73. PROFILE ON PRODUCTION OF CANDY

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I. SUMMARY

This profile envisages the establishment of a plant for the production of candy with a capacity of 500 tonnes per annum.

The present demand for the proposed product is estimated at 2,112 tonnes per annum. The demand is expected to reach at 3,516 tonnes by the year 2020.

The plant will create employment opportunities for 14 persons.

The total investment requirement is estimated at Birr 9.89 million, out of which Birr 6.94 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 28 % and a net present value (NPV) of Birr 8.36 million discounted at 8.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Candy is shaped pieces of cooked and flavored sugar, syrup, etc usually with coffee, mint, fruit juices, milk, nuts, etc added. It is recognized throughout the world as an important ingredient of a balanced diet. Candy is well known in replacing the energy which the human body continuously spends through physical exertion.

Now a days any one of the society enjoys the sweet taste of candy specially children of both urban and rural areas. At present, there is only few candy producing units in Ethiopia. The majority of the demand is satisfied with the imported product. The major raw materials are sugar and water. Production process is simple which involves boiling of sugar with water until it concentrates, adding flavors, and then forming candy, packing and marketing.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The demand for candy or sugar confectionaries is met both through local production and imports. Nearly all the producers are located in Addis Ababa, and according to "Region 14 Administration Industry and Handicrafts Bureau-Report" on the survey of Private Small and Medium Scale Industries, 1993, they used to number 24 at the time of the survey and their reported and combined annual production was 1118 tons, according to the same source. A more recent publication, "Addis Ababa city Government Trade, Industry & Tourism Bureau, Statistical Bulletin No. V, 2002, puts their number at 21. Although it is stated that their combined capital amounts to birr 6.5 Million, no information is available regarding production quantity.

Knowledgeable sources, however, indicates that owing to the rising price of sugar and competition from cheaply priced imports, most local producers are scaling down their operations while some have entirely closed and returned their licenses. Termination of the sugar quota privilege which the producers were enjoying formerly is also believed to be one of the factors that caused contraction of local production of candy.

The data obtained from CSA's annual survey of the large and medium scale manufacturing and Electricity industries, however, indicates that domestic production of candies during the period of 1991 – 1997 E.C was on average, 1306 tons.

Table 3.1

APPARENT CONSUMPTION OF CANDY (SUGAR CONFECTIONERY)

Year	Domestic production	Import
2000	1433	350.23
2001	1440	468.52
2002	1405	553.57
2003	992	764.6
2004	1460	763.24
2005	1103	694.59
Average	1306	599

***Source**: Customs Authority, External Trade Statistics, Annual Issues.*

Scruting of Table 3.1 also reveals that import of candy/Sugar confectionary, which amounted about 350.23 tons in 2000, witnesses an increase amounting to 694.59 tones in 2005.

The annual average g growth rate of candy imports during the period under consideration was 16%. Assuming this growth rate will be maintained, the present level of imports is estimated to be about 806 tons. When this estimate is added to the local production estimated earlier, total apparent consumption would be about 2112 tons, which could fairly approximate present effective demand.

2. Projected Demand

The consumption of sugar confectionaries in the country is bound to increase with an increase income of the population and development of taste to the products. In projecting the demand for the product an average annual growth rate of 4% is employed which is equivalent to the population growth rate (see Table 3.2).

Table 3.2

PROJECTED DEMAND FOR CANDY

Year	Projected Demand (tonnes)	Local Capacity (tonnes)	Demand Gap (tonnes)
2008	2196	1300	896
2009	2284	1300	984
2010	2375	1300	1075
2011	2470	1300	1170
2012	2569	1300	1269
2013	2672	1300	1372
2014	2779	1300	1479
2015	2890	1300	1590
2016	3006	1300	1706
2017	3126	1300	1826
2018	3251	1300	1951
2019	3381	1300	2081
2020	3516	1300	2216

3. Pricing and Distribution

The retail price of candy varies between Birr 20 and Birr 25 per kg depending on the country of origin and types of additives and flavorants. Allowing a 30% margin for wholesalers and distributors the product could be sold at a price ranging from Birr 16 to Birr 18 per kg.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

Based on the market study, capital requirement and minimum economy of scale, the annual production capacity of the envisaged plant is 500 tones of candy. This capacity will be attained by working single shift a day having eight working hours and 300 working days per annum.

