

POLDANOR'S EXPERIENCE IN IMPLEMENTING AND OPERATION OF FARM BIOGAS PLANTS

Miskolc, 28-29 April 2011



About Poldanor

Established: 1994

SHAREHOLDERS

- AXZON A/S (Danish farmers)
 - Axelgaard Universal Holding
-

ACTIVITIES AND SIZE:

- Pig production: 450,000 pigs/year
- Plant production: 14,000 ha
- Feed production: 135,000 t/year
- Production of energy in 7 biogas plants (52,000 MWh)
- Turnover: Euro 60 million
- Employment: 500 people



Common strategy: Sustainable agriculture



Cereals

Biogas

Feed

Gilts

Pigs for slaughter

Transport

Abattoir

Processing

from farm

traceability



to table

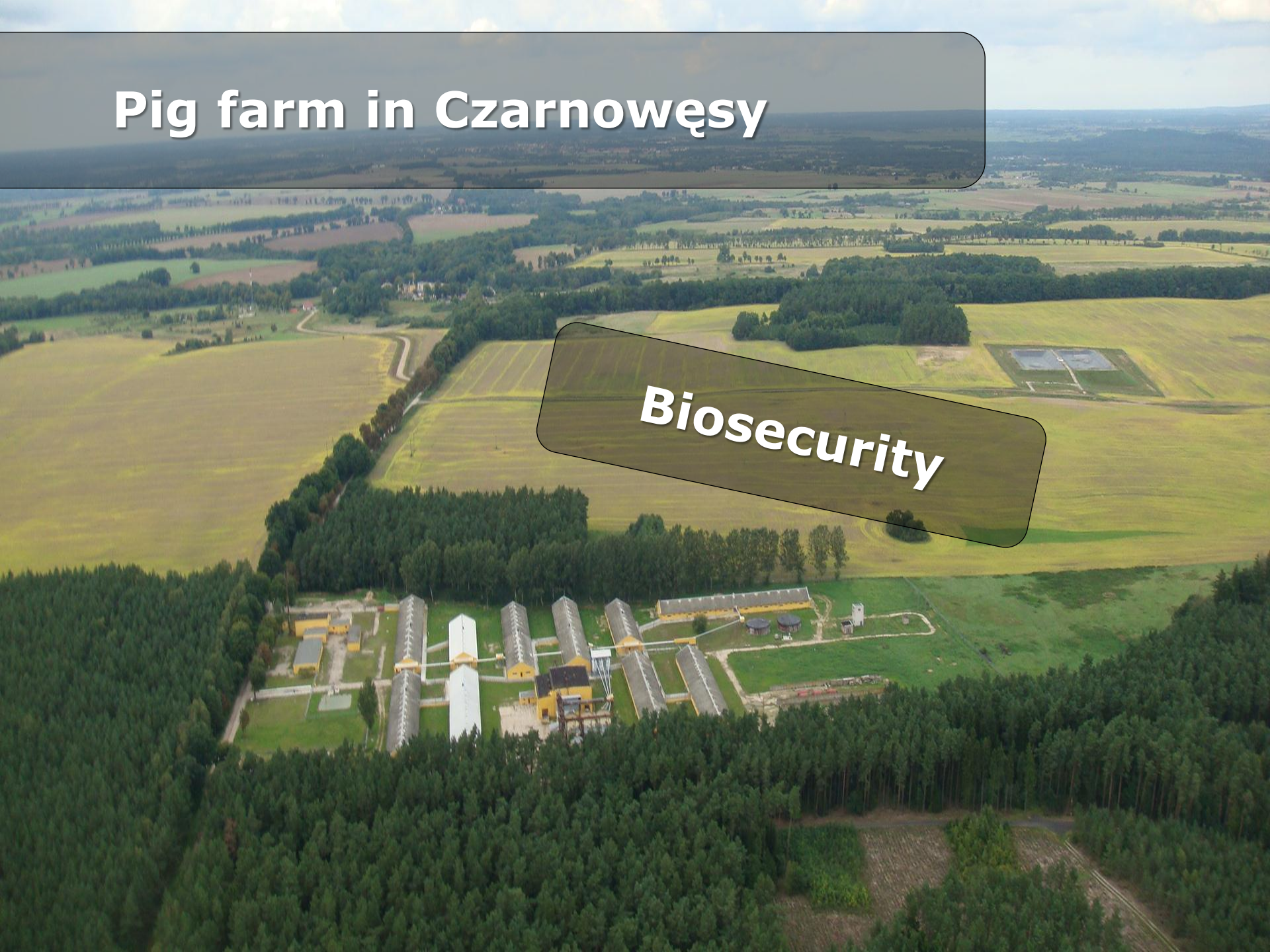
Efficient crop production



**Reduced farming solutions
save the environment (no
ploughing => reduction of
fuel consumption)**

Pig farm in Czarnowęsy

Biosecurity





**Poldanor sow herd: 18 000
in 7 farms**

**Total pig production:
450.000 pigs / year**



BIOGAS – yet another step towards sustainable agriculture (since 2005)



