In the name of God

Pre-feasibility study form

Plan Name: Extraction of Hexane, Pentane and Octane from Crude oil

Project Owner: Negin Roghan Co.

Consulting Company: Kavosh Consultants Co.

Project Address: Shahrekord Industrial Estate

Initial date: 2019

Update 2 (2020)

SUMMARY OF THE FEASIBILITY STUDY

General Specification
Name of The Project: Feasibility studies of Extraction of hexane, pentane and octane from crude oil
Project Capacity: 10000 ton per year
Personnel Number: 43 people
Working Days: 288 Days
Product Usage: Chemical Industry
Marketing
Product Global Price: 339 Euro per ton
Domestic Demand: 22.590.852 ton
Domestic Production: 1.185.700 ton
Import: 21,405,152 Kg
Export: 22.257.291 Kg
Technical Study
Land Area: 8000
Building Area: 3065
Main Raw Materials: Crude Oil
Supplying Place of Raw Materials: Local
Power Requirement: 1,800,000 (kwh)
Water Requirement: 90000(m^3)
Fuel Requirement: 1,670,000 (m^3)
Economical & Financial Study
Fixed Investment Cost (Rail's& other Currencies): 640084 Million Rials- 2703295 Euro
Working Capital: 29028 Million Rials- 122595 Euro
Total Investment Cost: 669112 Million Rials- 2825891 Euro
Annual Sale: 460000 Million Rials- 1942738 Euro
Net Present Value(NPV): 557593 Million Rials- 2354907 Euro
Break Even Point(BEP): 14851/14 Million Rials- 62722 Euro
Internal Rate of Return(IRR): 24%
Investment Return Period: 4 Years
Investment Sources Ratio Equity: 30 % Finance: 70%

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Introduction

Feasibility studies are expert studies that are carried out prior to the implementation of economic investment plans. In these studies, from the market, technical, financial and economic point of view, the plan is analyzed and its results used as a basis for investor decision making.

The present report is a feasibility study of Extraction of hexane, pentane and octane from crude oil. These studies have been prepared in the framework of feasibility studies methodology and according to the above methodology, the economic capacities and volume of investments required to execute the project will be estimated and presented so that investors and interested stakeholders can obtain all the information needed. Earn money and start investing in open-ended, open-minded economic investment. It is hoped that these auxiliary studies, however small, will contribute to the development of our country.

1 -Product Introduction

The name "octane" derives from the fact that when crude oil is broken down in a refinery by molecules, chains of hydrocarbons of different lengths are obtained. These chains can then be separated and mixed to produce different fuels. Methane, propane and butane are hydrocarbons. The methane molecule has a carbon atom (CH_4). The propane molecule has three carbon atoms that are interconnected (C_3H_8). The butane molecule has four carbon atoms that are interconnected (C_4H_{10}). Pentane five, hexane six, heptane seven, and octane have 8 carbon atoms that are interconnected.

Hexane

Hexane or Hexyl Hydride (Hexane) is an organic compound of the alkane group with six carbon atoms. Carbon dioxide is a colorless liquid with a low oil, water-insoluble, toxic, and flammable, but aliphatic hydrocarbons. Due to its very high chemical stability and non-reaction with chemicals it is used as non-polar solvent.

Hexane synthesis

It mainly comes from refining crude oil. The feedstock of the hexane production unit must be a type of naphtha in which aliphatic hydrocarbons form a major part of it. The composition of the percentage of naphtha depends on the type of crude oil and how it is refined. In the process of extracting hexane from naphtha cutting, first heat the naphtha. They are then inserted into an extraction distillation tower. The extractable solvent can be dimethylformamide and is introduced into the tower as a pure. The hexane is solvent removed from the cut and removed from the bottom of the tower. In order to recover the solvent, it must be dumped into a tower. The catalytic hydrogenation method of naphtha cutting is the best

method for extracting hexane. This method uses nickel-based alumina catalysts. In this process, the amount of sulfur in the process requires initial desulfurization as well as the process at high pressure.

Hexane applications

Vegetable seeds such as sesame, peanuts, soybeans and pennies are mainly used for oil extraction. These oils are often used in the production of edible oils and to a small extent in the production of soap as fatty acid. Hexane is used as the solvent of the reactants, especially in the polymerization reactions. Hexane is a constituent of gasoline, shoe and rubber adhesives and is used in the laboratory to extract oil and water from the soil. Hexane is also used in cleaning shoes and furniture, gas chromatography and textile.

Pentane

Pentane is an organic compound. It is grouped with five carbon atoms in the alkanes. Alkanes are one of the components of some fuels and are also used as solvents. The pentane properties are very similar to butane and hexane. Pentane has three isomers of normal pentane, isopentane and neopentane. Other names for pentane: Amyl Hydride and Skellysolve Solo

Pentane Gas Applications:

Pentane is one of the most volatile hydrocarbons that is liquid at room temperature. Pentane is often used as a solvent that evaporates easily. Since pentane is non-polar, only non-polar substances are dissolved in it. Pentane is also one of the common fuel components. Pentane is used as a foaming agent in the production of polystyrene foam. Pentane is used in geothermal power units.