2. Production Programme

The annual production programme is formulated on the basis of the market forecast and selected plant capacity. It is assumed that Production will commence at 75%, and then will grow to 85% and 100% in the second year, and the third year and then after, respectively. Detail production programme is shown in Table 3.3 below.

Table 3.3

PRODUCTION PROGRAMME

Sr. No	Description	Unit	Production Year		
			2008	2009	2010-2020
1.	Candy Production	Tones	375	425	500
2.	Capacity utilization rate	%	75	85	100

IV. MATERIALS AND INPUTS

A. RAW AND AUXILIARY MATERIALS

Various types of candies do exist depending on the ingredients used and manufacturing process employed. The envisaged plant will produce hard candy which can be identified by their hard brittle texture. The major raw material used to produce hard candy is sugar. Auxiliary materials added to sugar are liquid glucose (Corn syrup), edible colors, and flavors, wrapping and packing materials. Liquid glucose is used as a "doctor". Without it, would crystallize and

turn in to a lump of cloudy sugar, shortly after it was poured. Annual consumption of raw and auxiliary materials at full production capacity is given in Table 4.1 below. The total cost of raw material is estimated at Birr 3,845,000.

Table 4.1

RAW AND AUXILIARY MATERIALS REQUIREMENT AND COST

Sr. No.	Description	Qty	Cost, ['000 Birr]		
			LC	FC	TC
1	Sugar (ton)	550	3,575	-	3,575
2	Glucose	Req.	-	120	120
3	Edible colors	"	-	30	30
4	Flavors	"	-	30	30
5	Wrapping & packing materials	"	90	-	90
	Grand Total		**3,665**	**180**	**3,845**

B. UTILITIES

Electricity, water and fuel oil are the utilities required by the envisaged plant. Details of utilities are shown in Table 4.2. The total cost of utilities is estimated at 1,413,635.6.

Table 4.2

UTILITIES REQUIREMENT AND COST

Sr. No.	Description	Unit	Quantity	Total Cost, Birr
1	Electricity	kWh	43,500	19,035.6
2	Water	m^3	47,000	258,500
3	Furnace oil	Lit	210,000	1,136,100
	Grand Total			**1,413,635.6**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Broadly speaking there are two processes for making candies- the conventional process which heats materials, and the one for boiling down through reduced pressure (vacuum system). The latter process is proposed for the envisaged project since it is modern and rationalized in every aspect. The process features; small consumption of fuel, small size of plant, economization on wages and if required more transparent candies can be produced. These features provide better taste, long shelf life, and uniformity of quality, with mass production available.

The process is roughly divided into two units, namely, one to concentrate the material and the other to form hard candies. The process of vacuum concentration unit is to evaporate material under reduced temperature with reduced pressure. The candy material taken out of the concentrator is then mixed with various additives, spices or unique flavors according to the desire of candy makers. The mixing process requires sufficient kneading to obtain excellent products. After kneading is sufficiently carried out, the candy is drawn out in rope shape of determined measure by the batch roller (set with sizing roller). The drawn candy is then put into the hard candy forming unit, where candies are made formed. The formed candies are finally cooled down to normal temperature and charged to the packing machine. The cooling process is carried out by a cooling conveyor, where it is also possible to check and adjust ill formed candies. The process does not have any waste and is environmentally friendly.

2. Source of Technology

The technology of candy production is simple. Machinery can easily be purchased from India. Addresses of machinery suppliers are given below:-

1. ALLMPA INDIA
   TEL. 91-22-282511425
   FAX: 28071913
   E-MAIL allmpaindia@yahoo.com
   A.23, BHATIA CMPD, Kandivali(w), MUMBAI - 257
   India

2. Sunita impex Pvt. Ltd.
36A Bentinck Street, 1st floor, Kolkata 700069,
India, ph: 2248 1986/87, 2243 0102
Fax: 91-33-2248 3664
E-mail: Kolkata: admin@sunitaimpex.com, sutimpex@cal2.vsnl.net.in

