

## **Work package 4**

### **D11**

**A software tool for quantifying the influence of existing financial regulations on the feasibility of a biogas project**

**(Berechnungshilfe zur Quantifizierung des Einflusses bestehender finanzieller Regelungen auf die Machbarkeit von Biogas-Projekten)**

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Entwicklung einer Datenbank-Oberfläche mit Zugriff auf:

- Anlagen-Datenbank  
optional zu vervollständigen durch zwei weitere Ebenen  
(Systeme und Komponenten)
- Datenbank für Medien und Energieformen
- Datenbank der Finanz-Dienstleister
- Datenbank der untersuchten Finanzierungsmodelle



▼ Plants
?
✕

No	Name		Country	Location	Manufacturer
<input type="text" value="2"/>	<input type="text" value="Redubar Example 2"/>	↔	<input type="text" value="DE"/>	<input type="text" value="see Final report"/>	<input type="text"/>

General	Conditioning	Generation	Cleaning	Local use	Injection	Diagram	Summary
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(engineering) data

Nom. capacity (PE) [kW]	<input type="text" value="5945"/>
Electrical capacity [kW]	<input type="text" value="330"/>
Thermal capacity [kW]	<input type="text"/>

State-of-the art

Stage of development	<input type="text"/>
Commissioning	<input type="text" value="01.01.2009"/>
Operating hours p.a.	<input type="text" value="8760"/>

Description

Example of a plant for biomethane injection with approaching commissioning

Memo

Process

<input type="text" value="2"/>		<input type="text" value="Design Process Ref-2"/>
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⚡ Process

Op. case

Op hours

Feedstock

Material	<input type="text" value="62"/>	<input type="text" value="Input Ref-2 (Design)"/>
Mass flow [kg/h]	<input type="text" value="5091.3"/>	
Water content [%]	<input type="text"/>	

Energy consumption

Electricity [kW]	<input type="text"/>
Heat [kW]	<input type="text" value="155"/>
	<input type="text"/>

Gas data

Type	<input type="text" value="64"/>	<input type="text" value="Biogas Ref-2 clean"/>
Mass flow [Nm³/h]	<input type="text" value="1151.38"/>	
Pressure at access [bar]	<input type="text"/>	

BMK-Treffen in Rathenow

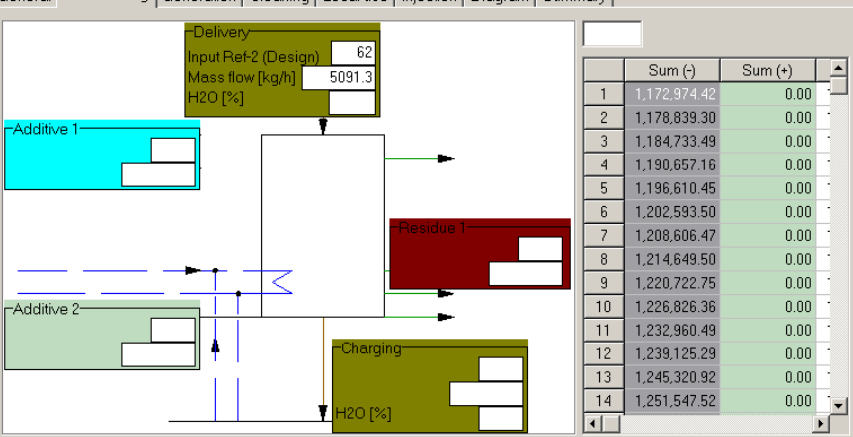
9. September 2009

## Systeme Konditionierung und lokaler Anwendung

Plants

No: 2 Name: Redubar Example 2 Country: DE Location: see Final report Manufacturer:

General Conditioning Generation Cleaning Local use Injection Diagram Summary

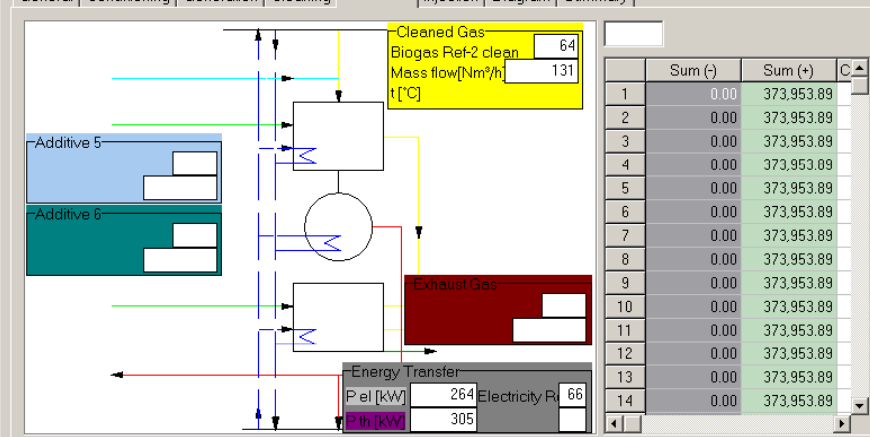


	Sum (-)	Sum (+)
1	1,172,974.42	0.00
2	1,178,839.30	0.00
3	1,184,733.49	0.00
4	1,190,657.16	0.00
5	1,196,610.45	0.00
6	1,202,593.50	0.00
7	1,208,606.47	0.00
8	1,214,649.50	0.00
9	1,220,722.75	0.00
10	1,226,826.36	0.00
11	1,232,960.49	0.00
12	1,239,125.29	0.00
13	1,245,320.92	0.00
14	1,251,547.52	0.00

Plants

No: 2 Name: Redubar Example 2 Country: DE Location: see Final report Manufacturer:

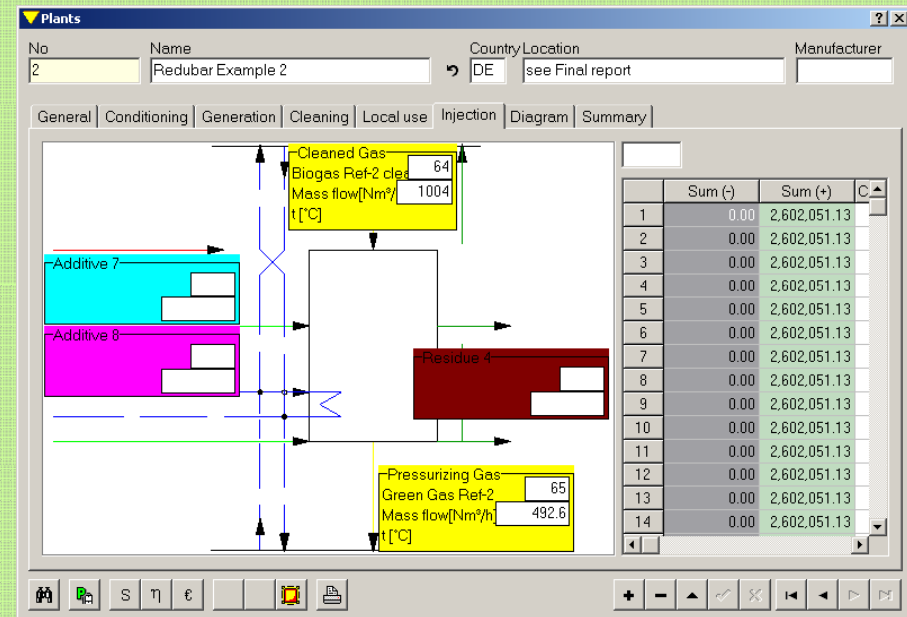
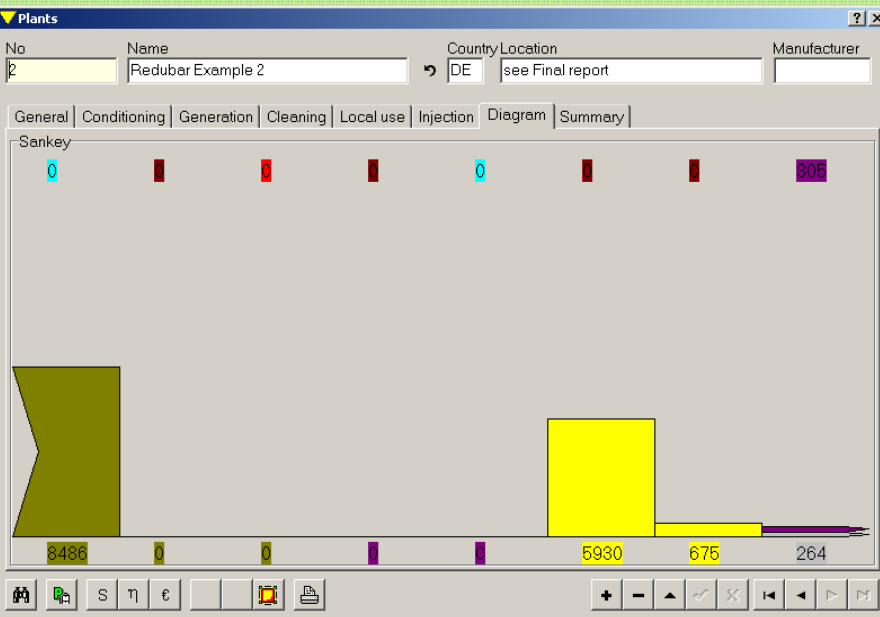
General Conditioning Generation Cleaning Local use Injection Diagram Summary



