

# EXECUTIVE SUMMARY

Biofabrik Green Refinery GmbH

V.26.12.2016



Secure high-quality food supply for  
a rising world population



Large selection of the population  
already malnourished



Constant area of cultivable land,  
so fertilisation is mandatory

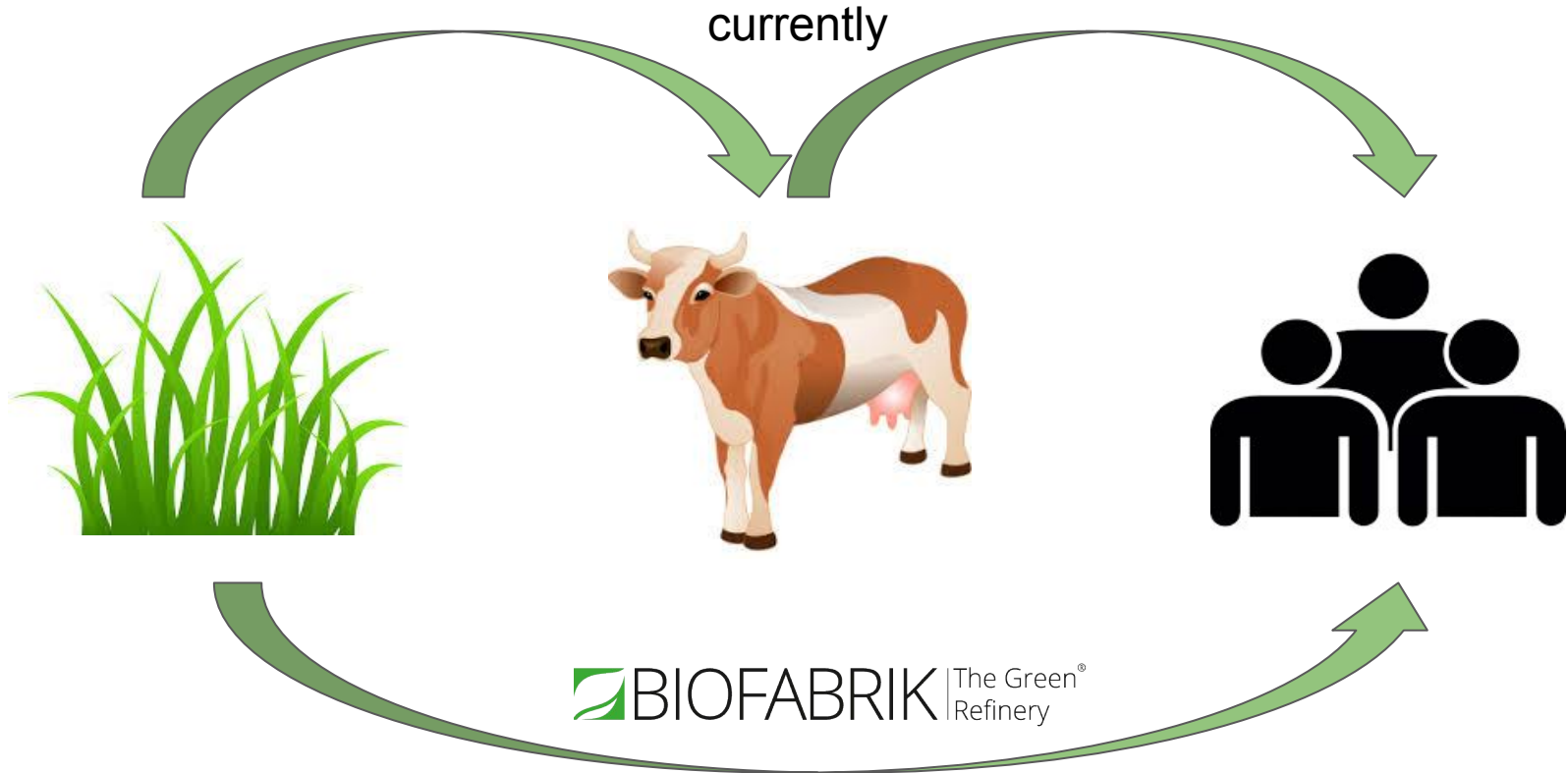
## THE CHALLENGE

Uno increases forecasts for 2050:  
World population growths to 9.7 Billion

n-tv.de // 29 July 2015

## The Biofabrik Green Refinery

Coverage of the worldwide protein requirement without mass husbandry







## 01 THE ESSENTIALS

**Biofabrik's Green Refinery® extracts amino acids from renewable resources to solve a major part of the world's nutrition problem. With pastured grass the Bio-Refinery opens up a new resource for the food, animal feed, fertilizer, cosmetics and pharma industry.**

