86. PROFILE ON ELECTRIC 'MITAD'

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I. SUMMARY

This profile envisages the establishment of a plant for the production of 1,000 electric 'mitads' per annum.

The present demand for proposed product is estimated at 715 pcs and it is projected to reach at 870 pcs by the year 2019.

The plant will create employment opportunities for 9 persons.

The total investment requirement is estimated at Birr 1.41 million, out of which Birr 145,390 is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 14% and a net present value (NPV) of Birr 281,140 discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Electric-mitad is the most important household article that is used for baking “enjera”, loaves and related similar food staffs.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Energy sources in Benishangul-Gumuz are dominated by traditional forms of energy that are derived froms bio-mass. The Resource Potential Study of the region carried out by IPS had established that biomass is often the only source of energy in urban centers too.

Firewood is the most important among the biomass sources, contributing to about 97% of total domestic supply.

Modern forms of energy such as electricity play a minimal role as energy sources at the household level. According to a survey conducted by UNIDO/UNECA/SAERP, 1997, only 0.8% of households use electricity for cooking purposes, and 0.1% for lighting purposes. Electricity supply is totally limited to few urban centers. The number of people who have access to electricity is no more than 55% of the total population. However, as a result of some substantive measures undertaken by EEPCo, some more woreda towns are electrified recently. The population size of electrified towns is shown in Table 3.1.

Table 3.1

POPULATION SIZE OF ELECTRIFIED TOWNS

Town	Population	Type of Electricity Supply
Assosa	1880	Generator
D.Zeit	3028	"
Mandura	N.A	Hydro power
Almu	2540	"
Tongo	2340	Generator
Bulen	4071	"
Menge	232	"
Kurmuk	403	"
Bambasi	6,600	"
Dangur	5204	Hydro power
Pawe	8915	"
Total	52133	

N.A. = Not Available

Source: *Resource Potential Assessment of Benishangul-Gumuz Region, IPS, 2003.*

Some Diesel Generators also exist in other population centers (Kamashi, Sherkole, Dabus, Wonbera, Belojiganfoy).

Although the introduction and expanded use of electric "Mitad" will help considerably in reducing the dependency of the population on inefficient and environmentally harmful energy sources, the degree of electrification, which is rudimentary as shown above, sets a limit to the demand for the product. Presently, therefore, the urban population having access to electricity, which numbers about 52,000 (1300 households), could only be considered as a potential source of demand. Assuming that 25% of these will afford purchase of electric "Mitad", the current effective unsatisfied demand is estimated at 3250 units.

2. Projected Demand

The future demand for electric "Mitad " in the region depends mainly on expansion of electricity supply. Income and growth of urban population also influence the market. As one of the least infrastructurally developed regions in the country, Benisangul-Gumuz will necessarily be targeted for implementation of new programmes aiming at expanding basic infrastructures vital for socio-economic development and enhancement of the peoples living standards. In view of this, EEPCo's electrification programme for woreda towns of the region(Tabe 3.2) is worth looking into as it has a decisive role in implantation of future market of eletric "mitad" and similar products.

Table 3.2
EEPCo. ELECTRIFICATION PROGRAMME FOR WOREDA TOWNS IN BENISHANGUL-GUMZ REGION

Zone	No	Woreda	Towns	Proposed Supply	Scheduled E.C	Remark
Metekel	1	Dangur	Mamuk	hydro	94	Already supplied
	2	Wonbera	D.Zeit	Diesel	96	
	3	Dibate	Dibate	Hydro	96	
	4	Tonogo sp. woreda	Tongo	Diesel	96	
	5	Bulen	Bulen	Diesel	96	
Assosa	1	Menge	Menge	Diesel	96	
	2	Kurmuk	Kurmuk	Diesel	96	
	3	Sherkole	Sherkole	Diesel	96	
	4	Bambasi	Bamasi	Diesel	94	Has become operational recently
	5	Oda Buldiglu	Buldiglu	Diesel	96	
	6	Komosha	Komesha	Diesel	96	
Kamashi	1	Gumbo	Kamashi	Diesel	97	
	2	Belojiganfoy	Belohiganfoy	Diesel	97	

Source: EEPCo, Annual Report.

Table 3.2 shows that EEPCo. is planning to newly electrify five towns: Manbuk, Dibate, Sherkole, Kamashi and Oda. The combined population of those towns is estimated at 5000 (1280 households), which means an increase by about 10% of households having access to electricity. The corresponding increment in demand for electric 'mitad', on the basis of assumptions made earlier, would be 325 units, raising the unsatisfied demand to 3575 units.

