

Project Overview

Manufacturing high-quality product from sunflower meal



Project goals:



Production of high-quality products for the food and fodder production industries, using available agricultural commodities (sunflower meal).



Creating green energy by burning residual fibres (waste product).



Global project background



SOLUTION: SUNFLOWER PROTEIN CONCENTRATE - WITH A PROTEIN CONTENT OF UP TO 82%.



Potential sources of protein

Over the course of the last few years, the residual material from fish and poultry processing has been recognised as a source of protein. The majority of fodder protein was and is of animal origin.

Residual plant material has been used in animal feeding for a long time, however only since the early 90s has it been used as a pure, concentrated protein fodder.

Despite considerable available amounts (see next slide) and good nutritional values, the processing of residual material has been hindered by a shortage of reliable and economically-viable technologies.

The residual materials best suited for protein production are sunflower seeds, rapeseed and soy.



Oilseed volume

The annually available amounts of oilseeds in Europe:

Soya meal:
6 - 8 million tonnes



Rapeseed meal:
10 - 12 million tonnes



Sunflower meal:
3 - 4 million tonnes



Composition of oilseeds

	Sunflower meal	Soya	Rape	Cotton
Protein	36-40%	47-52%	34-36%	41%
Fat	1.0%	1.5%	3.5%	1.50%
Fiber	21.0%	3.1%	12%	11.0%
Ash	6.0%	6.4%	6.8%	6.30%
Lysine	1.14%	2.99%	1.93%	1.72%
Arginine	2.46%	3.4%	2.21%	4.55%
Cystine	0.55%	0.73%	0.89%	0.70%
Valine	1.75%	2.26%	1.91%	1.78%
Isoleucine	1.38%	2.10%	1.41%	1.23%
Methionine	0.68%	0.68%	0.73%	0.67%
Threonine	1.13%	1.85%	1.54%	1.36%
Tryptophan	0.35%	0.65%	0.48%	0.48%



What is meal?

The production of refining vegetable oils leaves behind residues, so-called meal.

The extracted meal can contain, depending on the technology used, 25-52% protein and 0.5-10% oil.

Hexane extraction usually results in very low residual oil contents of <1%.

The protein content left after extracting oil from peeled seeds is relatively high up to 52%. Using unpeeled seeds reduces the protein content to about 26-28%.

The meal is currently only used as dietary fibre in protein supplementation of fodder.



Meal processing technologies of AG Technologies S.a.r.l.

*The technologies developed by AG Technologies allow for versatile processing of oilseed meal. At the moment, this technology is optimised for processing sunflower meal.

*The technologies enable protein extraction of 65% from meal. In this way, as an example, 1 metric tonne of meal with a protein content of around 38% can be processed to around 290 kg of dry concentrate with a protein purity of around 80%.

