

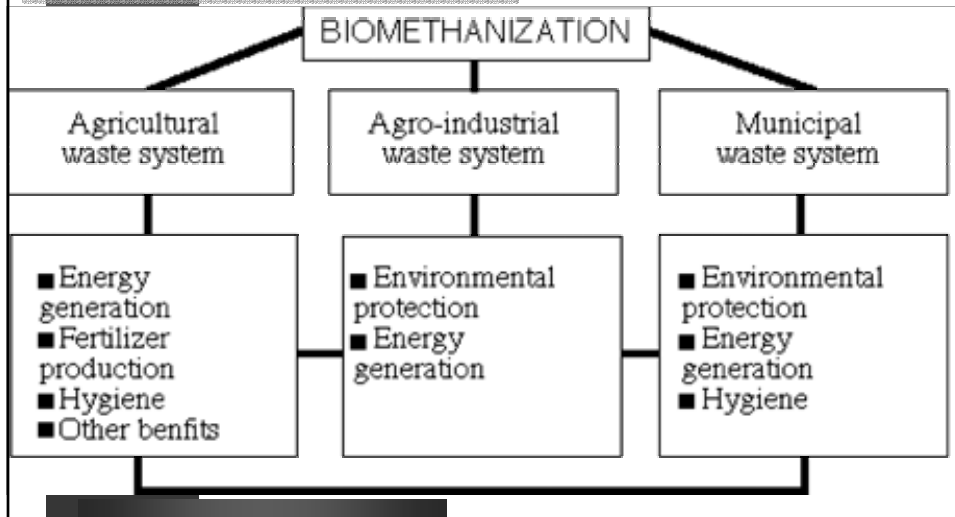
Biogas Potential in Chile – Technology Transfer from Europe and China to Chile

Dipl.-Ing. Heinz-Peter Mang
German Society for sustainable Biogas and Bioenergy Utilisation
(GERBIO)
www.gerbio.org

Overview

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- 2. Biogas potential in Chile based on MSW**
- 3. ... based on WWT**
- 4. ... based on crop residues**
- 5. ... based on animal husbandry**
- 6. ... based on agroindustrial residues**
- 7. Germany as RET exporter**
- 8. China's RET economy**
- 9. Cooperation China-Europe-Chile**

Biogas technology is suited to convert the organic waste from agriculture, livestock, industries, municipalities and other human activities.



Municipal Solid Waste

⇒ 282 existing landfills in Chile

⇒ 52 of these landfills with a capacity of 4.700.000 t/y (generated from 10.700.000 hab.) have a potential of 160.000.000 to 204.000.000 m³ of biogas/year (BID,2003)



Urban Wastewater Treatment

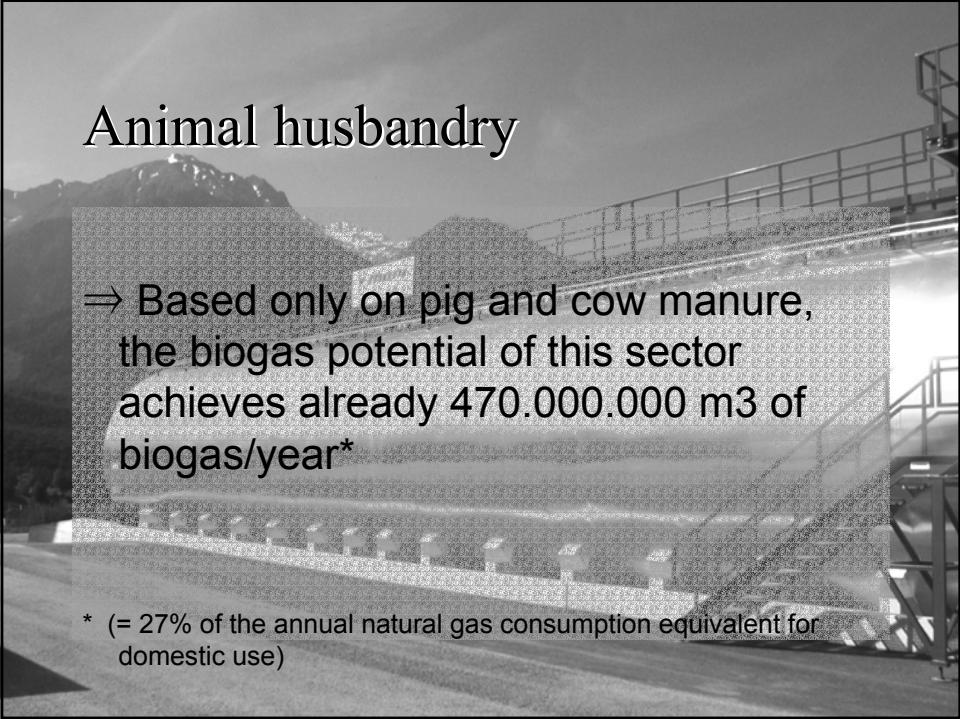
⇒ 162 wastewater treatment plants with sludge treatment are considered to be build for the treatment of 70,9% of all municipal waste water (Plan de Saneamiento Hídrico, 2005)

