

Islamic Republic of Iran
Organization for investment economic and technical assistance of Iran

"Summary of technical-economical prefeasible study"

The name: **production of sugar from sugar beet**

Sector: Industrial / food industry Sub sector: cane and sugar production
isic code: 1542412308-1542512321-1542512332-1542512336

The owner of:
Industry, Mine and Trade

Counselor plan:
Razi University

The Address:
Kermanshah, Iran.

Date of P.F.S:
2024/10/22

**Manager of Iran Investment Opportunities
SHAHRIG Engineering Company**

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1- Abstract:

PROJECT PROFILE - SUMMARY SHEET

Project Introduction	
1- Project title: cane production from sugar beet	
2- Sector: Industrial / food industry	Sub sector: cane and sugar production
3- Products / Services: The target product of the project is from the group of manufacturing food products and all kinds of beverages (15), the sub-group of cane and sugar production (1542), refined sugar from sugar beet (1542412308), cane from refined sugar beet (1542512321), dry bagasse of sugar beet (1542512336), ethyl alcohol from sugar beet molasses (15511112). The target products of the plan are imported and exported under H.S. code (1701) of Iran's import and export laws under the title "Cane or beet sugar and chemically pure sucrose, in solid form.", HTS code (17011200). And the tariff subchapters (2207) entitled "Undenatured ethyl alcohol of an alcoholic strength by volume of 80% or more; ethyl alcohol and other spirits, denatured, of any strength", are imported and exported under subchapter (22071010).	
4- location (address): Kermanshah, Eslamabad-e Gharb city, Zagros economic special zone or Eslamabad-e Gharb economic special zone Free Zone <input type="checkbox"/> Economic Special Zone <input checked="" type="checkbox"/> Industrial Estate <input type="checkbox"/> Main Land <input type="checkbox"/>	
5- Project description: This project is designed based on a capacity of 75,000 tons per year, which will start construction after obtaining the necessary permits, receive an operating license, and then start operating. Therefore, from its annual income, which includes the sale of sugar from sugar beet, sugar from sugar beet, dry pulp, and ethanol from sugar beet molasses, it is able to cover its costs and earn annual income. According to the existing standards for the production of sugar from beets, 300,000 square meters of land are required to construct a sugar production unit with a capacity of 75,000 tons of sugar and 4,600,000 liters of alcohol per year, of which 22,750 square meters are covered space and 247,250 square meters are uncovered space, and the rest is needed for the open area of the industrial unit. The ceiling intended for the implementation of this project is 300,000 square meters of land, the excess land being allocated to green space and open area. For this complex, a concession and a transformer with the desired power have been provided, which will be provided from the electricity of the Islamabad West Special Economic Zone. Also, a water concession from the Islamabad West Special Economic Zone has been provided for the complex. The plumbing of the premises, inside the sheds and other parts of the production unit will be done by a qualified contractor.	
Required equipment and machinery: <u>Preprocessing equipment:</u> Beet harvesting machines Washing and cleaning machines for raw materials Raw material crushing equipment Conveyors and internal transport systems	

Cooking and purification equipment:

Cooking and purification devices to convert raw materials into molasses and purify it
molasses evaporation equipment
Filters and other purification systems

cane producing equipment:

Crystallizers and equipment for separating sugar from molasses
Cane crushing machines
Cane cleaning equipment
Cane packaging

Tank building and storage equipment:

molasses storage tanks
Cane storage tanks
Transportation and storage systems

The human resource required in this project includes; 44 expert workers, 40 non-skilled workers and 212 skilled workers directly.

Project Status	
6- Local / internal raw material access: 100 %	
7- Sale : - Anticipated local market : 50 % - Anticipated export market : 50 %	
8 – Project total time (from start of activities to start of commercial operation in years): 3 years	
Schedule	Start of activities : Start of works at site End of Works : Start of commercial operation :
9- Project status : - Feasibility study available? Yes - Required land provided? No - Legal permissions (establishment license, foreign currency quota, environment, etc) taken? No - Partnership agreement concluding with local /foreign investor? No - Financing agreement concluding? No - Agreement with local /foreign contractor(s) concluding? No - Infrastructural utilities (electricity water supply, telecommunication, fuel, road, etc) procured? No - List of know- how, machinery, equipment, as well as seller /builder companies defined? Yes - Purchases agreement machinery, equipment and know-how concluded? No	

Financial Table

10- Financial structure :

Descriptions	Local Currency Required			Foreign Currency Required Million Euro	Total Million Euro
	Million Rials	Rate	Equivalent in Million Euro		
Fix Capital	13225470	600	15.3	6.7	22.0
Current Capital	4479240	600	7.5	0	7.5
Total Investment	17704710	600	22.8	6.7	29.5

- Value of foreign equipment / machinery 6.7 Million Euro
- Value of local equipment / machinery 0.2 Million Euro
- Value of foreign technical know-how 0 Million Euro
- Value of local technical know-how 0 Million Euro
- Net present value (NPV): 20.8 Million Euro
- Internal Rate of Return (IRR): 44%
- Capital Rate of Return: 49 %
- Payback Period 5 years and 2 months

General Information

11 - Project type: Establishment ☒

Expansion and completion ☐

12- Company Profile

- Name (Legal/Natural persons): 1. Dr. Somayeh Azami 2. Dr. Ehsan Khosravi

- Company's current activities: Razi University

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- Company's legal structure :