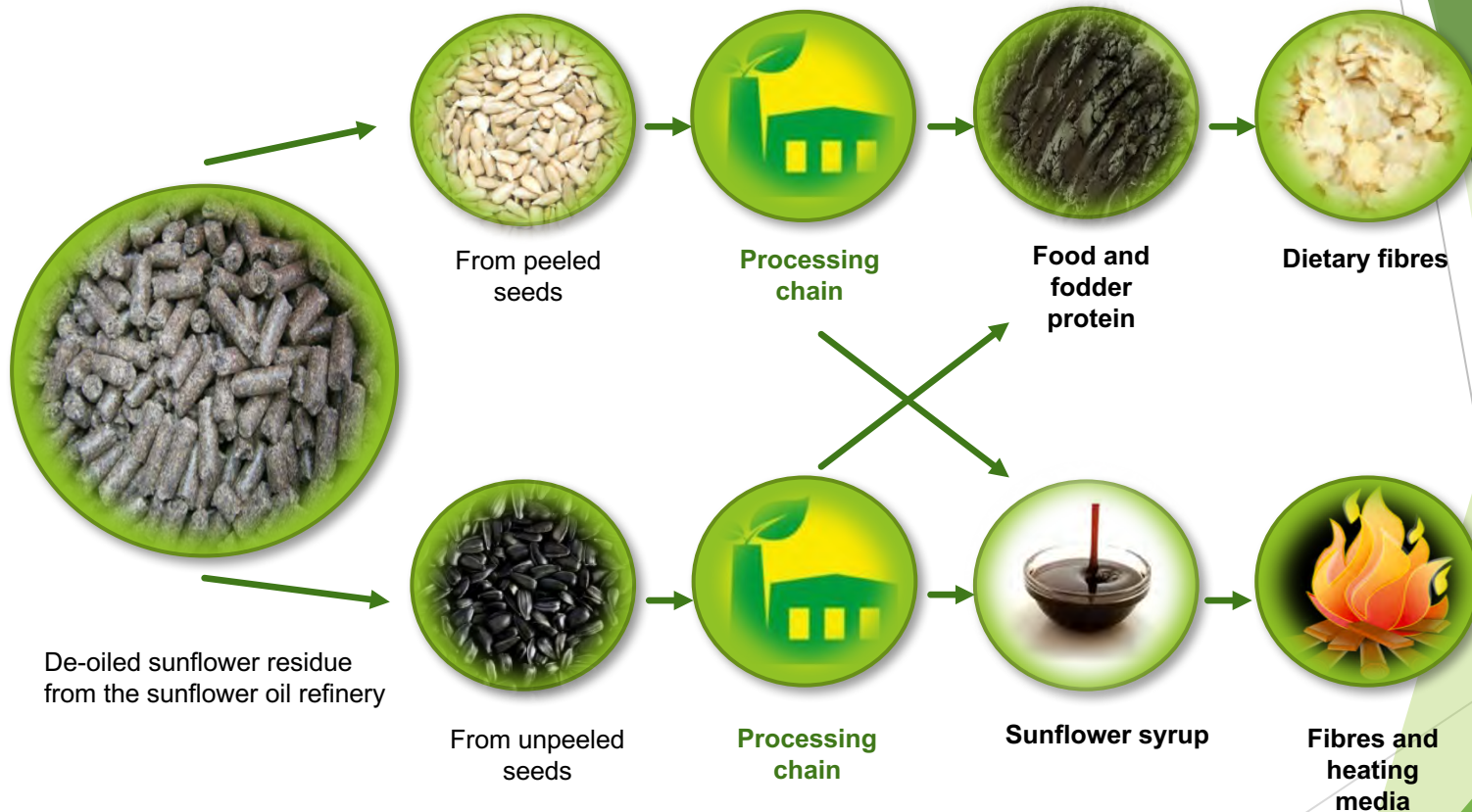
*The resulting fibres can be burned in a biomass boiler, producing electricity and steam. One metric tonne of meal can be processed into 0.5-0.6 tonnes of dry fibre. Burning this amount results in around 0.5 MW of electricity and around 5.0 metric tonnes of steam.

*Around 300 kg of sugar syrup can be extracted from 1 metric tonne of sunflower meal. The sugar syrup has dry contents of up to 75%, it can be used in fodder.

*Membrane filtration can be used for wastewater treatment and a return of clean water of up to 75%.



Meal processing technologies by AG Technologies S.a.r.l.



Sunflower protein concentrate: Main product after sunflower meal processing



Sunflower meal

Protein - 35%



Processing chain
technology

~~Fibres
Lignin
Antinutrients
Chlorogenic acid~~



Sunflower protein
concentrate

Protein - 82%

Contains:

- Pure protein - 92%
- High degree of realisable energy
- Low fibre content
- No antinutrients
- Good solubility
- Low moisture content
- Low germ content



Main features of the sunflower protein concentrate



- 100% natural product

Ingredients	Characteristics
Protein	82%
Digestibility	95%
Amino acid profile	wholesome
Antioxidant factors and allergens	not included
Taste, colour and smell	Neutral
Storability	9 months
Consistency	powder/granule
Prepackaging	30kg
Packaging	Eurobag
Costs	affordable



Comparison with analogue products

Parameter	Sunflower protein	Soybean	Fishmeal	Glutenmeal	Poultrymeat	Meat meal & bone meal
Proteins	80,00	65,00	62-65	60,20	64,10	54,00
Fat	0,10	1,00	9,40	2,90	12,60	12,00
Moisture	5,00	7,00	9,00	5,00	10,00	8,00
Wet fiber	0,20	4,00				
Ash	4,60	6,00				
NfE*	12,00	17,00				
Amino acids, %						
Lysine	1,84	4,23	4,81	1,02	3,32	3,07
Methionine	1,74	0,91	1,77	1,43	1,11	0,80
Zistin	0,93	0,98	0,57	1,09	0,65	0,60
Threonine	2,72	2,73	2,64	2,08	2,18	1,97
Thryptophan	3,41	0,78	0,66	0,31	0,48	0,35
Leucine	5,32	5,20	4,54	10,20	3,89	3,84
Isoleucine	2,39	3,19	2,57	2,48	2,01	1,60
Valine	3,35	3,38	3,03	2,79	2,51	2,66
Phenylalanine	4,41	3,45	2,51	3,84	2,26	2,17
Arginine	6,47	4,94	3,67	1,93	3,94	3,60
Histidine	1,88	1,82	1,78	1,28	1,25	1,14
Tyrosine	1,97			not specified		
Glycine	4,04			not specified		

