Medical &Industrial Gas Plant Project

Project Concept Proposal

Amman- Jordan

2019

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A- Technical Proposal

Project Summary

Public (Government) and private hospitals in Jordan are experiencing lack of medical gases supply which is necessary to operate and manage the growing number of healthcare facilities.

A certain volume of medical gasses are supplied by local manufacturers with limited capacity. However, there is a great reliance on daily imports. This is placing customers at risk given that the import process may crash or decline in volume due to volatility.

Given the steady increase in private hospitals and factories using such gases in the manufacturing of its products, the gap between the demand and supply available in the market is increasing , which exposed the customers often to control and the intransigence of some suppliers because of their need .

This study provides an argument for establishing a modern gas manufacturing factory in an industrial zone for the production and sale of gasses required for hospitals and numerous factories. It also addresses the need to provide a lasting solution for the steady supply of the products in a reliable manner.

The preparation of this plan is based solely on the total consumption of liquid oxygen used by hospitals and numerous factories.

Concept Project	To provide comprehensive solution to the needs of medical gases for medical institutions and industry
Project Description:	The production and sale of all types of gases used in hospitals and medical centers and industry
location	(Proposed) Qastal - Giza – AL Hizam – Wadi Aleshe - Sahab
Legal form	limited Liability Company L.L.C
Project Management	Management team
Capital:	10 - 15 million JD's (20 – 25 million USD)
Payback period	4 – 5 years
IRR	15-20 %

Project Description

Method of work and production phases

1. Pulls air into the filtration unit where the impurities are separated from the dust and dirt from the air.
2. Compressor compresses the air inside to approximately 10 bar.
3. Air enters the refrigerator where it is cooled to below 8 degrees Celsius and water are separated airborne and get rid of air humidity.
4. Then enters the air into the unit m. Sieve to get rid of carbon dioxide and other gases.
5. Clean fresh air is distributed into two parts: the first part is entering a cooling phase and result in the separation of air and produces liquid oxygen + nitrogen.
6. The second part pays for turbine cooling required for the season.
7. The liquid is stored in tanks intended for it.

