

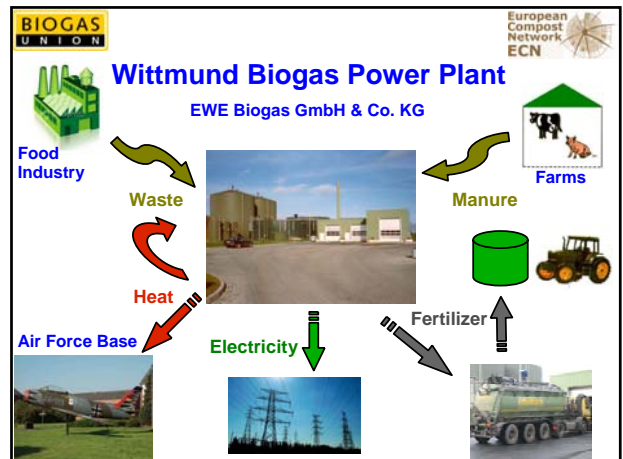
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**The Future for Anaerobic Digestion of Organic Waste in Europe**

**Co-digestion of organic waste and energy crops**

16th-17th of Jan. 2008, Nürnberg, Germany

**Biogasunion e. V.**  
**Eng. Marcelo de Lima Vasconcellos**



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**Wittmund Biogas Power Plant**

- 1996 started operation
- Since 01.07.2004 – 100% EWE AG subsidiary
- Organic waste processing – approx. 40.000 ton/a
- Manure processing – approx. 80.000 ton/a
- Electricity production (10.000 - 12.000 MWh/a) and external use of heat in Air Force base (approximately 8.000 MWh/a)
- Installed electric power – 2,5 MW

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**Wittmund Biogas Power Plant - Manure**

- Contract with 70 farmers for manure / digestate exchange
- Other 50 farmers take extra digestate (high quality fertilizer)
- Each farmer has a storage tank (40 tanks belong to the Power Plant)
- Fluid and solid waste process from approximately 40 industries (especially food industry)

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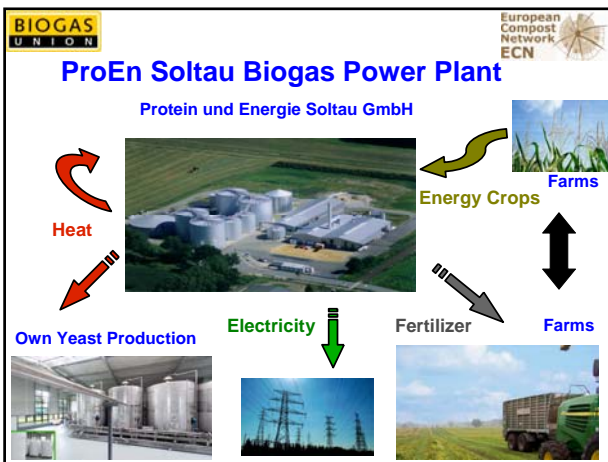
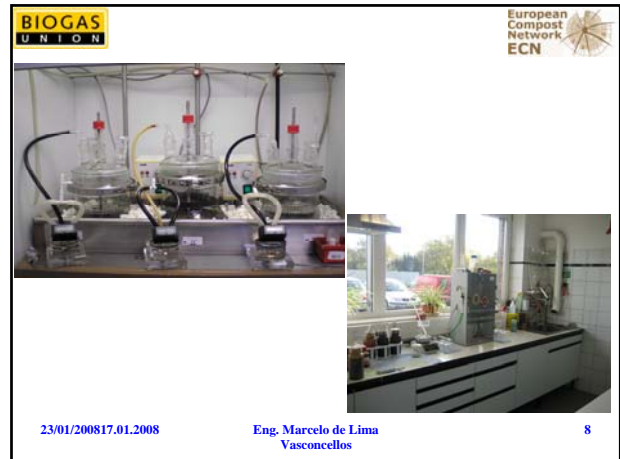
**Wittmund Biogas Power Plant - Heat**

- Heat concept – partnership with Wittmund Air Force base
- 1,4 km gas pipeline was built to supply 2 x 750 kW CHP Units
- Approximately 8.000 MWh/a process heat is delivered

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### Soltau Biogas Power Plant

- 2004 started operation
- Fritz Köster Handelsgesellschaft AG subsidiary
- Main product (dry yeast) - approximately 2.000 ton/a
- Energy Crops (NaWaRo) processing (Corn/Maize, Rye, CCM – Corn-Cob Mix) – approx. 50.000 ton/a
- Electricity production (33.000 MWh/a) and heat (aprox. 37.000 MWh/a through process heat)
- Installed electric power – 4,2 MW