*NfE – Nitrogen free Extract Substances



Sunflower protein concentrate: Matrix of nutrients*

Index	Value (%)
Moisture	4,5
Crude protein	81,36
Crude fiber	0,1
Crude fat	0,96
Raw ash	4,11
Calcium	0,16
Phosphors	0,52
Sodium	0,53
Lysine	3,83
Histidine	2,04
Arginine	7,08
Aspartic acid	7,45
Threonine	2,61

Index	Value (%)
Tryptophan	1,41
Serine	3,2
Glutamic acid	17,47
Proline	3,6
Glycine	4,25
Alanine	3,12
Cysteine	0,79
Valine	3,83
Methionine	1,76
Isoleuscin	3,15
Leucine	4,68
Tyrosine	2,04
Phenylalanine	4,05

*Proved by leading independent international laboratories.

BLGG AGROXPERTUS



SGS



AG Technologies
S.à.r.l.

Application of sunflower protein concentrate in feed

The sunflower protein concentrate can be used as an additive to other components in feed rations for animals, poultry and fish, eg:



Pig-breeding
Exchange energy - 16.02 MJ/kg



POULTRY
Exchange energy - 15.27 MJ/kg



Cattle: CALVES
Exchange energy, 17.55 MJ/kg



AQUACULTURE

Growth phase	Age (days)	Input %
Pre-starter	15-42	5
Starter	43-77	4
Grower	78-133	2.5
Finisher	134-189	1.5

Growth phase	Age (days)	Input %
Starter	0-14	4
Grower	15-28	3
Finisher	29-38	2

Kind of animals	Input %
Calves from 1 to 6 months	4

Fish species	Input %
Carp	To 15
Trout	To 30
Sturgeon	To 30



Examples of rations for broilers

Components	Starter (%)	Gover (%)
Corn	32,05	33,43
Wheat	30,00	28,00
Soybean meal	24,03	25,50
Fish meal	3,00	2,00
Sunflower protein concentrate	3,00	2,00
Soybean oil	4,50	5,55
Mineral part	2,42	2,70
Premix	1,00	1,00

