

# Pre-Feasibility Study

## OXYGEN GAS MANUFACTURING UNIT



**Small and Medium Enterprises Development Authority**

**Ministry of Industries & Production**

**Government of Pakistan**

**[www.smeda.org.pk](http://www.smeda.org.pk)**

**HEAD OFFICE**

4th Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road,  
Lahore

Tel: (92 42) 111 111 456, Fax: (92 42) 36304926-7  
[helpdesk@smeda.org.pk](mailto:helpdesk@smeda.org.pk)

<b>REGIONAL OFFICE PUNJAB</b>	<b>REGIONAL OFFICE SINDH</b>	<b>REGIONAL OFFICE KPK</b>	<b>REGIONAL OFFICE BALOCHISTAN</b>
3 <sup>rd</sup> Floor, Building No. 3, Aiwan-e-Iqbal Complex, Egerton Road Lahore, Tel: (042) 111-111-456 Fax: (042) 36304926-7 <a href="mailto:helpdesk.punjab@smeda.org.pk">helpdesk.punjab@smeda.org.pk</a>	5 <sup>TH</sup> Floor, Bahria Complex II, M.T. Khan Road, Karachi. Tel: (021) 111-111-456 Fax: (021) 5610572 <a href="mailto:helpdesk-khi@smeda.org.pk">helpdesk-khi@smeda.org.pk</a>	Ground Floor State Life Building The Mall, Peshawar. Tel: (091) 9213046-47 Fax: (091) 286908 <a href="mailto:helpdesk-pew@smeda.org.pk">helpdesk-pew@smeda.org.pk</a>	Bungalow No. 15-A Chaman Housing Scheme Airport Road, Quetta. Tel: (081) 831623, 831702 Fax: (081) 831922 <a href="mailto:helpdesk-qta@smeda.org.pk">helpdesk-qta@smeda.org.pk</a>

**May 2012**

## TABLE OF CONTENT

<b>1</b>	<b>EXECUTIVE SUMMARY .....</b>	<b>5</b>
<b>2</b>	<b>INTRODUCTION TO SMEDA .....</b>	<b>6</b>
<b>3</b>	<b>PURPOSE OF THE DOCUMENT .....</b>	<b>6</b>
<b>4</b>	<b>PROJECT PROFILE .....</b>	<b>7</b>
4.1	OPPORTUNITY RATIONALE .....	7
4.2	PROJECT BRIEF .....	7
4.3	PROPOSED BUSINESS LEGAL STATUS .....	8
4.4	PROPOSED CAPACITY .....	8
<b>5</b>	<b>CRUCIAL FACTORS &amp; STEPS IN DECISION MAKING.....</b>	<b>8</b>
5.1	STRENGTHS .....	8
5.2	WEAKNESSES .....	8
5.3	OPPORTUNITIES .....	9
5.4	THREATS .....	9
<b>6</b>	<b>CURRENT INDUSTRY STRUCTURE .....</b>	<b>9</b>
<b>7</b>	<b>MARKET ANALYSIS .....</b>	<b>9</b>
7.1	MAJOR PLAYERS.....	9
<b>8</b>	<b>PRODUCTION PROCESS.....</b>	<b>10</b>
8.1	LIQUID OXYGEN PUMP .....	11
8.2	RAW MATERIAL REQUIREMENT .....	12
8.3	AVAILABLE PRODUCTION CAPACITIES .....	12
8.4	PLANT SPECIFICATIONS .....	13
<b>9</b>	<b>MACHINERY AND EQUIPMENT.....</b>	<b>14</b>
<b>10</b>	<b>MANPOWER REQUIREMENTS.....</b>	<b>18</b>
<b>11</b>	<b>OFFICE EQUIPMENT AND FURNITURE .....</b>	<b>19</b>

**12 VEHICLE ..... 20**

**13 LAND & BUILDING..... 20**

13.1 LAND AND BUILDING REQUIREMENT ..... 20

13.2 RECOMMENDED MODE FOR ACQUIRING LAND ..... 20

13.3 SUITABLE LOCATIONS ..... 21

13.4 INFRASTRUCTURE REQUIREMENT ..... 21

**14 PROJECT ECONOMICS..... 21**

14.1 PROJECT COST ..... 22

14.2 REVENUE GENERATION ..... 23

14.3 INCOME STATEMENT ..... 24

14.4 BALANCE SHEET..... 25

14.5 CASH FLOW STATEMENT..... 26

**15 KEY ASSUMPTIONS ..... 27**

**16 ANNEXURE ..... 28**

16.1 MACHINERY SUPPLIERS..... 28

16.2 TAX DEDUCTION INCOME SLABS ..... 29



## DISCLAIMER

The purpose and scope of this information memorandum is to introduce the subject matter and provide a general idea and information on the said area. All the material included in this document is based on data/information gathered from various sources and is based on certain assumptions. Although, due care and diligence has been taken to compile this document, the contained information may vary due to any change in any of the concerned factors, and the actual results may differ substantially from the presented information. SMEDA does not assume any liability for any financial or other loss resulting from this memorandum in consequence of undertaking this activity. Therefore, the content of this memorandum should not be relied upon for making any decision, investment or otherwise. The prospective user of this memorandum is encouraged to carry out his/her own due diligence and gather any information he/she considers necessary for making an informed decision.

The content of the information memorandum does not bind SMEDA in any legal or other form.

## DOCUMENT CONTROL

Document No.	PREF-97
Revision	1
Prepared by	SMEDA-Punjab
Issue Date	June, 2006
Revision Date	May 2012
Issued by	Library Officer

## **1 EXECUTIVE SUMMARY**

Oxygen Gas Manufacturing Unit is a project of chemicals industry. The proposed unit would produce gaseous oxygen for medical and industrial use. The project is proposed to be set up in Lahore. Oxygen is used in hospitals, chemical processes, general engineering, fabrication, steel manufacturing, motorcycle and steel cutting / welding industries.

Oxygen has mainly three sectors in which the application of this product is going on. First and most important is healthcare, all hospitals are involved in this respect. The second biggest sector concerned with oxygen is the ship-breaking industry, which has a potential usage for oxygen. The third sector is that of the processes industry, which includes steel melting. These three sectors are very lively all over Pakistan at present. With the growing steel, ship breaking and related industries as well as the growing need of hospitals, the demand for oxygen is increasing, offering a good investment opportunity.

The total initial cost for setting up the unit is estimated at Rs. 99.325 million. The project is proposed to be financed through 50% debt and 50% equity. The project NPV is projected around Rs. 74.382 million, with an IRR of 29% and a payback period of 4.65 years. The legal business status of this project is proposed as 'Sole Proprietorship'.

The total capacity of the Oxygen Manufacturing unit is 2,160,000 m<sup>3</sup> of Gaseous Oxygen per year. The project would initially run at 50% production capacity in year 1 and eventually reach 100% production capacity in year 6. The unit would operate for 24 hours per day at 100% capacity, working in 3 shifts of 8 hours each.