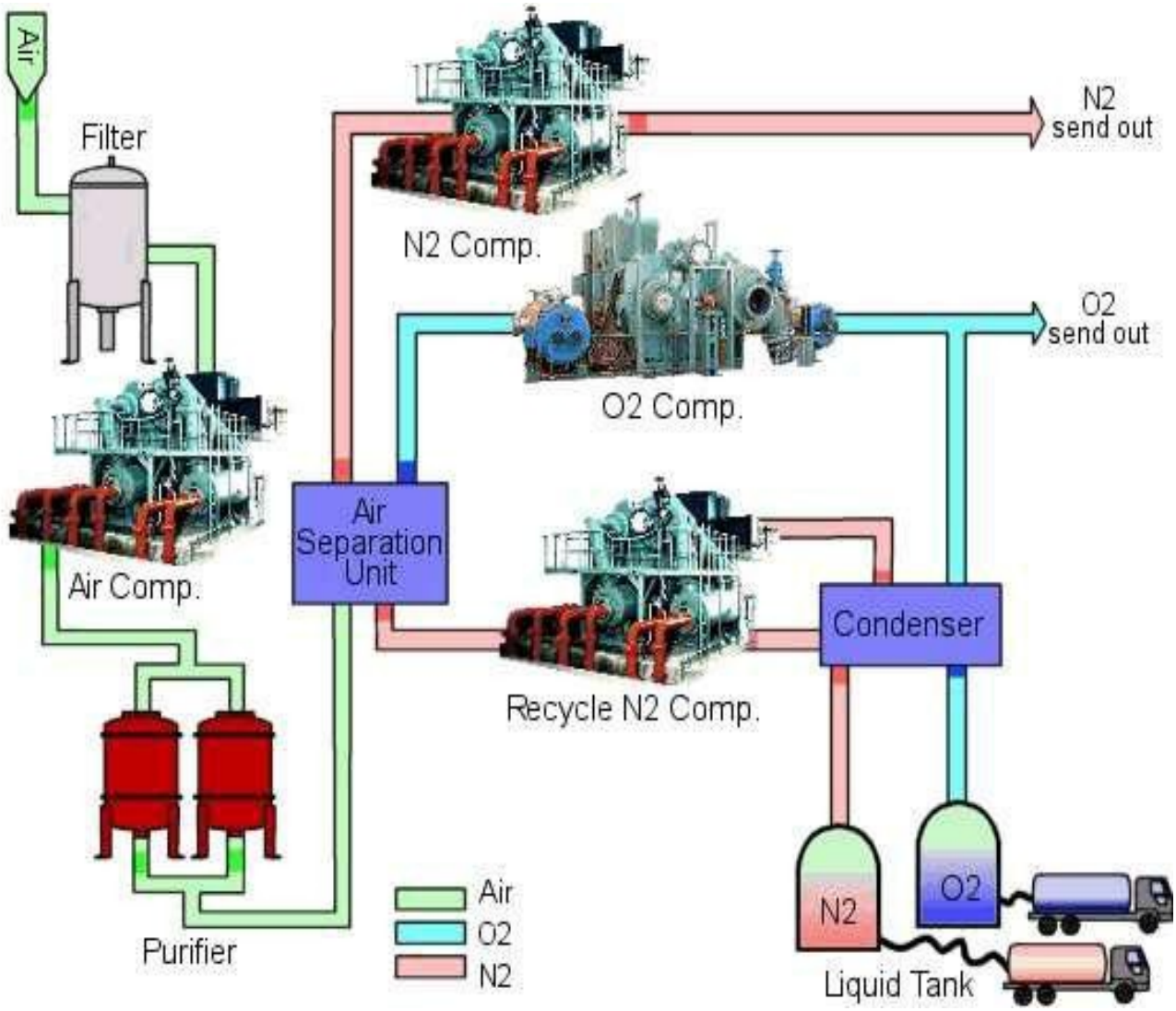
Electric capacity of the plant

1. Air Compressor 1000 kW/h
2. Recycle Compressor 0 kW/h
3. Refrigeration unit 45 kW/h
4. Heating unit 130 kW/h
5. Water cooling unit (pump + fan) 90 kW/h
6. Total **1,750** kW/h

Daily production capacity

7000-8000	gallons of liquid oxygen (LOX)
1500-2000	gallons of liquid nitrogen (LIN)
200-230	gallons of liquid Argon (LAR)

Factory General Layout

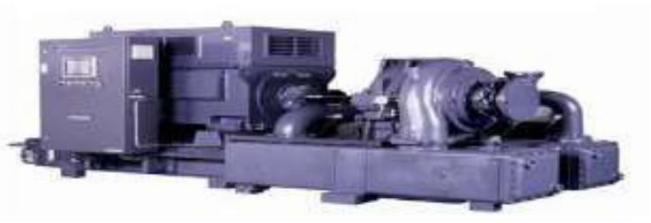


Factory main components

#	System	Description	Vendor/ Manufacturer
1	**Air Compressor**	Air Compressor	ATLAS Copco INGERSOLLRAND IHI CAMERON SUMSANG
2	**Recycling Air Compressor**	Recycling Air Compressor	ATLAS INGERSOLLRAND IHI CAMERON SUMSANG
3	**Pre-cooling system**	Pre cooling unit Compressor	SHANLI Bitzer
4	**Purification system**	Absorber Electric heater Silencer Switch valve Molecular Sieves	SASPG HANGYANG
5	**Booster Turbo-expander Unit**	Booster Turbo Oil Supply Device	CRYOSTAR ATLAS SASPG CRYOSTAR ATLAS ACD SASPG
6	**Cold box**	Lower Column Crude Argon Column I Crude Argon Column II Crude Argon Condenser Pure Argon Condenser Pure Argon Evaporator Pure Argon Column	SASPG CRYOSTAR CRYOMEC ACD
7	**Liquid storage system**		

