

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

"Summary of technical-economical prefeasible study"

The name:

Production of Melamine Crystal

Sector: **industry** subsector: **Chemical industries** ISIC code: **2411412698**

The owner of:

General Directorate of Economic and Financial Affairs of Kermanshah Province

Counselor plan:

Razi University of Kermanshah

The ADDRESS:

Harsin, Kermanshah Province

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Manager of Iran Investment Opportunities
SHAHRIG Engineering Company

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1- Abstract:

PROJECT PROFILE - SUMMARY SHEET

Project Introduction	
1- Project title: Production of Melamine Crystal	
2- Sector: Industry	Sub Sector: Chemical industries
3- Products / Services: Melamine Crystal	
4- location (address):	
Free Zone <input type="checkbox"/>	Economic Special Zone <input type="checkbox"/>
Industrial Estate <input checked="" type="checkbox"/>	Main Land <input type="checkbox"/>
5- Project description: <p>For this industrial unit with an annual capacity of 8,000 tons of Melamine Crystal and derivatives, the required land is estimated to be 6,000 square meters. Considering the purchase price of 30 million Rials per square meter in Gilan Gharb Industrial Town, the total cost of land acquisition amounts to 180 billion Rials. The site preparation includes leveling 6,000 square meters, constructing 2,000 square meters of walls and fencing, installing one metal entrance gate, and creating 900 square meters of green space and lighting, with an estimated cost of 51.5 billion Rials.</p> <p>Construction includes the production hall (2,000 square meters), raw material and parts warehouse (500 square meters), product warehouse (300 square meters), design unit (100 square meters), laboratory and quality control unit (150 square meters), administrative building (200 square meters), dining hall and canteen (200 square meters), security and caretaker rooms (60 square meters), power and generator room (60 square meters), and restrooms (100 square meters), totaling 3,670 square meters with a cost of 670.5 billion Rials. Additionally, the infrastructure includes electricity (250 kW connection), water (1-inch connection), gas, diesel (5,000-liter tank), and gasoline (5,000-liter tank) with a cost of 5.2 billion Rials.</p>	

Project Status	
6- Local / internal raw material access: 70 %	
7- Sale :	
- Anticipated local market : 40 %	
- Anticipated export market : 60 %	
8 – Project total time (from start of activities to start of commercial operation in years) : 15 months	
Schedule	Start of activities: Month 1 to 4 (4 months) Start of works at site : Month 5 to 10 (6 months) End of Works: Month 11 to 14 (4 months) Start of commercial operation: Month 15 (1 month)

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? **No**
- 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	7290875	500000 Rial	14.58	9.68	24.26
Current Capital	4147421	500000 Rial	8.3	-	8.3
Total Investment	11438296	500000 Rial	22.88	9.68	32.56

- Value of foreign equipment / machinery **9.6** Million Euro
- Value of local equipment / machinery **0.4** Million Euro
- Value of foreign technical know-how **-** Million Euro
- Value of local technical know-how **-** Million Euro
- Net present value (NPV) **20.04** Million Euro
- Internal Rate of Return (IRR) **60.79** %
- Capital Rate of Return: **52.8** %
- Payback Period **2 years and 11 months**

General Information

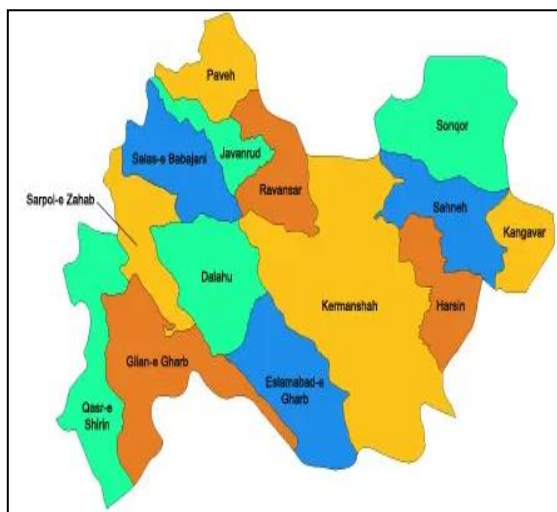
11 - Project type: Establishment ☒ Expansion and completion ☐

12- Company Profile

- Name (Legal / Natural persons): **Industry, Mine and Trade organization**
- Company's current activities: **Government services**
- Address: **Next to the Blood transfusion organization, Shahid Beheshti Blvd., Kermanshah**
- Tel: **08338239160** Fax: **08338239157**
- E-mail: Web Site: **www.ksh.mimt.gov.ir**
- Company's legal structure:
 Government ☒ Non-Governmental ☐ Public non-governmental ☐

2- Project's location:

2-1- Province: **Kermanshah**



Kermanshah Province, located in a mountainous area in western Iran with an area of 25,900 square kilometers, shares a 370-kilometer border with Iraq. It is bordered to the north by Kurdistan Province, to the south by Lorestan and Ilam Provinces, to the east by Hamadan Province, and to the west by Iraq. The capital of the province is the city of Kermanshah, and the province currently has 14 counties, 21 cities, 31 districts, 86 rural districts, 2,793 inhabited villages, and a population of about 2 million people. Positioned on the main transit routes from east to west and from the northwest to the southern regions of Iran,

Kermanshah serves as a key corridor for goods and services to Iraq and for pilgrims traveling to holy sites. It is strategically located near major economic hubs in Iran.

Due to its geographical location amidst the Zagros mountain range, Kermanshah Province enjoys diverse climates, earning it the nickname "the four-season province."

The province has numerous advantages, including a long border with Iraq, access to extensive land and air transportation networks, a significant number of technical and vocational training centers, 2,796 kilometers of roadways, a strategic location on the Silk Road and pilgrimage routes, and status as a hub for healthcare and medical education in western Iran. Kermanshah also hosts the Kermanshah Refinery, Bistoon Power Plant, oil and gas reserves, and the Shahid Ashrafi Esfahani International Airport, the largest airport in western Iran. It has considerable capacity for exporting technical and engineering services, particularly to Iraq in fields such as energy, infrastructure, and dam construction.

The province boasts a skilled and available workforce, several state and private higher education institutions, and a secure, favorable environment for attracting domestic and foreign investment. Kermanshah is well-suited for expanding economic and commercial ties with Iraq and the Kurdistan Region. Additionally, it is situated on the main pilgrimage route to Karbala and other tourist routes in northwestern and western Iran, serving millions of pilgrims and travelers.

Infrastructure development has been supported with essential resources like water, electricity, and gas for projects across 23 industrial zones. The province is home to the official customs points of Khosravi and Parviz Khan in Qasr-e Shirin, as well as border markets in Shushemi, Nowsud, Sheikh Saleh (Salas-e Babajani), and Sumar. Kermanshah has a high ecotourism potential due to its varied climate, forests, and biodiversity. It also includes the Qasr-e Shirin Free Trade-Industrial Zone, the Eslamabad-e Gharb Special Economic Zone, and is connected by the Iran-Iraq-Syria railway. There are eight operational dams with a total storage capacity of 832 million cubic meters, further enhancing the province's developmental capabilities.

Kermanshah Province boasts substantial industrial and mineral capabilities, including large-scale industries like Bistoon Petrochemical, Kermanshah Petrochemical, Steel Rolling and Jahan Foolad Gharb, Saman Cement, West Cement, Propylene Production, and

Kermanshah Refinery. The province is rich in natural oil and gas resources, building materials such as decorative stones, gypsum, rubble stone, and lime, as well as metallic and non-metallic mines, including iron ore, silica, and feldspar. The availability of abundant labor, experienced professionals in hand-woven carpet design, and the presence of natural bitumen (gilsonite and bitumen), which can be processed and exported, distinguishes Kermanshah from other provinces in western Iran. Additionally, the province's non-metallic minerals and upstream industries offer unique opportunities for industrial expansion.

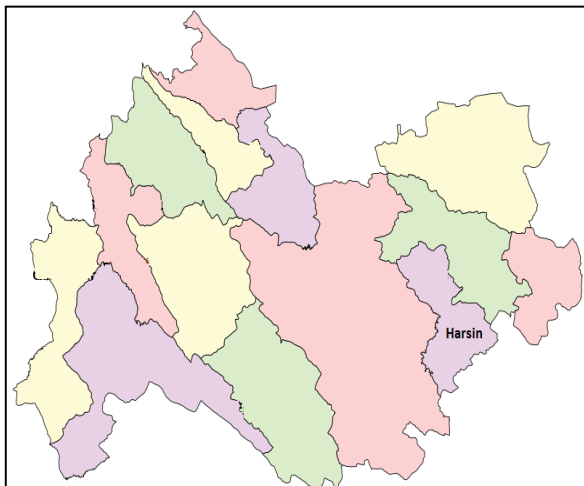
Kermanshah's agricultural and livestock sector is also notable, with 22 reservoirs and 9 billion cubic meters of water resources, 946,871 hectares of agricultural land (227,500 of which are irrigated), and 208 species of medicinal plants. The province enjoys an average annual rainfall of 537 millimeters and has 925,871 hectares of pasture and 527,404 hectares of forest. This environment supports the production of 20,281 tons of canola, 477,910 tons of wheat, 326,000 tons of barley, and 14,903 tons of sunflower seeds (for both oil and nuts). Additionally, the province houses 1,038 livestock and poultry farms, supporting 2,971,153 small livestock and 300,519 large livestock, with an annual production of 120,405 tons of red meat, 36,450 tons of white meat, and 83,955 tons of poultry and fish. The province also has 182 agricultural processing units.

Kermanshah is historically rich, holding the third-largest number of historical sites in Iran, following Shiraz and Susa. Prominent landmarks include Bisotun and Taq-e Bostan in the Kermanshah metropolitan area, six tourism zones, 14 tourism centers, and over 100 attractions, such as Taq-e Bostan, the traditional bazaar, Jameh Mosque, Sarab Nilufar, the ancient Ganjar Tepe, Darius's inscription, Shah Abbasi Caravanserai, Anahita Temple, Sarab Darband Sahneh, Rijab River, Yazdgerd Fortress, Abu Dujana's Tomb, Quri Qaleh Cave, Sarab Ravansar, Rijab Waterfall, and the villages of Hajij and Shamsir.