## **2 INTRODUCTION TO SMEDA**

The Small and Medium Enterprises Development Authority (SMEDA) was established with an objective to provide fresh impetus to the economy through the launch of an aggressive SME support program.

Since its inception in October 1998, SMEDA had adopted a sectoral SME development approach. A few priority sectors were selected on the criterion of SME presence. In depth research was conducted and comprehensive development plans were formulated after identification of impediments and retardants. The all-encompassing sectoral development strategy involved recommending changes in the regulatory environment by taking into consideration other important aspects including finance, marketing, technology and human resource development.

SMEDA has so far successfully formulated strategies for industries such as horticulture, including export of fruits and vegetables, marble and granite, gems and jewellery, marine fisheries, leather and footwear, textiles, surgical instruments, transport, dairy etc. Whereas the task of SME development at a broader scale still requires more coverage and enhanced reach in terms of SMEDA's areas of operation.

Along with the sectoral focus a broad spectrum of business development services is also offered to the SMEs by SMEDA. These services include identification of viable business opportunities for potential SME investors. In order to facilitate these investors, SMEDA provides business guidance through its help desk services as well as development of project specific documents. These documents consist of information required to make well-researched investment decisions. Pre-feasibility studies and business plan development are some of the services provided to enhance the capacity of individual SMEs to exploit viable business opportunities in a better way.

This document is in continuation of this effort to enable potential investors to make well-informed investment decisions.

## **3 PURPOSE OF THE DOCUMENT**

The objective of this pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. This pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management. The document also provides sector information and international scenario, which have some bearing on the project itself.

The purpose of this document is to facilitate potential investors of Oxygen Manufacturing Plant by providing them a macro and micro view of the business with the hope that the information provided herein will aid potential investors in crucial investment decisions.

This report is based on the information obtained from industry sources as well as discussions with businessmen. In the financial model, since forecast/projections relate to the future periods, actual results are likely to differ because of events and circumstances that do not occur as expected.

## 4 PROJECT PROFILE

### 4.1 Opportunity Rationale

Oxygen gas comprises 21 percent of atmospheric gas. Its symbol is O<sub>2</sub>. Atomic weight of oxygen is 16 and atomic no. is 8. Oxygen gas is non metallic element. Oxygen is colourless, odourless and tasteless. Oxygen reacts with all elements, but not with inert gases to form compound called oxides. Oxygen support combustion and support flammable materials to burn more rapidly. And this combustion supporting property prefers it for different industrial applications.

Atmospheric air is used to produce Oxygen and Nitrogen, in most industrial processes. Atmospheric air mainly contains the elements given in the table below.

**Table 4-1 Elements of Atmospheric air**

Element	Composition by volume	Boiling Point at atmospheric Pressure
Nitrogen (N <sub>2</sub> )	78.03%	-195.5 Deg.C.
Oxygen (O <sub>2</sub> )	20.99%	-182.7 Deg.C.
Argon (A)	0.9323%	-185.5 Deg.C.
Carbon Dioxide (CO <sub>2</sub> )	0.03%	-78.5 Deg. C.

Oxygen is largest volume industrial gas and is used in following industries:

1. Steel Manufacturing Industry.
2. Chemical Industry.
3. Pulp and Paper Industry.
4. Glass Manufacturing.
5. Petroleum Recovery and Refining.

In addition to the requirements of the oxygen gas in the industries as described above, oxygen gas is also largely consumed in the medical field in the hospitals.

There are many units which are in the business of industrial and medical oxygen gas manufacturing but still they are not successful in catering the demand. So there is a potential for new entrepreneurs to enter the market.

### 4.2 Project Brief

The project proposes setting up an oxygen manufacturing plant in any big city of Pakistan. The plant would produce medical grade oxygen and industrial oxygen from

free saturated air sucked from the atmosphere. The process adopted to produce oxygen and nitrogen is called liquefaction and fractional distillation of air.

The unit would produce 300m<sup>3</sup> per hour of gaseous oxygen. The plant is proposed to operate for 24 hours per day at 100% capacity, working in 3 shifts of 8 hours each.

#### **4.3 Proposed Business Legal Status**

The business legal status of the proposed project can either be sole proprietorship or partnership. Additionally, it can also be registered under the Companies Ordinance, 1984 with the Securities & Exchange Commission of Pakistan. The selection depends upon the choice of the entrepreneur. This pre-feasibility assumes the legal status to be Sole Proprietorship.

#### **4.4 Proposed Capacity**

The oxygen plant proposed would have a capacity to produce 300m<sup>3</sup> per hour of gaseous oxygen. The plant is assumed to operate at 50% capacity in year 1, working for 12 hours everyday. The production capacity would increase at 10% per year and would reach 100% capacity in year 6, running for 24 hours per day.

### **5 CRUCIAL FACTORS & STEPS IN DECISION MAKING**

Before making a decision, whether to invest in this project or not, one should carefully analyze the associated risk factors. SWOT analysis can help in analyzing these factors that play an important role in decision making.

#### **5.1 Strengths**

- Continuous availability of and easy access to raw material, i.e. free atmospheric air.
- Availability of Skilled and Unskilled labour.
- Latest technology oxygen producing plant with high working efficiency and trouble free operations, safety and low power consumption.
- Oxygen manufacturing plant is simple to operate.
- Easy availability of spare parts.
- Latest molecular sieve technology with out recurring cost of chemicals. About 3% of nitrogen gas is used for the regeneration of the molecular sieve battery and nitrogen cascade cooler

#### **5.2 Weaknesses**

- The big players in Oxygen Gas manufacturing business have already captured a major part of the market share. Therefore, the project would require strong promotional strategies and some orders already available.
- The process is completely automated and requires technical expertise of machine operators on a continuous basis.



### 5.3 Opportunities

- With the growing industrial and medical sector the demand for Oxygen gas is also likely to grow.
- Provisions can also be made for tapping up to 25% liquid oxygen / liquid nitrogen simultaneously with gaseous oxygen, at an additional cost.
- High purity Nitrogen of up to 2 PPM can also be tapped simultaneously with a separate liquid Nitrogen pump in modified plants, at an additional cost.

### 5.4 Threats

- In case of the power failure to the engine its braking mechanism will fail and this accelerating speed of the machine.
- The fire extinguisher should be installed and smoking should be banned near the production area as the out of the project is very sensitive and highly flammable.

## 6 CURRENT INDUSTRY STRUCTURE<sup>1</sup>

The current demand for the industrial gases sector stands at 6 million m<sup>3</sup> per month or an annual demand of 72 million m<sup>3</sup>. The excess demand is being met by import of gases from UAE, Singapore, China other countries. This current demand is expected to grow annually by almost 16% to 18%. In future, there lies a huge export potential for gases. The historical prices of Oxygen, Nitrogen and Argon gases have also shown consistent upward trend. The prices have increased by an average rate of 8% - 9% over the past five years. With economic stability and project like Aisha Steel and Altuwairqi Steel coming online, it is expected that the demand for industrial gases will further rise.

