

SeYu Kizyme GmbH

Business Plan

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Enzyme commodity for biogas production

Solutions for anaerobic digesters

Background

The world's oil reserves are becoming increasingly scarce, while demand continues to increase. The oil price will continue to rise in the next decades until oil production is no longer profitable and the reserves are exhausted. Therefore alternative energy resources have to be found and further developed.

Market Analysis

Proposal

Financing concept

Cost calculations

Conclusion

Another possibility of energy production is the use of renewable energies, such as the use of biomass plant for the production of biofuels. On one hectare, depending on climate and location, 8 to 22 tonnes of dry biomass can be produced each year.



Enzyme commodity for biogas production

Solutions for anaerobic digesters

Background

Plant biomass consists of the 3 biopolymers

- Cellulose
- Hemicellulose
- Lignin

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Cellulose and hemicellulose account for about 50% to 80% of the biomass.

Until now it's not possible to exploit more than 80% in total.

With Ki Enzymes biopolymers can be utilized close to 100%, indeed!*

*significant results after 1 year of progression by surrounding biogas facilities



Enzyme commodity for biogas production

Solutions for anaerobic digesters

Background

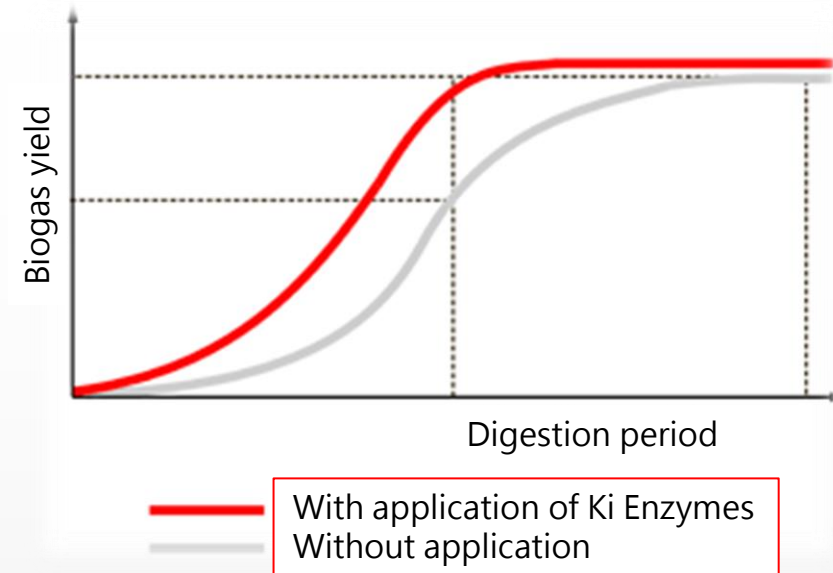
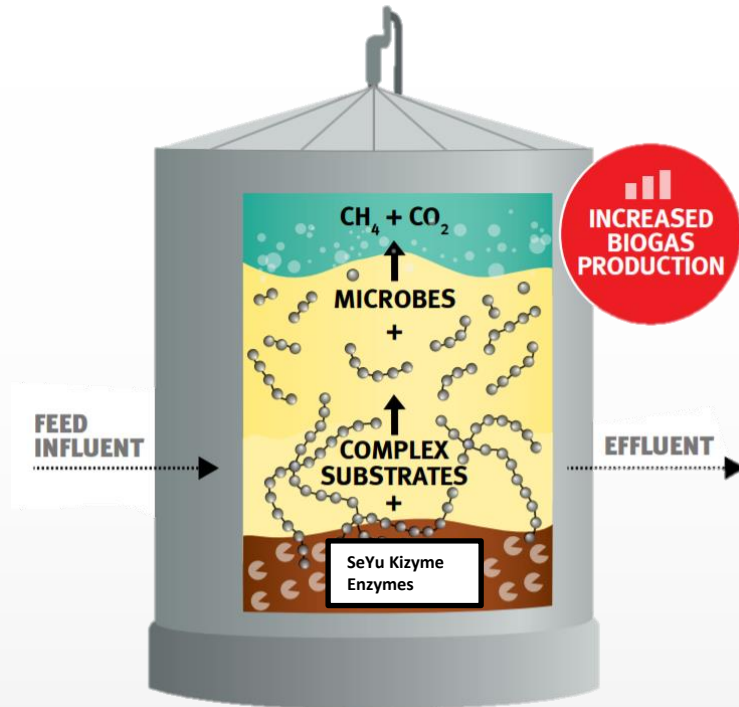
Market
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- Reduce anaerobic digestion costs by 10%
- Increase biogas production by up to 15%
- Reduce viscosity of substrate/digestate by 2-3x



Enzyme commodity for biogas production

What are Biogas Enzymes?

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- Enzymes are found in the cells of every living thing
- Their purpose is to help catalyze, or speed up, certain biochemical reactions
- Enzymes are used today in many industrial applications such as animal nutrition, detergents, and biofuels
- The enzymes developed by SeYu Kizyme GmbH for biogas production break down plant fibers (carbohydrates such as cellulose and hemicellulose) and protein-rich materials, resulting in sugars and amino acids more suitable for biogas-producing microorganisms



Enzyme commodity for biogas production

How can enzymes help biogas producers?

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- Increased biogas production from the same amount of feedstock OR decreased feedstock consumption to achieve the same level of biogas production
- Improved biogas quality (methane / CO₂ ratio)
- Reduced viscosity of substrate and digestate – reduced mixing costs
- Increased fermentation rate; shorter residence time
- Increased process robustness: ability to break down more difficult substrates, as well as reduce risk of rafting



Enzyme commodity for biogas production

Enzymes from SeYu Kizyme

Background

- Mixture of new Enzymes for Cellulose and Hemicellulose exploitation, f.e. Xylanases and Cellulases
- Increased productivity and stability for maize-dominated feeding rations as well as for fibrous rations (grass silage, solid dung, whole plant silage)
- Our special enzyme mixtures get the most out of the substrate, while ensuring that the entire content of the fermenter becomes easier to stir and pump

Market Analysis

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Product:
MethaKi
to 500 kW





Market analysis

Biogas facilities in Germany '92 – '16

Background

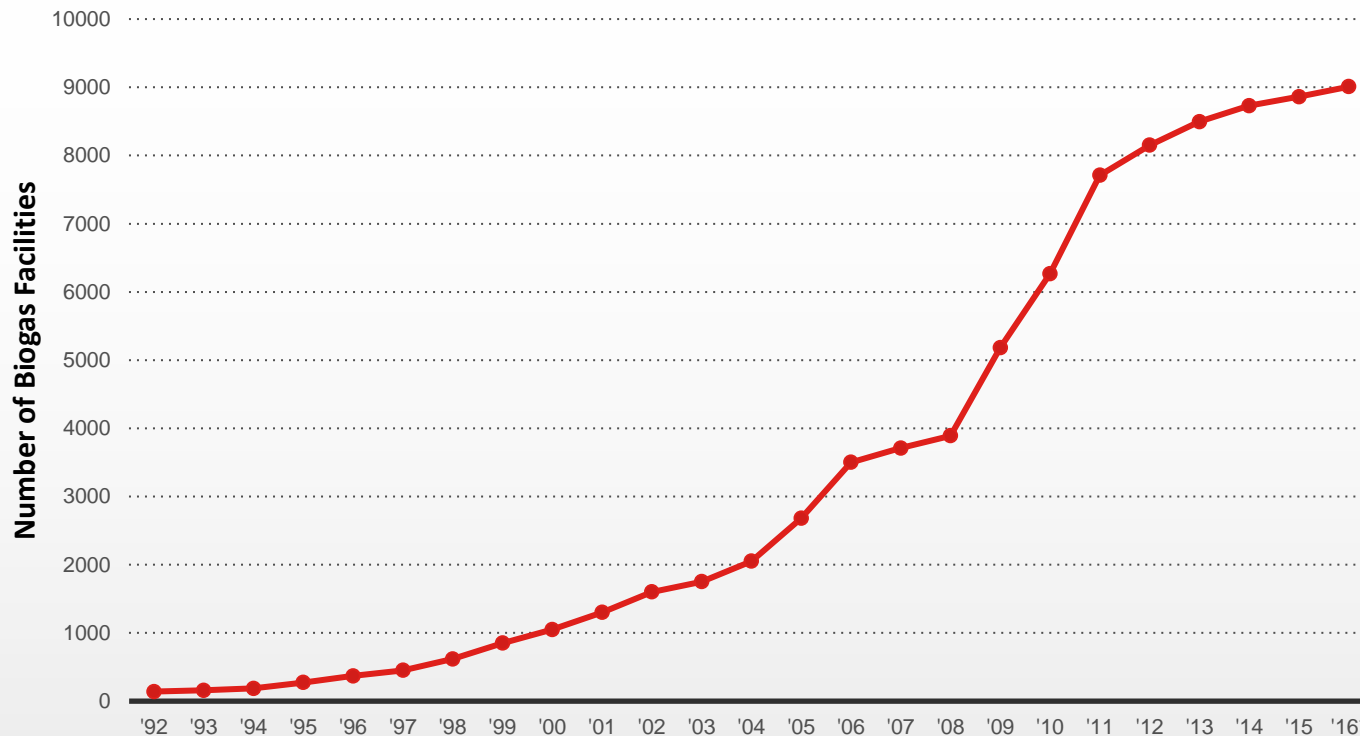
**Market
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Years	Number of Facilities
1992	139
2010	6268
2016*	9009

*Prognosis: as of July 2016



Market analysis

Additional Biogas enzyme producer

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Company	Web Page	Products	Additional Information
AGRAVIS Raiffeisen AG	www.terravis-biomasse.de	MethaFerm Mais, MethaGerm Gras	200g /to TS Input
AHRHOFF GmbH	www.ahrhoff.de	Prolific Methan	2L/Kg Prolific / to Kosubstrat-TS
Bergophor Futtermittelfabrik, Dr. Berg GmbH & Co. KG	www.bergo-biogas.de	Bergoferm Enzym	250g / Tonne Gülle-TS; 2Kg / 100m ³
DSM	www.dsmbiogas.de/	MethaPlus, Axiase 100	not specified
Deutsche Vilomix Tierernährung GmbH	www.Vilomix.de	ZYmaXX	not specified
Joachim Behrens Scheessel GmbH	www.behrens-scheessel.de	jbs enzym	25mL / Tonne of substrate
Miavit GmbH	www.miavit.de	MiaMethan	not specified

The biogas enzyme application currently costs about 32 €/d for a 500kW-plant in long-term usage.



Aims of SeYu Kizyme GmbH

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- Enzyme Production under ‚Good Manufacturing Practice‘
- Supply the biogas market with sufficient product
- Competitvness on the market
- Provide new jobs in Meschede (Hochsauerlandkreis)



SeYu Kizyme

Gesellschaft mit beschränkter Haftung

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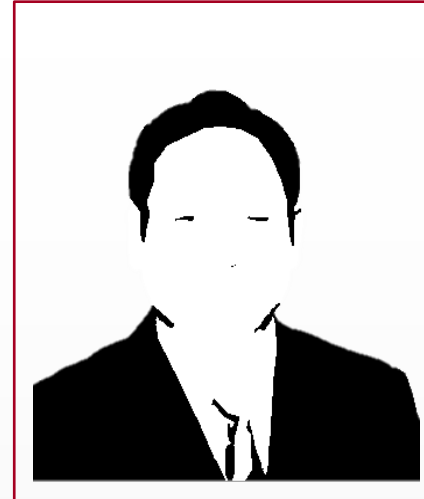
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S. Hohlreiter,
Shareholder & CEO



Y. Yu,
Shareholder



S. Kirchhoff,
Shareholder

Advantages

- Reduced risks through limited liability for each partner
- Flexible framework structure
- Easy foundation procedure
- No Supervisory Board: <500 employees
- Share capital : 30.000 € in total



Location of SeYu Kizyme GmbH

Business park Enste-Nord, Meschede



Total parcel: 179.300 m²

Buildable vacant lot from: 2.000 m²

Available: directly

Price per m²: 49,00 €

We strive to buy 4.000 m²



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Location of SeYu Kizyme GmbH

Business park Enste-Nord, Meschede

Close to customers due to excellent transport connections

Autobahn: A46: direct gate, A44: 30 Km

Bundesstraße (A-road): B55

Airport: Schüren (Airfield, 7 Km),

Paderborn-Lippstadt (regional airport, 44 Km),

Dortmund (63 Km)



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SeYu Kizyme GmbH

Business park Enste-Nord, Meschede

Background

Space for development: Commercial area **Meschede-Enste**

Market
Analysis

The industrial area of the economic region Meschede forms the industrial area Enste. Around **1000 companies** have settled there in the recent years – and the trend is rising.

Proposal

Financing
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The commercial and industrial area of Enste is able to offer what others are looking for: high-quality industrial sites, innovative companies, an excellent connection to one of the largest sales markets in Europe and a space for ideas in a pleasant environment.

Cost
calculations

Conclusion



Potential employee

SeYu Kizyme GmbH, Meschede

Background

The proximity of science by

- Fachhochschule Südwestfalen, Meschede (5 Km)
- Berufskolleg Olsberg des HSK (BKO, 18 Km)

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Offer jobs and internship for

- Maschinenbau (B.Eng.) - FH
- Biological technical assistant - BKO
- Chemical technical assistant - BKO





Design of the Company

SeYu Kizyme GmbH, Meschede

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Construction of SeYu Kizyme GmbH

Chosen building firm:

althoff ■
INDUSTRIE- UND VERWALTUNGSBAU

Enster Straße 15
59872 Meschede



Financing

SeYu Kizyme GmbH, Meschede



KfW Gründerkredit

- 10 year running time
- Interest rate: 2,25 %

Programm	KP Nr.	Anmerkung	maximaler Zinssatz EKN % Sollzins (Effektivzins) ¹⁾									Auszahlung %	Bereitstellungspro- v. ²⁾ p.M. %	Zinssätze gültig ab
			A	B	C	D	E	F	G	H	I			
Laufzeit / tilgungsfreie Anlaufjahre / Zinsbindung			Bei Programmen mit risikogerechtem Zinssystem gelten die Preisklassen											

ERP- Gründerkredit - Universell außerhalb KMU 20/ 3/ 10	73	3)	1,25 (1,26)	1,65 (1,66)	1,95 (1,97)	2,45 (2,48)	3,05 (3,09)	3,75 (3,82)	4,25 (4,33)	5,35 (5,48)	7,65 (7,92)	100	0,25	16.12.2016
ERP- Gründerkredit - Universell außerhalb KMU 20/ 3/ 20	73	3)	1,85 (1,87)	2,25 (2,27)	2,55 (2,58)	3,05 (3,09)	3,65 (3,71)	4,35 (4,44)	4,85 (4,96)	5,95 (6,11)	8,25 (8,57)	100	0,25	16.12.2016
ERP- Gründerkredit - Universell außerhalb KMU 5/ 1/ 5	73	3) 5)	1,00 (1,00)	1,40 (1,41)	1,70 (1,71)	2,20 (2,22)	2,80 (2,84)	3,50 (3,56)	4,00 (4,07)	5,10 (5,22)	7,40 (7,66)	100	0,25	21.06.2016
ERP- Gründerkredit - Universell außerhalb KMU 10/ 2/ 10	73	3) 5)	1,05 (1,06)	1,45 (1,46)	1,75 (1,76)	2,25 (2,27)	2,85 (2,89)	3,55 (3,61)	4,05 (4,13)	5,15 (5,27)	7,45 (7,71)	100	0,25	16.12.2016
ERP- Gründerkredit - Universell außerhalb KMU 20/ 3/ 10	73	3) 5)	1,25 (1,26)	1,65 (1,66)	1,95 (1,97)	2,45 (2,48)	3,05 (3,09)	3,75 (3,82)	4,25 (4,33)	5,35 (5,48)	7,65 (7,92)	100	0,25	16.12.2016

Source: www.kfw.de

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Cost calculations

SeYu Kizyme GmbH, Meschede

Investment cost

	Investment goods	Investment expenditure (€)	Depreciation rate (%)	Depreciation costs (€/p.a.)
Background	Property	205.800	0	0
Market Analysis	Exterior installations	720.000	2	14.400
	Machinery	1.340.000	10	134.000
Proposal	Building	2.260.000	2	45.200
	Off-Sites	1.120.000	10	112.000
Financing concept	Engineering	480.000	10	48.000
	Vehicles	75.000	5	3.750
Cost calculations	Transport	0		
	Assembly	0		
Conclusion	Unexpected	1.000.000		
	Circulating Capital	550.000		
	Totals	7.750.800		357.350



Cost calculations

SeYu Kizyme GmbH, Meschede

Total investment costs

Background

Total of investment and financing [€]

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Total investment	7.750.800
40% own capital funding	3.100.320
60% outside financing	4.650.480

073 074, 075, 076
Kredit Ab 1,00 % p.a. eff.

ERP-Gründerkredit – Universell
Einer für alles - Gründen, Nachfolgen, Festigen

Merken

- 10 year running time
- Interest rate: 2,25 %

Year	Balance of debt (€)	Interest rate	Interest costs (€/p.a.)	Refunding bank loan (€)
1	4.650.480	2,25%	104.636	465.048
2	4.185.432	2,25%	94.172	465.048
3	3.720.384	2,25%	83.709	465.048
4	3.255.336	2,25%	73.245	465.048
5	2.790.288	2,25%	62.781	465.048
6	2.325.240	2,25%	52.318	465.048
7	1.860.192	2,25%	41.854	465.048
8	1.395.144	2,25%	31.391	465.048
9	930.096	2,25%	20.927	465.048
10	465.048	2,25%	10.464	465.048
Sum interest			575.497	
Sum repayment				4.650.480



Cost calculations

SeYu Kizyme GmbH, Meschede

Labour costs

Labour costs	Number	Personnel direct costs (€)
Manager/CEO	1	85.000
Production leader	2	140.000
Technical assistants	20	600.000
Selling	3	150.000
Security	2	70.000
Cleaning staff	4	140.000
Quality Managment	4	180.000
Administration	8	320.000
Totals		1.685.000

Background

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Cost calculations

SeYu Kizyme GmbH, Meschede

Consumption costs

Expandable Material	Specific consumption (g/100 g Enzyme)	Specific prize* (€/g)	Costs per quantity (€/100 g Enzyme)
Raw Materials			
Glucose	100	0,23	23,30
Magnesiumsulfate	10	0,16	1,58
Kaliumphosphate	10	0,15	1,45
Calcium Chloride	10	0,24	2,42
Casein	5	0,08	0,39
Trace elements	5	0,69	3,43
Other**	50	1,74	86,96
Utilites			
Energy and water			15
Selling			2
Maintenance + Quality control			10
Totals (100 g Enzyme)			146,52

*taken from:
www.sigmaaldrich.com

**including:
anti-foam, other reagents,
Pipette tips, Eppendorf
tubes and more
(estimated price)

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Cost calculations

SeYu Kizyme GmbH, Meschede

Self costs (y1-3)

	Self costs	1. year	2. year	3. year
Background	Utilization of capacity	40%	70%	100%
Market Analysis	Enzyme quantity (g)	400.000	700.000	1.000.000
Proposal	Costs	Costs per year (€)	Costs per year (€)	Costs per year (€)
Financing concept	Depreciation costs	357.350	357.350	357.350
	Financing costs	104.636	94.172	83.709
	Labour costs	1.685.000	1.685.000	1.685.000
	Consumption costs	586.092	1.025.661	1.465.230
	Sum of Costs	2.930.723	3.340.064	3.749.405
Conclusion	Self costs (€/g)	7,33	4,77	3,75



Cost calculations

SeYu Kizyme GmbH, Meschede

Calculation of turnover

Background

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Conclusion

- The self costs for 1 g Enzyme is in the first year: **7,33 €**
- The self costs for 1 g Enzyme is in the years 5 to 10: **below 3,70 €**
- We decide to sell 1 g enzymes at **6,50 €** ex factory (net of VAT)
- We sell canisters, containing 154 g enzymes, at **1001,00 €** (net of VAT)

Year	Output (kg)	Price (€/g Enzyme)	Turnover (€)
1	400	6,5	2.600.000
2	700	6,5	4.550.000
3	1000	6,5	6.500.000
4	1000	6,5	6.500.000
5	1000	6,5	6.500.000
6	1000	6,5	6.500.000
7	1000	6,5	6.500.000
8	1000	6,5	6.500.000
9	1000	6,5	6.500.000
10	1000	6,5	6.500.000