The province's cultural diversity, including distinctive architecture like Tekyeh Moaven-ol-Molk and Tekyeh Biglarbeigi, and the rich heritage of ethnic traditions, local attire, dialects, customs, religious practices, and music, presents excellent potential for cultural and ethnographic tourism. It has developed infrastructure for cross-border commerce and travel at the Khosravi and Parviz Khan international borders, creating opportunities for investment in health tourism and medical tourism.

Key attractions include UNESCO-listed sites such as the Bisotun complex, Taq-e Bostan, Anahita Temple, Taq Gara, and protected wildlife areas, offering eco-tourism options for flora and fauna enthusiasts. The province's natural landscapes are ideal for sports tourism, with possibilities for paragliding, exploring the Simreh cliffs, water sports on dam reservoirs, caving, mountaineering, and scenic spots like Sarab Karand and the Bisotun-Taq-e Bostan tourism corridor, as well as destination villages like Shamsir and Fesh. Together, these resources position Kermanshah as a prime location for tourism development.

2-2- the County: **Harsin**



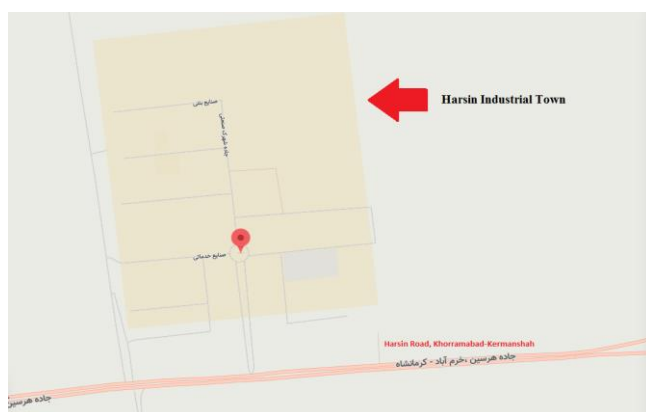
Harsin is a county located in the eastern part of Kermanshah Province, with a population of around 80,000. It is bordered by Sahneh County to the north, Lorestan Province to the east, Kermanshah to the west, and Kakavand District to the south. The residents of Harsin are primarily Kurdish and Lak. The county comprises two districts, Bisotun and Central, two cities, Harsin and Bisotun, and four rural districts. Harsin is known for its unique climate and rich

historical heritage, including numerous ancient sites like the Ganj Dareh Hill (Chia Khezeh), the Eshaqvand Rock Tomb, Shamsabad Tomb, Bisotun Inscription, Hercules Statue, Harsin Castle, Doz Bar Fortress, Sarmaj Fortress, Stone Pool (Clock Pool), Stone Arch, Stone Stairs, Takhte Shirin, Sassanian Wall, Khosrow Bridge, and the Bisotun Columns.

Harsin is also a significant mining hub in Kermanshah Province, containing over a third of the province's mines. The mineral deposits in Harsin include decorative and marble stones, limestone, and manganese. The county has two major mines: one for decorative and marble stones and another for manganese. Both are operational, with ongoing stone extraction.

Harsin has 69 active industrial units, making up 7.2% of the industrial units in Kermanshah Province, ranking it second in industrial development within the province. The county has attracted significant industrial investment, totaling 10,662 billion rials, also ranking second in the province for industrial investment. Major industries in Harsin include the Karp Naz factory, Kermanshah Petrochemical plants, Urea and Ammonia Plant, Jahan Foolad Gharb Steel Complex, Bistoon Dairy, and Bistoon Sugar Factory.

2-3- the project:



The proposed location for establishing the Harsin Industrial Town is at the UTM coordinates (34.1462, 45.9343). This site offers excellent access to essential infrastructure, including water, electricity, gas, and transportation networks, and complies with environmental guidelines and recommendations.

2-4-access to the infrastructures:

No.	Needed infrastructures	distance to the project	The supply infrastructures
1	Water	Less than 1 km	Harsin Industrial Town
2	Electricity	Less than 1 km	Harsin Industrial Town
3	Gas	Less than 1 km	Harsin Industrial Town
4	Telecommunications	Less than 1 km	Harsin Industrial Town
5	High way	Less than 1 km	Ministry of Roads and Urban Development - Kermanshah
6	Sub way	Less than 1 km	Ministry of Roads and Urban Development - Kermanshah
7	Airport	60 km	Shahid Ashrafi Kermanshah Airport
8	Port	1,415 km	Iranian Ports and Maritime Organization - Bandar Abbas
9	Rail way	60 km	Kermanshah Rail way

3- Technical Specifications of plan:

3-1 –product: **Melamine crystal**



Melamine crystal is an important chemical derivative obtained from the combination of two main substances: melamine and formaldehyde. Melamine is an organic compound with the chemical formula $C_3H_6N_6$, composed of three amine (NH_2) groups. This substance is naturally white, odorless, and stable at high temperatures. When melamine reacts with formaldehyde, a thermosetting resin known as melamine-formaldehyde is formed. After final curing, this resin solidifies and becomes insoluble, making it a hard and durable material. The process of

producing melamine crystals includes various stages such as polymerization, molding, and thermal curing, which ultimately result in a product with high physical and mechanical properties (Smith & Jones, 2019).

Due to its strong polymer structure, melamine crystal exhibits outstanding physical and chemical properties. One of the most important characteristics of this material is its high resistance to heat. It can withstand very high temperatures without undergoing deformation or physical degradation. This makes it highly suitable for use in dinnerware, which requires resistance to high food temperatures. Additionally, melamine crystals show good resistance to water and moisture, which is why they are used in products intended for humid environments such as bathrooms and kitchens. Moreover, this material is highly resistant to scratches, wear, and chemicals, making it ideal as a protective coating in various industries (Brown et al., 2020).

The production process of melamine crystals involves several key stages. First, melamine and formaldehyde react in the presence of a catalyst under controlled conditions to form an initial polymer. The polymer is then subjected to a molding process, where the final shape of the product is determined. After molding, the pieces are transferred to the thermal curing stage, where the resin is converted into a hard, insoluble material. This process ensures that the final product possesses excellent mechanical and thermal properties (Williams, 2021).

The molecular structure of melamine crystal consists of long polymer chains formed by strong covalent bonds between molecules. These strong bonds create a complex three-dimensional network, which naturally makes the material very hard and resistant. Its structure makes it highly resistant to breaking, cracking, and mechanical deformation. Additionally, due to its high molecular density, melamine crystal has outstanding insulating properties, making it suitable for many electrical applications. Another important feature of this material's structure is its stability against ultraviolet (UV) radiation, which ensures it does not yellow or discolor over time (Johnson & Lee, 2022).

Melamine crystal, due to its outstanding properties, is used in a wide range of industries. One of its main applications is in the production of dinnerware and kitchen items that require resistance to high temperatures, impact, and constant washing. These items are typically lightweight, durable, and have a smooth, glossy surface. In the furniture industry, melamine crystal is used as a protective coating on wooden surfaces, making them resistant to scratches, stains, and moisture. In the construction industry, melamine is used as a heat and fire-resistant material in wall and ceiling coatings. The automotive industry also uses this material for producing durable interior car parts. Furthermore, melamine crystal is used in the production of laminates and decorative coatings, where its smooth, shiny, and durable surface enhances the aesthetic appearance of the products (Smith et al., 2018).

Recent research in the field of melamine crystal has led to improvements in production processes and the enhancement of its efficiency. One significant innovation in this area is the use of nanoparticles to reinforce the mechanical and thermal properties of melamine crystal. These nanoparticles can significantly increase heat and scratch resistance, as well as provide better insulating properties. Additionally, the use of specific chemical additives can reduce production costs and improve the environmental sustainability of these products (Doe & Smith, 2020).

Given the broad properties and applications of melamine crystal, it is expected that this material will continue to attract attention from various industries in the future. Ongoing research is focused on improving its properties and reducing production costs. This includes the development of melamine resins with greater environmental resistance and increased recyclability. Moreover, given the growing demand for high-performance materials in advanced industries, melamine crystal may play a significant role in the development of new products (Green & Black, 2023).

Establishing a melamine crystal production unit in the city of Harsin is economically and technically justified for several reasons. Harsin, due to the availability of rich raw material resources (such as natural gas and petrochemical products), skilled and affordable labor in the region, and access to domestic and international markets through a well-developed transportation network, can increase the productivity and profitability of this industrial unit. Additionally, government support and industrial development programs for less developed areas in Kermanshah province can reduce initial investment costs and increase the economic return of the project.

3-2-project's requirements:

3-2-1-Space and infrastructure required:

A- **Land:** The minimum required land area is estimated to be 6,000 square meters. Considering the purchase price of 30 million rials per square meter in the Harsin Industrial Park, the total land acquisition cost is estimated to be 180 billion rials, which is equivalent to 360,000 Euros (with the exchange rate of 1 Euro = 500,000 rials).

Land Area (Square Meters)	Unit Price (Billion Rials)	Total Price (Billion Rials)	Total Price (Thousand Euros)
6000	0.03	180	360

B- **Site Development:** The cost of site development for the project includes leveling, wall construction and fencing, entrance gate, landscaping, and other related works. A detailed breakdown of these items and their associated costs is provided in the table below:

Row	Deescription	Area	Unit Price (Billion Rial)	Total Cost (Billion Rial)	Total Cost (Thousand Euros)
1	Leveling, Excavation, and Backfilling	6000	0.005	30	60
2	Wall Construction, Fencing, and Site Development	2000	0.04	80	160
3	Street Construction, Sidewalk, Parking, and Asphalt (20% of Land Area)	1200	0.03	36	72
4	Green Spaces and Lighting (15% of Land Area)	900	0.005	4.5	9
5	Metal Entrance Gate	-	1	1	2
	Total			151.5	303

C- Building Costs: Based on the dimensions of the machinery and equipment, the minimum required workspace is suggested as follows:

No.	Deescription	Area	Unit Price (Billion Rial)	Total Cost (Billion Rial)	Total Cost (Thousand Euros)
1	Production Hall	2000	0.20	400	800
2	Raw Materials and Parts Storage	500	0.15	75	150
3	Product Storage	300	0.15	45	90
4	Design Unit	100	0.15	15	30
5	Laboratory and Quality Control	150	0.15	22.5	45
6	Administrative Building	200	0.20	40	80
7	Dining Hall and Cafeteria	200	0.20	40	80
8	Security and Caretaker Room	60	0.15	9	18
9	Power Room and Generator	60	0.15	9	18
10	Restrooms	100	0.15	15	30
Total		3760	-	670.5	1341

D- Infrastructure and Utilities Costs: Based on an operational schedule of 270 working days per year with one 8-hour shift, the following utility and infrastructure costs are proposed:

No.	Utility	Technical Specifications	Daily Consumption / Hour	Hours per Shift	Working Days	Concurrent Use Factor	Maximum Annual Consumption in Industrial Unit	Total Cost (Billion IRR)	Total Cost (Thousand EUR)
1	Electricity	250 kW connection	250 kW	8 hours	270	0.8	43,200 kW	5	10
2	Water	1-inch connection	16.5 cubic meters	1 shift	270	-	4,455 cubic meters	0.1	0.2
3	Gas	-	225 cubic meters	1 shift	270	-	60,750 cubic meters	0.04	0.08
4	Diesel	5,000-liter tank	60 liters	1 shift	270	-	16,200 liters	0.03	0.06
5	Gasoline	5,000-liter tank	60 liters	1 shift	270	-	16,200 liters	0.03	0.06
Total								5.2	10.4

3-2-2-Equipment and m achinery:

The equipment and machinery required for this industrial unit to achieve an annual production capacity of 8,000 tons are estimated to cost approximately 5,040 billion IRR, equivalent to 10,080 thousand EUR. The detailed list of necessary equipment is as follows:

No.	Equipment/ Machinery	English Title	Specifications	Quantity	Unit Price (Billion Rials)	Total Price (Billion Rials)	Total Price (Thousand Euros)
1	Melamine Production Reactor	Melamine Reactor	Production capacity: 10,000 tons/year, stainless steel, equipped with temperature and pressure controls	4	300	1,200	2,400
2	Distillation Tower	Distillation Tower	Melamine separation from by-products, height: 40 meters, diameter: 7 meters	2	200	400	800

3	Filter Press	Filter Press	Solid-liquid separation, filter area: 100 square meters	4	70	280	560
4	Dryer	Dryer	Melamine crystal drying, capacity: 10,000 kg/hour	4	100	400	800
5	Mill	Mill	Grinding melamine crystals to desired particle size	4	50	200	400
6	Packaging System	Packaging System	Final product packaging in 25 kg bags	2	40	80	160
7	Boiler	Boiler	Providing steam for the process	2	150	300	600
8	Cooling Tower	Cooling Tower	Cooling water used in the process	2	70	140	280
9	Pumps and Compressors	Pumps & Compressors	Fluid and gas transfer within the process	40	15	600	1,200
10	Raw Material Storage Tanks	Raw Material Storage Tanks	20,000 liters capacity, carbon steel	4	50	200	400
11	Pipes and Fittings	Pipes and Fittings	Various (e.g., stainless steel, PVC)	-	-	200	400
12	Control Systems	Control Systems	PLC, touchscreen, sensors	1	200	200	400
13	Laboratory Equipment	Laboratory Equipment	Various (e.g., ovens, analyzers)	10	40	400	800
14	Forklifts	Forklifts	2-ton, electric	2	50	100	200
15	Electrical Distribution	Electrical Distribution	Switchgear, cables, etc.	-	-	80	160
16	Safety and Environmental Equipment	Safety & Environmental Equipment	Fire extinguishers, safety showers, etc.	-	-	50	100
17	Office Equipment	Office Equipment	Tables, chairs, etc.	-	-	20	40
18	Emergency Generator	Emergency Generator	770 kWh	1	-	40	80
19	Heating and Cooling	Heating and Cooling	Cooler, heater, etc.	-	-	40	80
20	Central Phone and Communication	Central Phone and Communication	PBX system, IP phones, switches, routers, racks, Ethernet cables, conferencing systems, call recording, computers, implementation and maintenance services, CRM software, and other required software	-	-	80	160
21	Light Trucks	Light Trucks	6-ton Force	1	20	20	40
22	Service Vehicles	Service Vehicles	Dena Plus	1	10	10	20
Total						5040	10080

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

For the production of melamine crystals, the raw materials and intermediate components of the production process are as follows:

❖ **Main Raw Materials:**

- **Urea:** The primary raw material for melamine production. Urea is produced from ammonia and carbon dioxide.
- **Ammonia:** Used as a catalyst and to create an alkaline environment during the reaction.
- **Carbon Dioxide:** Used in the production of urea and for pH adjustment.

❖ **Intermediate Chemicals (for Chemical Activation):**

- **Catalysts:** Used to accelerate reactions and reduce the required temperature. Common catalysts include metal oxides such as silicon oxide, aluminum oxide, and zirconium oxide.
- **Solvents:** Used to dissolve certain reactants and products. Water is the most commonly used solvent in the melamine production process.

❖ **Intermediate and Consumable Parts:**

- **Heat Exchangers:** Used for controlling the temperature of the reaction.
- **Pumps:** Used for transferring materials during the process.
- **Filters:** Used for separating solids from liquids.
- **Reaction Vessels:** Used for carrying out chemical reactions.
- **Distillation Columns:** Used for separating and purifying products.

❖ **Water and Fuels:**

- **Water:** Used for cooling, washing, and steam generation.
- **Fuels:** Used to supply the necessary energy for the process, such as heating reactants and generating steam.

❖ **Melamine Production Process:**

- **Urea Production:** Ammonia and carbon dioxide react in a high-pressure, high-temperature reactor to produce urea.
- **Urea Decomposition:** Urea is decomposed in another reactor under high temperature and pressure to produce melamine and ammonia.
- **Crystallization:** Ammonia vapor is separated from the reaction mixture, and melamine is recovered through crystallization from the solution.
- **Drying:** The melamine crystals are dried and then prepared for packaging.

"Table of the ratio or amount of raw materials or intermediate components used in the production of each ton of melamine crystals."

Materials/Components	Consumption Ratio or Amount per Ton	Approximate Unit Price (Million Rials)
Urea	2 tons	170
Ammonia	1 ton	64
Carbon Dioxide	1 ton	42
Catalysts	100 kg	85
Solvents	2 tons	4
Heat Exchangers	4 units per 100 tons	1
Pumps	4 units per 200 tons	1
Filters	4 units per 100 tons	0.5
Reaction Vessels	10 units per 100 tons	3.5
Distillation Towers	2 units per 100 tons	4

3-2-4-management and human resources:

The following table estimates the number of personnel required to set up a production line with a nominal capacity of 8,000 tons per year. Implementing this production unit will not face any issues regarding workforce availability and will contribute significantly to job creation in the region.

No.	Description	Activity Type	Skill Level	Quantity (People)	Basic Salary (Million Rials)	Annual Salary (Million Rials)
1	CEO	Non-Production	Specialist	1	150	1800
2	Production Manager	Non-Production	Specialist	1	150	1800
3	Process Engineer	Non-Production	Specialist	1	150	1800
4	Quality Control Technician	Production	Skilled	1	130	1560
5	Production Line Operator	Production	Skilled	10	130	15600
6	Unskilled Worker	Production	Unskilled	15	120	21600
7	Maintenance Technician	Production	Skilled	1	130	1560
8	Laboratory and Quality Control Specialist	Non-Production	Skilled	1	130	1560
9	Health and Safety Specialist	Non-Production	Skilled	1	130	1560
10	Procurement and Purchasing Officer	Non-Production	Skilled	1	130	1560
11	Accountant	Non-Production	Skilled	1	130	1560
12	Warehouse Manager	Non-Production	Skilled	1	130	1560
13	Warehouse Staff	Non-Production	Skilled	2	130	3120
14	Security Guard	Non-Production	Unskilled	3	120	4320
15	Administrative Officer	Non-Production	Skilled	1	130	1560
16	Administrative Staff	Non-Production	Unskilled	3	120	4320
17	Cleaning and Services	Non-Production	Unskilled	2	120	2880
18	Internal Transport Driver	Production	Skilled	4	130	6240
Total				50	-	75960
Employer's Benefits and Bonuses (Equivalent to 60% of Total Salary)						45576
Grand Total						121536

No.	Skill Level	Quantity (People)	Basic Salary (Rials)
1	Specialist	3	150,000,000
2	Skilled	24	130,000,000
3	Unskilled	23	120,000,000

- Number of skilled personnel required: **24** Persons
- number of non- skilled personnel required: **23** Persons
- number of expert personnel required: **3** Persons

4- Ownership and legal permission:

4-1- ownership of land:

Given that the industrial unit is proposed to be located in the Harsin Industrial Park, the land ownership belongs to the Industrial Estates Company of Kermanshah Province. Through a contract and as part of supporting the establishment of industrial units in underdeveloped areas, the land is transferred to investors by collecting 10% of the price upfront, with the remaining amount payable in long-term installments. Once the industrial unit obtains its operating license and begins trial production, the ownership deed is transferred to the unit.

Establishing industrial units in industrial parks offers multiple benefits for production facilities and the national economy. These benefits include reducing production costs, facilitating market access, improving productivity, enhancing product quality, creating employment opportunities, and supporting sustainable development. Additional advantages of locating in industrial parks include the following:

❖ **Infrastructure and Service Advantages:**

- **Easy Access to Essential Infrastructure:** Industrial parks are typically equipped with essential networks such as water, electricity, gas, sewage, and telecommunications. This reduces the initial investment costs for production units.
- **Shared Facilities:** Many industrial parks offer shared facilities like wastewater treatment plants, fire stations, technical and engineering service centers, police stations, healthcare centers, and more. The shared use of these facilities reduces the operational costs of the units.
- **Access to Suitable Transportation:** Most industrial parks are connected to road and rail networks, facilitating the transportation of raw materials and finished products.
- **Availability of Ready Land:** Industrial parks provide ready-to-use land designated for industrial purposes, allowing production units to acquire the necessary land with minimal difficulty and time.
- **Presence of Research and Technology Centers:** Some industrial parks have research and technology centers that can support improvements in product quality and production processes.

❖ **Economic and Legal Advantages:**

- **Tax Incentives:** Production units located in industrial parks benefit from tax advantages, such as tax exemptions and investment incentives.
- **Simplified Licensing Process:** The process of obtaining the necessary licenses for setting up an industrial unit is usually simpler and faster in industrial parks compared to other areas.
- **Banking Facilities:** Access to bank financing and the advantage of using guarantee funds are more readily available for production units located in industrial parks.
- **Reduced Administrative Costs:** Being in an industrial park facilitates the licensing process and administrative procedures, reducing related time and costs.
- **Formation of Industrial Clusters:** The concentration of similar or related production units within an industrial park enables the formation of industrial clusters, leading to increased productivity, cost reduction, and improved product quality.

❖ **Environmental and Social Advantages:**

- **Pollution Control:** Industrial parks are subject to environmental laws and regulations, which facilitate the control of industrial pollution and the protection of the environment.
- **Job Creation:** The establishment of production units within an industrial park generates employment in the region and contributes to its economic development.
- **Improvement in Living Standards:** The development of industrial parks and their social responsibility toward surrounding areas can help improve infrastructure and raise the standard of living for local residents.

4-2- Intellectual property and incentives:

Intellectual property (IP) refers to exclusive rights granted to an individual or organization to protect their intangible assets, such as inventions, industrial designs, utility models, trademarks, brand names, geographical indications, and copyrights. Registering intellectual property prevents the unauthorized copying of ideas, products, and processes, allowing the holder to gain competitive advantages. Strong intellectual property not only enhances brand value and product credibility but can also attract investors. It is possible to generate revenue by licensing the use of intellectual property to others. In the context of establishing an industrial unit for melamine crystal production, intellectual property is a crucial concept and can significantly impact the success and growth of the business. Below are some of the most important aspects of intellectual property and rights in this area:

- **Inventions:** If a new or improved method for producing melamine crystals, or any specific devices or equipment for the process, has been developed, a patent can be applied for. A patent grants exclusive rights to use, produce, and sell the invention.
- **Industrial Designs:** If the final product (melamine crystals) or its packaging has a unique and aesthetically pleasing design, an industrial design registration can be applied for. This prevents others from copying the design of the product.
- **Utility Models:** If a tool or equipment used for the production of melamine crystals has a new and useful shape, a utility model can be registered. This protects innovative features that improve the functionality or efficiency of the production process.
- **Trademarks:** Any brand name, logo, or symbol used to identify the products and services should be registered as a trademark. This helps maintain brand identity and prevents unauthorized use of the brand elements.
- **Copyright:** If any written materials, instructions, or other creative works have been created for the production of melamine crystals, they are protected under copyright laws, safeguarding the rights of the authors.
- **Trade Secrets:** The technical knowledge and specialized information related to the melamine crystal production process are valuable assets. Through confidentiality agreements and other legal tools, this knowledge can be protected from unauthorized disclosure.

4-3-legal permission:

To establish and operate a melamine crystal production unit in the Harsin Industrial Park, Kermanshah, obtaining several legal permits is essential. These permits are issued by various organizations and authorities to ensure compliance with environmental, safety, technical standards, and other mandatory regulations. The most important permits required are:

- **Industrial Establishment Permit (Establishment License):** This permit is issued by the Industry, Mining, and Trade Organization of Kermanshah Province. To obtain this permit, it is necessary to provide a technical and economic feasibility study, company registration documents, and other required documents.
- **Environmental Permit:** This permit is issued by the Department of Environment. To obtain this permit, an Environmental Impact Assessment (EIA) of the project must be conducted, and a waste management plan for the industrial unit must be submitted.
- **Safety and Health Permit:** This permit is issued by the Ministry of Cooperatives, Labor, and Social Welfare of Kermanshah Province. To obtain this permit, compliance with occupational safety and health standards in the industrial unit is mandatory.
- **Fire Safety Permit:** This permit is issued by the Fire Department. To obtain this permit, the industrial unit must meet fire safety standards in its buildings and equipment.

- **Utility Permits (Electricity, Water, and Gas):** These permits are issued by the relevant utility companies: the Electricity Distribution Company, the Water and Wastewater Company, and the Gas Company of Kermanshah Province. To obtain these permits, precise calculations of electricity, water, and gas consumption and compliance with related standards are required.
- **Construction Permit:** This permit is issued by the Industrial Parks Company of Kermanshah Province and is required for the construction and equipping of the industrial unit.
- **Industrial Operating License:** This license is issued by the Ministry of Industry, Mine, and Trade and represents the legal authorization to operate the industrial unit.

5- Market study and Competition:

Melamine crystal, as a vital raw material in various industries including the production of melamine-formaldehyde resins, coatings, adhesives, reinforced plastics, kitchenware, furniture coatings, and industrial components, holds significant importance. The market for this product is influenced by various factors such as the demand from consumer industries, raw material prices, production technologies, and competition among manufacturers. With the growth of consumer industries and increasing demand for melamine-based products, the market for this product is expected to continue expanding. However, producers must focus on improving efficiency, reducing costs, developing new products, and adhering to environmental standards in order to maintain their competitiveness. Therefore, understanding and analyzing the market can ensure and enhance the success of the industrial unit in this growing market.

A comprehensive analysis of the market and competition in the melamine crystal production industry involves evaluating various factors, including market trends, competitors, consumer needs, challenges, and opportunities. The following explores these aspects:

❖ **Market Trends**

Increased Demand: With population growth and rising living standards, demand for products made from melamine crystal has increased in various industries, including kitchenware, furniture coatings, and automotive parts. These products are valued for their strength, durability, and heat resistance. The Compound Annual Growth Rate (CAGR) is forecasted to be around 5% to 7% from 2024 to 2030, with volume reaching approximately 3.8 million tons and the market value reaching around 9.12 billion dollars by 2030.

The table below shows the production trends and market growth of melamine crystal from 2014 to 2024, along with the main growth drivers for each year:

Main Growth Driver	Market Size (Billion USD)	Growth Rate (CAGR)	Year
Growth in the construction and interior design industries	-	-	2014
Increased demand in the wood and furniture industries	3.5	4%	2015
Growth in the melamine kitchenware market	3.64	4.5%	2016
Development of the electronics industry and use of reinforced plastics	3.80	5%	2017
Increase in the production of adhesives and industrial coatings	3.99	5.5%	2018
Technological innovations and improvements in manufacturing efficiency	4.21	5.8%	2019
Increased demand in the automotive industry	4.46	6%	2020
Expansion of emerging markets in Asia	4.73	6.2%	2021
Increased focus on eco-friendly and sustainable products	5.02	6.3%	2022
Improved quality and development of new products	5.34	6.5%	2023
Continued growth in consumer industries and rising global demand	5.68	6.7%	2024

- **Changes in Consumer Preferences:** Today's consumers are increasingly inclined to use environmentally friendly, disposable, portable, and high-quality products. In this regard, manufacturers are focusing on developing new products using sustainable raw materials and optimizing production processes.
- **Technological Innovations:** Technological advancements in melamine production have led to increased productivity and reduced manufacturing costs. These innovations include the use of new processing techniques and the improvement of production management systems.

❖ **Competitors**

- **Key Players:** The major global producers of melamine and their respective market shares are China (40%), India (15%), the USA (12%), Germany (10%), Japan (7%), South Korea (5%), Taiwan (4%), and Iran holds less than 2%. These companies dominate the market by leveraging advanced technologies and extensive distribution networks. In the melamine production industry, several international companies play a prominent role. BASF SE in Germany, producing approximately 400,000 tons annually, is one of the largest chemical producers in the world. OCI N.V.

in the Netherlands, with an annual production of around 300,000 tons, is a leader in melamine and related chemical products. Mitsui Chemicals, Inc. in Japan, producing approximately 250,000 tons per year, specializes in producing chemicals and raw materials for various industries. Qatar Melamine Company, with a production of about 150,000 tons annually, is the largest melamine producer in the Middle East. Hexion Inc. in the USA, with around 100,000 tons annually, is another major player in the chemical products industry, including melamine production. In Iran, several large companies are active in melamine production. Pars Petrochemical Company, with an annual production of about 50,000 tons, is one of the largest producers in the country. Urmia Petrochemical Company, with a production of around 30,000 tons annually, and Shiraz Petrochemical Company, producing about 20,000 tons per year, are also significant players in Iran's melamine industry. Additionally, Tabriz Petrochemical Company, producing 15,000 tons annually, and Isfahan Petrochemical Company, with a production of 10,000 tons annually, are also involved. These Iranian companies play a crucial role in meeting domestic demand and expanding export markets, contributing significantly to the country's economic and industrial growth.

- **Price Competition:** The price of melamine is influenced by production costs, raw material prices, and market demand. Intense competition in the market may lead to price reductions, putting pressure on the profit margins of producers.
- **Product Differentiation:** Large companies strive to differentiate themselves from competitors by offering high-quality products, better customer services, and technological innovations.

❖ **Consumer Needs**

- **Main Consumers:** The primary consumers of melamine crystal and their market share globally are as follows: China (30%), the USA (15%), India (10%), Germany (9%), South Korea (7%), and Italy (5%). Iran accounts for 1% of the global consumption of this product.
- **High Quality:** Consumers are seeking products that are of high quality, durable, and resistant to environmental factors, enabling them to be used for long periods.
- **Attractive and Diverse Designs:** There is a growing demand for aesthetically appealing and modern designs, particularly for melamine crystal products. This has led producers to focus more on product design diversity and increasing the attractiveness of their offerings.
- **Competitive Pricing:** In the current economic environment, price competitiveness is a key factor in consumer decision-making. Therefore, producers need to minimize

production costs while maintaining quality in order to meet consumer expectations for affordability.

- **Support and Services:** Providing after-sales services and technical support to consumers, including consultation and installation services, can strengthen customer relationships and enhance overall satisfaction.

❖ **Challenges**

- **Raw Material Prices:** Fluctuations in raw material prices can significantly impact the cost of producing melamine crystal. According to reliable market reports from sources like ICIS, IHS Markit, and S&P Global Platts, the global average price of melamine crystal has fluctuated between €1500 and €2500 per ton over the past five years (from 2019 to 2023). These fluctuations are caused by global supply and demand changes, fluctuations in raw material costs, and changes in production expenses. These analyses help producers and consumers make more informed decisions and plan with greater accuracy in the market.
- **Currency Exchange Rate Fluctuations:** Changes in exchange rates can directly impact production costs and the final price of products. This is particularly significant for producers reliant on the import of raw materials.
- **Import Restrictions:** Sanctions and import restrictions can reduce access to high-quality raw materials and advanced technologies, which in turn affects the quality and competitiveness of domestic producers.
- **Intense Competition:** The melamine crystal market is highly competitive, and producers must continually focus on improving quality, reducing costs, and diversifying their product offerings to remain competitive.
- **Environmental Regulations:** Changes in environmental regulations and the need to adhere to higher standards may increase production costs and require investment in new technologies.

❖ **Opportunities**

- **Increased Exports:** Given the competitive quality and pricing of Iranian melamine products, there are significant opportunities for exports to regional and international markets. This can lead to economic growth and increased revenues for producers.
- **Development of New Products:** Producers can capture a larger market share by developing new and innovative products that meet the needs of emerging consumer markets.
- **Optimization of Production Processes:** Optimizing production processes through the use of advanced technologies can lead to reduced production costs and increased profitability.
- **Rising Environmental Awareness:** Growing concerns about environmental issues and the need for sustainable resource management are driving the demand for melamine crystals as an effective solution for pollution control and environmental protection.

As a result, the melamine crystal production market is growing due to the diverse needs in various industries and technological advancements. Competition in this market is intense, particularly among large and innovative producers. Manufacturers must continuously focus on improving product quality, reducing costs, and enhancing customer service to remain competitive. Additionally, focusing on new opportunities in emerging markets and the development of new technologies can contribute to the sustainable growth and development of this industry.

5-1- Introduce target market:

The target market for melamine crystal at the global level spans across various industries due to the unique properties of this material. Each industry has a specific application for melamine crystal, which drives its demand in different countries. Given these differences, melamine producers must tailor their marketing strategies according to the specific needs of each target market. The global target market for this important and strategic product is divided into different sectors based on usage and the major consuming countries. These markets have their own unique characteristics and requirements that influence the demand and consumption of this material:

❖ **Construction Industry**

- **Application:** Melamine crystal is used as a heat-resistant, scratch-resistant, and chemical-resistant material in the production of laminate sheets, flooring, wall panels, and other construction products.
- **Target Market for This Industry:**
 - **China:** Due to rapid infrastructure development and extensive construction.
 - **India:** Economic growth and increased demand for housing and infrastructure.
 - **United States:** Renovation and modernization of existing infrastructure and housing development.
 - **Germany:** Production and use of high-quality construction products.
- **Market Growth Drivers:** Population growth, urban development, and the need for resilient and sustainable infrastructure worldwide have led to an increase in demand for melamine products in the construction industry.

❖ **Household Products Industry:**

- **Usage:** Melamine crystal is used in the production of dinnerware, kitchenware, and other household products that require resistance to breakage and heat.
- **Target Market for This Industry:**
 - **United States:** High consumption in household products due to the large and diverse market.
 - **Japan:** Demand for modern, high-quality household products.
 - **South Korea:** Widespread use of high-quality products with unique designs in the domestic market.
- **Market Growth Drivers:** Increased household incomes, lifestyle changes, and rising demand for beautiful and durable household products have driven the growth of the melamine crystal market in this industry.

❖ **Automotive Industry:**

- **Usage:** Melamine crystal is used as a heat and chemical-resistant material in the production of interior automotive parts.
- **Target Market for This Industry:**
 - **Germany:** Focus on producing high-quality vehicles.
 - **Japan:** Use in advanced technology vehicles with modern designs.
 - **South Korea:** Production of competitively priced vehicles using high-quality materials.
- **Market Growth Drivers:** The global demand for durable, safe, and long-lasting vehicles has increased the use of melamine crystal in the automotive industry.

❖ **Chemical and Plastics Industry:**

- **Usage:** Melamine crystal is used as a raw material in the production of engineering plastics and other chemical products.
- **Target Market for This Industry:**
 - **China:** The largest producer and consumer of chemical products.

- **United States:** High consumption in the production of engineering plastics and chemicals.
- **Germany:** Widespread use in the production of high-quality chemicals and plastics.
- **Market Growth Drivers:** The growth of the chemical and plastics industries, combined with the demand for durable and resilient raw materials, has led to increased demand for melamine crystal in this sector.
- ❖ **Laminated Sheet Production Industry:**
 - **Usage:** Melamine crystal is used in the production of high-quality laminated sheets, which are used in interior decoration.
 - **Target Market for This Industry:**
 - **China:** The largest producer and consumer of laminated sheets.
 - **India:** Increased demand for decorative products in the domestic market.
 - **United States:** High consumption in the interior decoration market.
 - **Market Growth Drivers:** The growing demand for interior decoration and the use of durable and resilient laminated sheets have led to an increased consumption of melamine crystal in this industry.

The table below shows the market share, total value, and average growth of melamine crystal across different industries from 2014 to 2024. This table is approximate and based on available data from market analysis sources such as ICIS, IHS Markit, and S&P Global Platts, which provide comprehensive information on this subject.

Consumer Sector	Market Share (%)	Total Value (Billion USD)	Average Annual Growth (CAGR)
Wood and Furniture Industry	30%	1.8	5%
Kitchenware	25%	1.5	4.5%
Construction Industry	20%	1.2	4%
Adhesives and Coatings	10%	0.6	5.5%
Reinforced Plastics	8%	0.48	6%
Other Industries	7%	0.42	4%

Based on the above information, the most reasonable and expert decision for the target market of this plan, with its vision of actively participating in market development and export expansion, is to focus on the sub-sectors and countries where these industries are leading and have a larger market share. Of course, in the domestic market, due to the importance of the wood and construction industry, focusing on this sector could also economically justify and support the establishment of such an industrial unit.

6- Physical Progress of project: yes ☐ No ☒

This project, as one of the priority investment plans of the province, has been proposed to the private and non-governmental sectors by the Investment and Economic and Technical Assistance Organization of Iran, the Kermanshah Governorate, the Ministry of Economic Affairs and Finance, and the General Directorate of Industry, Mine, and Trade of the province. It is currently in the stage of preparing a technical-economic pre-feasibility study.

7- Action plan and Implementation schedule :

Project Implementation Timeline

Phase	Activity Description	Duration	Notes
Market Analysis and Planning	<ul style="list-style-type: none"> - Market analysis and industry needs assessment - Competitor analysis and opportunity identification - Preparation of the economic justification plan 	1 month	Includes data collection, opportunity evaluation, and drafting of the business plan.
Financial Planning and Investment Attraction	<ul style="list-style-type: none"> - Preparation of financial plan - Attracting investors - Securing loans and necessary credit 	1 month	Requires preparation of financial documentation and negotiations with banks and investors.
Site Selection and Licensing	<ul style="list-style-type: none"> - Selection of appropriate location for the production unit - Obtaining necessary permits from legal authorities 	1 month	Includes land review, construction and operating permits, and environmental impact assessment.
Design and Engineering	<ul style="list-style-type: none"> - Designing architectural plans and layouts - Equipment and machinery selection - Engineering consultation 	1 month	Detailed design of the production unit, equipment selection, and planning for installation and startup.
Construction and Setup	<ul style="list-style-type: none"> - Construction and preparation of building - Installation of equipment and machinery - Initial testing and trials 	6 month	Involves physical construction, equipment installation, and initial tests to verify equipment performance.
Staffing and Training	<ul style="list-style-type: none"> - Recruitment of required staff - Providing necessary training - Preparing the operational team 	1 month	The process of hiring and training personnel to perform various tasks in the production unit.
Final Testing and Trials	<ul style="list-style-type: none"> - Conducting final tests and evaluating production performance - Troubleshooting and process optimization 	1 month	Comprehensive testing of equipment and processes to ensure proper performance and optimization.
Commissioning and Production Start	<ul style="list-style-type: none"> - Initiating trial production - Reviewing and adjusting production processes - Commencing official production 	2 month	Starting trial production to ensure proper functioning and then launching official production.
Marketing and Distribution	<ul style="list-style-type: none"> - Developing marketing strategies - Introducing the product to the market - Establishing distribution network 	1 month	Includes marketing, sales, and establishing distribution channels for the produced products.
Monitoring and Continuous Improvement	<ul style="list-style-type: none"> - Monitoring production performance - Collecting feedback and improving processes - Updating equipment and methods 	Ongoing	Continuous evaluation of production performance, gathering customer feedback, and ongoing improvement of processes and equipment.

According to the above schedule, the project implementation will take **15 months**.

8- Financial projection:

8-1- The cost estimate:

The cost estimate

No.	subject	costs (million Rials)
1	Fixed investments	7295715
2	Operating costs	4147421
3	Financial costs	-

Fixed investment

No.	subject	costs (million Rials)	
1	land purchase	180000	
2	Site preparation and development	151500	
3	Civil works, structures and buildings	670500	
4	Plant machinery and equipment	4840000	
5	Auxiliary and service plant equipment	180000	
6	Environmental protection	20000	
7	Incorporated fixed assets (project overheads)	604200	
8	Pre-production expenditures (net of interest)	Studies	120840
		Management and organization	120840
		license	60420
9	contingencies costs	347415	
Total (Million IRR)		7295715	

Operating cost

No.	subject		Distribution Ratio	costs (million Rials)
Variable cost				3157478
1	Material		100%	3000000
2	Personnel		30%	36461
3	Marketing (except personnel)		100%	80000
4	Depreciation Costs			
5	Other variable costs	Energy*	85%	1845
		Maintenance*	20%	20431
		Unforeseen (2.5% of items*)	20%	18741
Fixed cost				989943
6	Material			
7	Personnel		70%	85075
8	Marketing (except personnel)			
9	Depreciation		100%	604050
10	Other fixed costs	Energy*	15%	326
		Maintenance*	80%	225528
		Unforeseen (2.5% of items*)	80%	74964
Total (Million IRR)				4147421

Notes:

- Marketing is considered as one percent of the revenue at full capacity.
- Depreciation for machinery and equipment (10%), building (10%), vehicles (20%), and office equipment (20%) is considered.
- Maintenance for machinery and equipment (5%), building (2%), vehicles (10%), and office equipment (10%) is considered.

