Processing and Disposal of unsorted, unsegregated Municipal Solid Waste and Conversion to High Quality Diesel Fuel

Mixed, un-segregated 100.000 t/year
Municipal solid waste (MSW 50% Inorganic and Water) Diesel Fuel Production 5.000.000 Gallons/year

The following documentation is based Municipal Solid Waste (MSW) consisting of 80 – 90% of polymerized long chain hydrocarbon molecules. The following is provided for the assessment of project viability.

Types of materials assumed in MSW
Apart from MSW synthetic diesel may be produced from a large variety of input materials such as:

- all organic input materials (straw, grass, press cake from fruits and oil plants)
- plastics of all kinds including PVC
- paper
- wood
- car fluff (residues from car recycling)
- tires
- sewage sludge
- animal manure
- animal waste etc.

Preparation of Waste Input Material
All “hard” materials such as stones, glass, metals, ceramics have to be removed. The incoming waste which arrives at the plant with a moisture of 60 – 65 % has to be dried to a residual moisture of less than 17%, and The waste is dumped into the receiving area and then picked up by a payloader equipped with a crusher shovel. A coarse grinding mechanism built into the shovel opens plastic bags and reduces the particles to < 50 mm size. Oversize parts such as bicycle frames, refrigerators etc. remain in the shovel and can be simply tilted out. The pre-shredded material passes a magnetic separator as well as an Eddy-current separator and is subsequently sent through our proprietary autoclave system where it is broken down to Fluff. The dried material passes a fine shredder which reduces the particle size to <5 mm. This is the material suitable for the diesel conversion process.

Basic Project Data
Plant Capacity and Waste Program
The plant will treat the following sort of waste: waste type: capacity t/year t/h mixed, un-segregated 100.000 municipal solid waste (MSW) assumed working time days/year 330 h/day 24 plant capacity t/h 12,6

Assumed Waste Composition
The following waste composition (in weight-%) has been assumed and all calculations are based on it:

% t/year organic fraction	45,0	45.000
paper/cardboard	12,0	12.000
plastics	14,0	14.000
glass	5,0	5.000
metals	6,0	6.000
rubber, rags, leather, diapers	8,0	8.000
stones and others	10,0	10.000
	100,0	100.000

Average dry matter (DM) % 30,0 specific gravity of waste t/m³ 0,6

Operating Conditions

The working time has been assumed as follows:

- ✓ Working time days/year 330
- ✓ Waste feeding to the plant hours/day 8
- ✓ Waste processing hours/day 24

Basis Data assumed for Calculation

The following data have been assumed for calculation. These figures may have to be adapted to the specific data of the country.

Investment Costs.

Steel structure for buildings height up to girder 7,0 m US$/m² 350

Operating Costs:

✓ salaries (semiskilled/trained)	US$/month	1000
✓ social costs, fringe benefits	%	35
✓ electricity bought from the grid	US$/kWh	0,06

Revenues:

✓ electricity sold into the grid	US$/kWh	0,10
✓ sales price for naphta (gasoline)	US$/ltr.	0,60
✓ sales price for kerosene (jet fuel)	US$/ltr.	0,80
✓ sales price for diesel	US$/ltr.	0,60
✓ sales price for heavy oil	US$/ltr.	0,40
✓ waste disposal fee (tipping/gate fee) MSW	US$/t	30,00

Various:

✓ corporate tax on company profit	%	25
✓ assumed tax holiday	years	
✓ import duty for machinery	%	
✓ exchange rate applied: 1 € =	US$	1.55
✓ Conversion for Liter to Gallon applied:	1 Liter	0.25 Gallon
✓ Conversion for KG to Pounds applied:	1 KG	2.2 Pounds

Energy and Mass Balance

Assumed Diversion of Waste Stream from MSW

Material	input moist	moisture content	going to diesel line	going to recycling ind. or road construction	going to concrete for	remaining landfill
	t/year	%	%	%	%	%
Organic fraction	45.000	70	100			
Paper/cardboard	12.000	50	100			
Plastics	14.000	30	100		5	
Glass	5.000	10		10	80	10
Metals	6.000	10		90		10
Rubber, rags, - leather, diapers	8.000	30	100			
Stones and others	10.000	10			80	20
total	100.000					