Properties and properties of pentane gas:

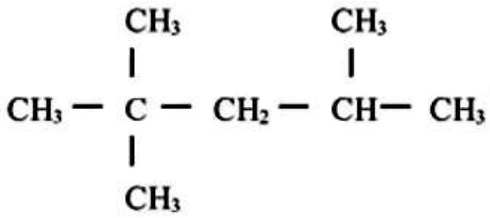
physical state	Liquid
Molecular weight	72.15 g/mol
melting point	-182.6°C
Boiling point	-161.6°C
Density (gas) kg / m3 at 15 ° C	0.626 g/cm³
Water solubility (mg / l)	> 0.004 g/100 mL
Color (Transparency)	Colorless
Odor	Odor similar to gasoline (very low)
Ignition range	flammable
UN number	1265
CAS number	109-66-0

Octane

They use an engine to measure this number. By comparing the iso-octane and normal heptane in the fuel mixture, this figure is obtained. The volumetric percentage of iso-octane in the mixture is the octane number relative to heptane. For example, the gasoline octane number is a mixture of 10% heptane and 90% iso-octane. Petrol, of course, does not only include these two types of hydrocarbons. Gasoline generally contains a mixture of hydrocarbons and additives.

The higher the octane number, the higher the resistance to compression and spontaneous combustion.

Octanes are a family of hydrocarbons found in gasoline. A colorless liquid with a boiling point of about 125 ° C. One of the members of the octane family is isoctane, which is considered as a standard in determining the amount of fuel resistance in spontaneous combustion.



In some cases the octane number can be more than 100. This number is called the RON or research octane number. In fact, iso-octane is not the only knock-resistant material. Aircraft fuels, racing cars, LPG gas, and numerical fuels have a range of about 110 and above.

It is important to note that the octane number does not represent the stored energy of the fuel. This number is only one criterion for measuring fuel propensity to combustion under controlled conditions. The octane number is increased in combination with ethanol and the energy stored there decreases at the same time.

1-1-Product Name and Code (ISIC 3)

According to information from the Ministry of Industry, Mining and Commerce, ISIC Code of Hexane, pentane and octane are as follows:

Name	Code	Unit of measurement
Hexane	2320412483	Ton
N-hexane	2320412388	Ton

N-pentane	2320412386	Ton
Iso pentane	2320412387	Ton
Pentane cut	2320412412	Ton
Octane	2411412840	Ton

1-2-Customs Tariff Number

According to the Export and Import Regulations Book of 2019 and the Chamber of Commerce, Industries, Mines and Agriculture website, this plan contains the Customs Tariff Code:

Name	Customs Tariff Code
Hexane	27112990
Pentane	27112990
Octane	29011000

1-3- IMPORT AND EXPORT CONDITIONS

Basic salaries include customs duties, taxes, patents, types of duties and other remuneration received from imported goods and are equivalent to 4% of the customs value of the goods. In sum, this is the income received from the business determined by the Board of Ministers in accordance with the relevant rules.

Description	Heading Subheading No.	SUQ	Input rights
Hexane - pentane	27112990	Kg	5
Octane	29011000	Kg	5

1-4- REVIEW AND PRESENTATION OF STANDARDS (NATIONAL OR INTERNATIONAL)

The national standards associated with the title of this plan are as follows:

Standard Name	Standard Numb	Description
National standard	17384	Soluble Substances in Hexane - Test Method
National standard	18107	Measurement of extractable amounts of hexane from polyolefins - Test method
National standard	5318	Hexane - Properties and Test Methods
National standard	18120	Lubricating oils - Determination of pentane insoluble material by membrane filtration - Test method

International standards related to the title of this project are as follows:

Standard Name	Standard Number	Description
ISO TS	29001	Quality management in the oil, gas and petrochemical industries

1-5- REVIEWING AND PROVIDING NECESSARY INFORMATION ON DOMESTIC AND GLOBAL PRODUCTION PRICES AS WELL AS GLOBAL PRODUCT PRICES

The average price of the products mentioned in the plan is about 45 million riyals per tonne domestically and about 400 dollars per ton abroad.

1-6- EXPLAIN THE USES OF THE PRODUCT

The products in this design have various applications, including:

A: Can be used as a solvent and cleanser for base oil paints

B: Common material in gasoline and shoe glue, leather goods and building materials

C: Used for the extraction of cooking oil, rubber cleaners, home appliances and textile products

D: Chemical reaction media

And: Use in the laboratory to extract oil and grease from water and soil

Pentane is also often used as a solvent that evaporates easily. Since pentane is non-polar, only non-polar substances are dissolved in it. Pentane is also one of the common fuel components. Pentane is used as a foaming agent in the production of polystyrene foam. Pentane is used in geothermal power units.

1-7-EXAMINE ALTERNATIVE PRODUCTS AND ANALYZE THEIR EFFECTS ON PRODUCT CONSUMPTION

Each of the hexane, pentane and octane products have different applications and processes and technologies, and they cannot be considered a substitute product.

1-8-STRATEGIC IMPORTANCE OF GOODS IN IRAN AND COUNTRIES OF THE REGION

Petrochemical industry is a part of the chemical industry that produces chemical products from raw materials from petroleum or natural gas. Today petroleum products, in addition to consuming fuel in vehicles, motor oil, etc., in the manufacture of many components Petroleum products are essential for fueling guided missiles, spaceships and satellites, and even for the manufacture of many of their internal components, and most drugs and even antibiotics are derived from petroleum compounds. From the introduction of oil into the modern concept of life Humans needed chemicals derived from the transformation of the plant and animal industries, but by the early 20th century, crude oil and natural gas had become increasingly important as a raw material for many of the compounds needed by humans.

According to the country's upstream documents, including the general system of the oil sector and the general policies of the resisting economy, it is necessary to complete the value chain and replace the export of petroleum, gas and petrochemical products instead of exporting crude oil and natural gas. The refinery industry and its downstream industries, including the petrochemical industry and topics such as extraction of hexane, pentane, and octane from crude oil, play a key role in achieving this goal. It can be said that crude oil is not very useful and is of little use today. There are many oil wells around the world today that extract oil and call it crude oil. Since unrefined sweet oil (low viscosity and low sulfur) was generally used in steam engines and since gases and other lighter solutions usually accumulate in the fuel tank and cause explosions, now oil They refine the crude, that is, the different hydrocarbons that make up the crude oil from each other, in order to get the more uniform, characteristic products they need, called oil refining, and that is done in refineries. Oil is the source of energy and the source of many of the chemicals such as hexane, pentane and octane and is one of the main drivers of modern economic development.

In modern industry, the power to create infinite wealth and to transform and transform its raw materials is immense.

1-9-MAJOR MANUFACTURING AND CONSUMER COUNTRIES

The major producer and consumer countries listed in this plan are:

Country	Total consumption	Total Production	Percentage of world production
Venezuela	676	2,174.3	2.23
Saudi Arabia	3,302	12,089.6	12.34
Canada	2,378	4,986.1	5.09
Iran	1,850	4,668.6	4.76
Iraq	788	4,462.4	4.55
Kuwait	489	2,927.7	2.99
Emirates	849	3,720.5	3.80
Russia	3,512	11,200.4	11.43
Nigeria	325	2,037.2	2.08
America	19,872	15,599.5	15.92
China	12,376	4,778.7	4.88
Diameter	255	2,068.3	2.11
Brazil	3,087	3,363.1	3.43
Mexico	2,026	2,260.5	2.31
Norway	227	1,979	2.02

Energy Information Administration, U.S. Department of Energy, International Energy Statistics (2018).

The following are some of the leading global manufacturing companies operating in this industry:

• Shell

• Phillipes 66

• Exxon Mobil

• Chevron Phillips Chemical

• Bharat Petroleum

• SK Chem

• Sumitomo

• Fuji Heavy Industries

• SINOPEC

• Yangzi Chemical

• Yufeng Chemical

• Liangxin Petrochemical

• CNPC

• Junyuan Petroleum

• HeLiShi Petroleum

• Jihua Group

• Yanshan Petrochemical

• ZT League Chemical

The names of the domestic companies active in this industry are given in the next section.

2- SUPPLY AND DEMAND SITUATION IN IRAN AND COUNTRIES IN THE REGION

2-1-AN EXAMINATION OF EXPLOITATION CAPACITY AND PRODUCTION PROCESS FROM THE BEGINNING OF THE THIRD DEVELPOMENT PLAN TO NOW

According to the latest statistics released by the Information and Services Portal of the Ministry of Industry, Mining and Commerce, active plants producing hexane, pentane and octane are as follows:

Row	Name	State	Capacity (Ton)
1	Petroshimi Lorestan	Lorestan	1000
2	Palayesh Naft Tabriz	AZarbaijan Sharghi	15000
3	Zahedin	Qom	60000
4	Kimia Palayesh Shokouhieh	Qom	350
5	Petroshimi Nouri	Special Economic Zone	47000
6	Petroshimi Bandar Emam	Khouzestan	768000
7	Palayesh Gaz Ilam	Ilam	293150
8	Pishgaman Shimi Anzali	Gilan	200
9	Shimiaei Farshid Shahreza	Isfahan	15000
10	Salar Shimi Shahriar	Tehran	20000
11	Petroshimi Boushehr	Boushehr	2115

Source: Ministry of Industry, Mining and Commerce - Statistics and Information Center

2-2-CHECK THE STATUS OF NEW PROJECTS AND ONGOING DEVELOPMENT PLANS

Row	Location (province)	State	Capacity
1	Petro Sanat Naftalian Pars	Special Economic Zone	111500
2	Arman Sina	Alborz	5
3	Barad Exir Azma	Alborz	10

4	Pasargad Sanat Qarn	Khouzestan	1000
5	Fidar Palayesh Vira	Kermanshah	200
6	Setareh Pouya Caspian	Mazandaran	15000

Source: Ministry of Industry, Mining and Commerce - Statistics and Information Center

2-3-REVIEWING THE PROCESS OF PRODUCT IMPORTATION

According to the information in the book "Export and Import Regulations of the Islamic Republic of Iran, hexane and pentane are charged with customs tariff 27112990 and octane with customs tariff 29011000. The amount of imports in the last five years, along with the value of the rial and the dollar, are as follows:

Imports of hexane and pentane

Year	Euro value	Rial value	Weight (kg)
2015	33,491	1,118,719,228	2,835
2016	75,852	2,703,749,028	4,529
2017	0	0	0
2018	0	0	0
2019	0	0	0

Imports of octane

Year	Euro value	Rial value	Weight (kg)
2015	6,558,447	228,700,394,660	6,441,967
2016	10,987,375	406,988,105,756	14,846,286
2017	11,620,872	467,774,545,105	19,982,293
2018	18,273,537	908,051,003,051	21,405,152
2019	383,749	19,018,583,632	398,542

2-4-MONTORING CONSUMPTION TRENDS

The best way to determine the amount of consumption of the types of products mentioned in this plan is to use the balance of supply and demand. In such a way that the amount of domestic consumption is estimated to be equal to the difference between supply (total domestic production

and imports) and exports. According to the latest statistics available in 2018, we have imported about 21,000 tons, which in 2019 reached a significant drop of about 400 tons, and we have produced about a thousand tons. Consumption of this product in recent years, considering the trend of industrial development of the country, it is predicted that by exceeding the conditions created by sanctions, the consumption of this substance will reach 10,000 tons in the near future.