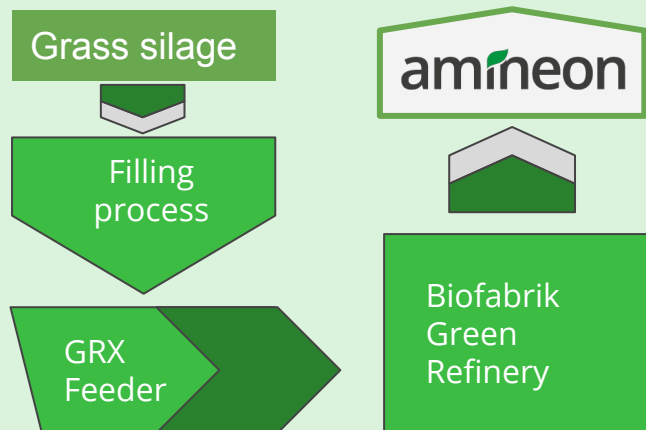
- Developed over more than 12 years
- Business model contains sales of the technology and trading the products
- Product contains a vast range of free amino acids alongside with minerals, carboxylic and lactic acids and sugars
- Can be used as a basis for sustainable, organic fertilizer
- Including vegan BCAAs for fitness supplements and
- Vegan GABA as basis for natural tranquilizers



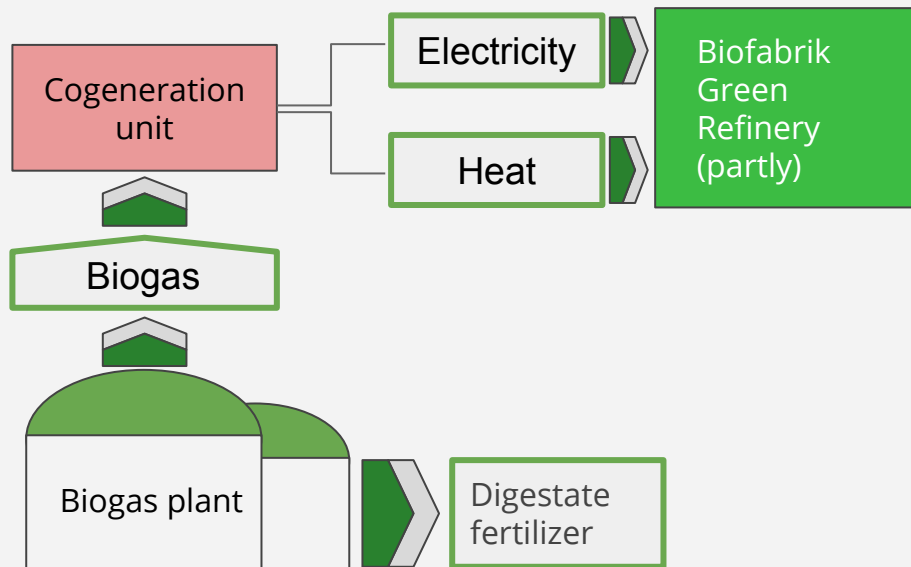


## The Green Refinery process with biogas plants

Seamless integration of the fully automated Green Refinery<sup>®</sup> process



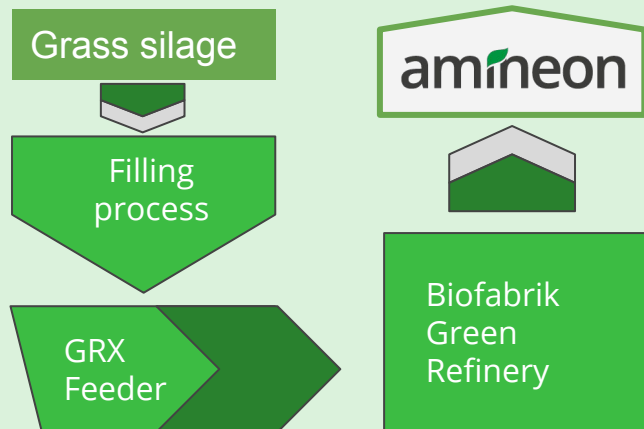
Conventional process without Green Refinery<sup>®</sup>.





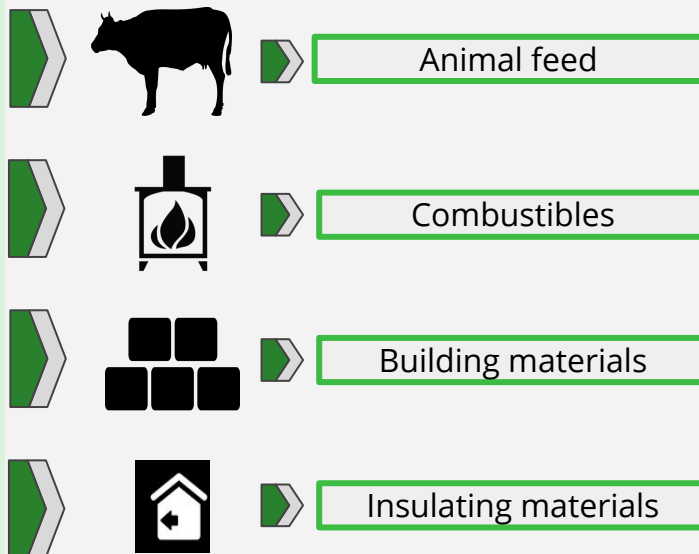
## The Green Refinery process with alternativ further processing

Seamless integration of the fully automated Green Refinery<sup>®</sup> process



Process residue

Conventional process without Green Refinery<sup>®</sup>.