Government ☒

Non-Governmental ☐

Public non-governmental ☐

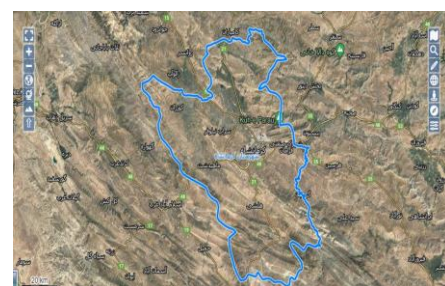
2- Project's location:

2-1- Province:

Kermanshah province is the 17th largest province of Iran. It covers about a total area of 25045 km². The capital of this province is Kermanshah. This province is located in the middle of the western side of Iran. The latitude and the longitude of Kermanshah province are between 33° 40' to 35° 18' N and 45° 24' to 48° 7' E from the Greenwich meridian. Kermanshah province is bordered by Kurdistan province from the north, Lorestan and Ilam provinces from the south, Hamadan province from the east, and it has a 371 km common border with Iraq from the west. Its average height above sea level is about 1200 meters. Kermanshah province covers 1/5% of the country's area. According to the administrative divisions, Kermanshah province includes 14 counties, 31 cities, 86 rural districts and 2,793 districts.

According to the latest National Census of Population and Housing of Statistical Centre of Iran in 2015, the population of Kermanshah province was 1,952,434 people, spread over an area of 25,009 km² with a population density of 77.5 km², and the most populated city is Kermanshah as the capital of the province. It has a population of 946,651 people.

(The location of province in the map of country)



Kermanshah province ranks 11th in terms of the total length of roads (without rural roads), ranks 17th in terms of the length of highways and freeways per 1000 km, and ranks 18th in terms of the length of main roads. Since Kermanshah city covers the largest share of the province's area, it also has the largest share of the province's roads.

Kermanshah province, having a wide network of country roads and rural roads, can convert a large part of the routes into highways in the form of road development projects. Kermanshah province, due to having 6 official borders and border markets, as well as tourism capabilities, can play a greater role in earning foreign currency and monetizing for the country, and one of the ways to achieve this goal is the development of roads and transport fleet.

Kermanshah International Airport is one of the prominent and top airports in the country in terms of the number of flights, and the railway project is supposed to connect to Khosravi international border and Iraq.

Kermanshah province is a mountainous and high region, so that 70/8% of the province's area consists of mountainous areas. The remaining area of Kermanshah province includes 22/1% of plain areas and 7/1% of foothill areas. In terms of altitude classification, 76/5% of the province is in the 2200-1000 meters altitude class, among which the share of the 1400-1800 meters altitude class is more than the others. If we divide the province of Kermanshah into two main altitude classes of less than 1400 meters and more than 1400 meters, about 58/2% of the area is located in the altitude class of 1400 and more and the rest 41/8% of it is located in the altitude classes of less than 1400 meters. Thus, in addition to being considered a mountainous region, Kermanshah province also has a high altitude. Kermanshah province has a moderate

mountainous climate. In the 4th century AD, Kermanshah province, which was a village with a pleasant climate at that time, was chosen as the second royal residence of the Sassanids. During the Sassanid era, large gardens were built in this area, and it has been a place of recreation for Sassanid kings for a long time. In the Islamic era, Kermanshah city has been described many times as a city with a pleasant climate, where the waters flow, where there are many trees and fruits, and where the goods are cheap. Ibn Faqih writes about Kermanshah in al-Baldan book, which he wrote in 290 AH:

“He, Qabad, from Mada'in to the Balkh River, he did not find any land where the weather was better, where the water was more fresh, and where breeze was more pleasant than Kermanshah to Hamadan-Asadabad pass. It was the reason he made Qaramsin¹.” The most sunny hours in Kermanshah reach 2999 hours, the most sunny hours are in July and August and the least in January and February. The climatic and ecological situation of Kermanshah province, according to the average annual rainfall and relative humidity, is such that its mountains and plains are generally covered with forests and pastures, and in some places, there are dryland farms and irrigated farms. The average annual temperature of Kermanshah province is around 14 degrees Celsius and the annual rainfall of this province is 456.8 mm.

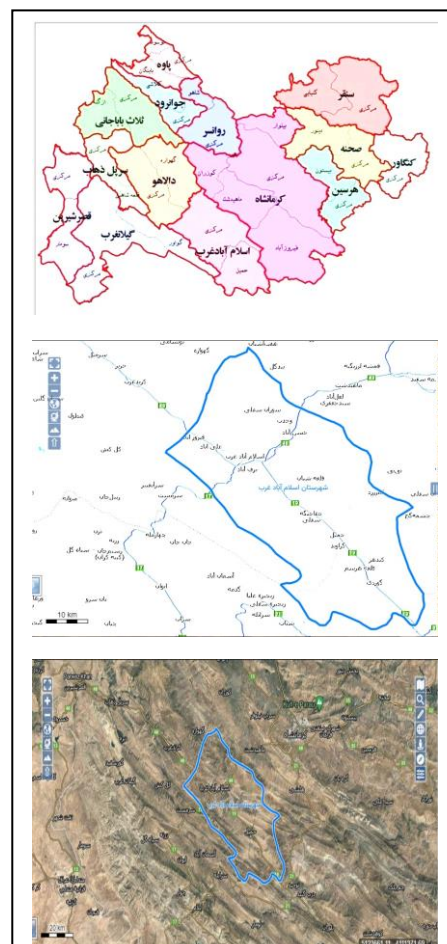
Kurds are the main residents of Kermanshah province. Kermanshah province is the native land of some of the largest Kurdish tribes, nomads and clans, such as Zanganeh, Kalhor, Guran, Jaff, Sanjabi, Qalkhani, Kolyai, Bajelan, Zhuleh, Jamir and Lak tribes, including: Jalalvand, Kakavand, Osmanvand, Payervand and Balavand tribes. In official statistics, Lak tribes are considered as a part of Kurdish ethnicity. The Turks of Kermanshah province live next to the

¹ It is said that after Islam, the name of Kermanshah was changed to Qarmasin in Arabic, but in the following periods, the names of Kermanshah was used again.

Kolyai Kurds in Sonqor and Kolyai cities and speak the Sonqori Turkish language. Sonqori language is a dialect of Azerbaijani Turkish language, which is also called as a transitional form from Azerbaijani Turkish language to Khorasani Turkish language. Also, a group of Lur people also live in Kangavar city. These people generally speak Solasi Luri dialect. During the past two centuries, some people from other provinces of Iran, especially Hamadan, Markazi, Isfahan, Semnan, etc., have migrated to the city of Kermanshah. During the last two centuries, several non-Kurdish families, including the families of Al-Agha, Nojomi, Meybodi, Fyz-Mahdavi, Shahrestani, Seddouqi, Mohammadi-Araghi, Kazazi, Jaberi, Dezfuli, etc., for religious reasons and to promote the Shia religion in the city have migrated to the city of Kermanshah. The influence of these migrations can be seen in the creation of the Persian dialect of Kermanshahi.

2-2- the County:

Eslamabad-e Gharb city covering an area of about 2125.05 square kilometers, equivalent to 8.5% of the area of the province. This city is located in the south of the province and is bordered to Dalaho city from the north, Lorestan province from the south, Kermanshah city from the east and Gilan-e Gharb city from the west. This city has 2 urban centers, 2 rural districts, 7 districts and 172 villages. This city is 6 to 7 thousand years old. In terms of communication, this city is the connecting point of 4 provinces (Kermanshah, Ilam, Lorestan and Khuzestan), and being on



(The location of county in the map of province)

the road to Karbala doubles the strategic importance of this city.

2-3- the project:

According to the investigations carried out in the first phase of studies, there is a potential for project implementation in all the cities of Kermanshah province. By carrying out further investigations, considering important factors such as the supply of raw materials, infrastructure facilities, access to communication routes, supply of human resources, environmental aspects, government exemptions, the position of other competitors, etc., it was found that the special economic zone of Eslamabad-e Gharb is capable of implementing the desired project. Zagros Special Economic Zone or Eslamabad-e Gharb Special Economic Zone is a special economic zone located in Eslamabad-e Gharb city in Kermanshah province. During the first provincial visit of the Cabinet of Ministers (government) to Kermanshah province on 9/30/1385 SH, the establishment of Eslamabad-e Gharb Special Economic Zone was approved, and on 7/4/1389 SH it was approved by the Islamic Parliament of I.R.Iran and on 8/11/1389 SH the law on the establishment of



(A picture of the project)

a special economic zone was approved. On 11/8/1389 SH, the law on the establishment of the aforementioned special economic zone was promulgated by the honorable president, at first, the Cooperation Organization of Kermanshah Province Municipalities was introduced as the executive of the special zone, and from 12/5/1390 SH, the task of the responsible organization was assigned to the Zagros Special Zone. with the aim of regional growth and development, implementation of regional development policies and creation of economic and industrial poles, economic growth and development of the province and taking advantage of the potential of Kermanshah province, attracting foreign and domestic capital practical action to job creation and determine new job opportunities, ingest and transfer technology, upgrade the level of technology and take advantage of high and new economic technologies through scientific and industrial cooperation with international companies, support Industries and artisans and creating facilities for them, processing local primary commodity and transform them into finished goods for export, reducing production costs in order to enter the competitive global

markets, etc., Zagros Special Economic Zone was created.

2-4-access to the infrastructures:

The implementation site of this plan is the Islamabad-e-Gharb Special Economic Zone. A general review of infrastructure access in the Islamabad-e-Gharb Special Economic Zone is shown in the table below.

No.	Needed infrastructures	distance to the project	The supply infrastructures
1	Water	0	the Islamabad-e-Gharb Special Economic Zone
2	Electricity*	0	the Islamabad-e-Gharb Special Economic Zone
3	Gas*	0	the Islamabad-e-Gharb Special Economic Zone
4	Telecommunications	0	the Islamabad-e-Gharb Special Economic Zone
5	High way	5 Km	-
6	Sub way	1 Km	-
7	Airport	60 Km	-
8	Port	600 Km	-
9	Rail way	55 Km	-

* Due to the impossibility of determining the exact location for the implementation of the project, it is not possible to check the electricity and gas infrastructure of the project.



(picture of product or sample)

3- Technical Specifications of plan:

3-1 –product:

The product of the project is from the group of food products and beverages (15) from the subgroup of sugar and sugar production (1542), refined sugar from sugar beets (1542412308), cane sugar from refined sugar beets (1542512321), dried beet pulp (1542512336) and ethyl alcohol from sugar beet molasses.(15511112)

The products covered by the plan are imported and exported under tariff sub-chapters (1701) of the Iranian Customs Regulations entitled "Cane or beet sugar and chemically pure sucrose, in solid form.", sub-tariff (17011200) and tariff sub-chapters (2207) entitled "Undenatured ethyl alcohol of an alcoholic strength by volume of 80% or more; ethyl alcohol and other spirits, fortified in any strength," sub-tariff (22071010).

3-2-project's requirements:

3-2-1-Space and infrastructure required:

This project is designed based on a capacity of 75,000 tons per year, which will start construction after obtaining the necessary permits, receive an operating license, and then start operating. Therefore, from its annual income, which includes the sale of sugar from sugar beet, sugar from sugar beet, dry

pulp, and ethanol from sugar beet molasses, it is able to cover its costs and earn annual income. According to the existing standards for the production of sugar from beets, 300,000 square meters of land are required to construct a sugar production unit with a capacity of 75,000 tons of sugar and 4,600,000 liters of alcohol per year, of which 22,750 square meters are covered space and 247,250 square meters are uncovered space, and the rest is needed for the open area of the industrial unit. The ceiling intended for the implementation of this project is 300,000 square meters of land, the excess land being allocated to green space and open area. For this complex, a concession and transformer with the desired power have been provided, which will be provided from the electricity of the West Islamabad Special Economic Zone. Also, a water concession from the West Islamabad Special Economic Zone has been provided for the complex. The piping of the premises, inside the sheds and other parts of the production unit will be carried out by a qualified contractor. The existence of two sugar factories, Bisotun with a capacity of 37,500 tons and the West Islamabad Sugar Factory with a capacity of 14,000 tons, has led to the formation of a production system and knowledge of cultivating this product in Kermanshah province in previous years. In order to produce beet sugar, there is no need to use high knowledge and the technical knowledge in question exists in the country. Of course, production must be in accordance with domestic standards. The specifications of the land, main buildings and other auxiliary buildings required and the investment in them are as follows in the table below.

Plan Investment in Land, Landscaping, and Construction

No.	Description/Name of Structures	Details	Required Investment		Total Cost (Million IRR)
			Quantity/Meterage Required	Unit Cost (IRR)	
1	Land	30 hectares of land in the West Islamabad Special Economic Zone	300,000	15,000,000	4,500,000
2	Landscaping Operations	As per detailed specifications	270,000	2,990,000	807,300
3	Construction	Industrial Shed	10,000	120,000,000	120,000,000

		Administrative Building	750	150,000,000	112,500
		Other Buildings	12,000	150,000,000	1,800,000
	Total		-	-	8.419.800

3-2-2-Equipment and machinery:

Preprocessing equipment:

Beet harvesting machines

Washing and cleaning machines for raw materials

Raw material crushing equipment

Conveyors and internal transport systems

Cooking and purification equipment:

Cooking and purification devices to convert raw materials into molasses and purify it

molasses evaporation equipment

Filters and other purification systems

cane producing equipment:

Crystallizers and equipment for separating sugar from molasses

Cane crushing machines

Cane cleaning equipment

Cane packaging

Tank building and storage equipment:

molasses storage tanks

Cane storage tanks

Transportation and storage systems

Equipment for producing ethanol from sugar beet molasses:

Molasses cooking and sterilization equipment

Yogurt cultivation equipment

Final fermentation equipment with tanks

Primary distillation unit

Final distillation unit

–40degree alcohol storage tank

–96degree alcohol storage tank

Automatic electric filler

Labeller

Capping

Types of pumps

Pure acid storage tank

Required Equipment and Machinery

No .	Machine/Equipment Name	Power Consumption (kWh)	Total Quantity	Working Days per Year	Daily Operating Hours	Required Investment			Total Cost (Million IRR)
						Quantity	Unit Purchase Price	Currency	
1	Sugar and Beet Processing Line	1,500	1	300	24	1	3,320,000	Million IRR	3,320,000
2	Alcohol production line from sugar beet molasses	132	1	300	24	3	135,720	Million IRR	135,720
Total									3,455,720

Auxiliary Machinery and Equipment

No.	Machine/Equipment Name	Unit of Measure	Type of Equipment	Required Investment for Plan		Total Cost (Million IRR)
				Quantity	Unit Purchase Price (Million IRR)	
1	Electrical Connection/Demand Capacity	KW	Facilities	2,500	6	15,000
2	Various Electrical Cables	M	Facilities	4,000	4	16,000
3	Electrical Lighting System Equipment	Units	Facilities	825	40	33,000
4	Panels and Related Electrical Equipment	Units	Facilities	60	320	19,200
5	Water Connection	-	Facilities	1	30,000	30,000
6	Other Water Transfer Equipment	Units	Facilities	1	20,000	20,000
7	Piping for Drinking Water, Firefighting, etc.	M	Facilities	3,000	8	24,000
8	Other Piping (Electrical, etc.)	M	Facilities	1,500	3	4,500
9	Firefighting, Safety, Health Equipment	Capsule	Facilities	150	30	4,500
10	Gas Piping	M	Facilities	4,500	5	22,500
11	Gas Connection	-	Facilities	1	55,000	55,000
12	Ventilation Equipment	Fan	Facilities	60	36	2,160
13	Air Conditioner	Set	Facilities	20	700	14,000
14	Cooling Tower	Set	Facilities	2	50,000	100,000
15	3-Ton Forklift	Unit	Vehicles	1	17,700	17,500
16	5-Ton Forklift	Unit	Vehicles	1	25,000	25,000
17	Light Truck	Unit	Vehicles	1	24,000	24,000
18	Pickup Truck	Unit	Vehicles	2	8,000	16,000
19	Passenger Car	Unit	Vehicles	3	6,000	18,000
20	Workshop and Laboratory Tools	Unit	Workshop Equipment	1	50,000	50,000
21	Safety Equipment & CCTV System	Set	Facilities	1	9,000	9,000
22	Office Equipment	Set	Office Equipment	9	800	7,200
23	Restaurant Equipment	Set	Office Equipment	254	30	7,620
24	Other Auxiliary Facilities	-	Facilities	1	15,820	15,820
Total						550,000

3-2-3- Raw materials and intermediate components:

Cost of Utilized Raw Material

Row	Description	Unit	Purchase Cost (Thousand IRR)	Annual Consumption	Annual Cost (Million IRR)
1	Sugar Beets	Ton	26,000,000	550,000	14,300,000
2	Pre-Processing Chemicals	Kilogram	7,540	65,000	490,000
3	Yeast	Kilogram	2,000,000	16,000	32,000
4	Ammonium salt	Kilogram	2,800,000	77,550	217,140
5	Sulfuric acid	Kilogram	800,000	207,900	166,320
6	Antifoam	Liter	1,500,000	22,000	33,000
7	Bottle	Thousands of Numbers	125,000	7,680	960,000
8	Lids and handles	Thousands of Numbers	20,000	7,680	153,600
9	Labels	Thousands of Numbers	15,000	7,680	115,200
10	Cartons	Numbers	82,500	640,000	52,800
11	Glue	Rings	320,000	13,750	4,400
Total					16,524,460

3-2-4-management and human resources:

No.	Skill level	number	Salaries (wages) (Rials)
1	Expert	44	240000
2	Skilled	40	180000
3	non-skilled	212	125000

- Number of skilled personnel required: 44
- number of non- skilled personnel required: 40
- number of expert personnel required: 212

4- Ownership and legal permission:

4-1- ownership of land:

Ownership of land in the Islamabad-e-Gharb Special Economic Zone will be through the transfer and conveyance of title deeds to the investor.

According to the Executive Regulations of the Law on the Formation and Administration of Special Economic Zones of the Islamic Republic of Iran, the registration of companies or representative branches of companies that intend to operate in the Special Economic Zone regardless of the amount of their domestic or foreign stocks and also the registration of Property and Intellectual Rights in the region based on the request of the regional organization under the responsibility of the Deeds and Properties Registration Organization of Iran and according to the rules of registration of companies and industrial and intellectual properties in the commercial and industrial free zones of the Islamic Republic of Iran subject to approval letter No. 21453/T15011K dated 2/30/1374 and its subsequent amendments. Separation of real estate in the region and issuance of ownership documents in the region is done only upon the request of the regional organization by the relevant real estate Deeds and Properties Registration Organization. The transfer of real estate in the region between natural and legal persons will be possible at any stage with the notification of the Special Economic Zone organization and compliance with the relevant regulations. Also, the issuance of separate ownership documents is deferred to the completion of work issued by the Special Economic Zone organization.

4-2- Intellectual property and incentives:

For the production of beet sugar, there is no need for highly specialized technical knowledge, and the necessary technical expertise exists within the country. Today, the production of high-quality sugar is of fundamental importance in various industries. The production of beet sugar through the extraction method has placed Iran among the countries that produce and possess the technology for sugar production from sugar beets. Of course, the production must comply with domestic standards. Also, the most common method of producing alcohol from sugar beet molasses in Iran is the semi-continuous method, in which the production stages are divided into three general parts: fermentation, wort preparation, and distillation.

4-3-legal permission:

Natural and legal economic operators need a license to establish an industrial unit for any type of production and industrial activity, the license is issued in free and special economic zones under the supervision of the regional organization. The first stage of all investment activities in the production and industry sector is obtaining the license to establish an industrial unit.

After the establishment of the industrial unit and the completion of the trial production phase, if the conditions and items mentioned in the establishment license are met, an exploitation license will be issued for the industrial unit. The prerequisite for issuing an exploitation license is to have an establishment license.

A committee composed of representatives of The Ministry of Industry, Mine and Trade of Iran, Ministry of Agriculture Jihad of Iran, central Bank of The Islamic Republic of Iran, The Islamic Republic of Iran Customs Administration, the Secretariat of the Supreme Council and the representative of the economic zone, has the duty of determining the allowed percentage (the amount of goods produced in an industrial unit that can be imported -as domestic goods- without registering a costume

order import the country) and also determining the percentage of added value (the amount of customs duty discount). These percentages are based on the information of the business plan of the production unit and the required internal and external raw materials.

Every industrial and production unit needs to receive a production certificate for every part of its product production, the certificate should mention the report of the manufactured product, domestic and foreign raw materials.

The products produced by industrial units in free and special zones have four destinations:

- Consumption of goods in the region
- Sending goods to the main country
- Exporting goods abroad
- Sending goods to other regions

In this group, economic operators should specify the final destination of their goods.

Also, in order to produce this product, legal licenses (such as establishment license and exploitation license) are required from the organization of Agriculture Jihad of Kermanshah or the organization of Industry, Mine and Trade of Kermanshah Province and the license of Department of Environment.

Considering that, based on the type of materials consumed and produced, as well as the process stages, the type and amount of pollutants in industries are different, meaning that various processes are susceptible to pollution in three stages: collection of raw materials, production and conversion of intermediate materials, and collection and storage of produced materials. Among the environmental activities recommended is obtaining certifications such as ISO 14000 from

reputable institutions approved by the Environmental Organization and the Institute of Standards through the following activities:"

1- Treatment of Industrial and Sanitary Wastewater:

Accurate identification of wastewater and quantitative and qualitative measurement of pollutants in all units and installation of wastewater treatment systems.

2- Efforts to Prevent Pollution:

In the field of air pollution control resulting from industrial activities, quantitative and qualitative assessment studies of pollutants have been carried out and necessary measures will be taken to control them, including the installation of advanced atmospheric pollutant measurement devices and CCTV cameras that measure pollutants daily and online.

3- Removal of Solid Waste:

4- Conducting Environmental Research: These activities are based on process improvement and waste reduction, water and wastewater treatment, air pollution control and waste recycling.

