Feasibility Study for Establishing an Agricultural Plastic Products Factory

Prepared by:
Spark Consulting and Training

SPARK

2021

Table of Contents

Table of Tables

Executive Summary

Business Description

Farming in Palestine is the largest sector of the economy. According to the Centre for Economic Policy Research (CEPR), agriculture employs 13.4 percent of the population formally, though informally it employs about 90 percent of those who work. In Gaza, agriculture offers life-saving job opportunities in a region rife with unemployment. And in the West Bank, where farming has been a way of life since ancient times, agriculture makes up an integral part of cultural identity. It also offers opportunities for stable employment and sustainability. (Anera, 2020)

Plastic products related to agriculture are of vital important in this business. These products help solving the challenges of farmers and optimizing their growing. Among the most important products are greenhouse cover films and solarization films (thermal shaders). Currently, there are no producers of such products in Palestine, and all of demand is covered by the Israeli manufacturers.

Objectives

The objectives of the project are as follows:

- Meeting the local market's need for greenhouse plastic sheets
- Reducing coverage costs for farmers
- Encouraging investment in the agricultural sector
- Providing the required product with high quality and reasonable price instead of importing it
- Contributing to the renaissance of the agricultural and industrial sectors.
- Contributing to reducing the unemployment problem by providing more job opportunities directly and indirectly.

Main Products

The two main products that will be manufactured are:

1) Greenhouse cover films: Thermic greenhouse cover films are plastic films that block infrared radiation to reduce the risk of frost when the greenhouse is not heated and to reduce the energy consumption when a heating system is used. The thickness for these films is 40 micrometers, and every donum needs around 156 kg for being covered.
2) Thermal Shaders: Used for killing the viruses and bacteria after the land being prepared. This Every donum needs to be covered with aroung 36 kilograms of thermal shaders.

Keys to Success

There are several keys to success in this project, which could be listed below:

1) There are just two dominant suppliers of the products in Palestine, which are two Israeli suppliers: Gineger and A.A. Politive.
2) The demand for the two main products is increasing.
3) The national importance of having such a project, especially for employing tens of graduates and workers.
4) The high experience for top management in the field of business.
5) There is a good potential for expansion to other markets (Such as the Israeli and Jordanian markets).

Market Study

Industry Analysis: Description and Outlook

The latest agricultural census published by the Ministry of Agriculture and PCBS in 2010 estimated that the total area of agricultural land was 1,207,061 dunum (91.6% or 1,694,554 in the West Bank, and 8.4% in Gaza Strip). The agricultural census of 2008 estimated that the area of agricultural land was 1,854,000 dunum (91.4% in the West Bank, and 8.4% in Gaza Strip). But, the land-use analysis of satellite images – conducted by ARIJ in 2010 – indicated that the area of agricultural land in the West Bank was 2,150,800 dunum. This variation in estimates is due to the use of effective agricultural land to build the agricultural census of 2010, i.e. agricultural land whose area exceeds 1 dunum for rainfed agriculture and 0.5 dunum for irrigated agriculture.

Furthermore, the agricultural sector is an important driver in the Palestinian economy since it creates job opportunities in the local Palestinian market. One of the drivers of the Palestinian agricultural is greenhouses. Greenhouses are concerned in building designed for the protection of tender or out-of-season plants against excessive cold or heat industry, and this industry is one of the drivers of the agricultural sector in Palestine, as it provides jobs opportunities and increases the export income since it covers more than 30,000 donums of the agricultural lands.

Farming inside greenhouses occupies a special importance in the Palestinian agriculture sector, as it is a source of income for many Palestinian families (since the greenhouses cover more than 60% of the vegetable yields for example), and greenhouses cover about 30 thousand dunums of agricultural area in Palestine, and the metal structure and plastic sheets are the most important elements for creating a greenhouse resistant to atmospheric changes (Strong winds, snow accumulation) in terms of design and construction, as most of the greenhouses are exposed to many risks as a result of atmospheric changes that lead to heavy losses in the structure of the greenhouse, especially in the plastic covers.

Market Needs

Starting from the importance of greenhouses to the Palestinian agriculture sector and the economy, and due to the full dependence of the local market on importing plastic sheets (due to the lack of a local factory for the production of these covers in Palestine, despite the large volume of demand for this product), the idea of establishing a factory for the manufacture of plastic covers for greenhouses came. So, projects owners decided to establish a local factory that will produce these products through Importing modern machines for the production of plastic sheets according to international standards. These production lines will yield a high production capacity and high quality in a way that increases the plastic cover's ability to bear more of the agricultural risks so reduce losses of the farmers.