## 7 MARKET ANALYSIS

### 7.1 Major Players

Major players in the oxygen manufacturing industry are located in Lahore and Karachi. Major players are as below:

1. Linde Industrial Gases (BOC)
2. Ghani Gases Limited
3. Fine Gas Company Limited
4. Medi Gas Private Limited
5. Sultan Oxygen
6. National Gases Limited

---

<sup>1</sup> Ghani Gases Limited report 2009 -  
(<http://www.akdsecurities.net/downloads/Ghani%20Gases%20Presentation.pdf>)

## 8 PRODUCTION PROCESS

Free atmospheric air is sucked in by a multi-stage air compressor through a filter and compressed to the working pressure. After each stage, intermediate coolers and water separators are provided. The compressed air then passes through the (evaporation) pre-cooler and then to the molecular sieve battery where the moisture and carbon dioxide are removed from the process air. It then passes through the exchanger No. 1 where it is cooled by the out-going waste nitrogen and product oxygen.

A part of this cold air then flows through an expansion machine and the balance through the 2nd heat exchanger. The ratio of the two air streams is controlled by an expansion valve, RI.

Both these streams of air then unite in the lower pressure column where it partially liquefies.

The liquid air (rich air) then passes through the expansion valve R2 to the upper column which is at a lower pressure than the lower column. Similarly the liquid nitrogen (poor liquid) travels from the lower column to the upper column through an expansion valve R3 where the separation of oxygen and nitrogen occurs. Nitrogen being more volatile passes out as a gas from the top of the column and this waste nitrogen flows through both the heat exchangers cooling the in-coming air. Similarly product oxygen is also passed through the two heat exchangers to cool the in-coming air and then to the filling manifold via a liquid pump. If a small amount of air is vented out from the upper column, higher purity nitrogen can also be obtained from this plant. R4 Valve is provided in order to fasten cooling during start-up.

**Figure 8-1: 300 m<sup>3</sup>/hr. Plant View**



**Figure 8-2: 300 m<sup>3</sup>/hr ASU & Expansion Engine and M.S.B****Figure 8-3: Air compressor for Oxygen Plant**

### 8.1 Liquid Oxygen Pump

The Liquid Oxygen Pump is a single acting piston pump. It is used for filling Oxygen into Cylinders up to a pressure of 165 kgs./cm<sup>2</sup>.

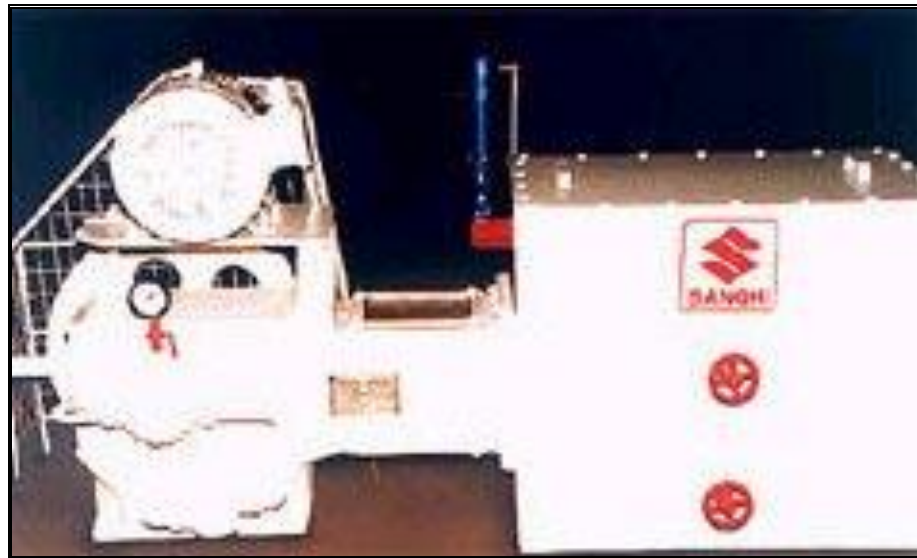
The pump is designed for assembly in air separation unit that works by pumping liquid Oxygen and converting the same into gas in the Heat Exchangers for final filling as gas in Cylinders. Control of liquid feed is not necessary, because the pump

is designed in accordance with the plant size and the liquid produced is constantly pumped off.

The drive unit is similar to any reciprocating machine with the Crank Shaft, Flywheel, Connecting Rod, Cross Head, etc.

The Liquid Oxygen Pump consists of a stainless steel inside liner with liquid inlet and evaporated gas outlet ports. There are no valves on these ports, which are closed by the piston itself on the pressure stroke. The third outlet is the main discharge outlet with the two non-return ball valves. The two ball valves remain firmly closed during suction stroke, due to high pressure in partly filled cylinders. To ensure that these valves are fully closed, a positive pressure of about 60 kgs/cm<sup>2</sup> must be maintained on it. When a fresh batch of cylinders is taken for filling, open the manifold valve slowly or use a spare batch of cylinders to ensure positive pressure on these valves.

**Figure 8-4: Liquid Oxygen Pump**



## 8.2 Raw Material Requirement

The project would be producing medical grade and industrial oxygen from free saturated air sucked from atmosphere and hence there is no requirement of raw material other than air.

## 8.3 Available Production Capacities

Oxygen gas manufacturing plants are available in various production capacities. The table below gives details of the available capacities. The product capacities are based on ambient conditions of 15°C temperature 760mm of Hg pressure and 50% relative humidity and 0.03% of Carbon Di-oxide is allowed as impurity. Nitrogen can be produced as a second product simultaneously with a separate liquid Nitrogen pump.

**Table 8-1 Oxygen Plant Production Details**

	Plant capacity Alternative	OXYGEN PRODUCTION			NITROGEN PRODUCTION		
		Gas Quantity m <sup>3</sup> /Hr.	Gas Purity %	Product Pr. kg/cm <sup>2</sup>	Gas Quantity m <sup>3</sup> /Hr.	Gas Purity %	Product Pr. kg/cm <sup>2</sup>
1.	80 m <sup>3</sup>	80	99.5	150	*275	96	0.1
1A.	80 m <sup>3</sup>	70	99.5	150	*250	99.5	0.1
2.	100 m <sup>3</sup>	100	99.5	150	*450	96	0.1
2A.	100 m <sup>3</sup>	90	99.5	150	*400	99.5	0.1
3.	200 m <sup>3</sup>	200	99.5	150	*700	99.5	0.1
3A.	200 m <sup>3</sup>	200	99.5	150	*400	99.99	0.1
4	300 m <sup>3</sup>	300	99.5	150	*1300	98.00	0.1
4A.	300 m <sup>3</sup>	300	99.5	150	*700	99.99	0.1
5.	400 m <sup>3</sup>	400	99.5	150	*1600	98.00	0.1
5.A	400 m <sup>3</sup>	400	99.5	150	*900	99.99	0.1
6.	600 m <sup>3</sup>	600	99.5	150	*2940	98.00	0.1
6.	600 m <sup>3</sup>	600	99.5	150	*1400	99.99	0.1

\* About 100 m<sup>3</sup>/Hr of Nitrogen will be used for regeneration of driers for SANGHI-ORG 80.