5- Development of Green Space: Integrating industry with green space is one of the main goals of upstream and downstream industries. According to environmental standards, ten percent of the industrial area should be allocated to green space, which in this complex, a higher percentage of this amount has been allocated to green space (the irrigation of this green space is done using treated industrial wastewater, which greatly reduces water consumption).

6- Utilizing Up-to-Date Technology and Avoiding the Use of Inefficient Technology: When a new environmental standard is established, due to environmental pressures, it requires significant cost and manpower to eliminate existing pollution in order to reduce a percentage of pollutants. Calculations have shown that if new technology used in the industry complies with the desired standards, in addition to reducing pollution, its high efficiency will also lead to increased production. In this regard, the company, considering its up-to-date

technology and having all the world's environmental and quality standards, can prove this. Preserving the environment can also promote technological advancement. This method has been used in European countries, and technologies that have reached the end of their lives and do not comply with the mentioned standards are collected. Of course, these technologies are sometimes sent to developing countries, and Iran has not been without its share in this regard. Environmental experts believe that if our industry does not have the capability to produce a product while maintaining environmental standards, and at the same time does not see itself capable of accessing the appropriate technology, it should not move towards producing those products. Because in some units, due to the use of obsolete and old technologies, so much raw material and energy is wasted that the discussion of the priority of economic efficiency over environmental protection has also become meaningless. If the costs that must be paid to obtain a more expensive but up-to-date technology are compared with the costs that are wasted due to the use of inappropriate technology in the consumption of raw materials, energy and environmental restoration, the result is that these cases are much more cost-effective and in terms of technology development and industrial growth will also be more useful.

4- Market study and Competition:

Sugar beet is one of the main agricultural products cultivated in the world. This plant belongs to the Altissima cultivar group and is cultivated as an annual plant. Sugar beet usually has good growth and quality in mountainous climate. The length of the sugar beet growth period, in order to extract sugar, is estimated to be 6 to 9 months. Sugar beet with its side products has many applications in other industries. Some of the by-products of sugar beet are: pomace, molasses, silage and cellulose. Sugar beet pomace and molasses are by-products of sugar production.

In the process of producing sugar from sugar beet roots, two valuable edible substances are obtained, sugar beet pomace and molasses. These two by-products are used in the production of animal food due to their high fiber content. Pomace and molasses can be used separately or mixed with other foods, dried or processed, in the preparation of all kinds of animal feed. Dry pomace is prepared in two ways, impregnated with molasses or without molasses, which is suitable for feeding ruminants. Because of its high energy content, sugar beet pomace is used for feeding dairy cattle and also for rearing lambs. Molasses is the juice that remains after processing sugar beets. Molasses is usually diluted to 75% dry matter and then sold in the market. One of the important substances that can be extracted from beet molasses is sugar, alcohol and disinfectant.

The amount of world sugar production and consumption is around 188 million tons, and the amount of annual storage is around 75 million tons. Sugar is produced in 120 countries of the world and 80% of global sugar production is based on sugar cane. Brazil and India are the pioneers of production of sugar industry in the world. Brazil is the largest exporting country and China is the first in importing sugar. Iran is one of the seven countries in the world that, in terms of climate diversity and latitude, has the conditions for sugar production from both sugar beet and sugar cane; However, contrary to global statistics, the share of sugar production based on sugar beet is higher than that of sugar cane, and about 60% of the sugar produced in Iran comes from beet manufacturing. A total of 35 beet sugar factories and 9 cane sugar factories have been established in Iran, of which only 36 factories are active. The country's annual need for sugar consumption is about 2 to 2.5 million tons, and the annual production amount is about 1.6 million tons. Considering that the spring sugar production capacity based on sugar beet is 1 million tons and the sugar production capacity based

on sugarcane is between 0.9 and 1 million tons, the deficit of sugar production is provided through autumn cultivation and import. The spring cultivation of beetroot takes place from the beginning of March to May, and its harvesting time is from the end of September to the end of December. The yield of beets is between 16 and 20%. The autumn cultivation of beetroot is done from the end of September to the beginning of December, and its harvesting period is from the end of April to the end of June. Also, the grade of autumn sugar beet is between 14 and 16 percent. Considering that sugar is a basic commodity, sugar pricing is mandatory; That is, it is announced by the government. On average, 80% of the sales of sugar factories (beet) are based on mandated pricing and the rest of the by-products (molasses and dry pomace) with free pricing, whose rates are determined by the board of directors.

The price of sugar is announced based on the approved price of sugar beet. On average, in the last 15 years, the price of sugar has been 11 folds over the price of beet; Because beet prices are announced before spring planting and sugar prices are announced before September. The approved price per kilo of sugar beet in 1402 was announced as 2,800 Tomans, and according to the correlation between the price of sugar and sugar beet, the price of each kilo of sugar was announced as 25,000 Tomans. The existence of the Bistun sugar factory with a capacity of 37,500 tons and Eslamabad-e Gharb sugar factory with a capacity of 14,000 tons has led to the formation of the production system and cultivation knowledge of this product in Kermanshah province. The cultivated area of this product in recent years is about 11 thousand hectares with the production of more than 600 thousand tons. This amount of production has been done only in cold and temperate regions of the province. Considering the establishment of the tropical system and the containment of border waters, the autumn

cultivation of suger beet is considered as one of the main potentials of agricultural development in these areas.