8	**Automation, Control & Instrumentation**	DCS DCS Cabinet Hardware MONITOR Printer UPS Analyzer Control Valve Pressure Transmitter Pressure Differential Transmitter Solenoid Valve Flow elements	SIEMENS YOKOGAWA SASPG SIEMENS YOKOGAWA DELL CANON HP SANTEK Emerson TELEDYNE SIEMENS SERVOMEX ABB KOSO EJA ROSEMENT EJA SASPG ASCO FESTO SMC SASPG

Components and parts / Real Pictures

	
Air Compressor	Air Filter
	
water separation unit	Air cooling unit
	
Expansion turbine	**Air separation column**
	
Storage tanks	

B- The Market

Market Study

Jordan is considered one of the most advanced countries in the field of medicine and drugs in the region which attracts patients from the Arab Gulf states, Yemen, Sudan, Libya, and the North African countries in general.

The number of hospitals – the main market for the factory products – exceed 110 public hospitals, military, and special hospitals. This is aside the healthcare investments in Jordan which amounts to billions of JD's in medical tourism.

The size of domestic consumption for liquid oxygen exceeds 4 million gallons annually which is distributed as follows;

- Government hospitals 2 million gallons
- Private Hospitals 1 million gallons
- Industrial sector 1 million gallons

The daily consumption is more than 13 thousand gallons, 35 % of which is manufactured locally, 65% is imported from neighboring countries. This poses a risk of reliability in supply for hospitals and industry which can trigger a state of emergency.

The cost of manufacturing liquid oxygen in local factories goes up to one dinar per gallon, and the cost of importing 1 gallon of the same can reach 0.88 JD's per gallon. The total value of sale of liquid oxygen for hospitals up to 2.5 dinars per gallon.

Main Competitors

#	Company	Daily production	Share%	Main clients	Owned By	Production	Cost / gallon
1	Jordan gases	2000 g lox 1000 g lin	22%	MOH+PRIAVETE hospitals	-	No	1.3 JD
2	Middle east Gases	3000 g lox 1000 g lin	22%	Royal services +private hospitals	-	No	1.25 JD
3	Rum	Filling only	16%	Filling only for distributors		No	
4	gasesNational	Filling only	20%	Private hospitals	Owned by Jordan gases	No	
5	Alalamiah	Filling only	20%		Owned by middle east gases	No	
6	AL-Malkawi	Filling only –Irbid	Old factory producing gas only	Filling only for distributors		No	
7	Steel company	Out of Business		Filling only for distributors		No	
8	Advanced gases	Trade only , no production	Argon – rear gases	No station		NO	
9	LINDI	ONLY CO2				No	

Note:

g lox refers to:	**gallon liquid Oxygen**
g lin refers to:	**gallon liquid Nitrogen**

Market volume

According to Customs Department dated …… (imported gases only)

Daily consumption [Gallon / day]	2016	2017	2018
Lox	7,624	12,000	12,000
LIN	700	1,276	1,227
LAR	166	127	164
CO2/KG	32,000	32,000	20,027

Imported Amounts

Daily consumption [Gallon / day]	2016	2017	2018
Lox	7,624	12,000	12,000
LIN	700	1,276	1,227
LAR	166	127	164
CO2/KG	32,000	32,000	20,027

COST OF IMPORTED GASES

	JD/ GALLON	Transport	Total	LOSSES/ NOT INCLUDED
LOX	0.5 JD	0.25 JD	0.75 JD	7-10%
LIN	0.5 JD	0.25 JD	0.75	7-10%
LAR	2.35 JD	0.25 JD	2.7 JD	7-10%
CO2	0.38 JD /KG	0.07 JD/KG	0.45 JD	-

NOTE the cost is not including losses and overhead cost it will reach 0.88 JD

Note:

LOX refers to:	**liquid Oxygen**
LIN refers to:	**liquid Nitrogen**
LAR refers to:	**liquid Argon**