B. ENGINEERING

1. Machinery and Equipment

The list of machinery and equipment required by the envisaged plant is given in Table 5.1 below. The total cost of machinery and equipment with the envisaged capacity is estimated at Birr 6.94 million.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT

Sr. No.	Description	Qty. (No.)
1	Automatic dissolving machine	1
2	Automatic vacuum concentrator (including receiving tank	1
3	Cooling tables	2
4	Kneading machine	1
5	Hot table	2 set
6	Batch roller(set with sizing roller)	1
7	Plastic forming machine	1
8	Shifter	1
9	Three tier cooling conveyor	**1**
10	Packing machines	1
11	Boiler	1

2. Land, Building and Civil Works

The total land requirement, including provision for open space is 1000 m^2, of which 500 m^2 will be covered by building. Estimating unit building construction cost of Birr 2,300 per m^2, the total cost of building will be Birr 1,150,000. The cost of land leasing is Birr 0.2 per m^2, and for 80 years land holding will be Birr 16,000. Thus, the total investment cost of land, building and civil works will be Birr 1,166,000.

3. Proposed Location

Candy is highly consumed in urban areas. Therefore, the candy plant should be located where there is access to infrastructure and utilities like electricity & water. It should also be nearer to the market. Considering this factor, it is proposed that the envisaged plant be located in Dale woreda, Yrgalem town.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The envisaged plant requires 14 workers. The detailed manpower requirement and the estimated annual labour cost including fringe benefits is given in Table 6.1. The total cost of manpower including fringe benefit is estimated at Birr 126,000.

Table 6.1

MANPOWER REQUIREMENT AND ANNUAL LABOUR COST

Sr. No	Description	Req. No.	Salary, Birr	
			Monthly	**Annual**
1	Plant manager	1	1750	21,000
2	Secretary	1	700	8,400
3	Accountant	1	900	10,800
4	Clerk	1	350	4,200
5	Technician Operator	4	2400	28,800
6	Store keeper	1	500	6,000
7	Purchaser/sales man	1	900	10,800
8	Driver	1	450	5,400
9	Guard	2	600	7,200
10	Cleaner	1	200	2,400
	Sub total	**14**	**8750**	**105,000**
	Employee benefit (20% BS)	-	-	21,000
	Total		**-**	**126,000**

B. TRAINING REQUIREMENT

The production operators should be given on-job training on the operation and maintenance of the machineries for a duration of two weeks by experts of the supplier of the machinery and equipment. The estimated training cost is Birr 12,000.

VII. FINANCIAL ANALYSIS

The financial analysis of the candy 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	30days
Raw material, import	90days
Work in progress	2 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at 9.89 million, of which 17 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 Cost ('000 Birr)
1	Land lease value	16.0
2	Building and Civil Work	1,150.0
3	Plant Machinery and Equipment	6,940.0
4	Office Furniture and Equipment	125.0
5	Vehicle	200.0
6	Pre-production Expenditure*	670.8
7	Working Capital	795.0
	Total Investment cost	**9,896.8**
	Foreign Share	17

** N.B Pre-production expenditure includes interest during construction (Birr 520.8 thousand) training (Birr 12 thousand) and Birr 138 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 6.84 million (see Table 7.2). The material and utility cost accounts for 76.89 per cent, while repair and maintenance take 2.63 per cent of the production cost.

Table 7.2

ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)

Items	Cost	%
Raw Material and Inputs	3,845.00	56.22
Utilities	1413.64	20.67
Maintenance and repair	180	2.63
Labour direct	75.6	1.11
Factory overheads	25.2	0.37
Administration Costs	50.4	0.74
Total Operating Costs	5,589.84	81.73
Depreciation	834	12.19
Cost of Finance	415.48	6.07
Total Production Cost	**6,839.32**	**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 operate at full capacity (year 3) is estimated by using income statement projection.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 15\ \%$$

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 4 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 28% and the net present value at 8.5% discount rate is Birr 8.36 million.

D. ECONOMIC BENEFITS

The project can create employment for 14 persons. In addition to supply of the domestic needs, the project will generate Birr 5.07 million 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.