	Input moist	going to diesel line moist	going to diesel line dry	going to recycling	going to concrete for ind. or road construct.	remaining landfill
	t/year	t/year	t/year	t/year	t/year	t/year
Organic fraction	45.000	45.000	13.500			
Paper/cardbrd	12.000	12.000	6.000			
Plastics	14.000	14.000	9.800		700	
Glass	5.000			500	4.000	500
Metals	6.000			5.400		600
Rubber, rags, - leather,diapers	8.000	8.000	5.600			
Stones & others	10.000				8.000	2.000
total	100.000	79.000	34.900	5.900	12.700	3.100

Residual waste for landfill in % of original input:

3,1

Diesel Production

Available input material dry	t/year	34.900		
equivalent to	t/day	116,3		
equivalent to	t/h	4,8		
Capacity 1 line	t/h	4,0		
Number of lines required		1,2		
Number of lines proposed		1,0		
Diesel production per line:	ltr/h	2000		
per line	ltr/year	15.000.000	required for net sales	
total	ltr/year	15.000.000	input material	
equivalent to	t/year	12.000	drying	
Split into (approximately):				
Naphta (gasoline)	ltr/year	1.500.000	1.453.500	46.500
Kerosene (jet fuel)	ltr/year	4.500.000		
4.500.000				
Diesel	ltr/year	4.500.000		4.500.000
Heavy oil	ltr/year	4.500.000		4.500.000

Energy/Mass Balance

Input material dry:	t/year	calorific kcal/kg	value kWh/kg
Organic fraction	13.500	4.500	5,2
Paper/cardboard	6.000	3.500	4,1
Plastics	9.800	10.000	11,6
Glass metals rubber rags leather diaper	5.600	3.500	4,1
	34.900		25,0
Average			6,6

Total energy input	kWh/year	230.300.000	
assumed output oil	%	70	
assumed output energy in oil	kWh/year	161.210.000	
equivalent to quantity oil	t/year	14.700	
or equivalent	ltr/year	16.333.000	
assumed output gas	%	30	
assumed output energy in gas	kWh/year	69.100.000	
equivalent to electricity	kWh/year	22.112.000	
equivalent to thermal energy	kWh/year	42.289.000	
of which approx. available for drying	kWh/year	25.373.000	
equivalent to	kW		2.990

Energy for Drying

input material moist going to diesel line	t/year	79.000
input material dry going to diesel line	t/year	34.900
water to be evaporated	t/year	39.690
equivalent to	t/h	4,7
heat required for drying	kWh/t	1.000
heat required for drying	kW	4.700
heat avail from diesel conversion	kW	2.990
surplus/deficit	kW	-1.710

These figures are theoretical and the deficit and calculated on the safe side. In reality the deficit may turn out much smaller. Any possible energy deficit shall be covered by burning a small part of the generated fuel

fuel required to cover any heat deficit:		
energy content diesel fuel	kWh/ltr.	10
fuel quantity to cover the deficit	ltr/year	1.453.500

Investment Costs for Machinery and Equipment

Based on detailed planning, the costs for equipment on fob basis have been determined as follows:	Price in US$
Separation and preparation	2.692.300
Input material preparation for diesel line	2.347.500
Diesel fuel production line	11.700.000
Various items and Infrastructure	1.598.700

Total	18.338.500
Fermentation, dewatering CHP Power Generation/Gas Storage	
initial supply of Spare Parts	917.000

	19.255.500
Custom Duty on imports %:	---
Investment Costs Machinery and Equipment	19.255.500
	=========

Steel Structure for Factory Building

including roof and wall cladding, translucent sheets for natural illumination, all necessary rainwater downs, truck gates, required escape doors,		Figures in US$	
designed as single floor building height up to girder	m	8,0	
covered area	m²	1.300	
purchase price	US$/m²	350	
total costs			455.000
Illumination	in US$	37.400	
Fence and access gate, consisting of galvanized wire mesh fence with two lines of barbed wire			
height	m	2,0	
length approx.	m	480	
unit price incl. Installation	US$/m	86,00	41.300
2 electric barriers	US$	20.000	

		553.700	
Erection and installation		110.700	

Total Building		664.400	
		=========	

Civil Engineering

Concrete works, roads, storage areas, foundations for equipment and building, infrastructure,