In projecting the demand for the product, it is assumed that the unsatisfied potential demand (3575 units) will be translated into effective demand and be a prospective market for new producers for the coming five years, even if no new electrification is undertaken. This will mean, on average, an annual demand of about 715 units. Further electrification in the future is assumed to increase this demand by 2%, annually.

The projected demand accordingly ranges from 715 units in the year 2005 to 870 units by the year 2019. The project will not face competition from products of 'electric mitad' in Addis Ababa or other regional urban centers. The main reason for this is that electric mitad is fragile and cannot be transported to a distance place. Hence, it has to be fabricated near the intended sales area.

Table 3.3

PROJECTED DEMAND FOR ELECTRIC 'MITAD' (2005-2019)

Year	Projected Demand (units)
2005	715
2006	715
2007	715
2008	715
2009	715
2010	730
2011	743
2012	760
2013	775
2014	790
2015	805
2016	820
2017	840
2018	855
2019	870

3. Pricing and Distribution

Depending on quality, the price of electric mitad varies between Birr 400 and 600 per unit; for the envisaged plant factory gate price of Birr 500 per unit is recommended. Sales is usually effected at workshop premises or through small distributors.

B. PLANT CAPACITY & PRODUCTION PROGRAMME

1. Plant Capacity

Based on the demand projection indicated above, the proposed plant will have a capacity to produce 1000 electric-'mitads' per annum having different sizes. The plant is envisaged to operate in one shift for 264 days per year. The plant can also produce other fabrication items such as metal shelves, sumi-finished items for furniture producers …etc to use the capacity of the plant as much as possible.

2. Production Programme

The fact that the manufacturing of electric-'mitad' and related fabrication items is not complicated, it can be assumed that it will not take time to develop specific skills and knowhow to manufacture the products. The production build up programme is, hence, made to start at relatively higher (90%) and then gradually rise to full capacity in the 2nd year of operation.

Table 3.4

PRODUCTION PROGRAMME

Year of Production	1st Year	2nd Year
Production in %	90%	100%
Electric Mitad	675	750

IV. RAW MATERIALS AND INPUTS

A. MATERIALS

The raw materials required for the manufacturing of electric-'mitad' and other related sheet-metal products are mainly low carbon sheet metals, Aluminum sheet metals, different metal profile, clay pan (mitad), …etc. In addition, it requires standard parts such

as electric heating resistors, electric cables, switches, circuit breakers, gypsum and other related items, which can be purchased locally or be imported from abroad. The detailed breakdown of material requirement and at full operation capacity of the plant is given in Table 4.1.

Table 4.1

LIST OF RAW MATERIALS AND ESTIMATED COST

Sr. No.	Raw Material	Unit of Measure	Qty.	Costs in Birr		
				LC	FC	Total
1.	Low carbon sheet metals	Kg	11,250	14,490	26,910	41,400
2.	Aluminum sheet metal	Kg	7875	55,390	102,866	158,256
3.	Low carbon metal profiles	Kg	2250	1,288	2,392	3,680
4.	Electric heating resistors	M	3,020	31,700	58,900	90,600
5.	Circuit breakers	Pcs	755	6,600	12,300	18,900
6.	Switches	Pcs	755	5,300	9,800	15,100
7.	Electric wires	M	2,265	2,400	4,400	6,800
8.	Welding electrode	Packet	200	1,700	3,100	4,800
9.	Rivets	Packet	50	900	1,600	2,500
10.	Others (including clay)			16,600	30,800	47,400
Grand Total				**135,968**	**253,068**	**389,036**

B. UTILITIES

The plant will use electrical energy and water as main utilities. Estimated annual utilities consumption along with corresponding price is shown in Table 4.2.

Table 4.2

UTILITIES CONSUMPTION OF THE PLANT AT FULL CAPACITY

Utility	Unit of Measure	Consumption	Unit Cost	Total Cost
Electrical Energy	kwh	26,700	0.4736	12,650
Water	m^3	500	1.67	835
Grand Total				**13,485**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The production process of manufacturing electric-'mitad' involves mainly conventional fabrication processes and assembly of the same with clay-pan along with other standard products such as electric resistors, circuit breakers, etc. For that purpose, fabricated parts are manufactured using general purpose fabrication machines (shearing, folding, profile bending, welding). Standard parts such as, electric resistors, wires, circuit breakers, etc. and other related items can be purchased locally or be imported from abroad. The process is clean and does not affect the environment.

2. Source of Technology

The machinery required to manufacture electric 'mitad' can either be imported or purchased locally. The technology is simple and is already widely spread in almost all electrified towns. However, there is still a possibility to manufacture electric-'mitads' with better design to be more competitive in the market. It is also possible to manufacture other fabrication products using the same technology in order to better utilize the capacity of the workshop.

B. ENGINEERING

1. Machinery and Equipment

The list of required machinery and equipment is given in Table 5.1. The total cost of machinery and equipment is estimated at Birr 145,390.