Market Price

LOX ONLY	JD/ gallon
MOH (ministry of health)	2.35-2.53
Private hospitals	2.4-3
Royal services	2.35
Industrial	0.9-2

LIN	1-5 JD / GALLON
LAR	9 JD / fob factory
CO_2	0.65 jd/ kg
Acetylene	10-13 jd / cylinder

Main Medical Gases Consumers

#	name	Provider	Daily consumption [gallon]	Price [JD/g]
1	Steel factory (alettlaf)	Middle east	2000-3000	1.0-1.5
2	Royal services	Jordan gases	1800-2000	2.35
3	MOH	Jordan gases	4500-5500	2.35-2.75
4	King , hospital , irbid	Middle east	400-500	2.75
5	University hospital	Middle east	280-350	2.0-2.4
6	AMC,KHCC,ISTSHARI,SPECILTIY HOSPITAL,ISLAMI,ISRAA,ISTIKLAL ,KILANI, KHALDI	Jordan gases + Middle East	1235-1500	2.4
7	Industrial use	all	2000-3000	1-2
	Total		**12,000-14,000 gallon daily**	

C- Financial Proposal

-	General Overview
C1	Capital Investment
C2	Fixed Assets
C3	Operational Cost
C4	Expected Revenues
C5	Financial key Indicators : IRR, NPV, PBP

General Overview

The cost of the factory and Disbursements

Factory machines value: 3.5-4 million JD (5- 5.5 million USD).
The cost of shipping and installation is 1 million JD (1.4 million USD).

One year warranty, one year spare part included.

QTY	DESCRIPTION	MODEL	Total Price (USD)
1	Self-cleaning Air Filter	21000Nm^3/h	
1	Air compressor	10500Nm^3/h 0.52MPa(A)	
1	Recycling air compressor	19600Nm^3/h, 4.8barg->27barg	
1	Air Pre-cooling System	SAYL-10500/5.2	
1	Air Purification System	HXK-10500/5.2	
1	Warm-end turbo-expander		
1	Cold-end turbo-expander		
1	Cold box system	FONAr-1900Y/567Y/60Y	
2	(Horizontal) LOX tank	200m3 2barg	
1	(Vertical) LIN tank	100m3 5barg	
1	(Vertical) LAR TANK	30m3 2barg	
3	Tank filling pump	16m3/h 16barg	
1	Instrument Control System	DCS	
1	Electric Control System		
1	Installation Material		
1	Two Year O & M Spare Part		
1	ASME design without U stamp		
1	Engineering design (Excluding civil engineering design)		
1	Transportation(FOB SHANGHAI)		
Total Amount (USD)			2m ..jd

Project Management

The establishment and management of the project will be carried out by Engineer Dirar Alqasem, 15 years in the production and employment of medical gases in hospitals, factories and production companies. Technical staff and a management team will be assigned to carry out the whole project according to predesigned stage definition of implementation and operation of the project.

The number of administrative staff, technicians and finance can eventually rise to 46 employees. However, at the beginning of operations some functions can be merged bringing the number to 20 employees only when the stability of production and market insurance.

المسمى الوظيفي	.NO	basic salary	social security 17.5%	extra	monthly	Yearly
G M	1	7000	1225	500	8,725	104,700
deputy	1	4000	700	500	5,200	62,400
Finance Manager	1	3000	525	500	4,025	48,300
Sales Manger	1	2000	350	500	2,850	34,200
Sales	1	750	131.25	0	881	10,575
Accountant	2	750	262.5	0	1,763	21,150
admin	1	750	131.25	0	881	10,575
collector	1	500	87.5	0	588	7,050
secretary	1	500	87.5	0	588	7,050
security	8	300	420	0	2,820	33,840
Total administrative jobs	**18**	**19550**	**3920**	**2000**	**28320**	**339840**
Technical manager	1	1500	262.5	500	2,263	27,150
Station	1	1500	262.5	500	2,263	27,1

manager						50
engineer	2	1500	525	500	4,025	48,300
operator	4	800	560	0	3,760	45,120
Operator assistant	4	400	280	0	1,880	22,560
Maintenance tech	1	750	131.25	0	881	10,575
filler	4	300	210	0	1,410	16,920
Worker	6	300	315	0	2,115	25,380
Quality tech	1	600	105	0	705	8,460
driver	10	750	1312.5	0	8,813	105,750
Total technical jobs	**34**	**8400**	49980	**1500**	28,114	**337365**
إجمالي إداري وفني	**52**	**27950**	**53900**	**3500**	**5643 3.75**	**677205**