⇒ 3 plants have already sludge fermenters (La Farfana, El Trebal and Bío Bío) with a production of 44.500.000 m³ of biogas/year, with Los Nogales (under construction - 2009) 63.900.000 m³ of biogas/year



Agricultural crop residues

⇒ Harvest residues from wheat, corn and beets, rice, grass and others (also considered as energy crops for biogas) with a potential of minimum 122.000.000 m³ of biogas/year



Animal husbandry

⇒ Based only on pig and cow manure, the biogas potential of this sector achieves already 470.000.000 m³ of biogas/year*

* (= 27% of the annual natural gas consumption equivalent for domestic use)



Agroindustrial residues

⇒ Wine, beer and fruit processing industry, dairy production, fibers and other textile/leather industries, fish and meat processing, and other food and feed industries, are organic waste and wastewater producers, their potential is not yet clear estimated (about 100.000.000 m³/year ?)

Biogas in Germany and in China

Germany:

500.000 farm units
2.500 agricultural biogas
plants in operation
= 0,5% of the farms

Potential of 24 billion m³
agro-biogas/year,
5 % of the available
organic substrates are
used

China:

600.000.000 farm units
6.000.000 agricultural biogas
plants in operation
= 1% of the farms

Potential of 145 billion m³
agro-biogas/year, (only
manure)
2.5 % of the available organic
substrates are used

RET Transfer potential Germany

- from mid 1990s to the end of the last century the German RET export volume has increased up to EUR 350 million, assuming a 10 % export share of the national production of RET technologies in 1999, representing a direct employment of almost 30,000 people (Allnoch 2000).
- in 2004 biogas CHP producers have a booming business
- 60 companies are related to biogas construction.

Economic RET potential China



The expansion of China's renewable energy industry has created new employment opportunities for thousands of people. According to estimations, the existing Rmb 10 billion (US\$1.2 billion) renewable energy industry provides more than 1 million jobs (2002).

Biogas Cooperation China-Europe



- German, British, Italian and Swiss companies have already established biogas cooperation with China (mainly in digester design and efficient biogas use)
- Since 10 years, a German company is manufacturing biogas plants (civil work) in China .
- Since 2 years, some German biogas companies are analysing the Chilean biogas market.
- Instruments of technology transfer: joint ventures, CDM, DC (TC&FC), integrated experts (CIM), PPP, study tours, R+D
- Joint training of international biogas experts (BRTC), chinese investment in German biogas companies, contracting European staff in/for Chinese biogas units

Facts and proposals

- **The main potential of biogas in Chile is in the agro - and food sector**
- **Landfill biogas use will be enforced as a climate politic condition**
- **Large components for biogas plants could be manufactured in Chile**
- **Biogas CHP systems could be imported from Germany, PNG from Netherlands and Bio-autogas from Sweden**
- **Biogas civil work construction know-how could be facilitated by China, also small scale systems**
- **The engineering of the biogas process should be developed and implemented in a multilateral cooperation with the two countries of main biogas experience**

Enabling Environments for Biogas Technology Transfer

- **The combination of market-based instruments such as tradeable permits, green certificates, eco-taxes, with government commitment and obligations have been effective in advancing the general share of renewable energy**
- **For commercialising biogas technology, favorable government policies are needed at the early stages, while equipment certification and standards may help boost the market at a later stage.**

Enabling Environments for Biogas Technology Transfer

- **Power sector reforms have the potential to create an enabling environment for cleaner energy generating technologies.**
- **A favorable investment and trade policy in the transferring countries for joint ventures may be supported by pollution control norms in both involved country.**

Enabling Environments for Biogas Technology Transfer

- **For the dissemination of smaller scale biogas plants, a combination of market stimulation and human capacity development has proved to be effective**
- **R&D is accompanied by information dissemination and capacity building for both, potential investors and end-users.**

Enabling Environments for Biogas Technology Transfer

- o NGOs have had a crucial role to play in the fields of capacity building for the dissemination of clean energy technologies



GERBIO* network ...

... is hosted by the International Biogas and Bioenergy Competence Centre (IBBK).

*German Society for sustainable Biogas and Bioenergy Utilisation

Fachgruppe Biogas

Heimstraße 1
D-74592 Kirchberg/J.

Telefon: +49-(0) 79 54 - 92 62 03
Telefax: +49-(0) 79 54 - 92 62 04
E-mail: info@biogas-zentrum.de
Internet: www.biogas-zentrum.de



MORE INFOS...

Heinz - Peter Mang / mang@gerbio.org / china-ecosan@gtz.de

Fon: +49-160-711 2249 / Fax: +49-9377-929 227

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