8-2- Estimated revenues:

As mentioned earlier, the global price for each ton of the product in this project, melamine crystal, ranges from 1500 euros to 2500 euros. To minimize the project's risk, an average price of 2000 euros has been considered for this project.

The project revenues in the first five years after commissioning.

Related Topic	Season 1	Season 2	Season 3	Season 4	Total Year 1	Year 2	Year 3	Year 4	Year 5
Nominal Capacity Utilization Rate	15%	15%	15%	15%	15%	60%	70%	80%	90%
Actual Capacity	1200	1200	1200	1200	4800	5600	6400	7200	8000
Price per Ton (Euro)	2000	2000	2000	2000	2000	2000	2000	2000	2000
Revenue (Thousands of Euros)	2400	2400	2400	2400	9600	11200	12800	14400	16000
Revenue (Billions of Rials)	1200	1200	1200	1200	4800	5600	6400	7200	8000

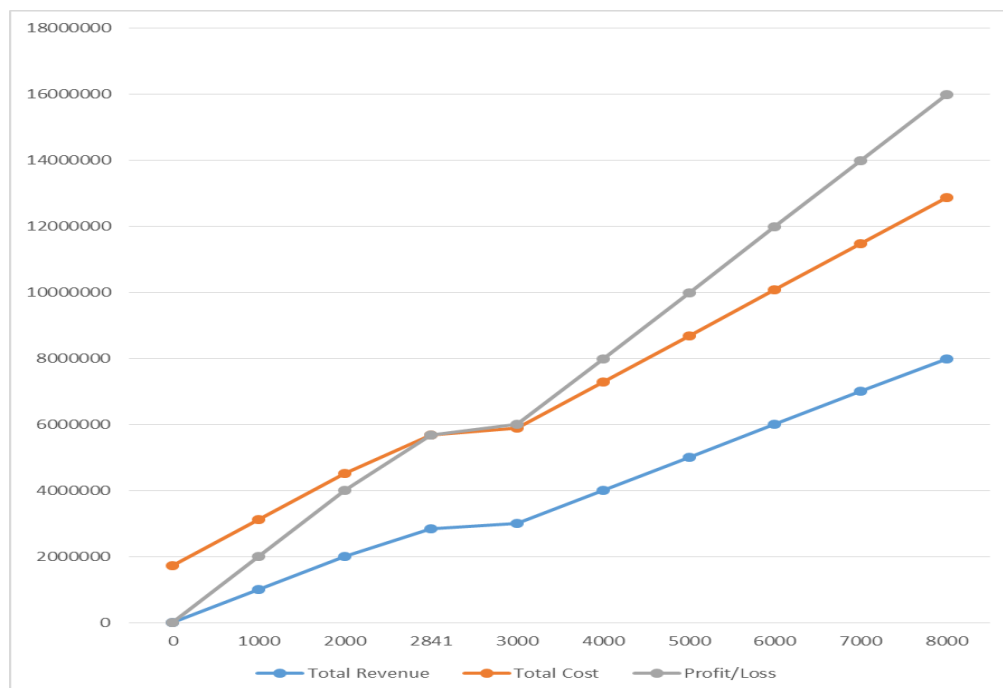
8-3-Duration of project operation:

Considering the various factors affecting the economic lifespan of industrial projects such as melamine crystal production, including raw material reserves, localized technology, market fluctuations, and government support policies, the optimal operational period for this project is estimated to be 10 years with a discount rate of 18%. This time frame has been determined based on the expected return on investment for investors, anticipated maintenance costs, and sensitivity analysis regarding changes in key parameters.

8-4-Break- even analysis:

The break-even analysis for the melamine crystal production project shows that the project will reach the breakeven point with the production and sale of at least 2,841 tons of melamine crystal per year, equivalent to 35.51% of the project's nominal capacity. This point is calculated based on fixed costs, including initial investment, general expenses, and fixed production costs, as well as variable production costs per ton of melamine crystal. Given the plant's production capacity and market forecasts, the project is expected to quickly reach the break-even point and enter a phase of sustainable profitability. The following table presents the break-even analysis:

Production Quantity (tons)	Total Revenue (Million IRR)	Total Cost (Million IRR)	Profit/Loss (Million IRR)
0	0	1,719,514.5	-1,719,514.5
1000	1,000,000	2,114,199.25	-1,114,199.25
2000	2,000,000	2,508,884.0	-508,884.0
2841	2,841,000	2,841,000	0
3000	3,000,000	2,903,568.75	96,431.25
4000	4,000,000	3,298,253.5	701,746.5
5000	5,000,000	3,692,938.25	1,307,061.75
6000	6,000,000	4,087,623.0	1,912,377.0
7000	7,000,000	4,482,307.75	2,517,692.25
8000	8,000,000	4,876,992.5	3,123,007.5



8-5- Cost-benefit analysis:

The table of project efficiency indicators

Total fixed investment Present value	25934582 million IRR
Total net revenue Present value	35952690 million IRR
Net present value (NPV)	10018107 million IRR
benefit - Cost ratio B/C	1.39
Internal rate of return (IRR)	60.79%

❖ Net Present Value (NPV):

The net present value of the project is 10,018,107 million IRR, indicating the project's profitability. A positive NPV means that after subtracting the investment and operating costs from the total revenue, the project has generated more return than the initial investment. In other words, the incoming cash flow of this project exceeds the outgoing cash flow, and the added value created benefits the investors.

❖ Benefit-Cost Ratio (B/C):

The B/C ratio is 1.39. This number indicates that for every unit of cost, the project generates 1.39 units of revenue. A ratio greater than 1 shows that the project is economically viable and has the ability to generate more revenue than its initial and ongoing costs. This ratio is often a decisive criterion for project implementation decisions, and in this case, the economic value of the project is clear.

❖ Internal Rate of Return (IRR):

The internal rate of return for the project is 60.79%, which represents a very high return. This indicator shows that the project's profitability is significantly higher than the typical interest rates in the market. Given this IRR value, the project is capable of attracting investors, as its internal return exceeds the minimum return rate expected by investors.

❖ Payback Period:

The payback period for this project is 2 years and 11 months, meaning investors will be able to recover their initial investment through positive cash flows in a short period. This quick payback period increases the attractiveness of the project and reduces its risk for investors. In summary, the analysis of these indicators shows that the project is highly profitable economically. With a high internal rate of return and a short payback period, it is both attractive and justifiable for investors.

8-6- Sensitivity analysis of IRR:

A. Based on Annual Revenue

The following table presents the sensitivity analysis of the Melamine Crystal production plant project based on annual revenue. This analysis examines the impact of changes in revenue on the economic indicators of the project, including NPV (Net Present Value), IRR (Internal Rate of Return), and Payback Period. Percentage changes in revenue ranging from -30% to +30% are detailed in the table below:

Percentage Change	New Revenue (Million Rial)	NPV (Million Rial)	IRR (%)	Payback Period (Years)
-30%	5,600,000	7,012,674.9	39.79	3.7635
-20%	6,400,000	8,014,485.6	44.96	3.4740
-10%	7,200,000	9,016,296.3	51.69	3.1845
0%	8,000,000	10,018,107.0	60.79	2.8950
10%	8,800,000	11,019,917.7	73.77	2.6055
20%	9,600,000	12,021,728.4	93.81	2.3160
30%	10,400,000	13,023,539.1	128.78	2.0265

❖ Comprehensive Analysis:

• Impact of Revenue Decrease on Economic Indicators:

- **30% Decrease in Revenue:** With a reduction in revenue to 5,600,000 million Rial, the NPV decreases to 7,012,674.9 million Rial, and the IRR drops to 37.79%. The payback period increases to 3.76 years. A revenue decrease of this magnitude has a significant negative impact on the project's profitability.
- **20% Decrease in Revenue:** The new revenue reaches 6,400,000 million Rial. The NPV decreases to 8,014,485.6 million Rial, and the IRR drops to 44.96%, while the payback period increases to 3.47 years. While the project remains profitable, the decrease in profitability is noticeable.
- **10% Decrease in Revenue:** The NPV decreases to 9,016,296.3 million Rial, and the IRR drops to 51.69%. The payback period increases to 3.18 years. A 10% decrease still maintains acceptable profitability for the project.

• Impact of Revenue Increase on Economic Indicators:

- **10% Increase in Revenue:** The new revenue rises to 8,800,000 million Rial, pushing the NPV to 11,019,917.7 million Rial and the IRR to 73.77%. The payback period decreases to 2.61 years.
- **20% Increase in Revenue:** The NPV increases to 12,021,728.4 million Rial, and the IRR reaches 93.81%. The payback period further decreases to 2.32 years. A revenue increase has a significantly positive impact on the project's return.
- **30% Increase in Revenue:** With revenue of 10,400,000 million Rial, the NPV rises to 13,023,539.1 million Rial, and the IRR increases to 128.78%, while the payback period drops to 2.03 years. These changes demonstrate an exceptionally high return if revenue increases.

❖ Conclusion:

- **Project Sustainability:** The sensitivity analysis indicates that the melamine crystal production project remains acceptably profitable even with a decrease in revenue, although with reduced profitability and an extended payback period. On the other hand, increased revenue can significantly boost the project's profitability.
- **Risk Management:** This analysis allows decision-makers to devise appropriate strategies to cope with potential revenue decreases and capitalize on potential revenue increases.