5-1- Introduce target market:

After the textile industry, the sugar industry is the oldest industry in Iran, its history dates back to 120 years ago. The cane and sugar industry is a seasonal industry, the main activity of its factories is in the autumn season. The agricultural sector is the most important supplier of raw materials (beet and sugar cane) and the dairy industries, beverages, confectionery and other food products are the main customers of this industry, and according to its large customers, the main product of the factory is sugar. The main product of this industry is sugar produced from beets, which includes an average of 78% of its sales, and by-products include 12% dry pomace, which its main customers are animal husbandry and farming companies, and 5% molasses, which is used in the alcohol industry (other products include Sugar is a fee and raw refined sugar). The target market of this industry is domestic (food industry, etc.) and the export share is practically zero. Therefore, this industry does not have foreign exchange income, and exchange rate fluctuations will not directly affect the companies' income.

5- Physical Progress of project: yes ☐ No ☒

This is a feasibility study report and it is studied and defined in order to cover the needs of the country and to export a part of the product abroad. This project has only been studied and not implemented.

6- Action plan and Implementation schedule:

The implementation of the project until its operation is planned for 36 months.

The timetable

	Month																	
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
Study																		
Licensing																		
Construction																		
Equip																		
Education																		
Exploitation																		

7- Financial projection:

8-1- The cost estimate:

The cost estimate

No.	subject	costs (million Rials)
1	Fixed investments	13225470
2	Operating costs	4479240
3	Financial costs	17704710

Fixed investment

No.	Subject	costs (million Rials)	
1	land purchase	4500000	
2	Site preparation and development	807300	
3	Civil works, structures and buildings	3112500	
4	Plant machinery and equipment	3455720	
5	Auxiliary and service plant equipment	550000	
6	Environmental protection	0	
7	Incorporated fixed assets (project overheads)	0	
8	Pre-production expenditures (net of interest)	Studies	24850
		Management and organization	124250
		license	29570
9	contingencies costs		621280
Total Fix investment			13225470

Operating cost

No.	Subject		costs (million Rials)
Variable cost			18972170
1	Material		16524460
2	Personnel		608730
3	Marketing (except personnel)		429230
4	Other variable costs	Fuel and energy	50740
		Maintenance and repair	455580
		Unpredicted costs	903430
Fixed cost			1029600
5	Material		0
6	Personnel		152430
7	Marketing (except personnel)		0
8	Depreciation		711820
9	Other fixed costs	Fuel and energy	11130
		Maintenance and repair	113900
		Unpredicted costs	13870
		insurance	26450
Total Operating cost			20001770

8-2- Estimated revenues:

Project revenues

No.	subject	Season 1	Season 2	Season 3	Season 4	Year 1	year2	year3	year 4	year 5
1	Cane produced from sugar of sugar beet	350000	350000	350000	350000	1400000	1487500	1575000	1662500	1750000
2	sugar produced from sugar beets	3730000	3730000	3730000	3730000	14920000	15852500	16785000	17717500	18650000
3	Dry beet pomace	79000	79000	79000	79000	316000	335750	355500	375250	395000
4	Ethanol 96 degrees	1564000	1564000	1564000	1564000	6256000	6647000	7038000	7429000	7820000
total		5723000	5723000	5723000	5723000	22892000	24322750	25753500	27184250	28615000

8-3-Duration of project operation:

In general, there are three types of project life cycle in production plans as follows:

- * Project life cycle or construction phase.
- * Life cycle of exploitation or production or production phase.
- * Product life cycle.

The life cycle of the project is the same as the construction phase of the project. In this phase, a lot of expenses are usually paid. A successful project is a project that completes this phase in less time and cost. In order to realize this part, project management techniques must be implemented along with correct and timely control, so that if there is a problem, it can be corrected in the planning phase.

The exploitation life cycle is in fact the production phase, which includes the service life of exploitation or production, which are usually designed for 15 years in the projects of processing and supplementary industries. During the exploitation process, we will have incomes and expenses due to the sale of the product. But the amount of income is usually more than the expenses, otherwise the project has no economic feasibility. Project management techniques should not be used in the operation life cycle. Rather, the methods of production plan and operation process are more suitable methods for planning. In industrial and agricultural projects during the operation period, only maintenance management should be done properly.

8-4-Break- even analysis:

fixed capital = Cost before exploitation + fixed costs

fixed capital = 178670 + 12160280 = 13225470

A- Total price of the product in Rials:

Total price of the product (Rials) = total product / sum of annual production costs

$$\text{Total price of the product (Rials)} = 20001770000000 / 75000000 = 266690$$

B- Annual break-even point percentage:

Annual break-even percentage = total fixed costs (TFC) / price (P) - (BEP)Variable cost (V)

$$\text{Annual break-even percentage} = 1029600 / 28615000 - 18972170 = \%11$$

The (P-V) value has its own importance and is called the contribution per unit margin. This amount of profit is per unit or in other words it is a part of each sale that compensates the fixed costs. As a result, the break-even point occurs when the total contribution of all units is equal to the total fixed costs. In other words, this number of sales covers more than 11% of fixed costs.

The relationship between the total sales revenue and the total costs shows that this plan generates 11% more than the annual break-even point during three production periods and creates a margin of safety for the production activity in the break-even analysis. In other words, the margin of safety represents the amount by which actual or forecasted sales exceed the break-even target by more than 11%.