Table 5.1

LIST OF MACHINERY AND EQUIPMENT

Sr. No.	Machine/Equipment Description	Qty.
1	Sheet metal shearing machine	1
2	Sheet metal rolling machine	1
3	Arc welding	2
4	Gas welding	1
5	Riveting machine	2
6	Pillar drilling machine	2
7	Bench drilling machine	3
8	Bench grinding machine	1
9	Hand drilling machines	3
10	Air compressor with spray painting	1
	Others (dies, test equipments … etc)	

2. Land, Building and Civil Works

The required area for both building and open space for the envisaged plant is estimated to be 1300 m^2, out of which 500 m^2 will be a built-up area. The total cost of civil works at a unit cost of Birr 1,500 per m^2 is estimated at Birr 750,000. The total land lease cost for a period of 70 years at a unit cost of Birr 2.5 per m^2 is estimated at Birr 227,500. 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 977,500.

3. Proposed Location

Based on the availability of infrastructure and market out let. The plant is proposed to be located in Assosa town.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The plant will require about 9 workers at the beginning of the plant operation. The breakdown of manpower allocation and annual labour costis indicated in Table 6.1.

Table 6.1

MANPOWER REQUIREMENT AND ANNUAL LABOUR COST

Sr. No	Description	Required Number	Salary (Birr)	
			Monthly	Annual
1.	Plant Manager	1	800	9,600
2.	Accountant & Cashier	1	500	600
3.	Production & Techn. Dept.	1	600	7,200
4.	Operators	3	400	14,400
5.	Electro-mech. Maintenance Mechanic	1	600	7,200
6.	Prod. & Tech. Helper	1	300	3,600
7.	Sells & Purchase Person	1	500	6,000
	Sub-total	**9**	**-**	**54,000**
	Workers benefit (25%)	-	-	3,500
	Grand total	**-**	**-**	**67,500**

B. TRAINING REQUIREMENT

The manufacturing of electric 'mitad' is not such a new and complicated process as the technology of fabrication is given in any technical & vocational schools. It is also

possible to get well-experienced workers from the market. Therefore, training arrangement is not required for the envisaged project.

VII. FINANCIAL ANALYSIS

The financial analysis of electric 'mitad' project is based on the data provided in the previous chatpers and the following assumptions:-

Construction period	1 years
Source of finance	30% equity
	70% loan
Tax holidays	3 years
Bank interest	10.5%
Discounted cash flow	10.5%
Repair and maintenance	5 % of Plant machinery and equipment
Accounts receivable	30 days
Raw material (local)	30 days
Raw material (import)	90 days
Work in progress	2 days
Finished products	30 days
Cash at 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 Birr 1.51 million. Details are indicated in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST ('000 BIRR)

Sr. No.	Cost Items	Cost
1	Land	227.50
2	Building and Civil Work	750.00
3	Plant Machinery and Equipment	145.39
4	Office Furniture and Equipment	50.00
5	Pre-production Expenditure*	139.38
	Total Investment Cost	**1,412.09**
6	Working Capital	95.13
	Total	**1,407.91**

B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 684,970 (see Table 7.2). The material and utility cost accounts for 53 per cent while repair and maintenance take 1.08 per cent of the production cost.

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* *Pre-production expenditure include interest during construction (Birr 189,200) and cost of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

Table 7.2
ANNUAL PRODUCTION COST

('000 BIRR)

Items	Year			
	3	**4**	**7**	**10**
Raw Material and Inputs	307.47	341.64	341.64	341.64
Labour Direct	68.69	76.32	76.32	76.32
Utilities	12.14	13.48	13.48	13.48
Maintenance and repair	6.54	7.27	7.27	7.27
Factory overheads	28.62	31.80	31.80	31.80
Administration overheads	45.79	50.88	50.88	50.88
Total operating costs	**469.25**	**521.39**	**521.39**	**521.39**
Depreciation	70.29	70.29	60.29	60.29
Cost of Finance	99.32	93.24	61.80	28.47
Total Production Cost	**638.86**	**684.97**	**643.48**	**610.15**

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 the percentage of net profit to total sales, net profit to equity (return on equity) and net profit plus interest to total investment (return on total investment) will show an increasing trend throughout the production life of the project.

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

2. Break-even Analysis

The break-even point of the project is estimated by using income statement projection.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales-Variable Cost}} = 29\ \%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period. The project will fully recover the initial investment and working capital within 7 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 14% and the net present value at 10.5% discount rate is Birr 281,140.

D. ECONOMIC BENEFITS

The project can create employment opportunities for 9 persons. In addition to supply of the domestic needs, the project will generate Birr 524,960 in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue.