



re-energise Africa
sustainable development

Company Presentation

2nd National Biogas Conference
6th of March 2015 at IDC



Green Africa -
change through innovation

About re-energise Africa (Pty) Ltd.

Our facts

Founders:	Tarik Höppener (Managing Director) Mikateko Höppener (Director)
Incubation:	2013
Physical Address:	191 Leeuwpoort Street Boksburg 1478
BEE-Status:	Level 1
Industry Sectors:	Bioenergy, recycling, energy efficiency, and energy system integration
Business activities:	Service provider and equipment supply



About re-energise Africa (Pty) Ltd.

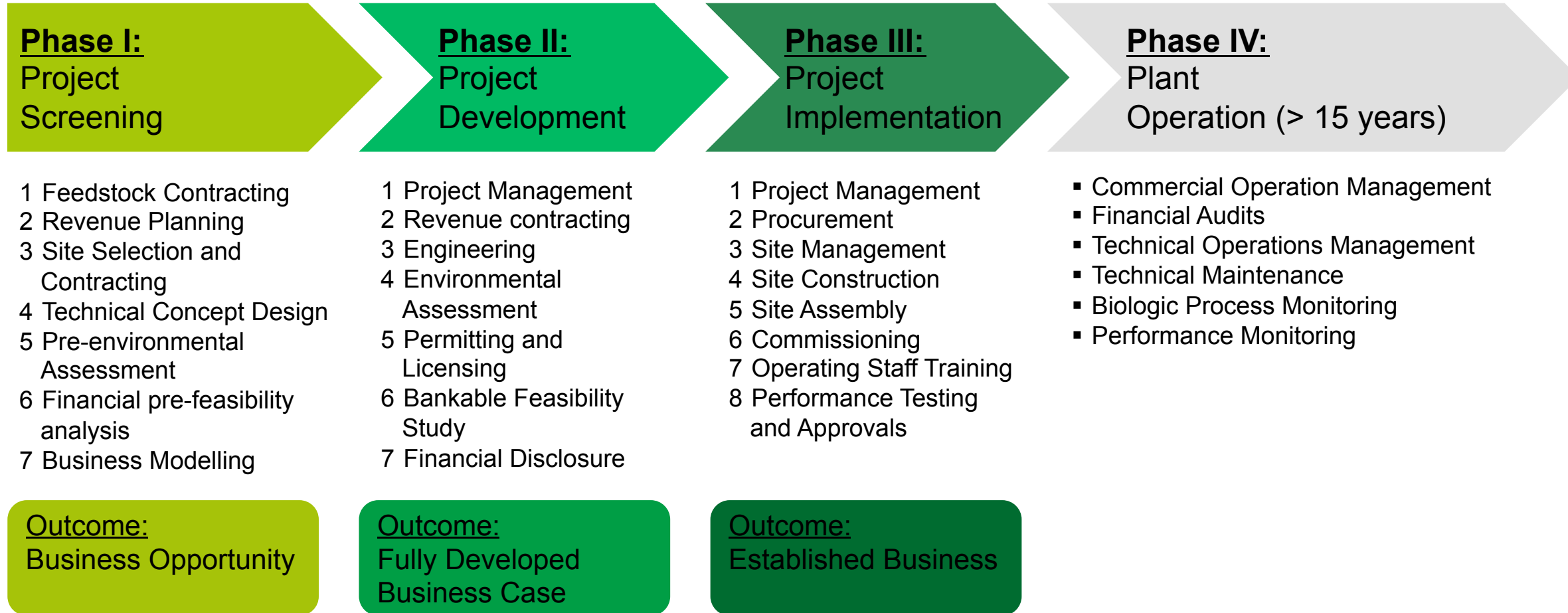
Our core competence

Feedstock and anaerobic digestion	Gas management
<ul style="list-style-type: none">• Feedstock supply logistics• Biomass composition evaluation• Anaerobic digestion	<ul style="list-style-type: none">• Gas Storage• Biogas, landfill gas, and sewage gas treatment• Biogas upgrading• Biogas compression and conditioning• Gas measurement and validation
<h3>Energy system integration</h3> <ul style="list-style-type: none">• Cogeneration• Power-to-gas• Electricity storage with batteries	



Standard Biogas Project Life-Cycle

Consulting services in biogas business development process



Technology Partner – gas treatment

Siloxa Engineering AG – An introduction

➤ **Formation of the company 1998**

➤ Components and aggregates for
Sewage-Gas, Landfill-Gas, Bio-Gas, Coal-bed methane gas
everything between the gas well and the consumer