C- Gross value added (million Rials)

Gross value added = total sales - (maintenance and repair + fuel and energy + raw materials and packaging)

$$\text{Gross value added} = 28615000 - (16524460 + 61870 + 569480) = 11459190$$

D- Net value added (million Rials)

Net value added = gross value added - (pre-operating depreciation + depreciation)

$$\text{Net value added} = 11459190 - (711820 + 35730) = 11351640$$

E- Net income and gross income (million Rials)

Gross income = the total cost of sales - sale revenue

Net income = (administrative cost, sales, advertising and other costs) – gross margin

$$\text{Gross income} = 28615000 - 1946090 = 9068908$$

$$\text{Net income} = 9068908 - (402780) = 8666128$$

F- Fixed capital per capita (million Rials)

Fixed capital per capita = number of personnel/fixed capital

$$\text{Fixed capital per capita} = 13225470/296 = 44680$$

G- Total investment per capita (million Rials)

Total investment per capita = number of personnel/total investment

$$\text{Total investment per capita} = 17704710/296 = 59813$$

H- Annual rate of return

Annual rate of return = total investment/total cost-total income

$$\text{Annual rate of return} = 28615000 - 20001770 / 17704710 = \%49$$

I- Annual payout period

$$\text{Payback Period} = \frac{1}{\text{IRR}} + \text{The duration of the construction period}$$

$$\text{Annual payout period} = 5 \text{ years and 2 months}$$

8-5- Cost-benefit analysis:

The table of project efficiency indicators

total fixed investment Present value	20001770
total net revenue Present value	28615000
Net present value (NPV)	12456849
benefit - Cost ratio B/C	1/4
Internal rate of return (IIR)	%44

8-6- Sensitivity analysis of IRR:

Sensitivity of IRR

Discount rate (percentage)	Net present value (NPV)
10	38988227
20	16284695
30	6267885
40	1274222
50	-1439524
60	-3001136
70	-3930215
80	-4489331
90	-4821401
100	-5008991

8-7- Summarize table:

"Summary of economic issues"

activity	International Standard Industrial Classification (ISIC Code)	product name	Nominal capacity (unit)
Producing sugar from sugar beet	1542412308 1542512321 1542512336 15511112	Refined sugar from sugar beet Cane sugar from refined sugar from sugar beet Ethyl alcohol from sugar beet molasses	75000 (Ton)
Activity duration	Fix investment (million Rials)	Variable investment (million Rials)	Human resources
15 years	13225470	4479240	296 people

Internal rate of return (IRR)	Net present value (million Rials)	Owners share (million Rials)	Benefit-cost ratio *B/C
%44	12456849	17704710	1/4

8-8-Estimation of exchange rate changes during the project implementation:

The buying and selling prices are influenced by the market prices and they are highly influenced by the increase in the exchange rate in the market. Therefore, exchange rate fluctuations regarding the purchase of foreign equipment will be partially compensated by the income from sales, and exchange rate fluctuations will have little effect on the evaluation results. Therefore, in the construction and implementation phase, if the financing of the project is through foreign currency sources, the number of financial resources required will not change much.

8- Capital needs, the supply and guarantees method:

9-1- Foreign currency needed:

A significant portion of the plan's fixed capital investment is in IRR. The total plan investment is estimated to be 17.5 million Euros Of this amount, the equivalent of 6.7 million Euros is projected in foreign currency, the payment of which is planned over three years (36 months, in line with the physical progress of the plan).

Required (fixed) foreign currency capital (Million Euros)

No.	year	Exchange rate
1	first	2.1
2	second	2.1
3	third	2.5
4	fourth	0

5	fifth	0
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9-2- The Way of participation and finance method:

Participation in this plan and its financing are envisioned through the establishment of a company within the country. All the required financial resources are projected to be provided through the investor's capital contribution, and no domestic bank facilities have been considered for the plan's implementation.

9-3- Payback period:

The time of investment return in this project is based on the amount of fixed and variable capital and annual production sales after about **5 years and 2 months** of investment, or in other words, the project investment will be returned.

9- Incentives, features and advantages of project:

Regarding the benefits of establishing the plan in the special economic zone, the following can be mentioned:

- Commercial exchanges of the zones with countries outside of Iran, or with other special economic zones and free trade and industrial zones, after registration in customs, are exempt from customs duties, commercial profits, and all import and export duties under any title, and are not subject to the restrictions and prohibitions of import and export regulations, with the exception of legal and religious restrictions and prohibitions. Commercial exchanges of the zones with other parts of the country, with the exception of the aforementioned zones, are subject to export and import regulations.
- The entry of goods from outside the country or free trade-industrial zones into the zone will be carried out with minimal customs formalities, and the

domestic transit of imported goods into the zone will be carried out in accordance with the relevant regulations.

- Goods that are imported into the zone from outside the country or from free trade-industrial zones or other zones can leave the country without any formalities.
- The zone's management can, after classifying and valuing the zone, transfer the right to use parts of it to eligible natural or legal persons.
- Owners of goods imported into the zone can declare all or part of their goods to customs for temporary entry into the country and clear them by complying with the relevant regulations.
- Goods produced or processed in the zone, upon entering other parts of the country, are permitted and considered domestic products up to the total value added and the value of domestic raw materials and domestic parts used in them, and will be exempt from paying import duties.
- Foreign raw materials and components utilized in produced or processed goods are permitted and considered as domestic raw materials and components, subject to the payment of import duties.
- The management of each zone is authorized, upon request of the applicant, to issue certificates of origin for goods that leave the zone, subject to the approval of the Customs of Iran. The country's banks are obligated to accept the aforementioned certificate.
- The customs office is obligated to accept the request of the owners of goods for the transit of goods and direct transport from other entry points to the zones, and to provide the necessary facilities in this regard.
- The National Organization for Registration of Deeds and Properties is obligated to register companies or branches of representative offices of companies that intend to operate in the zone, regardless of the amount of domestic or foreign shareholding, as well as registering tangible and intangible property rights in the zone.

- All goods required for the production or provision of services needed by the zone are exempt from the general export and import regulations.