



BLACK SOLDIER FLY PROTEIN AND BIOFERTILIZER APPLICATION.

**Investment in organic waste processing
and protein production from biomass of
black soldier fly larvae (BSFL)**

2025

SUMMARY

Proposed location – AL AIN Region is adjacent to the international sea trade port and global transport corridors



INVESTMENT

15 mln \$

EBITDA

**3 mln \$
per year**

CAPACITY

**33 000 tons of
organic waste
per year**

EBITDA Margin

40% +

REVENUE

**6,5 mln \$
per year**

PROBLEM



Nutrient recycling and pollution, growing waste from agriculture and food & drink industries; rising urbanization in developing countries



The increase in demand for protein. BSF protein meal is an alternative source of protein that is used as a nutritional ingredient in animal feed & pet food processing.



Increase in fish meal and soybean price. In 2022 the share of aquafeed segment is expected **52,3%** of the global BSF protein meal market. **By 2033** this segment is projected to reach **1 237 mln \$**

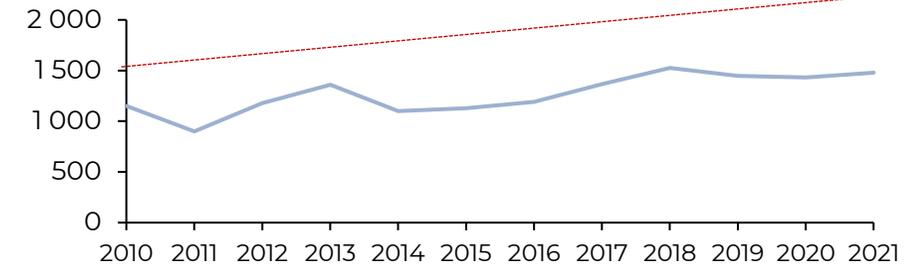


Increasing need in land use for cultivation. Organic fertilizers release nutrients as they break down, improving the soil and its ability to hold water and nutrients.

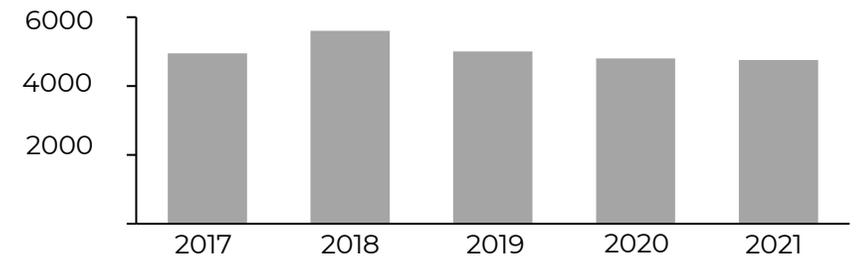


Increase in fish and soybean oil price and applications as an alternative of insect oil due to high concentration of Oleic and Lauric acid.

Fishmeal average yearly price, \$ per ton



Fishmeal supply, thousands tons



Source: World Bank; Feed Navigator; Strategy Partners analysis

SOLUTION

**BSF larvae have a high protein content (~60%).
Therefore, they can be used as an alternative
source of protein.**

Black soldier fly larvae production:



Construction of a biotechnological waste recycling plant in your Region



Take care of organic waste and nutrient recycling



Provide a viable and more profitable protein-rich feed supply



Sales of products (insect protein meal, insect oil, biofertilizer) in the EU, USA and the Middle East

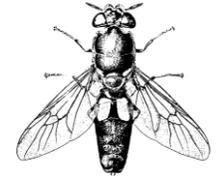


Organic biofertilizer solution for crops made from BSF FRASS



PROPOSAL

Investment in the growing market for alternative protein from the biomass of black soldier fly larvae (BSF)



We are projecting biotechnological production facility in **Middle East Region** dedicated to processing of organic waste.

We offer a modern **organic production** of highly demanded feed components and fertilizer made from the biomass of black soldier fly larvae (BSF).



The final product is used in **feed** (insect protein meal, oil), **pharmacology and cosmetology** (oil) and **organic fertilizer as plant protection products** (biofertilizer).

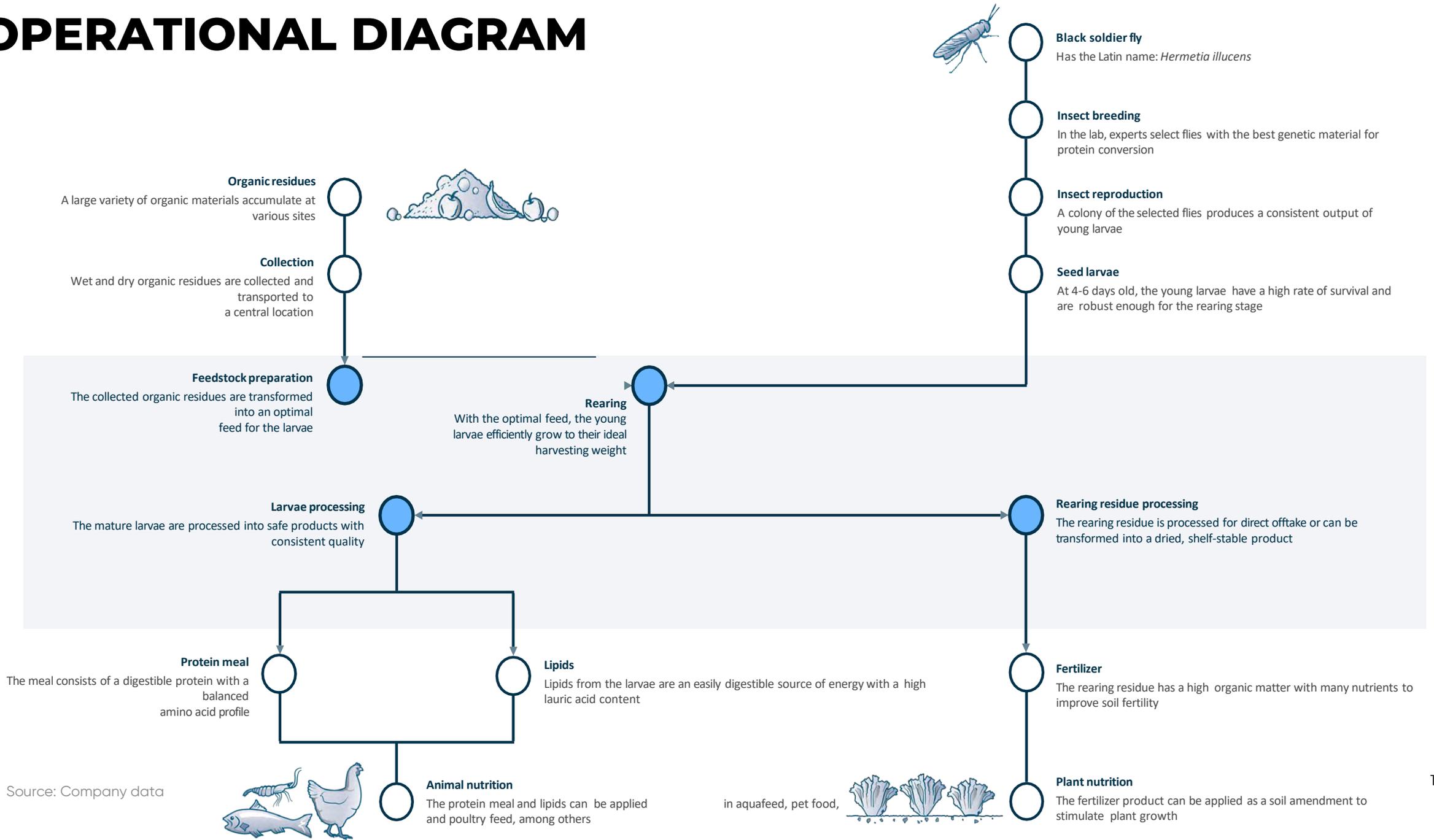


The project is designed to **process 33 000 tons of organic waste per year, produce 1500 tons** of insect protein meal, **600 tons** of insect oil, **8000 tons** of biofertilizer annually.



The technology assumes a **total investment (including pilot) of 12,7 mln \$, a payback period of 5 years.**