SILOXA

▪ **Gas-Drying**

- Condensation-Dryer
55°C > 3 °C
- Adsorptions- Dryer
< - 70°C

▪ **Gas-Compressors-plants**

- Supply for Gas-engines
 - Micro-Gas-Grid
< 1 bar

▪ **Gas-Cleaning**

- H₂S
- Siloxane

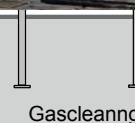
➤ **Turn over 2012: 8 Mio. €, today 40 employees**

➤ **More than 700 references for gas-drying, compression, and cleaning for in Europe, USA, Russia, Korea, and Japan**



Gas Treatment equipment

Scope of Supply



Gas quality I

Impurities in biogas

- Biogas is not a clean fuel
 - Trace compounds such as hydrogen sulfide and Siloxanes (if you feed waste into the process) cause problems
 - Hydrogen Sulfide
 - acidification of the engine oil
 - increase of oil Consumption
 - Risk of damages through bad oil
 - deposits on piston and spark plugs
 - deposits in the exhaust system
 - higher risk of corrosion in the total system e.g. intercooler
 - Siloxanes
 - Heavy Deposits in the combustion chamber
 - Increasing wear or brake downs



Gas quality II

Impurities in biogas

- Biogas is not a clean fuel
 - Water
 - Biogas with 40°C content 58 g/m³ Water or 7,3 Vol.% Water vapor
 - 500 kW / 250 m³/h -> more than 300 l/day
 - condensate causes:
 - corrosion issues
 - deposits in the gas control system
 - pipe blockings
 - reduced efficiency of the total system



Gas quality III

Gas composition on empirical experience

Main-Compounds	Sewer-Gas	Biogas	Landfill Gas
CH4	60 - 65 Vol.-%	55 - 70 Vol.-%	50 - 60 Vol.-%
CO2	35 - 40 Vol.-%	30 - 45 Vol.-%	30 - 40 Vol.-%
O2	< 0,1 Vol.-%	< 0,1 Vol.-%	bis 3 Vol.-%
N2	< 0,4 Vol.-%	< 0,4 Vol.-%	Rest
Trace-Compounds			
H2S	bis 4.240 mg/m ³ Ø < 100 mg/m ³	bis 10.000 mg/m ³ Ø < 200 mg/m ³	bis 5.000 mg/m ³ Ø < 500 mg/m ³
CL & F	< 10 mg/m ³	< 5 mg/m ³	< 150 mg/m ³
Siloxanes	bis zu 317 mg/m ³ Ø > 10 mg/m ³	bis zu 500 mg/m ³ Ø < 5 mg/m ³	bis zu 150 mg/m ³ Ø > 25 mg/m ³
Hydrocarbons > C5	bis zu 500 mg/m ³ Ø < 100 mg/m ³	bis zu 800 mg/m ³ Ø < 40 mg/m ³	Ø >> 600 mg/m ³
Water	8 Vol.% at 40°C	8 Vol.% at 40°C	8 Vol.% at 40°C



Gas requirements of CHPs

Typical fuel specifications

Parameter		Limit	
Chlorine	Cl	< 100	mg/m ³ _{N CH4}
Fluorine	F	< 50	mg/m ³ _{N CH4}
Dust	< 5 μm	< 10	mg/m ³ _{N CH4}
Oil vapour		< 400	mg/m ³ _{N CH4}
Organic silicon compounds	Si	< 5 (< 1)	mg/m ³ _{N CH4}
H2S	H2S	< 200 (< 1)	ppm
Ammonia	NH3	< 50	mg/m ³ _{N CH4}
Rel. Humidity	φ	< 60	%