2-5-INVESTIGATE THE EXPORT PROCESS OF THE PRODUCT AND THE POSSIBILITY OF ITS DEVELOPMENT

The amount of exports in the last 5 years plus the value of the rial and the dollar according to the announcement of the Chamber of Commerce, Industries, Mines and Agriculture as follows:

Export of hexane and pentane

Year	Euro value	Rial value	Weight (kg)
2015	2,883	99,457,470	600
2016	0	0	0
2017	8,492	210,891,600	24000
2018	0	0	0
2019	0	0	0

Export of octane

Year	Euro value	Rial value	Weight (kg)
2015	16,253,397	574,482,613,399	22,980,039
2016	15,759,303	565,283,910,423	30,535,442
2017	77,853	2,291,779,256	44,720
2018	10,884,114	548,214,142,727	22,257,291
2019	0	0	0

2-6- PRODUCT REQUIREMENT CHECK WITH EXPORT PRIORITY

One of the most important reasons for the need for extracted petroleum products is that, unlike crude oil, they are not sanctioned.

Converting crude oil to a chain of chemicals turns a single product into a top-5 product, bringing Iran's customers from six customers to more than a few thousand customers in small and large companies all over the world, whose sanctions are very high. It will be harder than crude oil.

Crude oil extraction and the production of products such as hexane, pentane and octane are one of the best ways to create productivity, value-added and ineffectual oil sanctions domestically. Crude oil exports, which take place in very large cargoes (sometimes up to 5 million barrels), are easily monitored by the United States, insurance and banking bans. Apart from the large shipments, the

quality and chemical and physical properties of Iranian crude oil are known worldwide and can be identified by a few simple tests.

The most important point in the easy sanctioning of crude oil is the number of customers and the volume of transactions, he said. In general, there are about 5 refineries in the world that can use Iranian crude oil as feed. These five refineries are located in only a few countries, the most important being China, India, Japan, Korea, and southern European countries such as Greece, Italy and Spain. The oil boycott of Iran is actually a boycott of oil purchases. This means that any refinery or any company that buys oil from Iran will be sanctioned directly. Or if a country like China buys oil for a set of its own refineries, that country will be boycotted.

On the other hand, Iranian crude oil exports are usually to distant countries. But the extraction of crude oil and its conversion into a variety of refining and petrochemical products, including hexane, pentane and octane, make it possible to export large quantities of products to neighboring countries through heavy vehicles, pipelines, and ultimately ships.

This type of export can be called "distribution through the capillary network", where sanctions are far more severe than crude oil sanctions. These products are usually traded in small consignments, mainly to neighboring countries and on distances.

3-OVERVIEW OF TECHNOLOGY AND METHODS OF PRODUCTION AND SUPPLY IN THE COUNTRY AND COMPARISON WITH OTHER COUNTRIES

The extraction of petroleum products requires chemical and physical operations and processes in which they are separated from the raw material or feed, with specific cuts each having a range of boiling point of the ingredients. In addition, some processes Contaminated and harmful substances such as sulfur compounds are desirably removed from the refinery.

It is also necessary to obtain processes that obtain in addition to observing the range, boiling point and permissible levels of other harmful constituents such as cetane number in diesel and many other properties to obtain physically and chemically suitable end-use products called heavy hydrocarbon cutting.

Depending on the structure, hydrocarbons can be divided into two major aliphatic and aromatic groups. Aliphatic hydrocarbons themselves are divided into broader groups: alkanes (methane CH, alkenes (or unsaturated hydrocarbons)), alkynes (or acetylene compounds)) and cyclic compounds similar to cycloalkanes, etc. The production process as a whole That is, after the salts and acids are extracted from the crude oil, the remaining hydrocarbons are refined, refined by a partial distillation of the crude oil.

Light paraffin hydrocarbons form the bulk of natural gas and light cuts from the distillation of petroleum, which can often be separated from other materials by producing heavy paraffin hydrocarbons (oils or paraffins. High molecular weight) is a byproduct and because of the low octane number of C10 hydrocarbons above it cannot be used as gasoline, but because of the long hydrocarbon chains, it is of great importance in synthesis. They have detergents.

The aim is to produce crude oil, petroleum products that meet the quantitative and qualitative needs of the consumer market.

In this respect, the refiner uses a number of physical separation methods and chemical conversion and purification methods. The interconnectedness of these different operations forms the diagram of a refinery. The development of refining operations and processes in refining diagrams has always been influenced by the process of applying petroleum products.

The process is as follows:

1- Salting of crude oil

The basis for salting out the solubility of salts in crude oil by water. The difficulty of this method is to prepare an effective mixture of water and oil, to moisten the solid particles and to separate the wash water from the oil. The purpose of salting is to remove suspended solids (sand, clay, soil, oxide and iron sulfide ...) in crude oil. In this case, by particle size, the removal percentage should be between 60 and 80%. The salting operation is performed by mixing the crude oil with 3 to 10% by volume of water at 90 to 150 ° C. The percentage of water consumed and the operating temperature depend on the crude oil density.