OPERATIONAL DIAGRAM

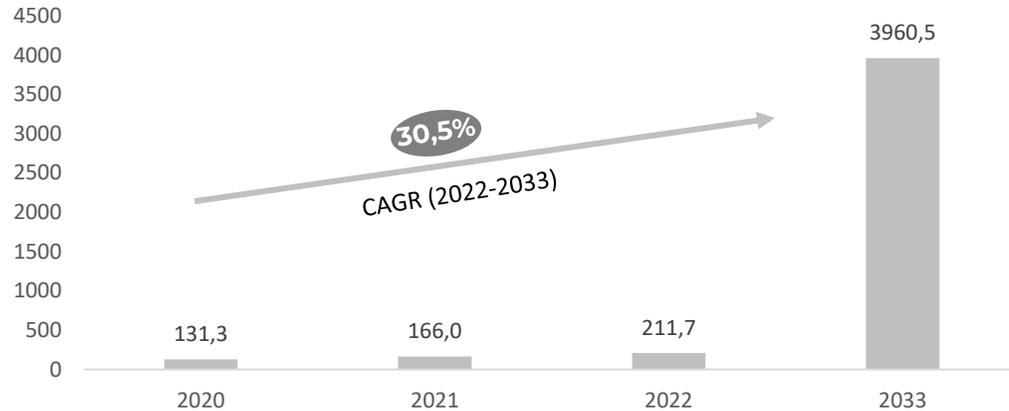


Source: Company data

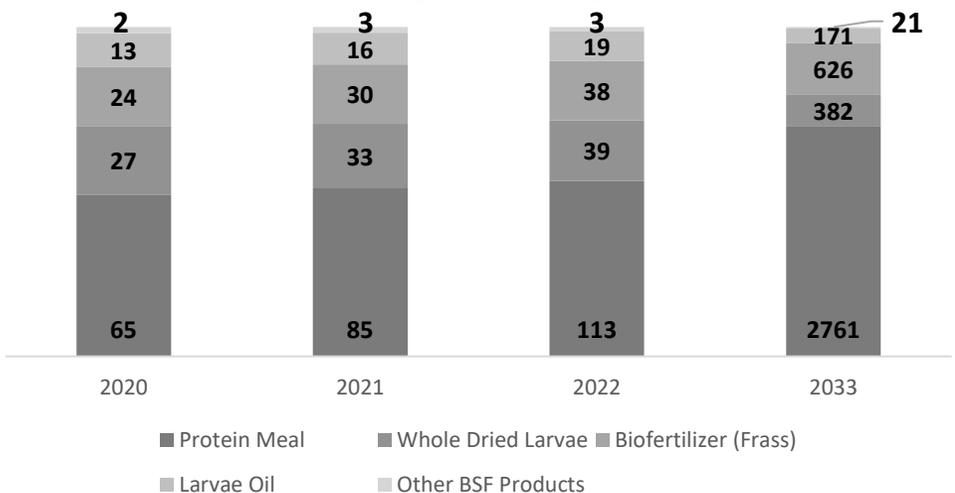
GLOBAL BSF MARKET

The market is growing at a double-digit rate of **30,5% per year (CAGR)** and is expected to grow **19 times in 10 years**

Global BSF market size, 2020–2033 mln \$



Global BSF market size, by product type, 2020–2033 (mln \$)



- The market is in its infancy and there is an opportunity for the development of **major global player**.
- Now there are several companies that are actively engaged in fundraising, e.g.
- **InnovaFeed** raised a total of 445.17 mln euro (250 mln euro in 2022 year) in funding over six rounds. The funding was utilized for the expansion of the company’s production facilities.
- **Protix** raised more than 110.5 mln euro in funding from 2017 to 2022 (50 mln euro in 2022 year). The funding was utilized to expand production capacities, develop products, and prepare for internationalization.
- **Entoprotech LTD** (Israel) raised around 2.0 mln \$ in funding in 2021 for expanding the production capacities to produce protein meals and other medical products.
- **Entosystem** (Canada) raised 1,6 mln \$ and 52 mln \$ from both public and private investors for expanding the production capacities for processing, production and sales of insect-based feeds for livestock animals.
- New projects are being actively announced in the world and those who can be one the first to **occupy niches** in large markets will win.

Product global prices and application areas

The prices of BSF meal, oil, frass are higher in North America compared to other regions, mainly due to the low availability of BSF products, higher operating costs & labor costs

Global prices

BSF products	Application area	Prices, \$/ton
Protein Meal	Animal Feed	1 800–2 200
	Aquafeed	2 300–2 500
	Pet Food	3 500–4 500
Insect Oil	Animal Feed	2 400–2 700
	Aquafeed	2 700–3 000
	Pet Food	4 300–4 800
Frass	Agriculture	200–400

- The project includes the following prices: insect protein meal - **2800 \$/ton**, insect oil - **1000 \$/ton**, bio-fertilizer - **200 \$/ton**.
- Main sales market products is **U.S.**, also planned to sell in the EU, and the Middle East.
- Places of focus for key BSF market players in Europe for product sales are **Asia, South America and North America, U.S., Latin America, Asia-Pacific**.