Cost calculations

SeYu Kizyme GmbH, Meschede

Cashflow Calculation 1

	Cashflow Calculation (all in €)	1. year	2. year	3. year
Background	Sales profit	2.600.000	4.550.000	6.500.000
Market	Depreciation costs	357.350	357.350	357.350
Analysis	Labour costs	1.685.000	1.685.000	1.685.000
Proposal	Consumption costs	586.092	1.025.661	1.465.230
	Financing costs	104.636	94.172	83.709
Financing	Loss carried forward		-330.723	
concept	Profit before tax	-133.078	1.254.739	2.908.711
Cost	Taxes (-40%)		501.895	1.163.484
	Profit after taxes	-133.078	752.843	1.745.227
Conclusion	Cash flow (net profit+depreciation)	224.272	1.110.193	2.102.577
	repayment credit	465.048	465.048	465.048
	Dividend	-240.776	645.145	1.637.529



Cashflow Calculation 2

Background

Market
Analysis

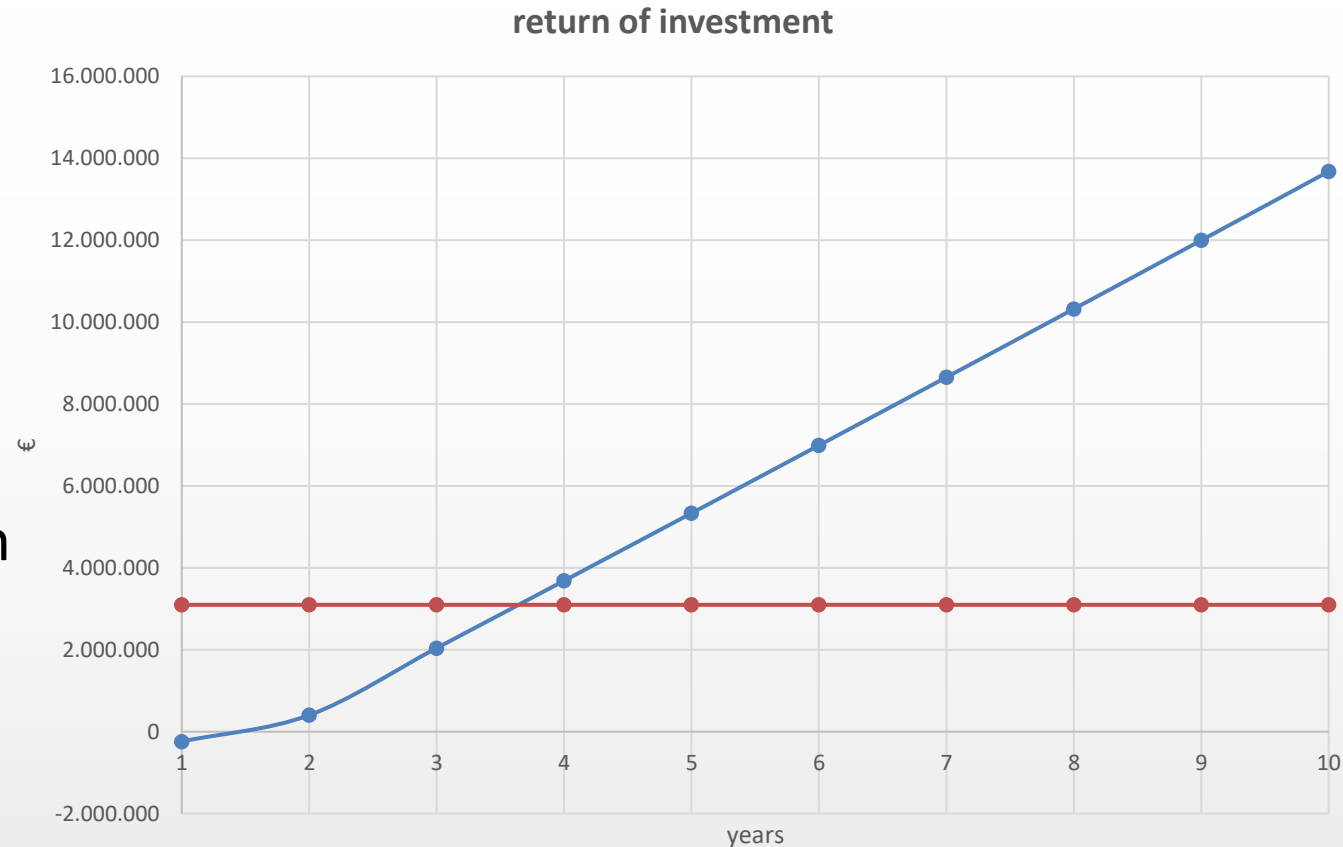
Proposal

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**Cost
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Conclusion

- **Total dividend after 10 years: 13.680.387 €**
- **After less than 4 years: return of investment**
- **Negative dividend only in the first year**





Conclusion

Our Product



Background

- We sell canisters (40 L) with 154 g SeYu Kizyme Enzymes
- Price for 1 g Enzymes: 6,50 €
- **Price for one canister: 1001,00 €**

Market
Analysis

Example calculation

Substrate requirement (500 kW system/year)	Product Consumption of pure enzyme / year	Product Consumption of MethaKi / day	Costs per day for biogas facilities
2.200 t cattle liquid manure	1,548 kg ¹	4,3 g	28€
6.500 t maize silage	1,668 kg ²	4,6 g	30€
1.100 t crop whole plants silage	1,380 kg ³	3,8 g	25€
1.100 t grass silage from permanent grassland	1,380 kg ³	3,8 g	25€

Proposal

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¹ 1,1 L MethaKi / day

² 1,2 L MethaKi / day

³ 1,0 L MethaKi / day

We are about 7 €/d cheaper than our competitors.

For SeYu Kizyme GmbH it is possible to provide Enzymes for up to 722 biogas facilities.



Conclusion

SeYu Kizyme GmbH, Meschede

Potential of biogas is not yet exhausted.

Background

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The mixture of enzymes is an additive for biogas yield increase. Additives achieve considerable results at low cost. Thanks to enzymes it is possible to get almost all the biogas out of the main digesters without a post-digesting stage. Biogas plant cost is 2 times cheaper with the additive.

With Enzymes from SeYu Kizyme GmbH you can save up to 7 € per day.

Give it a try!



We are the **Key**
to success –
SeYu **Kizymes**





Appendix

SeYu Kizyme GmbH, Meschede

Property and Machinery

Property	Investment	Depreciation	Depreciation
property estate ~m ²	196.000	0	0
additional expenses	9.800	0	0
Sum	205.800	0	0
Exterior installations			
Grading work	250.000	50	5.000
Roads	150.000	50	3.000
Foundations	100.000	50	2.000
Outside lights	60.000	50	1.200
Fence	20.000	50	400
Drains	80.000	50	1.600
Cables for power installation	60.000	50	1.200
Sum of exterior installations	720.000		14.400

Machinery	Investment	Depreciation	Depreciation
2x Fermenters (50 and 2000 und 8000 L)	450.000	10%	45.000
Autoklav	150.000	10%	15.000
Tangentialfluss Filtration	90.000	10%	9.000
Anionenaustauscher	50.000	10%	5.000
Teller Separator	200.000	10%	20.000
Clean Bench	80.000	10%	8.000
Laborbänke	20.000	10%	2.000
Additional (including Cartoning Machine, Lyophilisator, ..)	300.000	10%	30.000
Sum	1.340.000		134.000

Appendix

Cost
calculations



Appendix

SeYu Kizyme GmbH, Meschede

Appendix

Cost
calculations

Buildings	Investment	Depreciator	Depreciator
Adminstration	750.000	2%	15.000
Gatehouse	50.000	2%	1.000
Production hall	900.000	2%	18.000
QM-Laboratory	300.000	2%	6.000
Storage	200.000	2%	4.000
parking space	60.000	2%	1.200
Sum	2.260.000		45.200
Off-Sites	Investment	Depreciator	Depreciator
Tools	250.000	10%	25.000
Spare Parts	120.000	10%	12.000
Waste Water purification	750.000	10%	75.000
Sum of Offsites	1.120.000		112.000
Engineering	Investment	Depreciator	Depreciator
Planning	400.000	10%	40.000
Licences	80.000	10%	8.000
Sum of Engineering	480.000		48.000
Vehicles	Investment	Depreciator	Depreciator
3 passenger cars	75.000	5%	3.750
Sum	75.000		3.750

