



**Case Study:  
Bio fuels in Africa & Europe  
Challenges and solutions**

# Immingham – Current status

- Fully Consented
- Fully designed
- 8 year deal secured at fixed prices with British Farming
- 10 year contracts for CO2 and DDGS
- Key agreements complete
- 65% debt offer
- Struggling to find equity
  - Failed to list on the LSE – Feedstock prices
  - Failed to secure private equity – Food for Fuel

# Newcastle Cogeneration Pty

## A journey from Manchester to Newcastle



Licence Number: NERSA/G/KZ232/01

**ELECTRICITY GENERATION LICENCE**

This licence is issued by the National Energy Regulator of South Africa, hereinafter referred to as "NERSA", in terms of the Electricity Regulation Act, 2006 (Act No. 4 of 2006).

This licence is issued to:

**NEWCASTLE COGENERATION LIMITED**

(Registration No. 2000/008136/07)

for the purpose of generating the electricity at the facility listed in Schedule 1 and sell its electricity to:

**ESKOM HOLDINGS LIMITED**

(Registration No. 2002/015527/06)

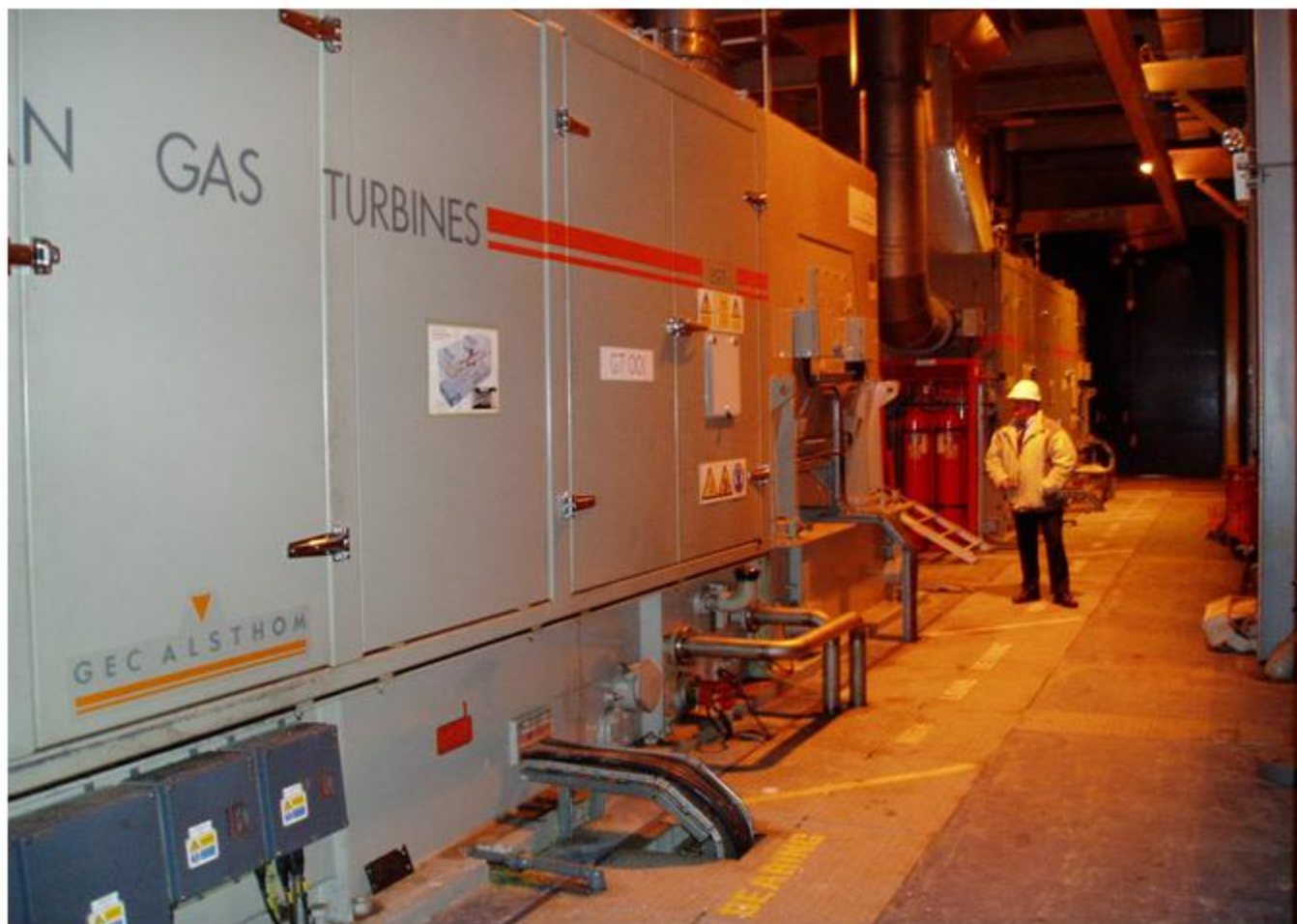
as listed in Schedule 2 subject to the terms and conditions contained in the licence conditions as imposed by the Energy Regulator.

ISSUED at Pretoria on this 30<sup>th</sup> day of July, 2010

  
CHIEF EXECUTIVE OFFICER  
NATIONAL ENERGY REGULATOR



# Turbine Hall



# The Control Room



# Newcastle Cogen Pty – An Overview

- A gas turbine, combined cycle and CHP Plant 18Mwe ISO and 100 tonne per hour steam
- Acquired plant in UK dismantled and shipped to South Africa
- Gas contracts with Sasol Gas
- Steam contract with Karbochem
- Electricity off taker Eskom under the MTPPP
- In UN CDM Carbon Credit Process- 250,000 tonnes per annum CDM credits

## Newcastle Cogen Pty – Facts

- Built for less than 50% of today's capital cost
- Gas price a multiple of the cost of coal
- Approaching 80% efficient use of heat
- 250,000 tonnes of carbon saved per year
- 98% target availability
- O&M team of 10



# DIY Cogeneration Guide

- Select and secure fuel contract
  - Will they wait?
- Select best available technology
  - What is best?
- Negotiate with power and heat off takers
  - Can you find the balance between heat and power?
  - Will they pay proper value?
- Obtain the site, funding and licences
  - Realisation it will not work!

