

## SWOT

s/n	Strength	Weakness	Opportunity	Threat
1	Strong shareholders - 20 yrs Experience in business	Capital adequacy	National and Regional demand is high and growing – seven countries surrounding	Bureaucracy – much establishment requirements
2	Land secured in industrial area.		Support from government - Investment initiatives	Development of Nyerere dam, Gas discovery, and Wind for energy source
3			The continue rise in fuel price and Gvt pressure to find alternative energy solution, may trigger more demand of ethanol	Depreciation of local currency –high cost of Raw materials

## Machine systems

### SYNOPSIS OF SCOPE OF SUPPLY OF DISTILLERY PLANT

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1 Grain Silo Section.</li> <li>2 Grain Handling &amp; Milling</li> <li>3 Liquefaction Section.</li> <li>4 Multi Pressure Distillation.</li> <li>5 Thin Stillage Recycle Systems.</li> <li>6 Decanters &amp; Accessories</li> <li>7 Rotary Tube Bundle Dryer</li> <li>8 Instrumentation, Electrical, DCS &amp; MCC Systems for Scope</li> <li>9 PCC Panel &amp; Onward Electrical.</li> <li>10 Utility - Cooling Towers, Air</li> <li>11 Sealing Water Systems for Scope of sections.</li> <li>12 Ethanol Receiver &amp; Storage</li> </ol> | <ol style="list-style-type: none"> <li>13 Section – Pumps, Electrical,</li> <li>14 Instrumentation, Piping &amp; valves.</li> <li>15 Water Treatment Plant.</li> <li>16 Water piping up to battery limits</li> <li>17 Steam Condensate Tank &amp; Its</li> <li>18 Steam piping up to steam header with all accessories including PRDS.</li> <li>19 Captive Power Plant &amp; Accessories Inside Plant Lighting</li> <li>20 Yard Lighting, High Mask Lamps, cabling</li> <li>21 Plant Lighting for sections</li> <li>22 Lab Equipment, Chemicals &amp; Glassware.</li> <li>23 Fire Fighting &amp; Water Hydrant</li> <li>24 System for Internal Sections of onward Ring Header.</li> </ol> <p style="text-align: center; margin-top: 20px;">Yard Fire Fighting &amp; Water Hydrant System with Pumps, Motors, Electrical,<br/>25 Instrumentation, Ring Header &amp; Its Accessories for Total Plant.</p> |
|---|---|