	Sum (-)	Sum (+)	C
1	0.00	373,953.89	
2	0.00	373,953.89	
3	0.00	373,953.89	
4	0.00	373,953.89	
5	0.00	373,953.89	
6	0.00	373,953.89	
7	0.00	373,953.89	
8	0.00	373,953.89	
9	0.00	373,953.89	
10	0.00	373,953.89	
11	0.00	373,953.89	
12	0.00	373,953.89	
13	0.00	373,953.89	
14	0.00	373,953.89	

Energy Transfer  
 P el [kW]: 264 Electricity R: 66  
 P th [kW]: 305

## Vereinfachtes Sankey Diagramm und Einspeisung



## Zusammenfassung der Rohstoff-Kosten und Einkünfte

▼ Plants
? x

No	Name	Country	Location	Manufacturer
<input type="text" value="2"/>	<input type="text" value="Redubar Example 2"/>	<input type="text" value="DE"/>	<input type="text" value="see Final report"/>	<input type="text"/>

General
Conditioning
Generation
Cleaning
Local use
Injection
Diagram
Summary

Construction

Cold gas efficiency [%]

Raw gas	<input type="text" value="0"/>
Clean gas	<input type="text" value="46.59"/>

	Sum (-)	Sum (+)
1	1,234,874.51	2,914,104.93
2	1,240,739.39	2,914,104.93
3	1,246,633.58	2,914,104.93
4	1,252,557.25	2,914,104.93
5	1,258,510.54	2,914,104.93
6	1,264,493.59	2,914,104.93
7	1,270,506.56	2,914,104.93
8	1,276,549.59	2,914,104.93
9	1,282,622.84	2,914,104.93
10	1,288,726.45	2,914,104.93
11	1,294,860.58	2,914,104.93
12	1,301,025.38	2,914,104.93
13	1,307,221.01	2,914,104.93
14	1,313,447.61	2,914,104.93
15	1,319,705.35	2,914,104.93
16	1,325,994.38	2,914,104.93

Other

Operator	<input type="text"/>
Purchase costs	<input type="text" value="9140000"/>
last entry / update	<input type="text"/>
Project	<input type="text"/>

Capital cost (Average)

Date of calc.	<input type="text"/>
Investment	<input type="text"/>
Life cycle	<input type="text" value="18"/>
Capital cost p.a.	<input type="text"/>

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## Datenbank der Medien und Energieformen

**Agents** [X]

No: 62 Name: Input Ref-2 (Design)

Memo:  
Pig manure 4.9%x0.000€/kg=0  
cattle manure 4.9%x0.000€/kg=0

Term	Unit	Value
Pressure	bar	
Temp	°C	
Density	kg/m³	
Water content	%	
Hu (Heating Value)	MJ/kg (wf)	6
Hu Diff	%	
Lumpiness1	mm	
Lumpiness2	mm	
Lumpiness3	mm	
finest	%	
ref. price table		
UnitAnalysis	%	
C	%	
CnHm aliphatic >= 2	%	
CnHm cyclic	%	