B. Based on Annual Production Costs

The following table presents the sensitivity analysis of the melamine crystal production project based on annual production costs. This analysis examines the impact of changes in production costs on the economic indicators of the project, including NPV (Net Present Value), IRR (Internal Rate of Return), and Payback Period. The percentage changes in annual production costs, ranging from -30% to +30%, are detailed below:

Percentage Change	New Cost (Million IRR)	NPV (Million IRR)	IRR (%)	Payback Period (Years)
-30%	2,903,194.7	13,023,539.1	128.78	2.0265
-20%	3,317,936.8	12,021,728.4	93.81	2.3160
-10%	3,732,678.9	11,019,917.7	73.77	2.6055
0%	4,147,421.0	10,018,107.0	60.79	2.8950
10%	4,562,163.1	9,016,296.3	51.69	3.1845
20%	4,976,905.2	8,014,485.6	44.96	3.4740
30%	5,391,647.3	7,012,674.9	39.79	3.7635

❖ **Impact of Cost Reduction on Economic Indicators:**

- **30% Reduction in Production Costs:** With a new cost of 2,903,194.7 million IRR, the NPV increases to 13,023,539.1 million IRR, and the IRR rises to 128.78%. The payback period decreases to 2.03 years. This significant cost reduction has a positive impact on the project's profitability.
- **20% Reduction in Production Costs:** The new cost is 3,317,936.8 million IRR, resulting in an NPV of 12,021,728.4 million IRR and an IRR of 93.81%. The payback period reduces to 2.32 years, indicating an increase in profitability.
- **10% Reduction in Production Costs:** The new cost is 3,732,678.9 million IRR, with an NPV of 11,019,917.7 million IRR and an IRR of 73.77%. The payback period decreases to 2.61 years.

❖ **Impact of Cost Increase on Economic Indicators:**

- **10% Increase in Production Costs:** The new cost rises to 4,562,163.1 million IRR. The NPV decreases to 9,016,296.3 million IRR, and the IRR drops to 51.69%. The payback period increases to 3.18 years.
- **20% Increase in Production Costs:** The new cost reaches 4,976,905.2 million IRR, with an NPV of 8,014,485.6 million IRR and an IRR of 44.96%. The payback period increases to 3.47 years.
- **30% Increase in Production Costs:** The NPV decreases to 7,012,674.9 million IRR, the IRR drops to 39.79%, and the payback period increases to 3.76 years. This indicates a negative impact on the project's profitability due to increased costs.

❖ **Conclusion:**

- **Project Stability:** The analysis shows that reducing production costs leads to a significant increase in profitability and a reduced payback period. On the other hand, increasing production costs results in lower profitability and a longer payback period.
- **Risk Management:** Reducing production costs can significantly improve the economic indicators of the project. To mitigate the negative effects of increasing costs, it is essential to effectively manage and control production costs.

C. Sensitivity Analysis Based on Initial Investment Cost:

The table below presents the sensitivity analysis for the Melamine Crystal production project, based on initial investment costs. This analysis examines the impact of changes in the initial investment on the economic indicators of the project, including NPV (Net Present Value), IRR (Internal Rate of Return), and payback period. The percentage variations in the initial investment cost range from -30% to +30%, as detailed below:

Changes	New Cost (Million Rial)	NPV (Million Rial)	IRR (%)	Payback Period (Years)
-30%	5,107,000.5	13,023,539.1	129.7	2.021
-20%	5,836,572.0	12,021,728.4	102.67	2.224
-10%	6,566,143.5	11,019,917.7	84.67	2.431
0%	7,295,715.0	10,018,107.0	60.79	2.895
10%	8,025,286.5	9,016,296.3	56.72	3.013
20%	8,754,858.0	8,014,485.6	50.4	3.234
30%	9,484,429.5	7,012,674.9	47.96	3.335

❖ **Comprehensive Analysis:**

- **Impact of Reduction in Initial Investment Costs on Economic Indicators:**
- **30% Reduction in Initial Investment Costs:** The new cost decreases to 5,107,000.5 million Rial. The NPV increases to 13,023,539.1 million Rial, and the IRR rises to 129.7%. The payback period decreases to 2.021 years, indicating a significant increase in profitability.

- **20% Reduction in Initial Investment Costs:** The new cost decreases to 5,836,572.0 million Rial. The NPV increases to 12,021,728.4 million Rial, and the IRR rises to 102.67%. The payback period decreases to 2.224 years.
- **10% Reduction in Initial Investment Costs:** The new cost decreases to 6,566,143.5 million Rial. The NPV increases to 11,019,917.7 million Rial, and the IRR rises to 84.67%. The payback period decreases to 2.431 years.
- **Impact of Increase in Initial Investment Costs on Economic Indicators:**
 - **10% Increase in Initial Investment Costs:** The new cost increases to 8,025,286.5 million Rial. The NPV decreases to 9,016,296.3 million Rial, and the IRR falls to 56.72%. The payback period increases to 3.013 years.
 - **20% Increase in Initial Investment Costs:** The new cost increases to 8,754,858.0 million Rial. The NPV decreases to 8,014,485.6 million Rial, and the IRR falls to 50.4%. The payback period increases to 3.234 years.
 - **30% Increase in Initial Investment Costs:** The new cost increases to 9,484,429.5 million Rial. The NPV decreases to 7,012,674.9 million Rial, and the IRR falls to 47.96%. The payback period increases to 3.335 years.
- ❖ **Conclusion:**
 - **Project Sustainability:** A reduction in initial investment costs results in a significant increase in profitability and a reduction in the payback period. Conversely, an increase in initial investment costs negatively impacts economic indicators and reduces profitability.
 - **Risk Management:** Controlling initial investment costs and working to reduce them can improve the financial performance of the project. On the other hand, an increase in costs can present challenges in terms of payback and profitability, requiring careful management.

8-7- Summarize table:

"Summary of economic issues"

Activity	International Standard Industrial Classification (ISIC Code)	product name	Nominal capacity (unit)
Production	2411412698	Melamine Crystal	8,000 tons
Activity duration	Fix investment (million Rials)	Variable investment (million Rials)	Human resources
15 months	7295715	4147421	50 people
Internal rate of return (IIR)	Net present value (million Rials)	Owners share (million Rials)	Benefit-cost ratio *B/C
60.79%	10018107	2288627	1.39

❖ Economic and Strategic Analysis of the Melamine Crystal Production Project:

- **Internal Rate of Return (IRR):** The internal rate of return of 60.79% for this project demonstrates its high profitability level. This return rate is above the current bank interest rates and inflation rates. The 60.79% IRR indicates a quick return on investment, high profitability within a short time frame, and significant appeal to investors.
- **Net Present Value (NPV):** The net present value (NPV) of 10,018,107 million Rial clearly shows that the project not only covers all investment costs but also generates substantial profits. This value confirms that the project has high potential in creating economic value, and investing in it will lead to capital growth.

- **Benefit-to-Cost Ratio (B/C):** The benefit-to-cost ratio of 1.39 indicates that for every unit of cost, 1.39 units of benefit are generated. This ratio suggests that the project not only covers its costs but also produces more benefits than its expenses. This metric strengthens the project's attractiveness for investors.
- **Payback Period:** The payback period of 2 years and 11 months indicates that the initial investment will be recovered in a short time. This fast payback reduces the investment risk and provides greater security to investors. After the capital is recouped, the project will generate profits, highlighting the potential for high profitability both in the short and long term.
- **Annual Working Capital and Workforce:** The requirement for 4,147,421 million Rial in annual working capital and the employment of 50 people reflect the project's appropriate scale and its potential to create local employment and stimulate the economy. Moreover, the recruitment of 50 people will not only support regional economic growth but also contribute to job stability and the creation of new employment opportunities.

❖ **Market Opportunities:**

Melamine crystal, with its wide range of applications in various industries, especially in the production of melamine and plastic dishes and other chemical products, enjoys high demand. Due to its unique characteristics such as heat and impact resistance, it has found numerous uses in both domestic and international markets. The growth of consumer industries and the increasing need for durable, high-quality products provide a guarantee for sustained demand and market capacity expansion for melamine crystal.

❖ **Competitive Analysis:**

This project, relying on optimized production processes and the use of modern technologies, has the capability to produce a high-quality product at a competitive price. The availability of local resources and reduced transportation costs can provide a competitive advantage for this project. Additionally, the annual production capacity of 8,000 tons of melamine crystal opens up opportunities for entering international markets and exports.

❖ **Conclusion:**

The melamine crystal production project, considering strong economic indicators such as a high internal rate of return (60.79%), positive net present value, and a favorable benefit-to-cost ratio (1.39), presents an attractive and profitable investment opportunity. The short payback period (2 years) also reduces investment risk and ensures greater investor confidence. Investment in this project can offer excellent returns due to its high profitability and favorable market opportunities. Furthermore, by creating jobs and supporting the local economy, this project can significantly contribute to the region's economic development.

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

Exchange rate fluctuations can significantly impact key aspects of this industrial project, such as costs, financing, and foreign exchange risk management. By examining different scenarios, it is possible to minimize the adverse effects of exchange rate changes (USD to IRR) and achieve desirable profitability. Below are the details of this analysis:

❖ **Cost Analysis in Response to Exchange Rate Variations**

- **Import Costs:** With the exchange rate rising from IRR 30,000 per USD in 2020 to an anticipated IRR 60,000 per USD by 2024, import costs for raw materials—excluding locally sourced items like urea and ammonia—could increase substantially. Essential imported components, such as CO₂, catalysts, solvents, heat exchangers, pumps, filters, reactors, distillation towers, and high-tech equipment that are not readily available domestically, will see marked price increases. This could lead to a substantial rise in both fixed and variable project costs.