Market Segmentation

The target market will be segmented based on geographic criteria (areas where greenhouses industry would be feasible) as follows:

- Local Market: as mentioned above, more than 30 thousand donums are preserved as greenhouses areas as follows:
    - West Bank greenhouses: Mainly Tulkarm and Jenin (largest greenhouses areas in WB) then Qalqilya and Jericho and then other governorates.
    - Gaza Strip greenhouses
- Potential neighbor markets: Jordan and Israel greenhouses.
- Other Potential Markets

Marketing Strategies

Any developed marketing strategies and action plans should consider the following aspects:

- Maintain a high market share in the local market (not less than 70-80% in the first 3 years)
- Penetration of potential markets linked with specific time periods.
- Maintain sales increase yearly or quarterly.
- Show products quality and competitive advantages.

Competitors Analysis

As mentioned previously, there are no direct competitors in the local market. While Gineger Company is a huge competitor in the local market in addition to A A Politive Company. These companies cover a big percentage of the local market needs so the competition will mainly derive against these manufacturers. Regarding the Jordanian market, Daoudco Company found to be a producer of the targeted products (mainly the 5-layers sheets) but have lower impact in the local market. The following table is establishing a comparison between these companies regarding their products, capacity, employees and main customers. Note that all competitors produce at least one of the products the project aims to produce.

Competitor	Products	Capacity	Employees	Sales	Customers
Gineger - Israel	a- Solarization films b- Geomembrane c- Silage d- Fumigation/barrier films e- Mulch films f- Greenhouse and tunnel cover films g- Greenhouse cover films h- Thermal screen (Aluminet) i- Anti-insect net (polysack) j- Greenhouse shading nets k- Anti-hail nets	15 Production Lines in Israel - Capacity 52,000 Tons/yr (in 2017): Film production capacity of 52,000 tons and net production capacity of 62M m2 per annum.	More than 440 employees worldwide: Brazil, USA, Italy and Israel.	Average export sales growth rate of 6% in the last 3 years. 2017 SALES = 506 MNIS 2017 EBIDTA = 61.8 MNIS	Customers in over 60 countries especially: - USA - Colombia - Brazil - Mexico
A.A. Politive-Israel	a- Greenhouses b- Fumigation c- Mulch films d- Low tunnels films e- Silobags f- Silage covers g- Nets protecting from hail h- Pest protection i- Shade nets j- Other plastic products for industries	Israel: 35000 tons/yr Mexico: 17000 tons/yr	Not Available	Not Available	- USA - Colombia - Ecuador - India

Daoudco-Jordan	a- Greenhouse films b- Low tunnel film c- Mulching film d- Solarization and Fumigation films e- Silage films f- Pondliner films g- Hydroponic films h- Drip irrigation	Annual production capacity of over 50,000 tons and a cutting edge 5-layer co-extrusion blown film machinery among its variety of production lines	Not Available	Not Available	Mainly the local market (Jordanian farmers)

Environmental Analysis (Porter Five Forces)

- **Competitive rivalry:** This project faces intense competition from A. A Politive and Gineger. Both manufacturers play a huge role in the local market and other international markets as they produce the same products (especially the 5-layers sheets) with relatively same quality.

- **Bargaining power of suppliers:** A diverse supplier base limits supplier bargaining power. This project raw material is produced by dozens of manufacturers based in multiple countries (Saudi Arabia, China, Qatar, ...). This provides an advantage to the project by diminishing suppliers' leverage.

- **Bargaining power of customers:** project potential customers include greenhouses owners in Palestine and neighbor markets. Customers (farmers) from the local market, hold a certain degree of bargaining leverage, as they could substitute the project products with those of competitors to gain higher margins. The bargaining power of customers is lower as the factory is considered the first producer of the needed products in the local market with the price advantage over competitors.

- **Threat of new entrants:** Large capital investment costs are required for establishing the factory, which limits the entry of newer players in the greenhouses supplies market. However, existing investors in the agriculture industry could enter the competition in the future.

- **Threat of substitute products:** The demand for greenhouses supplies (mainly sheets) is expected to continue to grow (greenhouses areas are expected to grow so customer base is also expected to grow). Therefore, this force does not threaten the project in the foreseeable future. Moreover, the type of products to be manufactured is considered to be high quality products and will save costs on the long term for the farmer.

SWOT Analysis

The following tables summarizes the Strengths, Weaknesses, Opportunities and Threats and the strategies evolving this project:

	Strengths • High quality products • Using modern technologies in the production process • Experienced top management	**Weaknesses** • High Capital Investment • Non-Experienced staff in the field
Opportunities • The only greenhouses plastic producer in Palestine. • Competitive Price • High costs of imported plastic sheeting • Potential Markets (Jordan, Israel)	• Increasing the market share locally to reach high levels. • Targeting neighbor markets with lower cost and high-quality products.	• Search for funding or investors to reduce the load on the project owners and to sustain business continuity. • Organize some training sessions locally or internationally for the potential employees on the use of the chosen technology.
Threats • Funding and Sustainability • Israeli polices regarding competition with Israeli producers • Raw Material (importing risks)	• Use the high-quality specifications of products and the cash flow prediction to persuade investors and funders. • Study the Israeli polices to overcome any unexpected restrictions.	• Polices and regulations deep study and maintaining multiple suppliers for raw materials