Base: 0.0263 Cost: Sale: Rate: 1.005

[Icons: Hu, +, -, ^, v, x, <, >, <=>]

**Agents** [X]

No: 64 Name: Biogas Ref-2 clean

Memo:

Term	Unit	Value
Pressure	bar	
Temp	°C	
Density	kg/m³	
Water content	%	
Hu (Heating Value)	MJ/Nm³	18.54
Hu Diff	%	
UnitAnalysis	Vol %	
CO	Vol %	
CO2	Vol %	45.2
CH4	Vol %	51.8
CnHm aliphatic >= 2	Vol %	
CnHm cyclic	Vol %	
H2	Vol %	
O2	Vol %	0.5
N2	Vol %	2.5

Base: Cost: Sale: Rate:

[Icons: Hu, +, -, ^, v, x, <, >, <=>]

**Agents** [X]

No: 66 Name: Electricity Ref-2

Memo:

Term	Unit	Value
Tariff - high	%	
Tariff - low	%	
Tariff - peak	%	
Renewable en.	%	100
by contract	%	
House load	%	
Tariff - Supplier		

Base: 0.1617 Cost: Sale: 0.1617 Rate: 1

[Icons: Hu, +, -, ^, v, x, <, >, <=>]

# Datenbank der Finanz-Dienstleister

**Financial Service Provider** [?] [X]

No: 90002    Name: KFW BANKENGRUPPE / BERLIN    Statistics Sign:    Date: 27.08.2008

Address | Information | Person: 0

Name 1	KfW Bankengruppe	
Name 2	Niederlassung Berlin	
Name 3		
Street / No	Charlottenstraße 33/33a	
Country	Zip code	Location
D	10117	Berlin
Zip Box	P.O. Box	
Address / Title		
Contact person		
Phone	E-mail	
www.kfw.de		
Phone	Mobile	
030 2 02 64-0		
Fax	E-mail	
030 2 02 64-51 8	info@kfw.de	

**Financial Service Provider** [?] [X]

No: 90002    Name: KFW BANKENGRUPPE / BERLIN    Statistic Sign:    Date: 27.08.2008

Address | Information | Person: 1 | Documents

Memo

Name	<a href="http://www.kfw-foerderbank.de/DE_Home/Umweltschutz/KfW-Umwelt44/Konditionen.jsp">http://www.kfw-foerderbank.de/DE_Home/Umweltschutz/KfW-Umwelt44/Konditionen.jsp</a>
▶ KfW-Umweltprogramm	
ERP Energy Efficiency Programme	
ERP-Umwelt- und Energiesparprogramm	
KfW-Programm Erneuerbare Energien	

Limit: 10,000,000.00    EUR    Expiration:    Date: 10.09.2008





## Datenbank der Investitions-Vorhaben (Varianten)

**Finanzierung**

Nummer: 2, Bezeichnung: Redubar Example 2, Land: DE, Währ.: EUR, Datum: 17.10.2008, Jahr: 2009

Allgemein | Own funds | Subsidies | Private loan | Betriebskost. | Materialaufw. | Erlös

Memo  
Example of a plant for biomethane injection with approaching commissioning

Investition  
 Preis: 9.140.000,00  
 Zusatz: 0,00  
 Gesamt: 9.140.000,00  
 Gedeckt: 9.139.999,70  
 Defizit: 0,30

Abschreibung  
 Lebensdauer: 18  
 Beginn: 01.01.2009  
 Ende: 01.01.2029

Parts  
 Own funds: 750.000,00  
 Subsidies: 2.742.000,00  
 Private loan: 5.763.265,00  
 Public loan:

Reserve  
 Betrag:

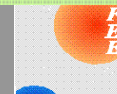
**Finanzierung**

Nummer: 2, Bezeichnung: Redubar Example 2, Land: DE, Währ.: EUR, Datum: 17.10.2008, Jahr: 2009