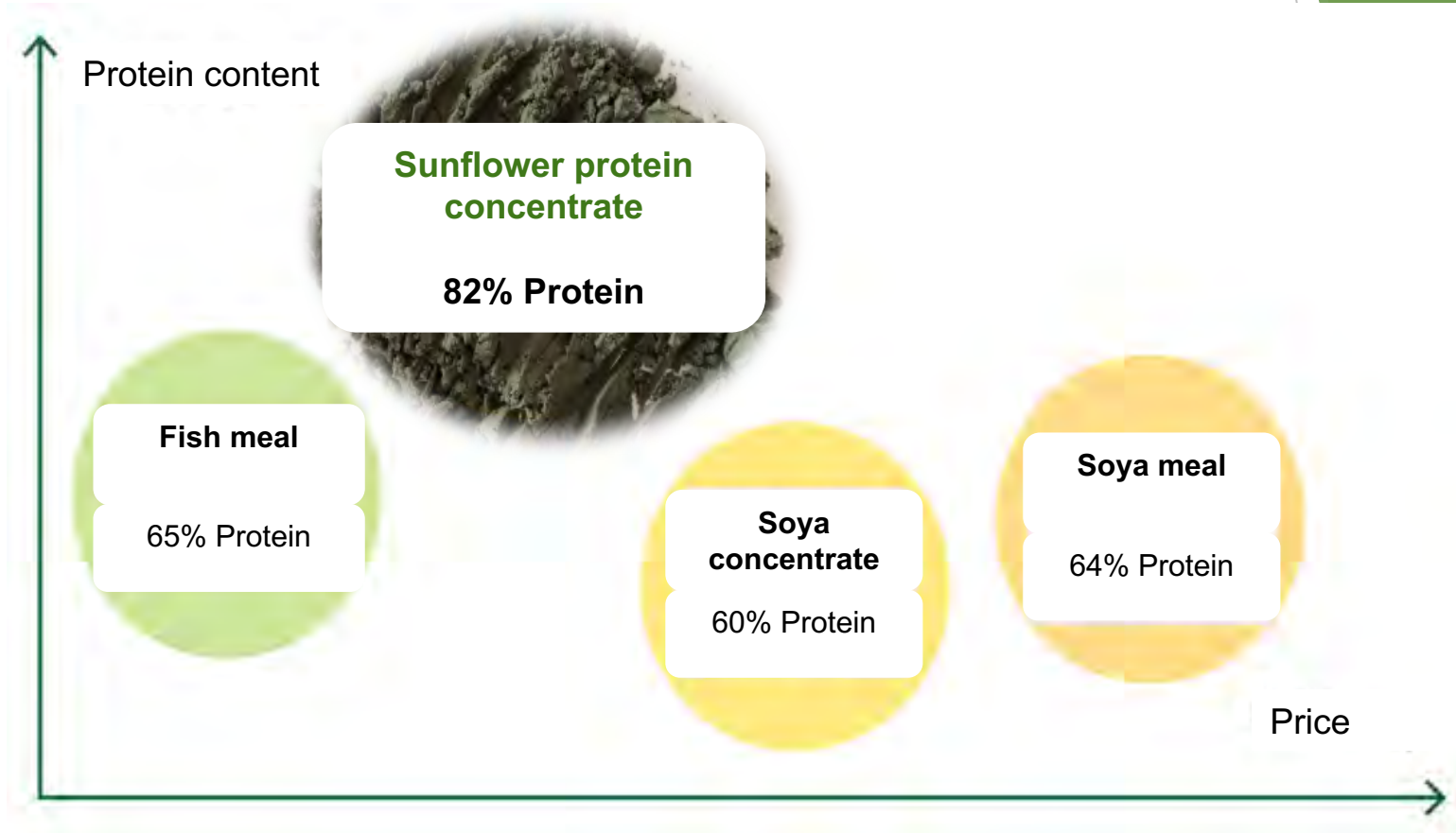


Broiler chicken Study Results

- Sunflower protein concentrate has more raw protein content than high-quality fishmeal, soybean meal and residue soybean meal.
- The amino acid composition is higher than in fishmeal, soybean meal and residue soybean meal.
- The protein of the product consists of 97% pure protein.
- Larger yield of the valuable parts of poultry breast muscles (24.3%).
- No identification of:
 - Negative effects on internal organs
 - Accumulation of vitamins in the liver
 - Accumulation of chemical compounds in poultry meat



Sunflower protein concentrate: market position



The calculation of market value of the sunflower protein concentrate

- The market value of sunflower meal concentrate can be estimation by considering the costs for 1 metric tonne of pure protein from similar products.
- The first estimate can be made for soybean meal and fishmeal:

- Based on the values indicated here for fishmeal and soybean meal:
<http://www.indexmundi.com/commodities/?commodity=fish-meal&months=120>

cost of 1 metric tonne of pure protein of fishmeal with 65% protein content is:

1,560 USD / 65% protein content = **2,400.00 USD**

or

around **2,160.00 euros/tonne.**

- Assuming a protein content of at least 77% for sunflower protein concentrate, the price should be around **1,600.00-1,700.00 euros/tonne.**



Profitability of the project – in short



- 1.Total investment
- 2.around 86 million euros



- 1.Amortisation time around
- 2.around 7 years



1.
Taxation will be clarified



- 1.Employment of at least 100 employees:
among which 20 engineers, indirect
employment of up to 150 persons.



Profitability of the project

COST CALCULATION	
Production costs Euro/day	134.030 €
Per person Euro/day	8.382 €
Cost of spare parts and maintenance Euro/day	2.855 €
= Total production costs Euro/day	145.266 €
= Production costs Euro/day	47.937.793 €
Additional fixed costs Euro/year	100.000 €
Total cost Euro/year	48.037.793 €
INCOME CALCULATION	
Sunflower protein production tonnes/day	99 €
Sunflower protein sales price tonnes/day	1.700 €
Income from sunflower oil sales Euro/day	167.790 €
Sunflower syrup production tonnes/day	54 €
Sunflower syrup selling price tonnes/day	300 €
Income from the sunflower syrup sale Euro/day	16.065 €
Total turnover Euro/day	184.209 €
Total turnover Euro/year	60.788.822 €
Profit (without taxes)	12.751.028 €
Profit (without taxes) in %	26,54%
INVESTMENTS	
Installations including installation and commissioning in Euro	471.000.000 €
Power installations including installation and commissioning in euro	22.500.000 €
Land and buildings in euros	11.200.000 €
Commissioning in Euro	5.329.068 €
TOTAL FESTIVITIES in Euro	86.129.068 €
Amortization period in years	6,8