Photo1. Ethanol plant



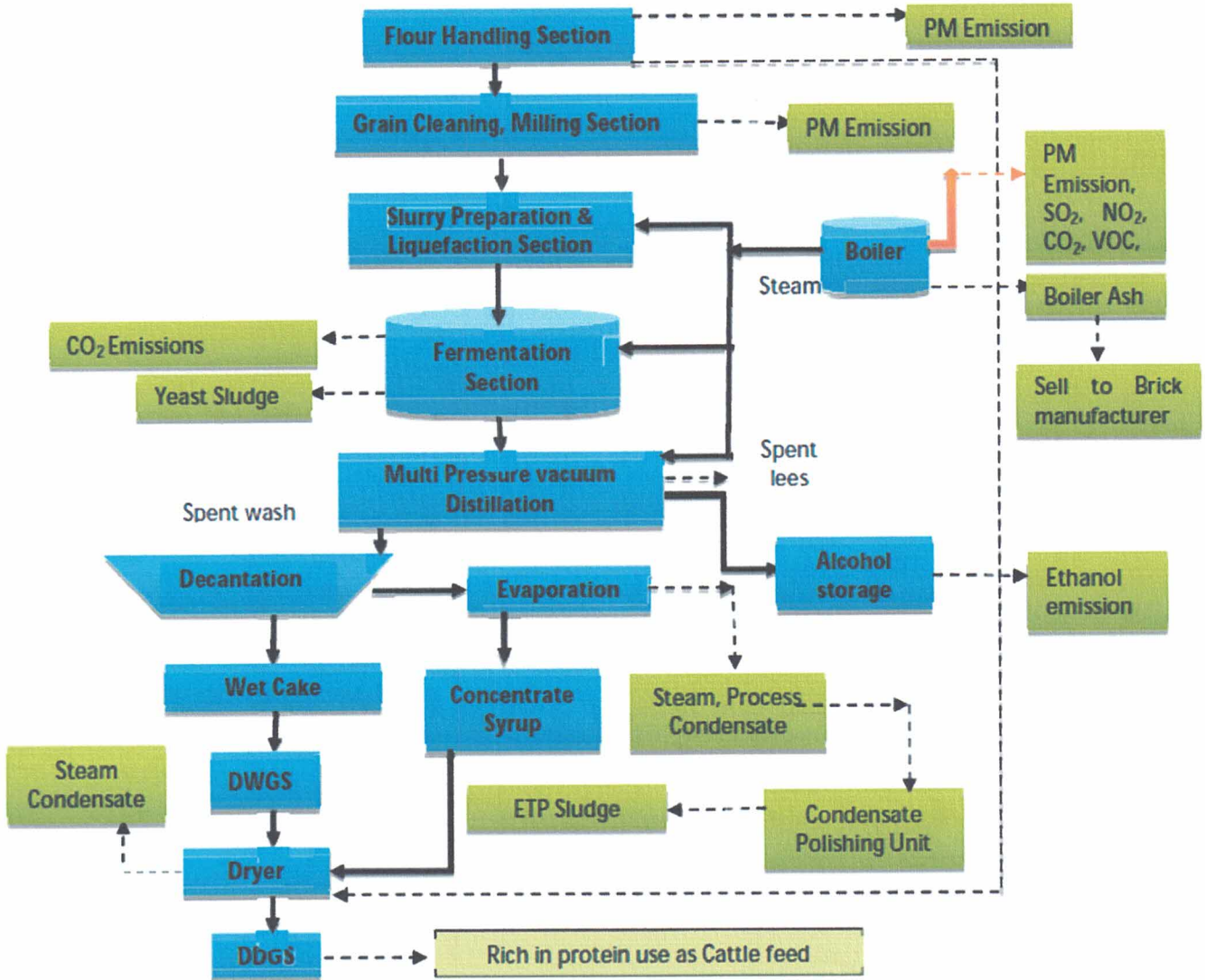
## Machines Supplier- evaluation and selection

The project was tendered to 5 prospective suppliers

S/n	Supplier name	Country	Remarks
1	Rattan Group	India	<ul style="list-style-type: none"> <li>• One of the good performing in India, estimated to be within top 15 in India.</li> <li>• Much specialized in bottling</li> <li>• Less experience in full fledged system of turbine distillery plant</li> </ul>
2	Green Engeneering Group	Siena – Italy	<ul style="list-style-type: none"> <li>• Could not submit the offer</li> </ul>
3	Chemdist Process Solution	India	<ul style="list-style-type: none"> <li>• Small sized fabrication company</li> <li>• Concentrated much on supply of equipments</li> </ul>
4	Mojj Engeneering Systems Ltd	India	<ul style="list-style-type: none"> <li>• Within top 3 best companies in India in Distillery plant construction and commissioning</li> <li>• Completed projects and commissioned to more than 1000+ clients world wide including Africa and Tanzania.</li> </ul>

The initial evaluation has opted for Mojj Engineering Systems Ltd from India. However further negotiations shall be done before final contract execution and signing. BGL is open in the meantime to receive other supplier who will be more favourable than Mojj. Obligation of suppliers and BGL are stipulated in the offer.

**Manufacturing Process flow**



## 9 Financial Considerations

### Investment cost and break down

The company expects to spend \$11.799Million in investment. This will cover land acquisition, fencing, electrification, water facilities and administration block, Plant and building, machinery cost, transportation, duty payments, clearing and installation and working capital for raw materials and startup.