POLDANOR'S BIOGAS PLANTS:

No.	BIOGAS PLANT	LOCATION (commune)	COMMISSIONED	POWER [kWe]
1.	Pawłówko	Przechlewo	2005	946
2.	Płaszczycza	Przechlewo	2008	625
3.	Kujanki	Człuchów	2008	330
4.	Koczała	PKoczała	2009	2 126
5.	Nacław	Polanów	2010	625
6.	Świelino	Bobolice	2010	625
7.	Uniechówek	Debrzno	2011	1 064
8.	Gizyno	Kalisz Pomorski	Under construction	1 064

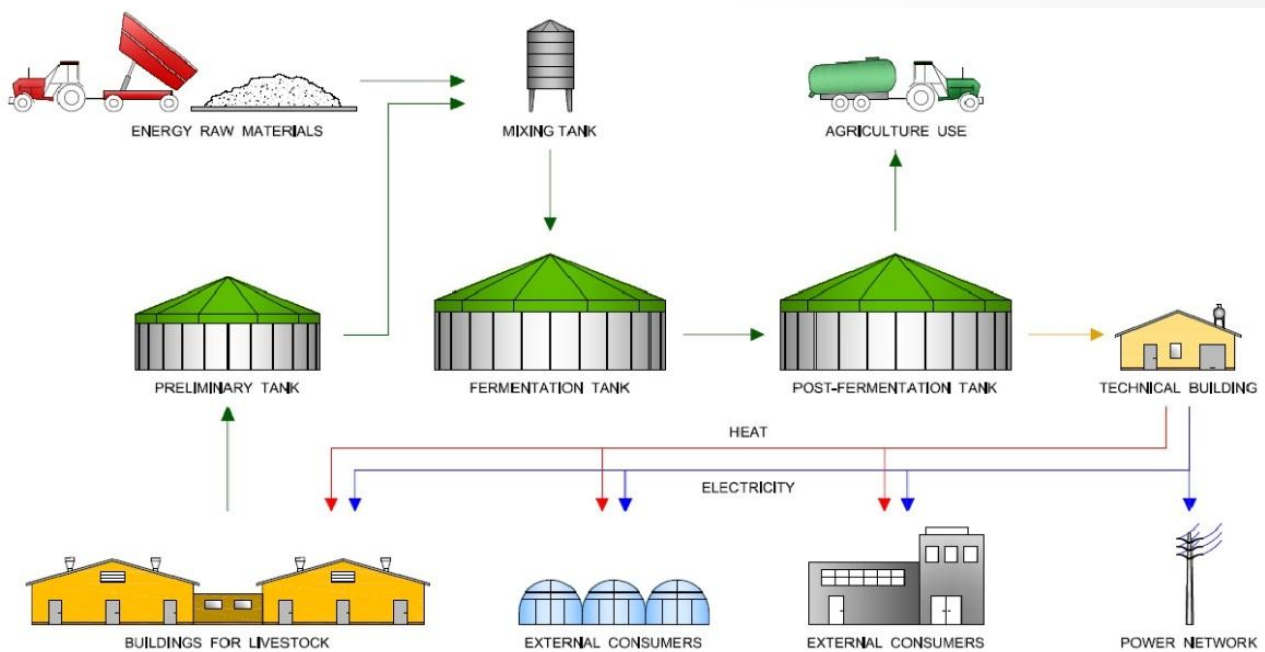
Total installed capacity: **7,405 MW el.** and **9,938 MW heat**

Essential functions of biogas plants:

- Electricity and heat – cogeneration (app. 52,000 MWh in 2011)
- Renewable energy source (spread: 8 units)
- Utilization of plant and animal waste (1000 t/year)
- Natural fertilizer (app. 300,000 tons/year)
- Reduction of GHG (greenhouse gas) emission (app. 250,000 tons of CO₂ eq/year)
- Reduction of odour (slurry from animal breeding) – app. 80%
- Development of local infrastructure
- New jobs