# Investors worth \$ 1.25 Trillion urge Industry to switch to sustainable Plant Proteins

[foodnavigator.com // 27 Sep 2017](https://foodnavigator.com//27-Sep-2017)

- 70% of the world's protein requirements covered by livestock
- However, factory farming is emerging as a high-risk production method
- This is linked with significant environmental damage and major public health issues, such as antibiotic-resistant bacteria and outbreaks of pandemics such as avian flu
- Consumer demand for non-meat protein continues to grow
- Market for meat substitutes will grow by 8.4 % annually over the next five years

“Consumers are much more aware of the health impact of food than they were 10–15 years ago. They are also ready to pay premium for quality food.”<sup>17</sup>

Martijn Oosterwoud, Head of Client Portfolio Management, RobecoSAM

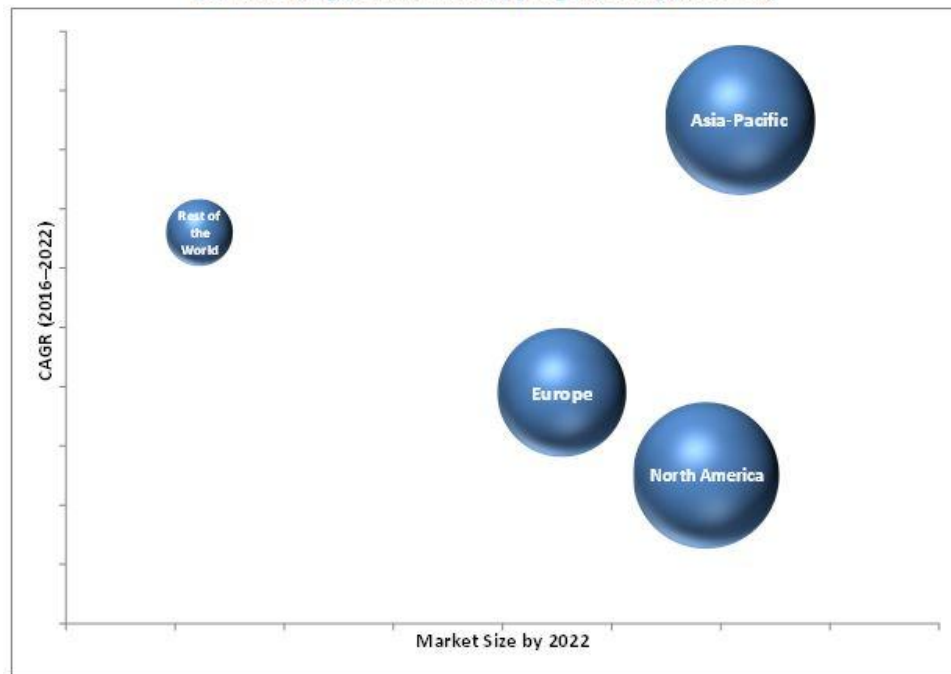


# Fermented Ingredients Market worth \$ 35.63 Billion by 2022

[marketsandmarkets.com](https://marketsandmarkets.com) // 05 Dez 2016

- The global fermented ingredients market has grown exponentially in the last few years
- Projected CAGR (compound annual growth rate) of 9% from 2017
- As of 2015, the amino acids segment accounted for the largest share of fermented ingredients markets
- This is due to a growth in demand for amino acids by food & beverage and animal feed additive industries
- Market is driven by factors such as rise in awareness among consumers toward the quality of fermented food ingredients

Fermented Ingredients Market, by Region, 2022 (USD Billion)



Source: Expert Interviews and MarketsandMarkets Analysis





## 02 PRODUCT OVERVIEW

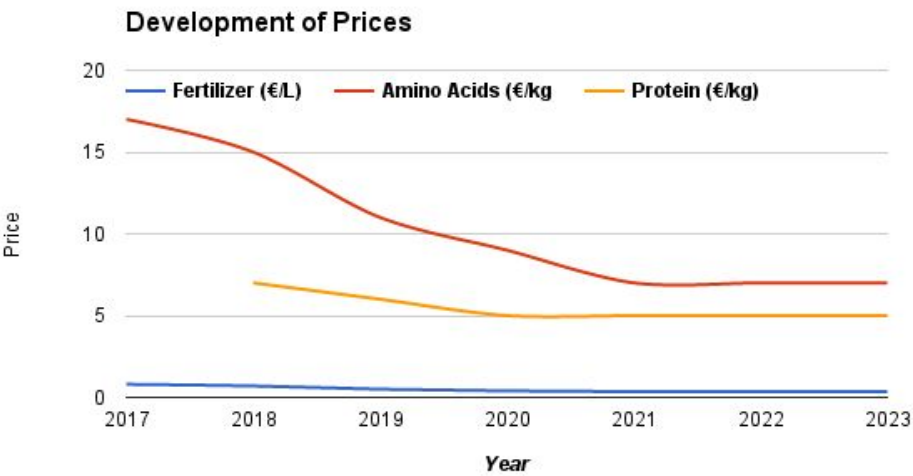
### 2.1 Comparison plant protein sources - peas vs. gras/legumes

Resource	Yield by acre	dry matter content	Available yield by acre dry matter	Protein content in dry matter	Available amount proteins per ton resource	Costs resource per ton	Costs raw protein content (excluded extraction)
Peas	30 t/ha	20%	6.0 t/ha	33%	66 kg	200 €	3.00 €/kg
Grass and legumes without further use	60 t/ha	20%	12.0 t/ha	20%	40 kg	40 €	1.00 €/kg
The Biofabrik Prozess*: grass and legumes with further processing to biogas	60 t/ha	20%	1.2 t/ha	20%	4 kg	1.4 €	0.35 €/kg

\* Due to the optimal purchase strategy of Biofabrik Green Refinery, only the actually used amount of the protein source (10% of the dry matter) is paid for.

2.2 Estimated price development

Product	Price 2017	Price 2018	Price 2019	Price 2020	Price 2021	Price 2022	Price 2023
Fertilizer (€/L)	0.80	0.70	0.50	0.40	0.35	0.35	0.35
Amino Acids (€/kg)	17.00	15.00	11.00	9.00	7.00	7.00	7.00
Protein (€/kg)	-	7.00	6.00	5.00	5.00	5.00	5.00



2.3 Quantities

Product	Sales Price	Quantity world wide in 2016 (t/a)	Quantity organic in 2020 (t/a, 10% share assumed)	Potential Green Refinery plants	Quantity 1024 GR plants t/a	Market Share 1024 GR Plants organic	Market Share 1024 GR plants total
Fertilizer	up to 0.35 €/liter	160,000,000 t for industrial fertilizer	16,000,000	16,276	983,040	6.14 %	0.61 %
Amino Acids	up to 7 €/kg	6,500,000 t for industrial amino acids	650,000	15,743	41,287,68	6.35 %	0.64 %
Protein	up to 5 €/kg	100,000,000 t for industrial proteins	10,000,000	346,004	28,901	0.29 %	0.029 %
Total		266,500,000	26,650,000	378,024	1,053,229	3.95%	0.40%



Industrial fertilizers are made of fossil resources like mineral oil, phosphorus or potassium



Organic alternatives are too expensive for industrial agriculture



No scalable, sustainable alternative available – until now

## THE PROBLEM

# Soil Degradation and Scarcity of Fertilizers alarm Science

topagrar.com // 09 May 2015



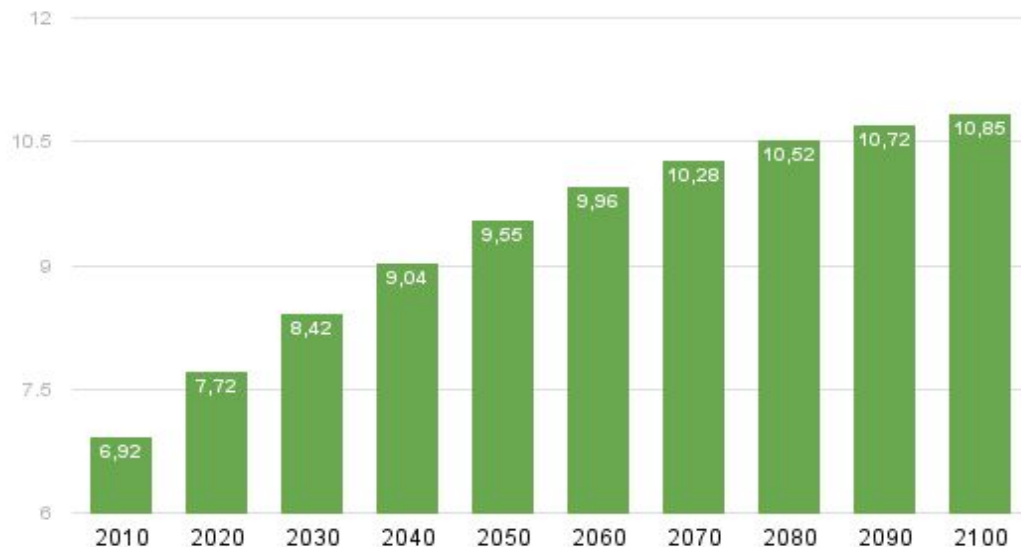
## 02 THE PROBLEM

**Scientists warn of soil degradation and scarcity of fertilizers. But existing ecological alternatives are too expensive to get used in large quantities. At the same time a large section of the population is already malnourished.**

### 2.1 Ecological fertilizers are not economic

- World's population will rise to 10 billion people until the middle of the century
- This goes along with an increasing demand for high-quality food
- But areas of cultivable land remain constant at best
- To sustain the high yield on the available agricultural land, fertilizer is mandatory
- Industrial fertilizers correspond to a number of environmental problems
- Sustainable organic fertilizers are too expensive to be used on a wide scale

Forecast for the development of the world's population (in billions), source: Statista 2015







## 02 THE PROBLEM

Scientists warn of soil degradation and scarcity of fertilizers. But existing ecological alternatives are too expensive to get used in large quantities. At the same time a large section of the population is already malnourished.