## IPSA - Cogeneration Benefits

- More efficient use of important world resources
  - Cleaner
  - But not necessarily cheaper
- Off balance sheet solution
  - Much plant is in need of replacement
- Partner with know how
  - You may have the idea
  - Cogeneration is no “slam dunk”

# It Can Be Done





# South African Cogeneration Threats

- Limited fuel options
- Complex and difficult design and procurement
- Unsympathetic administration
- *Cogeneration has an important role to play in saving fuel resources, reducing emissions and contributing to improved balance of payments*

# Governments Role

- Make the bio fuels / cogeneration process clear and simple
- Exploit UN CDM Carbon Credits
  - China's DNA meets every two weeks
- Incentives focussed on helping project advancement
  - Feasibility
  - Finance
- Speed of Government decisions and actions
  - Time costs money
- Allow learning by doing
  - Accept mistakes will be made

# Our experience of the barriers?

## Government's Commitment and Funding

- ✔ **Changing policies**
- ✔ Misinformation by NGOs and others
- ✔ Financing production technology
- ✔ Resistance by society
- ✔ Protectionism by the oil industry and the sugar industry

# African and UK Co-operation

- Greenheart Energy can offer experience and track record
- We Bring Long term secure contracts for agricultural products
  - Vegetable oils
  - Starches (eg dried cassava )
  - Sugars
- We can provide aroute to premium European market
  - First to bring bioethanol into Scotland
  - Regular enquiries from oil majors
  - Seen as a producer not a trader
- An experience JV partner
  - Designs
  - EIA's and permitting
  - Project structuring
  - Direct access to London debt and equity markets



# Case Studies

- Chairman – Greenheart Energy Limited
  - Newcastle, South Africa – Soya extraction and bio diesel production
    - 250,000 tpa CDM Carbon Credits
- Managing Director – Bioethanol Limited
  - Immingham, UK - 200,000tpa bioethanol production plant  
1% of UK petrol supplies – 20% of UK bio fuels target
- Executive Director – IPSA Group Plc
  - Newcastle, South Africa – 20mw Combined Cycle CHP
    - 250,000tpa CDM Carbon Credits

# Newcastle, South Africa

## Soya Extraction and Biodiesel Overview

- Joint Venture with Siyanda Oil Holdings (Pty) Ltd – A BEE with one of four licenses wholesale transport fuel distributors in South Africa
- Greenheart Energy Ltd (UK) will provide an EPC contract utilising a stranded 100,000 tonne plant, which Greenheart has agreed terms on
- Greenheart Energy (Pty) Ltd will joint venture Siyanda Oil Holdings (Pty) Ltd in Newco on at 50/50 basis
- Project has all relevant consents to build, soya feedstock in place under Siyanda's control as well as a purchase agreement through a Tolling arrangement
- Project anticipated to be commissioned in less than 12 months with a CAPEX of approx \$8m



# Site Location

- Site located in Newcastle, South Africa
- Newcastle is located between Johannesburg and Durban, on the main transport route
- The site is controlled by Siyanda and has all relevant consents for immediate construction, including EIA
- Site is ideally located for the import of food stock and the export of biodiesel



# Financials



- Greenheart have negotiated with Lloyds TSB and UK Government ECGD for project Debt – Due diligence is in progress
- Lloyds TSB have agreed a supplier credit model which is quicker to put in place
- Siyanda are in partnership with Central Energy Fund, who will put up equity and manage the Carbon Credits resulting from the project
- Greenheart in discussions with Industrial Development Corporation and other equity
- Siyanda will purchase the product under a tolling agreement with the biodiesel plant
- Equity rate of return targeted at 20%

# Bioethanol Limited – Evolution

- Founded in 2001 as a fully ABB funded bio fuels development company.
- Researched best available technologies
- Developed ABB Global business plan based on second and third generation technologies
- 2002 Developed IOGEN Corporations (Shell) UK business plan for building a cellulosic bioethnaol plant .
- 2003 reached agreement with USA gasification and microbial fermentation company to develop in the UK
- 2005 commenced work on the Immingham bioethnaol project. Now designed and fully consented and permitted.

# The UK and European Market

- 12 bioethanol plants would be required in the UK by 2014 to meet the EU 5% target based on UK petrol sales of 30 billion litres per annum and a typical plant size of 125 million litres annual output.
- Pan European requirement to meet Directive substitution targets will require 15 billion litres per annum of bioethanol production
- This would mean building 115 plants of 100,000 tonnes capacity by 2020. Current EU capacity is around 1,500,000 tonnes or 15 plants.

# Bioethanol Limited – Immingham plant profile

Bioethanol (UK) PLC intends build, own and operate its first plant producing 200,000 tonnes of bioethanol p.a. on South Humberbank

- Site consented for 200,000 tonnes bioethanol production– planning permission granted 2<sup>nd</sup> April 2007.
- The plant design by Katzen International Inc., experienced in process engineering of conventional fermentation and distillation of bioethanol.
- Plant to be constructed by Shaw, Stone & Webster Ltd:
- All feed stock take from UK surplus and within a 25 mile radius.
- CO2 Carbon Capture and used in food industry
- Co product used to produce renewable energy
- Capital costs of £170million