\* About 150 m<sup>3</sup>/Hr of Nitrogen will be used for regeneration of driers for SANGHI-ORG 100.

\* About 300 m<sup>3</sup>/Hr of Nitrogen will be used for regeneration of driers for SANGHI-ORG 200.

#### 8.4 Plant Specifications

Other specifications of Oxygen manufacturing plants are given in the table below.

**Table 8-2 Specifications of Oxygen Manufacturing Plant**

Production capacity of Oxygen Plant (m <sup>3</sup> )	80	100	200	300	400	600
Air Pressure - starting (kgs/cm <sup>2</sup> )	55	45	45	45	45	45
Air Pressure - Normal operation (kgs/cm <sup>2</sup> )	38	35	34	34	34	34
Starting Time after defrost (hours)	8	8	8	8	8	8

Starting Time for short stop (hours)	2	1.5	1	1	1	1
Defrost Time (hours)	8	8	9	8	8	8
Defrosting cycle at normal conditions (months)	6	9	9	9	9	9
Cylinder Filling Manifold connections in Nos.	2 x 8	2 x 12	2 x 24	2 x 40	2 x 50	2 x 70
Cooling Water Requirement (m <sup>3</sup> /hr.)	20	30	50	70	80	150
Inlet Cooling Water Temperature (°C)	25	25	27	27	27	27
Approx. Total Weight (tonnes)	26	29	45	50	80	100
Assembly Height (metres)	7.6	8.1	10.5	10.5	10.5	10.5
Maximum Roof Height (metres)	9.5	10	12	12	12	12
Area Required (metres)	12x12	12x12	35x15	35x15		
Power Supply Required (volts)	400/230	400/230	400/230	400/230	400/230	400/230

## 9 MACHINERY AND EQUIPMENT

Table 9-1 gives details of the Machinery proposed for Oxygen Manufacturing unit with production capacity of 300m<sup>3</sup> per hour.

**Table 9-1 Machinery Details**

	Machinery Details	No. of units
1	<b><u>SUCTION FILTER:</u></b> MS Tank consists of Woollen felt and perforated sheet duly covered with SS Wire Mesh. This assists in drawing dust free Air.	1
2	<b><u>AIR COMPRESSOR:</u></b> Multi-Stage, Horizontal, Positive Displacement, Piston type with Sight Glass for indication of oil lubrication for each stage complete with Flywheel, Inter Coolers including Foundation Bolts, Motor, Motor Pulley, V-Belts, Belt Guard, Motor Starter and Slide Rails.	1

3	<b><u>AFTER COOLER:</u></b> MS Cooler consisting of MS Vessel submerged in cold circulating water	1
4	<b><u>MOISTURE SEPARATORS:</u></b> This is a Capsule shaped Vessel made of MS Duly fitted with Drain Valves for removal of moisture present in the process air.	2
5	<b><u>CASCADE COOLER:</u></b> This is a specially designed container consisting of MS Coils in two separate chambers. The process air that passes through this Cooler is cooled through incoming Nitrogen from the ASU. These coils are immersed in water with a provision for water level indicator.	1
6	<b><u>CHILLING UNIT:</u></b> This is a Refrigerant based cooling unit. The refrigerant is expanded in the copper coil installed between the air coils for bringing down the air temperature between 8 Deg. C to 10 Deg. C. The temperature mentioned is required for the efficient working of the Molecular Sieve Battery enhances the life of the Molecular Sieve which is expensive.	1
7	<b><u>ACTIVATED CARBON FILTER:</u></b> This equipment is made of MS Capsule shaped Vessel with activated Carbon with 2 Nos. Sand Filters inside. This assists absorption of Hydro-Carbons in the Process Air.	1
8	<b><u>CERAMIC FILTERS :</u></b> This equipment is made of MS and is Cylindrical in shape. It consists of micro ceramic filter to avoid entry of dust to the ASU.	2
9	<b><u>MOLECULAR SIEVE BATTERY:</u></b> This consists of 2 Nos. MS Vessels interconnected pipelines of Nitrogen and Air, Electric Heater for regeneration, Temperature Sensor and Control Panel with automatic Temperature control. This assist in the removal of moisture carbon-dioxide, traces of Acetylene and other Hydro-Carbons present in the process air.	1
10	<b><u>AIR SEPARATION UNIT:</u></b> For liquefaction and partial distillation of Air. This unit consists of lower and upper column with a Condenser in	1

	between, Heat Exchangers, Inter-connected Pipe Lines fabricated out of copper and brass, housed in a steel box, duly insulated with Powder Perlite, Nitrogen Blower and fitted with Expansion Valves, Temperature Sensors and Liquid Level Indicator, pressure Gauges and Electric heater for defrosting, Safety Relief Valves for Top Column and Bottom Column. Complete in all respects.	
11	<b><u>EXPANSION ENGINE:</u></b> It is a vertical single acting dry running with Hydraulic Valve control bursting disc for safety, complete with Flywheel, Pressure Gauges, Motor, Motor Pulley, V-Belts, Belt Guard, Slide Rails, Inter Connecting Copper Pipes (Inlet and Outlet with A.S.U.) but including Motor Starter.	1
12	<b><u>LIQUID OXYGEN PUMP:</u></b> Horizontal single acting pump with Piston, Piston Rings, Safety Devices, Non-Return Valves, Motor with Pulley, V- Belts, Belt Guard, Inter Connecting Pipes with ASU suitable for filling Oxygen.	1
13	<b><u>FILLING MANIFOLD FOR OXYGEN:</u></b> For filling Oxygen to Cylinders. It consists of main Isolation Valve & Pigtail connection with individual Industrial regulation Valve with Pressure Gauge and Safety Relief Valve.	Set
14	<b><u>GAS / AIR LINES:</u></b> All Pipelines for the process Air, Nitrogen line and Oxygen, HP Line up to Manifold along with Short Bend, Elbow, Sockets and other necessary fittings as per our Standard Layout Drawing.	Set
15	<b><u>ALL WATER LINES:</u></b> All inter-connecting water lines from Cooling Tower, Water Pump to Air Compressor with suitable long bend, short bend, Flanges, Tee etc.	Lot
16	<b><u>WATER PUMPS:</u></b> For circulation of water to Hot and Cold Well Centrifugal pump Mono Block type.	2
17	<b><u>COOLING TOWER:</u></b> Induced Draft - Rotary Sprinkler type with Aluminium Casting an, FRP Body with suitable Electric Motor for	1



	maintaining the circulating water temperature between the Hot well and Cold well for optimum performance of the Plant. Complete in all respects.	
18	<b><u>WATER SOFTENER PLANT:</u></b> Made of HDPE having single multi-port Valve for different operations. Used to remove hardness of the water and to avoid scaling in Air Compressor Cylinder Jacket and Water Line.	1
19	<b><u>ELECTRICAL PANEL:</u></b> Electrical Panel for Supply of Electricity to individual Motors. It has a bank of on / off switches and fuses. This enables the Operator to control all motors from one point.	1
	<b>Total cost of Plant</b>	<b>Rs. 30,600,000</b>

Table 9-2 gives details of Oxygen gas cylinders proposed for the unit.