Capital Investment

Establishment Expenses:

item	jd
The costs of study and action plan	15,000
18 months ' salaries	498,298
Registration fees , licenses and design	300,000
Total incorporation expenses	813,298

Capital account

ITEM	JD	$
Establishment expenses	813,298	1145490.317
Shipment &instlattion	650,000	915492.9577
Incorporation period operating expenses	300,000	422535.2113
12 months operation cost	600,000	845070.4225
Raw materials (carbide and carbon dioxide)	100,000	140845.0704
solar 50%	5,258,838	7406814.625
fixed assets	6,769,000	9533802.817
Total capital	14,491,137	20410051.42

Factory Fixed Assets

s.no	item	qty	value	total	% dep	annual dep
1	oxygen plant	1	2,000,000	2,000,000	8%	160,000
	N2O plant	1	200,000	200,000	8%	16,000
2	acytelen plant	1	100,000	100,000	8%	8,000
3	trucks	12	42,000	504,000	20%	100,800
4	land	100	6,500	650,000	0	0
5	hangers	6	130,000	780,000	5%	39,000
6	generatoer	2	15,000	30,000	8%	2,400
7	officess	2	100,000	200,000	5%	10,000
8	fire system	2	200,000	400,000	8%	32,000
9	Furnture	2	50,000	100,000	8%	8,000
10	o2 cylinders	5000	45	225,000	8%	18,000
11	acytlen cylinders	1000	60	60,000	8%	4,800
12	electric trans	2	100,000	200,000	8%	16,000
13	tools	2	5,000	10,000	8%	800
14	filling machine	2	30,000	60,000	8%	4,800
15	infra structure	2	100,000	200,000		
16	tanks	15	70,000	1,050,000	6%	63,000
				6,769,000	**total dep**	**483,600**

Operating expenses include the incorporation the following items:

1. Processing Hanger by the official specifications and standards
2. Additional spare parts for production lines.
3. Fill the imported cylinders with argon gas.
4. Liquid nitrogen containers.
5. Cylinder Test Tool.
6. Mobile measuring devices.
7. Operating license.

Expected Revenues and operating costs

Revenue was calculated and operational costs for the first five years of the project on the basis of the following assumptions:

1. Daily production plant 4500 gallon (10% LOSSES) of liquid oxygen + 800 gallons of liquefied nitrogen + 100 gallon liquid Argon.
2. From 2-50 m^3/hr acetylene production.
3. Sale price of liquefied oxygen 2 dinars per gallon.
4. Carbon dioxide will be purchased from abroad and re- fill.
5. Sale price of carbon Dioxide is 12 dinars per cylinder at a rate of 20 cylinders per day.
6. 14 JD selling price for Argon cylinder at 20 cylinders per day.
7. Increase the sales price for all gases at a rate of 8 % per annum.
8. Calculating annual bonus at the rate of 8 % for all staff.
9. The electricity cost based on : 1500 kW/hours Tariff ×days of operating×24 hours

- **Expected operating profit for the first five years of the project (from the start of production)**