Allgemein | Own funds | Subsidies | Private loan | Betriebskost. | Materialaufw. | Erlös

Detail

Bezeichnung	Prozent	Betrag	Rate
Management - Betriebsführ	1,75	160000	1,01
Maintenance - Wartung	2,15	196486	1
Repair - Reparaturen			1,02
Energy - Strom	3,37	308332	1,005
Insurance - Versicherung	0,42	38700	1
Rents - Pachten/Mieten			1,01
Other - Sonstige		165100	0



# Zusammenfassung der Aufwendungen und Einkünfte

**Finance**

No: 2 Name: Redubar Example 2 Country: DE Sign: Curr: EUR Date: 17.10.2008 Year: 2009 Author:

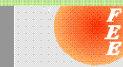
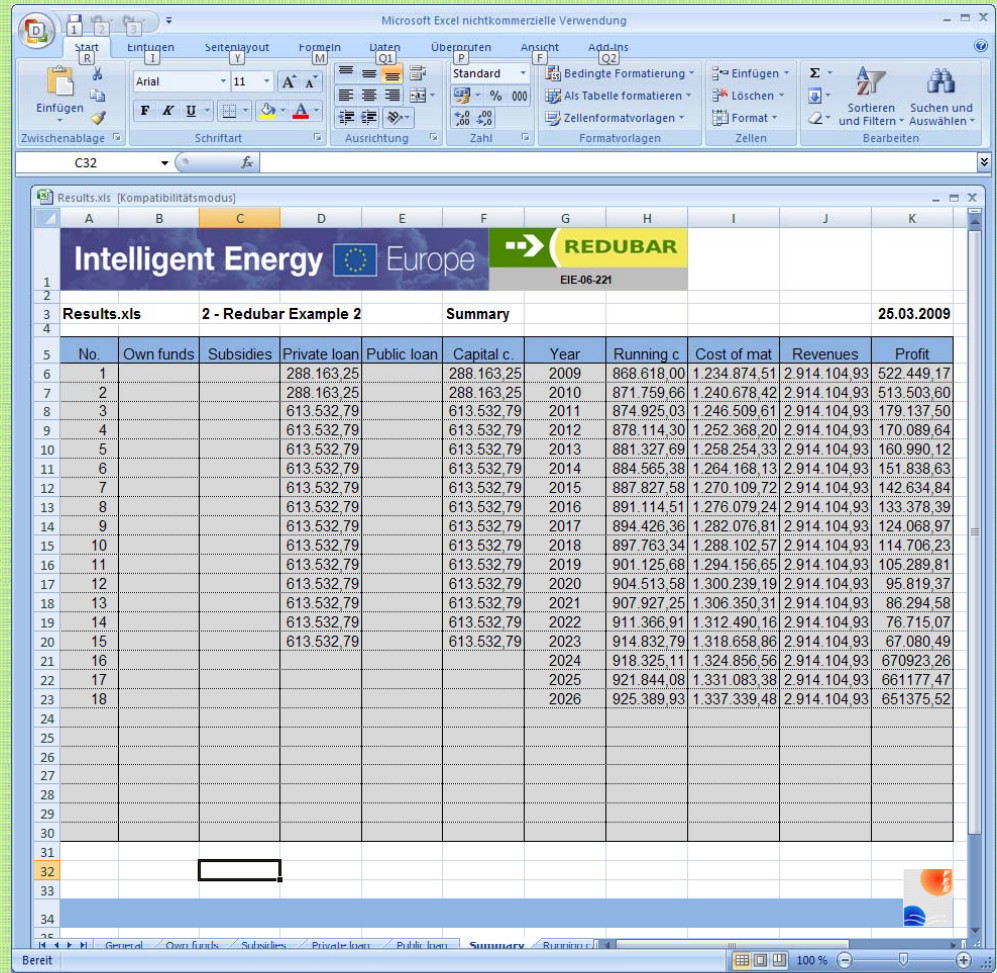
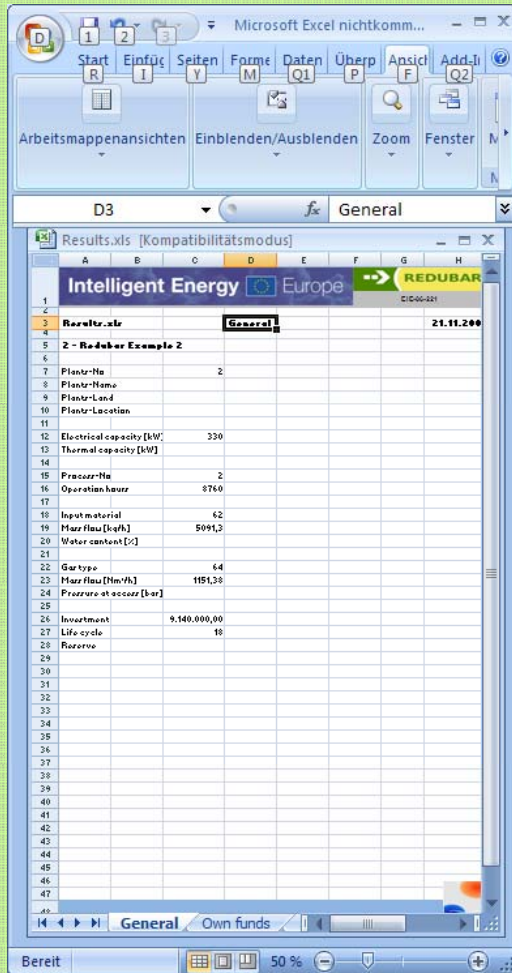
General | Own funds | Subsidies | Private loan | Summary | Running c. | Cost of mat. | Revenues