PESTEL Analysis

Category	Factors
Political	• The political circumstances may affect the state of the boarders, which may lead to a halt, disruption or delay in the import and export process, which may lead to a shortage of raw materials or delayed arrival of finished products to customers at locally and abroad, as well as an increase in manufacturing and export costs. • Israeli polices regarding the competition with Israeli manufacturers which may lead to some disruptions to the business sustainability.
Economic	• Unstable Palestinian economy especially in the last year due to COVID-19 pandemic. • The importance of this kind of projects to the Palestinian economy, since that this project will contribute in reducing production costs of the farmers and reduces the lead time so increasing the productivity and income. • The reflection of Israeli economic polices on the Palestinian economy including the agricultural sector. • Competition with the Israeli manufacturers especially with the restrictions of the Israeli polices. • High unemployment rate in Palestine as it crossed 25% in 2020. • Encouraging investment in the agricultural sector so in turn increases the GDP. • Relatively unstable exchange rates.
Social	• This kind of projects creates job vacancies and reduces unemployability rate which reached 25% in the first quarter in 2020. • The lack of a local manufactures makes farmers more supportive to establishing a local factory which makes it hard for to change with generational shifts.
Technological	• The use of modern and updated technology regarding the production of greenhouses supplies especially plastic covers and sheets which yields to a high-quality product.
Legal	• Delays in some Licenses & Permits.
Environmental	• Despite the stable weather conditions and climate change aspects, there might be some losses in the greenhouses if a natural disaster happened. • Production planning based on weather and climate changes.

Technical Study

Production Line

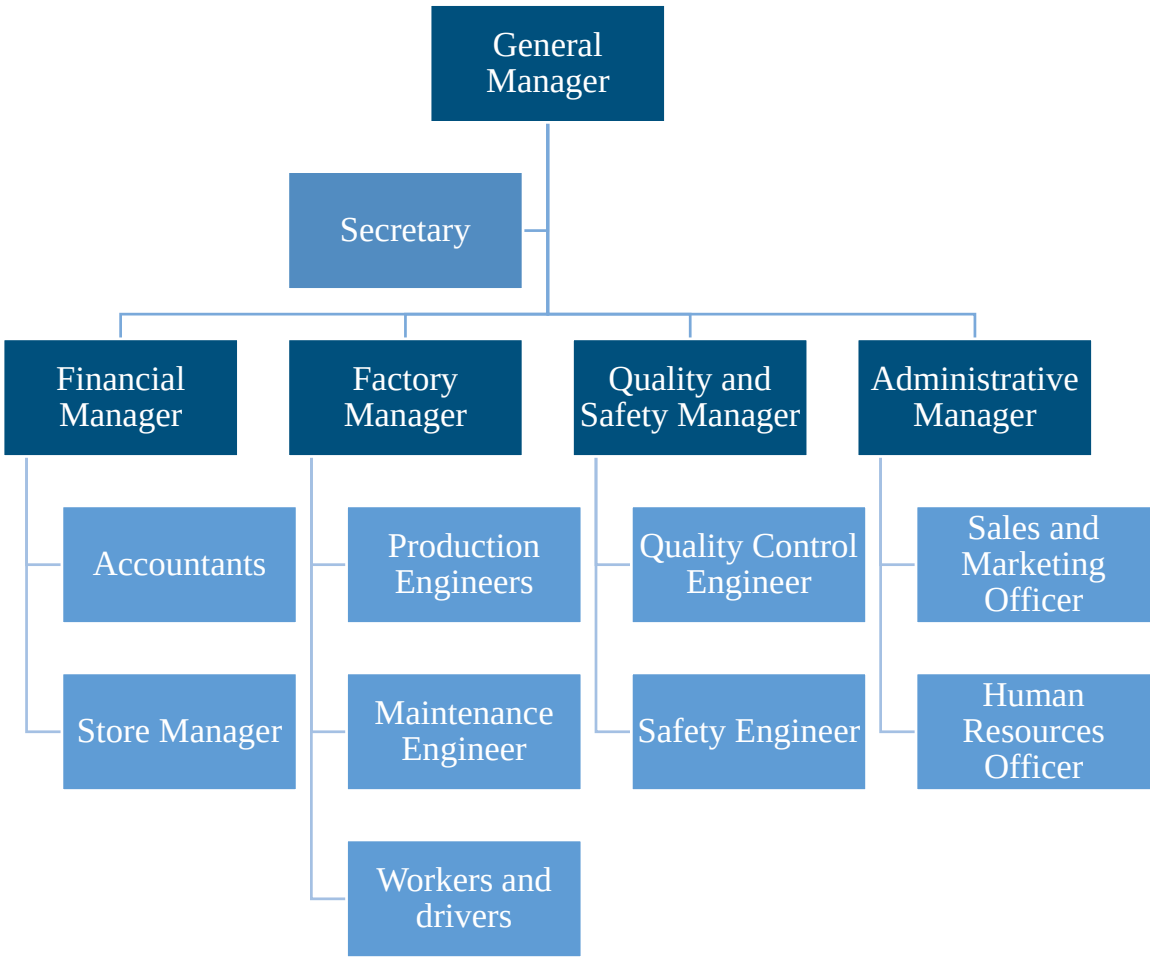
The main extrusion production lines' suppliers are from Germany, Italy and Turkey. Several quotations were received for this purpose from reputed companies. The production line needed for this factory is with the following information and specifications:

- Tubing Production.
- Raw material for processing: LDPE, LLDPE, BLENDS HDPE, MDPE, mLLDPE.
- Total Height of production line: around 30 meters.
- Electric Power: 400 Volt 3phase + Neutral + PE – 50 Hz
- Production line components:
    - Centralized system granules intake
    - Pre-storage receiver
    - Supplementary pump
    - Batch gravimetric dosing system
    - Extruders
    - Hydraulic screen changers
    - Coextrusion die head
    - Double flow air ring with automatic profile control system
    - Cooling control systems
    - Sensors
    - Control boards
    - Take-off unit
    - Lateral triangles
    - Spreader rollers
    - Blow film tower roller
    - Edge guide system
    - Automatic shaft-less winder

Moreover, there are additional requirements for installation, electric parts, compressed air supply and water cooling.

Organizational Structure

The good governance of such a project is critical and important, to guarantee that, the below organizational structure is needed to be adopted:



Financial Feasibility Study

Executive Summary

The following table illustrates a summary about the project:

Executive Summary	
Project	Establishing an Agricultural Plastic Products Factory
Industry	Plastic Manufacturing

Project Excerpt
This project aims at establishing a factory for producing the main agricultural plastic products, greenhouse film covers and thermal shaders.

Project's Key Indicators			
Location	Der Sharaf Industrial Zone, Nablus	**Pay Back Period (PBP)- Years**	4.4
First Amount of Investment (USD)	9,482,741	**Return on Investment (ROI)**	36%
First Year Net Profit after Tax (USD)	1,330,539	**Net Present Value (NPV)**	12,845,032
Maximum annual Net Profit (USD)	5,390,215	**Internal Rate of Return (IRR)**	25%

Assumptions

The following assumptions were made for studying the feasibility of the project:

- Project starting date: 1/6/2021
- USD:ILS rate: 1 : 3.40
- EUR:USD rate: 1 : 1.21
- Number of working days per year: 312
- Project Area in squared meters: 5,000
- Maximum production Capacity (Kg/Hour): 900

Pricing

Competitive prices for the two main products were set in the study, so that to have a price-leading competitive advantage. The price is 10.5 ILS (3.1 USD) per Kg (for both Greenhouse Cover Films and Thermal Shaders).

Expected Demand and Demand Growth

Expected demand quantities were calculated based on the demand for each Donum. Each Donum needs 156 Kgs of plastic films, and each thermal shader needs 36 Kgs of plastic. Currently, based on the published statistics and market studies, there is a total of 30,000 donums of lands covered by plastic films. It is assumed to cover 50% of the market by the first year, by an annual growth of 5% annually, to reach 75% from the sixth year, as shown in the below tables.

Table 1: Market Share Growth (in Donums)

Year	Number of Donums in Palestine	Growth Rate of Donums in WB	Market Share of Donums	Demanded Number of Donums in Palestine
١	٣٠,٠٠٠		%٥٠	١٥,٠٠٠
٢	٣١,٨٠٠	%٦	%٥٥	١٧,٤٩٠
٣	٣٣,٧٠٨	%٦	%٦٠	٢٠,٢٢٥
٤	٣٥,٧٣٠	%٦	%٦٥	٢٣,٢٢٥
٥	٣٧,٨٧٤	%٦	%٧٠	٢٦,٥١٢
٦	٤٠,١٤٧	%٦	%٧٥	٣٠,١١٠
٧	٤٢,٥٥٦	%٦	%٧٥	٣١,٩١٧
٨	٤٥,١٠٩	%٦	%٧٥	٣٣,٨٣٢
٩	٤٧,٨١٥	%٦	%٧٥	٣٥,٨٦٢
١٠	٥٠,٦٨٤	%٦	%٧٥	٣٨,٠١٣