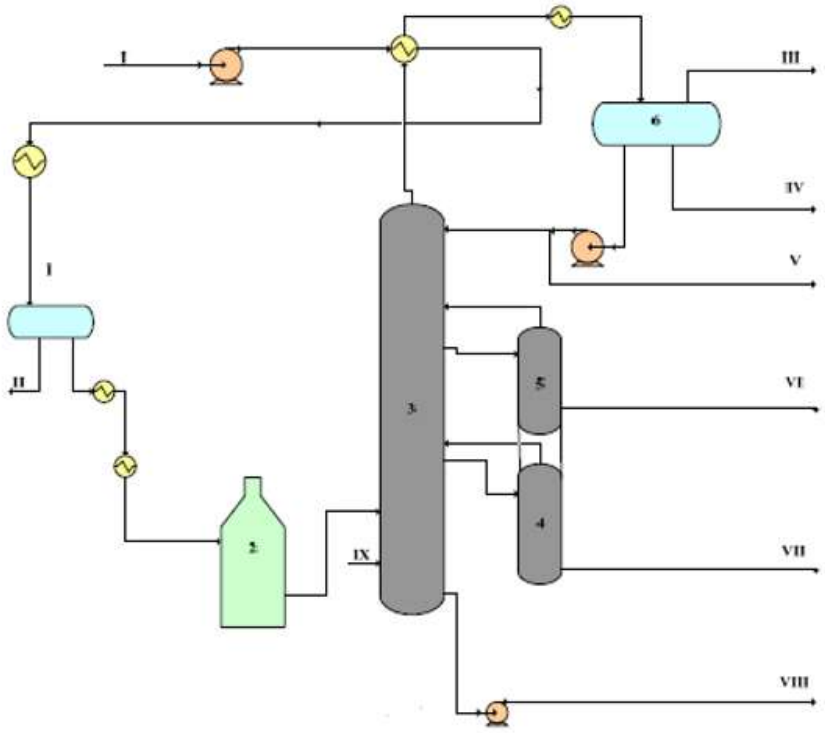
As specified in the table below:

API	The volume of water washed	Temperature
API>40	3-4	115-125
30<API<40	4-7	125-140
API<40	7-10	140-150

The salts are dissolved in the wash water, then separated in the separating tank, water and oil. This is done either by the addition of demulsiferous brittle chemicals or by the creation of a high-potential electric field to accelerate the adhesion of salt-containing water droplets. Alternate or direct current can be used in this case. The required potential is between 16,000 and 35,000 volts.

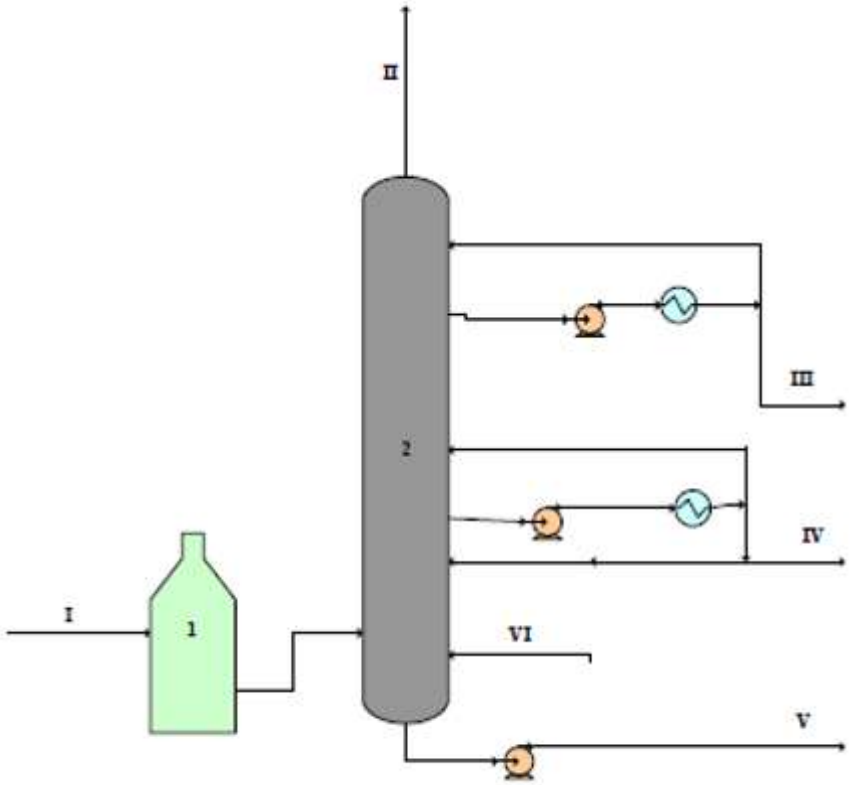
Distillation

The first important operation after salting on crude oil is distillation. During this operation, the crude oil is separated into various petroleum products. The basis for this distinction is the difference in the boiling distance (the starting distance to the end point of the boiling) of the products. Distillation of crude oil is performed in two stages at atmospheric pressure (atmospheric adjustment) and at lower pressure (vacuum distillation).



Scheme of Atmospheric Distillation Unit

Apparatus: 1-salt-holder 2-furnace 3-distillation tower 4,5-strippers 6-separator



scheme of vacuum distillation unit

After crude oil enters the fractional distillation column, it is chemically processed to change one component to another. Finally, the distilled and chemically treated portions are used to remove impurities.

• Fractional distillation

This process is based on the principle that different materials boil at different temperatures depending on their different boiling point. The distillation of each component of the crude oil has several stages. A brief description of each of these steps is as follows:

1. The mixture of crude oils (liquids) with different boiling points is heated to high temperatures. Heating is usually done by high-pressure steam at a temperature of about 1112 degrees Fahrenheit / 600 degrees Celsius.

2. The mixture boils and becomes a vapor state. Most materials enter the vapor phase.

3. Steam enters the bottom of a long column (fractional distillation column) filled with trays or plates. The trays have many bubbles or holes that allow steam to pass through. They increase the contact time between steam and liquids in the column and help collect liquids that form at different heights in the column. There is a temperature difference in the column (hot at the bottom and cold at the top).