KEY MARKET PLAYERS' PRODUCTION CAPACITIES

PROTIX B.V. and INNOVAFEED SAS lead the BSF industry due to their large-scale commercial production facilities

Company Name	Headquarters	Total Production Capacity (Tons)	Protein Meal Production Capacity (Tons)	Processing Method Used	Headquarters
Protix B.V.	Netherlands	~32,000–33,000	~4,100	Wet Processing	Netherlands
InnovaFeed SAS	France	~118,000–120,000	~15,000	Wet Processing	France
BioflyTech	Spain	-	-	-	Spain
Hexafly	Ireland	~50	~10-20	Dry Processing	Ireland
nextProtein SA	France	~10,000	~1,200–1,500	Dry Processing	France

The product offerings of PROTIX B.V. and INNOVAFEED SAS are of superior quality due to the use of wet processing technology. These factors have resulted in better brand recognition and awareness regarding the products.

GLOBAL BSF PROTEIN MEAL MARKET SIZE – numbers in

The aquafeed segment is projected to reach 1,237 mln \$ by 2033

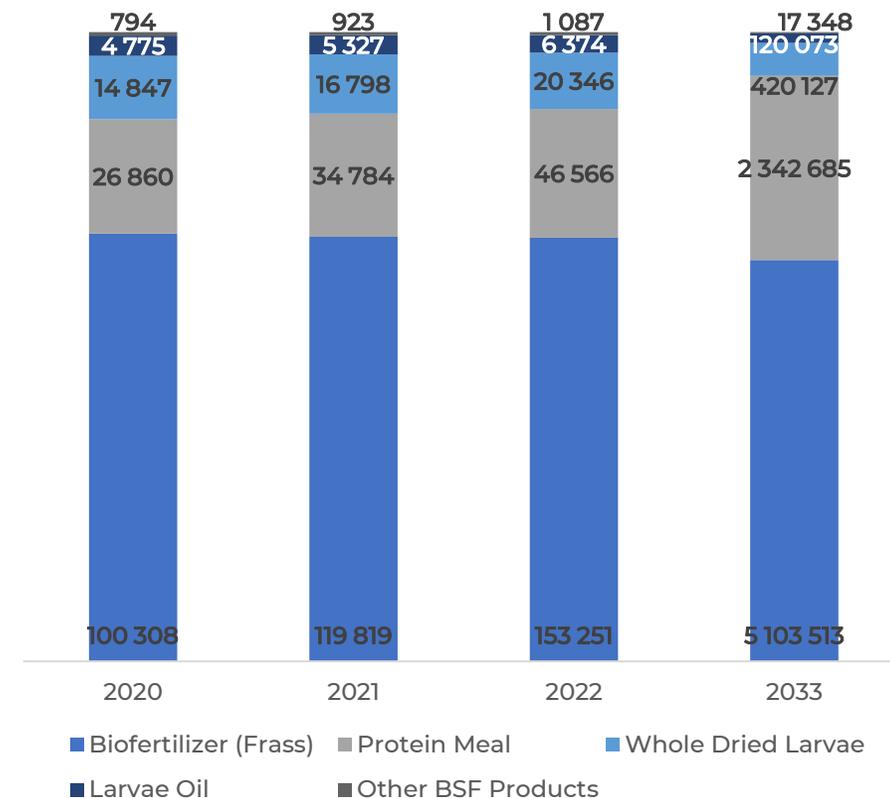
Global BSF protein meal market size, 2020–2033 (thousands \$)

Application	2020	2021	2022	2033	CAGR % (2022–2033)
Aquafeed	39,384.9	51,159.1	66,795.9	1,236,982.3	30.4%
Animal Feed	17,051.9	22,872.2	30,843.5	957,712.6	36.7%
Pet Food	8,051.1	11,048.5	15,244.4	565,984.7	38.9%
Total	64,487.9	85,079.9	112,883.8	2,760,679.5	33.7%

Global BSF protein meal market size, 2020–2033 (Tons)

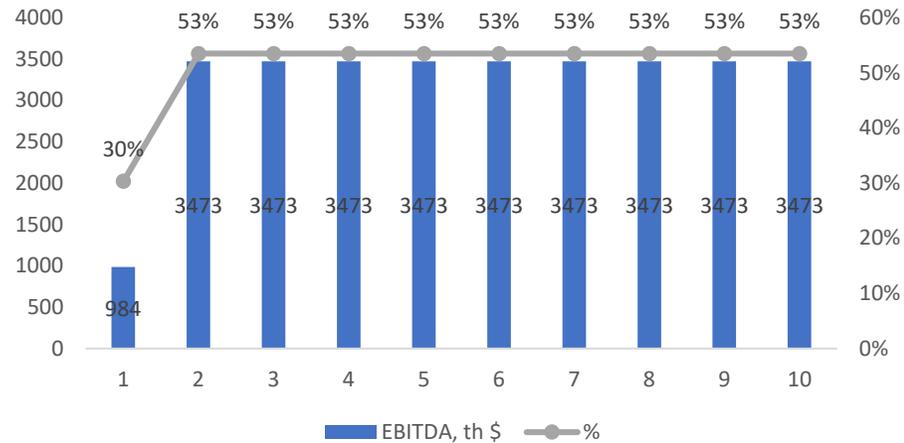
Application	2020	2021	2022	2033	CAGR % (2022–2033)
Aquafeed	16,270.1	21,259.1	28,699.5	1,524,526.3	43.5%
Animal Feed	8,604.4	10,810.4	14,032.6	481,791.0	37.9%
Pet Food	1,985.8	2,714.5	3,833.6	336,367.2	50.2%
Total	26,860.2	34,783.9	46,565.7	2,342,684.6	42.8%