Table 2: Expected Production in Tons

Year	Greenhouse cover films Production in Tons	Thermal Shaders	Total Production (Tons)	Utilization of Production (%)
١	٢,٣٤٠	٥٤٠	٢,٨٨٠	%٣٩
٢	٢,٧٢٨	٦٣٠	٣,٣٥٨	%٤٦
٣	٣,١٥٥	٧٢٨	٣,٨٨٣	%٥٣
٤	٣,٦٢٣	٨٣٦	٤,٤٥٩	%٦١
٥	٤,١٣٦	٩٥٤	٥,٠٩٠	%٧٠
٦	٤,٦٩٧	١,٠٨٤	٥,٧٨١	%٧٩
٧	٤,٩٧٩	١,١٤٩	٦,١٢٨	%٨٤
٨	٥,٢٧٨	١,٢١٨	٦,٤٩٦	%٨٩
٩	٥,٥٩٤	١,٢٩١	٦,٨٨٥	%٩٤
١٠	٥,٩٣٠	١,٣٦٨	٧,٢٩٩	%١٠٠

Expected Sales

Based on the demand growth, the below table shows the total expected sales volumes in ILS and USD currencies.

Table 3: Total Sales in ILS

Year	Greenhouse cover films Sales in ILS	Thermal Shaders Sales in ILS	Total
١	٢٤,٥٧٠,٠٠٠	٥,٦٧٠,٠٠٠	٣٠,٢٤٠,٠٠٠
٢	٢٨,٦٤٨,٦٢٠	٦,٦١١,٢٢٠	٣٥,٢٥٩,٨٤٠
٣	٣٣,١٢٨,٢٢٢	٧,٦٤٤,٩٧٤	٤٠,٧٧٣,١٩٧
٤	٣٨,٠٤٢,٢٤٢	٨,٧٧٨,٩٧٩	٤٦,٨٢١,٢٢١
٥	٤٣,٤٢٦,٦٨٢	١٠,٠٢١,٥٤٢	٥٣,٤٤٨,٢٢٥
٦	٤٩,٣٢٠,٣٠٤	١١,٣٨١,٦٠٩	٦٠,٧٠١,٩١٢
٧	٥٢,٢٧٩,٥٢٢	١٢,٠٦٤,٥٠٥	٦٤,٣٤٤,٠٢٧
٨	٥٥,٤١٦,٢٩٣	١٢,٧٨٨,٣٧٥	٦٨,٢٠٤,٦٦٩
٩	٥٨,٧٤١,٢٧١	١٣,٥٥٥,٦٧٨	٧٢,٢٩٦,٩٤٩
١٠	٦٢,٢٦٥,٧٤٧	١٤,٣٦٩,٠١٩	٧٦,٦٣٤,٧٦٦

Table 4: Total Sales in USD

Year	Greenhouse cover films Sales in USD	Thermal Shaders Sales in USD	Total
١	٧,٢٢٦,٤٧١	١,٦٦٧,٦٤٧	٨,٨٩٤,١١٨
٢	٨,٤٢٦,٠٦٥	١,٩٤٤,٤٧٦	١٠,٣٧٠,٥٤١
٣	٩,٧٤٣,٥٩٥	٢,٢٤٨,٥٢٢	١١,٩٩٢,١١٧
٤	١١,١٨٨,٨٩٥	٢,٥٨٢,٠٥٣	١٣,٧٧٠,٩٤٧
٥	١٢,٧٧٢,٥٥٤	٢,٩٤٧,٥١٢	١٥,٧٢٠,٠٦٦
٦	١٤,٥٠٥,٩٧٢	٣,٣٤٧,٥٣٢	١٧,٨٥٣,٥٠٤
٧	١٥,٣٧٦,٣٣٠	٣,٥٤٨,٣٨٤	١٨,٩٢٤,٧١٤
٨	١٦,٢٩٨,٩١٠	٣,٧٦١,٢٨٧	٢٠,٠٦٠,١٩٧
٩	١٧,٢٧٦,٨٤٤	٣,٩٨٦,٩٦٤	٢١,٢٦٣,٨٠٨
١٠	١٨,٣١٣,٤٥٥	٤,٢٢٦,١٨٢	٢٢,٥٣٩,٦٣٧

Raw Material Cost

The main raw material cost is 1,200 USD per ton (mainly from polyethylene). We assumed a 2% increase in the main raw material cost. Moreover, the additives cost is assumed at 400 USD per ton. The total raw material costs are shown in the below table.