**Table 9-2 Oxygen Gas Cylinder Details**

Cylinder Details	
Water Capacity	46.5 – 47 Litres
Gas Capacity	7 m <sup>3</sup>
Outside Diameter	232 mm
Wall thickness	5.4 mm min
Length (Nominal)	1370 mm
Working pressure	150 Bar (15 MPA)
Testing pressure	250 Bar (25 MPA)
Thread of cylinder	BS341-1"-14
Valve	With CGA 540-2 Valve
Cap	With cap and neck ring
Colour	Black colour
Material	34MN2V or 37 MN Special Steel
Quantity	Per 330 Pcs/20'FCL

Table 9-3 gives total machinery and equipment cost, installation charges and freight costs.

**Table 9-3 Total Machinery and Installation costs**

<b>Machinery and Equipment</b>	<b>Cost in USD</b>	<b>Cost in PKR</b>
Machinery cost	340,000	30,600,000
Generator (750 KVA)		15,000,000
Erection and commissioning	12,000	1,080,000
Travel of engineer (appointed by Machinery Supplier)		47,000
Engineer's boarding and lodging for 27 days		63,000
Cost of 2000 cylinders (7 m <sup>3</sup> )		27,810,000
Freight cost		1,168,200
<b>Total cost</b>		<b>75,768,200</b>

## 10 MANPOWER REQUIREMENTS

The Oxygen Manufacturing Plant is assumed to operate for 24 hours daily at 100% capacity; working in 3 shifts of 8 hours each. Production capacity utilized in year 1 is around 50%. The plant would run for 12 hours at 50% capacity. The production staff hired shift wise would be increased according to the number of operational hours.

**Table 10-1 Human Resource Requirement – Year 1**

<b>Description</b>	<b>No of Staff</b>	<b>Monthly Salary (Rs)</b>	<b>Annual Salary in (Rs)</b>
<b>Production Staff</b>			
Production Manager	1	60,000	720,000
Plant Engineer	1	40,000	480,000
Technical Supervisor	1	25,000	450,000
Machine Operators	3	12,000	648,000
Quality Inspector	2	10,000	240,000
Skilled Labour	2	10,000	360,000
Unskilled Labour (Helpers)	3	9,000	486,000
Total Direct Salaries			<b>3,384,000</b>
<b>Administrative Staff</b>			
Admin and Finance Manager	1	60,000	720,000
Accounts Officer	1	15,000	180,000
Purchase Officer	1	15,000	180,000
Operator/Receptionist	1	12,000	144,000
Office boys	2	8,000	192,000
Driver	1	9,000	108,000

Security Guards	4	9,000	432,000
<b>Total Administrative Salaries</b>			<b>1,956,000</b>
<b>Marketing and Sales Staff</b>			
Marketing and Sales Manager	1	60,000	720,000
Asst. Mngr. Marketing and Sales	1	40,000	480,000
Sales Officer	15	25,000	1,500,000
<b>Total Marketing/Sales Salaries</b>			<b>2,700,000</b>
<b>Total Salaries</b>			<b>8,040,000</b>

## 11 OFFICE EQUIPMENT AND FURNITURE

Following tables present the office equipment and furniture/fixtures proposed for the unit:

**Table 11-1 Office Equipment**

Description	Qty	Cost/Unit (Rs.)	Total Cost (Rs.)
Computers with UPS	6	40,000	240,000
Computer printer (s)	2	20,000	40,000
Scanner	1	40,000	40,000
Fax machines	1	15,000	15,000
Telephone set	15	1,500	22,500
Copier	1	100,000	100,000
<b>Total Office Equipment</b>			<b>457,500</b>

**Table 11-2 Office Furniture and Fixtures**

Description	Qty	Cost/Unit (Rs.)	Total Cost (Rs.)
Management workstations	7	15,000	105,000
Chairs for management staff	7	5,000	35,000
Visitor Chairs	14	4,000	56,000
Conference Room Table	1	9,000	9,000
Conference Room Chairs	12	4,000	48,000
Other tables	8	6,000	48,000
Chairs	8	3,000	24,000
Reception Table	1	5,000	5,000
File Cabinets	10	6,000	60,000
Electric wiring and lighting			30,000
Airconditioners (1.5 tonne)	5	41,600	208,000
UPS for Admin	1	90,000	90,000
<b>Total</b>			<b>718,000</b>

## 12 VEHICLE

Vehicle requirement for the project is given in the table below for delivery of oxygen cylinders. Motorbikes would be provided to the sales officer for sales calls.

**Table 12-1 Office Vehicle**

Description	Qty	Cost/Unit (Rs.)	Total Cost (Rs.)
Hyundai Shehzore	1	889,000	889,000
Motorbikes	5	75,000	375,000
Registration fee (3%)			37,920
<b>Total</b>			<b>1,301,920</b>

## 13 LAND & BUILDING

### 13.1 Land and Building requirement

Most suitable location for setting up an Oxygen Gas Manufacturing unit can be any industrial area in or near Lahore or Karachi. The most important factor for setting up an oxygen gas unit is developed infrastructure and availability of utilities.

The total area required would be 18,000 square feet. The detail of land and building construction cost is given in the table below.

**Table 13-1 Land and Building Area and Cost**

Description	Sq ft	Construction cost/Sq. ft	Total (Rs.)
lant Area	7,000	1,200	8,400,000
Cooling Tank Area	1,000	1,000	1,000,000
Management office	1,200	1,500	1,800,000
Finished good store	1,000	1,000	1,000,000
Washroom	400	1,000	400,000
Cafeteria	250	1,000	250,000
Grounds	7,150	50	357,500
<b>Total Area &amp; Construction Cost</b>			<b>13,207,500</b>
Total Cost of Land	<b>18,000</b>		4,000,000
<b>Total Cost</b>			<b>17,207,500</b>

### 13.2 Recommended Mode for Acquiring Land

In this particular pre-feasibility, it has been assumed that the land area of 18,000 square feet (approximately 4 kanals) would be purchased. It is recommended to purchase land for setting up this project as the investment required for infrastructure and other costs is high and it is not advisable to invest a huge amount on leased or rented area.

### 13.3 Suitable Locations

The proposed project is assumed to be set up in areas near G.T. road, Muridke.

### 13.4 Infrastructure Requirement

It is recommended that the unit should be located in areas where basic utilities are available, like electricity, water, gas, etc.

