble (see Table 3.2).

Table 3.2

MARBLE EXPORT (M^2)

Year	Export
1997	152
1998	197
1999	294
2000	2186
2001	5926
2002	6006
2003	1315
2004	113
2005	1128
2006	3114
Average	**2043**

Source- External Trade Statistics, Customs Authority.

Therefore, the apparent consumption of marble is composed of domestic production minus export. Table 3.3 summarizes the past local production, export and apparent consumption of the product.

Table 3.3
APPARENT CONSUMPTION OF MARBLE (M^2)

Year	Local	Export	Apparent Consumption
1997	84,939	152	84,787
1998	83,811	197	83,614
1999	93,408	294	93,114
2000	152,235	2186	150,049
2001	135,875	5926	129,949
2002	114,182	6006	108,176
2003	209,803	1315	208,488
2004	128,918	113	128,805
2005	344,452	1128	343,324
2006	161,002	3114	157,888
2007	200,408	NA	200,408

As can be seen from Table 3.3, apparent consumption of marble shows a general increasing trend although, the annual consumption is erratic. In 1998 apparent consumption has decreased by about 1.38 % compared to 1997. However, in 1999 and 2000 apparent consumption increased by about 11.36% and 61.15% respectively. In year 2001 and 2002 compared to the year 2000 and 2001 apparent consumption has registered a decline of 13.40% and 16.76% respectively. In 2003 however, apparent consumption has increased by 92.73 % which then decreased by 38.32% in year 2004. The fluctuating trend of apparent consumption has also continued during the remaining years, increasing by 166.55% in 2005, decreasing by 54.01% in 2006 and again increasing by 26.93% in 2007. However, during the time under consideration apparent consumption have registered an annual average growth rate of 23.49%.

Given, the considerable fluctuations in the apparent consumption of the products, the average annual apparent consumption during the last five years (2003 – 2007) is considered to reasonably reflect the present apparent consumption for the product. Accordingly, the present (2008) local demand for the product is estimated at 208,917 m^2

Regarding export as can be seen from Table 3.2 during the period 1997 – 2006 export of marble from Ethiopia has shown an increasing trend registering an annual average growth rate of about 200%.

However, export of marble fluctuates from year to year with out a visible trend. For example during the period 1997 – 1999 the average export was only 214 m^2 which jumped to 2,186 m^2, 5,926 m^2 and 6,006 m^2 in 2000, 2001 and 2002, respectively and then declining to 1,315 m^2 and 113 m^2 in the succeeding year and moderately increasing to 1,128 m^2 and 3144 m^2 in 2005 and 2006, respectively.

 Therefore, since export data does not show a discernible pattern, it is assumed that the average annual export during the recent five years (2001 – 2006) reasonably reflects present (2008) level of export. Hence, present export demand for marble is estimated at 2,335 m^2.

Accordingly, the present total demand (local plus export) for marble is estimated at 211,252 m^2.

2.   Projected Demand

The future demand for marble, like many other construction materials is a function of a number of interrelated variables. These variables that are essential in determining the magnitude and trend of demand for cement are:-

- The overall economic development level and growth trend of the country,
- The pattern and growth trend of the construction industry,
- Government policies and regulations that have impact on the future level and trend of construction activities, and
- Size of population and its growth rate.

Considering all the above factors and the growth trend in supply observed from the historical data (both local and export), future demand for the product is conservatively projected to grow at a rate of 10%, annually. Moreover in order to estimate the demand supply gap, the average local production during the period 2004 – 2007, which was 208,695 m^2, is assumed to be the existing local capacity (see Table 3.4).

Table 3.4
PROJECTED DEMAND AND UNSATISFIED DEMAND (M^2)

Year	Total Projected Demand	Domestic Supply	Unsatisfied Demand
2008	232,377	208,695	23,682
2009	255,615	208,695	46,920
2010	281,176	208,695	72,481
2011	309,294	208,695	100,599
2012	340,223	208,695	131,528
2013	374,245	208,695	165,550
2014	411,670	208,695	202,975
2015	452,837	208,695	244,142
2016	498,121	208,695	289,426
2017	547,933	208,695	339,238
2018	602,726	208,695	394,031
2019	662,999	208,695	454,304
2020	729,299	208,695	520,604

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.

B.   PLANT CAPACITY AND PRODUCTION PROGRAMME

1.   Plant Capacity

Considering the projected demand, competition and minimum economies of scale, the annual rated capacity of the plant will be 160,000 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. Its capacity utilization will be 70%, 85% and 100% in the first, second and third years, respectively.

Table 3.6
PRODUCTION PROGRAMME

Year	1st	2nd	3rd and then after
Capacity Utilization (%)	70	85	100
Production (m^2)	112,000	136,000	160,000

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 resource is available in, Oromia, Amhara, Gambella and Tigray regions. 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. (Tonnes)	Cost ('000 Birr)
Marble or dimension stones	13,650	16,380
Total	13,650	16,380

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 requirements of these utilities are indicated in Table 4.2.