	Own funds	Subsidies	Private loan	Public loan	Capital c.	Year	Running c.	Cost of mat	Revenues	Profit
1			288,163.25		288,163.25	2009	868,618.00	1,234,874.51	2,914,104.93	522,449.17
2			288,163.25		288,163.25	2010	871,759.66	1,240,678.42	2,914,104.93	513,503.60
3			613,532.79		613,532.79	2011	874,925.03	1,246,509.61	2,914,104.93	179,137.50
4			613,532.79		613,532.79	2012	878,114.30	1,252,368.20	2,914,104.93	170,089.64
5			613,532.79		613,532.79	2013	881,327.69	1,258,254.33	2,914,104.93	160,990.12
6			613,532.79		613,532.79	2014	884,565.38	1,264,168.13	2,914,104.93	151,838.63
7			613,532.79		613,532.79	2015	887,827.58	1,270,109.72	2,914,104.93	142,634.84
8			613,532.79		613,532.79	2016	891,114.51	1,276,079.24	2,914,104.93	133,378.39
9			613,532.79		613,532.79	2017	894,426.36	1,282,076.81	2,914,104.93	124,068.97
10			613,532.79		613,532.79	2018	897,763.34	1,288,102.57	2,914,104.93	114,706.23
11			613,532.79		613,532.79	2019	901,125.68	1,294,156.65	2,914,104.93	105,289.81
12			613,532.79		613,532.79	2020	904,513.58	1,300,239.19	2,914,104.93	95,819.37
13			613,532.79		613,532.79	2021	907,927.25	1,306,350.31	2,914,104.93	86,294.58
14			613,532.79		613,532.79	2022	911,366.91	1,312,490.16	2,914,104.93	76,715.07
15			613,532.79		613,532.79	2023	914,832.79	1,318,658.86	2,914,104.93	67,080.49
16						2024	918,325.11	1,324,856.56	2,914,104.93	670,923.26
17						2025	921,844.08	1,331,083.38	2,914,104.93	661,177.47
18						2026	925,389.93	1,337,339.48	2,914,104.93	651,375.52