- ✓ Machinery cost is provided through Offer letter from supplier.
- ✓ Shipments and clearing pegged at 20% of FOB, and
- ✓ raw materials includes grain, (2 months stock-20k tones /day) chemicals and labor
- ✓ Energy (Coal at 450k/ Tone)

s/n	Investment cost	\$	Client	Norsad	Status
i	Land, fencing, admin Block, electricity, water	1,250,000	1,250,000		70%
ii	Plant Building *	1,650,000		1,650,000	0%
iii	Machinery FOB **	6,950,000		6,950,000	0%
iv	Shipment, Duty and Clearing	1,390,000		1,390,000	0%
v	Raw Materials /w-capital *	559,565	559,565		0%
	<b>Total</b>	<b>11,799,565</b>	<b>1,809,565</b>	<b>9,990,000</b>	
	<b>Costruction</b>	<b>11,240,000</b>		<b>95%</b>	
	<b>Working capital</b>	<b>559,565</b>		<b>5%</b>	
	<b>Total by activity</b>	<b>11,799,565</b>		<b>100%</b>	
	<b>Equity</b>	<b>1,809,565</b>		<b>15%</b>	
	<b>Financial inst.</b>	<b>9,990,000</b>		<b>85%</b>	
	<b>Total</b>	<b>11,799,565</b>		<b>100%</b>	

v(a)	Raw materials	Qty	Price	Total TZS
	Maize Kg (2Month)	1,200,000	1000	1,200,000,000
	Coal TZS/MT	111	450,000	50,000,000
	chemicals			5000000
	Labour /Month	80	400000	32000000
	<b>Working Capital p.m</b>			<b>1,287,000,000</b>

Exrate TZS2300/\$

### Contribution of the capital requirements

- Equity contribution will be 15% at \$1,809,565 and will cover working capital (raw materials, Labour , Chemicals and Coal) Plus Land acquisition, electrification, water facility, land scaping and admin block) currently the work is 70% complete.
- External Term Loan will be 85% at \$9,990,000 and will be used to cover acquisition of machinery and civil work building to commissioning as per suppliers offer submitted.

### Terms of the loan

- 8 years Term Loan with one year grace period. (Note the construction period is 12 months)
- Repayment mode quarterly basis
- Interest on grace period - will be paid through other existing business/ guarantor (*Guarantor sec 9.4.2*)
- Disbursement: 50% immediate, 50% after 2 months.

### Security of the loan

#### 9.1.1 Chattel and Legal Mortgage

Over Plant and machinery to be acquired and erected on 20,000sqm plot located at Kibaha Coast region (Expected cost after investment \$13 Million)

#### 9.1.2 Corporate guarantee by City Music Sound Limited

- City music sound is the sister company to BGL with the same shareholders who have diversified to manufacturing sector.
- The company is currently the market leader for the importation and supply of all kind of music systems in Tanzania.

### Key Assumptions

Assumptions	
1 Debtors	60 days
2 interest rate	12%p.a
3 Loan	80% of investment
4 Repayments period	8 yrs
5 cost of sales	50%
6 ops expenses	10%
7 Depreciation (30 yrs plant Life span)	5% flat rate
8 Sales start	one year after investment
9 Opening Cash YR0	20% Equity Contribution
11 Loan balance	Amortised by 8 yrs anualised
12 Creditors	5% of direct cost
14 Production target: 20Klp/day- discounted to 20days/30 days (growing 1 day p.a from Yr2-Yr8)	