Problem demonstration I

Cylinder head



- **white-greasy encrustation mainly from silicon**

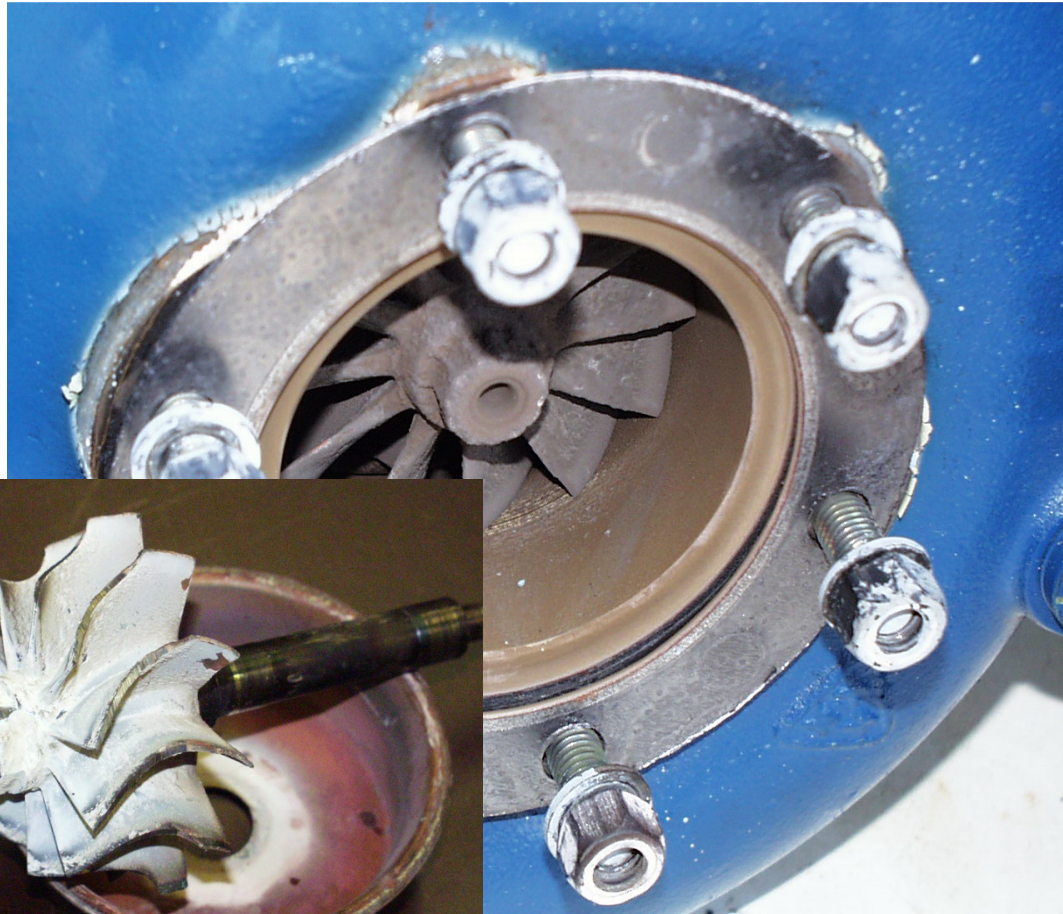
→ **Result:**

Burned outlet valve after 3.500 operating hours



Problem demonstration II

Turbocharger



- **greyish encrustation on the blades**

→ **result:**

**power loss of the turbocharger
bearing damages**

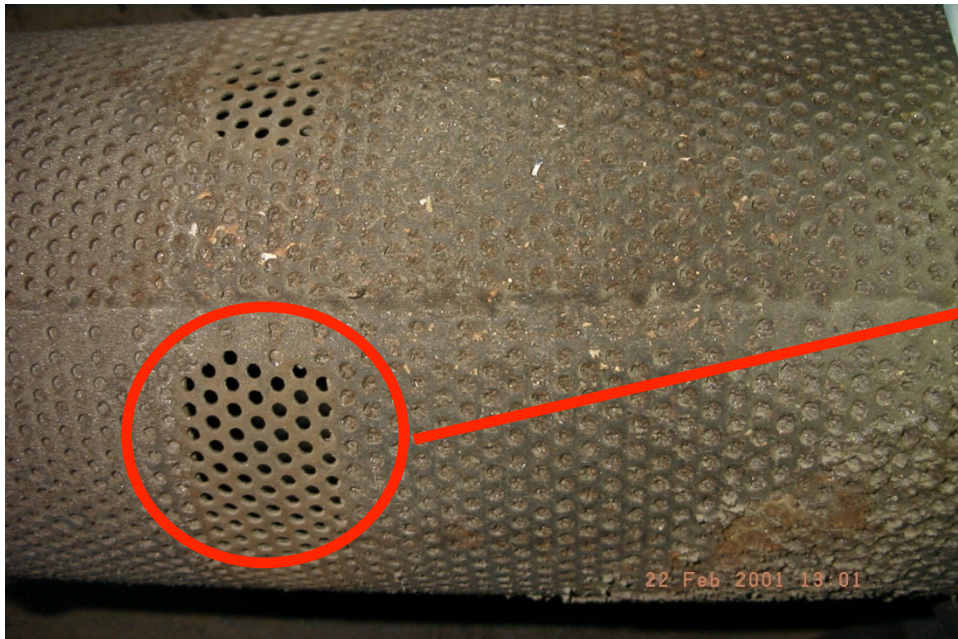


Problem demonstration III

Silencer

Blocked silence at exhaust

Power loss caused by an increased exhaust counter pressure



Benefits of gas treatment

Conclusion

- Increase in the Reliability
 - Less downtime
- Reduction of maintenance costs
 - Longer oil change intervals
 - Longer spark plug life time
 - Less trouble shooting time
- Compliance with fuel specifications of technical engine warranty
 - You are within technical thresholds => no discussion about warranty
 - You meet fuel gas specifications => no discussion with service partners
- Result: => **Higher overall system performance and profits**