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### Soltau Biogas Power Plant – Heat and Substrate

- Energy optimization - construction of a Biogas Power Plant with heat concept to lower yeast production thermal energy costs
- Excess heat of Biogas Power Plant is used to dry yeast through evaporation - 1.300 kg/h - KWK Bonus
- Contract with 50 farmers for supply of energy crops (NaWaRo) and receiving of fertilizer

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### A good concept pays off

Year	Anlagenzahl	installierte elektr. Leistung (MW <sub>e</sub> )
1999	850	49
2000	1043	78
2001	1360	111
2002	1608	160
2003	1760	190
2004	2010	247
2005	2690	665
2006	3279	949
2007*	3900	1300

– Biogas corresponds to approx. 1% of total German electricity production

Source: Daten und Fakten zu Nachwachsenden Rohstoffen, 2007

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– Biogas Power Plants of Industry Waste and Energy Crops (NaWaRo)

Source: Monitoring zur Wirkung des novellierten Erneuerbare-Energien-Gesetzes (EEG) auf die Entwicklung der Stromerzeugung aus Biomasse, 2007

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### Price of Waste Processing - Wittmund Power Plant -

Year	Total Waste	Domestic Waste	Imported Waste
2004	100%	100%	100%
2005	53%	63%	42%
2006	52%	66%	33%
2007	44%	59%	30%

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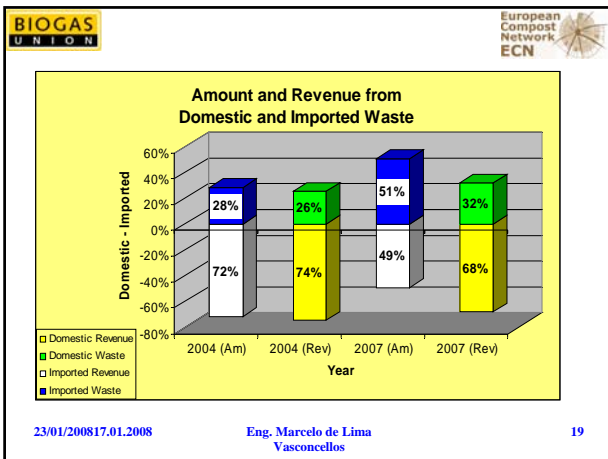
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### Waste Processing - Wittmund Power Plan

Year	Relative Waste Price	Amount Processed
2000	100%	35,000 t
2001	100%	35,000 t
2002	100%	35,000 t
2003	100%	35,000 t
2004	100%	35,000 t
2005	49%	43,000 t
2006	49%	36,000 t
2007	41%	40,000 t

– Sinking Waste Processing Revenues due to rise of Industry Waste processing biogas facilities in Germany, Belgium and in The Netherlands

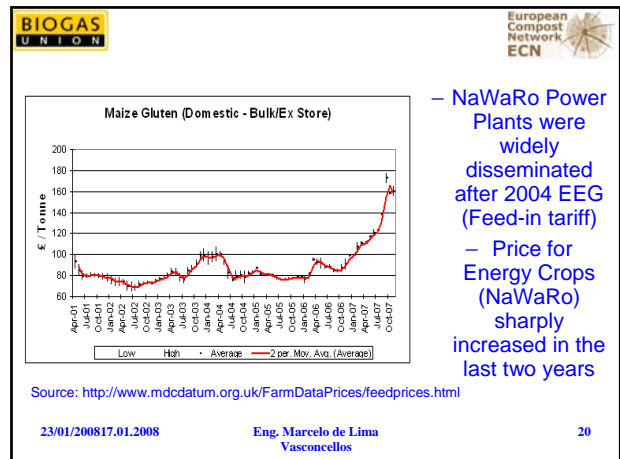
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Source: <http://www.mcdatum.org.uk/FarmDataPrices/feedprices.html>

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### Conclusions

- More efficient and ecological concepts need to be developed
  - Excess heat use
  - Better biological control of process
  - Higher substrate efficiency and lower process losses (e.g. hydrolysis, silo losses, covered storage tanks, etc.)
  - „Own“ substrate production (lower price risk)

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### Conclusions

- Healthy communication between Government and industry
  - Prioritize Ecological / Efficient concepts (like in dissemination of waste water treatment and compost plants or in regulation of animal production)
  - To support a healthy wide biogas use, the growth and spread of plants need to be well controlled and a good subsidy concept must be well implemented.

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Obrigado, Thank you, Danke...

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