The most important technical parameter of the project

1. Consumption of raw materials (sunflower meal)

- 315 tonnes per day

2. Power consumption (taking into account the generation)

- approx. 12 MW per day

3. Consumption of natural gas (including steam generation)

- approx. 80 thousand Nm³ per day

4. Water consumption

- about 1,500 tonnes per day

5. Waste water

- approx. 500 tonnes per day



The most important technical parameter of the project product yield

Sunflower protein concentrate

- around 98 tonnes per day

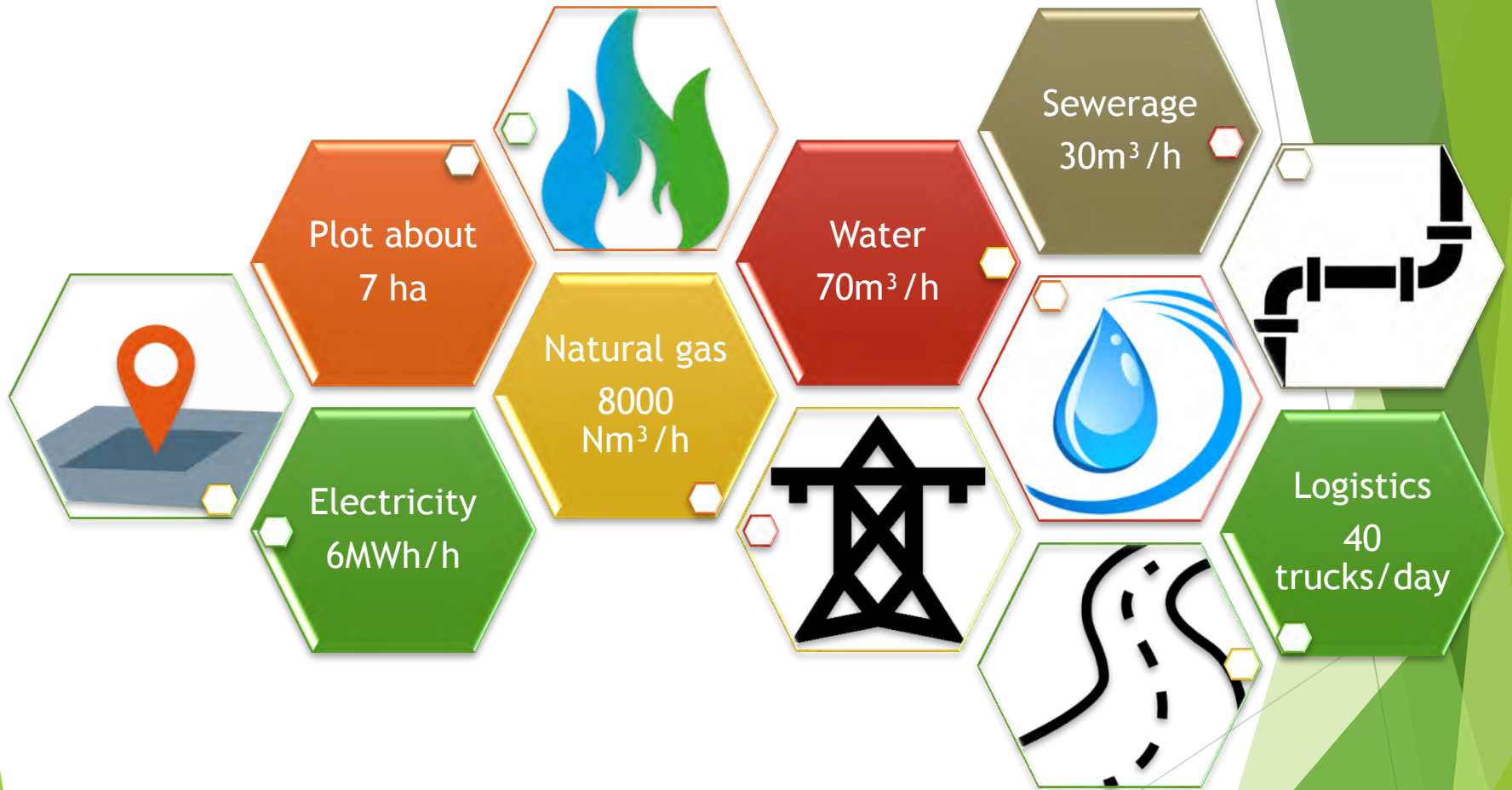
Sunflower syrup

- around 54 tonnes per day

It is possible to expand the project to include the processing of syrup to feed yeast. The production of dry feed yeast will amount to around 20 tonnes per day in this case.