Table 5: Raw Material Cost

Year	Main RM Cost in USD per Kg	Increase In Price (Forecasted)	Other RMs (Additives)	Total Cost (USD/Kg)	Production in Kg	Raw Material Cost in USD
١	١,٢٠	%٠	٠,٤٠	١,٦٠	٢,٨٨٠,٠٠٠	٤,٦٠٨,٠٠٠
٢	١,٢٢	%٢	٠,٤٠	١,٦٢	٣,٣٥٨,٠٨٠	٥,٤٥٣,٥٢٢
٣	١,٢٥	%٢	٠,٤٠	١,٦٥	٣,٨٨٣,١٦٢	٦,٤٠١,٣١٤
٤	١,٢٧	%٢	٠,٤٠	١,٦٧	٤,٤٥٩,١٦٤	٧,٤٦٢,١٨٦
٥	١,٣٠	%٢	٠,٤٠	١,٧٠	٥,٠٩٠,٣٠٧	٨,٦٤٨,٠١٧
٦	١,٣٢	%٢	٠,٤٠	١,٧٢	٥,٧٨١,١٣٤	٩,٩٧١,٨٦١
٧	١,٣٥	%٢	٠,٤٠	١,٧٥	٦,١٢٨,٠٠٣	١٠,٧٣٢,٥٥٢
٨	١,٣٨	%٢	٠,٤٠	١,٧٨	٦,٤٩٥,٦٨٣	١١,٥٥٢,٠٧٠
٩	١,٤١	%٢	٠,٤٠	١,٨١	٦,٨٨٥,٤٢٤	١٢,٤٣٥,٠١٥
١٠	١,٤٣	%٢	٠,٤٠	١,٨٣	٧,٢٩٨,٥٤٩	١٣,٣٨٦,٣٥٠

Waste in Production

The assumption in production waste started from 3.5% of production, and increasing to reach a 1.5%. This is due to the learning curve of the business.

Table 6: Expected Waste in Production

Year	Waste in Production	Total Production in Kg	Total waste in Kg	Total Cost (USD/year)
١	%٣,٥	٢,٨٨٠,٠٠٠	١٠٠,٨٠٠	١٦١,٢٨٠
٢	%٣,٥	٣,٣٥٨,٠٨٠	١١٧,٥٣٣	١٩٠,٨٧٣
٣	%٣,٠	٣,٨٨٣,١٦٢	١١٦,٤٩٥	١٩٢,٠٣٩
٤	%٣,٠	٤,٤٥٩,١٦٤	١٣٣,٧٧٥	٢٢٣,٨٦٦
٥	%٢,٥	٥,٠٩٠,٣٠٧	١٢٧,٢٥٨	٢١٦,٢٠٠
٦	%٢,٥	٥,٧٨١,١٣٤	١٤٤,٥٢٨	٢٤٩,٢٩٧
٧	%٢,٠	٦,١٢٨,٠٠٣	١٢٢,٥٦٠	٢١٤,٦٥١
٨	%٢,٠	٦,٤٩٥,٦٨٣	١٢٩,٩١٤	٢٣١,٠٤١
٩	%١,٥	٦,٨٨٥,٤٢٤	١٠٣,٢٨١	١٨٦,٥٢٥
١٠	%١,٥	٧,٢٩٨,٥٤٩	١٠٩,٤٧٨	٢٠٠,٧٩٥

Capital Expenses

- **Construction**

Table 7: Construction Costs

Group	Item	Cost (USD)
Building Construction	Building construction- Barracks	700,000
	Fire system	150,000
	Lighting system	20,000
Solar System	Solar System (0.5 Mega)	400,000
Total		**1,270,000**

- **Furniture and Equipment**

Table 8: Furniture and Equipment Costs

Group	Item	Cost (EUR)	Cost (USD)
Production Line and Equipment	Production Line	3,792,000	4,588,320
	Shipping and Taxes	50,000	60,500
	Reel Lifting and handling	40,000	48,400
	Raw material containers and silos	50,000	60,500
	Installation: Assembly and wiring	50,000	60,500
	Software and electrical infrastructure	20,000	24,200
	Compressor and compressed airliners	60,000	72,600
	Water and air cooling system	100,000	121,000
	Power Generator	50,000	60,500
Furniture	Administrative Offices	20,000	24,200
	Computer	25,000	30,250
Labs	Inspection Lab	35,000	42,350
Vehicles	Forklifts	50,000	60,500
	Cars	200,000	242,000
Other Miscellaneous		50,000	60,500
Total		**4,592,000**	**5,556,320**

- **Incorporation Expenses**

Table 9: Incorporation Expenses

Item	Cost (USD)
Licenses	20,000
Salaries before starting work	50,000
Environmental Impact study	20,000
Miscellaneous	20,000
Total	**110,000**

Total Capital Expenses

Item	Cost (USD)
Construction	1,270,000
Furniture and Equipment	5,556,320
Incorporation Expenses	110,000
Total	**6,936,320**

Manpower

Based on the organizational structure set for the factory, a total of 40 employees and workers are needed to run the factory at the first year, increasing to reach a 55 employees and workers at the tenth year. An annual increase rate of 5% is assumed in the salaries, and the calculations were taken at 13 months to compensate the end-of-service expenses.