## 14 PROJECT ECONOMICS

The total project cost is estimated around Rs. 99.325 million. The capital cost is estimated around Rs. 98.704 million and working capital of Rs. 0.620 million. The total cost, project returns and financial plan are given in the tables below:

**Table 14-1 Total Project Cost**

Account Head	Total Cost (Rs.)
Capital Cost	98,704,729
Working Capital Cost	620,492
<b>Total Project Cost</b>	<b>99,325,221</b>

**Table 14-2 Project Returns**

NPV (Rs.)	74,382,896
IRR	29%
Payback Period (Years)	4.65

**Table 14-3 Financing Plan**

Financing	Ratio	Rs.
Equity	50%	49,662,610
Debt	50%	49,662,610

## 14.1 Project Cost

<b>Initial Investment</b>		
<b>Capital Investment</b>		<b>Rs. in actuals</b>
Land		4,000,000
Building/Infrastructure		13,207,500
Machinery & equipment		75,768,200
Furniture & fixtures		718,000
Office vehicles		1,301,920
Office equipment		457,500
Pre-operating costs		3,201,609
Training costs		50,000
<b>Total Capital Costs</b>		<b>98,704,729</b>
<b>Working Capital</b>		<b>Rs. in actuals</b>
Equipment spare part inventory		94,710
Raw material inventory		25,781
Cash		500,000
<b>Total Working Capital</b>		<b>620,492</b>
<b>Total Investment</b>		<b>99,325,220</b>
<b>Initial Financing</b>		<b>Rs. in actuals</b>
Debt		49,662,610
Equity		49,662,610
<b>Project Returns</b>		
	EQUITY	PROJECT
Net Present Value (Rs.)	47,519,472	74,382,896
Internal Rate of Return	38%	29%
Payback Period (Yrs)	4.69	4.65

## 14.2 Revenue Generation

Revenue Generation										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Production capacity (units)	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000
Starting capacity utilization	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Capacity utilization growth rate		10%	10%	10%	10%	10%	10%	10%	10%	10%
Capacity utilization for the year	50%	60%	70%	80%	90%	100%	100%	100%	100%	100%
Production per year	1,080,000	1,296,000	1,512,000	1,728,000	1,944,000	2,160,000	2,160,000	2,160,000	2,160,000	2,160,000
Production quantity sold	1,035,000	1,287,000	1,503,000	1,719,000	1,935,000	2,151,000	2,160,000	2,160,000	2,160,000	2,160,000
Production quantity in finished goods inventory	45,000	54,000	63,000	72,000	81,000	90,000	90,000	90,000	90,000	90,000
Sale price per unit	39	44	49	55	61	69	77	86	97	108
Revenue	40,365,000	56,216,160	73,529,165	94,187,778	118,745,639	147,841,081	166,274,823	186,227,802	208,575,138	233,604,155

### 14.3 Income Statement

Income Statement										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue	40,365,000	56,216,160	73,529,165	94,187,778	118,745,639	147,841,081	166,274,823	186,227,802	208,575,138	233,604,155
<i>Cost of sales</i>										
Transportation costs	618,750	680,625	748,688	823,556	905,912	996,503	1,096,153	1,205,769	1,326,346	1,458,980
Direct labor	1,863,000	2,542,147	3,257,848	4,088,815	5,050,707	6,161,144	6,789,290	7,450,305	8,175,677	8,971,673
Machinery maintenance	1,136,523	1,193,349	1,253,017	1,315,667	1,381,451	1,450,523	1,523,050	1,599,202	1,679,162	1,763,120
Direct electricity	13,500,000	17,820,000	22,869,000	30,546,450	39,530,700	50,006,336	55,006,969	60,507,666	66,558,433	73,214,276
Generator expense	6,041,700	7,975,044	10,234,640	8,845,653	7,076,522	4,865,109	5,351,620	5,886,782	6,475,460	7,123,006
Direct water	96,000	105,600	116,160	127,776	140,554	154,609	170,070	187,077	205,785	226,363
Direct gas										
Total cost of sales	23,255,973	30,316,766	38,479,352	45,747,917	54,085,846	63,634,224	69,937,152	76,836,801	84,420,862	92,757,418
Gross Profit	17,109,027	25,899,394	35,049,813	48,439,861	64,659,792	84,206,858	96,337,671	109,391,001	124,154,276	140,846,736
<i>General administration &amp; selling expenses</i>										
Administrative Salaries	6,096,000	6,689,515	7,340,816	8,055,528	8,839,826	9,700,484	10,644,936	11,681,342	12,818,654	14,066,697
Electricity expense	291,375	320,513	352,564	387,820	426,602	469,262	516,189	567,807	624,588	687,047
Travelling expense	240,000	252,000	264,600	277,830	291,722	306,308	321,623	337,704	354,589	372,319
Communications expense (phone, fax, mail, internet, etc.)	360,000	378,000	396,900	416,745	437,582	459,461	482,434	506,556	531,884	558,478
Office vehicles repair and maintenance	104,154	114,569	126,026	138,628	152,491	167,740	184,514	202,966	223,262	245,589
Office expenses (stationary, entertainment, janitorial services, etc.)	420,000	441,000	463,050	486,203	510,513	536,038	562,840	590,982	620,531	651,558
Promotional expense	605,475	843,242	1,102,937	941,878	1,187,456	1,478,411	1,662,748	1,862,278	2,085,751	2,336,042
Depreciation expense	8,591,687	8,591,687	8,591,687	8,615,725	8,615,725	8,615,725	8,643,552	8,643,552	8,643,552	8,675,765
Amortization of pre-operating costs	640,322	640,322	640,322	640,322	640,322	-	-	-	-	-
Amortization of legal, licensing, and training costs	10,000	10,000	10,000	10,000	10,000	-	-	-	-	-
Subtotal	17,359,012	18,280,848	19,288,902	19,970,678	21,112,238	21,733,429	23,018,837	24,393,188	25,902,813	27,593,493
Operating Income	(249,985)	7,618,547	15,760,911	28,469,182	43,547,554	62,473,429	73,318,834	84,997,813	98,251,463	113,253,243
Other income (interest on cash)	26,289	-	310,698	1,756,357	4,420,630	8,811,831	15,217,309	23,053,149	32,469,011	43,710,203
Gain / (loss) on sale of machinery & equipment	-	-	-	-	-	-	-	-	-	-
Gain / (loss) on sale of office equipment	-	-	274,500	-	-	455,018	-	-	595,365	-
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	-	-	-	-
Earnings Before Interest & Taxes	(223,696)	7,618,547	16,346,109	30,225,539	47,968,184	71,740,277	88,536,144	108,050,963	131,315,840	156,963,446
Interest on short term debt	275,434	499,181	223,748	-	-	-	-	-	-	-
Interest expense on long term debt (Project Loan)	7,966,337	6,719,538	5,246,884	3,550,207	1,489,003	28,153	18,820	7,796	-	-
Interest expense on long term debt (Working Capital Loan)	27,541	-	-	-	-	-	-	-	-	-
Subtotal	8,269,311	7,218,719	5,470,632	3,550,207	1,489,003	28,153	18,820	7,796	-	-
Earnings Before Tax	(8,493,007)	399,827	10,875,477	26,675,332	46,479,181	71,712,124	88,517,324	108,043,167	131,315,840	156,963,446
Tax	-	29,987	2,718,869	6,668,833	11,619,795	17,928,031	22,129,331	27,010,792	32,828,960	39,240,862
<b>NET PROFIT/(LOSS) AFTER TAX</b>	<b>(8,493,007)</b>	<b>369,840</b>	<b>8,156,608</b>	<b>20,006,499</b>	<b>34,859,386</b>	<b>53,784,093</b>	<b>66,387,993</b>	<b>81,032,375</b>	<b>98,486,880</b>	<b>117,722,585</b>