Description:			Price in US$
civil engineering costs			58.000
excavation and removal of top soil	m³	560	32.500
concrete works for foundations and factory floor slab	m³	350	80.500
formwork	m²	1.100	50.600
reinforcement steel	t	9	12.400
roads, parking areas, storage areas	m²	750	86.300
			---
subtotal			320.300
fresh water piping system			38.400

sewage piping system	64.100
sewage tank	57.700
various	112.000

	592.500
contingencies 10%	59.300

	651.800
	=========

Sea Freight

Assumptions:			Price in US$
❑ transport in containers			
❑ Freight rate per 40´ container	US$	1.610	
❑ Rate for maritime insurance in of equipment value	%	0,6	
Total amount of equipment in	t	940	
Equivalent to	m³	3.290	
Number of containers required		132	
Sea freight			212.500
Maritime insurance			115.500

			328.000
			=========

Local Freight, Forwarding and Handling Charges

Assumptions:			Price In US$
❑ transport in containers			
❑ distance between port of arrival and construction site	km	300	
❑ freight rate per container	US$		780
Arrival port handling and forwarding charges est.1,5 % of asset value			
❑ Costs for land carriage			103.000
❑ Handling and forwarding charges			288.800

			391.800
			=========

Erection and Commissioning

For erection of equipment as well as for supervision and commissioning, the costs are calculated as follows:

Description:			Figures in US$
❑ Estimated period of erection	months	5	
❑ Estimated period for commissioning	months	3	
❑ Number of supervisors		1	
Costs for supervisors			
❑ Salary	US$/month	18.400	147.200
❑ Accommodation and allowance	US$/month	2.900	23.200
❑ Traveling costs return trip	US$	1.200	3.200
❑ Required local labor	man-months	100	
❑ Erection costs local labor	US$/month	2.900	290.000
❑ Erection tools, crane, scaffolding	US$		17.300

			480.900
			=========

Planning, Engineering

	Figures in US$
Mechanical (basic) engineering	290,000
Local (detailed) engineering	320,000

Total costs know how and engineering	610,000
	=========

Pre-investment Costs and Fees

The following additional pre-investment costs have to be calculated

	Figures in US$
❑ Legal fees/costs for creation of the corporation	23.000
❑ Traveling costs	17.300
❑ Various costs	34.500
❑ Approval procedure with authorities	92.000

	166.800
	=========

Summary Investment Costs

	Figures in US$
❑ Investment Costs for Machinery and Equipment	19.255.500
Steel Structure for Factory Buildings	664.400
❑ Civil Engineering	651.800
❑ Sea Freight	328.000
❑ Local Freight, Forwarding, Handling Charges	391.800
❑ Freight by Truck directly to the site Erection and Commissioning	480.900
❑ Planning, Engineering, License and Know How	610.000
❑ Various Pre-investment Costs and Fees	166.800

	22.549.200
	=========

Working Capital

Estimation of working capital requirements are based on the following assump.	Figures in US$
❑ Stock of chemicals for a two months´ production	69.800
❑ Credit sales for generated products	262.700
production of 4 weeks, priced at costs without depreciation and interests	
❑ - liquid cash: 3% of turnover, including tipping fee	400.200

Total	732.700
	========

Interests during Erection and Commissioning Period

Calculation of interests during construction is based on following assumption			Figures in US$
❑ interest rate during construction phase	%	7,0	
❑ period of implementation	months	5	
❑ pro rata utilization of loans during			
implementation period total investment in	US$	22.549.200	
total loans in	US$	14.549.200	
interests during construction			212.200
			=========

Input Material Costs

			Costs US$/year
Assumed input material	mixed, unsegregated municipal solid waste (MSW)		
quantity	t/year	100.000	
input materials costs	US$/t		
input materials costs			=========

Salaries

Qualification:		wages US$/month	number	salaries US$/yr
trained/semi skilled operators		1000	16	192.000
			-------	----------
				192.000
social charges/fringe benefits	%	35		67.200
				----------
total labor costs				259.200
				=========

Electricity

	Capacity installed per kVA/year kW	US$	Costs US$/year
Maximum demand fee preparation	1.010	25	25.300
Maximum demand diesel line	850	25	21.300
	Consumption unit price		
	kWh/year	US$/kWh	
Consumption preparation	10.262.000	0,06 6	15.700
Consumption diesel line	6.732.000	0,06	403.900

			1.066.200
			========

Auxiliary Materials

	kg/year	US$/kg	Figures in US$/year
Catalyst 1% of dry input material	349.000	1,20	418.800
Others			200.000