Technological process



Substrates



- Pig slurry (65%)
- Maize silage (30%)
- Glycerin etc. (2%)
- Slaughter waste (3%)

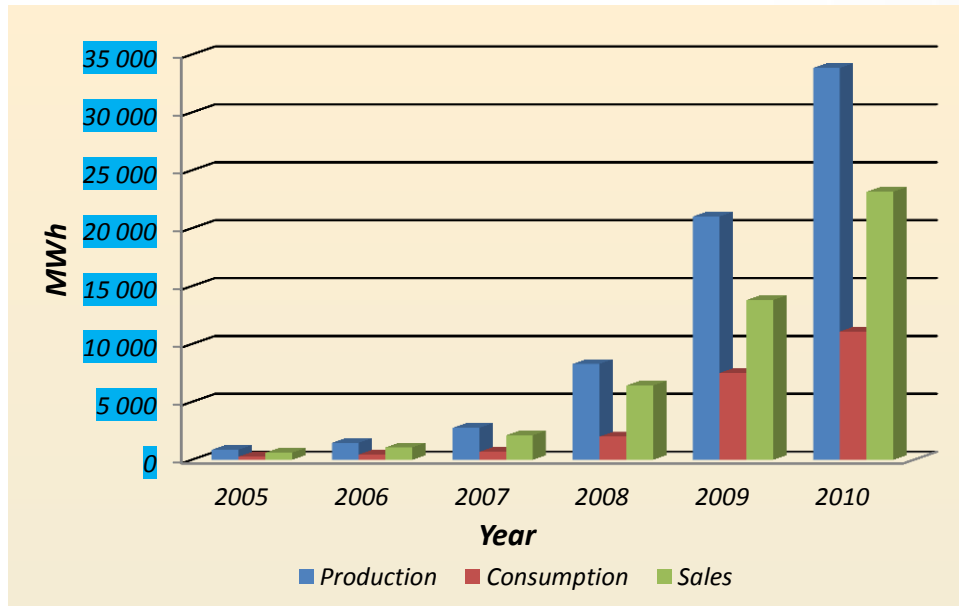
Energy Balance

Electricity production in 2005 r. – **875 MWh**

2010 – **33 851 MWh**
(44 times more than in 2005)

33% of the energy produced is consumed by Poldanor, out of which 30% is used in the technological process in biogas plants