## 14.4 Balance Sheet

<b>Balance Sheet</b>											
<b>Assets</b>	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<i>Current assets</i>											
Cash & Bank	525,781	-	-	6,213,961	28,913,169	59,499,438	116,737,174	187,609,013	273,453,977	375,926,250	498,277,816
Accounts receivable		3,317,671	3,969,089	5,332,000	6,892,477	8,750,688	10,955,619	12,908,873	14,486,409	16,224,778	18,171,752
Finished goods inventory		1,011,129	1,272,032	1,612,907	1,916,143	2,264,059	2,662,520	2,914,048	3,201,533	3,517,536	3,864,892
Equipment spare part inventory	94,710	99,446	104,418	109,639	115,121	120,877	126,921	133,267	139,930	146,927	-
<b>Total Current Assets</b>	<b>620,492</b>	<b>4,428,246</b>	<b>5,345,539</b>	<b>13,268,507</b>	<b>37,836,910</b>	<b>70,635,062</b>	<b>130,482,233</b>	<b>203,565,200</b>	<b>291,281,850</b>	<b>395,815,491</b>	<b>520,314,460</b>
<i>Fixed assets</i>											
Land	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000
Building/Infrastructure	13,207,500	12,547,125	11,886,750	11,226,375	10,566,000	9,905,625	9,245,250	8,584,875	7,924,500	7,264,125	6,603,750
Machinery & equipment	75,768,200	68,191,380	60,614,560	53,037,740	45,460,920	37,884,100	30,307,280	22,730,460	15,153,640	7,576,820	-
Furniture & fixtures	718,000	646,200	574,400	502,600	430,800	359,000	287,200	215,400	143,600	71,800	-
Office vehicles	1,301,920	1,171,728	1,041,536	911,344	781,152	650,960	520,768	390,576	260,384	130,192	-
Office equipment	457,500	305,000	152,500	529,613	353,076	176,538	613,094	408,729	204,365	709,733	473,155
<b>Total Fixed Assets</b>	<b>95,453,120</b>	<b>86,861,433</b>	<b>78,269,746</b>	<b>70,207,672</b>	<b>61,591,947</b>	<b>52,976,222</b>	<b>44,973,591</b>	<b>36,330,040</b>	<b>27,686,488</b>	<b>19,752,669</b>	<b>11,076,905</b>
<i>Intangible assets</i>											
Pre-operation costs	3,201,609	2,561,287	1,920,965	1,280,644	640,322	-	-	-	-	-	-
Legal, licensing, & training costs	50,000	40,000	30,000	20,000	10,000	-	-	-	-	-	-
<b>Total Intangible Assets</b>	<b>3,251,609</b>	<b>2,601,287</b>	<b>1,950,965</b>	<b>1,300,644</b>	<b>650,322</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>TOTAL ASSETS</b>	<b>99,325,220</b>	<b>93,890,966</b>	<b>85,566,250</b>	<b>84,776,822</b>	<b>100,079,179</b>	<b>123,611,284</b>	<b>175,455,825</b>	<b>239,895,240</b>	<b>318,968,338</b>	<b>415,568,160</b>	<b>531,391,364</b>
<b>Liabilities &amp; Shareholders' Equity</b>											
<i>Current liabilities</i>											
Accounts payable		101,586	106,666	111,999	117,599	123,479	129,653	136,136	142,942	150,089	144,914
Short term debt	-	3,197,683	2,597,629	-	-	-	-	-	-	-	-
<b>Total Current Liabilities</b>	<b>-</b>	<b>3,299,269</b>	<b>2,704,295</b>	<b>111,999</b>	<b>117,599</b>	<b>123,479</b>	<b>129,653</b>	<b>136,136</b>	<b>142,942</b>	<b>150,089</b>	<b>144,914</b>
<i>Other liabilities</i>											
Deferred tax		-	29,987	2,748,856	9,417,689	11,524,307	9,630,102	7,735,897	5,841,692	3,947,487	2,053,282
Long term debt (Project Loan)	49,352,364	42,469,594	34,340,025	25,002,610	13,624,035	184,256	132,734	71,879	-	-	-
Long term securities against cylinders		6,952,500	6,952,500	6,952,500	6,952,500	6,952,500	6,952,500	6,952,500	6,952,500	6,952,500	6,952,500
Long term debt (Working Capital Loan)	310,246	-	-	-	-	-	-	-	-	-	-
<b>Total Long Term Liabilities</b>	<b>49,662,610</b>	<b>49,422,094</b>	<b>41,322,512</b>	<b>34,703,966</b>	<b>29,994,224</b>	<b>18,661,063</b>	<b>16,715,336</b>	<b>14,760,276</b>	<b>12,794,192</b>	<b>10,899,987</b>	<b>9,005,782</b>
<i>Shareholders' equity</i>											
Paid-up capital	49,662,610	49,662,610	49,662,610	49,927,417	49,927,417	49,927,417	49,927,417	49,927,417	49,927,417	49,927,417	49,927,417
Retained earnings		(8,493,007)	(8,123,167)	33,441	20,039,939	54,899,325	108,683,419	175,071,412	256,103,787	354,590,667	472,313,252
<b>Total Equity</b>	<b>49,662,610</b>	<b>41,169,603</b>	<b>41,539,443</b>	<b>49,960,857</b>	<b>69,967,356</b>	<b>104,826,742</b>	<b>158,610,836</b>	<b>224,998,828</b>	<b>306,031,204</b>	<b>404,518,084</b>	<b>522,240,668</b>
<b>TOTAL CAPITAL AND LIABILITIES</b>	<b>99,325,220</b>	<b>93,890,966</b>	<b>85,566,250</b>	<b>84,776,822</b>	<b>100,079,179</b>	<b>123,611,284</b>	<b>175,455,825</b>	<b>239,895,240</b>	<b>318,968,338</b>	<b>415,568,160</b>	<b>531,391,364</b>

