In the name of God

Pre-feasibility study form

Plan Name: Hybrid solar dryer

Employer:.

Consulting Company: Kavosh Consultants Co.

Project Address: Shahrekord Industrial Estate

Date: ۲۰۲۲

SUMMARY OF THE FEASIBILITY STUDY

	Feasibility Studies	
	Hybrid Solar Dryer	

General Specification
Name of The Project: Feasibility studies of Hybrid solar dryer
Project Capacity: ١٠٠٠٠٠ unit per year
Personnel Number: ٢٢ people
Working Days: ٢٨٩ Days
Product uses: Drying all kinds of products and...
Marketing
Global product price: starting at $١،٥٠٠
Domestic demand: about one million - over the next five years
Domestic production: about ٥٠٠ thousand units
Import: ١٠٥٦ dollars
Exports: $٩٥٢،٩٥٣
Technical Study
Land Area: ٣٠٠٠
Building Area: ١١٠٠
Main raw materials: chassis, solar collector, sensors, tray housing and heating system, etc.
Supplying Place of Raw Materials: Local-Import
Power Requirement: ١،١٠٠،٠٠٠ (kwh)
Water Requirement: ٧٠٠٠٠($m^٣$)
Fuel Requirement: ١،٢٠٠،٠٠٠ ($m^٣$)
Economical & Financial Study
Fixed investment amount: ٣٨١٢٢٦ million rials - ٧٦٢،٤٥٣ euro
Circulating capital: ٤٣٥٢٠٦ million rials - ٨٧٠،٤١٢ euro
Total investment: ٨١٦٤٣٢ million rials - ١،٦٣٢،٨٦٥ euro
Annual sales: ٢٩١٩٧٠٨ million Rials - ٥،٨٣٩،٤١٦ euro
Net present value (NPV): ٦٨٠٣٢١ million rials - ١،٣٦٠،٧٢٣ euro
Breakeven point (BEP): ٢١٨٩٧٨١ million rials - ٤،٣٧٩،٥٦٢ euro
Internal Rate of Return(IRR): ٤٧٪
Investment Return Period: ٢ Years
Investment Sources Ratio Equity: ٣٠٪ Financing: ٧٠٪

	Feasibility Studies	
	Hybrid Solar Dryer	

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Introduction

	Feasibility Studies	
	Hybrid Solar Dryer	

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

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

۱ -Product Introduction

Drying of food products, especially fruits and vegetables, has been done since a long time as one of the methods of protecting these products. In the traditional method of drying using solar energy, the products are exposed to direct sunlight in the open air. In addition to the need for a large area for drying in large quantities, this method has disadvantages such as contamination of the product based on dust and insects. In solar dryers that are inspired by the traditional method, products are exposed to indirect sunlight in closed chambers and trays. Products dried in this method, in addition to eliminating the disadvantages of traditional drying, also have the advantage of high product quality compared to industrial drying using electricity or gas. Drying in this way preserves the vitamins and nutritional value of the ingredients due to exposure of the products to appropriate temperature. The use of free solar energy compared to the fossil energy used in industrial dryers is another advantage that makes the use of solar dryers economical. Note that dry products have a very high added value and can be very profitable for people who are looking to start a small business.



Solar-gas dryer (hybrid)

This industrial dryer is designed in such a way that it can be used all day and night. The hot air needed by the dryer is supplied during the day by using solar collectors, and during the hours when the radiation is not suitable, it is provided by a supplementary heating system (electric heater or gas

burner). In order to increase the thermal efficiency, this dryer is equipped with a heat recovery system where the air coming out of the suction fan is reused after passing through the dehumidifier system.

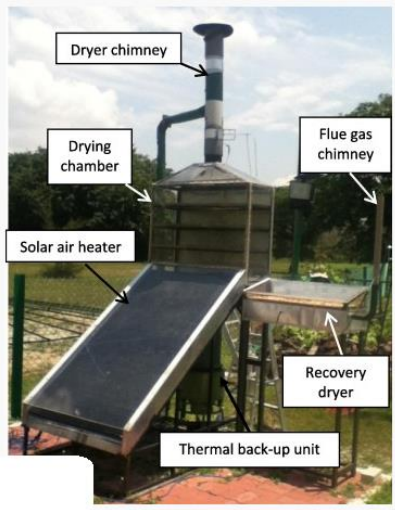
The main components of the hybrid solar dryer

The solar energy collectors of this type of dryer are installed in a mobile and separate manner from the main chamber of the dryer in the open air and transfer heat to the main cabin of the dryer through built-in ducts. The dryer is equipped with a heat and humidity control system, which can be adjusted in certain amounts to produce products with good quality.





The built-in heat recovery system will increase the efficiency of the dryer and save energy. The dimensions of this dryer, which has a maximum capacity of ۳۰۰ kg of product, are ۲,۳ x ۲,۲ x ۱,۱۵ meters. It should be mentioned that in order to work properly in the production of dried fruits and vegetables, it is necessary to use complete equipment such as washing tubs, slicers, disinfectants.



Types of solar dryers

Solar dryers are classified into several categories according to the heating method. In general, solar dryers are divided into two main groups: passive (natural air circulation) and active (forced air circulation):

• In the passive system, the air is heated naturally and due to the natural flow of the wind, it moves between the layers of the product.

• In the active system, the flow of hot air moves through the suction or blowing fans in the product layer.

Active and passive solar dryers can be classified into three categories that differ in design and components and the method of using solar energy:

١-Integrated or direct type solar dryer

In the direct method, drying is done by direct sunlight on the product. In this type of dryer, the product is spread on the trays located in a cabinet with a glass door. Direct sunlight causes drying of the product.

٢- Distributed or indirect solar dryer

In the indirect method, the air flows on a black plate called "absorbing plate" and is heated by absorbing the heat energy of the sun. Then the air passes through the product and causes it to dry. The air usually flows by means of an electric blower or in windy areas in a natural way.

٣- Combined type solar dryers

In the combined method, both direct and indirect heating systems are used; In this way, after passing through the absorbent screen, the air gets heated and flows under the product trays. On the other hand, the enclosure of the product trays has a sloping glass surface through which the sun shines directly on the product.

١-١-Product Name and Code (ISIC ٣)

According to the information obtained from the Ministry of Industry, Mining and Trade, the ISIC code of the hybrid solar dryer is ٢٩٣٠١١٤٢.

١-٢-Customs Tariff Number

According to the Export and Import Regulations Book of ٢٠٢١ and the Chamber of Commerce, Industries, Mines and Agriculture website, the customs tariff code of Hybrid solar dryer is ٨٤١٩١٩٠٠.

١-٣- IMPORT AND EXPORT CONDITIONS

Basic rights include customs duties, taxes, the right to register goods, various duties and other funds received from imported goods. The sum of these receipts and commercial profit, which is determined by the Cabinet of Ministers according to the relevant laws, is referred to as input rights. The entry fee for the products of this plan is ۱۰٪.

۱-٤- REVIEW AND PRESENTATION OF STANDARDS (NATIONAL OR INTERNATIONAL)

Some of the standards related to this plan are as follows:

Standard name	Standard Number	Description
National standard	۱۴۱۱۵-۱۳	Photovoltaic devices - Part ۱۳: Electroluminescence of photovoltaic modules (solar panels)
National standard	۱۴۱۱۵-۳	Photovoltaic devices - Part ۳: Principles of measurement for ground-based solar photovoltaic (PV) devices with reference spectral irradiance data
National standard	۱۴۱۱۵-۹	Photovoltaic devices - Part ۹: Solar simulator performance requirements
National standard	۱۴۲۶۵	Solar energy-calibration of field pyranometers compared to a reference pyranometer
National standard	۱۷۹۰۸	Solar Energy Conversion - Glossary
National standard	۲۰۳۱۰	Solar energy - collection components and materials
National standard	۵۰۵۲	Compressed air dryers - characteristics and test methods

۱-۵- REVIEWING AND PROVIDING NECESSARY INFORMATION ON DOMESTIC AND GLOBAL PRODUCTION PRICES AS WELL AS GLOBAL PRODUCT PRICES

The global price for a hybrid solar dryer product starts at around $۱،۵۰۰. In the country, the domestic models start from approximately sixteen million tomans.

۱-٦- EXPLAIN THE USES OF THE PRODUCT

Solar dryer is suitable for drying different agricultural products. The absorbent plate of the dryer collects the solar radiation energy and causes the air passing over it to heat up. Hot air evaporates the water in the product and causes the product to dry. In addition to using the free energy of the sun in the drying process, the solar dryer produces a higher quality product compared to the traditional method. The dry products produced in this way are very desirable and appropriate from the point of view of hygiene and marketability. Sunlight varies in different seasons of the year. This causes the drying time of the product to be longer in autumn and winter, and it is not economical from an economic point of

view. Increasing the efficiency of the solar dryer, in addition to reducing the energy consumption, will reduce the drying time. Among the methods of increasing the efficiency of the dryer, using a special mechanism to change

The single angle of solar energy absorption is to use the return circuit of the air coming out of the container and directing it to the collector inlet and using wind blades in the dryer container. The use of each of the mentioned mechanisms causes the efficiency of the dryer to increase from ۱۰ to ۲۵ percent.

۱-۷-EXAMINE ALTERNATIVE PRODUCTS AND ANALYZE THEIR EFFECTS ON PRODUCT CONSUMPTION

Drying or reducing humidity is one of the oldest methods of food preservation. The decrease in humidity causes the reduction of microbial activities and chemical interactions or its stopping. It also causes the volume and weight of the food to be reduced and the transportation and storage of dried food becomes easier and cheaper. Considering the crisis of global warming and environmental problems and the high cost of energy, countries are trying to replace fossil fuels with clean and affordable sources and to develop the desirable use of renewable resources. The sun has a huge thermal energy of which only ۱۵ to ۲۰ percent reaches the earth. It should be said that Iran is one of the rich countries in terms of receiving this energy.

The amount of heat that the earth receives from the sun in one hour is more than all the energy that humans consume in one year. If only ۱۵ minutes of this energy is stored, all the annual energy needs of the earth will be provided. The use of solar energy for drying is done in the traditional way and by spreading fruits and other agricultural products, usually the fruit is exposed to sunlight. Contamination caused by the attack of fungi, insects, birds, and rodents, as well as sudden rains and the effect of other atmospheric factors such as wind and soil, in addition to the unevenness of dryness and the long time it takes to dry the products, limit the use of this method. has encountered The dry products produced in this way are undesirable from the point of view of health and are not marketable. In recent years, many efforts have been made in the world in the field of designing and building various mechanized equipments for absorbing sunlight and using it usefully. Industrial and home solar dryers can be mentioned among them.

Perhaps one of the competitors of solar dryers are electric dryers. However, it should be known that in order to use an electric dryer that uses fossil fuels, one must bear very high costs both for purchase and for use.

۱-۸-STRATEGIC IMPORTANCE OF GOODS IN IRAN AND COUNTRIES OF THE REGION

	Feasibility Studies	
	Hybrid Solar Dryer	

Home solar dryers are made in the country with the aim of using the free energy of the sun to reduce the waste of agricultural products and to produce dried fruits and vegetables. This is one of the necessary and very important matters in agriculture and food industries. Solar dryers can provide the necessary heat by using solar energy. Undoubtedly, the production of a dryer with adequate performance and productivity and low cost provides the ground for the expansion of the use of this device.

In general, the dryer includes these parts: a solar energy absorption unit (collector), product tray enclosure, a small fan to create a forced flow of hot air.





The increasing need for food products throughout the year and the lack of constant access to them due to the growing season or the high price of the products, as well as the need to import them into the country, justify the drying and storage of the products. Since the water in food is in the form of free molecules, they can directly participate in chemical and microbial interactions or indirectly cause rapid spoilage of the food system. For this reason, removing water from food products is effective in increasing the shelf life. On the other hand, in terms of energy consumption, product drying is one of the most expensive post-harvest processes in agriculture. Due to the reduction and depletion of fossil fuels, the use of renewable energy, including solar energy, can be a suitable alternative to fossil fuels.

Industrial drying has recently become popular with the advancement of energy, but ultimately increases the cost. Vegetables and fruits can be dried in completely hygienic conditions according to international standards with hybrid drying technology. These systems can save energy, reduce time and required area, increase product quality, make the process more efficient and increase environmental protection.

Due to its geographical location, Iran has sufficient light radiation due to its location in the semi-tropical and dry region, and this potential can be used. Therefore, it seems necessary to design and build a hybrid dryer that can increase the quality of the product and ensure its health safety by reducing costs.

Using hybrid dryers is one of the best ways to dry food that is affordable. This means that instead of using fossil fuels, solar energy is used, which in addition to being cheap, is available anywhere and can also be used to run different parts of the device, such as heaters, fans, etc. used instead of fossil fuels. With the construction of this dryer, the energy needed to operate it is only taken from the sun and no cost is paid for providing energy. In this dryer, solar energy was used in three general ways and these three ways are completely new.

-Using radiant energy from the sun

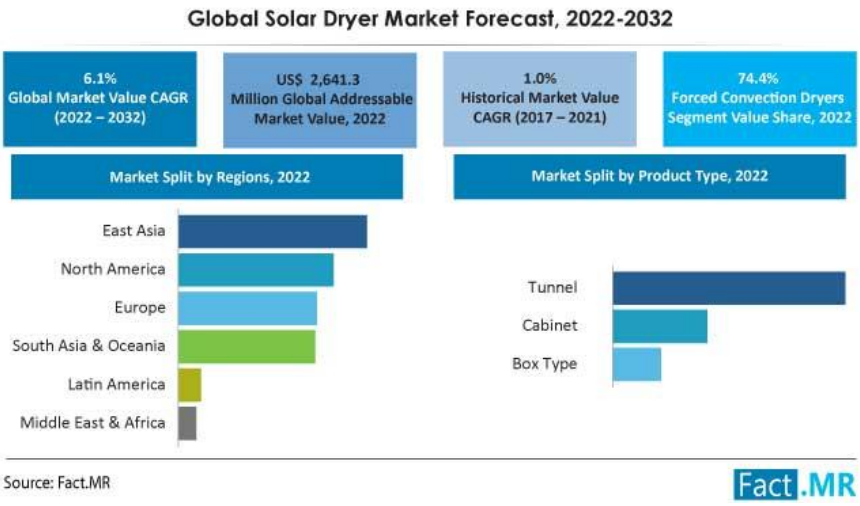
-Using photovoltaic cells to convert solar energy into electrical energy for desired purposes

-Using electric heaters by electric energy stored in the battery.

۱-۹-MAJOR MANUFACTURING AND CONSUMER COUNTRIES

The largest active and producing country in this field is China.

The figure below shows the largest consumer markets and the percentage of market growth globally:



The list of some manufacturing companies in the world is shown in the following table:

Rudra Solar Energy

My Solar Dryer

Juatechnology

Radha Solar Dryer

Focusun Energy Systems

Malnutrition Matters

Effimaxsolar

Solar Brother

Covestro

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

۲-۱-AN EXAMINATION OF EXPLOITATION CAPACITY AND PRODUCTION PROCESS FROM THE BEGINNING OF THE THIRD DEVELPOMENT PLAN TO NOW

The following figure and table show the specifications and capacity of units active in the field of Hybrid solar dryer based on the statistics of the Ministry of Industry, Mines and Trade:

State	Number of units	capacity (device)
Tehran	٤	٥٠٠،٣٧٥
East Azarbaijan	١	٩٣٠
Guilan	١	٢٥٠
Western Azerbaijan	١	٥٠
Total	٧	٥٠١،٦٠٥

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

۲-۲-CHECK THE STATUS OF NEW PROJECTS AND ONGOING DEVELOPMENT PLANS

By referring to the industrial database of the Ministry of Industry, Mines and Trade, the status and specifications of new projects creating Hybrid solar dryer have been collected and entered in the following table:

State	Number of units	capacity (device)
Golestan	١	١٠
Total	١	١٠

۲-۳-REVIEWING THE PROCESS OF PRODUCT IMPORTATION

According to the Chamber of Commerce, Industries, Mines and Agriculture, the import statistics for the last five years are as follows:

Year	Weight (kg)	Rial value	Dollar value
۲۰۱۷	۵۳۵۵۰	۱۱۹۵۵۹۵۸۵۲۰	۳۴۵۲۸۳
۲۰۱۸	۱۴۶۵۴	۶۴۲۴۴۹۲۵۷۶	۱۵۳۷۶۵
۲۰۱۹	۲۷۴۱	۷۰۲۴۸۷۵۰۰۰	۵۶۱۹۹
۲۰۲۰	۹۹۵	۶۳۸۶۵۰۳۴۹	۱۵۲۰۶
۲۰۲۱	۷	۴۴۳۶۱۵۶۲	۱۰۵۶

Source: Tehran Chamber of Commerce, Industries, Mines and Agriculture http://www.tccim.ir

۲-٤-MONTORING CONSUMPTION TRENDS

According to the latest statistics available in ۱٤۰۰, the amount of import was very small, and the amount of export was ۹۵۲،۹۵۳ dollars, and we had about ۵۰۰،۰۰۰ units of production. The consumption of this product has been increasing in recent years due to the industrial development of the country and it is expected to reach about one million units per year in the near future.

۲-۵-INVESTIGATE THE EXPORT PROCESS OF THE PRODUCT AND THE POSSIBILITY OF ITS DEVELOPMENT

According to the Chamber of Commerce, Industries, Mines and Agriculture, the export statistics for the last five years are as follows:

Year	Weight (kg)	Rial value	Dollar value
۲۰۱۷	۹۲۴۷۵۸	۸۴۷۲۸۳۵۳۰۲۷	۲۴۸۵۵۵۲
۲۰۱۸	۷۹۱۷۳۵	۱۰۸۲۶۷۳۶۷۴۷۵	۲۰۶۷۰۷۶
۲۰۱۹	۶۰۳۲۶۹	۱۶۰۸۵۵۶۷۹۳۹۸	۱۲۸۶۸۴۵
۲۰۲۰	۷۴۲۳۸۰	۲۹۹۵۴۲۷۱۲۴۴۶	۱۳۴۶۹۶۹
۲۰۲۱	۶۱۶۶۴۰	۲۲۳۱۸۸۸۸۹۱۰	۹۵۲۹۵۳

Source: Tehran Chamber of Commerce, Industries, Mines and Agriculture http://www.tccim.ir

۲-٦- PRODUCT REQUIREMENT CHECK WITH EXPORT PRIORITY

Many countries that in the contemporary period, especially in the past few decades, have been able to follow the path of progress and development, have accurately implemented specific economic, social and political programs, and after going through medium- or long-term programs. Progress and development have been achieved.

The first proposed development plan after the Islamic Revolution for the years ۱۹۸۳-۱۹۸۷ was prepared. The last development plan (Sixth Development Plan) was approved by the Islamic Consultative Assembly in March ۲۰۱۷.

In many developed countries, exports are the main focus of development and are very important in the presence of that country in global markets. Domestic production and its arena in the global competitive market, or in other words, exports, is one of the factors that can make countries independent. The importance and necessity of the presence of goods made by a country in the world market and the atmosphere of the international economy are among the most important factors of development. The role of exports in this regard is so important that many export experts consider the only successful path to economic development of a country in the global market.

The most important issue for any country like Iran is to achieve economic development and to have an economic, productive and export-oriented system. In order to achieve this, first of all, it is necessary to meet the domestic needs of the country and to expand the export of goods and services in excess of domestic consumption. To achieve a society where there is no poverty, unemployment and backwardness, efforts must be made for its economic growth. Along with economic growth, there must be justice and empowerment of the people of the society to manage their lives.

Exports play an important role in production and employment, so they require a lot of attention to expand and have an active presence in global markets. Exporters in the economic field should also be encouraged.

At present, we can see a very good export of Hybrid solar dryer. Because there is a lot of demand in different countries and each of them is trying to get in touch with first-hand producers. This can help Iran's non-oil exports and boost production in the country.

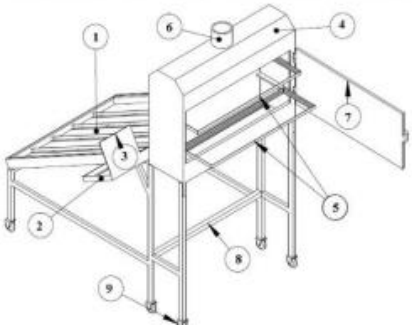
۳-OVERVIEW OF TECHNOLOGY AND METHODS OF PRODUCTION AND SUPPLY IN THE COUNTRY AND COMPARISON WITH OTHER COUNTRIES

In the design and selection of dryer components, three principles of simplicity, efficiency and economy have been taken into consideration. Based on this, the solar energy collector of the finned flat plate type has been selected. Despite the simplicity of the finned collector, due to having fins, it causes better heat exchange between the absorber plate and air and the efficiency of the collector increases.

The drying chamber has two trays with a mesh bottom that are placed inside the chamber in a sliding manner. One of the features of the enclosure is its lightness and the use of non-flammable materials such as aluminum and galvanized sheet. The drying chamber is connected to the collector through a canvas fabric channel that is permanently installed on the chamber and can be easily connected to the collector and separated from it.

An aluminum profile is used as a collector frame in the construction of the collector. The four pieces of the frame are connected using aluminum corners. ٠,٥ mm galvanized sheet is used for the collector. Glass wool insulation with a thickness of ٦ cm was used to insulate the collector between the absorbent plate and the bottom plate, which became ١,٥ cm when compressed. The energy absorber plate is covered with a special dark color. This color is made by mixing titanium oxide with ready-made dark oil paint, and after use, it creates a dark rough coating on the surface of the piece. The surface of the absorbent plate was covered twice with this color. Construction glass with a thickness of ٤ mm was used as the transparent plate of the collector cover. The distance between the absorbent plate and the glass cover plate is ٤٥ mm, and based on this, the air inlet and outlet ducts in the collector are made almost equal to this width so that the passage of air in the collector is more uniform.





solar dryer components

solar dryer components include:

- solar collector or solar radiation absorption unit;

- fan to create a forced flow of hot air in the dryer;

- product trays compartment;

- the communication channel between the absorption unit and the drying chamber;

- temperature sensors;

- auxiliary heating system that can be used to provide the necessary thermal energy in adverse weather conditions;

- chassis

it is made of iron sheet, and for solar dryer components, insulation of enclosure wall and solar collector unit is generally made of rock wool or engineering insulating plastics. the absorber plate is generally made of plates with a high absorption coefficient (such as aluminum). the inner surface of the collector unit and the absorber plate and inside the container are covered with black color. black color absorbs more heat. the product trays are placed inside the dryer compartment and thin layers of fruits or vegetables are arranged on them. if the weather in the area is cloudy, auxiliary heating equipment (such as electric heaters) can be used in the dryer.

used these heaters are installed at the connection point of the collector unit to the dryer enclosure. this dryer is of a combination type that receives both direct sunlight and hot air flows through the absorber plate under the trays. in this way, the drying time is shorter compared to integrated and distributed solar dryers.

a light chassis is used to place the solar collector at the right angle to the sun. the exhaust air from the end of each solar collector is transferred to the dryer chamber. the solar collector and enclosure are made of galvanized sheet. the figure below shows how the air flows under the product trays.

The air flows by means of a fan that is installed either at the outlet end of the container or at the beginning of the solar collector. It is possible to change the fan speed by means of a converter. Sometimes, when the solar collector alone cannot provide the necessary heat, gas burners or electric heaters are used. There are product trays inside the dryer chamber. Solar dryers for drying sheet and sliced products, including apples, pears, kiwi, bananas, citrus fruits,

Melons, watermelons, mushrooms, tomatoes and grain products such as pomegranate seeds, dried fruits and vegetables and medicinal plants are suitable.

The absorber plate of the solar dryer is placed facing south to use the maximum solar energy and heat up. The angle of the absorbing surface relative to the horizon is defined based on the geographical latitude of each region. In spring and summer, this angle is equal to the geographical latitude of -۱۵ degrees, and in autumn and winter it is equal to the geographical latitude of +۱۵ degrees, so that the sun's rays always shine perpendicularly on the absorbent

surface and cause maximum heating. The air circulated by the fan passes over the absorber plate of the solar collector and gets heated. Hot air flows under the trays of the container and causes the product spread on the trays to dry. The amount of air entering the dryer can also be controlled by means of an adjustable valve at the entrance of the solar collector.

The production process is also assembly.

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

Efficiency and high quality and low cost of Hybrid solar dryer, are among the most important advantages of the mentioned methods. The production of this product requires a strict quality management process, which is mentioned below.

The growth and development of the world's industries is largely due to the competition between industrial units. In this regard, every industrial unit tries to gain a greater share of the market by increasing the quality of its products, and this trend over time has improved the quality of products and, as a result, the growth of industrial societies. Quality control is performed to determine the correctness of the production process, according to the technical specifications determined for the product. This operation causes to prevent the production of defective products, the wastage of capital is prevented and the finished price of the product is reduced.

In general, the objectives of quality control can be summarized as follows:

• Maintaining the established standards
• Diagnosing and improving deviations in the production process
• Diagnosing and improving non-standard products
• Evaluating the efficiency of the people of the units

In other words, it can be said that quality control means ensuring the supply and production of goods and services according to the standards.

It is determined and inspection is performed as one of the inseparable components of quality control in order to identify defects and provide the information needed for the quality control system in all industrial units.

The general inspection steps according to the status of each industry are as follows:

١) In the phase of handing over raw materials
٢) In the stage of starting production
٣) Before the start of operations
٤) Before starting irreversible operations
٥) Before the start of the operation that causes defects to be covered
٦) In the final stage of the work

Each of these inspection steps may be done at the operation site or laboratory.

In this unit, according to the characteristics of this industry, each of the necessary stages of quality control and the location of these tests are determined.

will be.

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

EXPLANATION: EXCHANGE RATE BASED ON NIMA SYSTEM - DATED ۲۰۲۲-۱۱ - AMOUNT: ۵۰۰۰۰۰ RIALS

Project Investment Schedule:

Description	Cost (Million Rials)	Cost (Euro)
Land	۱۵۰۰۰	۵۴,۷۴۵
Landscaping	۷۶۲۰	۲۷,۸۱۰
Construction	۵۱۰۰۰	۱۸۶,۱۳۱
Production line machinery and equipment	۸۵۰۰۰	۳۱۰,۲۱۹
laboratory equipment	۳۰۰۰	۱۰,۹۴۹
Utilities	۸۰۰۰	۲۹,۱۹۷
transportation	۱۶۵۰۰	۶۰,۲۱۹
Office equipment	۳۸۰۰	۱۳,۸۶۹
Miscellaneous and unforeseen	۱۸۲۹۲	۶۶,۷۵۹
Total	۲۰۸۹۱۲	۷۶۲,۴۵۳

The ground specification of the project implementation is as follows:

Description	Area (m ۲)	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Land	۳۰۰۰	۵/۰۰۰/۰۰۰	۱۵۰۰۰	۵٤،۷٤۵

The cost of landscaping is as follows:

Description	Area	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Digging and leveling	۳۰۰۰	۲۰۰۰۰۰۰	۶,۰۰۰	۲۱,۸۹۸
Fencing	۲۶۰	۳۰۰۰۰۰۰	۷۸۰	۲,۸۴۷
Asphalt and pavement paving	۲۱۰	۲۰۰۰۰۰۰	۴۲۰	۱,۵۳۳
Green space and lighting	۱۵۰	۲۸۰۰۰۰۰	۴۲۰	۱,۵۳۳
Total			۷۶۲۰	۲۷,۸۱۱

Building Information:

Description	Building type	Area	Unit Price (Rials)	Total (Million Rials)	Total (Euro)
Production	Niches	۷۰۰	۴۰۰۰۰۰۰۰	۲۸,۰۰۰	۱۰۲,۱۹۰
Raw materials and supplies	Niches	۲۰۰	۴۰۰۰۰۰۰۰	۸,۰۰۰	۲۹,۱۹۷
Office building and services	Official	۱۳۰	۸۰۰۰۰۰۰۰	۱۰,۴۰۰	۳۷,۹۵۶
Utilities	Niches	۴۰	۷۰۰۰۰۰۰۰	۲,۸۰۰	۱۰,۲۱۹
Guard		۳۰	۶۰۰۰۰۰۰۰	۱,۸۰۰	۶,۵۶۹
Total		۱۱۰۰		۵۱,۰۰۰	۱۸۶,۱۳۱

Utilities:

Description	Cost (Million Rials)	Cost (Euro)
Power Supply	۲۵۰۰	۹,۱۲۴
Water and Wastewater	۶۰۰	۲,۱۹۰
Fuel	۸۰۰	۲,۹۲۰
Heating and cooling equipment	۲۵۰۰	۹,۱۲۴
Protective equipment and security system	۴۰۰	۱,۴۶۰
Compressed air supply	۱۲۰۰	۴,۳۸۰

Total	۸۰۰۰	۲۹,۱۹۷

Transportation:

Description	Technical Specifications	Cost (Million Rials)	Cost (Euro)
Forklifts	۳ ton	۹۵۰۰	۳۴,۶۷۲
Pickup	Nissan	۳۵۰۰	۱۲,۷۷۴
Riding	Samand	۳۵۰۰	۱۲,۷۷۴
Total		۱۶۵۰۰	۶۰,۲۱۹

Equipment and Machinery:

Production machinery is considered the most important part of industrial investments. The machines of each production complex determine the quality and variety of products, production technology, raw materials and many methods and production costs and even the final price of the product. The selection of machines is a serious and influential issue in the macroeconomic indicators of the project. The cost of production line machinery and equipment is estimated based on inquiries made from important manufacturing companies or reputable agencies. Also, the side costs of providing machines, including transportation costs, installation and commissioning, customs duties, etc. are also calculated. Zhengzhou Zhengzhou Lonkia Machinery Co.,Ltd. Group, Gelgoog Intelligent Technology Co., Lt.. Jooyeshgar and... The prices of all companies are almost in the same range and finally with a difference of ۱۰٪. The price of machines for this process is shown in the following table:

Number	Name	Required amour	cost (million rials)	Rial sum (million rials)	Currency (Euro)	supply (domestic / foreign)
۱	Reservoir design process	۱	۳۵۰۰۰	۳۵۰۰۰	۱۲۷,۷۳۷	Local-Foreign
۲	Production and assembly process	۱	۴۰۰۰۰	۴۰۰۰۰	۱۴۵,۹۸۵	
۳	Test process	۱	۱۰۰۰۰	۱۰۰۰۰	۳۶,۴۹۶	
Total (million rials)			۸۵۰۰۰		۳۱۰,۲۱۹	

laboratory equipment:

Number	Name	Currency (Euro)	Rial Cost (Million Rials)	Rial sum million) (rials
۱	laboratory equipment	۱۰،۹۴۹	۳۰۰۰	۳۰۰۰
۲				

Total	٣٠٠٠

Office equipment:

Number	Name	The required amount	Rial cost per unit	Rial Cost (Million Rials	Currency (Euro)
١	All kinds of tables and chairs	٢٥	١٠٠	٢٥٠٠	٩,١٢٤
٢	All kinds of computers, printers and scanners	٦	٩٠	٥٤٠	١,٩٧١
٣	Phone and fax	٥	٣٠	١٥٠	٥٤٧
٤	Fingerprint attendance device	١	٧٠	٧٠	٢٥٥
٥	Wireless network and internet equipment	١	٥٠	٥٠	١٨٢
٦	Office stationery	٤	١٠	٤٠	١٤٦
٧	Central control system	١	١٥٠	١٥٠	٥٤٧
٨	other	–	٣٠٠	٣٠٠	١,٠٩٥
Total (Million Rials)		٣٨٠٠			١٣٨٦٧

Working Capital Costs:

Name	Description	Cost (Million Rials)	Cost (Euro)
Raw materials and packaging	٦٠ Days	٢٣٣٣٣٣	٨٥١,٥٨٠
salary	٣٠ Days	٢٦٥٨	٩,٧٠١
Energy costs	٣٠ Days	٧٨٢	٢,٨٥٤
revolving fund	١٥ Days	١٧٢٠	٦,٢٧٧
Total		٢٣٨٤٩٣	٨٧٠,٤١٢

Production costs:

Description	Cost (Million Rials)	Cost (Euro)
Cost of raw materials and packaging	١٤٠٠٠٠٠	٥,١٠٩,٤٨٩

Salary Cost	۳۱۸۹۸	۱۱۶,۴۱۶
Energy costs	۹۳۸۷	۳۴,۲۵۹
Cost of maintenance	۱۳۸۶۱	۵۰,۵۸۸
Unforeseen cost of production	۲۰۹۱	۷,۶۳۱
Administrative and sales costs	۱۴۵۷۲	۵۳,۱۸۲
Costs of financial facilities	۱۴۷۱۸	۵۳,۷۱۵
Insurance costs	۲۰۸۹	۷,۶۲۴
Depreciation cost	۵۰۰	۱,۸۲۵
Depreciation expense before operation	۱۸۲۹	۶,۶۷۵
Total	۱۴۹۰۹۴۵	۵,۴۴۱,۴۰۵

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

Number	Description	Consumption per unit product	Unit of consumption	Amount of Consumption Required for Total Capacity	Currency prices (Euro)	Rial equivalent (per unit)	Place of supply	Cost (Million Rials)
۱	chassis	۱	Unit	۱۰۰۰۰	۷۳	۲۰/۰۰۰/۰۰۰	Local	۲۰۰۰۰۰
۲	Solar collector or solar radiation absorption unit	۱	Unit	۱۰۰۰۰	۹۱	۲۵/۰۰۰/۰۰۰	Import	۲۵۰۰۰۰
۳	Compartment of product trays	۱	Unit	۱۰۰۰۰	۵۵	۱۵/۰۰۰/۰۰۰	Import	۱۵۰۰۰۰
٤	Temperature sensors	۱	Unit	۱۰۰۰۰	۹۱	۲۵/۰۰۰/۰۰۰	Import	۲۵۰۰۰۰
۵	Auxiliary heating system	۱	Unit	۱۰۰۰۰	۹۱	۲۵/۰۰۰/۰۰۰	Import	۲۵۰۰۰۰
٦	other	۱	Unit	۱۰۰۰۰	۱۰۹	۳۰/۰۰۰/۰۰۰	Local-Import	۳۰۰۰۰۰
Total (Million Rials)								۱۴۰۰۰۰۰
Total (Euro)								۵,۱۰۹,۴۸۹

۷-RISK ANALYSIS OF PROJECT IMPLEMENTATION

Studies show that in the next year the market will be in short supply and there will be a greater need for imports. So it can be said that the implementation of new projects in this field is not very risky because in addition to the domestic market there is easily good potential to export this product to neighboring countries and if for any reason the applicant intends to undertake this plan, it is necessary to act with caution and superiority over other industrial units and by examining further the weaknesses and strengths as internal factors as well as opportunities and opportunities. Threats as external factors minimize project risk.

۸- HUMAN RESOURCES AND NUMBER OF JOBS

One important aspect of any industrial unit is its job creation, which is thoroughly examined in the market segment. Due to the nature of the industry and the need for ۲ shifts to work, it has been attempted to select the number of personnel in a manner that addresses the production needs of the two shifts. It has also been tried to use related specialties in different parts of production.

To calculate the amount of annual salaries and benefits, three shifts and other benefits have been added to the annual salary. For this purpose, the annual salary is set at ۱٦,٤ months per year

.

Description	Gender	Number	Monthly salary per person (Million Rials)	Monthly salary (Million Rials)	Annual salaries (Million rials)	Annual salaries (Euro)
Managing Director	Man	۱	۲۰۰	۲۰۰	۳۲۸۰	۱۱,۹۷۱
financial manager	Man	۱	۱۴۰	۱۴۰	۲۲۹۶	۸,۳۸۰
Marketing Manager	Man	۱	۱۴۰	۱۴۰	۲۲۹۶	۸,۳۸۰
Financial, sales and administrative personnel	Female	۱	۱۰۰	۱۰۰	۱۶۴۰	۵,۹۸۵
warehouse keeper	Man	۱	۹۰	۹۰	۱۴۷۶	۵,۳۸۷
Line Administrator	Man	۲	۹۰	۱۸۰	۲۹۵۲	۱۰,۷۷۴
skilled worker	Man	۲	۸۰	۱۶۰	۲۶۲۴	۹,۵۷۷
Semi-skilled worker	Man	۲	۷۵	۱۵۰	۲۴۶۰	۸,۹۷۸
worker	Man	۵	۷۰	۳۵۰	۵۷۴۰	۲۰,۹۴۹