Average efficiency of Poldanor's biogas plants reached **85%** in 2010





Biogas plants investment budget

Estimated investment budget PLN

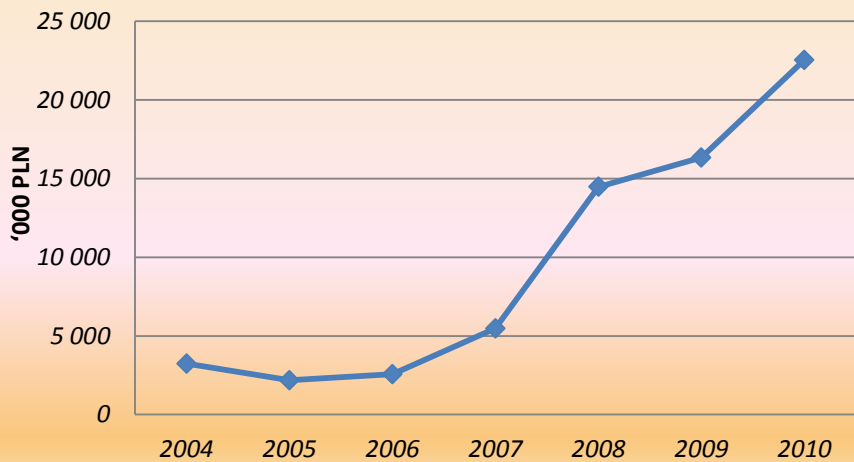
Biogas plant 625kW_{el} 7-9 mil

Biogas plant 1 063kW_{el} 12-13 mil

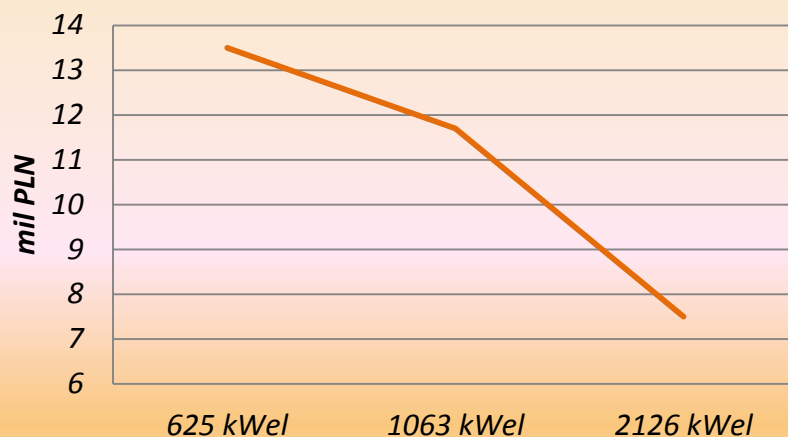
Biogas plant 2 126kW_{el} 15-17 mil

1 kW_{el} ~ 3,000 - 3,500. Euro

Biogas plants outlays – Poldanor S.A.



Investment outlays per 1 kW_{el}



Production start:

06.2005

Power:

946 kW_{el}

Substrates:

Manure – 74 t/day

Silage – 20 t/day

Other – 23 t/day

Slaughter waste – 3t/day

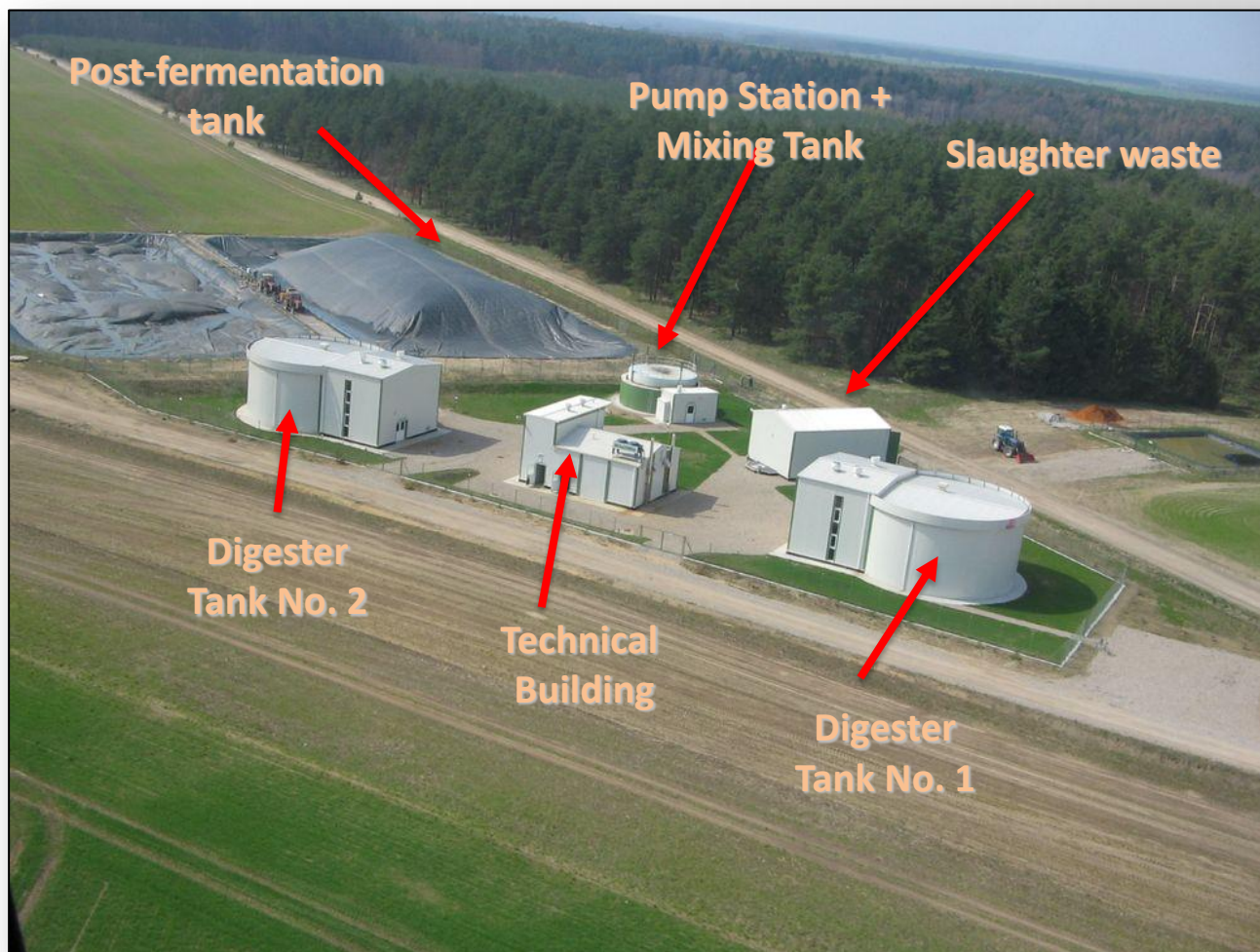
Biogas production:

~ 6 700 m³/ day

Annual energy

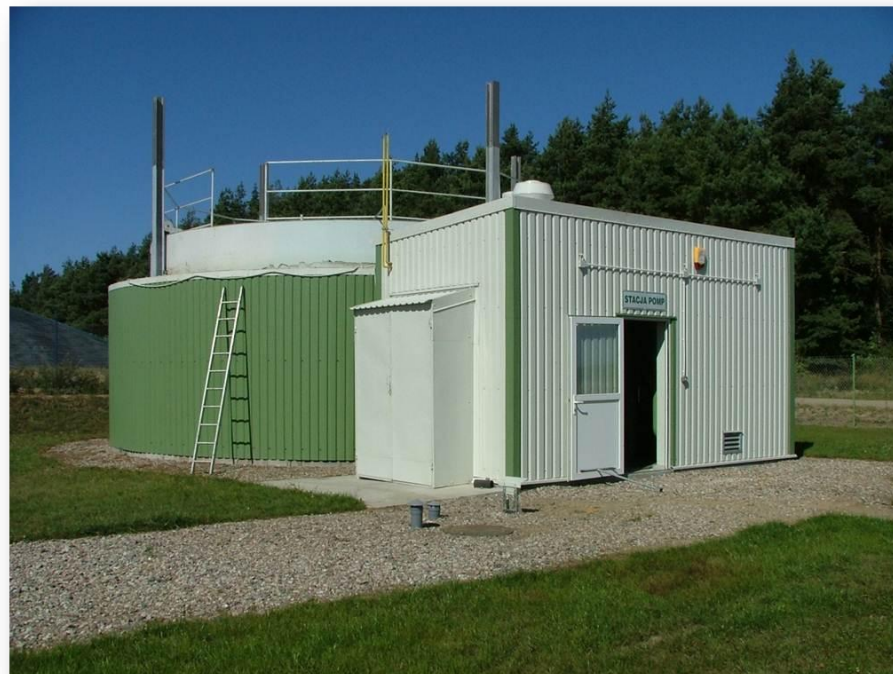
production:

~ 7 100 MWh





*Technical building with
hygienizator and CHP unit*



*Mixing tank and
pump station*

Production start:

04.2009

Power:

2 126 kW_{el}

Substrates:

Manure – 150 t/day

Silage – 110 t/day

Other – 4 t/day

Biogas production:

~ 25 000 m³/ day

Annual energy production:

~ 16 600 MWh





CHP unit - 625 kW_e



Desulphurization unit



Digester tanks – 3000 m³ each



Heat Consumers
(app. 500 kW)