Global BSF market size, by product type, 2020–2033 (Tons)

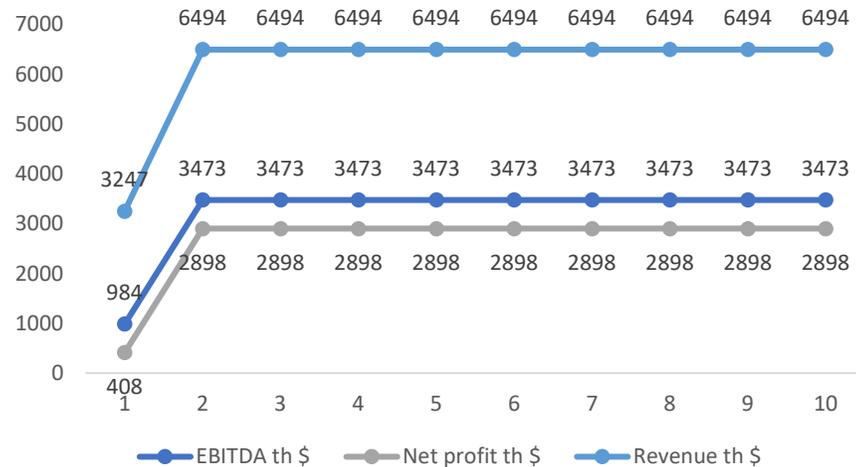


SUMMARY OF FINANCIAL ANALYSIS.

Operating efficiency forecast for project of 100 ton capacity



Dynamics in the forecast period for project of 100 ton capacity



NPV, thousand \$

50 ton/day	(411)
75 ton/day	1 953
100 ton/day	4 138

IRR, %

50 ton/day	13,9
75 ton/day	18,8
100 ton/day	21,5

Payback period, years

50 ton/day	6,2
75 ton/day	5,9
100 ton/day	5,4

Total Investment (inc. pilot), thousand \$

50 ton/day	7 643
75 ton/day	10 389
100 ton/day	12 712



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11

Лет на рынке
кормовых
протеинов

4

Успешно
запущенных
проекта

100%

Репутация среди
партнеров и
работодателей.

11

Лет на рынке
молочных и
пищевых
продуктов

В I O

Даты рождения.
24.10.1976

О себе:

С момента успешного запуска продукции компании Hamlet Protein в России в 2012 году, специализируюсь на проектах связанных с производством и продажей альтернативных протеинов. Специализация в области премиальных стартерных кормов. Опыт взаимодействия со ведущими российскими и иностранными Агропроизводителями.

Гражданство.
РФ

Место жительства.
Москва

ОБРАЗОВАНИЕ

- 1993-99 ● **Ташкентский ГЭУ**
МЭО. Бакалавр.
- 1996-98 ● **CUNY, NY, USA.**
Бакалавр. Маркетинг.
- 2007-09 ● **Университет г. Мангайм, ФРГ.**
МБА.

ОПЫТ РАБОТЫ С ПРОТЕИНОМ



ГОТОВНОСТЬ ЗАПУСТИТЬ НОВЫЙ ПРОЕКТ

ЗНАНИЕ ТЕХНОЛОГИИ ЛЧЛ	НАЛИЧИЕ КОМАНДЫ	ТЕХНИЧЕСКАЯ ПОДГОТОВКА
95	90	95
Готовность к переезду %	Мотивация выполнить проект %	Опыт ВЭД и GR %
75	100	95

НАВЫКИ

- Управление биотех-проектами
- Знание рынка кормов и аквакультуры
- Промышленное производство ЛЧЛ.
- Сертификация стартерных протеинов

Знание языков

- Русский
- English
- Deutsche

ХОББИ