## 14.5 Cash Flow Statement

Cash Flow Statement											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<i>Operating activities</i>											
Net profit		(8,493,007)	369,840	8,156,608	20,006,499	34,859,386	53,784,093	66,387,993	81,032,375	98,486,880	117,722,585
Add: depreciation expense		8,591,687	8,591,687	8,591,687	8,615,725	8,615,725	8,615,725	8,643,552	8,643,552	8,643,552	8,675,765
amortization of pre-operating costs		640,322	640,322	640,322	640,322	640,322	-	-	-	-	-
amortization of training costs		10,000	10,000	10,000	10,000	10,000	-	-	-	-	-
Deferred income tax		-	29,987	2,718,869	6,668,833	2,106,618	(1,894,205)	(1,894,205)	(1,894,205)	(1,894,205)	(1,894,205)
Accounts receivable		(3,317,671)	(651,418)	(1,362,911)	(1,560,477)	(1,858,211)	(2,204,930)	(1,953,254)	(1,577,536)	(1,738,369)	(1,946,973)
Finished goods inventory		(1,011,129)	(260,903)	(340,875)	(303,236)	(347,916)	(398,461)	(251,528)	(287,485)	(316,003)	(347,356)
Equipment inventory	(94,710)	(4,736)	(4,972)	(5,221)	(5,482)	(5,756)	(6,044)	(6,346)	(6,663)	(6,997)	146,927
Accounts payable		101,586	5,079	5,333	5,600	5,880	6,174	6,483	6,807	7,147	(5,175)
Other liabilities		6,952,500	-	-	-	-	-	-	-	-	-
Cash provided by operations	(94,710)	3,469,552	8,729,623	18,413,812	34,077,783	44,026,048	57,902,352	70,932,694	85,916,843	103,182,005	122,351,566
<i>Financing activities</i>											
Project Loan - principal repayment		(6,882,770)	(8,129,569)	(9,602,223)	(11,378,575)	(13,439,779)	(51,522)	(60,855)	(71,879)	-	-
Working Capital Loan - principal repayment		(310,246)	-	-	-	-	-	-	-	-	-
Short term debt principal repayment		-	(3,197,683)	(2,597,629)	-	-	-	-	-	-	-
Additions to Project Loan	49,352,364	-	-	264,807	-	-	-	-	-	-	-
Additions to Working Capital Loan	310,246	-	-	-	-	-	-	-	-	-	-
Issuance of shares	49,662,610	-	-	264,807	-	-	-	-	-	-	-
Cash provided by / (used for) financing activities	99,325,220	(7,193,016)	(11,327,251)	(11,670,238)	(11,378,575)	(13,439,779)	(51,522)	(60,855)	(71,879)	-	-
<i>Investing activities</i>											
Capital expenditure	(98,704,729)	-	-	(529,613)	-	-	(613,094)	-	-	(709,733)	-
Acquisitions											
Cash (used for) / provided by investing activities	(98,704,729)	-	-	(529,613)	-	-	(613,094)	-	-	(709,733)	-
<b>NET CASH</b>	<b>525,781</b>	<b>(3,723,464)</b>	<b>(2,597,629)</b>	<b>6,213,961</b>	<b>22,699,208</b>	<b>30,586,269</b>	<b>57,237,736</b>	<b>70,871,839</b>	<b>85,844,965</b>	<b>102,472,273</b>	<b>122,351,566</b>

## 15 KEY ASSUMPTIONS

**Table 15-1: COGS/Revenue Calculation basis**

Production capacity utilization – year 1	50%
Production capacity growth rate	10%
Maximum Production capacity utilization	100%
Annual production in m <sup>3</sup> at 100% capacity utilization	2,160,000
Production per hour in m <sup>3</sup>	300

**Table 15-2: Revenue Assumptions**

Sales price per m <sup>3</sup> of Oxygen gas (Rs.)	39
Sales price growth rate	12%

**Table 15-3 Expense Assumptions**

COGS growth rate	10%	
Machinery maintenance	1.5%	% of machinery cost
Direct Electricity per unit cost	Rs. 15	(Cost per unit of production)
Water expense	Rs. 96,000 per annum	
Operating costs growth rate	5.0%	
Office vehicles repair and maintenance	8%	% of vehicles expense
Office expenses	5%	% of admin expense
Promotional expense Year 1 - 3	1.5%	% of revenue
Promotional expense Year 4 - 10	1.0%	% of revenue
Building depreciation rate	5%	% of building cost
Machinery and Equipment depreciation	10%	% of machinery & equip. cost
Office Equipment depreciation rate	33%	% of office equipment cost
Furniture & Fixtures depreciation rate	10%	% of furniture & fixture cost
Office vehicle depreciation rate	10%	% of vehicle cost

**Table 15-4 Economy Related Assumptions**

Inflation rate	10%
Electricity growth rate	10%
Water price growth rate	10%
Gas price growth rate	10%
Wage growth rate	10%
Office equipment price growth rate	5%
Office vehicles price growth rate	10%

**Table 15-5: Cash Flow Assumptions**

Accounts receivable in days	30
Accounts payable in days	30
Equipment spare part inventory (months)	1
Raw material inventory (months)	0.5
Finished goods inventory (months)	0.5
Hours operational per day for admin	8
Hours operational per day for plant (100% capacity)	24
Maximum no. of shifts	3
Hours per shift	8
Operational days per year	300

**Table 15-6 Financial Assumptions**

Project life (Years)	10
Debt	50%
Equity	50%
Interest rate on long-term debt (KIBOR + 5%)	17%
Interest rate on short-term debt	16%
Interest on cash in bank	10%
Debt tenure (Years)	5
Debt payments per year	1

## 16 ANNEXURE

### 16.1 Machinery Suppliers

Company Name:	Sanghi Overseas
Address:	1-2 Turf view, Opp. Nehru Centre, Seth M.G.Sanghi Marg, Worli
City/Country:	Mumbai – 400018, India
Tel:	+91-22-24945464
Email:	mail@sanghioverseas.com
Website:	www.sanghioverseas.com
Company Name:	ING. L&A. Boschi
Address:	Okhla Industrial Area
City/Country:	New Delhi – 110020, India
Tel:	+91-124-4386250, +91-124-6519863,(International calls only)
Email:	info@universalo2.com; info@universalboschi.com
Website:	www.universalboschi.com

Company Name:	Sanghi Oxygen
Address:	Mani Mahal,11/21 Mathew Road Opera House
City/Country:	Mumbai – 400004, India
Tel:	+91-22-23634852, 23634853, 23634854
Email:	sanghioxygen@gmail.com
Website:	www.sanghioxygen.com
Company Name:	Bhartiya Vehicles and Engineering
Address:	A-29, Industrial Area, Site-IV Sahibabad
City:	Ghaziabad, India
Tel:	+91-9818530714
Email:	info@bhartiyagroupindia.com
Website:	www.bhartiyagroupindia.com

## 16.2 Tax deduction income slabs

Income Slabs	Tax Rate
	0.00%
100,000 – 110,000	0.50%
110,000 – 125,000	1.00%
125,000 – 150,000	2.00%
150,000 – 175,000	3.00%
175,000 – 200,000	4.00%
200,000 – 300,000	5.00%
300,000 – 400,000	7.50%
400,000 – 500,000	10.00%
500,000 – 600,000	12.50%
600,000 – 800,000	15.00%
800,000 – 1,000,000	17.50%
1,000,000 – 1,300,000	21.00%
1,300,000 and above	25.00%