Poldanor



Village of Naclaw



**Biogas
Plant**



Pig farm



**Blocks
of flats**



**Housing
Association**



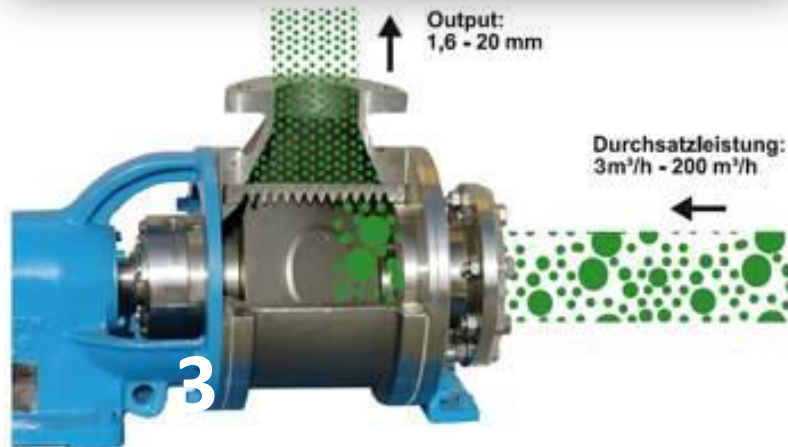
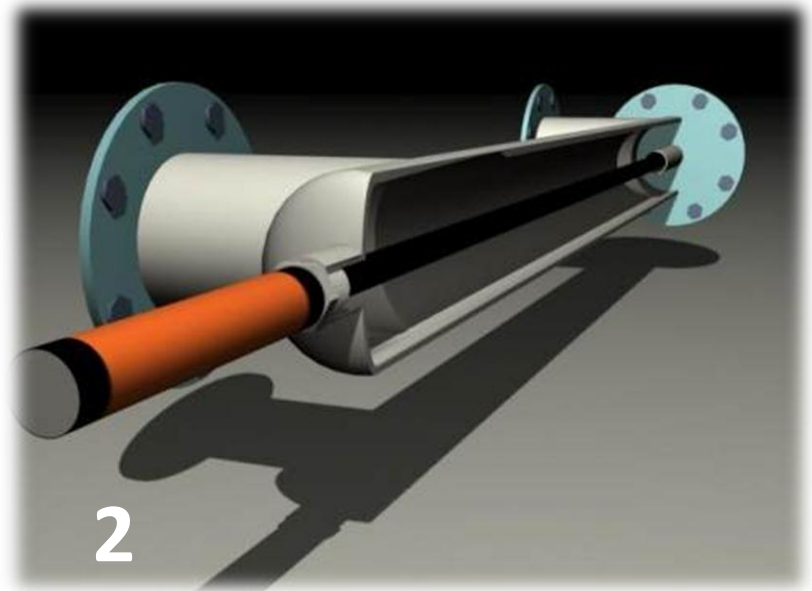
Local school



The heating pipeline under construction



Systems for pre-treatment corn silage and biomass



1. **Hunning** - mobile hammer mill for grinding maize silage (6 t/hour)
2. **Biocrack** - system for desintegration of cells membranes (up to 40 m³/hour)
3. **Gorator** – grinder for biomass (mixture of slurry and silage) – 40m³/hour

Separation of biomass after fermentation

Capacity: 11,5 t/h

Solid fraction: 25-30% DM



Advantages:

- more efficient use of storage tanks on slurry
- reduction of N and P in organic fertilizer used on fields
- potential source of additional revenue from the sale of solid fraction

**Utilization of the fermented biomass as natural
fertilizer, using the soil injection method
Capacity: 150 t/h**



CONSTRUCTION AND OPERATION OF A BIOGAS PLANT - BARRIERS





Crucial factors of success

- A well-considered investment concept, taking into account a rational supply of substrates and utilization of the fermented biomass
- Reliable information and dialogue with local municipalities
- Applying solutions which eliminate/reduce negative impact of the investment on the surroundings/environment
- A good CSR policy – building up positive, long-term relations with the local community
- Professionalism at every stage
- Credibility, credibility, credibility...

Sustainable Agriculture





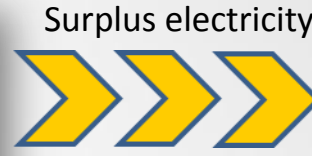
Local projects



Heat



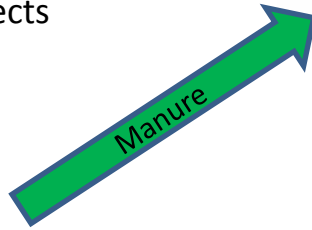
Biogas Plants
(Cogeneration)



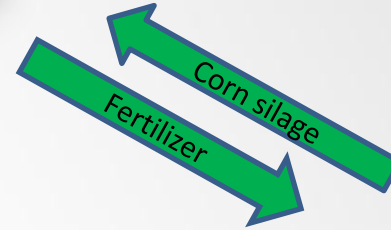
Surplus electricity



Power grid



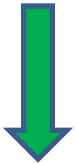
Manure



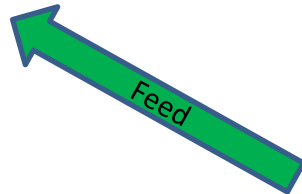
Corn silage
Fertilizer



Pig production



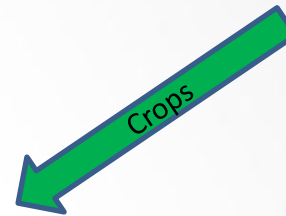
Prime Food



Feed



Feed mill



Crops



Arable Production





Biomass for biogas Goals

Develop methods for utilization of non-food biomass for biogas production

Biomass must be used for energy production as close to the place of production as possible

Energy output should be used as efficient as possible

We are serious about **Corporate Social Responsibility** because:



- we care for environment
- we care for people
- we care for animals
- we contribute to local development



THANK YOU FOR YOUR ATTENTION

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