### 2.2 Malnutrition despite increasing food amounts

- Already today, a significant part of the population is suffering from malnutrition
- In many parts of the world this is caused by a shortage of food
- But also in the Western World processed food leads to malnutrition
- This correlates to diseases like high blood pressure, depression and even cancer
- Deficient supply of branched-chain amino acids (BCAAs) is linked to causing diabetes mellitus – which affected 8.9% of Germans already in 2007

Progression of Diabetes in Germany from 1998 to 2007





First operation in 2014, fully automatic  
and telemonitored



Low production costs thanks to an  
innovative resource concept

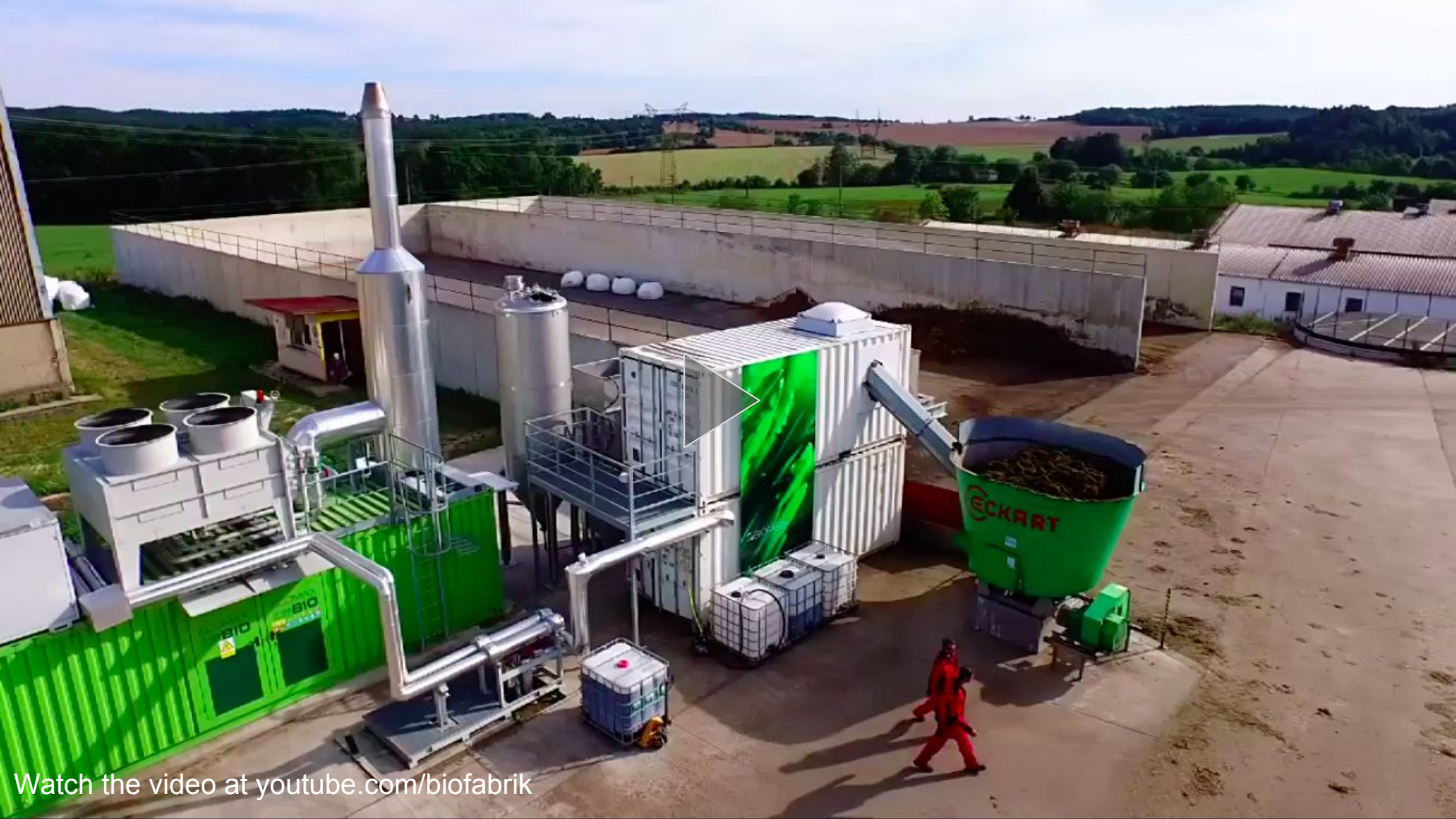


Attractive remuneration model for  
grass processing industries

## THE SOLUTION

# First decentral Bio-Refinery of the World

Prototype (45 km before Prague) in stable non-stop operation



Watch the video at [youtube.com/biofabrik](https://youtube.com/biofabrik)





## 03 THE SOLUTION

**With pastured grass the Bio-Refinery opens up a new resource for the food, animal feed, fertilizer, cosmetics and pharma industry. It uses the existing infrastructure and resources of grass-processing industries to reduce production costs to a minimum.**

### 3.1 Organic fertilizers produced economically

- Produced in multiple processes of extraction, filtration and concentration
- Contains minerals, carboxylic and lactic acids, sugars, ammoniacal nitrogen and a vast range of free amino acids
- Suitable as a universal fertilizer for indoor gardening, fruit, vegetables, herbage and lawn
- Produced with 100% renewable resources, free from GMOs and additives
- No fossil resources like oil, phosphorous and potassium