4. The steam rises in the column

5. The steam cools as it travels.

6. When a material in a steam reaches a height where the column temperature is equal to the boiling point of that material, the liquid is formed. (The material with the lowest boiling point at the highest point of the column, the material with the highest boiling point at the lowest point of the column, will be discharged)

7. Trays collect components of various liquids

8. Collected liquid components may be transferred to condensers to cool them further, then transferred to storage tanks, or they may be transferred to other areas for further chemical processing. The few components obtained from the distillation column are ready to be used and marketed. Many of them have to be chemically processed to produce other components.

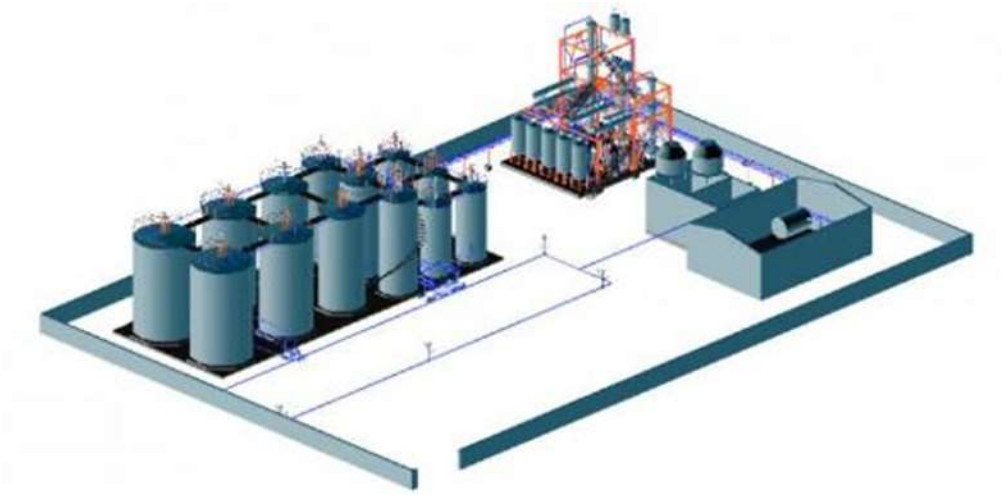
4-DETERMINING THE STRENGTHS AND WEAKNESSES OF CONVENTIONAL TECHNOLOGIES IN THE PRODUCT MANUFACTURING PROCESS

Normal pentane is one of the most widely used solvents in the petrochemical industry. For example, it is used in the production of polystyrene. Feed is supplied from the normal pentane production unit from the refinery LSRG. By removing the pentane from the refinery, the LSRG output from the refinery is improved, which has a significant impact on the quality of gasoline produced. With the facilities envisioned in this project, other solvents such as hexane and octane can be produced that demonstrate the ability to design and produce this plant.

The features of this method are as follows:

- Localization
- Prevent currency exit

- Commercialization
- Economic justification



5- INVESTIGATE AND DETERMINE THE MINIMUM ECONOMIC CAPACITY, INCLUDING ESTIMATING THE VOLUME OF FIXED INVESTMENT IN RIAL AND FOREIGN CURRENCY

EXPLANATION: EXCHANGE RATE BASED ON NIMA SYSTEM - DATED 22/8/2020 - AMOUNT: 236784 RIALS

Project Investment Schedule:

Description	Cost (Million Rials)	Cost (Euro)
Land	8000	33786
Landscaping	2223	9388
Construction	20185	85248
laboratory equipment	588000	2483327
Utilities	1700	7179
transportation	2220	9376
equipment and machinery	4520	19090
Office equipment	885	3737
Miscellaneous and unforeseen	12351	52163
Total	640084	2703295

The ground specification of the project implementation is as follows:

Description	Area (m 2)	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Land	8000	1/000/000	8000	33786

The cost of landscaping is as follows:

Description	Area	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Digging and leveling	8000	150/000	1200	5068
Fencing	500	1/500/000	750	3168
Asphalt and pavement paving	450	450/000	203	858
Green space and lighting	700	100/000	70	295
Total			2223	9388

Building Information:

Description	Building type	Area	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Production	Niches	1500	5/700/000	8550	36110
Raw materials and supplies	Niches	1200	5/700/000	6840	28888
Office building and services	Official	170	20/000/000	3400	14360
Utilities	Niches	170	6/000/000	1020	4308
Guard		25	15/000/000	375	1584
Total		3065		20185	85248

Utilities:

Description	Cost (Million Rials)	Cost (Euro)
Power Supply	850	3590
Fuel	100	422
Heating and cooling equipment	650	2745
Protective equipment and security system	220	929
Compressed air supply	400	1690
Total	2220	9376

Transportation:

Description	Technical Specifications	Cost (Million Rials)	Cost (Euro)
Forklifts	3 ton	2400	10136
Pickup	Nissan	790	3337
Riding	Samand	650	2745
Tanker	-	2100	8869
Total		4520	19090

Equipment and Machinery:

Manufacturing machinery is the most important part of industrial investment. The machinery of each manufacturing complex determines the quality and variety of products, production technology, raw materials, and many of the methods, costs of production, and even the finished product price. Machinery selection is a critical and influential factor in the macroeconomic indicators of the plan. The cost of producing the machinery and equipment of the production line is estimated on the basis of inquiries from major manufacturing companies or reputable agencies. It also calculates the cost of procuring machinery, including shipping, installation, customs duties, and so on. The world-renowned companies producing the main equipment for the process of extracting hexane, pentane and lactone from crude oil :

Schlumberger Limited, Halliburton, Baker Hughes, Smith International, National Oilwell Varco, Weatherford international, GE Oil and Gas, FMC Technologies.