			618.800

Maintenance

Costs for materials and spare parts for maintenance and repairs are estimated at 3,0% of equipment costs			Figures in US$/year
Value of equipment installed	in US$	19.255.500	
Maintenance costs			577.700
			========

Various Costs

Remaining costs are summed up and calculated as a percentage of total costs

Figures in. US$/year

These costs comprise:

- ❑ office and administration
- ❑ sales,
- ❑ advertising
- ❑ insurance
- ❑ miscellaneous operating costs

total various costs are estimated at	630.000
	========

Depreciation

Type of investment	Depreciation rate %	Investment in US$	Depreciation US$/year
❑ Buildings/civil engineering	3	1.316.200	39.500
❑ Machinery and equipment including	8	20.456.200	1.636.500
❑ Freight and erection			----------
Total depreciation			1.676.000
			========

Interests

Assumptions:

- ❑ Financing scheme as per details below
- ❑ Repayment of long and medium term loans in equal installments, interests calculated in 3 months´ intervals on the open loan amount
- ❑ The global calculation below considers an average amount for the entire currency period of 50% of initial interest payment for the long/medium term loans

❑ Total investment (fixed assets)		in US$	22.549.200
❑ Working Capital		in US$	732.700
❑ Interests during construction		in US$	212.200

Financing Scheme	interest rate %	investment in US$	interests US$/year
❑ Equity		8.000.000	
❑ Loan financing	6,0	14.549.200	436.500
❑ Short term overdraft	8,0	944.900	75.600

			512.100
			========

Expenditures = Operating Costs

are summarized again:			US$/year
❑ Input Material Costs			
❑ Salaries			259.200
❑ Electricity			1.066.200
❑ Auxiliary Materials			618.800
❑ Maintenance			577.700
❑ Various costs			630.000

			3.151.900
❑ Depreciation			1.676.000
❑ Interests			512.100

			5.340.000
			========
equivalent to	US$/ltr.	0,36	

Calculation of Turnover

	Sales per year kWh/ltr	Sales price US$/unit	Turnover US$/year
Electricity from anaerobic digestion		0,10	
Electricity from diesel line	22.112.000	0,10	2.211.200
Naphta (gasoline)	46.500	0,60	27.900
Kerosene (jet fuel)	4.500.000	0,80	3.600.000
Diesel	4.500.000	0,60	2.700.000
Heavy oil	4.500.000	0,40	1.800.000

Total receipts			10.339.100
			========

Waste Disposal Costs (Tipping or Gate Fee)

The municipality or the households directly shall pay a tipping fee to compensate for the management costs of municipal waste.

	Assumed tipping fee US$/t	Waste quantity t/year	Turnover US$/year
mixed, unsegregated municipal solid waste (MSW)	30,00	100.000	3.000.000

Total receipts			3.000.000
			========

Carbon Credits

Depending on the situation in the country, the utilization of renewable energy sources (from waste) may grant a certain number of carbon credit certificates (CDM), which can be sold to companies all over the world, which need more credits than they have been allocated. In addition carbon credits may be allocated for avoiding landfill methane emissions.

Unfortunately the procedure for granting carbon credits is long and burdensome. Further the income from selling carbon credits is an unreliable source. The prices for carbon credits are fluctuating on the international market. The indicated revenues can only be indicative.
For the actual project possibly the following income may be expected:

	t CO2/year	Recent Price per t CO2 US$/t	Receipts US$/year
For reduction of methane emissions From landfills	18.200		
For substitution of fossil fuels	40.200		
Total	58.400	20,00	1.168.000
			========

Evaluation of Profitability

		Figures in US$/year
Receipts from Operations		10.339.100
Receipts from Tipping fee		3.000.000
Receipts from Sale of carbon rights		1.168.000
Total Income		14.507.100
Operating Costs		3.151.900
Depreciation		1.676.000
Interests		512.100
Company Profit		9.167.100
Some Characteristic Ratios:		
Profit / Turnover %	63,2	
Profit / Total investment %	40,7	
Break-even point %	19,3	
Internal rate of return IRR %	61,4	
Capital repayment period years	3,5	