### 3.2 Blanket supply with essential amino acids

- World's first amino acids from pasture grass
- Opens up a completely new resource for the food industry
- A healthy alternative to industrially amino acids of questionable origin
- Basis for healthy food and supplements which are able to balance malnutrition.
- Vegan BCAAs for sport supplements and vegan GABA for natural tranquilizers
- Cheap, full-fledged nutrition complex can be developed to fight famine



## 04 THE MARKET

**Due to an innovative resource management concept and its high degree of automation, the Bio-Refinery can produce sustainable fertilizers and vegan amino acids to a fraction of the market price. With pastured grass it uses an old resource in a way it has never been done before.**

### 4.1 Global need for fertilizer hard to cover

- Worldwide annual output of mineral about 160,000,000 tons per year
- 3,200 Bio-Refineries necessary to produce only 1% of this
- Market is extremely big, but dominated of cheap mineral fertilizer companies
- Opening up international markets in 3 steps

Global nutrients consumption (N + P2O5 + K2O) in Million Tons







**Due to an innovative resource management concept and its high degree of automation, the Bio-Refinery can produce sustainable fertilizers and vegan amino acids to a fraction of the market price. With pastured grass it uses an old resource in a way it has never been done before.**

### 4.1 Global need for fertilizer hard to cover

- **Step 1: Industries, that already use organic fertilizers today**
- Including organic farms, where mineral fertilizers are not allowed or not favored
- Industries with high yield by acre that utilize premium fertilizer to increase quality: fruit and vegetables, ornamental plants, fir trees and turf
- Industries that cannot use mineral fertilizers due to years of soil overload, for example coffee or banana plantation
- 75 Bio-Refineries necessary to secure only 5% of this need
- At the same time admixture to established fertilizer products that only have macro- but lack micronutrients
- 320 Bio-Refineries necessary in case of an average admixture over all industrial fertilizers of only 0.1 %



**Due to an innovative resource management concept and its high degree of automation, the Bio-Refinery can produce sustainable fertilizers and vegan amino acids to a fraction of the market price. With pastured grass it uses an old resource in a way it has never been done before.**

### **Step 2: Market leadership for organic fertilizers**

- Possible retail price a fraction of the market price
- 225 Bio-Refineries used to capacity in case of a market share of 15%

### **Step 3: Open up industrial fertilizer market**

- Sales prices drop through economies of scale and continuous process improvements
- In case of market coverage of only 1% additional 3,200 Bio-Refineries possible





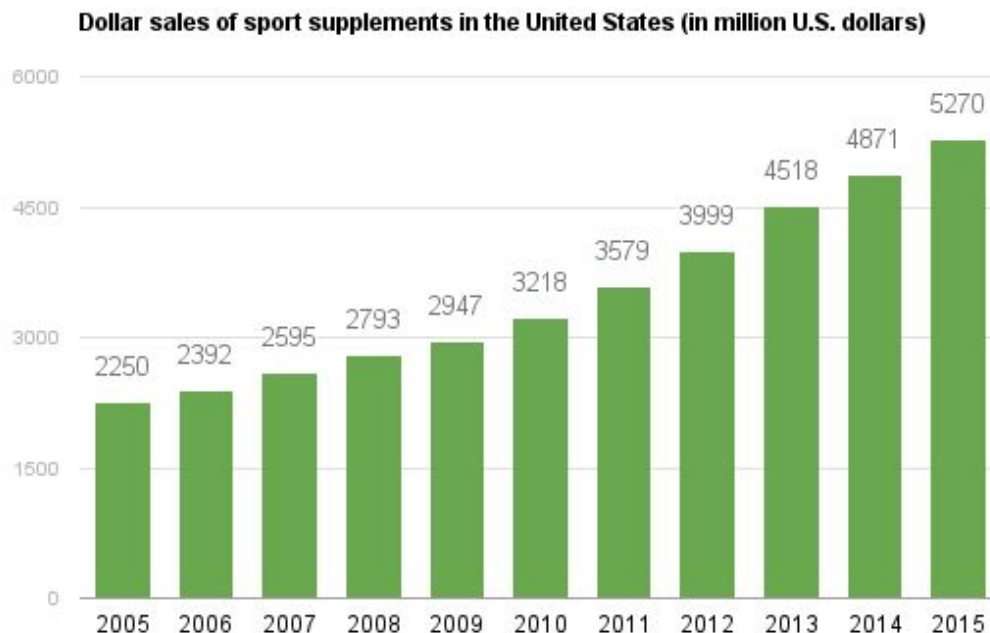
## 04 THE MARKET

**Due to an innovative resource management concept and its high degree of automation, the Bio-Refinery can produce sustainable fertilizers and vegan amino acids to a fraction of the market price. With pastured grass it uses an old resource in a way it has never been done before.**

### 4.2 vegan amino acids – from trend product to basic foods

Worldwide annual market of amino acids in the product about 1,600,000 tons

- Natural amino acids as an increasing trend market with a nutritionally conscious, wealthy target group
- One Bio-Refinery produces up to 50 tons (currently 20) of the relevant amino acid mix per year
- Production of the first refinery already completely under contract