Table 10: Needed manpower per year

Manpower		Monthly Salary (USD)	1	2	3	4	5	6	7	8	9	10
General Manager Office	General Manager	3,500	1	1	1	1	1	1	1	1	1	1
	Secretary	600	1	1	1	1	1	1	1	1	1	1
Financial Department	Financial Manager	2,000	1	1	1	1	1	1	1	1	1	1
	Accountants	1,000	1	1	2	2	2	3	3	3	3	3
	Store Manager	1,500	1	1	1	1	1	1	1	1	1	1
Factory Management	Factory Manager	1,700	1	1	1	1	1	1	1	1	1	1
	Production Engineer	1,500	2	2	3	3	3	4	4	4	4	4
	Maintenance Engineer	1,300	1	1	1	1	1	1	1	1	1	1
	Workers	900	18	18	20	20	22	22	24	24	24	24
	Store handling	700	4	4	4	4	5	5	6	6	6	6
	Forklifts Drivers	700	3	3	4	4	4	4	4	4	4	4
Quality and Safety Management	Quality and Safety Manager	1,500	1	1	1	1	1	1	1	1	1	1
	Quality Control Officers	1,200	1	1	2	2	3	3	3	3	3	3
	Safety Engineer	1,500	1	1	1	1	1	1	1	1	1	1
Administrative Management	Administrative Manager	2,000	1	1	1	1	1	1	1	1	1	1
	Sales and Marketing Manager	2,000	1	1	1	1	1	1	1	1	1	1
	Human Resources Officer	1,600	1	1	1	1	1	1	1	1	1	1
Total		**25,200**	**40**	**40**	**46**	**46**	**50**	**52**	**55**	**55**	**55**	**55**

Accordingly, the total manpower expenses are shown in the below table:

Table 11: Manpower expenses per year

Manpower		1	2	3	4	5	6	7	8	9	10
General Manager Office	General Manager	45,500	47,775	50,164	52,672	55,306	58,071	60,974	64,023	67,224	70,585
	Secretary	7,800	8,190	8,600	9,029	9,481	9,955	10,453	10,975	11,524	12,100
Financial Department	Financial Manager	26,000	27,300	28,665	30,098	31,603	33,183	34,842	36,585	38,414	40,335
	Accountants	13,000	13,650	28,665	30,098	31,603	49,775	52,264	54,877	57,621	60,502
	Store Manager	19,500	20,475	21,499	22,574	23,702	24,887	26,132	27,438	28,810	30,251
Factory Management	Factory Manager	22,100	23,205	24,365	25,584	26,863	28,206	29,616	31,097	32,652	34,284
	Production Engineer	39,000	40,950	64,496	67,721	71,107	99,550	104,527	109,754	115,242	121,004
	Maintenance Engineer	16,900	17,745	18,632	19,564	20,542	21,569	22,648	23,780	24,969	26,217
	Workers	210,600	221,130	257,985	270,884	312,871	328,515	376,299	395,114	414,869	435,613
	Store handling	36,400	38,220	40,131	42,138	55,306	58,071	73,169	76,828	80,669	84,703
	Forklifts Drivers	27,300	28,665	40,131	42,138	44,244	46,457	48,779	51,218	53,779	56,468
Quality Management	Quality Assurance Manager	19,500	20,475	21,499	22,574	23,702	24,887	26,132	27,438	28,810	30,251
	Quality Control Officers	15,600	16,380	34,398	36,118	56,886	59,730	62,716	65,852	69,145	72,602
	Safety Engineer	19,500	20,475	21,499	22,574	23,702	24,887	26,132	27,438	28,810	30,251
Administrative Management	Administrative Manager	26,000	27,300	28,665	30,098	31,603	33,183	34,842	36,585	38,414	40,335
	Sales and Marketing Manager	26,000	27,300	28,665	30,098	31,603	33,183	34,842	36,585	38,414	40,335
	Human Resources Officer	20,800	21,840	22,932	24,079	25,283	26,547	27,874	29,268	30,731	32,268
Total		**591,500**	**621,075**	**740,990**	**778,040**	**875,408**	**960,657**	**1,052,243**	**1,104,855**	**1,160,098**	**1,218,103**

Administrative Costs

Table 12: Administrative Costs

Item	Cost (USD/Year)
Stationery	6,000
Internet	12,000
Auditing	5,000
Licenses	2,000
Cleaning	2,500
Misc.	2,500
Total	**30,000**

Utilities

Table 13: Utilities Costs

Year	Water	Electricity	Diesel	Cost (USD/Year)
1	1,000	81,008	52,941	134,949
2	1,050	94,456	52,941	148,447
3	1,103	109,225	52,941	163,269
4	1,158	125,427	52,941	179,525
5	1,216	143,179	52,941	197,336
6	1,276	162,611	52,941	216,828
7	1,340	172,368	52,941	226,649
8	1,407	182,710	52,941	237,058
9	1,477	193,672	52,941	248,091
10	1,551	205,292	52,941	259,785

Marketing

An annual marketing costs of 30,000 USD were assumed for the project.