- **Operating Costs:** Exchange rate fluctuations can also affect operating expenses such as wages, maintenance, and energy costs. As the rate increases, so too will these operational expenditures, impacting overall project profitability.
- ❖ **Financing and Loan Repayment**
 - **Foreign Currency Loans:** Financing the project through foreign currency loans can increase the cost of loan repayments if the exchange rate rises. Therefore, precise planning for loan repayment, based on exchange rate forecasts, is crucial to mitigate the risk of unforeseen financial burdens.
 - **Financial Planning:** Selecting the right financing source and utilizing appropriate financial instruments, such as hedging mechanisms or currency futures contracts, can be effective in reducing foreign exchange risk.
- ❖ **Foreign Exchange Risk Management**
 - **Financial Instruments:** To counter the adverse effects of exchange rate fluctuations, instruments like currency futures, options, and swaps can be employed to stabilize costs.
 - **Financial Planning:** Developing a financial plan that considers different exchange rate scenarios and their impact on project costs and revenues can help manage exchange rate risks and support profitability.
- ❖ **Proposed Scenarios**
 - **Conservative Scenario:** Assuming the exchange rate reaches IRR 80,000 per USD between 2025 and 2027. This scenario would account for a significant increase in import costs and foreign currency loan repayments.
 - **Optimistic Scenario:** Assuming the exchange rate remains steady at IRR 60,000 per USD between 2025 and 2027. In this scenario, import and loan repayment costs remain controlled, improving the project's profitability outlook.
 - **Realistic Scenario:** Assuming the exchange rate reaches IRR 70,000 per USD between 2025 and 2027. Here, a balance between cost increases and their impact on loan repayments must be maintained, along with implementing foreign exchange risk management strategies.
- ❖ **Sensitivity Analysis of Exchange Rate Impact**

Conducting sensitivity analysis can help evaluate the overall impact of exchange rate fluctuations on total costs and project profitability. By examining various scenarios and forecasting their effects, the best strategies for financial management and exchange rate risk mitigation can be selected.

This comprehensive approach helps ensure the project can effectively navigate exchange rate fluctuations, optimizing both risk management and profitability.

A. Import Costs

- **Conservative Scenario (Exchange Rate: IRR 80,000):**
 - **Increase in Import Costs:** Import costs for raw materials and equipment increase by 1.33 times compared to an exchange rate of IRR 60,000.
 - **Impact on Total Cost:** If 50% of the project's total costs are related to imports, an exchange rate of IRR 80,000 will lead to a 33% increase in import-related costs.
- **Optimistic Scenario (Exchange Rate: IRR 60,000):**
 - **Stable Import Costs:** Import costs remain stable with no change in the current exchange rate.
- **Realistic Scenario (Exchange Rate: IRR 70,000):**
 - **Increase in Import Costs:** Import costs increase by 1.17 times.
 - **Impact on Total Cost:** There is a 17% increase in import-related costs.

B. Operating Costs

- **Conservative Scenario:**
 - **Increase in Operating Costs:** An exchange rate increase to IRR 80,000 could raise operating costs by 1.33 times if operating expenses are directly influenced by the exchange rate.
- **Optimistic Scenario:**
 - **Stable Operating Costs:** Operating expenses remain unaffected by exchange rate changes.
- **Realistic Scenario:**
 - **Increase in Operating Costs:** Operating costs increase by 1.17 times.

C. Loan Repayments

- **Conservative Scenario:**
 - **Increase in Repayment Costs:** A higher exchange rate leads to a 1.33-fold increase in foreign currency loan repayments, potentially imposing substantial financial pressure on the project.
- **Optimistic Scenario:**
 - **Stable Repayment Costs:** Foreign currency loan repayment costs remain stable.
- **Realistic Scenario:**
 - **Increase in Repayment Costs:** An exchange rate increase of 1.17 times raises loan repayment costs.

D. Financing and Financial Planning

- **Conservative Scenario:**
 - **Increased Financing Needs:** An exchange rate rise may require additional financing, which could increase debt and strain financial planning.
- **Optimistic Scenario:**
 - **Adequate Financing Level:** Financing costs remain manageable with a stable exchange rate.
- **Realistic Scenario:**
 - **Moderate Financing Requirements:** Financing needs may moderately increase.

E. Foreign Exchange Financial Instruments

- **Conservative Scenario:**
 - **Use of Hedging Instruments:** To mitigate the impact of a high exchange rate, it is advisable to use currency hedging tools like futures contracts and swaps.
- **Optimistic Scenario:**
 - **Minimal Hedging Requirements:** With a stable exchange rate, the need for currency hedging tools decreases.
- **Realistic Scenario:**
 - **Balanced Hedging:** Moderate use of currency hedging tools will effectively manage exchange rate risks.

F. Foreign Exchange Financial Planning

- **Conservative Scenario:**
 - **Detailed Financial Planning:** Rigorous financial planning is needed to manage the impact of a high exchange rate, adjust financial strategies, and manage loan repayments.
- **Optimistic Scenario:**
 - **Standard Financial Planning:** Financial planning proceeds under stable exchange rate conditions, requiring few adjustments.
- **Realistic Scenario:**
 - **Moderate Financial Adjustments:** Financial planning should account for moderate exchange rate changes and incorporate risk management strategies.

9- Capital needs, the supply and guarantees method:

9-1- Foreign currency needed:

Since essential raw materials (such as urea and ammonia), as well as carbon dioxide, catalysts, solvents, heat exchangers, pumps, filters, reaction vessels, distillation towers, and most high-tech equipment that are unavailable domestically, must be imported, foreign currency funding for these items is essential. To allow the investor adequate time to secure financial resources, especially for acquiring equipment and machinery, the foreign currency requirement for production equipment and machinery—estimated at approximately €9,680,000 (equivalent to 4,840 billion IRR)—has been specified as follows for the planned two-year project implementation period:

No.	year	Exchange rate
1	first	4840
2	second	4840
3	third	-

9-2- The Way of participation and finance method:

Given the inherent risks associated with industrial projects, particularly in melamine crystal production, which requires substantial initial investment, selecting the right financing method is crucial. The best approach depends on various factors, such as the amount of capital required, the development stage of the project, investor risk tolerance, and market conditions. Below are some of the optimal financing methods and key considerations for this project:

❖ **Financing through Banks and Financial Institutions:**

- **Bank Loans:** With a strong business plan and adequate guarantees, bank loans at fixed interest rates can be obtained.
- **Credit Lines:** For working capital and purchasing raw materials, a bank credit line can be a valuable resource.
- **Letters of Credit (LCs) and Foreign Exchange Credits:** Opening LCs can be beneficial for importing equipment and raw materials.

❖ **Attracting Investor Participation:**

- **Venture Capital (VC):** Venture capitalists, interested in innovative and high-risk projects, can provide funding in the early stages.
- **Angel Investors:** These investors, often wealthy and experienced individuals, are willing to invest in small and medium-sized enterprises.
- **Institutional Investors:** Large companies and organizations, such as social security holding companies, the Barkat Foundation, IMIDRO, etc., may invest in melamine crystal production projects for strategic or social benefits.

❖ **Utilizing Government Incentives:**

- **Subsidies and Grants:** The government may provide subsidies for small and medium enterprises (SMEs) to support such projects.
- **National Development Fund Facilities:** This fund offers support for large industrial and infrastructure projects.
- **Guarantee Funds:** These funds provide guarantees to facilitate access to bank financing for investors.

The most effective financing strategy for the melamine crystal production project would be a combined approach. This includes private sector partnerships, attracting investors, using bank loans and credit lines, issuing letters of credit to secure foreign currency for the project, and leveraging government incentives for development in less advanced regions. This diversified approach not only ensures capital adequacy but also helps to mitigate financial risks associated with the project.

9-3- Payback period:

Based on conducted studies and forecasts, the payback period for this project is estimated to be 2 years and 11 months. This estimate considers multiple factors, including initial investment, operating costs, projected revenues, discount rate, and inflation rate. Additionally, sensitivity analysis of key parameter variations shows that the project demonstrates a reasonable resilience to market fluctuations and changes in production costs.

10- Incentives, features and advantages of project:

Establishing a melamine crystal production unit in the Harsin Industrial Park in Kermanshah Province offers numerous opportunities for economic and industrial development in the region, given its existing potentials and the increasing demand for this product. Below are some key incentives, characteristics, and benefits of this project:

❖ Incentives:

▪ Government Support:

- Tax and customs exemptions for importing necessary equipment and raw materials.
- Support for the production and export of high-value-added products.
- Support for research and development to produce higher-quality melamine crystals.
- Valuation of foreign machinery at 90% of their bank system cost in underdeveloped regions and access to financing.
- Ten-year tax exemption for projects in underdeveloped areas.
- Only 10% of the land value and long-term payment plans in industrial parks in underdeveloped regions.

▪ Regional Potentials:

- Abundant natural resources such as hardwood (oak), coal, and agricultural waste, which can serve as raw materials for melamine crystal production.
- Proximity to the Iraqi border and other neighboring markets, providing export opportunities and access to regional and international markets.
- Adequate infrastructure such as water, electricity, gas, roads, and transportation facilities essential for production units.
- Availability of skilled and affordable labor in the region.

▪ Market Demand:

- Increasing demand for melamine crystals in various industries, including water and wastewater, oil and gas, petrochemicals, pharmaceuticals, and food industries.
- Lack of high-capacity melamine crystal production units in the area.

❖ Project Characteristics:

▪ Utilization of Advanced Technologies:

- Adoption of innovative melamine crystal production methods to enhance quality and reduce production costs.
- Optimization of energy consumption and reduction of environmental pollution.

▪ Production of Various Melamine Crystal Types:

- Production of melamine crystals with diverse properties for multiple applications.
- Customization of products to meet the demands of domestic and international markets.

- **Job Creation:**
 - Creation of direct and indirect employment opportunities for many individuals in the region.
- **Development of Value Chains:**
 - Building the value chain for melamine crystal production by establishing raw material processing units and producing by-products.

❖ **Project Benefits:**

- **Regional Economic Development:**
 - Increased regional GDP.
 - High added value created from low-cost, local raw materials.
 - Growth of related industries and creation of sustainable jobs.
 - Expansion of related products such as water and air filters, respiratory masks, and other related items.
 - Attraction and encouragement of other investors, boosting the local economy.
- **Reduction in Import Dependency:**
 - Decreased import of melamine crystals, leading to foreign exchange savings.
 - Increased self-sufficiency in the production of this product.
- **Environmental Protection:**
 - Use of agricultural and industrial waste as raw materials.
 - Reduction in environmental pollution caused by waste disposal and improvement of quality of life.
- **Enhancement of Technical Knowledge:**
 - Transfer of technical knowledge and technology to the region.
 - Improvement in the scientific and technical levels of the workforce.

Establishing this melamine crystal production unit in the region represents a golden opportunity for economic and industrial growth. Given the government incentives, regional potential, market demand, and numerous benefits of this project, investing in this area can lead to high added value, job creation, and sustainable regional development.