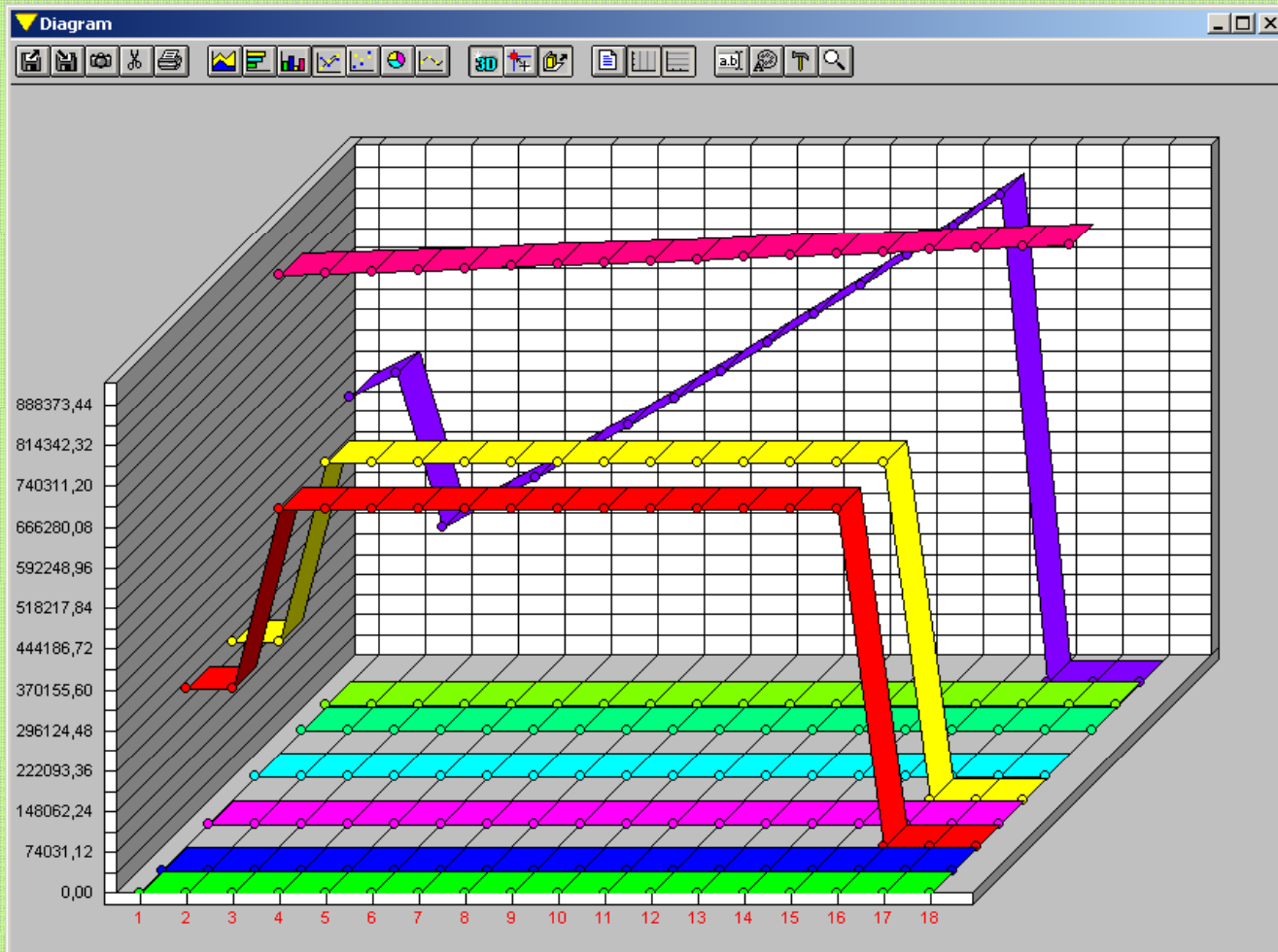
Buttons: B S [Icons] + - [Navigation]



## Der Export einer Finanzierungsvariante zu EXCEL umfaßt alle Tabellenblätter des Projekts.



## Grafische Darstellung der Ergebnisse:



**Das ist der aktuelle Stand:**

**Verfügbarkeit des Programms im Internet**

**Zwei reale Datensätze von Anlagen-Projekten in Deutschland  
(sowohl für Biogas als auch für Gas aus thermischer  
Vergasung)**

**(Die Daten wurden freundlicherweise von Mitgliedern der FEE  
und des BBK im Rahmen des BMK zur Verfügung gestellt)**

Danke für die Aufmerksamkeit