## 10 Environmental evaluation

### Air Emissions

Dust generated from the normal operation of the hammer mill, conveyors, elevators, DOGS dryer and storage areas will be spirited. The dust laden streams will be passed through centrifugal cyclones to minimize fire hazard and particulate emissions : The wood fired boiler system will include a separate cyclone to remove particulate matter from the spent flue gases discharged through the DOGS dryer system and into the atmosphere. The cyclone will have a removal efficiency of 94-95%. The boiler system can be retrofitted with a bag filter in series with the cyclone in the unlikely event that the cyclone alone proves to be inadequate. Emission of NO<sub>a</sub> will be minimal because the X fluidized bed combustion temperature will be limited to 1500 to 1600°F. Since wood fuel is normally low in sulfur content (relative to coal), no so<sub>2</sub> removal equipment will be required. The so<sub>2</sub> and co emissions will be within allowable limits. Some hydrocarbon emissions will come from the product surge tanks and the denaturant tanks. The main alcohol storage tanks will have internal floating roofs to minimize vapor losses from tank breathing or displaced vapors during filling operations. The gasoline storage tank will be provided with a vapor recovery balance-back system to eliminate the escape of gasoline vapors into the atmosphere during tank truck-to-storage transfer operations

- A minimal amount of vapor will be displaced from the alcohol tank trucks during filling operations. This vapor will be piped away from the truck rack area to minimize fire hazard. Since vapor losses from these tanks is insignificant relative to state environmental standards, a vapor recovery system will not be necessary.

### Liquid Effluents and Wastes

Approximately 70 GPM of process and sanitary wastes will be piped to an activated sludge waste water treatment system. The waste water will flow initially to an equalization basin for stabilization. It will then flow to two aeration basins connected in series. Compressed air supplied through a diffuser system provides the oxygen necessary to satisfy the demands of the microorganisms responsible for consuming the organic waste material. The basins will be constructed of concrete to prevent the possibility of waste water leaching into the ground water. The BOD level of the treated effluent will be reduced from an initial level of 1000 mg/1 in the combined waste water stream (2000 mg/1 in stripper bottom and evaporator condensate) to 30 mg/1 for eventual discharge into McIvor canal which flows approximately two miles south of the plant sit~. Computer model studies (to be made by the Mississippi Air and Water Pollution Control System) will evaluate the possibility of discharging the treated effluent into a dry stream bed which runs from the plant site to Mcivor Canal. Allowances have been made to provide a 6" subgrade outfall line from the site to the canal in the event that use of the dry stream bed is unacceptable. A closed loop cooling system will be utilized with the only discharge being from occasional cooling tower blow down. This flow along with the boiler blow down is combined with the activated sludge waste water for a total effluent flow of 100 GPM. All alcohol and gasoline storage tanks as well as the fermenters will be diked for spill containment.

**Solid waste**

Debris from grain handling and ash from the wood fired boiler system will be trucked off-site for use as a soil nutrient. Accumulated solids which will be periodically dredged from the waste water treatment basin will be trucked to a land fill.

**Thermal**

The principal source of thermal discharge will be from the boiler/ DOGS dryer system exhaust stack. The exiting gases will be comprised of the products of wood fuel combustion and moisture evaporated in the DOGS dryer. The temperature of this discharge will be approximately 200 to 250°F. Thermal radiation from process equipment will be minimal because most of the system and interconnecting piping will be insulated for operating economy and personnel protection. The only point of constant steam exhaust will be from the evaporator and cooking air ejector systems. The heat from these sources is negligible.

**Noise**

External noise is not expected to be a problem as most of the noise producing process equipment will be housed in the main process building. Noise emanating from the outdoor evaporator air ejector system will be muffled to a non-objectionable sound level.

**Odor**

A slight corn and DOGS odor will prevail in the area at times but it is not expected to be significant. The dryer exhaust duct can be retrofitted with an absorber if the DOGS odor proves to be objectionable. The fermenters will be of enclosed top design since they will be out of doors. Prevailing winds will not affect nearby communities with unpleasant odors.

**Visibility**

Since the only exhaust points are at the boiler/DOGS dryer system stack, the dust control system, cooling tower, evaporator and cooking air ejectors and an occasional boiler blowoff, the exhaust plumes will consist of mostly water vapor. This would have a minimal effect on local atmospheric visibility. The elevation profile of the plant will be similar to that of other chemical processing plants with tanks, buildings and open steel structure set back from the road insofar as possible.