Maintenance

Table 14: Maintenance Costs

Item	Cost (USD)	Annual Maintenance Rate	Cost (USD)
Construction	1,270,000	5%	63,500
Equipment	5,556,320	3%	166,690
Total	**---**		**230,190**

Insurance

Table 15: Insurance Costs

Item	Cost (USD/Year)
Building and Equipment	55,563
Employees	10,000
Total	**65,563**

Depreciation

Table 16: Depreciation Costs

Item	Cost (USD)	Depreciation Rate (%)	Depreciation Cost (USD)
Building Construction	870,000	10%	87,000
Solar System	400,000	5%	20,000
Production Line and Equipment	5,096,520	7%	356,756
Furniture	54,450	20%	10,890
Labs	42,350	15%	6,353
Vehicles	302,500	20%	60,500
Other Miscellaneous	50,000	15%	7,500
Total	**---**	**---**	**548,999**

Amortization

Table 17: Amortization Costs

Item	Cost (USD)	Amortization Rate (%)	Amortization Cost (USD)
Incorporation Expenses	110,000	10%	11,000

Total Operating Cost

Table 18: Total operating costs

Year	Raw Material Cost	Production Waste	Manpower	Administrative	Utilities	Marketing	Maintenance	Insurance	Depreciation	Amortization	Total Operating Cost (USD)
١	4,608,000	161,280	591,500	30,000	134,949	30,000	230,190	65,563	548,999	11,000	6,411,481
٢	5,453,522	190,873	621,075	31,500	148,447	30,000	230,190	65,563	548,999	11,000	7,331,169
٣	6,401,314	192,039	740,990	33,075	163,269	30,000	230,190	65,563	548,999	11,000	8,416,439
٤	7,462,186	223,866	778,040	34,729	179,525	30,000	230,190	65,563	548,999	11,000	9,564,097
٥	8,648,017	216,200	875,408	36,465	197,336	30,000	230,190	65,563	548,999	11,000	10,859,178
٦	9,971,861	249,297	960,657	38,288	216,828	30,000	230,190	65,563	548,999	11,000	12,322,683
٧	10,732,552	214,651	1,052,243	40,203	226,649	30,000	230,190	65,563	548,999	11,000	13,152,050
٨	11,552,070	231,041	1,104,855	42,213	237,058	30,000	230,190	65,563	548,999	11,000	14,052,989
٩	12,435,015	186,525	1,160,098	44,324	248,091	30,000	230,190	65,563	548,999	11,000	14,959,804
١٠	13,386,350	200,795	1,218,103	46,540	259,785	30,000	230,190	65,563	548,999	11,000	15,997,324

Working Capital

Table 19: Working capital

Item	Working Capital Percentage	Cost (USD)
Manpower (Average of five years)	20%	144,281
Administrative	20%	6,000
Utilities	20%	26,990
Marketing	20%	6,000
Maintenance	20%	46,038
Raw Material	50%	2,304,000
Insurance	20%	13,113
Total	**-**	**2,546,421**

Investment Expenses

Table 20: Investment Expenses

Item	Cost (USD)
Total Capital Expenses	٦,٩٣٦,٣٢٠
Working Capital	٢,٥٤٦,٤٢١
Investment Cost	**9,482,741**

Profits

Table 21: Annual Profits

Year	Total Operating Costs (USD)	Loan (USD)	Total Revenues (USD)	Profits Before Taxes (USD)	Taxes (USD)	Net Profit After Tax (USD)	(%) Profit Increase
1	6,411,481	1,152,098	8,894,118	1,330,539	93,138	1,237,401	0%
2	7,331,169	1,152,098	10,370,541	1,887,275	132,109	1,755,166	42%
3	8,416,439	1,152,098	11,992,117	2,423,580	169,651	2,253,929	28%
4	9,564,097	1,152,098	13,770,947	3,054,752	213,833	2,840,920	26%
5	10,859,178	1,152,098	15,720,066	3,708,790	259,615	3,449,175	21%
6	12,322,683	1,152,098	17,853,504	4,378,722	306,511	4,072,212	18%
7	13,152,050	1,152,098	18,924,714	4,620,566	323,440	4,297,126	6%
8	14,052,989	1,152,098	20,060,197	4,855,109	339,858	4,515,252	5%
9	14,959,804	1,152,098	21,263,808	5,151,906	360,633	4,791,273	6%
10	15,997,324	1,152,098	22,539,637	5,390,215	377,315	5,012,900	5%

Tax Rate: 7%

Loan Payment Information

Loan Period in Years	10
Laon Payment Method	Monthly
Loan amount (USD)	9,482,741
Monthly payment	96,008
Number of payments	120
Total interest (USD)	2,038,236
Total cost of loan (USD)	11,520,977
Annual Interest Rate	4%

Financial Indicators

The below tables show the financial indicators for the overall project.

Payback Period in Years (PBP)
4.4

Return on Investment (ROI)
36%

Net Present Value (NPV)
12,845,032

Internal Rate of Return (IRR)
25%