**Buildings, Off-sites, Engineering
and Vehicles**



Appendix

SeYu Kizyme GmbH, Meschede

Labour costs and calculation of consumption costs

Labour costs	Number	Personnel di
Manager/CEO	1	85.000
Production leader	2	140.000
Technical assistant	20	600.000
Selling	3	150.000
Security	2	70.000
Cleaning staff	4	140.000
Quality Managment	4	180.000
Administration	8	320.000
Total of Labour costs (1 shift)		1.685.000

Calculation of consumption costs			
Expandable Mat	specific cons	specific prize	costs per qua
Raw Materials			
Glucose	100	0,23	23,30
Magnesiumsulfat	10	0,16	1,58
Kaliumphosphat	10	0,15	1,45
Calcium Chloride	10	0,24	2,42
Casein	5	0,08	0,39
Trace elements	5	0,69	3,43
other	50	1,74	86,96
Utilites			
Energy, Water			15
Selling			2
Maintenance + Quality control			10
SUM of raw materials costs per 100 g Enzyr			146,52

Appendix

Cost
calculations



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SeYu Kizyme GmbH, Meschede

Self costs (years 1 to 10)

Appendix

Cost
calculations

Self costs in years 1-10										
	1. year	2. year	3. year	4. year	5. year	6. year	7. year	8. year	9. year	10. year
Utilization of capacity	40%	70%	100%	100%	100%	100%	100%	100%	100%	100%
Enzyme quantity (g)	400000	700000	1000000	1000000	1000000	1000000	1000000	1000000	1000000	1000000
Costs	costs per year	costs per year	costs per year	costs per year	costs per year	costs per year	costs per year	costs per year	costs per year	costs per year
Depreciation costs	357.350	357.350	357.350	357.350	357.350	357.350	357.350	357.350	357.350	357.350
Financing costs	104.636	94.172	83.709	73.245	62.781	52.318	41.854	31.391	20.927	10.464
Labour costs	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000
Consumption costs	586.092	1.025.661	1.465.230	1.465.230	1.465.230	1.465.230	1.465.230	1.465.230	1.465.230	1.465.230
Sum of Costs	2.733.078	3.162.183	3.591.289	3.580.825	3.570.362	3.559.898	3.549.435	3.538.971	3.528.507	3.518.044
Costs per g	6,83	4,52	3,59	3,58	3,57	3,56	3,55	3,54	3,53	3,52



Appendix

SeYu Kizyme GmbH, Meschede

Cash flow calculation (years 1 to 10)

Cash Flow Calculation										
	1. year	2. year	3. year	4. year	5. year	6. year	7. year	8. year	9. year	10. year
Sales profit	2.600.000	4.550.000	6.500.000	6.500.000	6.500.000	6.500.000	6.500.000	6.500.000	6.500.000	6.500.000
Depreciation	357.350	357.350	357.350	357.350	357.350	357.350	357.350	357.350	357.350	357.350
Labour costs	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000	1.685.000
Consumption	586.092	1.025.661	1.465.230	1.465.230	1.465.230	1.465.230	1.465.230	1.465.230	1.465.230	1.465.230
Financing costs	104.636	94.172	83.709	73.245	62.781	52.318	41.854	31.391	20.927	10.464
Loss carried forward		-133.078								
Profit before taxes	-133.078	1.254.739	2.908.711	2.919.175	2.929.638	2.940.102	2.950.565	2.961.029	2.971.493	2.981.956
Taxes (-40%)		501.895	1.163.484	1.167.670	1.171.855	1.176.041	1.180.226	1.184.412	1.188.597	1.192.782
Profit after taxes	-133.078	752.843	1.745.227	1.751.505	1.757.783	1.764.061	1.770.339	1.776.617	1.782.896	1.789.174
Cash flow (net)	224.272	1.110.193	2.102.577	2.108.855	2.115.133	2.121.411	2.127.689	2.133.967	2.140.246	2.146.524
repayment costs	465.048	465.048	465.048	465.048	465.048	465.048	465.048	465.048	465.048	465.048
Re-Investing										
Dividend	-240.776	645.145	1.637.529	1.643.807	1.650.085	1.656.363	1.662.641	1.668.919	1.675.198	1.681.476

Appendix

Cost
calculations



Appendix

SeYu Kizyme GmbH, Meschede

Appendix

About us

About us:

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