Requirements for the building site



Chronological order of project execution 1

•The new company (e.g. Plant Proteins) is registered to execute the project.

*AG Technologies and the investor become shareholders of the new company.

*AG Technologies S.a.r.l. is the main supplier for all technological and energy installations.

*Building and earthworks are done by specialised companies, directly instructed by Plant Proteins.

*Assembly and commissioning under supervision of AG Technologies.

*AG Technologies S.a.r.l. bears the full responsibility for project execution.



Chronological order of project execution 2

•After the project reaches full efficiency, AG Technologies bears full responsibility for installation, operation, and service. A contract is signed between AG Technologies and Plant Proteins to this end.

*The management of Plant Proteins, elected by the shareholders, bears full responsibility of company operation, including product sales.

*The marketing strategy (price, markets, etc.) is discussed in the shareholder meeting.



Strategy for the shareholders

We consider two strategies for the shareholders:



- Unlimited equity participation
- Distribution of profits



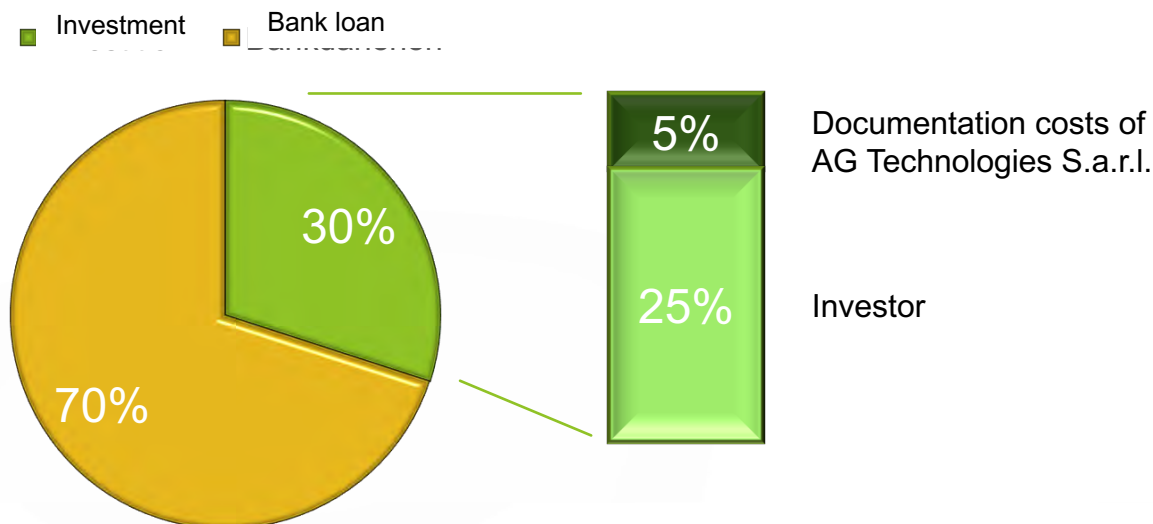
- Resignation of a shareholder after assignment of shares

Details on both options will be discussed.



Financing of the project

We consider the following structure of project finance:



- 30% of the project costs equity of the investor, whereby:
 - 5% - costs of technical project documentation will be provided by AG Technologies S.a.r.l.
 - 25% - will be financed by the investor
- 70% through bank loan.

The share of equity capital/bank credit can be adjusted in the negotiations with the bank.



Information on our company

AG Technologies S.a.r.l.

- Company founded in Wasserbillig, Luxembourg in 2013
- Uses unique know-how in processing plant-based raw materials
- Possesses extensive experience in high-tech projects and the realisation of foreign projects



Contact

AG TECHNOLOGIES S. À R. L.

15 ESPLANADE DE LA MOSELLE
L-6637 WASSERBILLIG
LUXEMBOURG

Numéro d'identification (TVA number)
Numéro de Matricule
Company registration number
EORI-No:

LU26302530
2013 2424870
B 178078
LU26302530

General Director:

Tatiana Ryabikova

Phone:

00 352 26714776

Fax:

00 352 26740910

Email:

info@ag-technologies.net

HTTP:

www.ag-technologies.net