Table 4.2

UTILITIES REQUIREMENT AND COST

Description	Qty.	Cost ('000 Birr)
Electricity, kWh	540,000	255.75
Water, m^3	2,250	7.31
Total	-	263.06

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.

The dusts to be generated during cutting and polishing of the marble has to be collected through a vacuum pump and a bag filter arrangement to clean the air before released to the atmosphere. The quarry site also needs proper treatment after finishing the project life. These costs are estimated to be Birr 500,000.

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 machinery and equipment listed in Table 5.1. The machinery and equipment have to be purchased as a package to avoid incompatibility. The total cost of the machinery is estimated at Birr 4.2 million, out of which about 2.78 million will be required in foreign currency.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT AND COST

Sr. No.	Description	Qty. (No.)	Costs ' 000 Birr		
			FC	LC	TC
1	Diamond saws	4	744	148	892
2	Planers	4	288	160	448
3	Rubbing beds	4	336	68	404
4	Turning lathes	4	424	84	508
5	Polishing machines	10	1,600	112	1,712
6	Gang saws	4	144	28	172
7	Lifting equipments	4	288	160	448
8	Vehicles	4	-	864	864
	Grand Total		2,784	1,416	4,200

2.   Land, Building and Civil Works

Total land space required is about 5000 m^2. A built-up area of about 1,500 square meters will be utilized for production (800m^2), storage (450 m^2) and office rooms and other facilities (250 m^2). 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.

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 blow 5000 m^2 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^2 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^2 in Akakai-Kalti and Birr 341/ m^2 in Lebu and recently the city's Investment Agency has proposed a lease price of Birr 346 per m^2 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 since it is a manufacturing project a land lease rate of Birr 346 per m^2 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 criterions 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

Scored Point	Grace Period	Payment Completion Period	Down Payment
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^2, is estimated at Birr 103.80 million of which 10% or Birr 10,380,000 will be paid in advance. The remaining Birr 93.42 million will be paid in equal installments within 28 years, i.e., Birr 3,336,429 annually.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The plant requires 11 administrative and 21 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	Salary (Birr) Annually
A. Administrative labour			
1. Manager	1	3,500	42,000
2. Secretary	1	900	10,800
3. Accountant	1	1,500	18,000
4. Store keeper	1	600	7,200
5. Marketing clerk	1	600	7,200
6. Guards	4	1,400	16,800
7. Driver	2	1,000	12,000
Sub-total (A)	**11**		**114,000**
B. Production			
1. Supervisor	1	1,500	18,000
2. Technicians	2	1,800	21,600
3. Skilled Laborers	12	7,200	86,400
4. Unskilled Laborers	6	2,100	25,200
Sub-Total (B)	**21**		**151,200**
Total A + B	**32**		**265,200**
Benefits (20%)			66,300
Total	**32**		**331,500**

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 year
Source of finance	30 % equity
	70 % loan
Tax holidays	3 years
Bank interest	8%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30 days
Work in progress	2 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 20.36 million, of which 14 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)

Sr. No.	Cost Items	Local Cost	Foreign Cost	Total Cost
1	Land lease value	10,380.00	-	10,380.00
2	Building and Civil Work	1,425.00	-	1,425.00
3	Plant Machinery and Equipment	1416.00	2,784.00	4,200.00
4	Office Furniture and Equipment	100.00	-	100.00
5	Vehicle	450.00	-	450.00
6	Pre-production Expenditure*	1,163.83	-	1,163.83
7	Working Capital	2,646.96	-	2,646.96
	Total Investment cost	**17,581.79**	**2,784.00**	**20,365.79**

* N.B   Pre-production expenditure includes interest during construction (Birr 1.05 million) training (Birr 10 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 18.61 million (see Table 7.2).   The raw material cost accounts for 88.0 per cent of the production cost. The other major components of the production cost are financial cost, depreciation, and utility which account for 4.35 %, 3.34 % and 1.41 % respectively. The remaining 2.91 % is the share of, direct labour, repair and maintenance, labour over head and other administration cost.

Table 7.2

ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)

Items	Cost	%
Raw Material and Inputs	16,380.00	88.00
Utilities	263.06	1.41
Maintenance and repair	210.00	1.13
Labour direct	159.12	0.85
Labour overheads	66.30	0.36
Administration Costs	106.08	0.57
Land lease cost	-	-
Total Operating Costs	**17,184.56**	92.32
Depreciation	621.25	3.34
Cost of Finance	808.82	4.35
Total Production Cost	**18,614.63**	**100**

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 3.07 million to Birr 5.25 million during the life of the project. Moreover, at the end of the project life the accumulated cash flow amounts to Birr 34.55 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.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 19\%$$

4.   Payback Period

The pay back period, also called pay – off period is defined as the period required to recover 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 4 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 porject is computed to be 23.65 % indicating the vaiability 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 in to 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 principal 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 12.47 million which is acceptable.

D.   ECONOMIC BENEFITS

The project can create employment for 32 persons. In addition to supply of the domestic needs, the project will generate Birr 7.33 million in terms of tax revenue. The project will create a forwarded and backward linkage with the construction sector and mining sectors, respectively. It will also enable foreign exchange earning through exporting the products to the world market.