**Safety**

The design and construction of the plant will be in compliance with OSHA standards for the protection of operating personnel.

## 11 Conclusion and recommendation

**Recommendation**

- Market for Ethanol is growing fast with estimated country shortage of 368 Million Liters p.a

**Projected cash flow**

	yr0	yr1	yr2	yr3	yr4	yr5	yr6	yr7	yr8	Total	
<b>Revenues</b>			7,283,609	7,960,985	8,299,673	8,638,361	8,977,049	9,315,737	9,654,425	9,993,113	70,122,950
Loan	9,990,000										9,990,000
Debtors collection		148,645	162,469	169,381	176,293	183,205	190,117	197,029	203,941	203,941	1,431,081
<b>Total cash inflows</b>	<b>9,990,000</b>	<b>7,432,254</b>	<b>8,123,454</b>	<b>8,469,054</b>	<b>8,814,654</b>	<b>9,160,254</b>	<b>9,505,854</b>	<b>9,851,454</b>	<b>10,197,054</b>	<b>10,197,054</b>	<b>81,544,030</b>
<b>Outflows</b>											
<b>Construction</b>	<b>11,240,000</b>										11,240,000
Direct and op exp		5,570,866	6,127,952.24	6,406,495.52	6,685,038.81	6,963,582.09	7,242,125.37	7,520,668.66	7,799,211.94	7,799,211.94	54,315,940
Loan Repayments (8yrs)		1,852,824	1,852,824	1,852,824	1,852,824	1,852,824	1,852,824	1,852,824	1,852,824	1,852,824	14,822,592
<b>Total out flow</b>	<b>11,240,000</b>	<b>7,423,690</b>	<b>7,980,776</b>	<b>8,259,320</b>	<b>8,537,863</b>	<b>8,816,406</b>	<b>9,094,949</b>	<b>9,373,493</b>	<b>9,652,036</b>	<b>9,652,036</b>	<b>80,378,532</b>
Net inflow	(1,250,000)	8,564	142,678	209,734	276,791	343,848	410,904	477,961	545,018	545,018	1,165,498
Balance b/d (Equity)	1,809,565	559,565	568,129	710,807	920,541	1,197,332	1,541,180	1,952,084	2,430,045	2,430,045	1,809,565
<b>Balance e/d</b>	<b>559,565</b>	<b>568,129</b>	<b>710,807</b>	<b>920,541</b>	<b>1,197,332</b>	<b>1,541,180</b>	<b>1,952,084</b>	<b>2,430,045</b>	<b>2,975,063</b>	<b>2,975,063</b>	<b>2,975,063</b>

**Net present value and pay back**

	yr1	yr2	yr3	yr4	yr5	yr6	yr7	yr8
Cash flow	1,861,388	1,995,502	2,062,558	2,129,615	2,196,672	2,263,728	2,330,785	2,397,842
<b>Discounted c/f (8% rate)=cf/(r+1)n+1</b>	<b>1,723,508</b>	<b>1,710,821</b>	<b>1,637,325</b>	<b>1,565,331</b>	<b>1,495,018</b>	<b>1,426,533</b>	<b>1,359,991</b>	<b>1,295,479</b>
Present Value	12,214,005							
Investment cost	(11,799,565)							
<b>NPV</b>	<b>414,440</b>							

Pay back	yr1	yr2	yr3	yr4	yr5	yr6	yr7	yr8
Discounted cash flow	1,723,508	1,710,821	1,637,325	1,565,331	1,495,018	1,426,533	1,359,991	1,295,479
Less Investment I	(11,799,565)	(10,076,058)	(8,365,237)	(6,727,911)	(5,162,581)	(3,667,563)	(2,241,030)	(881,039)
Balance after investment I	(10,076,058)	(8,365,237)	(6,727,911)	(5,162,581)	(3,667,563)	(2,241,030)	(881,039)	414,440

Months	92.16
Yrs	7yrs, 8 months