Service	Female	۱	۷۰	۷۰	۱۱۴۸	۴,۱۹۰
Guard	Man	۲	۷۵	۱۵۰	۲۴۶۰	۱۰۴,۴۴۵
Driver	Man	۱	۷۵	۷۵	۱۲۳۰	۴,۴۸۹
Secretary	Female	۲	۷۰	۱۴۰	۲۲۹۶	۸,۳۸۰
Total		۲۲			۳۱۸۹۸	۲۱۱۸۸۵

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

Description	Unit	annual consumption	Cost per unit in Rials	Total Cost (Million Rials)	Total Cost (Euro)
Power Consumption	KWh	۱/۱۰۰/۰۰۰	۹۳۹	۱۰۳۳	۳,۷۷۰
Water Consumption	Cubic meters	۷۰/۰۰۰	۳۳۶۲۲	۲۳۵۴	۸,۵۹۱
Gas	Cubic meters	۱/۲۰۰/۰۰۰	۵۰۰۰	۶۰۰۰	۲۱,۸۹۸
Total			۹۳۸۷		۳۴۲۵۹

۱۰- CONDITIONS OF ECONOMIC AND COMMERCIAL SUPPORT

۱۰-۱- CUSTOMS TARIFF SUPPORT (PRODUCTS AND MACHINES) WITH GLOBAL TARIFFS

Support for fertilizer producers, especially Hybrid solar dryer, is part of the Agricultural Support Service Company program and is monitored periodically by a technical working group on behalf of the company and the Ministry of Agriculture and Water and Soil to monitor the quality of fertilizers. The agricultural support services company relies on domestic production and a significant reduction in fertilizer imports, including the supply of fertilizers, organic fertilizers, biofertilizers, microbes and more. Also, in most petrochemical companies, unfortunately, some of the raw materials and machinery needed are supplied from abroad, which come to Iran after initial tests and technical examinations, and in the absence of problems. Therefore, the customs duty received is about ۱۰٪ of the total imported genus. It also requires payment of customs duties if the product is exported. Although in recent years appropriate incentives have been adopted to encourage domestic producers to export their products, which has led to increased exports, but more attention must be paid to this issue by the authorities.

۱۰-۲- FINANCIAL SUPPORT (EXISTING UNITS AND PLANS) OF BANKS - INVESTOR COMPANIES

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

Terms:

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

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

۳- The Bank typically finances up to ۷۰٪ of the project's fixed capital investment as a facility, while ۳۰٪ of the total project investment (including fixed capital and working capital) must be provided by the applicant as paid-in company capital. .

٤- The repayment period of the facility is typically a maximum of ٥ years. It was the Bank's authority to change this period to suit the status of the plans.

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

٦-In general, ۳۰٪ of the total project investment must be financed by the investor and the bank can invest up to the remaining ۷۰٪.

Steps:

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

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

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

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

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

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

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

- One of the basic principles of sustainable production is to improve soil quality from fertility and to return nutrients absorbed by plants to the soil. Fortunately, we are very successful in the field of biofertilizers in the country. The use of these fertilizers not only contributes to environmental sustainability, but also to food security. Due to the growing of the agricultural industry, the need for farmers to use different fertilizers such as Hybrid solar dryer is very high. Although the process of this product is not complicated, for unknown reasons this product is produced in small quantities in Iran and according to the Chamber of Commerce, Industry, Mines and Agriculture, its imports amounted to about ٤٧،٥٤٩،٣٦٢ kg in ٢٠١٨. Therefore, if access to the raw material, applicants are suggested to build one (or several) ٢٠،٠٠٠ tonnes (or even more) units in different areas (especially deprived areas). The plan is to start operating at ٦٠ percent capacity in the first year and increase below capacity in the following years, respectively.
- The plan is to start operating at ٦٠ percent capacity in the first year and increase below capacity in the following years, respectively.

Year	First Year	Second Year	third year	forth year	Fifth year
Capacity(%)	٦٠ %	٧٠ %	٨٠ %	٩٠ %	١٠٠ %
Production capacity (ton)	٦٠٠٠٠	٧٠٠٠٠	٨٠٠٠٠	٩٠٠٠٠	١٠٠٠٠٠

prime cost	٢٧٢ million rials/Per Ton –٥٤٤ Euro
Selling prices of products	٣١٠ million rials/Per Ton – ٦٢٠ Euro
Total Sales (Million Rials)	٢٩١٩٧٠٨ million Rials - ٥،٨٣٩،٤١٦ euro
Percentage of sales at the point head to head	٧٥
Profit (Million Rials)	٣٨٣٢١١ million rials - ٧٦٦،٤٢٣ euro
Gross Value Added (Million Rials)	٢١٠٣٢٧٥ million rials - ٤،٢٠٦،٥٥١ euro
Net Value Added (Million Rials)	٢٠٧٧٩٨٢ million rials - ۴,۱۵۵,۹۶۴ euro
Ratio of gross value added to total sales	٠/٧٢
Ratio of net added value to total sales	٠/٧١
Return of capital	٢