Sie haben diesen Artikel am 15. August 2016 gekauft.  
Größe: 1.000ml | [Bestellung anzeigen](#)



Für größere Ansicht Maus über das Bild ziehen

### BLATTWERK Pure Bio Düngemittel - 1.000ml: 100% veganer, organischer NPK Dünger mit Aminosäuren. Flüssiger Naturdünger aus Gras

von Biofabrik

★★★★★ 7 Kundenrezensionen | 4 beantwortete Fragen

Statt: EUR 14,95  
Jetzt: **EUR 12,95** ✓Prime | GRATIS Same-Day  
GRATIS Lieferung noch heute für qualifizierte Bestellungen ab 20€. [Details](#)  
Sie sparen: EUR 2,00 (13%)  
Alle Preisangaben inkl. MwSt.

**Auf Lager.**  
Verkauf durch Biofabrik Green Refinery und Versand durch Amazon. Für weitere Informationen, Impressum, AGB und Widerrufsrecht klicken Sie bitte auf den Verkäufernamen.

Größe: 1.000ml

1.000ml EUR 12,95 ✓Prime	10 x 1000ml EUR 99,95
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- Rein-biologischer Flüssigdünger für Zimmerpflanzen und Gartenpflanzen. Geben Sie Ihren BLATTWERK Dünger in einer Dosierung von 0,5% regelmäßig bei jedem Gießvorgang (max. einmal wöchentlich) dem Wasser zu. 1 Liter Blattwerk ergibt 200 Liter Gießwasser. Einsatzmöglichkeiten als Blumendünger, Rasendünger, Obstdünger, Gemüsedünger und Dünger für Hanf sowie Kräuter. Zur Anwendung sowohl als Blatt- und Wurzel- bzw. Bodendünger.
- Einmalige Transparenz: 100% nachwachsende Rohstoffe. Energie- und klimaneutral und unter strengen Richtlinien in der EU produziertes Düngemittel. Frei von gentechnisch verändertem Material, chemischen Zusätzen oder Additiven.
- In einem weltweit einzigartigen Verfahren wurden die besten Inhalte aus Weide- und Wiesen gras für das Wohlbefinden und Wachstum Ihrer Pflanzen gewonnen.
- Blattwerk überzeugt durch den höchsten Anteil an freien Aminosäuren und bestens pflanzenverfügbaren Stickstoff, Phosphor und Kalium - alles aus der Pflanze für die Pflanze.
- Wir garantieren: zufrieden oder Geld zurück. Sollten Sie nach 8 Wochen keine Verbesserungen an Ihrer Pflanze feststellen, erstatten wir Ihnen den Kaufpreis zurück (Voraussetzung: Vorher-/Nachfoto).

**Ratgeber Rasenpflege**  
Sie interessieren sich für Rasenpflege? Tipps und Hinweise für die richtige Produktauswahl zur Pflege Ihres Grüns finden Sie in unserem Ratgeber. [Zum Ratgeber](#)

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Innerhalb von **8h 46min** bestellen und Lieferung erfolgt am:  
**Freitag, 28 Okt**  
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**Lieferort:**  
Biofabrik - Olive- Dresden - 01328

[Auf die Liste](#)

Möchten Sie verkaufen?  
[Bei Amazon verkaufen](#)

# Blattwerk: Organic fertilizer for everyone



8venture

WILLKOMMEN

MENÜPUNKT

MENÜPUNKT


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MEIN KONTO


WARENKORB



KRASSE TEASER FÜR JEDEN ZWECK

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ZU DEN PRODUKTEN




MUSKELAUFBAU UND LEISTUNG

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START YOUR 8VENTURE. NOW!

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## 8VENTURE: Vegan nutritional supplements



**The business model includes both the build-operate-hold of Bio-Refineries and the trading of the refined products and by-products.**

**The Bio-Refineries are placed free of charge to generate long-term revenues and company valuation.**

### 5.1 Refinement and trading of the products

- The Biofabrik Green Refinery GmbH buys the raw product of the location companies, refines and trades it
- Refined products are sold primarily to wholesalers with long-term offtake agreements
- New Bio-Refineries are put into operation only when product sales are protected by long-term contracts
- Additionally own end customer products have been created, which can be ordered online



**The business model includes both the build-operate-hold of Bio-Refineries and the trading of the refined products and by-products.**

**The Bio-Refineries are placed free of charge to generate long-term revenues and company valuation.**

## 5.2 Connecting locations and investors

- Biofabrik Green Refinery develops, builds, operates and owns the Green Refinery Plants
- Location owners as resource supplier get Bio-Refinery free of cost
- Bio-Refinery generates six-figure profits for location owners without own risk
- Enables fast market development and increases entry barrier of potential rivals
- One project company per location, which operates as GmbH & Co. KG
- Liability and profits clearly isolated from other locations





**The organic fertilizers of the Bio-Refinery promote plant growth in a natural way and protect the plant against vermin. With the world's first amino acids from pasture grass the Bio-Refinery opens up a new resource for the food industry.**

### 6.1 USPs in the fertilizer Market

- Products out of renewable resources that so far required finite, fossil resources
- Can be utilized where chemical products are forbidden or not favored
- For all products apply the following quality characteristics
  - Made in the European Union
  - Herbal origin und vegan
  - Free of genetically modified material
- Special composition of the fertilizers trigger complex effect mechanisms:
  - Free amino acids: more growth due to durch better plant availability
  - Sugar: improved soil life due to stimulation of microbial growth
  - Lactic acid: biological protection against bacteria and fungi
  - Sulfates: less deficiency symptoms due to metabolic stimulation

The image shows a side-by-side comparison of pea plants in pots. On the left, there are three tall, healthy pea plants with green leaves and developing pods. On the right, there are two shorter, less developed pea plants. A grey arrow points from the taller plants on the left to the shorter ones on the right, indicating a comparison or a transition. The background is dark, and the plants are in clear plastic pots.