The price range for all of these companies is about 10 percent. The price of machines for this process is given in the table below:

Number	Name	Required amount	Currency (Euro)	cost (million rials)	Rial sum (million rials)
1	Salting equipment	1	2483327	588000	588000
2	Atmospheric distillation process equipment	1			
3	Vacuum distillation process equipment	1			
4	Apparatus	2			
5	Condensers	3			
6	Tanks	4			
7	Unexpected items	1			
Total- million rials				87980	
Total - Euro				2483327	

laboratory equipment:

Number	Name	Currency (Euro)	Rial Cost (Million Rials)	Rial sum million) (rials
1	laboratory equipment	10000	7179	1700
Total		1700		

Office equipment:

Number	Name	The required amount	Currency (Euro)	Rial cost per unit	Rial Cost (Million Rials
1	Management table with chair	1	63	15/000/000	15
2	Conference table and conference chair	1	190	45/000/000	45
3	Computer desk and chair	3	37	9/000/000	27
4	Office desk and chair	4	34	8/000/000	32
5	Secretary's desk and chair	1	30	7/000/000	7
6	Showcase	1	34	8/000/000	8
7	Library	1	34	8/000/000	8
8	Quad slider file	2	17	4/000/000	8
9	Waiting chair comfort	6	12	3/000/000	18
10	Dining table and chair	1 Series	37	9/000/000	9
11	Computer	6	190	45/000/000	270
12	Printer and Scanner	5	63	15/000/000	75
13	Fax	3	25	6/000/000	18
14	Telephone	7	8	2/000/000	14
15	kitchen appliances	1 Series	634	150/000/000	150
16	Fingerprint Attendance Device	1	36	8/500/000	85
17	Wireless and Internet equipment	1	25	6/000/000	6
18	Office stationery	4 Series	13	3/000/000	12
19	Central central system	1	296	70/000/000	70
Total- Million Rials		885			
Total- Euro		3738			

Working Capital Costs:

Name	Description	Cost (Million Rials)	Cost (Euro)
Raw materials and packaging	30 Days	27000	103448
salary	30 Days	1389	5866
Energy costs	30 Days	251	1060
revolving fund	15 Days	388	1639
Total		29028	122595

Production costs:

Description	Cost (Million Rials)	Cost (Euro)
Cost of raw materials and packaging	324000	1368363
Salary Cost	16664	70378
Energy costs	3013	12725
Cost of maintenance	31342	132368
Unforeseen cost of production	6310	26649
Administrative and sales costs	3813	16103
Costs of financial facilities	3851	16264
Insurance costs	18735	79125
Depreciation cost	500	2112
Depreciation expense before operation	1630	6884
Total	409858	1730971

6-THE AMOUNT OF RAW MATERIAL NEEDED ANNUALLY AND WHERE IT IS SUPPLIED

Number	Description	Consumption per unit product	Unit of consumption	Amount of Consumption Required for Total Capacity	Rial equivalent (per unit)	Place of supply	Cost (Million Rials)
1	Crude oil cuts	1	Ton	10000	27/000/000	Internal	270000
2	Other						54000
Total- Million Rials							324000
Total- Euro							1368363

7-RISK ANALYSIS OF PROJECT IMPLEMENTATION

In terms of income, the industry is the "highest income" in the economic field, and in terms of capital investment (including capital, financial, human and technological resources) it is also the "top capital" of the country's economy. Given this, the industry has a prominent place in the overall policies of the resisting economy, with articles 13 to 15 devoted to this industry. In addition, paragraphs 4 and 8 relate to the industry in terms of targeting subsidies and energy consumption management as well as paragraph 18 related to the National Development Fund's share of oil and gas export resources.

According to this upstream document, four general strategies for the country's oil industry should be considered:

(A) Reducing the dependence of the country on oil export earnings (paragraphs 13 and 18): in paragraph 13 of the general policies of the resisting economy to counter the impact of oil and gas export earnings through the selection of strategic customers, diversification of sales methods, Involving the private sector in the sale and export of gas, electricity, petrochemicals and petroleum products, and in paragraph 18 of these policies, the National Development Fund's annual increase in the share of oil and gas exports to oil budget dependency is also emphasized.

B. Increasing value added by completing the value chain of the oil and gas industry (paragraphs 13 and 15): Paragraph 13 of these policies addresses the impact of oil and gas export earnings by increasing the export of gas, electricity, petrochemicals and products. Oil and Clause 15 The overall policies of the resisting economy also emphasize value-added by completing the value

chain of the oil and gas industry by boosting exports of electricity, petrochemicals and petroleum products.

(C) Maintenance and Development of Oil and Gas Production Capacities, Especially in Joint Fields (Article 14): Article 14 of the general policies of the Resistance Economy emphasizes the maintenance and development of oil and gas production capacities, especially in the common fields.

(D) energy management (paragraphs 4 and 8): in paragraph 4 these policies emphasize the use of the capacity to implement targeted subsidies to reduce energy intensity and in paragraph 8 general policies of the resisting economy also emphasize on the management of consumption with emphasis on implementing general reform policies. The pattern of consumption is emphasized.

Therefore, given the overall policies and strategies of the country with regard to the sanctions, as well as the favorable market conditions and the high demand for the aforementioned projects, implementation of this plan will be of little risk.

8- HUMAN RESOURCES AND NUMBER OF JOBS

One important aspect of any industrial unit is its job creation, which is thoroughly examined in the market segment. Due to the nature of the industry and the need for 3 shifts to work, it has been attempted to select the number of personnel in a manner that addresses the production needs of the two shifts. It has also been tried to use related specialties in different parts of production.
To calculate the amount of annual salaries and benefits, three shifts and other benefits have been added to the annual salary. For this purpose, the annual salary is set at 16.4 months per year
.