Waste Reception + Preparation

Item No.	Qty.	Description	Tech. Data/Capacity	Price in US$
1	1	truck scale	weighing range 25 t	21.100
2	1	pay loader	shovel capacity 2 m³	123.500
3	1	shovel with attached pre-crusher/bag splitter		95.800
4	1	metal magnetic detecting device		38.500
5	1	metal eddy current detecting device		48.300
6	1	conveyor belt	length 8 m	12.000
7	1	baling press for metal cans	capacity 1,2 t/h	30.500
8	1	conveyor belt	length 8 m	14.400
9	1	conveyor belt length	25 m	32.100
10	1	conveyor belt, reversible	length 1,5 m	8.200
11	1	fork lift truck	lifting capacity 1 t	65.300
12	1	turbo-dissolver tank	diameter 3.500 mm eff. volume 15 m³	177.900
13	2	mobile containers	contents 0,4 m³	2.400
14	1	flow control device		17.600
15	1	transport worm conveyor (heavy particles)	length 5 m	5.900
16	1	vibrating screen	diameter 800 mm	31.700
17	1	spray-washing system		8.800
18	3	dewatering vibro screen (light particles)	diameter 1200 mm	120.200
19	3	piston dewatering press	diameter 300 mm	423.500
20	1	sand separation tank	length 4,0 m	50.800
21	2	vibrating screen 1200 mm diameter	diameter 1200 mm	80.200
22	8	press worm separator	diameter 300 mm	1.129.200
23	4	circulation pump	capacity 20 m³/h	27.400
24	5	mud water pumps fresh slurry	capacity 80 m³/h	63.500
25	5	mud water pumps recycled slurry capacity	80 m³/h	63.500

				2.692.300

Input Material Preparation for Diesel Line

Item No.	Qty.	Description	Tech. Data/Capacity		Price in US$
1	1	Central control room installation			195.500
2	2	Trommel drier	length	8 m	822.300
			diameter	2,0 m	
3	2	Fine crusher 5 mm	capacity	6,0 t/h	1.181.100
4	2	Conveyor belt	length	8,0 m	31.300
5	1	measuring and control equipment			117.300

					2.347.500

Diesel Fuel Production Line

Item No.	Qty.	Description	Tech. Data/Capacity		Price in US$
1	1,0	Complete Diesel Fuel Plants Consisting of: ✓ Material feeding system ✓ Cracking reactor vessel ✓ Distillation column ✓ Heat exchanger ✓ Flue gas exhaust ✓ Electric backup heater ✓ Gas turbine 3,5 MW ✓ Fuel storage tanks for approx. 7 days ✓ Control unit and visualization	capacity equivalent to approx: 15.000.000	2000 ltr/h ltr/year	11.700.000 ---
					11.700.000

Various Installations and Infrastructure

Item No.	Qty.	Description	Tech. Data/Capacity		Price in US$
1	1	Piping system			224.300
2	1	Bio-filter	bio-filter are	a 630 m²	184.700
3	1	Low voltage electric installation			672.800
4	1	Small laboratory			58.700
5	1	Air evacuation system			179.400
6	2	Air fans	capacity	40.000 m³/h	50.500
7	1	Air compressor	capacity	9 m³/min	29.500
		Emergency flare	capacity	800 m³/h	
8	20	T supporting steel structure			68.800
9	1	Various and contingencies			130.000

					1.598.700

Spare Parts

	Price in US$
Spare Parts (proposal for initial outfit)	917.000

Total Investment Costs

	Price in US$
Total Costs Machinery and Equipment	19.255.500
	=========

Annex B: 10 Years´ economic Evaluation

Introduction

This part of the study investigates the medium term expectations and potential of the planned investment

The financial results are evaluated over a period of 11 years
after commissioning of the plant, i.e.:

- ✓ Construction and erection phase — Year 0
- ✓ Phase of full production — years 1 - 10

A tax holiday period has been considered of: years
Company income tax has been calculated : 25 %
Added value tax has not been considered All figures are shown in 1000 US$

The results are summarized below in various schedules:

- ✓ Schedule A: Annual operating Costs
- ✓ Schedule B: Calculation of Interests and Loan Repayments
- ✓ Schedule C: Calculation of Profit, Taxes and Cash-Flow
- ✓ Schedule D: Annual Liquidity Forecast

Schedule A: Annual Operating Costs

Year:	1	2	3	4	5
Plant Utilisation %	60	90	100	100	100
Input Material Costs					
Salaries	259	259	259	259	259
Electricity	826	1.011	1.066	1.066	1.066
Auxiliary Materials	324	397	419	419	419
Maintenance		173	289	433	578
Various Costs	488	598	630	630	630
Total Operating Costs	1.897	2.438	2.663	2.807	2.952