GROW TEST WITH PEAS

**+169%**

**amineon**

Watch the video at [youtube.com/biofabrik](https://youtube.com/biofabrik)



## 06 THE USPs

**The organic fertilizers of the Bio-Refinery promote plant growth in a natural way and protect the plant against vermin. With the world's first amino acids from pasture grass the Bio-Refinery opens up a new resource for the food industry.**

### 6.1 USPs in the food market

- Organic source for amino acids and highly automated production
- So far amino acids are either chemically synthesized or extracted from animal by-products
- Vegan alternative for an increasingly nutritionally conscious market
- Existing natural alternatives out of corn or soy which are controversial or have considerably lower concentrations







## 07 THE COMPETITION

The organic fertilizers of the Bio-Refinery promote plant growth in a natural way and protect the plant against vermin. With the world's first amino acids from pasture grass the Bio-Refinery opens up a new resource for the food industry.

### 7.1 Organic fertilizer at invincible prices

- At market entry primarily in competition with organic fertilizers
- Due to manufacture-like production and dedicated cultivated resources these are without exception more expensive
- The following comparison with the most popular competitor serves as an example:

Product	BLATTWERK	AMINOSOL
Manufacturer	Biofabrik	Lebosol
Aggregate state	fluid	fluid
Color	green-brown	brown
Density (kg/l)	1.1	1.13
pH-value	3.9 – 5.0	4.0 – 6.5
Dry matter	30%	35%
Net price per liter (€/Liter)	1.00 €	6.90 €
Price per kilo dry matter (€/kg_TS)	3.03 €	17.45 €
Price per kilo nitrogen (€/kg_N_ges)	75.76 €	115.00 €
Price per kilo free amino acids (€/kg_AS)	20.20 €	94.82 €



## 07 THE COMPETITION

The organic fertilizers of the Bio-Refinery promote plant growth in a natural way and protect the plant against vermin. With the world's first amino acids from pasture grass the Bio-Refinery opens up a new resource for the food industry.

### 7.2 Vegan amino acids as a high-priced trend product

- Up to today no other manufacturer for amino acids out of pasture grass
- Other vegan sources like corn, peas or soy accessible, but these are either controversial or have low concentrations
- Grass as healthy and rich source for amino acids cannot be digested in large amounts by human stomach
- Unlike in case of extracted amino acids: These are immediately available to the body and do not have to be metabolized by the liver

Amino Acid	Amineon BCAA	Amineon GABA
Alanin	26 %	12 %
Aspartic acid	4 %	2 %
Cystin	2 %	9 %
GABA	4 %	32 %
Glutamic acid	3 %	2 %
Glycine	9 %	4 %
Isoleucin	8 %	8 %
Leucin	10%	7 %
Lysin	0 %	5 %
Methionin	1%	1 %
Prolin	7%	3 %
Serin	3 %	1 %
Threonin	6 %	3 %
Valin	15 %	9 %



## 08 SWOT ANALYSIS

<b>SWOT</b>	<b>O   OPPORTUNITIES</b> Organic fertilizers very expensive Increasing nutritional awareness Biogas industry under pressure	<b>T   THREATS</b> Imitation through competitors Production losses
<b>S   STRENGTHS</b> Exclusive technology and product Strong in engineering and sales Already 20 locations under contract Organic fertilizer to a fraction of the costs Amino acids in food quality made in the European Union	<b>SO-STRATEGIES</b> Bio-Refinery cost-free and lucrative for location owner Contracts with wholesalers Vegan amino acids as a high-priced trend product	<b>ST-STRATEGIES</b> Fast and continuous development Continually lower prices with fixed margins Risk diversification due to project companies
<b>W   WEAKNESSES</b> Established fertilizer companies as competitors	<b>WO-STRATEGIES</b> Sale of test quantities to multipliers New refinery plants will only be build when product sales is long-term secured	<b>WT-STRATEGIES</b> Built-up of strategic partners for product sales Rapid market development through expansion financing



## 11 TEAM



**Oliver Riedel**  
Chief Executive Officer



**Jörg Metzner**  
Chief Sales Officer



**Hendrik Oeser**  
Business Engineering &  
Controlling



**Stefan Süßmilch**  
Manager Product & Sales



**Oliver Feig**  
Principal Engineer



**Oliver Klemm**  
Analytics



**Dr. Martin Schneider**  
Scientific Consultant



**Anne Lehmann**  
Backoffice

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