YEAR	1ST	2ND	3RD	4TH	5TH
no of days	287.2	287	309	309	309
elec tarif	0.100	0.100	0.100	0.100	0.100
DAILY PRODUCTION IN GALLON(جالون) المبيعات اليومية					
LOX	6500.00	6500.00	7000.00	7000.00	7000.00
GOX	1000	1,000	1,000	1,000	1,000
LAR	237.6	237.6	237.6	237.6	237.6
co2/kg/	2400	2400	2400	2400	2400
LIN	1920.00	1920	1920	1920	1920
PRICE OF SALE (JD/GALLON)(جالون / دينار) أسعار البيع					
LOX	1.31	1.31	1.37	1.37	1.37
GOX	1	1	1	1	1
LAR	7	7	7	7	7
kg/co2/	0.3	0.3	0.3	0.3	0.3
LIN	1.00	1.00	1.00	1.00	1.00
SALES INCOME JD					
LOX	2,441,604	2,441,604	2,969,697	2,969,697	2,969,697
GOX	287,247	287,247	309,343	309,343	309,343
LAR	477,750	477,750	514,500	514,500	514,500
LIN	551,515	551,515	593,939	593,939	593,939
co2	206,818	206,818	222,727	222,727	222,727
OTHER GASES	100,000	120,000	140,000	175,000	180,000
TOTAL REVENUE	**4,064,934**	**4,084,934**	**4,750,207**	**4,785,207**	**4,790,207**
Direct operating costs					
50% electricty cost					
electricty fine	67,500	67,500	67,500	67,500	67,500

sample test	11,490	11,490	12,374	12,374	12,374
salries	677,205	677,205	677,205	677,205	677,205
purchase cost					
chemicals+ water	10,000	10,000	10,000	10,000	10,000
maintenace 4%	162,597	162,597	162,597	162,597	162,597
petrol+car maintenace	69,600	76,560	84,216	92,638	101,901
Total operating costs	**998,392**	**1,005,352**	**1,013,892**	**1,022,314**	**1,031,577**
Total operating income	**3,066,542**	**3,079,582**	**3,736,315**	**3,762,893**	**3,758,630**

	1,066,082	**1,073,042**	**1,081,582**	**1,090,004**	**1,099,267**
	2,486,874	**2,486,874**	**2,832,843**	**2,832,843**	**2,832,843**
cost / gallone	**0.43**	**0.43**	**0.38**	**0.38**	**0.39**

Expected selling strategy

gallon	2017	
4000	0.75	3000
	1	0
	0.88	0
2500	2.2	5500
6500	1.31	8500

gallon	2018	
4000	0.75	3000
0	1	0
	0.88	0
2500	2.2	5500
6500	1.31	8500

gallon	2019	
4000	0.75	3000
0	1	0
	0.88	0
3000	2.2	6600
7000	1.37	9600

gallon	2020	
4000	0.75	3000
0	1	0
	0.88	0
3000	2.2	6600
7000	1.37	9600

gallon	2021	
4000	0.75	3000
0	1	0
3000	2.2	6600
7000	1.37	9600

Financial key indicators

The expected annual return on capital for the first five years

year	1	2	3	4	5
Total operating revenues	3,066,542	3,079,582	3,736,315	3,762,893	3,758,630
1% insurance expenses	67,690	67,690	67,690	67,690	67,690
depreciated assets	483,600	483,600	483,600	483,600	483,600
Total investment income	**2,515,252**	**2,528,292**	**3,185,025**	**3,211,603**	**3,207,340**
7.5% income tax	188,644	189,622	238,877	240,870	240,550
Net investment income	**2,326,608**	**2,338,670**	**2,946,148**	**2,970,733**	**2,966,789**
Rate of return on capita	**16%**	**16%**	**20%**	**21%**	**20%**

IRR	**20%**

R.O.I = 52 months (5 years)-one year grace period .

Internal Rate of Return (IRR) investment for years (10 years) 20%
Assuming constant yield of the fifth year to the tenth year

*Our cost of production is expected between(0.35 up to 0.45) dinars per gallon .

Legend

		kg	Usgal	M3	
LOX	Liquid oxygen	1	0.231	0.738	
LIN	Liquid nitrogen	1	0.327	0.843	
LAR	Liquid argon	1	0.189	0.591	
ASU	Air Separation Unit				