Continued:

Year:	6	7	8	9	10
Plant utilization %	100	100	100	100	100
Input Material Costs					
Salaries	259	259	259	259	259
Electricity	1.066	1.066	1.066	1.066	1.066
Auxiliary Materials	419	419	419	419	419
Maintenance	578	578	578	578	578
Various Costs	630	630	630	630	630

Schedule B: Calculation of Interests and Loan Repayments

Year:	1	2	3	4	5
Term Loan (3- 8 years)	14.549	14.549	14.549	11.639	8.729
✓ Repayment			2.910	2.910	2.910
✓ Interest rate %	6	6	6	6	6
✓ Interests	873	873	873	698	524
Short term loan/overdraft	945	945	945	945	945
✓ Repayment					945
✓ Interest rate %	8	8	8	8	8
✓ Interests	76	76	76	76	76
Total Interests	949	949	949	774	600
Total Repayments			2.910	2.910	3.855

Continued:

Year:	6	7	8	9	10
Term Loan (3- 8 years)	5.819	2.909			
✓ Repayment	2.910	2.909			
✓ Interest rate %	6	6	6	6	6
✓ Interests	349	175			
Short term loan/overdraft					
Repayment Interest rate %	8	8	8	8	8
Interests					
Total Interests	349	175			
Total Repayments	2.910	2.909			

Schedule C: Calculation of Profit, Taxes, and Cash-Flow

Year:	1	2	3	4	5
Plant Utilization %	60	90	100	100	100
Turnover incl. Tipping Fee	8.003	12.005	13.339	13.339	13.339
Operating Costs	1.897	2.438	2.663	2.807	2.952
Interests	949	949	949	774	600
Depreciation	1.676	1.676	1.676	1.676	1.676
Gross Profit	3.481	6.942	8.051	8.082	8.111
Carry-over accum. Losses	3.481				
Taxes on Profit	870	1.736	2.013	2.021	2.028
Net Profit	2.611	5.206	6.038	6.061	6.083
Cash Flow (net Profit + Depreciation)	4.287	6.882	7.714	7.737	7.759
Cash Flow accumulated	4.287	11.169	18.883	26.620	34.379

Continued:

Year:	6	7	8	9	10
Plant Utilization %	100	100	100	100	100
Turnover incl. Tipping Fee	13.339	13.339	13.339	13.339	13.339
Operating Costs	2.952	2.952	2.952	2.952	2.952
Interests	349	175			
Depreciation	1.676	1.676	1.676	1.676	1.676
Gross Profit	8.362	8.536	8.711	8.711	8.711
Carry-over accum. Losses					
Taxes on Profit	2.091	2.134	2.178	2.178	2.178
Net Profit	6.271	6.402	6.533	6.533	6.533
Cash Flow (net Profit + Depreciation)	7.947	8.078	8.209	8.209	8.209
Cash Flow accumulated	42.326	50.404	58.613	66.822	75.031

Schedule D: Annual Liquidity Forecast

Year:	0	1	2	3	4	5
Cash Inflow:						
Equity	8.000					
Term loan (3 - 8 years)	14.549					
Overdraft	945					
Cash Flow		4.287	6.882	7.714	7.737	7.759
Total (1)	23.494	4.287	6.882	7.714	7.737	7.759
Cash Outflow:						
Investment (fixed Assets)	22.549					
Repayment of Loans				2.910	2.910	3.855
Replacement of worn-out Equipment				580	700	840
Total (2)	22.549			3.490	3.610	4.695
Liquidity (1) - (2)	945	4.287	6.882	4.224	4.127	3.064
Liquidity accumulated	945	5.232	12.114	16.338	20.465	23.529

Continued:

Year:	6	7	8	9	10
Cash Inflow:					
Equity Term loan (3 - 8 years)					
Overdraft Cash Flow	7.947	8.078	8.209	8.209	8.209
Total (1)	7.947	8.078	8.209	8.209	8.209
Cash Outflow:					
Investment (fixed Assets)					
Repayment of Loans	2.910	2.909			
Replacement of worn-out Equipment	1.010	1.010	1.010	1.010	1.010
Total (2)	3.920	3.919	1.010	1.010	1.010
Liquidity	4.027	4.159	7.199	7.199	7.199
Liquidity accumulated	27.556	31.715	38.914	46.113	53.312