

Case Study - Pilot Project

Development of Biogas Technology combining Swedish and Indian experiences and competence

Parallel Workshop on Biomethanation
DIREC, Delhi 27th of October 2010

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The challenge: Can we combine Indian and Swedish experiences and competence?

Indian advantages:

- > 50 years of experience of biogas production from manure
- More than 4 million small scale biogas plants working
- CNG gas grid available in major cities
- Millions of cars running on CNG
- Active biogas companies
- Available production facilities



The challenge: Can we combine Indian and Swedish experiences and competence?

Swedish advantages:

- > 50 years of biogas experience, starting with waste water treatment
- Focus on biogas from waste and production of vehicle fuel
- Integrated solutions – biogas as a part of a sustainable society
- World leading companies in
 - Biogas technology and
 - Up grading of gas to vehicle fuel



Part 1

Study Tour to Sweden, August 30 – September 3, 2010

Participants from:

- Ministry of New and Renewable Energy (MNRE), Head of Delegation
- Indian Institute of Technology (IIT)
- Punjab Energy Development Agency (PEDA)
- GITS Associates, Pune
- Delhi Jal Board (DJB)
- Petrol, Explosive and Safety Organisation (PESO), Nagpur
- PSA Nitrogen Ltd
- Ashoka Biogreen, Nasik
- Indraprastha Gas Ltd (IGL)

Pilot Project – Swedish-Indian Biogas technology

Study visits and meetings with Swedish Biogas Stakeholders, including:

- NSR, Municipal Waste Management, *including biogas*
- Lund University, Dept of Bio Technology, *research on biogas*
- Bio Process Control, *biogas optimization tools*
- Helsingborg WWTP, *biogas production and upgrading*
- Norup Farm, *biogas production and upgrading*
- Malmberg Water, *biogas upgrading*
- Läckeby-Purac, *biogas upgrading*
- Volvo-Terracastus, *biogas upgrading*
- Swedish Waste Management Association
- Swedish Gas Association
- Sweco, BioMil, Grontmij, *biogas consultants*



SWEDISH BIOGAS UPGRADING EXPERIENCES

- TECHNOLOGIES USED FOR UP GRADING OF BIOGAS:
 - Water Scrubber 25
 - PSA (Pressure Swing Adsorption) 8
 - Coaab (Chemical absorption with amines) 4
 - Cryogenic separation (LBG) under construction (4)

- TECHNOLOGY PROVIDERS in Sweden
 - Malmberg Water
 - Läckeby-Purac
 - Volvo Terracastus
 - Scandinavian GtS
 - Swedish Biogas



NSR Integrated Waste Treatment Plant



NSR - biogas production from 70 000 tons of organic waste per year, 3.5 milj Nm³ of up graded biomethane to vehicle fuel and the gas grid

Pilot Project – Swedish-Indian Biogas technology



Lund University,
Dept of Bio Technology

Research Station Anneberg

- Fermentation tests, pilot scale
- Bio Refinery – utilization of biomass to produce chemicals

Lab tests to optimize and measure biogas potential

Liquid Biogas - new technologies

- **VOLVO** are interested in supporting the development of environmental friendly fuel for long distance transportation
- **TERRACASTUS** - in the **VOLVO** group, and Scandinavian GtS are companies that deliver plants for production of cleaned and liquefied biofuel - LBG



1 Nm3 methane corresponds to

- 5 liter CBG
- 1,7 liter LBG
- 1 liter Diesel
- 10 kWh

Some Workshop results – a Pilot Project Suggestion

- **A study on Biogas at Okhla WWTP :**
 - Optimization of gas production
 - Upgrading of biogas to CNG quality/vehicle fuel
 - Feasibility study (“bankable”) & conceptual design
 - Realization of pilot plant – design, construction, commissioning
- **Extended Cooperation**
 - Elaboration of “company to company” cooperation through contacts made,
 - Research and development – cooperation between universities,
 - Exchange on policy aspects, standards, regulations etc



Finally – there are concerns and obstacles to overcome!

- Technology prize levels – need for partnering, local production
- Market/Development India – need for regulations, standards and guidelines for upgraded biogas (vs. CNG standards)
- How to reach a financially viable production of upgraded biogas?
- Prize competition with other fuels and energy sources?
- How can environmental and climate benefits from biogas use be valued?