Description	Gender	Number	Monthly salary per person (Million Rials)	Monthly salary (Million Rials)	Annual salaries (Million rials)	Annual salaries (Euro)
Managing Director	Man	1	41	41	672	2838
financial manager	Man	1	34	34	558	2357
Marketing Manager	Man	1	34	34	558	2357
Financial, sales and	Female	2	29	58	951	4017

administrative personnel						
warehouse keeper	Man	3	24	72	1181	4988
Line Administrator	Man	2	24	48	787	3323
skilled worker	Man	4	23	92	1509	6373
Semi-skilled worker	Man	7	22	154	2526	10668
worker	Man	14	21	294	4822	20365
Service	Female	3	21	63	1033	4363
Guard	Man	2	21	42	689	2910
Driver	Man	1	21	42	689	2910
Secretary	Female	2	21	42	689	2910
Total		43			16664	70378

9- CHECK AND DETERMINE THE AMOUNT OF WATER, ELECTRICITY, FUEL AND ...

Description	Unit	annual consumption	Cost per unit in Rials	Total Cost (Million Rials)	Total (Euro)
Power Consumption	KWh	1/800/000	648	1166	4924
Water Consumption	Cubic meters	90/000	1973	177	747
Gas	Cubic meters	1/670/000	1000	1670	7052
Total			3013		12725

10- CONDITIONS OF ECONOMIC AND COMMERCIAL SUPPORT

10-1- CUSTOMS TARIFF SUPPORT (PRODUCTS AND MACHINES) WITH GLOBAL TARIFFS

Customs tariff support consists of two parts: tariff import of machinery and materials required by the export tariff plan of exported products, which must be selected and applied for the growth of the industry. As with most industrial machinery, the input rights of foreign machinery required by the plan are about 10%, which is a reasonable tariff and does not impose a high cost on investors. On the other hand, in recent years, the government has provided incentives for products that can

compete in international markets and can be exported overseas and give export bonuses to these units, which has contributed to the country's export volume. In recent years, it has enjoyed good growth despite difficulties and obstacles. Therefore, government incentives can be used to produce hexane, pentane, and octane products as a result of quality crude oil.

10-2- FINANCIAL SUPPORT (EXISTING UNITS AND PLANS) OF BANKS - INVESTOR COMPANIES

Long-term facilities to finance part of the investment costs for the creation or development of industrial, mining and tourism units or to provide the necessary conditions for the optimal utilization of these units, the facility bank in foreign currency and rial in the form of an Islamic contract Grants.

Terms:

1 .Only financial facility projects that have the necessary technical, financial and economic justification are granted.

2 .The granting of facilities to natural persons up to one billion rials shall be permitted and the payment of such facilities shall be exclusively permitted to legal persons.

3 .The Bank typically finances up to 70% of the project's fixed capital investment as a facility, while 30% of the total project investment (including fixed capital and working capital) must be provided by the applicant as paid-in company capital. .

4 .The repayment period of the facility is typically a maximum of 5 years. It was the Bank's authority to change this period to suit the status of the plans.

5 .When applying for a facility, the applicant shall open a loan account.

6 -In general, 30% of the total project investment must be financed by the investor and the bank can invest up to the remaining 70%.

Steps:

1.pre- Acceptance: At this stage the applicant can apply to any bank branch and submit his / her application. If the plan is not on the priority list, the Bank agrees to provide the justification.

2 .Compilation of project justification report: Applicant prepares justification report through Bank Consulting Engineer companies.

3 .Acceptance: At this stage, the project justification report will be delivered to the branch with the required documentation.

4 .Evaluation and approval: The Bank's justification report will be reviewed and if approved, the facility payment will be approved by the competent authority.

5 .Contract: After providing the required documents and guarantees, the contract for granting the facility will be concluded.

6 .Payment: The project progress report will be prepared at the time specified by the consulting engineer and submitted to the bank. Once the progress report has been approved by the bank, payment is made as appropriate to the progress of the plan.

11-ANALYZING AND PRESENTING FINAL CONCLUSIONS AND PROPOSALS FOR THE CONSTRUCTION OF NEW UNITS

Investigating the market status of hexane extracted crude oil pentane octane indicates that the market will need to build new production units in the coming years if the economy develops resistance policies and supports domestic production. Therefore, if domestic production is not increased (through the creation of new industrial units), this deficit will be met through imports. Therefore, it can be concluded that in order to overcome the market shortage and to create competitive conditions, such projects will be considered justified in the future and investors can work in this direction.

- The plan is to start operating at 60 percent capacity in the first year and increase below capacity in the following years, respectively.

Year	First Year	Second Year	Third year	Forth year	Fifth year
Capacity(%)	60 %	75 %	90 %	100 %	100 %
Production capacity (ton)	6000	7500	9000	10000	10000

prime cost	40 million rials/Per ton- 168 Euro
Selling prices of products	46 million rials/Per ton- 194 Euro
Total Sales	460/000 Million Rials - 1942738 Euro
Percentage of sales at the point head to head	48
Profit	60/000 Million Rials- 253401 Euro
Gross Value Added	126677 Million Rials – 535000 Euro
Net Value Added	93705 Million Rials- 395747 Euro
Ratio of gross value added to total sales	0/28
Ratio of net added value to total sales	0/2
Ratio of gross value added to investment	0/19
Net Present Value(NPV)	557593 Million Rials- 2354907 Euro
Return of capital	4